Typical Practice Installation Costs

South Dakota

Fiscal Year 2013

Practice cost information presented in this document is the basis for the development of the Fiscal Year 2013 Practice Payment Schedule for cost share programs administered in South Dakota. These costs are a representation of actual costs typically incurred during the installation or implementation of a practice or activity. Actual costs may vary. These costs should only be used for planning purposes and are not intended as a final cost estimate by NRCS.

For questions, contact Doug Vik at 605-352-1241 or email at douglas.vik@sd.usda.gov

December, 2012

Scenario Worksheet

Practice and Scenario Description:

Information Type	Data
Region	Northern Plains
State	South Dakota
Discipline Group	Environmental Engineering
Practice Code/Name	313 - Waste Storage Facility
Scenario ID	1
Scenario Name	Embankment Storage Pond
Scenario Description	An earthen waste impoundment constructed to store wastes such as manure, wastewater, and contaminated runoff as part of an agricultural waste management system. This scenario has a design storage volume of more than 382,000 ft3. This practice will address soil and water quality by reducing the pollution potential for surface water and groundwater quality degradation. Earthen storage liners are addressed with another standard. Vehicular and equipment access is addressed in Heavy Use Area Protection (561). Adequately protect liner at agitation and access points. 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).
Before Practice 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 Practice 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 865,400 ft3; The pond is constructed by a combination of excavation and earthfill with an embankment fill height greater than 3 feet. 3:1 inside and outside side slopes are utilizedfor the excavation and embankment; (not inclued in design volume - freeboard and sludge accumulation).
Scenario Feature Measure	Design Storage Volume
Scenario Unit	Cubic Foot
Scenario Typical Size	865400

Cost Summary:

Cost Category	Scenario Cost	Scenario Cost/Unit
Materials	$28.80	$0.00
Equipment/Installation	$61,877.60	$0.07
Labor	$0.00	$0.00
Mobilization	$450.32	$0.00
Acquisition of Technical Knowledge	$0.00	$0.00
Foregone Income	$0.00	$0.00
Total	$62,356.72	$0.07

Cost Details:

Cost Category	Component ID	Component Name	Component Description	Unit	Price ($/unit)	Quantity	Cost
Materials	1120	Structural steel tubing, 2" diameter	Structural steel tubing, 2" diameter, 1/8" wall thickness, materials only	Foot	$3.60	8	$28.80
Equipment/Installation	1199	Stripping and stockpiling, topsoil	Stripping and stockpiling of topsoil adjacent to stripping area. Includes equipment and labor.	Cubic Yard	$0.79	1860	$1,469.40
Equipment/Installation	49	Earthfill, Roller Compacted	Earthfill, roller or machine compacted, includes equipment and labor	Cubic yard	$3.67	16460	$60,408.20
Mobilization	1140	Mobilization, large equipment	Equipment >150HP or typical weights greater than 30,000 pounds or loads requiring over width or over length permits.	Each	$225.16	2	$450.32

Scenario Worksheet

Practice and Scenario Description:

Information Type	Data
Region	Northern Plains
State	South Dakota
Discipline Group	Environmental Engineering
Practice Code/Name	313 - Waste Storage Facility
Scenario ID	2
Scenario Name	Excavated Storage Pond
Scenario Description	An earthen waste impoundment constructed to store wastes such as manure, wastewater, and contaminated runoff as part of an agricultural waste management system. This scenario has a design storage volume of more than 382,000 ft3. This practice will address soil and water quality by reducing the pollution potential for surface water and groundwater quality degradation. Earthen storage liners are addressed with another standard. Vehicular and equipment access is addressed in Heavy Use Area Protection (561). Adequately protect liner at agitation and access points. 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).
Before Practice 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 Practice 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 382,000 ft3; The pond bottom is 280' x 120' x 10' deep with a small berm normally less than 3' high around the outside of the pond. 3:1 inside and outside side slopes; (not included in design volume - freeboard and sludge accumulation).
Scenario Feature Measure	Design Storage Volume
Scenario Unit	Cubic Foot
Scenario Typical Size	382000

Cost Summary:

Cost Category	Scenario Cost	Scenario Cost/Unit
Materials	$28.80	$0.00
Equipment/Installation	$44,592.40	$0.12
Labor	$0.00	$0.00
Mobilization	$450.32	$0.00
Acquisition of Technical Knowledge	$0.00	$0.00
Foregone Income	$0.00	$0.00
Total	$45,071.52	$0.12

Cost Details:

Cost Category	Component ID	Component Name	Component Description	Unit	Price ($/unit)	Quantity
Materials	1120	Structural steel tubing, 2" diameter	Structural steel tubing, 2" diameter, 1/8" wall thickness, materials only	Foot	$3.60	8
Equipment/Installation	1223	Excavation, common earth, large equipment, 150 ft	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	$3.34	12900
Equipment/Installation	1199	Stripping and stockpiling, topsoil	Stripping and stockpiling of topsoil adjacent to stripping area. Includes equipment and labor.	Cubic Yard	$0.79	1210
Equipment/Installation	49	Earthfill, Roller Compacted	Earthfill, roller or machine compacted, includes equipment and labor	Cubic yard	$3.67	150
Mobilization	1140	Mobilization, large equipment	Equipment >150HP or typical weights greater than 30,000 pounds or loads requiring over width or over length permits.	Each	$225.16	2

Scenario Worksheet

Practice and Scenario Description:

Information Type	Data
Region	Northern Plains
State	South Dakota
Discipline Group	Environmental Engineering
Practice Code/Name	313 - Waste Storage Facility
Scenario ID	3
Scenario Name	Concrete Tank, buried 5K<=15K CF
Scenario Description	This scenario consists of installing a concrete tank that has a design storage volume from 5,000 to 14,999 CF that is totally or partially buried and has an open top. The tank can also be under an animal facility with the top cover of either slats or solid concrete lid/floor. Design volume does not include freeboard. 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), 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).
Before Practice 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 Practice 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 7' deep, with a bottom area of 1400 SF, and a design storage volume of approximately 9,000 cubic feet plus 6" freeboard. Sizing based on manure, other wastes, rainfall, lot runoff, etc. as appropriate. Volume does not include 6" of freeboard.
Scenario Feature Measure	Design Storage Volume
Scenario Unit	Cubic Foot
Scenario Typical Size	9000

Cost Summary:

Cost Category	Scenario Cost	Scenario Cost/Unit
Materials	$2,376.32	$0.26
Equipment/Installation	$20,973.34	$2.33
Labor	$494.64	$0.05
Mobilization	$481.52	$0.05
Acquisition of Technical Knowledge	$0.00	$0.00
Foregone Income	$0.00	$0.00
Total	$24,325.81	$2.70

Cost Details:

Cost Category	Component ID	Component Name	Component Description	Unit	Price ($/unit)	Quantity	Cost
Materials	1614	Waterstop, PVC, ribbed, 3/16" x 6"	Waterstop, PVC, ribbed, 3/16" thick by 6"wide. Includes materials, equipment and labor.	Foot	$3.32	180	$597.60
Materials	46	Aggregate, Gravel, Graded	Gravel, includes materials, equipment and labor to transport and place. Includes washed and unwashed gravel.	Cubic yard	$25.23	70.5	$1,778.72
Equipment/Installation	933	Skidsteer, 80 HP	Skidsteer loader with horsepower range of 60 to 90. Equipment and power unit costs. Labor not included.	Hour	$34.80	24	$835.20
Equipment/Installation	50	Earthfill, Manually Compacted	Earthfill, manually compacted, includes equipment and labor	Cubic yard	$4.90	186	$911.40
Equipment/Installation	37	Concrete, CIP, slab on grade, reinforced	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	$204.81	39.1	$8,008.07
Equipment/Installation	38	Concrete, CIP, formed reinforced	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	$325.24	30.7	$9,984.87
Equipment/Installation	48	Excavation, Common Earth, side cast, small equipment	Bulk excavation and side casting of common earth with hydraulic excavator with less than 1 CY capacity. Includes equipment and labor.	Cubic yard	$1.99	620	$1,233.80
Labor	232	Equipment Operators, Light	Includes: Skid Steer Loaders, Hydraulic Excavators <50 HP, Trenchers <12", Ag Equipment <150 HP, Pickup Trucks, Forklifts, Mulchers	Hour	$20.61	24	$494.64
Mobilization	1139	Mobilization, medium equipment	Equipment with 70-150 HP or typical weights between 14,000 and 30,000 pounds.	Each	$120.38	4	$481.52

Scenario Worksheet

Practice and Scenario Description:

Information Type	Data
Region	Northern Plains
State	South Dakota
Discipline Group	Environmental Engineering
Practice Code/Name	313 - Waste Storage Facility
Scenario ID	4
Scenario Name	Concrete Tank, buried >15K <110K CF
Scenario Description	This scenario consists of installing a concrete tank that has a design storage volume from 5,000 to 14,999 CF that is totally or partially buried and has an open top. The tank can also be under an animal facility with the top cover of either slats or solid concrete lid/floor. Design volume does not include freeboard. 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), 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).
Before Practice 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 Practice 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 12' deep, with a bottom area of 5,391 SF, and a design storage volume of 62,000 cubic feet plus 6" freeboard. Sizing based on manure, other wastes, rainfall, lot runoff, etc. as appropriate. Volume does not include 6" of freeboard.
Scenario Feature Measure	Design Storage Volume
Scenario Unit	Cubic Foot
Scenario Typical Size	6200

Cost Summary:

Cost Category	Scenario Cost	Scenario Cost/Unit
Materials	$2,871.64	$0.05
Equipment/Installation	$69,984.70	$1.13
Labor	$0.00	$0.00
Mobilization	$931.84	$0.02
Acquisition of Technical Knowledge	$0.00	$0.00
Foregone Income	$0.00	$0.00
Total	$73,788.18	$1.19

Cost Details:

Cost Category	Component ID	Component Name	Component Description	Unit	Price ($/unit)	Quantity	Cost
Materials	1614	Waterstop, PVC, ribbed, 3/16" x 6"	Waterstop, PVC, ribbed, 3/16" thick by 6"wide. Includes materials, equipment and labor.	Foot	$3.32	257	$853.24
Materials	46	Aggregate, Gravel, Graded	Gravel, includes materials, equipment and labor to transport and place. Includes washed and unwashed gravel.	Cubic yard	$25.23	80	$2,018.40
Equipment/Installation	51	Earthfill, Dumped and Spread	Earthfill, dumped and spread without compaction effort, includes equipment and labor	Cubic yard	$3.00	2400	$7,200.00
Equipment/Installation	1223	Excavation, common earth, large equipment, 150 ft	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	$3.34	3000	$10,020.00
Equipment/Installation	50	Earthfill, Manually Compacted	Earthfill, manually compacted, includes equipment and labor	Cubic yard	$4.90	600	$2,940.00
Equipment/Installation	37	Concrete, CIP, slab on grade, reinforced	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	$204.81	94	$19,252.14
Equipment/Installation	38	Concrete, CIP, formed reinforced	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	$325.24	94	$30,572.56
Mobilization	1140	Mobilization, large equipment	Equipment >150HP or typical weights greater than 30,000 pounds or loads requiring over width or over length permits.	Each	$225.16	2	$450.32
Mobilization	1139	Mobilization, medium equipment	Equipment with 70-150 HP or typical weights between 14,000 and 30,000 pounds.	Each	$120.38	4	$481.52

Scenario Worksheet

Practice and Scenario Description:

Information Type	Data
Region	Northern Plains
State	South Dakota
Discipline Group	Environmental Engineering
Practice Code/Name	313 - Waste Storage Facility
Scenario ID	6
Scenario Name	Concrete Tank, Buried =>110K CF
Scenario Description	This scenario consists of installing a concrete tank that has a design storage volume of 110, 000 or more CF. Tank is totally or partially buried and has an open top. Tank can also be under a animal facility with the top cover using slats or concrete lid/floor. 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. 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), 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).
Before Practice 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 Practice 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 102' X 160' X 8' deep with a bottom area of 16,320 SF and a design storage volume of 122,000 CF plus 6" freeboard. Sizing based on manure, other wastes, rainfall, lot runoff, etc. as appropriate. Volume does not include 6" of freeboard.
Scenario Feature Measure	Design Storage Volume
Scenario Unit	Cubic Foot
Scenario Typical Size	122000

Cost Summary:

Cost Category	Scenario Cost	Scenario Cost/Unit
Materials	$11,024.32	$0.09
Equipment/Installation	$127,786.21	$1.05
Labor	$1,648.80	$0.01
Mobilization	$931.84	$0.01
Acquisition of Technical Knowledge	$0.00	$0.00
Foregone Income	$0.00	$0.00
Total	$141,391.17	$1.16

Cost Details:

Cost Category	Component ID	Component Name	Component Description	Unit	Price ($/unit)	Quantity	Cost
Materials	1614	Waterstop, PVC, ribbed, 3/16" x 6"	Waterstop, PVC, ribbed, 3/16" thick by 6"wide. Includes materials, equipment and labor.	Foot	$3.32	524	$1,739.68
Materials	46	Aggregate, Gravel, Graded	Gravel, includes materials, equipment and labor to transport and place. Includes washed and unwashed gravel.	Cubic yard	$25.23	368	$9,284.64
Equipment/Installation	933	Skidsteer, 80 HP	Skidsteer loader with horsepower range of 60 to 90. Equipment and power unit costs. Labor not included.	Hour	$34.80	80	$2,784.00
Equipment/Installation	1223	Excavation, common earth, large equipment, 150 ft	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	$3.34	4510	$15,063.40
Equipment/Installation	50	Earthfill, Manually Compacted	Earthfill, manually compacted, includes equipment and labor	Cubic yard	$4.90	432	$2,116.80
Equipment/Installation	37	Concrete, CIP, slab on grade, reinforced	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	$204.81	302.2	$61,893.58
Equipment/Installation	38	Concrete, CIP, formed reinforced	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	$325.24	134.3	$43,679.73
Equipment/Installation	48	Excavation, Common Earth, side cast, small equipment	Bulk excavation and side casting of common earth with hydraulic excavator with less than 1 CY capacity. Includes equipment and labor.	Cubic yard	$1.99	1130	$2,248.70

Scenario Worksheet

Practice and Scenario Description:

Information Type	Data
Region	Northern Plains
State	South Dakota
Discipline Group	Environmental Engineering
Practice Code/Name	313 - Waste Storage Facility
Scenario ID	6
Scenario Name	Above Ground Steel/Concrete Storage Structure
Scenario Description	An above ground circular glass lined steel or concrete structure constructed to store wastes such as manure, wastewater, and contaminated runoff as part of an agricultural waste management system. This typical scenario has a design storage volume of 66,000 ft3. This practice will address soil and water quality by reducing the pollution potential for surface water and groundwater quality degradation. Potential Associated Practices: Fence (382), Critical Area Planting (342), Nutrient Management (590), Waste Transfer (634), Heavy Use Area Protection (561), Solid/Liquid Waste Separation Facility (632), Waste Treatment (629), and Pumping Plant (533).
Before Practice 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 Practice Situation	An above ground storage structure 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 66,000 ft3, (not included - 1' freeboard); based on 73' X 19' glass lined steel tank
Scenario Feature Measure	Design Storage Volume
Scenario Unit	Cubic Foot
Scenario Typical Size	66000

Cost Summary:

Cost Category	Scenario Cost	Scenario Cost/Unit
Materials	$115,815.93	$1.75
Equipment/Installation	$28,230.42	$0.43
Labor	$0.00	$0.00
Mobilization	$548.18	$0.01
Acquisition of Technical Knowledge	$0.00	$0.00
Foregone Income	$0.00	$0.00
Total	$144,594.53	$2.19

Cost Details:

Cost Category	Component ID	Component Name	Component Description	Unit	Price ($/unit)	Quantity	Cost
Materials	46	Aggregate, Gravel, Graded	Gravel, includes materials, equipment and labor to transport and place. Includes washed and unwashed gravel.	Cubic yard	$25.23	91	$2,295.93
Materials	1620	Waste Storage, glass lined steel structure, 25,000 - 100,000 cubic foot	Includes materials, equipment and labor to install a steel glass lined structure (based on typical 73' diameter X 19' height) . Includes materials, equipment and labor.	Cubic Foot	$1.72	66000	$113,520.00
Equipment/Installation	1223	Excavation, common earth, large equipment, 150 ft	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	$3.34	365	$1,219.10
Equipment/Installation	37	Concrete, CIP, slab on grade, reinforced	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	$204.81	65	$13,312.65
Equipment/Installation	49	Earthfill, Roller Compacted	Earthfill, roller or machine compacted, includes equipment and labor	Cubic yard	$3.67	365	$1,339.55
Equipment/Installation	38	Concrete, CIP, formed reinforced	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	$325.24	38	$12,359.12
Mobilization	1137	Mobilization, very small equipment	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	$33.33	2	$66.66
Mobilization	1139	Mobilization, medium equipment	Equipment with 70-150 HP or typical weights between 14,000 and 30,000 pounds.	Each	$120.38	4	$481.52

Scenario Worksheet

Practice and Scenario Description:

Information Type	Data
Region	Northern Plains
State	South Dakota
Discipline Group	Environmental Engineering
Practice Code/Name	313 - Waste Storage Facility
Scenario ID	7
Scenario Name	Composted Bedded Pack, Concrete Floor, Concrete Wall
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 prohibit the use of earthen floors. This practice will address soil and water quality by reducing the pollution potential for surface water and groundwater quality degradation. Potential Associated Practices: Fence (382), Nutrient Management (590), Waste Transfer (634), Heavy Use Area Protection (561) and Roofs and Covers (367).
Before Practice 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 Practice 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 ft2, (40' X 100'); 4' concrete wall height, 3' footing depth with a 6" concrete floor; 20' openings on each end of structure.
Scenario Feature Measure	Square Foot Floor Area
Scenario Unit	Square Foot
Scenario Typical Size	4000

Cost Summary:

Cost Category	Scenario Cost	Scenario Cost/Unit
Materials	$1,498.08	$0.37
Equipment/Installation	$29,431.13	$7.36
Labor	$0.00	$0.00
Mobilization	$548.18	$0.14
Acquisition of Technical Knowledge	$0.00	$0.00
Foregone Income	$0.00	$0.00
Total	$31,477.39	$7.87

Cost Details:

Cost Category	Component ID	Component Name	Component Description	Unit	Price ($/unit)	Quantity	Cost
Materials	45	Aggregate, Sand, Graded, Washed	Sand, typical ASTM C33 gradation, includes materials, equipment and labor to transport and place	Cubic yard	$24.28	61.7	$1,498.08
Equipment/Installation	1223	Excavation, common earth, large equipment, 150 ft	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	$3.34	74	$247.16
Equipment/Installation	1199	Stripping and stockpiling, topsoil	Stripping and stockpiling of topsoil adjacent to stripping area. Includes equipment and labor.	Cubic Yard	$0.79	102	$80.58
Equipment/Installation	50	Earthfill, Manually Compacted	Earthfill, manually compacted, includes equipment and labor	Cubic yard	$4.90	22	$107.80
Equipment/Installation	37	Concrete, CIP, slab on grade, reinforced	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	$204.81	74	$15,155.94
Equipment/Installation	49	Earthfill, Roller Compacted	Earthfill, roller or machine compacted, includes equipment and labor	Cubic yard	$3.67	37	$135.79
Equipment/Installation	38	Concrete, CIP, formed reinforced	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	$325.24	42	$13,660.08
Equipment/Installation	48	Excavation, Common Earth, side cast, small equipment	Bulk excavation and side casting of common earth with hydraulic excavator with less than 1 CY capacity. Includes equipment and labor.	Cubic yard	$1.99	22	$43.78
Mobilization	1137	Mobilization, very small equipment	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	$33.33	2	$66.66
Mobilization	1139	Mobilization, medium equipment	Equipment with 70-150 HP or typical weights between 14,000 and 30,000 pounds.	Each	$120.38	4	$481.52

Scenario Worksheet

Practice and Scenario Description:

Information Type	Data
Region	Northern Plains
State	South Dakota
Discipline Group	Environmental Engineering
Practice Code/Name	313 - Waste Storage Facility
Scenario ID	8
Scenario Name	Bedded Pack, Earth, Wood Walls
Scenario Description	This scenario consists of a dry stack facility with compacted earthen floor with wooden walls, posts and a concrete curb. This scenario is intended for dryer material such as poultry litter. 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. 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
Before Practice 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 Practice Situation	The typical is 4,000 SqFt (40' x 100'). The earthen floor will be prepared by stripping the top 1' of soil and roller compactin an 18" thick compacted floor. Walls are 5' pressure treated wood (2" x 8" boards), 4' x 6" x 8' posts set 4' c-c with 6" concrete curbing. 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.
Scenario Feature Measure	Square Foot Floor Area
Scenario Unit	Square Foot
Scenario Typical Size	4000

Cost Summary:

Cost Category	Scenario Cost	Scenario Cost/Unit
Materials	$1,716.24	$0.43
Equipment/Installation	$7,163.38	$1.79
Labor	$1,504.80	$0.38
Mobilization	$900.64	$0.23
Acquisition of Technical Knowledge	$0.00	$0.00
Foregone Income	$0.00	$0.00
Total	$11,285.06	$2.82

Cost Details:

Cost Category	Component ID	Component Name	Component Description	Unit	Price ($/unit)	Quantity	Cost
Materials	1044	Dimension Lumber, Treated	Treated dimension lumber with nominal thickness equal or less than 2". Includes lumber and fasteners	Board Foot	$0.74	1200	$888.00
Materials	1609	Lumber, planks, posts and timbers, treated	Treated dimension lumber with nominal thickness greater than 2". Includes lumber and fasteners. Does not include labor.	Board Foot	$1.19	696	$828.24
Equipment/Installation	38	Concrete, CIP, formed reinforced	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	$325.24	18	$5,854.32
Equipment/Installation	1223	Excavation, common earth, large equipment, 150 ft	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	$3.34	148	$494.32
Equipment/Installation	49	Earthfill, Roller Compacted	Earthfill, roller or machine compacted, includes equipment and labor	Cubic yard	$3.67	222	$814.74
Labor	231	General Labor	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	$16.72	90	$1,504.80
Mobilization	1140	Mobilization, large equipment	Equipment >150HP or typical weights greater than 30,000 pounds or loads requiring over width or over length permits.	Each	$225.16	4	$900.64

Scenario Worksheet

Practice and Scenario Description:

Information Type	Data
Region	Northern Plains
State	South Dakota
Discipline Group	Environmental Engineering
Practice Code/Name	313 - Waste Storage Facility
Scenario ID	9
Scenario Name	Dry Stack, concrete floor, wood wall
Scenario Description	This scenario consists of a dry stack facility with reinforced concrete Floor with pressure treated wood walls. This scenario is intended for situations where consistency of manure or geographical conditions prohibit earthen floors. The purpose of this practice is to temporarily, 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. 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
Before Practice 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 Practice Situation	The typical is 4,000 SqFt (40' x 100'). The facility floor is 5" reinforced concrete with 5' pressure treated wood (2" x 8" boards) walls, 4' x 6" x 8' posts set 4' c-c with 6" concrete curbing. 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.
Scenario Feature Measure	Square Foot Floor Area
Scenario Unit	Square Foot
Scenario Typical Size	4000

Cost Summary:

Cost Category	Scenario Cost	Scenario Cost/Unit
Materials	$3,583.26	$0.90
Equipment/Installation	$23,824.26	$5.96
Labor	$1,504.80	$0.38
Mobilization	$900.64	$0.23
Acquisition of Technical Knowledge	$0.00	$0.00
Foregone Income	$0.00	$0.00
Total	$29,812.96	$7.45

Cost Details:

Cost Category	Component ID	Component Name	Component Description	Unit	Price ($/unit)	Quantity	Cost
Materials	1044	Dimension Lumber, Treated	Treated dimension lumber with nominal thickness equal or less than 2". Includes lumber and fasteners	Board Foot	$0.74	1200	$888.00
Materials	1609	Lumber, planks, posts and timbers, treated	Treated dimension lumber with nominal thickness greater than 2". Includes lumber and fasteners. Does not include labor.	Board Foot	$1.19	696	$828.24
Materials	46	Aggregate, Gravel, Graded	Gravel, includes materials, equipment and labor to transport and place. Includes washed and unwashed gravel.	Cubic yard	$25.23	74	$1,867.02
Equipment/Installation	38	Concrete, CIP, formed reinforced	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	$325.24	18	$5,854.32
Equipment/Installation	37	Concrete, CIP, slab on grade, reinforced	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	$204.81	84	$17,204.04
Equipment/Installation	1223	Excavation, common earth, large equipment, 150 ft	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	$3.34	148	$494.32
Equipment/Installation	49	Earthfill, Roller Compacted	Earthfill, roller or machine compacted, includes equipment and labor	Cubic yard	$3.67	74	$271.58
Labor	231	General Labor	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	$16.72	90	$1,504.80
Mobilization	1140	Mobilization, large equipment	Equipment >150HP or typical weights greater than 30,000 pounds or loads requiring over width or over length permits.	Each	$225.16	4	$900.64

Scenario Worksheet

Practice and Scenario Description:

Information Type	Data
Region	Northern Plains
State	South Dakota
Discipline Group	Environmental Engineering
Practice Code/Name	313 - Waste Storage Facility
Scenario ID	10
Scenario Name	Dry Stack, concrete floor, no wall
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 prohibit earthen floors. 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. 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
Before Practice 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 Practice Situation	The typical is 4,000 SqFt (40' x 100'). The facility floor is 6" 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.
Scenario Feature Measure	Square Foot Floor Area
Scenario Unit	Square Foot
Scenario Typical Size	4000

Cost Summary:

Cost Category	Scenario Cost	Scenario Cost/Unit
Materials	$1,261.50	$0.32
Equipment/Installation	$15,942.32	$3.99
Labor	$0.00	$0.00
Mobilization	$900.64	$0.23
Acquisition of Technical Knowledge	$0.00	$0.00
Foregone Income	$0.00	$0.00
Total	$18,104.46	$4.53

Cost Details:

Cost Category	Component ID	Component Name	Component Description	Unit	Price ($/unit)	Quantity	Cost
Materials	46	Aggregate, Gravel, Graded	Gravel, includes materials, equipment and labor to transport and place. Includes washed and unwashed gravel.	Cubic yard	$25.23	50	$1,261.50
Equipment/Installation	37	Concrete, CIP, slab on grade, reinforced	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	$204.81	74.1	$15,176.42
Equipment/Installation	1223	Excavation, common earth, large equipment, 150 ft	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	$3.34	148	$494.32
Equipment/Installation	49	Earthfill, Roller Compacted	Earthfill, roller or machine compacted, includes equipment and labor	Cubic yard	$3.67	74	$271.58
Mobilization	1140	Mobilization, large equipment	Equipment >150HP or typical weights greater than 30,000 pounds or loads requiring over width or over length permits.	Each	$225.16	4	$900.64

Scenario Worksheet

Practice and Scenario Description:

Information Type	Data
Region	Northern Plains
State	South Dakota
Discipline Group	Range/Pasture Grazing
Practice Code/Name	314 - Brush Management
Scenario ID	1
Scenario Name	Mechanical, General
Scenario Description	Using small mechanical equipment to remove or cut off woody plants. Typical area is moderate rolling to gentle sloping, moderately deep to deep soils that have stands of woody and non herbaceous species that are in the early phases of invasions. Typical unit is 30 acres.
Before Practice Situation	Area is infested with woody non herbaceous species that degrades ecological sites or habitat for desired wildlife species. Future degradation of key forage species and ecological site condition promoting noxious and invasive species and increased soil erosion if woody species are allowed to expand.
After Practice Situation	Woody species are removed to achieve the desirable plant community based on species composition, structure, density, and canopy cover or height. Ecological site condition continues to progressing in an upward trend, hydrology and plant health and vigor are sustained.
Scenario Feature Measure	Acres treated
Scenario Unit	Acre
Scenario Typical Size	30

Cost Summary:

Cost Category	Scenario Cost	Scenario Cost/Unit
Materials	$0.00	$0.00
Equipment/Installation	$10,300.90	$343.36
Labor	$2,484.80	$82.83
Mobilization	$164.32	$5.48
Acquisition of Technical Knowledge	$0.00	$0.00
Foregone Income	$0.00	$0.00
Total	$12,950.02	$431.67

Cost Details:

Cost Category	Component ID	Component Name	Component Description	Unit	Price ($/unit)	Quantity	Cost
Equipment/Installation	943	Mechanical cutter, chopper	Masticator, flail shredder, hydro axe, brush	Hour	$117.78	80	$9,422.40
Equipment/Installation	938	Brush Chipper, 6" capacity	Brush Chipper, 6" capacity, typically 35 HP. Includes chipper and power unit. Labor not included.	Hour	$17.57	50	$878.50
Labor	231	General Labor	Labor performed using basic tools such as power tool, shovels, and other tools that do not require extensive training. Ex. pipe layer,	Hour	$16.72	50	$836.00
Labor	232	Equipment Operators, Light	Includes: Skid Steer Loaders, Hydraulic Excavators <50 HP, Trenchers <12", Ag Equipment <150 HP, Pickup Trucks, Forklifts,	Hour	$20.61	80	$1,648.80
Mobilization	1138	Mobilization, small equipment	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	$82.16	2	$164.32

Scenario Worksheet

Practice and Scenario Description:

Information Type	Data
Region	Northern Plains
State	South Dakota
Discipline Group	Range/Pasture Grazing
Practice Code/Name	314 - Brush Management
Scenario ID	5
Scenario Name	Chemical, Uplands
Scenario Description	This Practice is for the implementation of brush management on range, pasture or native pasture reduce undersirable brush in uplands and other areas not in or directly adjacent to streams, ponds, or wetlands. The typical method of control is application of herbicides (basal or foliar location) on selected plants.
Before Practice Situation	Brush species exceed desired levels resulting in degraded plant condition, loss of forage production, or degraded wildlife habitat. Densities of brush exceed levels indicated in the ecological site descriptions.
After Practice Situation	Brush has been treated to a level which results in improved plant condition, forage production, or wildlife habitat. The typical method of control is application of herbicides (basal or foliar location) on selected individual plants.
Scenario Feature Measure	Acres treated
Scenario Unit	Acre
Scenario Typical Size	50

Cost Summary:

Cost Category	Scenario Cost	Scenario Cost/Unit
Materials	$931.50	$18.63
Equipment/Installation	$218.50	$4.37
Labor	$0.00	$0.00
Mobilization	$33.33	$0.67
Acquisition of Technical Knowledge	$0.00	$0.00
Foregone Income	$0.00	$0.00
Total	$1,183.33	$23.67

Cost Details:

Cost Category	Component ID	Component Name	Component Description	Unit	Price ($/unit)	Quantity	Cost
Materials	337	Herbicide, Picloram	A systemic herbicide used for general woody plant control. Product is typically used in these practices 314, 595, 666, and 645. Refer	Acre	$12.63	50	$631.50
Materials	330	Herbicide, 2,4-D	Product is typically used in these practices 595, 512 and 314. Refer to WIN-PST for product names and active ingredients.	Acre	$6.00	50	$300.00
Equipment/Installation	948	Chemical, ground application	Chemical application performed by ground equipment. Includes equipment, power unit and labor costs.	Acre	$4.37	50	$218.50
Mobilization	1137	Mobilization, very small equipment	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	Each	$33.33	1	$33.33

Scenario Worksheet

Practice and Scenario Description:

Information Type	Data
Region	Northern Plains
State	South Dakota
Discipline Group	Range/Pasture Grazing
Practice Code/Name	314 - Brush Management
Scenario ID	6
Scenario Name	Chemical, Riparian
Scenario Description	Apply brush management on rangeland, grazed forest, or pasture thru the use of broadcast application of spceialized chemicals to reduce or remove undesirable deciduous species (brush) in riparian and other areas in or directly adjacent to streams, ponds, or wetlands.
Before Practice Situation	Plant, animal, or wildlife resource concerns associated with ripairian areas and other areas in or adjacent to stream, ponds, or wetland on grazed range, grazed forest, or pasture which are adversely affected by brush.
After Practice Situation	A 40 acre unit of pasture, grazed range, or grazed forest where reduction or removal of undesirable deciduous species have been accomplished by broadcast or spot treatment chemical application to address plant, animal, and wildlife resource concerns.
Scenario Feature Measure	Acres planned
Scenario Unit	Acre
Scenario Typical Size	40

Cost Summary:

Cost Category	Scenario Cost	Scenario Cost/Unit
Materials	$226.00	$5.65
Equipment/Installation	$174.80	$4.37
Labor	$0.00	$0.00
Mobilization	$120.38	$3.01
Acquisition of Technical Knowledge	$0.00	$0.00
Foregone Income	$0.00	$0.00
Total	$521.18	$13.03

Cost Details:

Cost Category	Component ID	Component Name	Component Description	Unit	Price ($/unit)	Quantity	Cost
Materials	1095	Herbicide, Surfactant	Surfactants reduce the surface tension of water to produce more uniform coverage and penetration of herbicides, and weed killers.	Acre	$1.09	40	$43.60
Materials	346	Herbicide, Glyphosate-ipa salt 4SL	Product is typically used for aquatic usage. Refer to WIN-PST for product names and active ingredients. Materials only.	Acre	$4.56	40	$182.40
Equipment/Installation	948	Chemical, ground application	Chemical application performed by ground equipment. Includes equipment, power unit and labor costs.	Acre	$4.37	40	$174.80
Mobilization	1139	Mobilization, medium equipment	Equipment with 70-150 HP or typical weights between 14,000 and 30,000 pounds.	Each	$120.38	1	$120.38

Scenario Worksheet

Practice and Scenario Description:

Information Type	Data
Region	Northern Plains
State	South Dakota
Discipline Group	Range/Pasture Grazing
Practice Code/Name	314 - Brush Management
Scenario ID	7
Scenario Name	Chemical, Foliar Spot Treatment
Scenario Description	Apply brush management on 10 acres of rangeland, grazed forest, or pasture thru the use of foliar application of material with low cost chemical(s) to reduce or remove undesirable deciduous species (brush) in uplands and other areas not in or directly adjacent to streams, ponds, or wetlands.
Before Practice Situation	Plant, animal, or wildlife resource concerns associated with uplands and other areas not in or adjacent to stream, ponds, or wetland on grazed range, grazed forest, or pasture which are adversely affected by brush.
After Practice Situation	A 10 acre unit of pasture, grazed range, or grazed forest where reduction or removal of undesirable deciduous species have been accomplished by broadcast or spot treatment chemical application to address plant, animal, and wildlife resource concerns.
Scenario Feature Measure	Acres planned
Scenario Unit	Acre
Scenario Typical Size	10

Cost Summary:

Cost Category	Scenario Cost	Scenario Cost/Unit
Materials	$804.00	$80.40
Equipment/Installation	$1,396.75	$139.68
Labor	$0.00	$0.00
Mobilization	$120.38	$12.04
Acquisition of Technical Knowledge	$0.00	$0.00
Foregone Income	$0.00	$0.00
Total	$2,321.13	$232.11

Cost Details:

Cost Category	Component ID	Component Name	Component Description	Unit	Price ($/unit)	Quantity	Cost
Materials	1095	Herbicide, Surfactant	Surfactants reduce the surface tension of water to produce more uniform coverage and penetration of herbicides, and weed killers.	Acre	$1.09	10	$10.90
Materials	336	Herbicide, Imazapyr	Pre and post-emergent, non-selective herbicide for control of undesirable vegetation in non-crop areas. Product is	Acre	$79.31	10	$793.10
Equipment/Installation	964	Chemical, spot treatment, single stem application	Ground applied chemical to individual plants or group of plants, e.g., backpack sprayer treatment. Equipment and labor cost included.	Hour	$55.87	25	$1,396.75
Mobilization	1139	Mobilization, medium equipment	Equipment with 70-150 HP or typical weights between 14,000 and 30,000 pounds.	Each	$120.38	1	$120.38

Scenario Worksheet

Practice and Scenario Description:

Information Type	Data
Region	Northern Plains
State	South Dakota
Discipline Group	Range/Pasture Grazing
Practice Code/Name	315 - Herbaceous Weed Control
Scenario ID	1
Scenario Name	Biological
Scenario Description	Management of herbaceous plant species through the use of biological control agents on undesired, noxious, or invasive herbaceous species. Typical area is moderate rolling to gentle sloping, moderately deep to deep soils that have stands of herbaceous weed species that exceed the desirable ecological site condition or that are identified as noxious or invasive. This scenario is an alternative for traditional or organic producers.
Before Practice Situation	Area consist of herbaceous weed species that exceed the desirable ecological site condition degrading forage quality, promoting noxious and invasive species, increasing risk of soil erosion and degrading wildlife habitat.
After Practice Situation	Invasive herbaceous weed species are controlled using biological contols to achieve a desirable plant community based on species composition, structure, density, and canopy cover or height. Ecological site condition is progressing in an upward trend, hydrology and plant health and vigor is returning to near normal levels.
Scenario Feature Measure	Acres teated
Scenario Unit	Acre
Scenario Typical Size	80

Cost Summary:

Cost Category	Scenario Cost	Scenario Cost/Unit
Materials	$232.05	$2.90
Equipment/Installation	$52.24	$0.65
Labor	$33.44	$0.42
Mobilization	$33.78	$0.42
Acquisition of Technical Knowledge	$0.00	$0.00
Foregone Income	$0.00	$0.00
Total	$351.51	$4.39

Cost Details:

Cost Category	Component ID	Component Name	Component Description	Unit	Price ($/unit)	Quantity	Cost
Materials	303	Stem Mining Weevil (Ceutorhynchus litura)	Stem Mining Weevil. Includes all support necessary to ensure adequate release of insects. Labor not included.	Each	$1.31	105	$137.55
Materials	302	Stem Gall Fly (Urophora cardui)	Stem Gal Fly. Includes all support necessary to ensure adequate release of insects. Labor not included.	Each	$0.90	105	$94.50
Equipment/Installation	939	Truck, Pickup	Equipment and power unit costs. Labor not included.	Hour	$26.12	2	$52.24
Labor	231	General Labor	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	Hour	$16.72	2	$33.44
Mobilization	1142	Mobilization, General labor	Mobilization of general labor: Ex. pipe layer, herder, concrete placement, materials spreader, flagger, etc.	Hour	$16.89	2	$33.78

Scenario Worksheet

Practice and Scenario Description:

Information Type	Data
Region	Northern Plains
State	South Dakota
Discipline Group	Range/Pasture Grazing
Practice Code/Name	315 - Herbaceous Weed Control
Scenario ID	2
Scenario Name	Chemical, Ground
Scenario Description	Land unit on which weed control would be beneficial in order to set back the plant community succession, improve the ecological condition, and improve forage conditions for domestic livestock or wildlife. The practice entails the eradication of vegetation by use of weed treatment using ground equipment to apply chemicals, in order to eliminate noxious weeds, promote forage productivity, and improve ecological condition.
Before Practice Situation	Area consist of excessive stands of herbaceous weeds in existing or newly seeded or planted stands. Excessive weed growth degrades health and vigor of native herbaceous species promoting noxious and invasive species or undesirable plant species, and degrading wildlife habitat.
After Practice Situation	Herbaceous weeds are treated and controlled to achieve the desirable plant community based on species composition, structure, density, and canopy cover or height. Desirable plant community is progressing in an upward trend, hydrology and plant health and vigor is returning to near normal levels, and wildlife habitat improved.
Scenario Feature Measure	Acres treated
Scenario Unit	Acre
Scenario Typical Size	160

Cost Summary:

Cost Category	Scenario Cost	Scenario Cost/Unit
Materials	$1,940.80	$12.13
Equipment/Installation	$699.20	$4.37
Labor	$0.00	$0.00
Mobilization	$82.16	$0.51
Acquisition of Technical Knowledge	$0.00	$0.00
Foregone Income	$0.00	$0.00
Total	$2,722.16	$17.01

Cost Details:

Cost Category	Component ID	Component Name	Component Description	Unit	Price ($/unit)	Quantity	Cost
Materials	334	Herbicide, Glyphosate	A broad-spectrum, non-selective systemic herbicide. Product is typically used in these practices 340, 645, 314, 666, and 512. Refer	Acre	$11.04	160	$1,766.40
Materials	1095	Herbicide, Surfactant	Surfactants reduce the surface tension of water to produce more uniform coverage and penetration of herbicides, and weed killers.	Acre	$1.09	160	$174.40
Equipment/Installation	948	Chemical, ground application	Chemical application performed by ground equipment. Includes equipment, power unit and labor costs.	Acre	$4.37	160	$699.20
Mobilization	1138	Mobilization, small equipment	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	$82.16	1	$82.16

Scenario Worksheet

Practice and Scenario Description:

Information Type	Data
Region	Northern Plains
State	South Dakota
Discipline Group	Range/Pasture Grazing
Practice Code/Name	315 - Herbaceous Weed Control
Scenario ID	4
Scenario Name	Mechanical
Scenario Description	Removal of herbaceous weeds of light infestations on gentle sloping to moderately deep to deep soils. The practice entails the removal of herbaceous weeds by the use of mower, brush hog, disc or other light equipment in order to reduce fuel loading and improve ecological site condition. Weeds have exceeded desired levels based on ecological site potential. For organic and non-organic farms
Before Practice Situation	Area consist of excessive stands of herbaceous weeds degrading health and vigor of native herbaceous species promoting noxious and invasive species and degrading wildlife habitat.
After Practice Situation	Herbaceous weeds are removed to achieve the desirable plant community based on species composition, structure, density, and canopy cover or height. Ecological site condition is progressing in an upward trend, hydrology and plant health and vigor is returning to near normal levels, and improved wildlife habitat.
Scenario Feature Measure	Acres treated
Scenario Unit	Acre
Scenario Typical Size	20

Cost Summary:

Cost Category	Scenario Cost	Scenario Cost/Unit
Materials	$0.00	$0.00
Equipment/Installation	$170.00	$8.50
Labor	$66.88	$3.34
Mobilization	$20.42	$1.02
Acquisition of Technical Knowledge	$0.00	$0.00
Foregone Income	$0.00	$0.00
Total	$257.30	$12.87

Cost Details:

Cost Category	Component ID	Component Name	Component Description	Unit	Price ($/unit)	Quantity	Cost
Equipment/Installation	940	Mower, Bush Hog	Equipment and power unit costs. Labor not included.	Hour	$42.50	4	$170.00
Labor	231	General Labor	Labor performed using basic tools such as power tool, shovels, and other tools that do not require extensive training. Ex. pipe layer,	Hour	$16.72	4	$66.88
Mobilization	1143	Mobilization, Light Equipment Operator	Mobilization of light equipment operators: Skid Steer Loaders, Hydraulic Excavators <50 HP, Trenchers <12", Ag Equipment <150 HP, Pickup Trucks, Forklifts, Mulchers	Hour	$20.42	1	$20.42

Scenario Worksheet

Practice and Scenario Description:

Information Type	Data
Region	Northern Plains
State	South Dakota
Discipline Group	Range/Pasture Grazing
Practice Code/Name	315 - Herbaceous Weed Control
Scenario ID	5
Scenario Name	Mechanical, Tree Establishment
Scenario Description	Land unit on which weed control would be beneficial in order to set back the plant community succession, improve the ecological condition, and improve stand establishment of herbaceous or deciduous plantings. The practice entails the eradication of vegetation by use of weed treatment thru tillage, in order to eliminate undesirable weeds, promote stand establishment, improve ecological condition, and improve wildlife habitat.
Before Practice Situation	Area consist of excessive stands of herbaceous weeds degrading health and vigor of tree species in rows or plantings.
After Practice Situation	Undesirable herbaceous weeds are controlled or removed in and around tree planting thru tillage to achieve the desirable plant community based on species composition, structure, and density. Tree stand condition is progressing in an upward trend, hydrology and plant health and vigor is returning to near normal levels, and wildlife habitat is improved.
Scenario Feature Measure	Acres treated
Scenario Unit	Acre
Scenario Typical Size	1

Cost Summary:

Cost Category	Scenario Cost	Scenario Cost/Unit
Materials	$0.00	$0.00
Equipment/Installation	$24.78	$24.78
Labor	$0.00	$0.00
Mobilization	$82.16	$82.16
Acquisition of Technical Knowledge	$0.00	$0.00
Foregone Income	$0.00	$0.00
Total	$106.94	$106.94

Cost Details:

Cost Category	Component ID	Component Name	Component Description	Unit	Price ($/unit)	Quantity	Cost
Equipment/Installation	946	Tillage, Primary	Includes heavy disking (offset) or chisel plow. Includes equipment, power unit and labor costs.	Acre	$14.93	1	$14.93
Equipment/Installation	945	Tillage, Light	Includes light disking (tandem) or field cultivator. Includes equipment, power unit and labor costs.	Acre	$9.85	1	$9.85
Mobilization	1138	Mobilization, small equipment	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	$82.16	1	$82.16

Scenario Worksheet

Practice and Scenario Description:

Information Type	Data
Region	Northern Plains
State	South Dakota
Discipline Group	Environmental Engineering
Practice Code/Name	316 - Animal Mortality Facility
Scenario ID	1
Scenario Name	Incineration, < 50 CF Chamber
Scenario Description	This scenario consists of installing a manufactured Type IV incinerator designed to handle 350 lbs of average daily mortality for the species and size of the operation. System shall use high temperature (>1,300 degrees F) incineration with a secondary combustion or afterburner chamber prior to flue discharge. After determining average daily mortality in lbs, select smallest incinerator that meets capacity. Payment made per unit of actual chamber size obtained from manufacturers' product literature. This option is not typically least-cost. In most states a roofed static compost pile with concrete floor and bins would be considered least cost. Therefore consider reducing payment rate as per State Conservationist discretion. The purpose of the practice is to address resource concerns related to water quality degradation due to excessive nutrients, organics, and pathogens being transported into surface and groundwater resources. Air quality impacts due to odors will also be addressed, however, in non-attainment areas, certain states may require a higher level of processing such as gasification or other approved methods. Potential Associated Practices: Heavy Use Area Protection (561), Fence (382), Critical Area Planting (342), Access Road (560), Waste Storage Facility (313), Nutrient Management (590), Roofs and Covers (367), Critical Area Planting (342).
Before Practice Situation	Animal mortality is done in a manner that results in non-point source pollution of excessive nutrients, organics, and pathogens being transported into surface and groundwater resources. Improper operation results in odors and spread of pathogens from incomplete composting, incineration, or interaction with predators. No plan was formulated for both normal and catastrophic mortality events.
After Practice Situation	Animal mortality is being done in a manner that prevents non-point source pollution of excessive nutrients, organics, and pathogens being transported into surface and groundwater resources. Proper operation results in little to no odors, complete incineration, and protection from predators to minimize pathogen survival or spreading. An overall plan covers normal and catastrophic mortality events. Selected method for carcass treatment and disposal meet or are permitted by federal, state, and local laws, rules, regulation. Incinerator installed to handle 150 lbs per day average mortality for a small poultry operation. Included is a concrete slab to set the incinerator on and a fuel tank. Ash materials to be stored in suitable containers until land disposal as per the nutrient management plan or landfilled.
Scenario Feature Measure	Incinerator Chamber Volume
Scenario Unit	Cubic Foot
Scenario Typical Size	44

Cost Summary:

Cost Category	Scenario Cost	Scenario Cost/Unit
Materials	$6,298.60	$143.15
Equipment/Installation	$483.52	$10.99
Labor	$37.33	$0.85
Mobilization	$481.52	$10.94
Acquisition of Technical Knowledge	$0.00	$0.00
Foregone Income	$0.00	$0.00
Total	$7,300.97	$165.93

Cost Details:

Cost Category	Component ID	Component Name	Component Description	Unit	Price ($/unit)	Quantity	Cost
Materials	1624	Incinerator, 200 lb	Poultry and livestock incinerator with an approximate chamber capacity of 200 lb carcass weight. Includes equipment and after burner only.	Each	$6,025.00	1	$6,025.00
Materials	1033	Fuel Tank, Fixed	Materials	Gallon	$0.96	285	$273.60
Equipment/Installation	48	Excavation, Common Earth, side cast, small equipment	Bulk excavation and side casting of common earth with hydraulic excavator with less than 1 CY capacity. Includes equipment and labor.	Cubic yard	$1.99	4	$7.96
Equipment/Installation	37	Concrete, CIP, slab on grade, reinforced	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	$95.73	4	$382.92
Equipment/Installation	931	Hydraulic Excavator, 1 CY	Track mounted hydraulic excavator with bucket capacity range of 0.8 to 1.5 CY. Equipment and power unit costs. Labor not included.	Hour	$92.64	1	$92.64
Labor	232	Equipment Operators, Light	Includes: Skid Steer Loaders, Hydraulic Excavators <50 HP, Trenchers <12", Ag Equipment <150 HP, Pickup Trucks, Forklifts, Mulchers	Hour	$20.61	1	$20.61
Labor	231	General Labor	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	$16.72	1	$16.72
Mobilization	1139	Mobilization, medium equipment	Equipment with 70-150 HP or typical weights between 14,000 and 30,000 pounds.	Each	$120.38	4	$481.52

Scenario Worksheet

Practice and Scenario Description:

Information Type	Data
Region	Northern Plains
State	South Dakota
Discipline Group	Environmental Engineering
Practice Code/Name	316 - Animal Mortality Facility
Scenario ID	2
Scenario Name	Incineration 50-100CF chamber
Scenario Description	This scenario consists of installing a manufactured Type IV incinerator designed to handle 350 to 850 lbs of average daily mortality for the species and size of the operation. Typically very large poultry or medium sized swine operations. System shall use high temperature (>1,300 degrees F) incineration with a secondary combustion or afterburner chamber prior to flue discharge. After determining average daily mortality in lbs, select smallest incinerator that meets capacity. Payment made per unit of actual chamber size obtained from manufacturers' product literature. This option is not typically least-cost. In most states a roofed static pile with concrete floor and bins would be considered least cost. Therefore consider reducing payment rate as per State Conservationist discretion. The purpose of the practice is to address resource concerns related to water quality degradation due to excessive nutrients, organics, and pathogens being transported into surface and groundwater resources. Air quality impacts due to odors are reduced, however, in non-attainment areas, certain states may require a higher level of processing such as gasification or other approved methods. Potential Associated Practices: Heavy Use Area Protection (561), Fence (382), Critical Area Planting (342), Access Road (560), Waste Storage Facility (313), Nutrient Management (590), Roofs and Covers (367), Critical Area Planting (342).
Before Practice Situation	Animal mortality is done in a manner that results in non-point source pollution of excessive nutrients, organics, and pathogens being transported into surface and groundwater resources. Improper operation results in odors and spread of pathogens from incomplete composting, incineration, or interaction with predators. No plan was formulated for both normal and catastrophic mortality events.
After Practice Situation	Animal mortality is being done in a manner that prevents non-point source pollution of excessive nutrients, organics, and pathogens being transported into surface and groundwater resources. Proper operation results in little to no odors, complete incineration, and protection from predators to minimize pathogen survival or spreading. In non-attainment areas, certain states may require a higher level of processing such as gasification or different methods. An overall plan covers normal and catastrophic mortality events. Selected method for carcass treatment and disposal meet or are permitted by federal, state, and local laws, rules, regulation. Incinerator installed to handle 700 lbs per day average mortality for a medium poultry or swine operation. Included is a concrete slab to set the incinerator on and a diesel fuel tank. Ash materials to be stored in suitable containers until land disposal as per the nutrient managment plan or landfilled.
Scenario Feature Measure	Incinerator Chamber Volume
Scenario Unit	Cubic Foot
Scenario Typical Size	55.8

Cost Summary:

Cost Category	Scenario Cost	Scenario Cost/Unit
Materials	$7,199.52	$129.02
Equipment/Installation	$1,012.86	$18.15
Labor	$37.33	$0.67
Mobilization	$240.76	$4.31
Acquisition of Technical Knowledge	$0.00	$0.00
Foregone Income	$0.00	$0.00
Total	$8,490.47	$152.16

Cost Details:

Cost Category	Component ID	Component Name	Component Description	Unit	Price ($/unit)	Quantity	Cost
Materials	1625	Incinerator, 400 lb	Poultry and livestock incinerator with an approximate chamber capacity of 400 lb carcass weight. Includes equipment and after burner only.	Each	$6,825.00	1	$6,825.00
Materials	46	Aggregate, Gravel, Graded	Gravel, includes materials, equipment and labor to transport and place. Includes washed and unwashed gravel.	Cubic yard	$25.23	4	$100.92
Equipment/Installation	48	Excavation, Common Earth, side cast, small equipment	Bulk excavation and side casting of common earth with hydraulic excavator with less than 1 CY capacity. Includes equipment and labor.	Cubic yard	$1.99	270	$537.30
Equipment/Installation	37	Concrete, CIP, slab on grade, reinforced	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	$95.73	4	$382.92
Equipment/Installation	931	Hydraulic Excavator, 1 CY	Track mounted hydraulic excavator with bucket capacity range of 0.8 to 1.5 CY. Equipment and power unit costs. Labor not included.	Hour	$92.64	1	$92.64
Labor	232	Equipment Operators, Light	Includes: Skid Steer Loaders, Hydraulic Excavators <50 HP, Trenchers <12", Ag Equipment <150 HP, Pickup Trucks, Forklifts, Mulchers	Hour	$20.61	1	$20.61
Labor	231	General Labor	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	$16.72	1	$16.72
Mobilization	1139	Mobilization, medium equipment	Equipment with 70-150 HP or typical weights between 14,000 and 30,000 pounds.	Each	$120.38	2	$240.76

Scenario Worksheet

Practice and Scenario Description:

Information Type	Data
Region	Northern Plains
State	South Dakota
Discipline Group	Environmental Engineering
Practice Code/Name	316 - Animal Mortality Facility
Scenario ID	3
Scenario Name	Incineration >100 CF Chamber
Scenario Description	This scenario consists of installing a manufactured Type IV incinerator designed to handle a single 1,200 to 1,500 mortality. Typically a single dairy cow or multiple heifers or swine. System shall use high temperature (>1,300 degrees F) incineration with a secondary combustion or afterburner chamber prior to flue discharge. Select smallest incinerator that has a bin capacity to handle largest individual mortality. Payment made per unit of actual chamber size obtained from manufacturers' product literature. This option uses a very small footprint, however, it costs 15-20 gallons of diesel fuel per fill. The usage needs to be significant. At 500 cows with replacements, this option would offset a 4,000 SF concrete pad with another 8,000 to 12,000 SF of grassed area. Cost for that option would be for an area of 4,000 ft2 @$4.50 or $18,000 vs. $24,000. This option for small dairy operations would not typically be least-cost. In most states either a roofed or unroofed static pile with concrete floor and walls would be considered least cost. Unless regulations require this or severe site limitations exist, consider reducing payment rate as per State Conservationist discretion. The purpose of the practice is to address resource concerns related to water quality degradation due to excessive nutrients, organics, and pathogens being transported into surface and groundwater resources. Air quality impacts due to odors will also be addressed, however, in non-attainment areas, certain states may require a higher level of processing such as gasification or other approved methods. Potential Associated Practices: Heavy Use Area Protection (561), Fence (382), Critical Area Planting (342), Access Road (560), Waste Storage Facility (313), Nutrient Management (590), Roofs and Covers (367), Critical Area Planting (342).
Before Practice Situation	Animal mortality is done in a manner that results in non-point source pollution of excessive nutrients, organics, and pathogens being transported into surface and groundwater resources. Improper operation results in odors and spread of pathogens from incomplete composting, incineration, or interaction with predators. No plan was formulated for both normal and catastrophic mortality events.
After Practice Situation	Animal mortality is being done in a manner that prevents non-point source pollution of excessive nutrients, organics, and pathogens being transported into surface and groundwater resources. Proper operation results in little to no odors, complete incineration, and protection from predators to minimize pathogen survival or spreading. An overall plan covers normal and catastrophic mortality events. In non-attainment areas, certain states may require a higher level of processing such as gasification or other approved method. Selected method for carcass treatment and disposal meet or are permitted by federal, state, and local laws, rules, regulations. Incinerator installed to handle a whole 1350 lb dairy cow on a 1,000 cow operation. Included is a concrete slab to set the incinerator on and a fuel tank. Ash materials to be stored in suitable containers, a waste storage pit until land disposal as per the nutrient management plan or landfilled. Proper incineration will require between 15 and 25 gallons of diesel fuel per usage.
Scenario Feature Measure	Incinerator Chamber Volume
Scenario Unit	Cubic Foot
Scenario Typical Size	119.6

Cost Summary:

Cost Category	Scenario Cost	Scenario Cost/Unit
Materials	$9,174.52	$76.71
Equipment/Installation	$1,012.86	$8.47
Labor	$37.33	$0.31
Mobilization	$120.38	$1.01
Acquisition of Technical Knowledge	$0.00	$0.00
Foregone Income	$0.00	$0.00
Total	$10,345.09	$86.50

Cost Details:

Cost Category	Component ID	Component Name	Component Description	Unit	Price ($/unit)	Quantity	Cost
Materials	1033	Fuel Tank, Fixed	Materials	Gallon	$0.96	285	$273.60
Materials	46	Aggregate, Gravel, Graded	Gravel, includes materials, equipment and labor to transport and place. Includes washed and unwashed gravel.	Cubic yard	$25.23	4	$100.92
Materials	1626	Incinerator, 600 lb	Poultry and livestock incinerator with an approximate chamber capacity of 600 lb carcass weight. Includes equipment and after burner only.	Each	$8,800.00	1	$8,800.00
Equipment/Installation	48	Excavation, Common Earth, side cast, small equipment	Bulk excavation and side casting of common earth with hydraulic excavator with less than 1 CY capacity. Includes equipment and labor.	Cubic yard	$1.99	270	$537.30
Equipment/Installation	37	Concrete, CIP, slab on grade, reinforced	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	$95.73	4	$382.92
Equipment/Installation	931	Hydraulic Excavator, 1 CY	Track mounted hydraulic excavator with bucket capacity range of 0.8 to 1.5 CY. Equipment and power unit costs. Labor not included.	Hour	$92.64	1	$92.64
Labor	232	Equipment Operators, Light	Includes: Skid Steer Loaders, Hydraulic Excavators <50 HP, Trenchers <12", Ag Equipment <150 HP, Pickup Trucks, Forklifts, Mulchers	Hour	$20.61	1	$20.61
Labor	231	General Labor	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	$16.72	1	$16.72
Mobilization	1139	Mobilization, medium equipment	Equipment with 70-150 HP or typical weights between 14,000 and 30,000 pounds.	Each	$120.38	1	$120.38

Scenario Worksheet

Practice and Scenario Description:

Information Type	Data
Region	Northern Plains
State	South Dakota
Discipline Group	Environmental Engineering
Practice Code/Name	316 - Animal Mortality Facility
Scenario ID	4
Scenario Name	Invessel Rotary Drum <700 CF
Scenario Description	This scenario consists of installing a horizontal rotary drum to compost smaller poultry and swine facility mortality. It can handle between 250 and 600 lbs per day of mortality plus equal or higher volumes of carbon material (i.e. wood chips). A secondary composting storage area is required to finish materials. Payment quantity based on interior volume of rotary composter in cubic feet of smallest drum that can process daily mortality as per manufacturers' recommendations. This option is not typically least-cost. In most states a roofed static pile with concrete floor and multiple bins would be considered least cost. Therefore consider reducing payment rate as per State Conservationist discretion. The purpose of the practice is to address resource concerns related to water quality degradation due to excessive nutrients, organics, and pathogens being transported into surface and groundwater resources. Air quality impacts due to odors will also be addressed. Potential Associated Practices: Roofs and Covers (367), Waste Storage Facility (313), Fence (382), Critical Area Planting (342), Nutrient Management (590), Access Road (560), Structure for Water Control (587), Diversion (362), Subsurface Drain (606), and Underground Outlet (620).
Before Practice Situation	Animal mortality is done in a manner that results in non-point source pollution of excessive nutrients, organics, and pathogens being transported into surface and groundwater resources. Improper operation results in odors and spread of pathogens from incomplete composting, incineration, or interaction with predators. No plan was formulated for both normal and catastrophic mortality events.
After Practice Situation	Proper operation results in little to no odors, complete composting, and protection from predators to minimize pathogen survival or spreading. An overall plan covers normal and catastrophic mortality events. Installed a 5' diameter by 22' long rotary drum on two concrete pads that can process 325 lbs of mortality per day. Drum rotation moves and mixes mortality and wood chips. Site preparation includes topsoil removal, gravel pad, and concrete pads and slab at two locations plus small floor and walls to complete composting. Input material reduced by 40-60 percent and put into 4' high, three sided, 20'x 20' concrete bin with 10'x20 concrete apron for secondary composting. Area can be protected by adding Roofs and Covers (367) standard.
Scenario Feature Measure	Volume of Drum
Scenario Unit	Cubic Foot
Scenario Typical Size	432

Cost Summary:

Cost Category	Scenario Cost	Scenario Cost/Unit
Materials	$29,516.84	$68.33
Equipment/Installation	$2,486.13	$5.75
Labor	$0.00	$0.00
Mobilization	$333.30	$0.77
Acquisition of Technical Knowledge	$0.00	$0.00
Foregone Income	$0.00	$0.00
Total	$32,336.27	$74.85

Cost Details:

Cost Category	Component ID	Component Name	Component Description	Unit	Price ($/unit)	Quantity	Cost
Materials	1627	Composter, drum, 12 CY	12 CY drum composter unit. Includes equipment and operation controls. Labor not included.	Each	$29,315.00	1	$29,315.00
Materials	46	Aggregate, Gravel, Graded	Gravel, includes materials, equipment and labor to transport and place. Includes washed and unwashed gravel.	Cubic yard	$25.23	8	$201.84
Equipment/Installation	48	Excavation, Common Earth, side cast, small equipment	Bulk excavation and side casting of common earth with hydraulic excavator with less than 1 CY capacity. Includes equipment and labor.	Cubic yard	$1.99	4	$7.96
Equipment/Installation	38	Concrete, CIP, formed reinforced	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	$197.03	6	$1,182.18
Equipment/Installation	37	Concrete, CIP, slab on grade, reinforced	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	$95.73	11	$1,053.03
Equipment/Installation	36	Concrete, CIP, formless, non reinforced	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	$60.74	4	$242.96
Mobilization	1137	Mobilization, very small equipment	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	$33.33	10	$333.30

Scenario Worksheet

Practice and Scenario Description:

Information Type	Data
Region	Northern Plains
State	South Dakota
Discipline Group	Environmental Engineering
Practice Code/Name	316 - Animal Mortality Facility
Scenario ID	5
Scenario Name	Invessel Rotary Drum=>700 CF
Scenario Description	This scenario consists of installing a horizontal rotary drum to compost larger poultry and swine facility mortality. It can handle between 600 and 1,000 lbs per day of mortality plus equal or higher volumes of carbon material (i.e. wood chips). A secondary composting storage area is required to finish materials. Payment quantity based on interior volume of rotary composter in cubic feet of smallest drum that can process daily mortality as per manufacturers' recommendations. This option is not typically least-cost. In most states a roofed static pile with concrete floor and multiple bins would be considered least cost. Therefore consider reducing payment rate as per State Conservationist discretion. The purpose of the practice is to address resource concerns related to water quality degradation due to excessive nutrients, organics, and pathogens being transported into surface and groundwater resources. Air quality impacts due to odors will also be addressed. Potential Associated Practices: Roofs and Covers (367), Waste Storage Facility (313), Fence (382), Critical Area Planting (342), Nutrient Management (590), Access Road (560), Structure for Water Control (587), Diversion (362), Subsurface Drain (606), and Underground Outlet (620).
Before Practice Situation	Animal mortality is done in a manner that results in non-point source pollution of excessive nutrients, organics, and pathogens being transported into surface and groundwater resources. Improper operation results in odors and spread of pathogens from incomplete composting, incineration, or interaction with predators. No plan was formulated for both normal and catastrophic mortality events.
After Practice Situation	Proper operation results in little to no odors, complete composting, and protection from predators to minimize pathogen survival or spreading. An overall plan covers normal and catastrophic mortality events. Installed a 5' diameter by 54' long rotary drum on two concrete pads that can process 810 lbs of mortality per day. Drum rotation moves and mixes mortality and wood chips. Site preparation includes topsoil removal, gravel pad, concrete pads, slab at two locations plus concrete floor and walls to complete composting. Input material reduced by 40-60 percent and put into 4' high, three sided, 30'x 30' concrete bin with 10'x30' concrete apron for secondary composting. Area can be protected by adding Roofs and Covers (367) standard.
Scenario Feature Measure	Volume of Drum
Scenario Unit	Cubic Foot
Scenario Typical Size	1079

Cost Summary:

Cost Category	Scenario Cost	Scenario Cost/Unit
Materials	$60,026.23	$55.63
Equipment/Installation	$4,156.00	$3.85
Labor	$0.00	$0.00
Mobilization	$507.40	$0.47
Acquisition of Technical Knowledge	$0.00	$0.00
Foregone Income	$0.00	$0.00
Total	$64,689.63	$59.95

Cost Details:

Cost Category	Component ID	Component Name	Component Description	Unit	Price ($/unit)	Quantity	Cost
Materials	46	Aggregate, Gravel, Graded	Gravel, includes materials, equipment and labor to transport and place. Includes washed and unwashed gravel.	Cubic yard	$25.23	1	$25.23
Materials	1628	Composter, drum, 28 CY	28 CY drum composter unit. Includes equipment and operation controls. Labor not included.	Each	$60,001.00	1	$60,001.00
Equipment/Installation	48	Excavation, Common Earth, side cast, small equipment	Bulk excavation and side casting of common earth with hydraulic excavator with less than 1 CY capacity. Includes equipment and labor.	Cubic yard	$1.99	4	$7.96
Equipment/Installation	38	Concrete, CIP, formed reinforced	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	$197.03	9	$1,773.27
Equipment/Installation	37	Concrete, CIP, slab on grade, reinforced	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	$95.73	21	$2,010.33
Equipment/Installation	36	Concrete, CIP, formless, non reinforced	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	$60.74	6	$364.44
Mobilization	1139	Mobilization, medium equipment	Equipment with 70-150 HP or typical weights between 14,000 and 30,000 pounds.	Each	$120.38	2	$240.76
Mobilization	1137	Mobilization, very small equipment	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	$33.33	8	$266.64

Scenario Worksheet

Practice and Scenario Description:

Information Type	Data
Region	Northern Plains
State	South Dakota
Discipline Group	Environmental Engineering
Practice Code/Name	316 - Animal Mortality Facility
Scenario ID	7
Scenario Name	Static pile, Concrete Pad
Scenario Description	This scenario consists of installing a concrete pad over permeable soils, karst topography, frequently accessed sites or sites with regulatory requirements. Typically associated with large dairy (1,000 cows plus heifers) or beef animal mortality with an average daily mortality of 175 lbs/day. Area sized to compost animal mortality as a static pile or windrow with equipment around materials. Sufficient carbon based bulking material added to allow natural aeration and a proper C:N ratio. Piles typically turned at least once to go into another heat cycle prior to final disposal, typically land application. Site to be located out of drainage areas, off-site water diverted and any runoff to spread out into a grassed area or vegetated treatment area as per regulations. 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), Access Road (560), Structure for Water Control (587), Diversion (362), Subsurface Drain (606), and Underground Outlet (620).
Before Practice Situation	Animal mortality is done in a manner that results in non-point source pollution of excessive nutrients, organics, and pathogens being transported into surface and groundwater resources. Improper operation results in odors and spread of pathogens from incomplete composting, incineration, or interaction with predators. No plan was formulated for both normal and catastrophic mortality events.
After Practice Situation	Animal mortality is being done in a manner that prevents non-point source pollution of excessive nutrients, organics, and pathogens being transported into surface and groundwater resources. Proper operation results in little to no odors, complete composting, and protection from predators to minimize pathogen survival or spreading. An overall plan covers normal and catastrophic mortality events. Construct a 60'x95' concrete surface to process mortality. Concrete 5" thick with light reinforcement. Typical layout is 18' wide piles with 8' wide access area is around each pile or windrow. Site preparation includes topsoil removal, minimal regrading and compaction, installing gravel or sand subbase and then concrete.
Scenario Feature Measure	Pad Area
Scenario Unit	Square Foot
Scenario Typical Size	5700

Cost Summary:

Cost Category	Scenario Cost	Scenario Cost/Unit
Materials	$1,766.10	$0.31
Equipment/Installation	$9,458.30	$1.66
Labor	$0.00	$0.00
Mobilization	$481.52	$0.08
Acquisition of Technical Knowledge	$0.00	$0.00
Foregone Income	$0.00	$0.00
Total	$11,705.92	$2.05

Cost Details:

Cost Category	Component ID	Component Name	Component Description	Unit	Price ($/unit)	Quantity	Cost
Materials	46	Aggregate, Gravel, Graded	Gravel, includes materials, equipment and labor to transport and place. Includes washed and unwashed gravel.	Cubic yard	$25.23	70	$1,766.10
Equipment/Installation	49	Earthfill, Roller Compacted	Earthfill, roller or machine compacted, includes equipment and labor	Cubic yard	$3.68	110	$404.80
Equipment/Installation	48	Excavation, Common Earth, side cast, small equipment	Bulk excavation and side casting of common earth with hydraulic excavator with less than 1 CY capacity. Includes equipment and labor.	Cubic yard	$1.99	220	$437.80
Equipment/Installation	37	Concrete, CIP, slab on grade, reinforced	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	$95.73	90	$8,615.70
Mobilization	1139	Mobilization, medium equipment	Equipment with 70-150 HP or typical weights between 14,000 and 30,000 pounds.	Each	$120.38	4	$481.52

Scenario Worksheet

Practice and Scenario Description:

Information Type	Data
Region	Northern Plains
State	South Dakota
Discipline Group	Environmental Engineering
Practice Code/Name	316 - Animal Mortality Facility
Scenario ID	8
Scenario Name	Static pile, Wood Bin(s)
Scenario Description	This scenario consists of installing a group of small bins along one side and a long narrow bin on the backside of a concrete pad to compost poultry or small swine mortality in static pile(s) that have sufficient bulking material to allow natural aeration. Piles are turned to go through a second heat cycle prior to final land application. The roofed portion of the facility is addressed with Roofs and Covers (367). Size of facility based on daily mortality and sizing procedures accepted in particular state. Organic sites will require more frequent replacement of lumber. Potential Associated Practices: Roofs and Covers (367), Heavy Use Area Protection (561), Critical Area Planting (342), Nutrient Management (590), Access Road (560), Structure for Water Control (587), Roof Runoff Structure (558), Diversion (362), Subsurface Drain (606), and Underground Outlet (620).
Before Practice Situation	Animal mortality is done in a manner that results in non-point source pollution of excessive nutrients, organics, and pathogens being transported into surface and groundwater resources. Improper operation results in odors and spread of pathogens from incomplete composting, incineration, or interaction with predators. No plan was formulated for both normal and catastrophic mortality events.
After Practice Situation	Animal mortality is being done in a manner that prevents non-point source pollution of excessive nutrients, organics, and pathogens being transported into surface and groundwater resources. Proper operation results in little to no odors, complete composting, and protection from predators to minimize pathogen survival or spreading. An overall plan covers normal and catastrophic mortality events. Selected method for carcass treatment and disposal meet or are permitted by federal, state, and local laws, rules, regulation. Install facility on a 18' x 40' concrete pad with 4 bins (5' H x 10' W x 6' Length) along the front side and one 8'w by 40' long secondary bin. Bin wall consists of a 1' concrete curb and 4' of treated lumber. Includes 10' gravel apron on three sides. Roofed portion is addressed under Roofs and Covers (367). Site preparation includes topsoil removal, installing 4" of gravel, setting posts , installing concrete slab, installing wooden walls and doors, and gravel approach apron. Piles turned to go through a second heat cycle prior to final land application.
Scenario Feature Measure	Total Bin Area
Scenario Unit	Square Foot
Scenario Typical Size	720

Cost Summary:

Cost Category	Scenario Cost	Scenario Cost/Unit
Materials	$2,193.52	$3.05
Equipment/Installation	$2,130.31	$2.96
Labor	$1,882.40	$2.61
Mobilization	$407.41	$0.57
Acquisition of Technical Knowledge	$0.00	$0.00
Foregone Income	$0.00	$0.00
Total	$6,613.64	$9.19

Cost Details:

Cost Category	Component ID	Component Name	Component Description	Unit	Price ($/unit)	Quantity	Cost
Materials	1609	Lumber, planks, posts and timbers, treated	Treated dimension lumber with nominal thickness greater than 2". Includes lumber and fasteners. Does not include labor.	Board Foot	$1.19	448	$533.12
Materials	1044	Dimension Lumber, Treated	Treated dimension lumber with nominal thickness equal or less than 2". Includes lumber and fasteners	Board Foot	$0.74	880	$651.20
Materials	46	Aggregate, Gravel, Graded	Gravel, includes materials, equipment and labor to transport and place. Includes washed and unwashed gravel.	Cubic yard	$25.23	40	$1,009.20
Equipment/Installation	48	Excavation, Common Earth, side cast, small equipment	Bulk excavation and side casting of common earth with hydraulic excavator with less than 1 CY capacity. Includes equipment and labor.	Cubic yard	$1.99	100	$199.00
Equipment/Installation	38	Concrete, CIP, formed reinforced	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	$197.03	3	$591.09
Equipment/Installation	37	Concrete, CIP, slab on grade, reinforced	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	$95.73	14	$1,340.22
Labor	230	Skilled Labor	Labor requiring a high level skill set: Includes carpenters, welders, electricians, conservation professionals involved with data collection, monitoring, and or record keeping, etc.	Hour	$23.53	80	$1,882.40
Mobilization	1139	Mobilization, medium equipment	Equipment with 70-150 HP or typical weights between 14,000 and 30,000 pounds.	Each	$120.38	2	$240.76
Mobilization	1137	Mobilization, very small equipment	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	$33.33	5	$166.65

Scenario Worksheet

Practice and Scenario Description:

Information Type	Data
Region	Northern Plains
State	South Dakota
Discipline Group	Environmental Engineering
Practice Code/Name	316 - Animal Mortality Facility
Scenario ID	9
Scenario Name	Static pile, Concrete Bin(s)
Scenario Description	This scenario consists of installing a two or more of concrete bins, open on one end on a concrete pad to compost larger quantities of poultry or mature swine mortality in static pile(s) that have sufficient bulking material to allow natural aeration. Piles are turned to go through a second heat cycle prior to final land application. The roofed portion of the facility is addressed in Cover and Roofs (367). Size of facility based on daily mortality and sizing procedures accepted in particular state. Potential Associated Practices: Roofs and Cover (367), Heavy Use Area Protection (561), Critical Area Planting (342), Nutrient Management (590), Access Road (560), Structure for Water Control (587), Roof Runoff Structure (558), Diversion (362), Subsurface Drain (606), and Underground Outlet (620).
Before Practice Situation	Animal mortality is done in a manner that results in non-point source pollution of excessive nutrients, organics, and pathogens being transported into surface and groundwater resources. Improper operation results in odors and spread of pathogens from incomplete composting, incineration, or interaction with predators. No plan was formulated for both normal and catastrophic mortality events.
After Practice Situation	Animal mortality is being done in a manner that prevents non-point source pollution of excessive nutrients, organics, and pathogens being transported into surface and groundwater resources. Proper operation results in little to no odors, complete composting, and protection from predators to minimize pathogen survival or spreading. An overall plan covers normal and catastrophic mortality events. Selected method for carcass treatment and disposal meet or are permitted by federal, state, and local laws, rules, regulation. Install a 20' deep by 48' long pad with four bins with 4' high walls and one end open. Open side to have 10' concrete apron due to heavy traffic during loading and movement from bin to bin. Roofed portion is addressed under Roofs and Covers (367). Site preparation includes topsoil removal, installing 4" of gravel, setting posts , installing concrete slab, installing 4' high concrete walls, and concrete approach apron. Piles are turned by moving to adjacent bin to go through a second heat cycle prior to final land application.
Scenario Feature Measure	Total Bin Area
Scenario Unit	Square Foot
Scenario Typical Size	960

Cost Summary:

Cost Category	Scenario Cost	Scenario Cost/Unit
Materials	$353.22	$0.37
Equipment/Installation	$5,429.39	$5.66
Labor	$0.00	$0.00
Mobilization	$240.76	$0.25
Acquisition of Technical Knowledge	$0.00	$0.00
Foregone Income	$0.00	$0.00
Total	$6,023.37	$6.27

Cost Details:

Cost Category	Component ID	Component Name	Component Description	Unit	Price ($/unit)	Quantity	Cost
Materials	46	Aggregate, Gravel, Graded	Gravel, includes materials, equipment and labor to transport and place. Includes washed and unwashed gravel.	Cubic yard	$25.23	14	$353.22
Equipment/Installation	48	Excavation, Common Earth, side cast, small equipment	Bulk excavation and side casting of common earth with hydraulic excavator with less than 1 CY capacity. Includes equipment and labor.	Cubic yard	$1.99	85	$169.15
Equipment/Installation	38	Concrete, CIP, formed reinforced	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	$197.03	15	$2,955.45
Equipment/Installation	37	Concrete, CIP, slab on grade, reinforced	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	$95.73	19	$1,818.87
Equipment/Installation	36	Concrete, CIP, formless, non reinforced	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	$60.74	8	$485.92
Mobilization	1139	Mobilization, medium equipment	Equipment with 70-150 HP or typical weights between 14,000 and 30,000 pounds.	Each	$120.38	2	$240.76

Scenario Worksheet

Practice and Scenario Description:

Information Type	Data
Region	Northern Plains
State	South Dakota
Discipline Group	Environmental Engineering
Practice Code/Name	317 - Composting Facility
Scenario ID	1
Scenario Name	Composter, structure facility with concrete floor and walls only
Scenario Description	The composting facility, with concrete floor and walls between bins only, is installed to address water quality concerns and disease vectors resulting from improper waste disposal by providing a dedicated facility for storage and treatment, and by creating a compost product that can be used in multiple ways including land application for enrichment of crop ground. All animal mortality composting shall be done using Practice Standard 316 - Animal Mortality Facility. 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), Access Road (560), Structure for water control (587), Diversion (362), Pipeline (516), Subsurface Drain (606), Heavy Use Area Protection (561), Roofs and Covers (367), Roof Runoff Structure (558), Waste Storage Facility (313), Waste Recycling (633), Waste Transfer (634), Underground Outlet (620) and Vegetative Treatment Area (635).
Before Practice 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 Practice Situation	Manure, litter and other agricultural by-products are being controlled, by the collection at the source, and stored properly, 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. The typical composter is designed to handle organic material from a livestock operation. The typical composter is 42' x 14' with 5' high concrete walls between 4 bins. Strip top 1' of soil and roll compact same back into sub-floor. The bins are constructed on a 7" concrete slab used to store and stabilize manure, litter and other agricultural by-products from a four house complex on any farm.
Scenario Feature Measure	Square Foot Floor Area
Scenario Unit	Square Foot
Scenario Typical Size	588

Cost Summary:

Cost Category	Scenario Cost	Scenario Cost/Unit
Materials	$275.01	$0.47
Equipment/Installation	$5,497.68	$9.35
Labor	$0.00	$0.00
Mobilization	$484.10	$0.82
Acquisition of Technical Knowledge	$0.00	$0.00
Foregone Income	$0.00	$0.00
Total	$6,256.79	$10.64

Cost Details:

Cost Category	Component ID	Component Name	Component Description	Unit	Price ($/unit)	Quantity	Cost
Materials	46	Aggregate, Gravel, Graded	Gravel, includes materials, equipment and labor to transport and place. Includes washed and unwashed gravel.	Cubic yard	$25.23	10.9	$275.01
Equipment/Installation	49	Earthfill, Roller Compacted	Earthfill, roller or machine compacted, includes equipment and labor	Cubic yard	$3.67	32.7	$120.01
Equipment/Installation	38	Concrete, CIP, formed reinforced	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	$325.24	8.6	$2,797.06
Equipment/Installation	37	Concrete, CIP, slab on grade, reinforced	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	$204.81	12.6	$2,580.61
Mobilization	1140	Mobilization, large equipment	Equipment >150HP or typical weights greater than 30,000 pounds or loads requiring over width or over length permits.	Each	$225.16	2	$450.32
Mobilization	1142	Mobilization, General labor	Mobilization of general labor: Ex. pipe layer, herder, concrete placement, materials spreader, flagger, etc.	Hour	$16.89	2	$33.78

Scenario Worksheet

Practice and Scenario Description:

Information Type	Data
Region	Northern Plains
State	South Dakota
Discipline Group	Environmental Engineering
Practice Code/Name	317 - Composting Facility
Scenario ID	2
Scenario Name	Composter, structure facility with concrete and wood walls
Scenario Description	The composting facility, with concrete floor and treated lumber walls and between bins, is installed to address water quality concerns and disease vectors resulting from improper waste disposal by providing a dedicated facility for storage and treatment, and by creating a compost product that can be used in multiple ways including land application for enrichment of crop ground. All animal mortality composting shall be done using Practice Standard 316 - Animal Mortality Facility. 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), Access Road (560), Structure for water control (587), Diversion (362), Pipeline (516), Subsurface Drain (606), Heavy Use Area Protection (561), Roofs and Covers (367), Roof Runoff Structure (558), Waste Storage Facility (313), Waste Recycling (633), Waste Transfer (634), Underground Outlet (620) and Vegetative Treatment Area (635).
Before Practice 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 Practice Situation	Manure and other agricultural by-products are being controlled, by the collection at the source, and stored properly, 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. The typical composter is designed to handle organic material from a livestock operation. The typical facility is 30' x 40' with 4' high bins, 6-primary bins, and 4' constructed lumber sidewalls. Strip top 1' of soil and roll compact same back into sub-floor. The entire structure is constructed on a 7" concrete slab used to store and stabilize organic material from a four house complex on any farm.
Scenario Feature Measure	Square Foot Floor Area
Scenario Unit	Square Foot
Scenario Typical Size	1200

Cost Summary:

Cost Category	Scenario Cost	Scenario Cost/Unit
Materials	$3,143.87	$2.62
Equipment/Installation	$5,631.38	$4.69
Labor	$2,675.20	$2.23
Mobilization	$934.42	$0.78
Acquisition of Technical Knowledge	$0.00	$0.00
Foregone Income	$0.00	$0.00
Total	$12,384.86	$10.32

Cost Details:

Cost Category	Component ID	Component Name	Component Description	Unit	Price ($/unit)	Quantity	Cost
Materials	1609	Lumber, planks, posts and timbers, treated	Treated dimension lumber with nominal thickness greater than 2". Includes lumber and fasteners. Does not include labor.	Board Foot	$1.19	540	$642.60
Materials	46	Aggregate, Gravel, Graded	Gravel, includes materials, equipment and labor to transport and place. Includes washed and unwashed gravel.	Cubic yard	$25.23	22.2	$560.11
Materials	1044	Dimension Lumber, Treated	Treated dimension lumber with nominal thickness equal or less than 2". Includes lumber and fasteners	Board Foot	$0.74	2434	$1,801.16
Materials	43	Silt Fence	Silt Fence with support post, includes materials, equipment and labor	Foot	$0.70	200	$140.00
Equipment/Installation	49	Earthfill, Roller Compacted	Earthfill, roller or machine compacted, includes equipment and labor	Cubic yard	$3.67	44.4	$162.95
Equipment/Installation	37	Concrete, CIP, slab on grade, reinforced	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	$204.81	26.7	$5,468.43
Labor	231	General Labor	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	$16.72	160	$2,675.20
Mobilization	1140	Mobilization, large equipment	Equipment >150HP or typical weights greater than 30,000 pounds or loads requiring over width or over length permits.	Each	$225.16	4	$900.64
Mobilization	1142	Mobilization, General labor	Mobilization of general labor: Ex. pipe layer, herder, concrete placement, materials spreader, flagger, etc.	Hour	$16.89	2	$33.78

Scenario Worksheet

Practice and Scenario Description:

Information Type	Data
Region	Northern Plains
State	South Dakota
Discipline Group	Agronomy
Practice Code/Name	327 - Conservation Cover
Scenario ID	1
Scenario Name	Introduced Grass
Scenario Description	This practice applies on land to be retired from agricultural production and on other lands needing permanent protective cover. This practice typically involves conversion from a clean-tilled (conventional tilled) intensive cropping system to permanent non-native vegetation (scenario includes non-native grass). The typical size of the practice is 50 acres. This practice scenario is typically used to reduce soil erosion, reduce soil quality degradation, improve water quality, develop wildlife habitit, and reduce air quality impacts.
Before Practice Situation	Crops such as corn, soybeans, or cotton are conventionally grown and harvested. Full width tillage is utilized, weeds controlled by cultivation and/or chemical application. Soil surface residue amounts average 10% or less. Soil erosion occurs with visible rills present, sediment may be moving offsite into surface water degrading water quality. Soil quality (soil organic matter) declines over time as a result of tillage practices, low residue, and long periods of bare soil. Air quality may be impacted during field operations by the creation of particulates. The system provides little to no wildlife habitat.
After Practice Situation	Land covered with permanent non-native grass vegetation has reduced soil erosion, reduced water/sediment runoff, and significant dust emissions are eliminated therefore, air quality is improved. Plants sown for conservation cover may provide cover for beneficial insects and wildlife. This scenario does not apply to plantings for forage production or to critical area plantings.
Scenario Feature Measure	Area planted
Scenario Unit	Acre
Scenario Typical Size	50

Cost Summary:

Cost Category	Scenario Cost	Scenario Cost/Unit
Materials	$1,044.25	$20.89
Equipment/Installation	$1,428.50	$28.57
Labor	$0.00	$0.00
Mobilization	$246.48	$4.93
Acquisition of Technical Knowledge	$0.00	$0.00
Foregone Income	$0.00	$0.00
Total	$2,719.23	$54.38

Cost Details:

Cost Category	Component ID	Component Name	Component Description	Unit	Price ($/unit)	Quantity	Cost
Materials	97	Timothy (Phleum pratense)	Introduced Perennial Grasses and shipping.	Pound	$2.46	12.5	$30.75
Materials	95	Smooth Bromegrass (Bromus inermis)	Introduced Perennial Grasses and shipping.	Pound	$3.15	50	$157.50
Materials	92	Orchard Grass (Dactylis glomerata)	Introduced Perennial Grasses and shipping.	Pound	$2.04	37.5	$76.50
Materials	112	Red Clover (Trifolium pratense)	Introduced Legumes and shipping.	Pound	$2.60	87.5	$227.50
Materials	334	Herbicide, Glyphosate	A broad-spectrum, non-selective systemic herbicide. Product is typically used in these practices 340, 645, 314, 666, and 512. Refer to WIN-PST for product names and active	Acre	$11.04	50	$552.00
Equipment/Installation	945	Tillage, Light	Includes light disking (tandem) or field	Acre	$9.85	50	$492.50
Equipment/Installation	948	Chemical, ground application	Chemical application performed by ground	Acre	$4.37	50	$218.50
Equipment/Installation	960	Seeding Operation, No Till/Grass	No Till drill or grass drill for seeding. Includes	Acre	$14.35	50	$717.50
Mobilization	1138	Mobilization, small equipment	Equipment <70 HP but can't be transported	Each	$82.16	3	$246.48

Scenario Worksheet

Practice and Scenario Description:

Information Type	Data
Region	Northern Plains
State	South Dakota
Discipline Group	Agronomy
Practice Code/Name	327 - Conservation Cover
Scenario ID	2
Scenario Name	Native Grass
Scenario Description	This practice applies on land to be retired from agricultural production and on other lands needing permanent protective cover. This practice typically involves conversion from a clean-tilled (conventional tilled) intensive cropping system to permanent native vegetation (scenario includes native grass). The typical size of the practice is 50 acres. This practice scenario is typically used to reduce soil erosion, reduce soil quality degradation, improve water quality, develop wildlife habitat, and reduce air quality impacts.
Before Practice Situation	Crops such as corn, soybeans, or cotton are conventionally grown and harvested. Full width tillage is utilized, weeds controlled by cultivation and/or chemical application. Soil surface residue amounts average 10% or less. Soil erosion occurs with visible rills present, sediment may be moving offsite into surface water degrading water quality. Soil quality (soil organic matter) declines over time as a result of tillage practices, low residue, and long periods of bare soil. Air quality may be impacted during field operations by the creation of particulates. The system provides little to no wildlife habitat.
After Practice Situation	Land covered with permanent native grass vegetation has reduced soil erosion, reduced water/sediment runoff, and significant dust emissions are eliminated therefore, air quality is improved. Plants sown for conservation cover may provide cover for beneficial insects and wildlife. This scenario does not apply to plantings for forage production or to critical area plantings.
Scenario Feature Measure	Area planted
Scenario Unit	Acre
Scenario Typical Size	50

Cost Summary:

Cost Category	Scenario Cost	Scenario Cost/Unit
Materials	$4,861.68	$97.23
Equipment/Installation	$2,423.50	$48.47
Labor	$0.00	$0.00
Mobilization	$328.64	$6.57
Acquisition of Technical Knowledge	$0.00	$0.00
Foregone Income	$0.00	$0.00
Total	$7,613.82	$152.28

Cost Details:

Cost Category	Component ID	Component Name	Component Description	Unit	Price ($/unit)	Quantity	Cost
Materials	82	Switchgrass, Blackwell (Panicum virgatum)	Native Grasses and shipping.	Pound	$9.62	10	$96.20
Materials	112	Red Clover (Trifolium pratense)	Introduced Legumes and shipping.	Pound	$2.60	25	$65.00
Materials	84	Wild Rye, Virginia (Elymus virginicus)	Native Grasses and shipping.	Pound	$9.81	125	$1,226.25
Materials	79	Little Blue Stem (Schizachyrium scoparium)	Native Grasses and shipping.	Pound	$15.43	45	$694.35
Materials	76	Big Blue Stem (Andropogon gerardii)	Native Grasses and shipping.	Pound	$11.81	50	$590.50
Materials	2012	Prairie Junegrass (Koeleria macrantha)	Native Grasses & shipping	Pound	$31.30	5	$156.50
Materials	148	Black-Eyed Susan (Rudbeckia hirta)	Native Forbs and shipping.	Pound	$33.55	7.5	$251.63
Materials	334	Herbicide, Glyphosate	A broad-spectrum, non-selective systemic herbicide. Product is typically used in these practices 340, 645, 314, 666, and 512. Refer to WIN-PST for product names and active ingredients. Materials only.	Acre	$11.04	50	$552.00
Materials	136	Purple Coneflower (Echinacea purpurea)	Native Forbs and shipping.	Pound	$32.78	37.5	$1,229.25
Equipment/Installation	945	Tillage, Light	Includes light disking (tandem) or field cultivator. Includes equipment, power unit and labor costs.	Acre	$9.85	50	$492.50
Equipment/Installation	948	Chemical, ground application	Chemical application performed by ground equipment. Includes equipment, power unit and labor costs.	Acre	$4.37	50	$218.50
Equipment/Installation	957	Mechanical weed control, Vegetation termination	Mechanical operations, Includes: Roller/crimper, mower, shredder, etc. Includes equipment, power unit and labor costs.	Acre	$19.90	50	$995.00
Equipment/Installation	960	Seeding Operation, No Till/Grass Drill	No Till drill or grass drill for seeding. Includes equipment, power unit and labor costs.	Acre	$14.35	50	$717.50
Mobilization	1138	Mobilization, small equipment	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	$82.16	4	$328.64

Scenario Worksheet

Practice and Scenario Description:

Information Type	Data
Region	Northern Plains
State	South Dakota
Discipline Group	Agronomy
Practice Code/Name	327 - Conservation Cover
Scenario ID	3
Scenario Name	Pollinator Habitat
Scenario Description	Permanent vegetation, including mix of native grasses, legume, forbs (mix may also include non-native species), established on any land needing permanent vegetative cover that provides habitat for pollinators. Typical practice size is variable depending on site, this scenario uses 1 ac as the typical size. In addition to providing pollinator habitat, this practice scenario may also reduce sheet and rill erosion, improve soil quality, improve water quality, and improve air quality. The practice may also provide wildlife habitat. Practice applicable on cropland, odd areas, corners, etc.
Before Practice Situation	Crops such as corn, soybeans, or cotton are conventionally grown and harvested. Full width tillage is utilized, weeds controlled by cultivation and/or chemical application. Soil surface residue amounts average 10% or less. Soil erosion occurs with visible rills present, sediment may be moving offsite into surface water degrading water quality. Soil quality (soil organic matter) declines over time as a result of tillage practices, low residue, and long periods of bare soil. Air quality may be impacted during field operations by the creation of particulates. The system provides little to no wildlife or pollinator habitat.
After Practice Situation	Land covered with permanent pollinator habitat including a mix of native grasses, legume, forbs (mix may also include non-native species). This practice may also have reduced soil erosion, reduced water/sediment runoff, and significant dust emissions are eliminated therefore, air quality is improved. Plants sown for pollinator habitat may also provide cover for beneficial insects and wildlife. This scenario does not apply to critical area plantings.
Scenario Feature Measure	Area planted
Scenario Unit	Acre
Scenario Typical Size	1

Cost Summary:

Cost Category	Scenario Cost	Scenario Cost/Unit
Materials	$124.53	$124.53
Equipment/Installation	$48.47	$48.47
Labor	$0.00	$0.00
Mobilization	$246.48	$246.48
Acquisition of Technical Knowledge	$0.00	$0.00
Foregone Income	$0.00	$0.00
Total	$419.48	$419.48

Cost Details:

Cost Category	Component ID	Component Name	Component Description	Unit	Price ($/unit)	Quantity	Cost
Materials	1493	Common Yarrow (Achillea millefolium)	Native Forbs & shipping	Pound	$32.19	0.1	$3.22
Materials	84	Wild Rye, Virginia (Elymus virginicus)	Native Grasses and shipping.	Pound	$9.81	1	$9.81
Materials	79	Little Blue Stem (Schizachyrium scoparium)	Native Grasses and shipping.	Pound	$15.43	0.4	$6.17
Materials	2012	Prairie Junegrass (Koeleria macrantha)	Native Grasses & shipping	Pound	$31.30	0.05	$1.57
Materials	148	Black-Eyed Susan (Rudbeckia hirta)	Native Forbs and shipping.	Pound	$33.55	0.2	$6.71
Materials	334	Herbicide, Glyphosate	A broad-spectrum, non-selective systemic herbicide. Product is typically used in these practices 340, 645, 314, 666, and 512. Refer to WIN-PST for product names and active ingredients. Materials only.	Acre	$11.04	1	$11.04
Materials	136	Purple Coneflower (Echinacea purpurea)	Native Forbs and shipping.	Pound	$32.78	0.5	$16.39
Materials	133	Smooth Aster (Aster laevis)	Native Forbs and shipping.	Pound	$217.74	0.05	$10.89
Materials	129	Wild Senna (Cassia hebecarpa)	Native Legumes and shipping.	Pound	$68.25	0.1	$6.83
Materials	127	Slender Bush Clover (Lespedeza virginica)	Native Legumes and shipping.	Pound	$224.95	0.05	$11.25
Materials	125	Partidge Pea (Chamaecrista fasciculata)	Native Legumes and shipping.	Pound	$15.70	1	$15.70
Materials	121	Canada Tick Trefoil (Desmodium canadense)	Native Legumes and shipping.	Pound	$171.45	0.1	$17.15
Materials	119	Blue Wild Indigo (Baptisia australis)	Native Legumes and shipping.	Pound	$156.45	0.05	$7.82
Equipment/Installation	945	Tillage, Light	Includes light disking (tandem) or field cultivator. Includes equipment, power unit and labor costs.	Acre	$9.85	1	$9.85
Equipment/Installation	948	Chemical, ground application	Chemical application performed by ground equipment. Includes equipment, power unit and labor costs.	Acre	$4.37	1	$4.37
Equipment/Installation	957	Mechanical weed control, Vegetation termination	Mechanical operations, Includes: Roller/crimper, mower, shredder, etc. Includes equipment, power unit and labor costs.	Acre	$19.90	1	$19.90
Equipment/Installation	960	Seeding Operation, No Till/Grass Drill	No Till drill or grass drill for seeding. Includes equipment, power unit and labor costs.	Acre	$14.35	1	$14.35
Mobilization	1138	Mobilization, small equipment	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	$82.16	3	$246.48

Scenario Worksheet

Practice and Scenario Description:

Information Type	Data
Region	Northern Plains
State	South Dakota
Discipline Group	Agronomy
Practice Code/Name	328 - Conservation Crop Rotation
Scenario ID	2
Scenario Name	Standard rotation
Scenario Description	In this region this practice may be part of a conservation management system to: 1) Reduce sheet and rill erosion 2) Reduce soil erosion from wind 3) Maintain or improve soil organic matter 4) Manage the balance of plant nutrient 5) Improve water use efficiency 6) Manage plant pests (weeds, insects, and diseases). 7) Provide food for domestic livestock and 8) Provide food and cover for wildlife. This practice payment is provided to acquire the technical knowledge and skills necessary to effectively implement a conservation crop rotation on a typical 160 cropland farm. Foregone income included due to lost crop yield and income by adding an additional crop into the rotation. Cost represents typical situations for conventional (non-organic) producers.
Before Practice Situation	The rotation consists primarily of a two crop rotation of high value crops row crops. An additional lower value crop is added to the rotation to improve soil health. Fields range from nearly flat to C and D slopes. Erosion, soil quality, and pest management are the primary concerns.
After Practice Situation	A minimum 3 crop rotation is established that requires a minimum of at least one additional high residue and/or perennial crops. The 3 crop minimum rotation reduces erosion, improves soil quality, breaks pest cycles, and provide additional wildlife needs.
Scenario Feature Measure	Area planted
Scenario Unit	Acre
Scenario Typical Size	160

Cost Summary:

Cost Category	Scenario Cost	Scenario Cost/Unit
Materials	$0.00	$0.00
Equipment/Installation	$0.00	$0.00
Labor	$0.00	$0.00
Mobilization	$0.00	$0.00
Acquisition of Technical Knowledge	$0.00	$0.00
Foregone Income	$5,472.12	$34.20
Total	$5,472.12	$34.20

Cost Details:

Cost Category	Component ID	Component Name	Component Description	Unit	Price ($/unit)	Quantity	Cost
Foregone Income	1961	FI, Soybeans Dryland	Dryland Soybeans is Primary Crop	Acre	$232.94	80	$18,635.20
Foregone Income	1959	FI, Corn Dryland	Dryland Corn is Primary Crop	Acre	$292.03	80	$23,362.40
Foregone Income	1963	FI, Wheat Dryland	Dryland Wheat is Primary Crop	Acre	$164.19	-53	($8,702.07)
Foregone Income	1961	FI, Soybeans Dryland	Dryland Soybeans is Primary Crop	Acre	$232.94	-53	($12,345.82)
Foregone Income	1959	FI, Corn Dryland	Dryland Corn is Primary Crop	Acre	$292.03	-53	($15,477.59)

Scenario Worksheet

Practice and Scenario Description:

Information Type	Data
Region	Northern Plains
State	South Dakota
Discipline Group	Agronomy
Practice Code/Name	328 - Conservation Crop Rotation
Scenario ID	4
Scenario Name	Organic Rotation
Scenario Description	In this region this practice may be part of a conservation management system to: 1) Reduce sheet and rill erosion 2) Reduce soil erosion from wind 3) Maintain or improve soil organic matter 4) Manage the balance of plant nutrients 5) Improve water use efficiency 6) Manage plant pests (weeds, insects, and diseases). 7) Provide food for domestic livestock and 8) Provide food and cover for wildlife. This practice payment is provided to acquire the technical knowledge and skills necessary to effectively implement a conservation crop rotation on a typical 100 cropland farm. Foregone income included. Cost represents typical situations for conventional (non-organic) producers.
Before Practice Situation	The rotation consists primarily of low residue and conventionally produced row crops. Fields range from nearly flat to C and D slopes. Erosion, soil quality, and pest management are the primary concerns.
After Practice Situation	An organic system rotation is implemented. The rotation is planned that compliments erosion control, nutrient cycling, soil organic matter, and pest management via crop rotation.
Scenario Feature Measure	Area planted
Scenario Unit	Acre
Scenario Typical Size	160

Cost Summary:

Cost Category	Scenario Cost	Scenario Cost/Unit
Materials	$0.00	$0.00
Equipment/Installation	$0.00	$0.00
Labor	$1,324.40	$8.28
Mobilization	$0.00	$0.00
Acquisition of Technical Knowledge	$300.54	$1.88
Foregone Income	$5,265.37	$32.91
Total	$6,890.31	$43.06

Cost Details:

Cost Category	Component ID	Component Name	Component Description	Unit	Price ($/unit)	Quantity	Cost
Labor	234	Supervisor or Manager	Labor involving supervision or management	Hour	$33.11	40	$1,324.40
Acquisition of Technical Knowledge	297	Transportation	Mileage to attend a training conference,	Mile	$0.56	120	$67.20
Acquisition of Technical Knowledge	294	Training, Workshops	Educational seminar or series of meetings	Each	$116.67	2	$233.34
Foregone Income	1961	FI, Soybeans Dryland	Dryland Soybeans is Primary Crop	Acre	$232.94	80	$18,635.20
Foregone Income	1963	FI, Wheat Dryland	Dryland Wheat is Primary Crop	Acre	$164.19	-53.3	($8,751.33)
Foregone Income	1959	FI, Corn Dryland	Dryland Corn is Primary Crop	Acre	$292.03	80	$23,362.40
Foregone Income	1961	FI, Soybeans Dryland	Dryland Soybeans is Primary Crop	Acre	$232.94	-53.3	($12,415.70)
Foregone Income	1959	FI, Corn Dryland	Dryland Corn is Primary Crop	Acre	$292.03	-53.3	($15,565.20)

Scenario Worksheet

Practice and Scenario Description:

Information Type	Data
Region	Northern Plains
State	South Dakota
Discipline Group	Agronomy
Practice Code/Name	328 - Conservation Crop Rotation
Scenario ID	6
Scenario Name	Irrigation to Dryland Rotation
Scenario Description	In this region this practice may be part of a conservation management system to primarily convert from an irrigated cropping system to dryland farming. In addition to improving water use efficiency the rotation may 1) Reduce sheet and rill erosion 2) Reduce soil erosion from wind 3) Maintain or improve soil organic matter 4) Manage the balance of plant nutrients 5) Manage plant pests (weeds, insects, and diseases). 6) Provide food for domestic livestock and 7) Provide food and cover for wildlife. This practice payment is provided to acquire the technical knowledge and skills necessary to effectively implement a conservation crop rotation on a typical 200 cropland farm. There is foregone income involved with this conversion from irrigated to dryland farming due to lower yields and net return. Cost represents typical situations for conventional (non-organic) producers converting from irrigated cropping to dryland farming.
Before Practice Situation	This rotation consisted of growing high value row crops that received a significant (more than half) of the required water via irrigation. The water demands are impacting the area's water availability. Erosion, soil condition, and future water availability are the major concerns.
After Practice Situation	The dryland rotation, using the same crops or a rotation that grows crops over different periods, will be part of a management system capable of utilizing available rainfall and soil moisture more efficiently and controling wind and water erosion. Corn yields will be expected to be reduced from 200 to 100 bu/acre.
Scenario Feature Measure	Area Planted
Scenario Unit	Acre
Scenario Typical Size	120

Cost Summary:

Cost Category	Scenario Cost	Scenario Cost/Unit
Materials	$0.00	$0.00
Equipment/Installation	$0.00	$0.00
Labor	$1,324.40	$11.04
Mobilization	$0.00	$0.00
Acquisition of Technical Knowledge	$0.00	$0.00
Foregone Income	$11,662.20	$97.19
Total	$12,986.60	$108.22

Cost Details:

Cost Category	Component ID	Component Name	Component Description	Unit	Price ($/unit)	Quantity	Cost
Labor	234	Supervisor or Manager	Labor involving supervision or management	Hour	$33.11	40	$1,324.40
Foregone Income	1961	FI, Soybeans Dryland	Dryland Soybeans is Primary Crop	Acre	$232.94	-40	($9,317.60)
Foregone Income	1963	FI, Wheat Dryland	Dryland Wheat is Primary Crop	Acre	$164.19	-40	($6,567.60)
Foregone Income	1960	FI, Corn Irrigated	Irrigated Corn is Primary Crop	Acre	$373.65	60	$22,419.00
Foregone Income	1962	FI, Soybeans Irrigated	Irrigated Soybeans is Primary Crop	Acre	$280.16	60	$16,809.60
Foregone Income	1959	FI, Corn Dryland	Dryland Corn is Primary Crop	Acre	$292.03	-40	($11,681.20)

Scenario Worksheet

Practice and Scenario Description:

Information Type	Data
Region	Northern Plains
State	South Dakota
Discipline Group	Agronomy
Practice Code/Name	329 - Residue and Tillage Management - No-Till/ Strip Till/ Direct Seed
Scenario ID	1
Scenario Name	No-Till/Strip-Till
Scenario Description	This practice typically involves conversion from a clean-tilled (conventional tilled) system to no-till or strip-till (conservation tilled) system on 100 acres of cropland. This involves managing the amount, orientation and distribution of crop and other plant residue on the soil surface year round while limiting soil-disturbing activities used to grow and harvest crops in systems. The practice is used to reduce sheet and rill erosion, reduce wind erosion, improve soil quality, reduce CO2 losses from the soil, reduce energy use, increase plant available moisture and provide food and escape cover for wildlife. The no-till/strip-till system includes chemical weed control (rather than cultivation) and may also include a period of chemical fallow. System is applicable in both irrigated and non-irrigated fields.
Before Practice Situation	Row crops or small grains are grown and harvested. Full width tillage is performed prior to planting and weed control during crop production is typically cultivation and chemical application. Fields are disked immediately following harvest, with additional operations in some fields to facilitate drainage or additional weed control. Residue amounts after tillage operations average 10% or less, resulting in bare soil being exposed to wind erosion and/or intense rainfall during the fall, winter, and early spring. Any crop residue that is present degrades and sediment/nutrient runoff from fields increases during rainfall events. Sheet and rill erosion occurs with visible rills by spring. Soil health (soil organic matter) declines over time as a result of tillage practices, low residue, and long periods of bare soil. This system will typically have a negative Soil Conditioning Index (SCI) and a high Soil Tillage Intensity Rating (STIR).
After Practice Situation	Managing crop residue on the surface of a field (typical 100 acre) year around according to the 329 practice plan while limiting soil disturbing activities to those which place nutrients, and plant crops that meet the minimum criteria in the 329 practice standard. All crops are seeded/planted with a no-till drill or no-till/strip-till planter, which minimizes soil disturbance while establishing good seed-soil contact. All residues are to be maintained on the soil surface in a uniform distribution over the entire field and not burned or removed. Crop residues provide soil surface cover throughout the year. Runoff and erosion are reduced and no rills are visible on the soil surface. Wind erosion is reduced by standing residues and surface cover. Over time, soil health is improved due to the additional biomass (crop residues), ground cover, and soil infiltration. Crop residues and/or cover crop residues left on the soil surface may maximize weed control by increasing allelopathic and mulching effect, and provides cover for wildlife. The practice would require reducing soil disturbance and erosion and increasing biomass returned to the soil in sufficient amounts to achieve increased SCI and decreased STIR.
Scenario Feature Measure	Area planted
Scenario Unit	Acre
Scenario Typical Size	100

Cost Summary:

Cost Category	Scenario Cost	Scenario Cost/Unit
Materials	$1,104.00	$11.04
Equipment/Installation	$1,900.00	$19.00
Labor	$0.00	$0.00
Mobilization	$0.00	$0.00
Acquisition of Technical Knowledge	$150.27	$1.50
Foregone Income	$0.00	$0.00
Total	$3,154.27	$31.54

Cost Details:

Cost Category	Component ID	Component Name	Component Description	Unit	Price ($/unit)	Quantity	Cost
Materials	334	Herbicide, Glyphosate	A broad-spectrum, non-selective systemic herbicide. Product is typically used in these practices 340, 645, 314, 666, and 512. Refer to WIN-PST for product names and active ingredients. Materials only.	Acre	$11.04	100	$1,104.00
Equipment/Installation	1230	Seeding Operation, No Till/Strip Till Planter	No Till/Strip Till row planters for seeding. Includes all costs for equipment, power unit, and labor.	Acre	$14.91	50	$745.50
Equipment/Installation	948	Chemical, ground application	Chemical application performed by ground equipment. Includes equipment, power unit and labor costs.	Acre	$4.37	100	$437.00
Equipment/Installation	960	Seeding Operation, No Till/Grass Drill	No Till drill or grass drill for seeding. Includes equipment, power unit and labor costs.	Acre	$14.35	50	$717.50
Acquisition of Technical Knowledge	294	Training, Workshops	Educational seminar or series of meetings emphasizing interaction and exchange of information among a usually small number of participants.	Each	$116.67	1	$116.67
Acquisition of Technical Knowledge	297	Transportation	Mileage to attend a training conference, workshop, or TSP travel associated with developing Conservation Activity Plan.	Mile	$0.56	60	$33.60

Scenario Worksheet

Practice and Scenario Description:

Information Type	Data
Region	Northern Plains
State	South Dakota
Discipline Group	Agronomy
Practice Code/Name	329 - Residue and Tillage Management - No-Till/ Strip Till/ Direct Seed
Scenario ID	2
Scenario Name	Organic No-Till/Strip-Till
Scenario Description	This practice typically involves conversion from a clean or mulch tilled (conventional tilled) system to no-till or strip-till (conservation tilled) system on 20 acres of organic cropland. This involves managing the amount, orientation and distribution of crop and other plant residue on the soil surface year round while limiting soil-disturbing activities used to grow and harvest crops in systems. The practice is used to reduce sheet and rill erosion, reduce wind erosion, improve soil quality, reduce CO2 losses from the soil, reduce energy use, increase plant available moisture and provide food and escape cover for wildlife. The organic no-till/strip-till system relies on mulching/residue management, organic-approved chemical weed control, or alterative methods of weed control such as hand weeding, flaming, etc. (rather than traditional cultivation). System is applicable in both irrigated and non-irrigated fields.
Before Practice Situation	Organically grown crops such as various vegetable and fruit crops (along with organically produced row crops) are grown and harvested throughout the year. Full width tillage is performed prior to planting and weed control during crop production is typically cultivation and mulching. Fields are disked immediately following harvest, with additional operations in some fields to facilitate drainage or additional weed control. Residue amounts after tillage operations average 10% or less, resulting in bare soil being exposed to wind erosion and/or intense rainfall during the fall, winter, and early spring. Any crop residue that is present degrades and sediment/nutrient runoff from fields increases during rainfall events. Wind and/or water erosion occurs with visible rills by spring. Soil health (soil organic matter) declines over time as a result of tillage practices, low residue, and long periods of bare soil. This system will typically have a negative Soil Conditioning Index (SCI) and a high Soil Tillage Intensity Rating (STIR).
After Practice Situation	329 is applied per the practice plan and all the appropriate criteria are followed for the planned purpose(s). Crop residue is managed on the surface of an organic crop field (typical 20 acre) year around while limiting soil disturbing activities to those which condition residue, place nutrients, and plant crops. All crops are seeded/planted with a no-till drill, no-till/strip-till transplanter, or no-till/strip-till planter, which minimize soil disturbance while establishing good seed-soil contact. All residues are to be maintained on the soil surface in a uniform distribution over the entire field and not burned or removed. Crop residues provide soil surface cover throughout the year. Runoff and erosion are reduced and no rills are visible on the soil surface. Wind erosion is reduced by standing residues and surface cover. Over time, soil health is improved due to the additional biomass (crop residues), ground cover, and soil infiltration. Crop residues and/or cover crop residues left on the soil surface may maximize weed control by increasing allelopathic and mulching effect and provide wildlife food and cover. The practice would require reducing soil disturbance and erosion and increasing biomass returned to the soil in sufficient amounts to achieve increased SCI and decreased STIR.
Scenario Feature Measure	Area planted
Scenario Unit	Acre
Scenario Typical Size	20

Cost Summary:

Cost Category	Scenario Cost	Scenario Cost/Unit
Materials	$0.00	$0.00
Equipment/Installation	$690.60	$34.53
Labor	$0.00	$0.00
Mobilization	$0.00	$0.00
Acquisition of Technical Knowledge	$150.27	$7.51
Foregone Income	$0.00	$0.00
Total	$840.87	$42.04

Cost Details:

Cost Category	Component ID	Component Name	Component Description	Unit	Price ($/unit)	Quantity	Cost
Equipment/Installation	1230	Seeding Operation, No Till/Strip Till Planter	No Till/Strip Till row planters for seeding. Includes all costs for equipment, power unit, and labor.	Acre	$14.91	10	$149.10
Equipment/Installation	957	Mechanical weed control, Vegetation termination	Mechanical operations, Includes: Roller/crimper, mower, shredder, etc. Includes equipment, power unit and labor costs.	Acre	$19.90	20	$398.00
Equipment/Installation	960	Seeding Operation, No Till/Grass Drill	No Till drill or grass drill for seeding. Includes equipment, power unit and labor costs.	Acre	$14.35	10	$143.50
Acquisition of Technical Knowledge	294	Training, Workshops	Educational seminar or series of meetings emphasizing interaction and exchange of information among a usually small number of participants.	Each	$116.67	1	$116.67
Acquisition of Technical Knowledge	297	Transportation	Mileage to attend a training conference, workshop, or TSP travel associated with developing Conservation Activity Plan.	Mile	$0.56	60	$33.60

Scenario Worksheet

Practice and Scenario Description:

Information Type	Data
Region	Northern Plains
State	South Dakota
Discipline Group	Range/Pasture Grazing
Practice Code/Name	338 - Prescribed Burning
Scenario ID	3
Scenario Name	Site Preparation
Scenario Description	Treating areas to encourage natural seeding or to permit reforestation by planting or direct seeding. Burning is utilized to eliminate existing competition and debris, reduce forest fuel and to prepare the site for planting or seeding. Burning a cutover site helps prepare the site for replanting. Burn should expose a portion of bare soil for planting. Objectives of a site preparation burn may dictate timing and burn intensity.
Before Practice Situation	Area to be burned has had a portion of the over story removed. Slash, brush and grasses dominate the site.
After Practice Situation	Area to be planted has been burned to remove grass, reduce competing brush and remove downed slash leftover from forestry activities. Some bare ground is exposed.
Scenario Feature Measure	Acres Planned
Scenario Unit	Acre
Scenario Typical Size	80

Cost Summary:

Cost Category	Scenario Cost	Scenario Cost/Unit
Materials	$99.75	$1.25
Equipment/Installation	$275.82	$3.45
Labor	$2,181.80	$27.27
Mobilization	$286.76	$3.58
Acquisition of Technical Knowledge	$0.00	$0.00
Foregone Income	$0.00	$0.00
Total	$2,844.13	$35.55

Cost Details:

Cost Category	Component ID	Component Name	Component Description	Unit	Price ($/unit)	Quantity	Cost
Materials	1596	Fuel, ignition fuel mixture	Mixture of gasoline and diesel for ignition of prescribed burns. Materials only.	Gallon	$3.99	25	$99.75
Equipment/Installation	965	All terrain vehicles, ATV	Includes equipment and labor costs.	Hour	$28.55	2	$57.10
Equipment/Installation	939	Truck, Pickup	Equipment and power unit costs. Labor not included.	Hour	$26.12	8	$208.96
Equipment/Installation	1602	Water tank, portable	Portable water tank transported in a pick up truck. Typically with 200 gallon capacity includes tank with pump, hose and sprayer. Does not include the pickup truck. Equipment only.	Hour	$2.44	4	$9.76
Labor	230	Skilled Labor	Labor requiring a high level skill set: Includes carpenters, welders, electricians, conservation professionals involved with data collection, monitoring, and or record keeping, etc.	Hour	$23.53	8	$188.24
Labor	235	Consultant Services	Consultant services to assist in resource inventory, plan development, site surveys, site monitoring, installation of practices, etc.	Hour	$82.88	16	$1,326.08
Labor	231	General Labor	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	$16.72	32	$535.04
Labor	234	Supervisor or Manager	Labor involving supervision or management activities. Includes crew supervisors, foremen and farm/ranch managers time required for adopting new technology, etc.	Hour	$33.11	4	$132.44
Mobilization	1145	Mobilization, Supervisor or Manager	Mobilization of supervisors or management. Includes crew supervisors, foremen and farm/ranch managers, etc.	Hour	$32.80	1	$32.80
Mobilization	1141	Mobilization, Skilled labor	Mobilization of skilled labor: Includes carpenters, welders, electricians, conservation professionals involved with data collection, monitoring, and or record keeping, etc.	Hour	$22.08	1	$22.08
Mobilization	1138	Mobilization, small equipment	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	$82.16	2	$164.32
Mobilization	1142	Mobilization, General labor	Mobilization of general labor: Ex. pipe layer, herder, concrete placement, materials spreader, flagger, etc.	Hour	$16.89	4	$67.56

Scenario Worksheet

Practice and Scenario Description:

Information Type	Data
Region	Northern Plains
State	South Dakota
Discipline Group	Agronomy
Practice Code/Name	340 - Cover Crop
Scenario ID	1
Scenario Name	Cover Crop, Single Species
Scenario Description	Typically a cool season small grain such as rye or wheat will be planted as a cover crop immediately after harvest of a row crop, and will be followed by a row crop that will utilize the residue as a mulch. This scenario assumes that seed will be planted with a no-till drill. The cover crop should be allowed to generate as much biomass as possible, without delaying planting of the following crop. The cover crop will be terminated using an approved chemical or mechanical method a minimum of 3 weeks prior to planting the subsequent crop.
Before Practice Situation	Row crops such as corn and soybeans are harvested in mid-late fall. Fields that are disked immediately following harvest or those used to produce a low residue crop such as soybeans or silage may have less than 30% residue resulting in bare soil being exposed to intense rainfall during the fall, winter, and early spring. Over the winter residue degrades and sediment/nutrient runoff from fields increases. Sheet and rill erosion occurs with visible rills by spring. Runoff from the fields flows into streams, water courses or other water bodies causing degradation to the receiving waters. Soil health (soil organic matter) declines over time as a result of tillage practices and long periods of bare soil.
After Practice Situation	Within 30 days after harvest of row crop, fields are planted with a small grain cover crop such as rye or wheat. The average field size is 40 acres. The cover crop is seeded with a no-till drill. The cover crop provides soil cover by late fall, throughout the winter, and into the early spring. Runoff and erosion are reduced and no rills are visible on the soil surface in the spring. Wind erosion is reduced by standing residues. The cover crop is terminated using an approved chemical or mechanical method prior to spring planting as late as feasible to maximize plant biomass production. Over time, soil health is improved due to the additional biomass, ground cover, soil infiltration, and plant diversity introduced to the cropping system. Cover crop residues left on the surface may maximize weed control by increasing allelopathic and mulching effect.
Scenario Feature Measure	Area planted
Scenario Unit	Acre
Scenario Typical Size	40

Cost Summary:

Cost Category	Scenario Cost	Scenario Cost/Unit
Materials	$1,113.60	$27.84
Equipment/Installation	$748.80	$18.72
Labor	$0.00	$0.00
Mobilization	$0.00	$0.00
Acquisition of Technical Knowledge	$0.00	$0.00
Foregone Income	$0.00	$0.00
Total	$1,862.40	$46.56

Cost Details:

Cost Category	Component ID	Component Name	Component Description	Unit	Price ($/unit)	Quantity	Cost
Materials	198	Rye, Cereal (Secale cereale L.)	Small Grains, Cover Crops. Shipping not included.	Pound	$0.30	2240	$672.00
Materials	334	Herbicide, Glyphosate	A broad-spectrum, non-selective systemic herbicide. Product is typically used in these practices 340, 645, 314, 666, and 512. Refer to WIN-PST for product names and active ingredients. Materials only.	Acre	$11.04	40	$441.60
Equipment/Installation	948	Chemical, ground application	Chemical application performed by ground equipment. Includes equipment, power unit and labor costs.	Acre	$4.37	40	$174.80
Equipment/Installation	960	Seeding Operation, No Till/Grass Drill	No Till drill or grass drill for seeding. Includes equipment, power unit and labor costs.	Acre	$14.35	40	$574.00

Scenario Worksheet

Practice and Scenario Description:

Information Type	Data
Region	Northern Plains
State	South Dakota
Discipline Group	Agronomy
Practice Code/Name	340 - Cover Crop
Scenario ID	2
Scenario Name	Cover Crop, Multiple Species
Scenario Description	Typically a small grain or small grain-legume mix (may also use forage sorghum, radishes, turnips, buckwheat, etc) will be planted as a cover crop immediately after harvest of a row crop, and will be followed by a row crop that will utilize the residue as a mulch. This scenario assumes that seed will be planted with a no-till drill. The cover crop should be allowed to generate as much biomass as possible, without delaying planting of the following crop. The cover crop will be terminated using an approved chemical or mechanical method a minimum of 3 weeks prior to planting the subsequent crop.
Before Practice Situation	Row crops such as corn and soybeans are harvested in mid-late fall. Fields that are disked immediately following harvest or those used to produce a low residue crop such as soybeans or silage may have less than 30% residue resulting in bare soil being exposed to intense rainfall during the fall, winter, and early spring. Over the winter residue degrades and sediment/nutrient runoff from fields increases. Sheet and rill erosion occurs with visible rills by spring. Runoff from the fields flows into streams, water courses or other water bodies causing degradation to the receiving waters. Soil health (soil organic matter) declines over time as a result of tillage practices and long periods of bare soil.
After Practice Situation	Within 30 days after harvest of row crop, fields are planted with a small grain-legume mix cover crop, typically rye and clover. The average field size is 40 acres. The cover crop is seeded with a no-till drill. The cover crop provides soil cover by late fall, throughout the winter, and into the early spring. Runoff and erosion are reduced and no rills are visible on the soil surface in the spring. Wind erosion is reduced by standing residues. The cover crop is terminated using an approved chemical or mechanical method prior to spring planting as late as feasible to maximize plant biomass production. Over time, soil health is improved due to the additional biomass, ground cover, soil infiltration, and plant diversity introduced to the cropping system. Cover crop residues left on the surface may maximize weed control by increasing allelopathic and mulching effect.
Scenario Feature Measure	Area planted
Scenario Unit	Acre
Scenario Typical Size	40

Cost Summary:

Cost Category	Scenario Cost	Scenario Cost/Unit
Materials	$1,908.80	$47.72
Equipment/Installation	$748.80	$18.72
Labor	$0.00	$0.00
Mobilization	$0.00	$0.00
Acquisition of Technical Knowledge	$0.00	$0.00
Foregone Income	$0.00	$0.00
Total	$2,657.60	$66.44

Cost Details:

Cost Category	Component ID	Component Name	Component Description	Unit	Price ($/unit)	Quantity	Cost
Materials	185	Crimson Clover (Trifolium incarnatum)	Legumes, Cover Crops and shipping.	Pound	$2.25	240	$540.00
Materials	198	Rye, Cereal (Secale cereale L.)	Small Grains, Cover Crops. Shipping not included.	Pound	$0.30	2240	$672.00
Materials	334	Herbicide, Glyphosate	A broad-spectrum, non-selective systemic herbicide. Product is typically used in these practices 340, 645, 314, 666, and 512. Refer to WIN-PST for product names and active ingredients. Materials only.	Acre	$11.04	40	$441.60
Materials	169	Turnips (Brassica rapa var. rapa)	Brassicas / Non-Legume Broadleaf, Cover Crops and shipping.	Pound	$3.19	80	$255.20
Equipment/Installation	948	Chemical, ground application	Chemical application performed by ground equipment. Includes equipment, power unit and labor costs.	Acre	$4.37	40	$174.80
Equipment/Installation	960	Seeding Operation, No Till/Grass Drill	No Till drill or grass drill for seeding. Includes equipment, power unit and labor costs.	Acre	$14.35	40	$574.00

Scenario Worksheet

Practice and Scenario Description:

Information Type	Data
Region	Northern Plains
State	South Dakota
Discipline Group	Agronomy
Practice Code/Name	340 - Cover Crop
Scenario ID	4
Scenario Name	Organic Cover Crop
Scenario Description	Typically a small grain or small grain-legume mix (may also use forage sorghum, radishes, turnips, buckwheat, etc) will be planted as a cover crop immediately after harvest of an organically grown crop, and will be followed by an organically grown crop that will utilize the residue as a mulch. This scenario assumes that seed will be planted with a no-till drill. The cover crop should be allowed to generate as much biomass as possible, without delaying planting of the following crop. The cover crop will be terminated using a mechnical kill method (mowing, rolling, undercutting, etc.), a minimum of 3 weeks prior to planting the subsequent crop. This scenario REQUIRES use of Certified Organic Seed.
Before Practice Situation	Organically grown crops such as various vegetable and fruit crops (along with organically produced row crops) are grown and harvested in mid-late fall. Fields are disked immediately following harvest. Residue amounts after harvest average 30% or less, resulting in bare soil being exposed to wind erosion and/or intense rainfall during the fall, winter, and early spring. Over the winter residue degrades and sediment/nutrient runoff from fields increases. Sheet and rill erosion occurs with visible rills by spring. Runoff from the fields flows into streams, water courses or other water bodies causing degradation to the receiving waters. Soil health (soil organic matter) declines over time as a result of tillage practices, low residue crops, and long periods of bare soil.
After Practice Situation	Within 30 days after harvest of organic crop, fields are planted with a small grain-legume mix cover crop, typically rye and clover. The average field size is 25 acres. The cover crop is seeded with a no-till drill. No additional fertilizer is applied with the cover crop. The cover crop provides soil cover by late fall, throughout the winter, and into the early spring. Runoff and erosion are reduced and no rills are visible on the soil surface in the spring. The cover crop is terminated with using a mechnical kill method (mowing, rolling, undercutting, etc.), prior to spring planting as late as feasible to maximize plant biomass production. Over time, soil health is improved due to the additional biomass, ground cover, and plant diversity introduced to the cropping system. Wind erosion is reduced by standing resides. Cover crop residues left on the surface may maximize weed control by increasing allelopathic and mulching effect.
Scenario Feature Measure	Area planted
Scenario Unit	Acre
Scenario Typical Size	40

Cost Summary:

Cost Category	Scenario Cost	Scenario Cost/Unit
Materials	$3,351.20	$83.78
Equipment/Installation	$1,370.00	$34.25
Labor	$0.00	$0.00
Mobilization	$0.00	$0.00
Acquisition of Technical Knowledge	$0.00	$0.00
Foregone Income	$0.00	$0.00
Total	$4,721.20	$118.03

Cost Details:

Cost Category	Component ID	Component Name	Component Description	Unit	Price ($/unit)	Quantity	Cost
Materials	203	Certified Organic, Rye, Cereal (Secale cereale L.)	Small Grains, Cover Crops. Shipping not included.	Pound	$0.58	2240	$1,299.20
Materials	192	Certified Organic, Crimson Clover (Trifolium incarnatum)	Legumes, Cover Crops and shipping.	Pound	$5.35	240	$1,284.00
Materials	173	Certified Organic, Turnips (Brassica rapa var. rapa)	Brassicas / Non-Legume Broadleaf, Cover Crops and shipping.	Pound	$9.60	80	$768.00
Equipment/Installation	960	Seeding Operation, No Till/Grass Drill	No Till drill or grass drill for seeding. Includes equipment, power unit and labor costs.	Acre	$14.35	40	$574.00
Equipment/Installation	957	Mechanical weed control, Vegetation termination	Mechanical operations, Includes: Roller/crimper, mower, shredder, etc. Includes equipment, power unit and labor	Acre	$19.90	40	$796.00

Scenario Worksheet

Practice and Scenario Description:

Information Type	Data
Region	Northern Plains
State	South Dakota
Discipline Group	Agronomy
Practice Code/Name	342 - Critical Area Planting
Scenario ID	1
Scenario Name	Introduced Species
Scenario Description	Establishment of permanent vegetation on a site that is void or nearly void of vegetation due to a natural occurrence or a newly constructed conservation practice. Costs include seedbed preparation with typical tillage implements, grass/legume seed, companion crop, and fertilizer and lime with application.
Before Practice Situation	Areas that are void or nearly void of vegetation, resulting in bare soil being exposed to erosive processes. The exposed areas may be caused from recent natural occurrences (fire, flood, wind, etc.) or due to newly constructed conservation practices such as waterways, terraces, water and sediment basins or dams. The exposed areas will be subject to wind erosion, sheet and rill erosion, or visible rills may have already occurred. Runoff from the area flows into streams, water courses or other water bodies causing degradation to the receiving waters. The soil typically has a pH imbalance and low fertility.
After Practice Situation	This typical 1.0 acre critical area is stabilized by applying fertilizer, lime and seed. Soil amendments will be incorporated at an depth of six inches to improve fertility and ensure establishment of permanent vegetative cover. Apply 30 lbs of nitrogen, 60 lbs of phosphate, and 60 lbs of potash, along with an application of 2 tons of lime. Prepare a firm, weed free seedbed so that proper germination and stand establishment are ensured. Once the seedbed has been prepared, drill the following mixture for a vegetative cover: Smooth Bromegrass (15 lbs/ac), and Red Clover (8 lbs/ac) with a nurse crop of oats at a seeding rate of 48 lbs per acre.
Scenario Feature Measure	area seeded
Scenario Unit	Acre
Scenario Typical Size	1

Cost Summary:

Cost Category	Scenario Cost	Scenario Cost/Unit
Materials	$284.67	$284.67
Equipment/Installation	$47.60	$47.60
Labor	$0.00	$0.00
Mobilization	$0.00	$0.00
Acquisition of Technical Knowledge	$0.00	$0.00
Foregone Income	$0.00	$0.00
Total	$332.27	$332.27

Cost Details:

Cost Category	Component ID	Component Name	Component Description	Unit	Price ($/unit)	Quantity	Cost
Materials	112	Red Clover (Trifolium pratense)	Introduced Legumes and shipping.	Pound	$2.60	8	$20.80
Materials	197	Oats (Avena sativa)	Small Grains, Cover Crops. Shipping not included.	Pound	$0.46	48	$22.08
Materials	71	Nitrogen (N), Urea	Price per pound of N supplied by Urea. Price is not per pound of total product applied, no conversion is needed.	Pound	$0.58	30	$17.40
Materials	75	Lime, ENM	Fertilizer: Limestone Spread on field.	Ton	$49.57	2	$99.14
Materials	74	Potassium, K2O	K2O supplied by Muriate Of Potash. Price is not per pound of total product applied, no conversion is needed.	Pound	$0.55	60	$33.00
Materials	73	Phosphorus, P2O5	Price per pound of P2O5 supplied by Superphosphate. Price is not per pound of total product applied, no conversion is needed.	Pound	$0.75	60	$45.00
Materials	95	Smooth Bromegrass (Bromus inermis)	Introduced Perennial Grasses and shipping.	Pound	$3.15	15	$47.25
Equipment/Installation	945	Tillage, Light	Includes light disking (tandem) or field cultivator. Includes equipment, power unit and labor costs.	Acre	$9.85	2	$19.70
Equipment/Installation	960	Seeding Operation, No Till/Grass Drill	No Till drill or grass drill for seeding. Includes equipment, power unit and labor costs.	Acre	$14.35	1	$14.35
Equipment/Installation	1100	Cultipacking	Includes equipment, power unit and labor costs.	Acre	$7.67	1	$7.67
Equipment/Installation	950	Fertilizer, ground application, dry bulk	Dry bulk fertilizer application performed by ground equipment. Includes equipment, power unit and labor costs.	Acre	$5.88	1	$5.88

Scenario Worksheet

Practice and Scenario Description:

Information Type	Data
Region	Northern Plains
State	South Dakota
Discipline Group	Agronomy
Practice Code/Name	342 - Critical Area Planting
Scenario ID	2
Scenario Name	Organic Grass/legume mix
Scenario Description	Establishment of permanent vegetation on a site that is void or nearly void of vegetation due to a natural occurrence or a newly constructed conservation practice. Costs include seedbed preparation with typical tillage implements, grass/legume seed, companion crop, and fertilizer and lime with application. Certified organic seed and fertilizer based upon NOP approved fertilizer inputs will be used where available.
Before Practice Situation	Areas that are void or nearly void of vegetation, resulting in bare soil being exposed to erosive processes. The exposed areas may be caused from recent natural occurrences (fire, flood, etc) or due to newly constructed conservation practices such as waterways, terraces, water and sediment basins or dams. The exposed areas will be subject to wind erosion, sheet and rill erosion, or visible rills may have already occurred. Runoff from the area flows into streams, water courses or other water bodies causing degradation to the receiving waters. The soil typically has a pH imbalance and low fertility.
After Practice Situation	This typical 1.0 acre critical area is stabilized by applying fertilizer, lime and seed. Soil amendments will be incorporated at an depth of six inches to improve fertility and ensure establishment of permanent vegetative cover. The plant nutrients will supplied by a blend of organic soil amendments. Apply 30 lbs of nitrogen, 60 lbs of phosphate, and 60 lbs of potash, along with an application of 2 tons of lime. Prepare a firm, weed free seedbed so that proper germination and stand establishment are ensured. Once the seedbed has been prepared, drill the following mixture for a vegetative cover: Smooth Bromegrass (15 lbs/ac) and Red Clover (8 lbs/ac) with a nurse crop of oats at a seeding rate of 48 lbs per acre. Organic seed will be used where available. Manure may be used in lieu of a commercially blended product as long as the manure is tested and the correct quantity of manure is calculated such that the specified 30-60-60 N-P2O5-K2O requirement is met.
Scenario Feature Measure	area seeded
Scenario Unit	Acre
Scenario Typical Size	1

Cost Summary:

Cost Category	Scenario Cost	Scenario Cost/Unit
Materials	$601.43	$601.43
Equipment/Installation	$47.60	$47.60
Labor	$0.00	$0.00
Mobilization	$0.00	$0.00
Acquisition of Technical Knowledge	$0.00	$0.00
Foregone Income	$0.00	$0.00
Total	$649.03	$649.03

Cost Details:

Cost Category	Component ID	Component Name	Component Description	Unit	Price ($/unit)	Quantity	Cost
Materials	117	Certified Organic, Red Clover (Trifolium pratense)	Introduced Legumes and shipping.	Pound	$8.46	8	$67.68
Materials	266	Nitrogen, Organic	ORGANIC Nitrogen	Pound	$2.53	30	$75.90
Materials	267	Phosphorus, Organic	ORGANIC Phosphorus	Pound	$3.04	60	$182.40
Materials	202	Certified Organic, Oats (Avena sativa)	Small Grains, Cover Crops. Shipping not included.	Pound	$0.62	48	$29.76
Materials	268	Potassium, Organic	ORGANIC Potassium	Pound	$1.34	60	$80.40
Materials	75	Lime, ENM	Fertilizer: Limestone Spread on field.	Ton	$49.57	2	$99.14
Materials	102	Certified Organic, Smooth Bromegrass (Bromus inermis)	Introduced Perennial Grasses and shipping.	Pound	$4.41	15	$66.15
Equipment/Installation	1100	Cultipacking	Includes equipment, power unit and labor costs.	Acre	$7.67	1	$7.67
Equipment/Installation	960	Seeding Operation, No Till/Grass Drill	No Till drill or grass drill for seeding. Includes equipment, power unit and labor costs.	Acre	$14.35	1	$14.35
Equipment/Installation	950	Fertilizer, ground application, dry bulk	Dry bulk fertilizer application performed by ground equipment. Includes equipment, power unit and labor costs.	Acre	$5.88	1	$5.88
Equipment/Installation	945	Tillage, Light	Includes light disking (tandem) or field cultivator. Includes equipment, power unit and labor costs.	Acre	$9.85	2	$19.70

Scenario Worksheet

Practice and Scenario Description:

Information Type	Data
Region	Northern Plains
State	South Dakota
Discipline Group	Agronomy
Practice Code/Name	342 - Critical Area Planting
Scenario ID	3
Scenario Name	Native seeding
Scenario Description	Establishment of permanent vegetation on a site that is void or nearly void of vegetation due to a natural occurrence or a newly constructed conservation practice. Costs include seedbed preparation with typical tillage implements, native grass seed, and fertilizer and lime with application.
Before Practice Situation	Areas that are void or nearly void of vegetation, resulting in bare soil being exposed to erosive processes. The exposed areas may be caused from recent natural occurrences (fire, flood, etc) or due to newly constructed conservation practices such as waterways, terraces, water and sediment basins or dams. The exposed areas will be subject to wind erosion, sheet and rill erosion, or visible rills may have already occurred. Runoff from the area flows into streams, water courses or other water bodies causing degradation to the receiving waters. The soil typically has a pH imbalance and low fertility.
After Practice Situation	This typical 1.0 acre critical area is stabilized by applying fertilizer, lime and seed. Soil amendments will be incorporated at an depth of six inches to improve fertility and ensure establishment of permanent vegetative cover. Apply 60 lbs of phosphate and 60 lbs of potash, along with an application of 2 tons of lime. Prepare a firm, weed free seedbed so that proper germination and stand establishment are ensured. Once the seedbed has been prepared, drill the following mixture for a vegetative cover: Big Bluestem (14 lbs/ac) and Switchgrass (2 lbs/ac) with a nurse crop of oats at a seeding rate of 32 lbs per acre.
Scenario Feature Measure	area seeded
Scenario Unit	Acre
Scenario Typical Size	1

Cost Summary:

Cost Category	Scenario Cost	Scenario Cost/Unit
Materials	$376.44	$376.44
Equipment/Installation	$47.60	$47.60
Labor	$0.00	$0.00
Mobilization	$0.00	$0.00
Acquisition of Technical Knowledge	$0.00	$0.00
Foregone Income	$0.00	$0.00
Total	$424.04	$424.04

Cost Details:

Cost Category	Component ID	Component Name	Component Description	Unit	Price ($/unit)	Quantity	Cost
Materials	197	Oats (Avena sativa)	Small Grains, Cover Crops. Shipping not included.	Pound	$0.46	32	$14.72
Materials	76	Big Blue Stem (Andropogon gerardii)	Native Grasses and shipping.	Pound	$11.81	14	$165.34
Materials	82	Switchgrass, Blackwell (Panicum virgatum)	Native Grasses and shipping.	Pound	$9.62	2	$19.24
Materials	75	Lime, ENM	Fertilizer: Limestone Spread on field.	Ton	$49.57	2	$99.14
Materials	74	Potassium, K2O	K2O supplied by Muriate Of Potash. Price is not per pound of total product applied, no conversion is needed.	Pound	$0.55	60	$33.00
Materials	73	Phosphorus, P2O5	Price per pound of P2O5 supplied by Superphosphate. Price is not per pound of total product applied, no conversion is needed.	Pound	$0.75	60	$45.00
Equipment/Installation	945	Tillage, Light	Includes light disking (tandem) or field cultivator. Includes equipment, power unit and labor costs.	Acre	$9.85	2	$19.70
Equipment/Installation	960	Seeding Operation, No Till/Grass Drill	No Till drill or grass drill for seeding. Includes equipment, power unit and labor costs.	Acre	$14.35	1	$14.35
Equipment/Installation	1100	Cultipacking	Includes equipment, power unit and labor costs.	Acre	$7.67	1	$7.67
Equipment/Installation	950	Fertilizer, ground application, dry bulk	Dry bulk fertilizer application performed by ground equipment. Includes equipment, power unit and labor costs.	Acre	$5.88	1	$5.88

Scenario Worksheet

Practice and Scenario Description:

Information Type	Data
Region	Northern Plains
State	South Dakota
Discipline Group	Agronomy
Practice Code/Name	345 - Res. & Tillage Mgt, Mulch-till
Scenario ID	1
Scenario Name	Mulch till, Basic
Scenario Description	Mulch-till is managing the amount, orientation and distribution of crop and other plant residue on the soil surface year round while limiting the soil-disturbing activities used to grow crops in systems where the entire field surface is tilled prior to planting. This practice includes tillage methods commonly referred to as mulch tillage or chiseling and disking. It applies to stubble mulching on summer-fallowed land, to tillage for annually planted crops and to tillage for planted crops and to tillage for planting perennial crops. All residue shall be uniformly surface throughout critical wind erosion period. All residue shall be uniformly distributed over the entire field and not burned or removed. These periods of intensive tillage have led to excessive soil loss, often above the Soil Loss Tolerance (T), due to the loss of critical crop or weed residue. The RUSLE2 model will be used to review the farming operation and determine if enough residue is being retained, throughout the rotation, to keep soil loss below T. The producer will then remove operations, or select alternate operations, to reduce erosion below T.
Before Practice Situation	Row crops such as corn, soybeans, etc. are grown and harvested in mid-late fall. Fields are disked immediately following harvest, with rows in some fields being hipped for drainage. Residue amounts after harvest average 30% or less, resulting in bare soil being exposed to wind erosion and/or intense rainfall during the fall, winter, and early spring. Over the winter residue degrades and sediment/nutrient runoff from fields increases. Sheet and rill erosion occurs with visible rills by spring. Spring tillage and seedbed preparation activities occur as early as possible in the late winter and early spring. Weed control is accomplished primarily through tillage, requiring multiple operations. Runoff from the fields flows into streams, water courses or other water bodies causing degradation to the receiving waters. Soil health (soil organic matter) declines over time as a result of tillage practices, low residue monocultures, and long periods of bare soil.
After Practice Situation	Mulch tillage applies to all cropland and other lands where crops are planned. It applies to stubble mulching on summer fallowed land to tillage for annually planted crops and to tillage for plating perennial crops. It also includes some planting operation such as hoe drill, air seeder and no-till drill that disturb a large percentage of soil surface using the planting operation. tillage occurs after crop harvest. In warmer areas, winter weeds or cover crops grow throughout the winter months. The residue that remains on the soil surface provides soil cover during late fall, throughout the winter, and into the early spring. Runoff and erosion are reduced and no rills are visible on the soil surface in the spring. Wind erosion is reduced by standing residues. Winter weeds or the cover crop is terminated with tillage, a roller-crimper, shredding, or a combination of these methods prior to spring planting as late as feasible. Over time, soil health is improved due to the additional biomass, ground cover, soil infiltration, and plant diversity in the cropping system.
Scenario Feature Measure	Area planted
Scenario Unit	Acre
Scenario Typical Size	100

Cost Summary:

Cost Category	Scenario Cost	Scenario Cost/Unit
Materials	$0.00	$0.00
Equipment/Installation	$3,941.00	$39.41
Labor	$0.00	$0.00
Mobilization	$0.00	$0.00
Acquisition of Technical Knowledge	$150.27	$1.50
Foregone Income	$0.00	$0.00
Total	$4,091.27	$40.91

Cost Details:

Cost Category	Component ID	Component Name	Component Description	Unit	Price ($/unit)	Quantity	Cost
Equipment/Installation	960	Seeding Operation, No Till/Grass Drill	No Till drill or grass drill for seeding. Includes equipment, power unit and labor costs.	Acre	$14.35	50	$717.50
Equipment/Installation	1230	Seeding Operation, No Till/Strip Till Planter	No Till/Strip Till row planters for seeding. Includes all costs for equipment, power unit, and labor.	Acre	$14.91	50	$745.50
Equipment/Installation	945	Tillage, Light	Includes light disking (tandem) or field cultivator. Includes equipment, power unit and labor costs.	Acre	$9.85	100	$985.00
Equipment/Installation	946	Tillage, Primary	Includes heavy disking (offset) or chisel plow. Includes equipment, power unit and labor costs.	Acre	$14.93	100	$1,493.00
Acquisition of Technical Knowledge	294	Training, Workshops	Educational seminar or series of meetings emphasizing interaction and exchange of information among a usually small number of participants.	Each	$116.67	1	$116.67
Acquisition of Technical Knowledge	297	Transportation	Mileage to attend a training conference, workshop, or TSP travel associated with developing Conservation Activity Plan.	Mile	$0.56	60	$33.60

Scenario Worksheet

Practice and Scenario Description:

Information Type	Data
Region	Northern Plains
State	South Dakota
Discipline Group	Agronomy
Practice Code/Name	346 - Residue and Tillage Management - Ridge Till
Scenario ID	1
Scenario Name	Ridge Till
Scenario Description	This practice typically involves conversion from a conventional tillage system to a ridge tillage (conservation tillage) system on 160 acres of cropland. This involves managing the amount, orientation and distribution of crop and other plant residue on the soil surface year round while limiting soil-disturbing activities used to grow and harvest crops in systems. The practice is used to reduce wind erosion, reduce sheet and rill erosion, improve soil quality, reduce energy use, increase plant available moisture. The ridge till system includes using a ridge till planter and chemical weed control, and may also include a period of chemical fallow. This residue management system is applicable to both irrigated and non-irrigated fields. This system will manage soil erosion to T and maintain a positive SCI.
Before Practice Situation	Row crops such as corn, soybeans, grain sorghum, etc are grown and harvested in mid-late fall. Full width tillage is performed prior to planting and weed control during crop production is typically cultivation and chemical application. Fields are plowed immediately following harvest, with several additional tillage operations applied to field prior to planting for land preparation and weed control. Residue amounts after tillage operations average less than 10%, resulting in bare soil being exposed to wind erosion and intense rainfall during the fall, winter, and early spring. Any crop residue that is present degrades and sediment/nutrient runoff from fields increases during rainfall events. Sheet and rill erosion and wind occurs with visible signs of soil erosion by spring. Soil health (soil organic matter) declines over time as a result of tillage practices, low residue, and long periods of bare soil. This system will typically have a negative Soil Conditioning Index (SCI) and a high Soil Tillage Intensity Rating (STIR).
After Practice Situation	Practice applied per the conservation practice standard 346 to meet the planned purposes. Managing crop residue on the surface year around while limiting soil disturbing activities to those which reshape ridges, place nutrients, and plant crops. All crops are seeded/planted with a ridge till planter, which minimizes soil disturbance while establishing good seed-soil contact. All residues are to be maintained on the soil surface in a uniform distribution over the entire field and not burned or removed. Crop residues provide soil surface cover throughout the year. Runoff and erosion are reduced and no rills are visible on the soil surface. Wind erosion is reduced by standing residues and surface cover. Over time, soil health is improved due to the additional crop residues, ground cover, and soil infiltration. This practice will require reducing soil erosion to T and maintain a positive SCI.
Scenario Feature Measure	Area planted
Scenario Unit	Acre
Scenario Typical Size	160

Cost Summary:

Cost Category	Scenario Cost	Scenario Cost/Unit
Materials	$0.00	$0.00
Equipment/Installation	$5,635.20	$35.22
Labor	$0.00	$0.00
Mobilization	$0.00	$0.00
Acquisition of Technical Knowledge	$150.27	$0.94
Foregone Income	$0.00	$0.00
Total	$5,785.47	$36.16

Cost Details:

Cost Category	Component ID	Component Name	Component Description	Unit	Price ($/unit)	Quantity	Cost
Equipment/Installation	1231	Ridge Till Row Cultivator	Includes equipment, power unit and labor costs.	Acre	$14.34	160	$2,294.40
Equipment/Installation	1232	Seeding Operation, Ridge Till Planter	Mechanical seeding using ridge-till equipment. Includes equipment, power unit and labor costs.	Acre	$20.88	160	$3,340.80
Acquisition of Technical Knowledge	294	Training, Workshops	Educational seminar or series of meetings emphasizing interaction and exchange of information among a usually small number of participants.	Each	$116.67	1	$116.67
Acquisition of Technical Knowledge	297	Transportation	Mileage to attend a training conference, workshop, or TSP travel associated with developing Conservation Activity Plan.	Mile	$0.56	60	$33.60

Scenario Worksheet

Practice and Scenario Description:

Information Type	Data
Region	Northern Plains
State	South Dakota
Discipline Group	Engineering General
Practice Code/Name	348 - Dam Diversion
Scenario ID	1
Scenario Name	Earthfill
Scenario Description	An earthen embankment built to divert all or part of the water from a waterway or a stream to provide water in such a manner that it can be controlled and used beneficially for irrigation, waterspreading, livestock water, fire control, municipal or industrial uses, develop renewable energy systems, recreation, or to divert periodic damaging flows from one watercourse to another watercourse thereby reducing the damage potential of the flows. This structure will address the resource concerns of inefficient water use on Irrigated Land, inadequate water for livestock, and inadequate water supply for other beneficial uses.
Before Practice Situation	This practice applies where a diversion dam is needed as an integral part of an irrigation or water-spreading system designed to facilitate the conservation use of soil and water resources, Diversion of water from an unstable watercourse to a stable watercourse is desirable, The water supply available is adequate for the purpose for which it is to be diverted, Adverse environmental impacts resulting from the installation of the practice can be overcome. This standard applies to structures of a permanent nature, constructed of materials having an expected life span consistent with the purpose for which the structure is designed. It does not apply where conservation practice standard Diversion (362), Floodwater Diversion (400), Dam (402), or Grade Stabilization Structure (410) would be used. This practice will provide beneficial uses for irrigation, livestock water, fire control, municipal or industrial uses, renewable energy systems, recreation, or to divert periodic damaging flows from one watercourse to another watercourse thereby reducing the damage potential of the flows.
After Practice Situation	An earth fill structure of approximately 3000 cubic yards is built to divert all or part of the water from a waterway or a stream. This standard applies to structures of a permanent nature, constructed of materials having an expected life span consistent with the purpose for which the structure is designed. This structure will be an integral part of an irrigation or water-spreading system designed to facilitate the conservation use of soil and water resources, or diversion of water from an unstable watercourse to a stable watercourse as needed. The water supply available is adequate for the purpose for which it is to be diverted. Adverse environmental impacts resulting from the installation of the practice must be overcome. The sheet pile structure provides beneficial uses for irrigation, livestock water, fire control, municipal or industrial uses, renewable energy systems, recreation, or to divert periodic damaging flows from one watercourse to another watercourse thereby reducing the damage potential of the flows. Any needed vegetation of disturbed areas must use Critical Area Planting (342). Other associated practices such as Channel Vegetation (322), Stream Habitat Improvement and Management (395), Channel Stabilization (584) will be as appropriate. Any needed head gates or flap gates to control the quantity of water being diverted must use Structure for Water Control (587).
Scenario Feature Measure	Volume of Earth Fill
Scenario Unit	Cubic Yard
Scenario Typical Size	3000

Cost Summary:

Cost Category	Scenario Cost	Scenario Cost/Unit
Materials	$0.00	$0.00
Equipment/Installation	$5,571.10	$1.86
Labor	$971.58	$0.32
Mobilization	$450.32	$0.15
Acquisition of Technical Knowledge	$0.00	$0.00
Foregone Income	$0.00	$0.00
Total	$6,993.00	$2.33

Cost Details:

Cost Category	Component ID	Component Name	Component Description	Unit	Price ($/unit)	Quantity	Cost
Equipment/Installation	1199	Stripping and stockpiling, topsoil	Stripping and stockpiling of topsoil adjacent to stripping area. Includes equipment and labor.	Cubic Yard	$0.79	400	$316.00
Equipment/Installation	1207	Scraper, pull, 15 CY	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	$21.34	30	$640.20
Equipment/Installation	928	Dozer, 200 HP	Track mounted Dozer with horsepower range of 160 to 250. Equipment and power unit costs. Labor not included.	Hour	$153.83	30	$4,614.90
Labor	231	General Labor	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	$16.72	8	$133.76
Labor	230	Skilled Labor	Labor requiring a high level skill set: Includes carpenters, welders, electricians, conservation professionals involved with data collection, monitoring, and or record keeping, etc.	Hour	$23.53	4	$94.12
Labor	233	Equipment Operators, Heavy	Includes: Cranes, Hydraulic Excavators >=50 HP, Dozers, Paving Machines, Rock Trenchers, Trenchers >=12", Dump Trucks, Ag Equipment >=150 HP, Scrapers, Water Wagons.	Hour	$24.79	30	$743.70
Mobilization	1140	Mobilization, large equipment	Equipment >150HP or typical weights greater than 30,000 pounds or loads requiring over width or over length permits.	Each	$225.16	2	$450.32

Scenario Worksheet

Practice and Scenario Description:

Information Type	Data
Region	Northern Plains
State	South Dakota
Discipline Group	Engineering General
Practice Code/Name	351 - Water Well Decommissioning
Scenario ID	1
Scenario Name	Shallow > 15" dia.
Scenario Description	A licensed well driller will seal and permanently close an inactive, abandoned, or unusable water well to prevent excess nutrients in surface and groundwater and to eliminate pesticides transported to surface and ground water. Well will be cleared of all equipment and materials. Residual water column must be treated with chlorine concentration of >50 ppm or according to local, State, Tribal, or Federal regulations. Install fill material (gravel, earth, concrete, and/or bentonite) consisting of 80% Gravel, 10% Cement or Bentonite, and 10% Earthfill.
Before Practice Situation	Shallow well or hand dug well that is greatr than 15" diameter and less than 20 feet deep. Assume 30" diameter casing. Well will be cleared of all equipment and materials. Residual water column must be treated with chlorine concentration of >50 ppm or according to local, State, Tribal, or Federal regulations.
After Practice Situation	Procedures and sealing materials shall conform to ASTM D5299 and be compatible with all local, State, Tribal, and Federal requirements. Backfill shall be placed and compacted in a manner that minimizes segregation and bulking to prevent surface subsidence. Associated practices: 342 Critical Area Seeding
Scenario Feature Measure	Length of well casing
Scenario Unit	Foot
Scenario Typical Size	20

Cost Summary:

Cost Category	Scenario Cost	Scenario Cost/Unit
Materials	$178.43	$8.92
Equipment/Installation	$149.82	$7.49
Labor	$107.81	$5.39
Mobilization	$120.38	$6.02
Acquisition of Technical Knowledge	$0.00	$0.00
Foregone Income	$0.00	$0.00
Total	$556.44	$27.82

Cost Details:

Cost Category	Component ID	Component Name	Component Description	Unit	Price ($/unit)	Quantity	Cost
Materials	1226	Concrete mix, bag	Pre-mixed dry concrete mix in 60 pound bag. Materials only.	Each	$4.79	3	$14.37
Materials	1335	Chlorine	Liquid chlorine bleach. Materials only.	Gallon	$2.32	1	$2.32
Materials	1331	Aggregate, gravel, washed, pea gravel	Washed and graded pea gravel river stone. Includes materials and transport to site.	Cubic Yard	$44.95	2.9	$130.36
Materials	41	Bentonite	Bentonite, includes materials (50# bag)	Each	$10.46	3	$31.38
Equipment/Installation	50	Earthfill, Manually Compacted	Earthfill, manually compacted, includes equipment and labor	Cubic yard	$4.91	3	$14.73
Equipment/Installation	926	Backhoe, 80 HP	Wheel mounted backhoe excavator with horsepower range of 60 to 90. Equipment and power unit costs. Labor not included.	Hour	$45.03	3	$135.09
Labor	231	General Labor	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	$16.72	2	$33.44
Labor	233	Equipment Operators, Heavy	Includes: Cranes, Hydraulic Excavators >=50 HP, Dozers, Paving Machines, Rock Trenchers, Trenchers >=12", Dump Trucks, Ag Equipment >=150 HP, Scrapers, Water Wagons.	Hour	$24.79	3	$74.37
Mobilization	1139	Mobilization, medium equipment	Equipment with 70-150 HP or typical weights between 14,000 and 30,000 pounds.	Each	$120.38	1	$120.38

Scenario Worksheet

Practice and Scenario Description:

Information Type	Data
Region	Northern Plains
State	South Dakota
Discipline Group	Engineering General
Practice Code/Name	351 - Water Well Decommissioning
Scenario ID	2
Scenario Name	Shallow < 15"dia.
Scenario Description	A licensed well driller will seal and permanently close an inactive, abandoned, or unusable water well to prevent excess nutrients in surface and groundwater and to eliminate pesticides transported to surface and ground water. Well will be cleared of all equipment and materials. Residual water column must be treated with chlorine concentration of >50 ppm or according to local, State, Tribal, or Federal regulations. Install fill material (gravel, earth, concrete, and/or bentonite) consisting of 60% Gravel, 20% Concrete or Bentonite, and 20% Earthfill.
Before Practice Situation	Shallow well or hand dug well that is less than 15" diameter and less than 80 feet deep. Assume 12" diameter casing. Well will be cleared of all equipment and materials. Residual water column must be treated with chlorine concentration of >50 ppm or according to local, State, Tribal, or Federal regulations.
After Practice Situation	Procedures and sealing materials shall conform to ASTM D5299 and be compatible with all local, State, Tribal, and Federal requirements. Backfill shall be placed and compacted in a manner that minimizes segregation and bulking to prevent surface subsidence. Associated practices: 342 Critical Area Seeding.
Scenario Feature Measure	Length of well casing
Scenario Unit	Foot
Scenario Typical Size	80

Cost Summary:

Cost Category	Scenario Cost	Scenario Cost/Unit
Materials	$107.77	$1.35
Equipment/Installation	$93.01	$1.16
Labor	$83.02	$1.04
Mobilization	$120.38	$1.50
Acquisition of Technical Knowledge	$0.00	$0.00
Foregone Income	$0.00	$0.00
Total	$404.18	$5.05

Cost Details:

Cost Category	Component ID	Component Name	Component Description	Unit	Price ($/unit)	Quantity	Cost
Materials	1226	Concrete mix, bag	Pre-mixed dry concrete mix in 60 pound bag. Materials only.	Each	$4.79	4	$19.16
Materials	1335	Chlorine	Liquid chlorine bleach. Materials only.	Gallon	$2.32	1	$2.32
Materials	41	Bentonite	Bentonite, includes materials (50# bag)	Each	$10.46	5	$52.30
Materials	45	Aggregate, Sand, Graded, Washed	Sand, typical ASTM C33 gradation, includes materials, equipment and labor to transport and place	Cubic yard	$24.28	1.4	$33.99
Equipment/Installation	50	Earthfill, Manually Compacted	Earthfill, manually compacted, includes equipment and labor	Cubic yard	$4.91	0.6	$2.95
Equipment/Installation	926	Backhoe, 80 HP	Wheel mounted backhoe excavator with horsepower range of 60 to 90. Equipment and power unit costs. Labor not included.	Hour	$45.03	2	$90.06
Labor	231	General Labor	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	$16.72	2	$33.44
Labor	233	Equipment Operators, Heavy	Includes: Cranes, Hydraulic Excavators >=50 HP, Dozers, Paving Machines, Rock Trenchers, Trenchers >=12", Dump Trucks, Ag Equipment >=150 HP, Scrapers, Water Wagons.	Hour	$24.79	2	$49.58
Mobilization	1139	Mobilization, medium equipment	Equipment with 70-150 HP or typical weights between 14,000 and 30,000 pounds.	Each	$120.38	1	$120.38

Scenario Worksheet

Practice and Scenario Description:

Information Type	Data
Region	Northern Plains
State	South Dakota
Discipline Group	Engineering General
Practice Code/Name	351 - Water Well Decommissioning
Scenario ID	3
Scenario Name	Pump Grout Filled
Scenario Description	A licensed well driller will seal and permanently close an inactive, abandoned, or unusable water well to prevent excess nutrients in surface and groundwater and to eliminate pesticides transported to surface and ground water.
Before Practice Situation	Drilled well with surface casing that is approximately 250 feet deep. Typically will be a well of less than 6" in diameter, or an artesian well which will require grout pumped and well filled from bottom up.
After Practice Situation	Procedures and sealing materials shall conform to ASTM D5299 and be compatible with all local, State, Tribal, and Federal requirements. Backfill shall be placed and compacted in a manner that minimizes segregation and bulking to prevent surface subsidense. Associated practices: 342 Critical Area Seeding
Scenario Feature Measure	Length of well casing
Scenario Unit	Foot
Scenario Typical Size	250

Cost Summary:

Cost Category	Scenario Cost	Scenario Cost/Unit
Materials	$145.71	$0.58
Equipment/Installation	$165.89	$0.66
Labor	$177.14	$0.71
Mobilization	$240.76	$0.96
Acquisition of Technical Knowledge	$0.00	$0.00
Foregone Income	$0.00	$0.00
Total	$729.50	$2.92

Cost Details:

Cost Category	Component ID	Component Name	Component Description	Unit	Price ($/unit)	Quantity	Cost
Materials	1333	Grout, cement	Cement grout meeting ASTM specifications for well sealing. Includes both neat-cement grout and bentonite gout mixtures. Includes materials, equipment and labor to place.	Cubic Yard	$79.66	1.8	$143.39
Materials	1335	Chlorine	Liquid chlorine bleach. Materials only.	Gallon	$2.32	1	$2.32
Equipment/Installation	1334	Grout pump	Grout pump with tremie pipe. Equipment and power unit costs. Labor not included.	Hour	$12.82	4	$51.28
Equipment/Installation	50	Earthfill, Manually Compacted	Earthfill, manually compacted, includes equipment and labor	Cubic yard	$4.91	5	$24.55
Equipment/Installation	926	Backhoe, 80 HP	Wheel mounted backhoe excavator with horsepower range of 60 to 90. Equipment and power unit costs. Labor not included.	Hour	$45.03	2	$90.06
Labor	231	General Labor	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	$16.72	2	$33.44
Labor	233	Equipment Operators, Heavy	Includes: Cranes, Hydraulic Excavators >=50 HP, Dozers, Paving Machines, Rock Trenchers, Trenchers >=12", Dump Trucks, Ag Equipment >=150 HP, Scrapers, Water Wagons.	Hour	$24.79	2	$49.58
Labor	230	Skilled Labor	Labor requiring a high level skill set: Includes carpenters, welders, electricians, conservation professionals involved with data collection, monitoring, and or record keeping, etc.	Hour	$23.53	4	$94.12
Mobilization	1139	Mobilization, medium equipment	Equipment with 70-150 HP or typical weights between 14,000 and 30,000 pounds.	Each	$120.38	2	$240.76

Scenario Worksheet

Practice and Scenario Description:

Information Type	Data
Region	Northern Plains
State	South Dakota
Discipline Group	Engineering General
Practice Code/Name	351 - Water Well Decommissioning
Scenario ID	4
Scenario Name	Drilled well greater than 300 ft deep
Scenario Description	A licensed well driller will seal and permanently close an inactive, abandoned, or unusable water well to prevent excess nutrients in surface and groundwater and to eliminate pesticides transported to surface and ground water.
Before Practice Situation	Drilled well that is greater than 300 feet deep. Assume 6" diameter casing.
After Practice Situation	Procedures and sealing materials shall conform to ASTM D5299 and be compatible with all local, State, Tribal, and Federal requirements. Backfill shall be placed and compacted in a manner that minimizes segregation and bulking to prevent surface subsidense. Associated practices: 342 Critical Area Seeding
Scenario Feature Measure	Length of well casing
Scenario Unit	Linear Foot
Scenario Typical Size	500

Cost Summary:

Cost Category	Scenario Cost	Scenario Cost/Unit
Materials	$297.06	$0.59
Equipment/Installation	$172.14	$0.34
Labor	$246.47	$0.49
Mobilization	$120.38	$0.24
Acquisition of Technical Knowledge	$0.00	$0.00
Foregone Income	$0.00	$0.00
Total	$836.05	$1.67

Cost Details:

Cost Category	Component ID	Component Name	Component Description	Unit	Price ($/unit)	Quantity	Cost
Materials	1333	Grout, cement	Cement grout meeting ASTM specifications for well sealing. Includes both neat-cement grout and bentonite gout mixtures. Includes materials, equipment and labor to place.	Cubic Yard	$79.66	3.7	$294.74
Materials	1335	Chlorine	Liquid chlorine bleach. Materials only.	Gallon	$2.32	1	$2.32
Equipment/Installation	50	Earthfill, Manually Compacted	Earthfill, manually compacted, includes equipment and labor	Cubic yard	$4.91	5	$24.55
Equipment/Installation	1334	Grout pump	Grout pump with tremie pipe. Equipment and power unit costs. Labor not included.	Hour	$12.82	8	$102.56
Equipment/Installation	926	Backhoe, 80 HP	Wheel mounted backhoe excavator with horsepower range of 60 to 90. Equipment and power unit costs. Labor not included.	Hour	$45.03	1	$45.03
Labor	233	Equipment Operators, Heavy	Includes: Cranes, Hydraulic Excavators >=50 HP, Dozers, Paving Machines, Rock Trenchers, Trenchers >=12", Dump Trucks, Ag Equipment >=150 HP, Scrapers, Water Wagons.	Hour	$24.79	1	$24.79
Labor	230	Skilled Labor	Labor requiring a high level skill set: Includes carpenters, welders, electricians, conservation professionals involved with data collection, monitoring, and or record keeping, etc.	Hour	$23.53	8	$188.24
Labor	231	General Labor	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	$16.72	2	$33.44
Mobilization	1139	Mobilization, medium equipment	Equipment with 70-150 HP or typical weights between 14,000 and 30,000 pounds.	Each	$120.38	1	$120.38

Scenario Worksheet

Practice and Scenario Description:

Information Type	Data
Region	Northern Plains
State	South Dakota
Discipline Group	Engineering General
Practice Code/Name	356 - Dike
Scenario ID	2
Scenario Name	Protective dike, <= 6 feet high
Scenario Description	Construction of a barrier, constructed of an earthen embankment, to control water level. Embankment structure to provide adequate freeboard, allowance for settlement, and foundation and embankment stability. Associated practices include, but are not limited to: PS327 Conservation Cover, PS656 Constructed Wetland, PS342 Critical Area Planting, PS378 Ponds, PS382 Fence, PS464 Irrigation Land Levelling, PS500 Obstruction Removal, PS528 Prescribed Grazing, PS587 Structure for Water Control, PS620 Underground Outlet, PS645 Upland Wildlife Management, PS658 Wetland Creation, PS659 Wetland Enhancement, PS657 Wetland Restoration, PS644 Wetland Wildlife Habitat Management.
Before Practice Situation	Site is subject to flooding or indundation which poses a potential hazard to public safety, damage to land or property. Site may also require control of water level for purposes connected with crop production; fish and wildlife managment; or wetland maintenance, improvement, restoration, or construction. An adequate quantity of soil suitable for constructing an earthen dike is available at an economical haul distance.
After Practice Situation	Water level controlled by a stable earthen structure. Potential hazard to public safety, land or property mitigated; environmental benefit provided.
Scenario Feature Measure	Length of constructed dike
Scenario Unit	Foot
Scenario Typical Size	1000

Cost Summary:

Cost Category	Scenario Cost	Scenario Cost/Unit
Materials	$0.00	$0.00
Equipment/Installation	$26,176.99	$26.18
Labor	$0.00	$0.00
Mobilization	$675.48	$0.68
Acquisition of Technical Knowledge	$0.00	$0.00
Foregone Income	$0.00	$0.00
Total	$26,852.47	$26.85

Cost Details:

Cost Category	Component ID	Component Name	Component Description	Unit	Price ($/unit)	Quantity	Cost
Equipment/Installation	1223	Excavation, common earth, large equipment, 150 ft	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	$3.34	1222	$4,081.48
Equipment/Installation	49	Earthfill, Roller Compacted	Earthfill, roller or machine compacted, includes equipment and labor	Cubic yard	$3.67	5925	$21,744.75
Equipment/Installation	1199	Stripping and stockpiling, topsoil	Stripping and stockpiling of topsoil adjacent to stripping area. Includes equipment and labor.	Cubic Yard	$0.79	444	$350.76
Mobilization	1140	Mobilization, large equipment	Equipment >150HP or typical weights greater than 30,000 pounds or loads requiring over width or over length permits.	Each	$225.16	3	$675.48

Scenario Worksheet

Practice and Scenario Description:

Information Type	Data
Region	Northern Plains
State	South Dakota
Discipline Group	Engineering General
Practice Code/Name	356 - Dike
Scenario ID	3
Scenario Name	Protective Dike > 6 feet high
Scenario Description	Construction of a barrier, constructed of an earthen embankment, to control water level. Embankment structure to provide adequate freeboard, allowance for settlement, and foundation and embankment stability. Associated practices include, but are not limited to: PS327 Conservation Cover, PS656 Constructed Wetland, PS342 Critical Area Planting, PS378 Ponds, PS382 Fence, PS464 Irrigation Land Levelling, PS500 Obstruction Removal, PS528 Prescribed Grazing, PS587 Structure for Water Control, PS620 Underground Outlet, PS645 Upland Wildlife Management, PS658 Wetland Creation, PS659 Wetland Enhancement, PS657 Wetland Restoration, PS644 Wetland Wildlife Habitat Management.
Before Practice Situation	Site is subject to flooding or indundation which poses a potential hazard to public safety, damage to land or property. Site may also require control of water level for purposes connected with crop production; fish and wildlife managment; or wetland maintenance, improvement, restoration, or construction. An adequate quantity of soil suitable for constructing an earthen dike is available at an economical haul distance.
After Practice Situation	Water level controlled by a stable earthen structure. Potential hazard to public safety, land or property mitigated; environmental benefit provided.
Scenario Feature Measure	Length of constructed dike
Scenario Unit	Foot
Scenario Typical Size	1000

Cost Summary:

Cost Category	Scenario Cost	Scenario Cost/Unit
Materials	$0.00	$0.00
Equipment/Installation	$39,131.31	$39.13
Labor	$0.00	$0.00
Mobilization	$675.48	$0.68
Acquisition of Technical Knowledge	$0.00	$0.00
Foregone Income	$0.00	$0.00
Total	$39,806.79	$39.81

Cost Details:

Cost Category	Component ID	Component Name	Component Description	Unit	Price ($/unit)	Quantity	Cost
Equipment/Installation	1223	Excavation, common earth, large equipment, 150 ft	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	$3.34	1222	$4,081.48
Equipment/Installation	49	Earthfill, Roller Compacted	Earthfill, roller or machine compacted, includes equipment and labor	Cubic yard	$3.67	9407	$34,523.69
Equipment/Installation	1199	Stripping and stockpiling, topsoil	Stripping and stockpiling of topsoil adjacent to stripping area. Includes equipment and labor.	Cubic Yard	$0.79	666	$526.14
Mobilization	1140	Mobilization, large equipment	Equipment >150HP or typical weights greater than 30,000 pounds or loads requiring over width or over length permits.	Each	$225.16	3	$675.48

Scenario Worksheet

Practice and Scenario Description:

Information Type	Data
Region	Northern Plains
State	South Dakota
Discipline Group	Environmental Engineering
Practice Code/Name	359 - Waste Treatment Lagoon
Scenario ID	1
Scenario Name	Embankment Lagoon
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. Earthen lagoon liners are addressed with another 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), Roofs and Covers (367), and Solid/Liquid Waste Separation Facility (632).
Before Practice 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 Practice Situation	A waste treatment lagoon 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 and treating waste until it can be utilized in a proper manner in accordance with a nutrient management plan. Typical design size : Design Volume 464,400 ft3; 100' X 240' (bottom); 3:1 inside and outside side slopes; storage depth = 13'; freeboard (not included in design volume) Earthwork quantities based on 70% excavated depth and 30% fill depth, or excavated material is balanced with the required compacted fill. This scenario does not include any additional efforts required for constructing a compacted clay lining in the lagoon. This would be contracted under 521D Pond Sealing or Lining-Compacted Clay Treatment.
Scenario Feature Measure	Design Storage Volume
Scenario Unit	Cubic Foot
Scenario Typical Size	464400

Cost Summary:

Cost Category	Scenario Cost	Scenario Cost/Unit
Materials	$28.80	$0.00
Equipment/Installation	$23,977.00	$0.05
Labor	$0.00	$0.00
Mobilization	$450.32	$0.00
Acquisition of Technical Knowledge	$0.00	$0.00
Foregone Income	$0.00	$0.00
Total	$24,456.12	$0.05

Cost Details:

Cost Category	Component ID	Component Name	Component Description	Unit	Price ($/unit)	Quantity	Cost
Materials	1120	Structural steel tubing, 2" diameter	Structural steel tubing, 2" diameter, 1/8" wall thickness, materials only	Foot	$3.60	8	$28.80
Equipment/Installation	1199	Stripping and stockpiling, topsoil	Stripping and stockpiling of topsoil adjacent to stripping area. Includes equipment and labor.	Cubic Yard	$0.79	1130	$892.70
Equipment/Installation	49	Earthfill, Roller Compacted	Earthfill, roller or machine compacted, includes equipment and labor	Cubic yard	$3.67	6290	$23,084.30
Mobilization	1140	Mobilization, large equipment	Equipment >150HP or typical weights greater than 30,000 pounds or loads requiring over width or over length permits.	Each	$225.16	2	$450.32

Scenario Worksheet

Practice and Scenario Description:

Information Type	Data
Region	Northern Plains
State	South Dakota
Discipline Group	Environmental Engineering
Practice Code/Name	359 - Waste Treatment Lagoon
Scenario ID	2
Scenario Name	Excavated Lagoon
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. Earthen lagoon liners are addressed with another 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), Roofs and Covers (367), and Solid/Liquid Waste Separation Facility (632).
Before Practice 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 Practice Situation	A waste treatment lagoon 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 and treating waste until it can be utilized in a proper manner in accordance with a nutrient management plan. Typical design size : Design Volume 464,400 ft3; 100' X 240' (bottom); 3:1 inside and outside side slopes; storage depth = 13'; freeboard (not included in design volume) Earthwork quantities based on 85% excavated depth and 15% fill depth. This scenario does not include any additional efforts required for constructing a compacted clay lining in the lagoon. This would be contracted under 521D Pond Sealing or Lining-Compacted Clay Treatment.
Scenario Feature Measure	Design Storage Volume
Scenario Unit	Cubic Foot
Scenario Typical Size	464400

Cost Summary:

Cost Category	Scenario Cost	Scenario Cost/Unit
Materials	$28.80	$0.00
Equipment/Installation	$53,113.50	$0.11
Labor	$0.00	$0.00
Mobilization	$450.32	$0.00
Acquisition of Technical Knowledge	$0.00	$0.00
Foregone Income	$0.00	$0.00
Total	$53,592.62	$0.12

Cost Details:

Cost Category	Component ID	Component Name	Component Description	Unit	Price ($/unit)	Quantity	Cost
Materials	1120	Structural steel tubing, 2" diameter	Structural steel tubing, 2" diameter, 1/8" wall thickness, materials only	Foot	$3.60	8	$28.80
Equipment/Installation	1199	Stripping and stockpiling, topsoil	Stripping and stockpiling of topsoil adjacent to stripping area. Includes equipment and labor.	Cubic Yard	$0.79	1130	$892.70
Equipment/Installation	1223	Excavation, common earth, large equipment, 150 ft	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	$3.34	14620	$48,830.80
Equipment/Installation	51	Earthfill, Dumped and Spread	Earthfill, dumped and spread without compaction effort, includes equipment and labor	Cubic yard	$3.00	1130	$3,390.00
Mobilization	1140	Mobilization, large equipment	Equipment >150HP or typical weights greater than 30,000 pounds or loads requiring over width or over length permits.	Each	$225.16	2	$450.32

Scenario Worksheet

Practice and Scenario Description:

Information Type	Data
Region	Northern Plains
State	South Dakota
Discipline Group	Environmental Engineering
Practice Code/Name	360 - Waste Facility Closure
Scenario ID	1
Scenario Name	Decommissioning of Concrete Waste Storage Structure
Scenario Description	This practice scenario includes the decomissioning of a concrete storage and/or treatment structure or impoundment. The purpose of the practice is to address resource concerns related to water quality degradation due to excess nutrient and pathogens in ground and/or surface waters and air quality impacts from greenhouse gases, particulate matter and associated precursors, and objectionable odors. This practice scenario does not include payment for the removal and land application of the manure, wastewater, slurry and/or sludge; however, all manure wastes shall be removed and properly land applied in accordance with Nutrient Management (590) prior to decomissioning of the structure. Associated practices: Nutrient Management (590), Critical Area Planting (342)
Before Practice Situation	An existing concrete waste storage structure is no longer functioning correctly or is not being used for its intended purpose. The structure may or may not contain manure, wastewater, slurry and/or sludge. It poses a safety hazard for humans and livestock and is a threat to environmentally sustainability by the potential for impacts to water and air quality.
After Practice Situation	This scenario assumes a concrete waste storage structure with a volume of 48000 cubic feet with footprint of 6000 square feet and 8 ft vertical walls 8" thick. The volume of earthwork (earthfill and/or excavation, final grading) required is approximately 75% of the storage volume. Decomissioning of a concrete waste storage structure will consist of collapsing the concrete sidewalls to 80% of their original height and filling the storage structure with earthfill. The concrete may be disposed off site if necessary. All manure and wastewater nutrient material shall be removed and land applied in accordance with Nutrient Management (590) prior to fill. After collapsing the side walls the remaining void will be filled with earthen material from a borrow source. The disturbed areas shall be vegetated in accordance with Critical Area Planting (342) or planted to crops in accordance with Nutrient Management (590). Removing and properly utilizing the manure and waste water from the impoundment, demolition of any above grade concrete and the fill in of the concrete waste structure will address water quality degradation, air quality impacts and safety hazards The site may also become available for another use.
Scenario Feature Measure	Cubic Feet of storage to be decomissioned
Scenario Unit	Cubic Foot
Scenario Typical Size	48000

Cost Summary:

Cost Category	Scenario Cost	Scenario Cost/Unit
Materials	$0.00	$0.00
Equipment/Installation	$7,017.92	$0.15
Labor	$332.08	$0.01
Mobilization	$570.70	$0.01
Acquisition of Technical Knowledge	$0.00	$0.00
Foregone Income	$0.00	$0.00
Total	$7,920.70	$0.17

Cost Details:

Cost Category	Component ID	Component Name	Component Description	Unit	Price ($/unit)	Quantity	Cost
Equipment/Installation	1498	Demolition, concrete	Demolition and disposal of reinforced concrete structures including slabs and walls. Includes labor and equipment.	Cubic Yard	$15.60	73	$1,138.80
Equipment/Installation	49	Earthfill, Roller Compacted	Earthfill, roller or machine compacted, includes equipment and labor	Cubic yard	$3.67	1400	$5,138.00
Equipment/Installation	931	Hydraulic Excavator, 1 CY	Track mounted hydraulic excavator with bucket capacity range of 0.8 to 1.5 CY. Equipment and power unit costs. Labor not included.	Hour	$92.64	8	$741.12
Mobilization	1140	Mobilization, large equipment	Equipment >150HP or typical weights greater than 30,000 pounds or loads requiring over width or over length permits.	Each	$225.16	2	$450.32
Mobilization	1139	Mobilization, medium equipment	Equipment with 70-150 HP or typical weights between 14,000 and 30,000 pounds.	Each	$120.38	1	$120.38
Labor	231	General Labor	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	$16.72	8	$133.76
Labor	233	Equipment Operators, Heavy	Includes: Cranes, Hydraulic Excavators >=50 HP, Dozers, Paving Machines, Rock Trenchers, Trenchers >=12", Dump Trucks, Ag Equipment >=150 HP, Scrapers, Water Wagons.	Hour	$24.79	8	$198.32

Scenario Worksheet

Practice and Scenario Description:

Information Type	Data
Region	Northern Plains
State	South Dakota
Discipline Group	Environmental Engineering
Practice Code/Name	360 - Waste Facility Closure
Scenario ID	2
Scenario Name	Earthen Waste Impoundment Closure
Scenario Description	This practice scenario includes the decommissioning of an earthen storage and/or treatment structure or impoundment (embankment or excavated type) include any basins intended for sediment removal. The purpose of the practice is to address resource concerns related to water quality degradation due to excess nutrient and pathogens in ground and/or surface waters and air quality impacts from greenhouse gases, particulate matter and associated precursors, and objectionable odors. This practice scenario does not include payment for the removal and land application of the manure, wastewater, slurry and/or sludge; however, all manure wastes shall be removed and properly land applied in accordance with Nutrient Management (590) pior to decomissioning of the structure. Associated practices: Nutrient Management (590), Critical Area Planting (342)
Before Practice Situation	The existing manure, runoff and/or wastewaste water lagoon, storage pond or pit is no longer functioning correctly or is not being used for its intended purpose. The structure may or may not contain manure, wastewater, slurry and/or sludge. It poses a safety hazard for humans and livestock and is a threat to environmentally sustainability by the potential for impacts to water and air quality.
After Practice Situation	This scenario assumes a waste storage pond with total storage volume of 100,000 cubic feet over a footprint of 12150 square feet. The volume of earthwork (earthfill and excavation) required to breach the embankment and/or fill in the impoundment and perform final grading of the site is approximately 75% of the storage volume. The volume of earthwork will include 60% as excavation and 40% as compacted earthfill. An additional excavation of 450 cubic yards is assumed to remove contaminated soil below original design over the entire footprint of pond. Structural removal, as necessary, may include the removal and disposal of the synthetic liner, sealing or removal and disposal of waste transfer components and other appurtenances associated with closure of the facility. All waste material shall be removed and land applied in accordance with Nutrient Management (590) prior to decommissioning. This includes agitating, removing, and spreading liquid/slurry waste material; and removing solid/sludge waste remaining in the bottom. If present, the synthetic liner will be removed and properly disposed of. All inflow devices and associated appurtenances will be removed and properly disposed of. The embankment will be breached and the excavation filled in with the embankment material or hauled in earthfill. The disturbed areas shall be vegetated in accordance with Critical Area Planting (342) or planted to crops in accordance to Nutrient Management (590). Closure of the waste impoundment will address water quality degradation, air quality impacts and safety hazards by removing and properly utilizing the waste from the impoundment and earthfill of the structure. The site will also become available for another use.
Scenario Feature Measure	Cubic feet of structural storage
Scenario Unit	Cubic Foot
Scenario Typical Size	100000

Cost Summary:

Cost Category	Scenario Cost	Scenario Cost/Unit
Materials	$47.65	$0.00
Equipment/Installation	$8,202.00	$0.08
Labor	$133.76	$0.00
Mobilization	$450.32	$0.00
Acquisition of Technical Knowledge	$0.00	$0.00
Foregone Income	$0.00	$0.00
Total	$8,833.73	$0.09

Cost Details:

Cost Category	Component ID	Component Name	Component Description	Unit	Price ($/unit)	Quantity	Cost
Materials	299	Test, Soil Test, Standard	Includes materials, labor, and equipment costs.	Each	$9.53	5	$47.65
Equipment/Installation	51	Earthfill, Dumped and Spread	Earthfill, dumped and spread without compaction effort, includes equipment and labor	Cubic yard	$3.00	1600	$4,800.00
Equipment/Installation	1633	Spreading, manure sludge	Loading, hauling and spreading manure solids/sludge by ground equipment on nearby fields. Includes equipment, power unit and labor costs.	Cubic Foot	$0.28	12150	$3,402.00
Mobilization	1140	Mobilization, large equipment	Equipment >150HP or typical weights greater than 30,000 pounds or loads requiring over width or over length permits.	Each	$225.16	2	$450.32
Labor	231	General Labor	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	$16.72	8	$133.76

Scenario Worksheet

Practice and Scenario Description:

Information Type	Data
Region	Northern Plains
State	South Dakota
Discipline Group	Agricultural Engineering
Practice Code/Name	362 - Diversion
Scenario ID	1
Scenario Name	Diversion
Scenario Description	An earthen channel constructed across long slopes with supporting ridge on lower side, to divert runoff away from farmsteads, gullies, critical erosion areas, construction areas or other sensitive areas. Outlet may be waterway, underground outlet. or other suitable outlet. Typical diversion is, 2300 feet long and requires 1 CY excavation per LF. Channel my be level or gradient and ridge may be vegetated or farmed. The quantity of excavation and fill is balanced.
Before Practice Situation	Excessive sedimentation and soil erosion as a result of gully, rill or sheet erosion which exceeds "T" from farm fields and other locations. Also, roof runoff or surface runoff that becomes contaminated with agricultral wastes that significantly contributes to the amount of runoff that has to be stored or treated.
After Practice Situation	Diversion is 2300 feet long installed using a dozer and/or scraper. Storm water runoff is diverted away from the area to be protected. Associated practices are Critical Area Planting (342), Grassed Waterway (412), Underground Outlet (620), Mulching (484), and Subsurface Drainage (606).
Scenario Feature Measure	Diversion Excavated Volume
Scenario Unit	Cubic Yard
Scenario Typical Size	2300

Cost Summary:

Cost Category	Scenario Cost	Scenario Cost/Unit
Materials	$0.00	$0.00
Equipment/Installation	$6,011.90	$2.61
Labor	$133.10	$0.06
Mobilization	$450.32	$0.20
Acquisition of Technical Knowledge	$0.00	$0.00
Foregone Income	$0.00	$0.00
Total	$6,595.32	$2.87

Cost Details:

Cost Category	Component ID	Component Name	Component Description	Unit	Price ($/unit)	Quantity	Cost
Equipment/Installation	1218	Excavation, clay, large equipment, 50 ft	Bulk excavation of clay with dozer >100 HP with average push distance of 50 feet. Includes equipment and labor.	Cubic Yard	$2.37	2300	$5,451.00
Equipment/Installation	1199	Stripping and stockpiling, topsoil	Stripping and stockpiling of topsoil adjacent to stripping area. Includes equipment and labor.	Cubic Yard	$0.79	710	$560.90
Labor	231	General Labor	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	$16.72	4	$66.88
Labor	234	Supervisor or Manager	Labor involving supervision or management activities. Includes crew supervisors, foremen and farm/ranch managers time required for adopting new technology, etc.	Hour	$33.11	2	$66.22
Mobilization	1140	Mobilization, large equipment	Equipment >150HP or typical weights greater than 30,000 pounds or loads requiring over width or over length permits.	Each	$225.16	2	$450.32

Scenario Worksheet

Practice and Scenario Description:

Information Type	Data
Region	Northern Plains
State	South Dakota
Discipline Group	Agricultural Engineering
Practice Code/Name	362 - Diversion
Scenario ID	2
Scenario Name	Diversion - Clean Water Diversion for Feedlot
Scenario Description	An earthen channel constructed across long slopes with supporting ridge on lower side, to divert runoff away from agricultural waste systems. Outlet may be waterway, underground outlet. or other suitable outlet. Typical diversion is, 2000 feet long and requires 2 CY excavation per LF. Channel dimensions are typically larger to accomodate the containment and control of runoff from the 25 yr. storm event due to the association with the waste storage facility. Channel my be level or gradient and ridge may be vegetated or farmed. The quantity of excavation and fill is balanced.
Before Practice Situation	Excessive sedimentation and soil erosion as a result of gully, rill or sheet erosion which exceeds "T" from farm fields and other locations. Also, roof runoff or surface runoff that becomes contaminated with agricultral wastes that significantly contributes to the amount of runoff that has to be stored or treated.
After Practice Situation	Diversion is installed using a dozer and/or scraper. Storm water runoff is diverted away from an agricultural waste management system to minimize the volume of runoff that is contaminated by agricultural waste. Associated practices are Critical Area Planting (342), Grassed Waterway (412), Underground Outlet (620), Mulching (484), and Subsurface Drainage (606).
Scenario Feature Measure	Diversion Fill Volume
Scenario Unit	Cubic Yard
Scenario Typical Size	4000

Cost Summary:

Cost Category	Scenario Cost	Scenario Cost/Unit
Materials	$0.00	$0.00
Equipment/Installation	$13,849.80	$3.46
Labor	$133.10	$0.03
Mobilization	$450.32	$0.11
Acquisition of Technical Knowledge	$0.00	$0.00
Foregone Income	$0.00	$0.00
Total	$14,433.22	$3.61

Cost Details:

Cost Category	Component ID	Component Name	Component Description	Unit	Price ($/unit)	Quantity	Cost
Equipment/Installation	1223	Excavation, common earth, large equipment, 150 ft	Bulk excavation of common earth including sand and gravel with dozer >100 HP with average push distance of 150 feet. Includes	Cubic Yard	$3.34	4000	$13,360.00
Equipment/Installation	1199	Stripping and stockpiling, topsoil	Stripping and stockpiling of topsoil adjacent to stripping area. Includes equipment and labor.	Cubic Yard	$0.79	620	$489.80
Labor	231	General Labor	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	$16.72	4	$66.88
Labor	234	Supervisor or Manager	Labor involving supervision or management activities. Includes crew supervisors, foremen and farm/ranch managers time required for adopting new technology, etc.	Hour	$33.11	2	$66.22
Mobilization	1140	Mobilization, large equipment	Equipment >150HP or typical weights greater than 30,000 pounds or loads requiring over width or over length permits.	Each	$225.16	2	$450.32

Scenario Worksheet

Practice and Scenario Description:

Information Type	Data
Region	Northern Plains
State	South Dakota
Discipline Group	Environmental Engineering
Practice Code/Name	366 - Anaerobic Digester
Scenario ID	1
Scenario Name	Small Plug Flow <1000 AU
Scenario Description	A plug flow anaerobic digester can be part of a waste management system. It provides biological treatment of the waste in the absence of oxygen. This process for manure and other byproducts of animal agricultural operations will manage odors, reduce the net effect of greenhouse gas emissions, and/or reduce pathogens. This scenario is for a plug flow digester with less than 1,000 animal units. Selection of digester type will be based on effluent consistency. Energy generation is not included with this scenario. Potential Associated Practices: Fence (382), Critical Area Planting (342), Nutrient Management (590), Waste Transfer (634), Heavy Use Area Protection (561), Roof and Covers (367), Solid/Liquid Waste Separation Facility (632), Waste Treatment Lagoon (359), and Waste Storage Facility (313).
Before Practice 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 ground waters, in addition to the use of excessive amounts of fertilizers. The treatment of manure and other agricultural by-products is desired in order to manage odors, and/or reduce pathogens.
After Practice Situation	Manure and other agricultural by-products are being treated such that odors are managed and/or pathogens are reduced. Effluent from the digester is disposed of or utilized in a proper manner in accordance with a nutrient management plan. A plug flow digester is typically constructed of concrete with vertical side walls and solid or flexible top. The typical scenario also includes items necessary to maintain mesophylic or thermophylic temperatures for bacterial activity (i.e. piping and boiler or other heat source). Typical Design Scenario: 910 animal units (650 - 1,400 lbs dairy cows).
Scenario Feature Measure	Animals Units Contributing to Digester
Scenario Unit	Animal Unit
Scenario Typical Size	910

Cost Summary:

Cost Category	Scenario Cost	Scenario Cost/Unit
Materials	$280,187.00	$307.90
Equipment/Installation	$316,874.00	$348.21
Labor	$0.00	$0.00
Mobilization	$757.74	$0.83
Acquisition of Technical Knowledge	$233.34	$0.26
Foregone Income	$0.00	$0.00
Total	$598,052.08	$657.20

Cost Details:

Cost Category	Component ID	Component Name	Component Description	Unit	Price ($/unit)	Quantity	Cost
Materials	1635	Plug Flow Heat Piping System, small	Piping installed in and/or around the digester for circulating heated liquid to maintain the necessary temperatures for efficient digester	Each	$138,494.00	1	$138,494.00
Materials	1638	Plug Flow Flare, small	Flare excess gas to convert from methane to carbon dioxide (<1000 AU). Includes labor and equipment.	Each	$12,313.00	1	$12,313.00
Materials	1637	Plug Flow Control Building, small	Controls for operating digester and boiler system (<1000 AU). Includes labor and	Each	$69,259.00	1	$69,259.00
Materials	1636	Plug Flow Gas Collection System, small	Piping and collection system for biogas (<1000 AU). Includes labor and equipment.	Each	$38,221.00	1	$38,221.00
Materials	2019	Boiler	Typical boiler needed to maintain digester temperature.	Each	$21,900.00	1	$21,900.00
Equipment/Installation	1634	Small Plug Flow Digester	Concrete plug flow anaerobic digester which includes poured walls, floor and top. Sized for smaller livestock operations (<1000 AU). Also included are any necessary reception and mixing tanks. Includes labor and equipment.	Each	$316,874.00	1	$316,874.00
Mobilization	1139	Mobilization, medium equipment	Equipment with 70-150 HP or typical weights between 14,000 and 30,000 pounds.	Each	$120.38	2	$240.76
Mobilization	1140	Mobilization, large equipment	Equipment >150HP or typical weights greater than 30,000 pounds or loads requiring over width or over length permits.	Each	$225.16	2	$450.32
Mobilization	1137	Mobilization, very small equipment	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	$33.33	2	$66.66
Acquisition of Technical Knowledge	294	Training, Workshops	Educational seminar or series of meetings emphasizing interaction and exchange of information among a usually small number of participants.	Each	$116.67	2	$233.34

Scenario Worksheet

Practice and Scenario Description:

Information Type	Data
Region	Northern Plains
State	South Dakota
Discipline Group	Environmental Engineering
Practice Code/Name	366 - Anaerobic Digester
Scenario ID	2
Scenario Name	Medium Plug Flow 1000-2000 AU
Scenario Description	A plug flow anaerobic digester can be part of a waste management system. It provides biological treatment of the waste in the absence of oxygen. This process for manure and other byproducts of animal agricultural operations will manage odors, reduce the net effect of greenhouse gas emissions, and/or reduce pathogens. This scenario is for plug flow digesters with livestock operations between 1,000 and 2,000 animal units. Selection of digester type will be based on effluent consistency. Energy generation is not included with this scenario. Potential Associated Practices: Fence (382), Critical Area Planting (342), Nutrient Management (590), Waste Transfer (634), Heavy Use Area Protection (561), Roof and Covers (367), Solid/Liquid Waste Separation Facility (632), Waste Treatment Lagoon (359), and Waste Storage Facility (313).
Before Practice 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 ground waters, in addition to the use of excessive amounts of fertilizers. The treatment of manure and other agricultural by-products is desired in order to manage odors, and/or reduce pathogens.
After Practice Situation	Manure and other agricultural by-products are being treated such that odors are managed and/or pathogens are reduced. Effluent from the digester is disposed of or utilized in a proper manner in accordance with a nutrient management plan. A plug flow digester is typically constructed of concrete with vertical side walls and solid or flexible top. The typical scenario also includes items necessary to maintain mesophylic or thermophylic temperatures for bacterial activity (i.e. piping and boiler or other heat source). Typical design scenario: 1,750 animal units (1,250 - 1,400 lbs dairy cows).
Scenario Feature Measure	Animals Units Contributing to Digester
Scenario Unit	Animal Unit
Scenario Typical Size	1750

Cost Summary:

Cost Category	Scenario Cost	Scenario Cost/Unit
Materials	$825,474.00	$471.70
Equipment/Installation	$0.00	$0.00
Labor	$0.00	$0.00
Mobilization	$998.50	$0.57
Acquisition of Technical Knowledge	$233.34	$0.13
Foregone Income	$0.00	$0.00
Total	$826,705.84	$472.40

Cost Details:

Cost Category	Component ID	Component Name	Component Description	Unit	Price ($/unit)	Quantity	Cost
Materials	1643	Plug Flow Flare, medium	Flare excess gas to convert from methane to carbon dioxide (1000-2000 AU). Includes labor and equipment.	Each	$12,313.00	1	$12,313.00
Materials	1642	Plug Flow Control Building, medium	Controls for operating digester and boiler system (1000-2000 AU). Includes labor and equipment.	Each	$69,259.00	1	$69,259.00
Materials	1641	Plug Flow Gas Collection System, medium	Piping and collection system for biogas (1000-2000 AU). Includes labor and equipment.	Each	$40,273.00	1	$40,273.00
Materials	1640	Plug Flow Heat Piping System, medium	Piping installed in and/or around the digester for circulating heated liquid to maintain the necessary temperatures for efficient digester	Each	$191,680.00	1	$191,680.00
Materials	1639	Plug Flow Digester, medium	Concrete plug flow anaerobic digester which includes poured walls, floor and top. Sized for medium sized livestock operations (1000-2000 AU). Also included are any necessary reception and mixing tanks. Includes labor	Each	$490,049.00	1	$490,049.00
Materials	2019	Boiler	Typical boiler needed to maintain digester temperature.	Each	$21,900.00	1	$21,900.00
Mobilization	1139	Mobilization, medium equipment	Equipment with 70-150 HP or typical weights between 14,000 and 30,000 pounds.	Each	$120.38	4	$481.52
Mobilization	1140	Mobilization, large equipment	Equipment >150HP or typical weights greater than 30,000 pounds or loads requiring over width or over length permits.	Each	$225.16	2	$450.32
Mobilization	1137	Mobilization, very small equipment	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	$33.33	2	$66.66
Acquisition of Technical Knowledge	294	Training, Workshops	Educational seminar or series of meetings emphasizing interaction and exchange of information among a usually small number of participants.	Each	$116.67	2	$233.34

Scenario Worksheet

Practice and Scenario Description:

Information Type	Data
Region	Northern Plains
State	South Dakota
Discipline Group	Environmental Engineering
Practice Code/Name	366 - Anaerobic Digester
Scenario ID	3
Scenario Name	Large Plug Flow >2000 AU
Scenario Description	A plug flow anaerobic digester can be part of a waste management system. It provides biological treatment of the waste in the absence of oxygen. This process for manure and other byproducts of animal agricultural operations will manage odors, reduce the net effect of greenhouse gas emissions, and/or reduce pathogens. This scenario is for plug flow digesters with more than 2,000 animal units. Selection of digester type will be based on effluent consistency. Energy generation is not included with this scenario. Potential Associated Practices: Fence (382), Critical Area Planting (342), Nutrient Management (590), Waste Transfer (634), Heavy Use Area Protection (561), Roof and Covers (367), Solid/Liquid Waste Separation Facility (632), Waste Treatment Lagoon (359), and Waste Storage Facility (313).
Before Practice 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 ground waters, in addition to the use of excessive amounts of fertilizers. The treatment of manure and other agricultural by-products is desired in order to manage odors, and/or reduce pathogens.
After Practice Situation	Manure and other agricultural by-products are being treated such that odors are managed and/or pathogens are reduced. Effluent from the digester is disposed of or utilized in a proper manner in accordance with a nutrient management plan. A plug flow digester is typically constructed of concrete with vertical side walls and solid or flexible top. The typical scenario also includes items necessary to maintain mesophylic or thermophylic temperatures for bacterial activity (i.e. piping and boiler or other heat source). Typical Design Scenario: 3,920 animal units (2,800 - 1,400 lbs dairy cows).
Scenario Feature Measure	Animals Units Contributing to Digester
Scenario Unit	Animal Unit
Scenario Typical Size	3920

Cost Summary:

Cost Category	Scenario Cost	Scenario Cost/Unit
Materials	$1,063,865.00	$271.39
Equipment/Installation	$0.00	$0.00
Labor	$0.00	$0.00
Mobilization	$1,239.26	$0.32
Acquisition of Technical Knowledge	$233.34	$0.06
Foregone Income	$0.00	$0.00
Total	$1,065,337.60	$271.77

Cost Details:

Cost Category	Component ID	Component Name	Component Description	Unit	Price ($/unit)
Materials	1648	Plug Flow Flare, large	Flare excess gas to convert from methane to carbon dioxide (>2000 AU). Includes labor and equipment.	Each	$22,943.00
Materials	1647	Plug Flow Control Building, large	Controls for operating digester and boiler system (>2000 AU). Includes labor and equipment.	Each	$170,946.00
Materials	1646	Plug Flow Gas Collection System, large	Piping and collection system for biogas (>2000 AU). Includes labor and equipment.	Each	$88,450.00
Materials	1645	Plug Flow Heat Piping System, large	Piping installed in and/or around the digester for circulating heated liquid to maintain the necessary temperatures for efficient digester operation (>2000 AU). Includes labor and equipment.	Each	$269,577.00
Materials	1644	Plug Flow Digester, large	Concrete plug flow anaerobic digester which includes poured walls, floor and top. Sized for large livestock operations (>2000 AU). Also included are any necessary reception and mixing tanks. Includes labor and equipment.	Each	$490,049.00
Materials	2019	Boiler	Typical boiler needed to maintain digester temperature.	Each	$21,900.00
Mobilization	1139	Mobilization, medium equipment	Equipment with 70-150 HP or typical weights between 14,000 and 30,000 pounds.	Each	$120.38
Mobilization	1140	Mobilization, large equipment	Equipment >150HP or typical weights greater than 30,000 pounds or loads requiring over width or over length permits.	Each	$225.16
Mobilization	1137	Mobilization, very small equipment	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	$33.33
Acquisition of Technical Knowledge	294	Training, Workshops	Educational seminar or series of meetings emphasizing interaction and exchange of information among a usually small number of participants.	Each	$116.67

Scenario Worksheet

Practice and Scenario Description:

Information Type	Data
Region	Northern Plains
State	South Dakota
Discipline Group	Environmental Engineering
Practice Code/Name	366 - Anaerobic Digester
Scenario ID	4
Scenario Name	Small Complete Mix <1000 AU
Scenario Description	A complete mix anaerobic digester can be part of a waste management system. It provides biological treatment of the waste in the absence of oxygen. This process for manure and other byproducts of animal agricultural operations will manage odors, reduce the net effect of greenhouse gas emissions, and/or reduce pathogens. This scenario is for complete mix systems with less than 1,000 animal units. Selection of digester type will be based on effluent consistency. Energy generation is not included with this scenario. Potential Associated Practices: Fence (382), Critical Area Planting (342), Nutrient Management (590), Waste Transfer (634), Heavy Use Area Protection (561), Roof and Covers (367), Solid/Liquid Waste Separation Facility (632), Waste Treatment Lagoon (359), and Waste Storage Facility (313).
Before Practice 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 ground waters, in addition to the use of excessive amounts of fertilizers. The treatment of manure and other agricultural by-products is desired in order to manage odors, and/or reduce pathogens.
After Practice Situation	Manure and other agricultural by-products are being treated such that odors are managed and/or pathogens are reduced. Effluent from the digester is disposed of or utilized in a proper manner in accordance with a nutrient management plan. A complete mix digester is typically a round above ground structure constructed of concrete or steel. The typical scenario also includes items necessary to maintain mesophylic or thermophylic temperatures for bacterial activity (i.e. piping and boiler or other heat source). Typical Design Scenario: 1,039 animal units (742 - 1,400 lbs dairy cows).
Scenario Feature Measure	Animals Units Contributing to Digester
Scenario Unit	Animal Unit
Scenario Typical Size	1039

Cost Summary:

Cost Category	Scenario Cost	Scenario Cost/Unit
Materials	$674,090.00	$648.79
Equipment/Installation	$0.00	$0.00
Labor	$0.00	$0.00
Mobilization	$757.74	$0.73
Acquisition of Technical Knowledge	$233.34	$0.22
Foregone Income	$0.00	$0.00
Total	$675,081.08	$649.74

Cost Details:

Cost Category	Component ID	Component Name	Component Description	Unit	Price ($/unit)	Quantity	Cost
Materials	1649	Complete Mix Digester, small	A complete mix flow anaerobic digester includes the containment facility, agitation or stirring equipment, and any necessary	Each	$393,903.00	1	$393,903.00
Materials	1650	Complete Mix Heat Piping System, small	Piping installed in and/or around the digester for circulating heated liquid to maintain the necessary temperatures for efficient digester	Each	$138,494.00	1	$138,494.00
Materials	1651	Complete Mix Gas Collection System, small	Piping and collection system for biogas (<1000 AU). Includes labor and equipment.	Each	$38,221.00	1	$38,221.00
Materials	2019	Boiler	Typical boiler needed to maintain digester temperature.	Each	$21,900.00	1	$21,900.00
Materials	1653	Complete Mix Flare, small	Flare excess gas to convert from methane to carbon dioxide (<1000 AU). Includes labor and equipment.	Each	$12,313.00	1	$12,313.00
Materials	1652	Complete Mix Control Building, small	Controls for operating digester and boiler system (<1000 AU). Includes labor and equipment.	Each	$69,259.00	1	$69,259.00
Mobilization	1139	Mobilization, medium equipment	Equipment with 70-150 HP or typical weights between 14,000 and 30,000 pounds.	Each	$120.38	2	$240.76
Mobilization	1140	Mobilization, large equipment	Equipment >150HP or typical weights greater than 30,000 pounds or loads requiring over width or over length permits.	Each	$225.16	2	$450.32
Mobilization	1137	Mobilization, very small equipment	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	$33.33	2	$66.66
Acquisition of Technical Knowledge	294	Training, Workshops	Educational seminar or series of meetings emphasizing interaction and exchange of information among a usually small number of participants.	Each	$116.67	2	$233.34

Scenario Worksheet

Practice and Scenario Description:

Information Type	Data
Region	Northern Plains
State	South Dakota
Discipline Group	Environmental Engineering
Practice Code/Name	366 - Anaerobic Digester
Scenario ID	5
Scenario Name	Medium Complete Mix 1000-2500 AU
Scenario Description	A complete mix anaerobic digester can be part of a waste management system. It provides biological treatment of the waste in the absence of oxygen. This process for manure and other byproducts of animal agricultural operations will manage odors, reduce the net effect of greenhouse gas emissions, and/or reduce pathogens. This scenario is for complete mix systems between 1,000 and 2,500 animal units. Selection of digester type will be based on effluent consistency. Energy generation is not included with this scenario. Potential Associated Practices: Fence (382), Critical Area Planting (342), Nutrient Management (590), Waste Transfer (634), Heavy Use Area Protection (561), Roof and Covers (367), Solid/Liquid Waste Separation Facility (632), Waste Treatment Lagoon (359), and Waste Storage Facility (313).
Before Practice 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 ground waters, in addition to the use of excessive amounts of fertilizers. The treatment of manure and other agricultural by-products is desired in order to manage odors, and/or reduce pathogens.
After Practice Situation	Manure and other agricultural by-products are being treated such that odors are managed and/or pathogens are reduced. Effluent from the digester is disposed of or utilized in a proper manner in accordance with a nutrient management plan. A complete mix digester is typically a round above ground structure constructed of concrete or steel. The typical scenario also includes items necessary to maintain mesophylic or thermophylic temperatures for bacterial activity (i.e. piping and boiler or other heat source). Typical Design Scenario: 1,890 animal units (1,350 - 1,400 lbs dairy cows).
Scenario Feature Measure	Animals Units Contributing to Digester
Scenario Unit	Animal Unit
Scenario Typical Size	1890

Cost Summary:

Cost Category	Scenario Cost	Scenario Cost/Unit
Materials	$779,489.00	$412.43
Equipment/Installation	$0.00	$0.00
Labor	$0.00	$0.00
Mobilization	$998.50	$0.53
Acquisition of Technical Knowledge	$233.34	$0.12
Foregone Income	$0.00	$0.00
Total	$780,720.84	$413.08

Cost Details:

Cost Category	Component ID	Component Name	Component Description	Unit	Price ($/unit)	Quantity	Cost
Materials	1658	Complete Mix Flare, medium	Flare excess gas to convert from methane to carbon dioxide (1000-2000 AU). Includes labor and equipment.	Each	$12,313.00	1	$12,313.00
Materials	1657	Complete Mix Control Building, medium	Controls for operating digester and boiler system (1000-2000 AU). Includes labor and equipment.	Each	$69,259.00	1	$69,259.00
Materials	2019	Boiler	Typical boiler needed to maintain digester temperature.	Each	$21,900.00	1	$21,900.00
Materials	1656	Complete Mix Gas Collection System, medium	Piping and collection system for biogas. Includes labor and equipment (1000-2000 AU).	Each	$40,273.00	1	$40,273.00
Materials	1655	Complete Mix Heat Piping System, medium	Piping installed in and/or around the digester for circulating heated liquid to maintain the necessary temperatures for efficient digester operation (1000-2000 AU). Includes labor and equipment.	Each	$191,680.00	1	$191,680.00
Materials	1654	Complete Mix Digester, medium	A complete mix flow anaerobic digester includes the containment facility, agitation or stirring equipment, and any necessary reception and mixing tanks (1000-2000 AU). Sized for medium sized livestock operations (1000-2500 AU). Includes labor and equipment.	Each	$444,064.00	1	$444,064.00
Mobilization	1139	Mobilization, medium equipment	Equipment with 70-150 HP or typical weights between 14,000 and 30,000 pounds.	Each	$120.38	4	$481.52
Mobilization	1140	Mobilization, large equipment	Equipment >150HP or typical weights greater than 30,000 pounds or loads requiring over width or over length permits.	Each	$225.16	2	$450.32
Mobilization	1137	Mobilization, very small equipment	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	$33.33	2	$66.66
Acquisition of Technical Knowledge	294	Training, Workshops	Educational seminar or series of meetings emphasizing interaction and exchange of information among a usually small number of participants.	Each	$116.67	2	$233.34

Scenario Worksheet

Practice and Scenario Description:

Information Type	Data
Region	Northern Plains
State	South Dakota
Discipline Group	Environmental Engineering
Practice Code/Name	366 - Anaerobic Digester
Scenario ID	6
Scenario Name	Large Complete Mix >2,500 AU
Scenario Description	A complete mix anaerobic digester can be part of a waste management system. It provides biological treatment of the waste in the absence of oxygen. This process for manure and other byproducts of animal agricultural operations will manage odors, reduce the net effect of greenhouse gas emissions, and/or reduce pathogens. This scenario is for complete mix systems with more than 2,500 animal units. Selection of digester type will be based on effluent consistency. Energy generation is not included with this scenario. Potential Associated Practices: Fence (382), Critical Area Planting (342), Nutrient Management (590), Waste Transfer (634), Heavy Use Area Protection (561), Roof and Covers (367), Solid/Liquid Waste Separation Facility (632), Waste Treatment Lagoon (359), and Waste Storage Facility (313).
Before Practice 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 ground waters, in addition to the use of excessive amounts of fertilizers. The treatment of manure and other agricultural by-products is desired in order to manage odors, and/or reduce pathogens.
After Practice Situation	Manure and other agricultural by-products are being treated such that odors are managed and/or pathogens are reduced. Effluent from the digester is disposed of or utilized in a proper manner in accordance with a nutrient management plan. A complete mix digester is typically a round above ground structure constructed of concrete or steel. The typical scenario also includes items necessary to maintain mesophylic or thermophylic temperatures for bacterial activity (i.e. piping and boiler or other heat source). Typical Design Scenario: 3,220 animal units (2,300 - 1,400 lbs dairy cows).
Scenario Feature Measure	Animals Units Contributing to Digester
Scenario Unit	Animal Unit
Scenario Typical Size	3220

Cost Summary:

Cost Category	Scenario Cost	Scenario Cost/Unit
Materials	$1,047,190.00	$325.21
Equipment/Installation	$0.00	$0.00
Labor	$0.00	$0.00
Mobilization	$1,239.26	$0.38
Acquisition of Technical Knowledge	$233.34	$0.07
Foregone Income	$0.00	$0.00
Total	$1,048,662.60	$325.67

Cost Details:

Cost Category	Component ID	Component Name	Component Description	Unit	Price ($/unit)	Quantity	Cost
Materials	1663	Complete Mix Flare, large	Flare excess gas to convert from methane to carbon dioxide (>2000 AU). Includes labor and equipment.	Each	$19,495.00	1	$19,495.00
Materials	1659	Complete Mix Digester, large	A complete mix flow anaerobic digester includes the containment facility, agitation or stirring equipment, and any necessary	Each	$536,018.00	1	$536,018.00
Materials	1662	Complete Mix Control Building, large	Controls for operating digester and boiler system (>2000 AU). Includes labor and	Each	$157,853.00	1	$157,853.00
Materials	1660	Complete Mix Heat Piping System, large	Piping installed in and/or around the digester for circulating heated liquid to maintain the necessary temperatures for efficient digester	Each	$236,764.00	1	$236,764.00
Materials	2019	Boiler	Typical boiler needed to maintain digester temperature.	Each	$21,900.00	1	$21,900.00
Materials	1661	Complete Mix Gas Collection System, large	Piping and collection system for biogas (>2000 AU). Includes labor and equipment.	Each	$75,160.00	1	$75,160.00
Mobilization	1139	Mobilization, medium equipment	Equipment with 70-150 HP or typical weights between 14,000 and 30,000 pounds.	Each	$120.38	6	$722.28
Mobilization	1140	Mobilization, large equipment	Equipment >150HP or typical weights greater than 30,000 pounds or loads requiring over width or over length permits.	Each	$225.16	2	$450.32
Mobilization	1137	Mobilization, very small equipment	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	$33.33	2	$66.66
Acquisition of Technical Knowledge	294	Training, Workshops	Educational seminar or series of meetings emphasizing interaction and exchange of information among a usually small number of participants.	Each	$116.67	2	$233.34

Scenario Worksheet

Practice and Scenario Description:

Information Type	Data
Region	Northern Plains
State	South Dakota
Discipline Group	Environmental Engineering
Practice Code/Name	366 - Anaerobic Digester
Scenario ID	7
Scenario Name	Covered Lagoon/Holding Pond
Scenario Description	A covered lagoon can be part of a waste management system. It provides biological treatment of the waste in the absence of oxygen. This process for manure and other byproducts of animal agricultural operations will manage odors, reduce the net effect of greenhouse gas emissions, and/or reduce pathogens. This scenario is for all livestock operation sizes. The waste holding/treatment area is covered by waste treatment lagoon (359) or waste storage facility (313) and the cover is addressed under roofs and covers (367). Selection of digester type will be based on effluent consistency. Costs for this scenario are only for system controls, gas collection, and flaring system. Energy generation is not included with this scenario. Potential Associated Practices: Fence (382), Critical Area Planting (342), Nutrient Management (590), Waste Transfer (634), Heavy Use Area Protection (561), Roof and Covers (367), Solid/Liquid Waste Separation Facility (632), Waste Treatment Lagoon (359), and Waste Storage Facility (313).
Before Practice 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 ground waters, in addition to the use of excessive amounts of fertilizers. The treatment of manure and other agricultural by-products is desired in order to manage odors, and/or reduce pathogens.
After Practice Situation	Manure and other agricultural by-products are being treated such that odors are managed and/or pathogens are reduced. Effluent from the digester is disposed of or utilized in a proper manner in accordance with a nutrient management plan. A covered lagoon/holding pond typically has a fexible top installed over an earthen storage/treatment facility for the purpose of capturing the biogas. Typical Design Scenario: 1,000 animal units (715 - 1,400 lbs dairy cows).
Scenario Feature Measure	Animals Units Contributing to Digester
Scenario Unit	Animal Unit
Scenario Typical Size	1000

Cost Summary:

Cost Category	Scenario Cost	Scenario Cost/Unit
Materials	$119,793.00	$119.79
Equipment/Installation	$0.00	$0.00
Labor	$0.00	$0.00
Mobilization	$307.42	$0.31
Acquisition of Technical Knowledge	$116.67	$0.12
Foregone Income	$0.00	$0.00
Total	$120,217.09	$120.22

Cost Details:

Cost Category	Component ID	Component Name	Component Description	Unit	Price ($/unit)	Quantity	Cost
Materials	1665	Covered Lagoon Control Building	Controls for operating the digester system. Includes labor and equipment.	Each	$69,259.00	1	$69,259.00
Materials	1666	Covered Lagoon Flare	Flare excess gas to convert from methane to carbon dioxide. Includes labor and equipment.	Each	$12,313.00	1	$12,313.00
Materials	1664	Covered Lagoon Gas Collection System	Piping and collection system for biogas. Includes labor and equipment.	Each	$38,221.00	1	$38,221.00
Mobilization	1139	Mobilization, medium equipment	Equipment with 70-150 HP or typical weights between 14,000 and 30,000 pounds.	Each	$120.38	2	$240.76
Mobilization	1137	Mobilization, very small equipment	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	$33.33	2	$66.66
Acquisition of Technical Knowledge	294	Training, Workshops	Educational seminar or series of meetings emphasizing interaction and exchange of information among a usually small number of participants.	Each	$116.67	1	$116.67

Scenario Worksheet

Practice and Scenario Description:

Information Type	Data
Region	Northern Plains
State	South Dakota
Discipline Group	Environmental Engineering
Practice Code/Name	367 - Roofs and Covers
Scenario ID	1
Scenario Name	Hoop Structure Roof
Scenario Description	A flexible membrane or fabric-like roof placed on a steel truss hoop-like supports and supporting foundation. Manure is stored as a liquid in basins, tanks, and as a solid on concrete and earthen surfaces. Excess precipitation can cause premature filling of storages or cause nutrients to leach from solid manure piles leading to uncontrolled runoff as well as odor issues. Associated practices include Waste Storage Facility (313), Animal Mortality Facility (316), Composting Facility (317), Roof Runoff Structure (558), and Waste Treatment (629).
Before Practice Situation	Applicable where the exclusion of precipitation from an animal waste storage and/or treatment facility will improve of an existing or planned system. Manure is stored as a liquid in basins, tanks, and as a solid on concrete and earthen surfaces. Excess precipitation can cause premature filling of storages or cause nutrients to leach from solid manure piles leading to uncontrolled runoff as well as odor issues.
After Practice Situation	A flexible membrane or fabric-like roof placed on a steel truss hoop-like supports and supporting foundation. Roof or cover will be engineered and installed in accordance with appropriate building codes and permits. Typical size is 9,000 square feet (36' X 250') and is over an approved animal waste management facility as a component of a CNMP. It is designed to prevent precipitation to allow proper management of animal waste streams (manure or compost streams), thus mitigating the negative factors from the "before practice implementation".
Scenario Feature Measure	Footprint of the building
Scenario Unit	Square Foot
Scenario Typical Size	9000

Cost Summary:

Cost Category	Scenario Cost	Scenario Cost/Unit
Materials	$62,640.00	$6.96
Equipment/Installation	$0.00	$0.00
Labor	$0.00	$0.00
Mobilization	$307.42	$0.03
Acquisition of Technical Knowledge	$0.00	$0.00
Foregone Income	$0.00	$0.00
Total	$62,947.42	$6.99

Cost Details:

Cost Category	Component ID	Component Name	Component Description	Unit	Price ($/unit)	Quantity	Cost
Materials	1668	Roof, Hoop Truss Arch Structure, 30-60' wide	Hoop Truss Arch Structure with fabric cover - 30' to 60' width, includes materials, equipment, and installation. Does not include foundation preparation.	Square Foot	$6.96	9000	$62,640.00
Mobilization	1137	Mobilization, very small equipment	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	$33.33	2	$66.66
Mobilization	1139	Mobilization, medium equipment	Equipment with 70-150 HP or typical weights between 14,000 and 30,000 pounds.	Each	$120.38	2	$240.76

Scenario Worksheet

Practice and Scenario Description:

Information Type	Data
Region	Northern Plains
State	South Dakota
Discipline Group	Environmental Engineering
Practice Code/Name	367 - Roofs and Covers
Scenario ID	2
Scenario Name	Timber or Steel Sheet Roof
Scenario Description	A timber framed structure without enclosing sidewalls with a timber or steel "sheet" roof and supporting foundation. Manure is stored as a liquid in basins, tanks, and as a solid on concrete and earthen surfaces. Excess precipitation can cause premature filling of storages or cause nutrients to leach from solid manure piles leading to uncontrolled runoff as well as odor issues. Associated practices include Waste Storage Facility (313), Animal Mortality Facility (316), Composting Facility (317), Agrichemical Handling Facility (309), Roof Runoff Structure (558), and Waste Treatment (629).
Before Practice Situation	Applicable where the exclusion of precipitation from an animal waste storage and/or treatment facility will improve of an existing or planned system. Manure is stored as a liquid in basins, tanks, and as a solid on concrete and earthen surfaces. Excess precipitation can cause premature filling of storages or cause nutrients to leach from solid manure piles leading to uncontrolled runoff as well as odor issues.
After Practice Situation	A timber framed building with a timber or steel "sheet" roof and supporting foundation. Engineered and installed in accordance with appropriate building codes and permits. Typical size is 5,000 square feet and is over an approved animal waste management facility as a component of a CNMP. It is designed to prevent precipitation to allow proper management of animal waste streams (manure or compost streams), thus mitigating the negative factors from the "before practice implementation".
Scenario Feature Measure	Area under roof
Scenario Unit	Square Foot
Scenario Typical Size	5000

Cost Summary:

Cost Category	Scenario Cost	Scenario Cost/Unit
Materials	$36,300.00	$7.26
Equipment/Installation	$0.00	$0.00
Labor	$0.00	$0.00
Mobilization	$187.04	$0.04
Acquisition of Technical Knowledge	$0.00	$0.00
Foregone Income	$0.00	$0.00
Total	$36,487.04	$7.30

Cost Details:

Cost Category	Component ID	Component Name	Component Description	Unit	Price ($/unit)	Quantity	Cost
Materials	1676	Roof, Post Frame Building, 30' to 60' wide	Post Frame Building, no sides, - 30' to 60' width, includes materials, equipment, and installation. Does not include foundation preparation.	Square Foot	$7.26	5000	$36,300.00
Mobilization	1137	Mobilization, very small equipment	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	$33.33	2	$66.66
Mobilization	1139	Mobilization, medium equipment	Equipment with 70-150 HP or typical weights between 14,000 and 30,000 pounds.	Each	$120.38	1	$120.38

Scenario Worksheet

Practice and Scenario Description:

Information Type	Data
Region	Northern Plains
State	South Dakota
Discipline Group	Environmental Engineering
Practice Code/Name	367 - Roofs and Covers
Scenario ID	3
Scenario Name	Flexible Membrane Cover Only
Scenario Description	A fabricated rigid, semi-rigid, or flexible membrane over a waste storage or treatment facility. The membrane will cover the entire surface of a waste storage or treatment facility (e.g. waste treatment lagoon or anaerobic digester). Cover will exclude precipitation and/or capture biogas for controlled release for flaring or anaerobic digestion. This scenario does not include the flare to convert methane to carbon dioxide. Associated practices include Waste Storage Facility (313), Waste Treatment Lagoon (359), Anaerobic Digester (366), Animal Mortality Facility (316), Composting Facility (317), Roof Runoff Structure (558), Pumping Plant (533), and Waste Treatment (629).
Before Practice Situation	Applicable where the exclusion of precipitation from an animal waste storage or treatment lagoon will improve the management of an existing or planned system, capture and controlled release or flaring of emissions from an existing or planned agricultural waste storage to improve air quality, and/or biogas production and capture for energy use are part of the existing or planned animal waste management system.
After Practice Situation	A fabricated rigid, semi-rigid, or flexible membrane over a waste storage or treatment facility. The membrane will cover the entire surface of a waste storage or treatment facility (e.g. waste treatment lagoon or anaerobic digester).
Scenario Feature Measure	Surface of Membrane
Scenario Unit	Square Foot
Scenario Typical Size	50000

Cost Summary:

Cost Category	Scenario Cost	Scenario Cost/Unit
Materials	$4,000.32	$0.08
Equipment/Installation	$6,509.40	$0.13
Labor	$7,699.60	$0.15
Mobilization	$240.76	$0.00
Acquisition of Technical Knowledge	$0.00	$0.00
Foregone Income	$0.00	$0.00
Total	$18,450.08	$0.37

Cost Details:

Cost Category	Component ID	Component Name	Component Description	Unit	Price ($/unit)	Quantity	Cost
Materials	1387	Synthetic Liner, 40 mil	Synthetic 40 mil HDPE, LLDPE, EPDM, etc membrane liner material. Materials only.	Square Foot	$0.72	5556	$4,000.32
Equipment/Installation	936	Trencher, 8"	Equipment and power unit costs. Labor not included.	Hour	$73.69	60	$4,421.40
Equipment/Installation	933	Skidsteer, 80 HP	Skidsteer loader with horsepower range of 60 to 90. Equipment and power unit costs. Labor not included.	Hour	$34.80	60	$2,088.00
Labor	232	Equipment Operators, Light	Includes: Skid Steer Loaders, Hydraulic Excavators <50 HP, Trenchers <12", Ag Equipment <150 HP, Pickup Trucks, Forklifts, Mulchers	Hour	$20.61	120	$2,473.20
Labor	231	General Labor	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	$16.72	200	$3,344.00
Labor	230	Skilled Labor	Labor requiring a high level skill set: Includes carpenters, welders, electricians, conservation professionals involved with data collection, monitoring, and or record keeping, etc.	Hour	$23.53	80	$1,882.40
Mobilization	1139	Mobilization, medium equipment	Equipment with 70-150 HP or typical weights between 14,000 and 30,000 pounds.	Each	$120.38	2	$240.76

Scenario Worksheet

Practice and Scenario Description:

Information Type	Data
Region	Northern Plains
State	South Dakota
Discipline Group	Environmental Engineering
Practice Code/Name	367 - Roofs and Covers
Scenario ID	4
Scenario Name	Flex Membrane w/Flare
Scenario Description	A fabricated rigid, semi-rigid, or flexible membrane over a waste storage or treatment facility. The membrane will cover the entire surface of a waste storage or treatment facility (e.g. waste treatment lagoon or anaerobic digester). Cover will exclude precipitation and/or capture biogas for controlled release for flaring or anaerobic digestion. This scenario includes the flare to convert methane to carbon dioxide. Associated practices include Waste Storage Facility (313), Waste Treatment Lagoon (359), Anaerobic Digester (366), Animal Mortality Facility (316), Composting Facility (317), Roof Runoff Structure (558), Pumping Plant (533), and Waste Treatment (629).
Before Practice Situation	Applicable where the exclusion of precipitation from an animal waste storage or treatment lagoon will improve the management of an existing or planned system, capture and controlled release or flaring of emissions from an existing or planned agricultural waste storage to improve air quality, and/or biogas production and capture for energy use are part of the existing or planned animal waste management system.
After Practice Situation	A fabricated rigid, semi-rigid, or flexible membrane over a waste storage or treatment facility. The membrane will cover the entire surface of a waste storage or treatment facility (e.g. waste treatment lagoon or anaerobic digester). This scenario includes the flare to convert methane to carbon dioxide.
Scenario Feature Measure	Surface of Membrane
Scenario Unit	Square Foot
Scenario Typical Size	50000

Cost Summary:

Cost Category	Scenario Cost	Scenario Cost/Unit
Materials	$16,313.32	$0.33
Equipment/Installation	$6,509.40	$0.13
Labor	$6,875.20	$0.14
Mobilization	$240.76	$0.00
Acquisition of Technical Knowledge	$0.00	$0.00
Foregone Income	$0.00	$0.00
Total	$29,938.68	$0.60

Cost Details:

Cost Category	Component ID	Component Name	Component Description	Unit	Price ($/unit)	Quantity	Cost
Materials	1387	Synthetic Liner, 40 mil	Synthetic 40 mil HDPE, LLDPE, EPDM, etc membrane liner material. Materials only.	Square Foot	$0.72	5556	$4,000.32
Materials	1666	Covered Lagoon Flare	Flare excess gas to convert from methane to carbon dioxide. Includes labor and	Each	$12,313.00	1	$12,313.00
Equipment/Installation	936	Trencher, 8"	Equipment and power unit costs. Labor not included.	Hour	$73.69	60	$4,421.40
Equipment/Installation	933	Skidsteer, 80 HP	Skidsteer loader with horsepower range of 60 to 90. Equipment and power unit costs. Labor not included.	Hour	$34.80	60	$2,088.00
Labor	232	Equipment Operators, Light	Includes: Skid Steer Loaders, Hydraulic Excavators <50 HP, Trenchers <12", Ag Equipment <150 HP, Pickup Trucks, Forklifts, Mulchers	Hour	$20.61	80	$1,648.80
Labor	231	General Labor	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	$16.72	200	$3,344.00
Labor	230	Skilled Labor	Labor requiring a high level skill set: Includes carpenters, welders, electricians, conservation professionals involved with data	Hour	$23.53	80	$1,882.40
Mobilization	1139	Mobilization, medium equipment	Equipment with 70-150 HP or typical weights between 14,000 and 30,000 pounds.	Each	$120.38	2	$240.76

Scenario Worksheet

Practice and Scenario Description:

Information Type	Data
Region	Northern Plains
State	South Dakota
Discipline Group	0
Practice Code/Name	371 - Air Filtration and Scrubbing
Scenario ID	1
Scenario Name	Biofilter
Scenario Description	Porous filter media is utilized to filter the exhaust from animal confinement facilities to allow microbial activity to reduce objectionable odors. The typical installation is a horizontal media bed supported by a treated lumber substructure to allow airflow to be directed beneath and then up through the media. Vertical biofilters may also be utilized. The filter media is a combination of wood chips to maintain porosity and compost to provide the microorganisms for the air filtering activity. A typical mix ratio would be 80% wood chips and 20% compost. Ventilation system component alterations that may be required to facilitate the biofilter application are not included in the cost computation. Resource concern: Air – Objectionable Odors
Before Practice Situation	The animal confinement facility has an uncontrolled airflow that is causing objectionable odors.
After Practice Situation	A 32' X 200" horizontal media bed, 20" thick is supported by a treated lumber substructure to allow airflow to be directed beneath and then up through the media is installed adjacent to a swine production facility. Exhaust from the facility is directed to flow through the biofilter media to reduce objectionable odors. Maintainace of the media bed will be required on a 3-5 year cycle to maintain effectiveness.
Scenario Feature Measure	Biofilter Media Volume
Scenario Unit	Cubic Yard
Scenario Typical Size	395

Cost Summary:

Cost Category	Scenario Cost	Scenario Cost/Unit
Materials	$11,136.30	$28.19
Equipment/Installation	$5,978.80	$15.14
Labor	$450.86	$1.14
Mobilization	$0.00	$0.00
Acquisition of Technical Knowledge	$0.00	$0.00
Foregone Income	$0.00	$0.00
Total	$17,565.96	$44.47

Cost Details:

Cost Category	Component ID	Component Name	Component Description	Unit	Price ($/unit)	Quantity	Cost
Equipment/Installation	1098	Aggregate, Wood Chips	Includes materials, equipment and labor	Cubic yard	$18.28	316	$5,776.48
Materials	265	Compost	A mixture of decaying organic matter, as from leaves and manure, used to improve soil structure and provide nutrients.	Ton	$47.44	20	$948.80
Materials	1044	Dimension Lumber, Treated	Treated dimension lumber with nominal thickness equal or less than 2". Includes lumber and fasteners	Board Foot	$0.74	9550	$7,067.00
Materials	1891	Shellfish Predation Screen, seed in-ground culture	Preditor control ground cover, medium weight high density polyethylene, 3/8" mesh, typical width is 6', lenths from 50'-165'. Can be reused after fouling dries. Materials only.	Square Foot	$0.32	6400	$2,048.00
Materials	1078	Post, Wood, Untreated, 8-9" X 8'	Wood Post, End 8-9" X 8', Untreated	Each	$35.75	30	$1,072.50
Equipment/Installation	927	Dozer, 140 HP	Track mounted Dozer with horsepower range of 125 to 160. Equipment and power unit costs. Labor not included.	Hour	$101.16	2	$202.32
Labor	233	Equipment Operators, Heavy	Includes: Cranes, Hydraulic Excavators >=50 HP, Dozers, Paving Machines, Rock Trenchers, Trenchers >=12", Dump Trucks, Ag Equipment >=150 HP, Scrapers, Water Wagons.	Hour	$24.79	2	$49.58
Labor	231	General Labor	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	$16.72	24	$401.28

Scenario Worksheet

Practice and Scenario Description:

Information Type	Data
Region	Northern Plains
State	South Dakota
Discipline Group	Agricultural Engineering
Practice Code/Name	374 - Farmstead Energy Improvement
Scenario ID	1
Scenario Name	Lighting, CFL
Scenario Description	To install dimmable CFLs to replace incandescent lamps on a one-for-one basis. Light fixtures do not have to be replaced. A typical poultry house has 48 fixtures. CFL requirements: minimum 8 Watt, 4100 Kelvin, dimmable, grow-out bulb; industrial grade; suitably protected from dirt accumulation. In high humidity environments or areas subject to wash down, gasketted or weatherproof housings are required to prevent corrosion and premature failure.
Before Practice Situation	An inefficient lighting system such as one using incandescent lamps has been identified by an on-farm energy audit.
After Practice Situation	More efficient lighting is provided by Compact Fluorescent Lamps (CFLs) in order to reduce energy use as evidenced by the energy audit. Associated practices/activities: 122-AgEMP - HQ, and other activities within 374-Farmstead Energy Improvement. The resource concern is inefficient use of energy in the farm operation which increases dependence on non-renewable energy sources and can be addressed through improved energy efficiency. Any improvements are based on a Type 2 energy audit meeting the requirements of ASABE S612.
Scenario Feature Measure	Each lamp replaced
Scenario Unit	Each
Scenario Typical Size	1

Cost Summary:

Cost Category	Scenario Cost	Scenario Cost/Unit
Materials	$15.31	$15.31
Equipment/Installation	$0.00	$0.00
Labor	$2.79	$2.79
Mobilization	$0.00	$0.00
Acquisition of Technical Knowledge	$0.00	$0.00
Foregone Income	$0.00	$0.00
Total	$18.10	$18.10

Cost Details:

Cost Category	Component ID	Component Name	Component Description	Unit	Price ($/unit)	Quantity	Cost
Materials	1166	Lighting, bulb, CFL, 8 watt	8 watt compact fluorescent lamp (CFL), typically 4100 Kelvin, dimmable, grow-out bulb, industrial grade, suitably protected from dirt accumulation. Materials only.	Each	$15.31	1	$15.31
Labor	231	General Labor	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	$16.72	0.167	$2.79

Scenario Worksheet

Practice and Scenario Description:

Information Type	Data
Region	Northern Plains
State	South Dakota
Discipline Group	Agricultural Engineering
Practice Code/Name	374 - Farmstead Energy Improvement
Scenario ID	2
Scenario Name	Lighting, LED
Scenario Description	To install dimmable LEDs to replace incandescent lamps on a one-for-one basis. Light fixtures do not have to be replaced. A typical poultry house has 48 fixtures. LED requirements: minimum 6 Watt, 3700 Kelvin, dimmable, grow-out bulb; industrial grade; suitably protected from dirt accumulation. In high humidity environments or areas subject to wash down, gasketted or weatherproof housings are required to prevent corrosion and premature failure.
Before Practice Situation	An inefficient lighting system such as one using incandescent lamps has been identified by an on-farm energy audit.
After Practice Situation	More efficient lighting is provided by Light-Emitting Diode (LED) lamps in order to reduce energy use as evidenced by the energy audit.Associated practices/activities: 122-AgEMP - HQ, and other activities within 374-Farmstead Energy Improvement. The resource concern is inefficient use of energy in the farm operation which increases dependence on non-renewable energy sources and can be addressed through improved energy efficiency. Any improvements are based on a Type 2 energy audit meeting the requirements of ASABE S612.
Scenario Feature Measure	Each lamp replaced
Scenario Unit	Each
Scenario Typical Size	1

Cost Summary:

Cost Category	Scenario Cost	Scenario Cost/Unit
Materials	$31.98	$31.98
Equipment/Installation	$0.00	$0.00
Labor	$2.79	$2.79
Mobilization	$0.00	$0.00
Acquisition of Technical Knowledge	$0.00	$0.00
Foregone Income	$0.00	$0.00
Total	$34.77	$34.77

Cost Details:

Cost Category	Component ID	Component Name	Component Description	Unit	Price ($/unit)	Quantity	Cost
Materials	1167	Lighting, bulb, LED, 6 watt	6 watt light emitting diode (LED), typically 3700 Kelvin, dimmable, grow-out bulb; industrial grade; suitably protected from dirt accumulation. Materials only.	Each	$31.98	1	$31.98
Labor	231	General Labor	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	$16.72	0.167	$2.79

Scenario Worksheet

Practice and Scenario Description:

Information Type	Data
Region	Northern Plains
State	South Dakota
Discipline Group	Agricultural Engineering
Practice Code/Name	374 - Farmstead Energy Improvement
Scenario ID	3
Scenario Name	Lighting, Linear Fluorescent
Scenario Description	The lighting system consists of a four-foot, three-lamp fixture with a single electronic ballast. The high-efficiency lighting system uses high-efficiency T8 fluorescent lamps. Associated materials for installation of replacement fixtures are included. Appropriate disposal of existing lamps, ballasts and other materials is required.
Before Practice Situation	Inefficient lighting (such as incandescent or T12 fluorescent tubes driven by magnetic ballasts) as evidenced by an on-farm energy audit.
After Practice Situation	High-efficiency lighting system which reduces energy use. The new lighting equipment will provide suitable light levels and reduce overall power requirements (kW) compared to the existing lighting system as evidenced by the energy audit. Associated practices/activities: may include 122-AgEMP - HQ, and other activities within 374-Farmstead Energy Improvement. The resource concern is inefficient use of energy in the farm operation which increases dependence on non-renewable energy sources and can be addressed through improved energy efficiency. Any improvements are based on a Type 2 energy audit meeting the requirements of ASABE S612.
Scenario Feature Measure	Each fixture replaced
Scenario Unit	Each
Scenario Typical Size	1

Cost Summary:

Cost Category	Scenario Cost	Scenario Cost/Unit
Materials	$372.35	$372.35
Equipment/Installation	$0.00	$0.00
Labor	$23.53	$23.53
Mobilization	$22.08	$22.08
Acquisition of Technical Knowledge	$0.00	$0.00
Foregone Income	$0.00	$0.00
Total	$417.96	$417.96

Cost Details:

Cost Category	Component ID	Component Name	Component Description	Unit	Price ($/unit)	Quantity	Cost
Materials	1168	Lighting, fixture, Fluorescent, 75 watt	75 watt fluorescent lamp fixture with T5 or T8 lamps and ballast. Materials only.	Each	$372.35	1	$372.35
Labor	230	Skilled Labor	Labor requiring a high level skill set: Includes carpenters, welders, electricians, conservation professionals involved with data collection, monitoring, and or record keeping, etc.	Hour	$23.53	1	$23.53
Mobilization	1141	Mobilization, Skilled labor	Mobilization of skilled labor: Includes carpenters, welders, electricians, conservation professionals involved with data collection, monitoring, and or record keeping, etc.	Hour	$22.08	1	$22.08

Scenario Worksheet

Practice and Scenario Description:

Information Type	Data
Region	Northern Plains
State	South Dakota
Discipline Group	Agricultural Engineering
Practice Code/Name	374 - Farmstead Energy Improvement
Scenario ID	4
Scenario Name	Ventilation, Exhaust
Scenario Description	Replacement of a conventional exhaust fan with high volume, low speed, efficient exhaust fan. Fans being installed should be models previously tested by BESS Lab or the Air Movement and Control Association and be in top 20 percentile of fans tested. Practice certification will be through receipts and pictures from the applicant. Typical scenario includes the replacement of a 48" fan.
Before Practice Situation	Inefficient ventilation in an agricultural building.
After Practice Situation	High-efficiency ventilation system which reduces energy use. The new ventilation equipment will provide suitable air quality and reduce overall power requirements (kW) compared to the existing ventilation system as evidenced in an energy audit. Associated practices/activities: may include 122-AgEMP - HQ, and other activities within 374-Farmstead Energy Improvement. The resource concern is inefficient use of energy in the farm operation which increases dependence on non-renewable energy sources and can be addressed through improved energy efficiency. Any improvements are based on a Type 2 energy audit meeting the requirements of ASABE S612.
Scenario Feature Measure	Each
Scenario Unit	Each
Scenario Typical Size	1

Cost Summary:

Cost Category	Scenario Cost	Scenario Cost/Unit
Materials	$1,268.57	$1,268.57
Equipment/Installation	$0.00	$0.00
Labor	$70.59	$70.59
Mobilization	$22.08	$22.08
Acquisition of Technical Knowledge	$0.00	$0.00
Foregone Income	$0.00	$0.00
Total	$1,361.24	$1,361.24

Cost Details:

Cost Category	Component ID	Component Name	Component Description	Unit	Price ($/unit)	Quantity	Cost
Materials	1187	Fan, exhaust, 48" High Efficiency	48 inch high efficiency exhaust fan, controls, wiring, and associated appurtenances. Materials only.	Each	$1,268.57	1	$1,268.57
Labor	230	Skilled Labor	Labor requiring a high level skill set: Includes carpenters, welders, electricians, conservation professionals involved with data collection, monitoring, and or record keeping, etc.	Hour	$23.53	3	$70.59
Mobilization	1141	Mobilization, Skilled labor	Mobilization of skilled labor: Includes carpenters, welders, electricians, conservation professionals involved with data collection, monitoring, and or record keeping, etc.	Hour	$22.08	1	$22.08

Scenario Worksheet

Practice and Scenario Description:

Information Type	Data
Region	Northern Plains
State	South Dakota
Discipline Group	Agricultural Engineering
Practice Code/Name	374 - Farmstead Energy Improvement
Scenario ID	5
Scenario Name	Ventilation, HAF
Scenario Description	A system of fans are installed to create a horizontal air circulation pattern; the new system promotes efficient heat and moisture distribution. In a typical 10,000 square foot greenhouse, 10 HAF fans are needed. Fan performance meets Energy Audit efficiency criteria as tested by AMCA or BESS Labs.
Before Practice Situation	Inefficent air circulation system in a greenhouse.
After Practice Situation	High-efficiency air circulation system which reduces energy use. The new equipment will provide suitable air quality and reduce overall power requirements (kW) compared to the existing system as evidenced in an energy audit. Associated practices/activities: may include 122-AgEMP - HQ, and other activities within 374-Farmstead Energy Improvement. The resource concern is inefficient use of energy in the farm operation which increases dependence on non-renewable energy sources and can be addressed through improved energy efficiency. Any improvements are based on a Type 2 energy audit meeting the requirements of ASABE S612.
Scenario Feature Measure	Each
Scenario Unit	Each
Scenario Typical Size	1

Cost Summary:

Cost Category	Scenario Cost	Scenario Cost/Unit
Materials	$195.45	$195.45
Equipment/Installation	$0.00	$0.00
Labor	$47.06	$47.06
Mobilization	$22.08	$22.08
Acquisition of Technical Knowledge	$0.00	$0.00
Foregone Income	$0.00	$0.00
Total	$264.59	$264.59

Cost Details:

Cost Category	Component ID	Component Name	Component Description	Unit	Price ($/unit)	Quantity	Cost
Materials	1189	Fan, HAF, 1/10 to 1/15 HP	High efficiency Horizontal Air Flow (HAF) fan, controls, wiring, and associated appurtenances. Materials only.	Each	$195.45	1	$195.45
Labor	230	Skilled Labor	Labor requiring a high level skill set: Includes carpenters, welders, electricians, conservation professionals involved with data collection, monitoring, and or record keeping, etc.	Hour	$23.53	2	$47.06
Mobilization	1141	Mobilization, Skilled labor	Mobilization of skilled labor: Includes carpenters, welders, electricians, conservation professionals involved with data collection, monitoring, and or record keeping, etc.	Hour	$22.08	1	$22.08

Scenario Worksheet

Practice and Scenario Description:

Information Type	Data
Region	Northern Plains
State	South Dakota
Discipline Group	Agricultural Engineering
Practice Code/Name	374 - Farmstead Energy Improvement
Scenario ID	6
Scenario Name	Plate Cooler
Scenario Description	The installation of all stainless steel dual pass plate cooler, type 316 stainless steel. Practice certification will be through receipts and pictures from the applicant.
Before Practice Situation	Inefficient milk cooling (minimal pre-cooling of milk before entering the bulk tank).
After Practice Situation	High-efficiency milk cooling system which reduces energy use. The new milk cooling equipment will pre-cool the milk and reduce overall power requirements (kW) compared to the existing milk cooling system (where most of the cooling was accomplished in the bulk tank) as evidenced in an energy audit. Associated practices/activities: may include 122-AgEMP - HQ, and other activities within 374-Farmstead Energy Improvement. The resource concern is inefficient use of energy in the farm operation which increases dependence on non-renewable energy sources and can be addressed through improved energy efficiency. Any improvements are based on a Type 2 energy audit meeting the requirements of ASABE S612.
Scenario Feature Measure	Each
Scenario Unit	Each
Scenario Typical Size	1

Cost Summary:

Cost Category	Scenario Cost	Scenario Cost/Unit
Materials	$12,158.49	$12,158.49
Equipment/Installation	$0.00	$0.00
Labor	$188.24	$188.24
Mobilization	$0.00	$0.00
Acquisition of Technical Knowledge	$0.00	$0.00
Foregone Income	$0.00	$0.00
Total	$12,346.73	$12,346.73

Cost Details:

Cost Category	Component ID	Component Name	Component Description	Unit	Price ($/unit)	Quantity	Cost
Materials	1178	Plate Cooler, 750 - 999 gal/hr capacity	Stainless Steel, dual pass plate cooler with 750 - 999 gallon/hour capacity. Materials only.	Each	$12,158.49	1	$12,158.49
Labor	230	Skilled Labor	Labor requiring a high level skill set: Includes carpenters, welders, electricians, conservation professionals involved with data collection, monitoring, and or record keeping, etc.	Hour	$23.53	8	$188.24

Scenario Worksheet

Practice and Scenario Description:

Information Type	Data
Region	Northern Plains
State	South Dakota
Discipline Group	Agricultural Engineering
Practice Code/Name	374 - Farmstead Energy Improvement
Scenario ID	7
Scenario Name	Scroll Compressor
Scenario Description	Install a new scroll compressor, associated controls, wiring, and materials to retrofit an existing refrigeration system. A new condenser is not included in this typical scenario. Typical scenario includes a new 5 horsepower scroll compressor.
Before Practice Situation	Inefficient reciprocating compressor as a key component of the refrigeration system used to cool milk. The compressor is a critical part of a milk cooling system, affecting milk quality, system reliability, and system efficiency.
After Practice Situation	A more efficient scroll compressor, which will reduce energy use, is evidenced by the energy audit. A comparably sized scroll compressor provides refrigeration capacity at a higher efficiency than a reciprocating compressor. Newer scroll compressor systems typically reduce electricity use by 15 to 25 percent compared to reciprocating compressors. Associated practices/activities: may include 122-AgEMP - HQ, and other activities within 374-Farmstead Energy Improvement. The resource concern is inefficient use of energy in the farm operation which increases dependence on non-renewable energy sources and can be addressed through improved energy efficiency. Any improvements are based on a Type 2 energy audit meeting the requirements of ASABE S612.
Scenario Feature Measure	Horse Power
Scenario Unit	Horse Power
Scenario Typical Size	1

Cost Summary:

Cost Category	Scenario Cost	Scenario Cost/Unit
Materials	$1,750.00	$1,750.00
Equipment/Installation	$0.00	$0.00
Labor	$94.12	$94.12
Mobilization	$0.00	$0.00
Acquisition of Technical Knowledge	$0.00	$0.00
Foregone Income	$0.00	$0.00
Total	$1,844.12	$1,844.12

Cost Details:

Cost Category	Component ID	Component Name	Component Description	Unit	Price ($/unit)	Quantity	Cost
Materials	1183	Scroll Compressor - 5 HP	Scroll compressor, 5 Horsepower, controls, wiring, and appurtenances. Materials only.	Horsepower	$1,750.00	1	$1,750.00
Labor	230	Skilled Labor	Labor requiring a high level skill set: Includes carpenters, welders, electricians, conservation professionals involved with data collection, monitoring, and or record keeping, etc.	Hour	$23.53	4	$94.12

Scenario Worksheet

Practice and Scenario Description:

Information Type	Data
Region	Northern Plains
State	South Dakota
Discipline Group	Agricultural Engineering
Practice Code/Name	374 - Farmstead Energy Improvement
Scenario ID	8
Scenario Name	Variable Speed Drive > 5 HP
Scenario Description	The typical scenario consists of a variable speed drive (VSD) and appurtances, such as hook-ups, control panels, wiring, control blocks, filters, switches, pads, etc. attached to an electric motor used to drive a ventilation fan, irrigation pumps, vacuum pump, or similar equipment involved with agricultural production. The motor size, on which the VSD is added, is larger than 5 HP.
Before Practice Situation	The system is inefficient when a motor operates at constant speed to satisfy a load which varies as to flow rate and/or pressure requirements.
After Practice Situation	An on-farm energy audit has determined that energy use can be reduced through use of a VSD to control electric motors. After the VSD is applied, the motor speed can be adjusted to reduce power requirements and better match varied flow or pressure requirements. Associated practices/activities: may include 122-AgEMP - HQ, and other activities within 374-Farmstead Energy Improvement. The resource concern is inefficient use of energy in the farm operation which increases dependence on non-renewable energy sources and can be addressed through improved energy efficiency. Any improvements are based on a Type 2 energy audit meeting the requirements of ASABE S612.
Scenario Feature Measure	HP
Scenario Unit	Horse Power
Scenario Typical Size	50

Cost Summary:

Cost Category	Scenario Cost	Scenario Cost/Unit
Materials	$6,316.25	$126.33
Equipment/Installation	$0.00	$0.00
Labor	$376.48	$7.53
Mobilization	$22.08	$0.44
Acquisition of Technical Knowledge	$0.00	$0.00
Foregone Income	$0.00	$0.00
Total	$6,714.81	$134.30

Cost Details:

Cost Category	Component ID	Component Name	Component Description	Unit	Price ($/unit)	Quantity	Cost
Materials	1287	Variable Speed Drive, 10 HP	Variable speed drive for 10 Horsepower electric motor. Does not include motor. Materials only.	Horsepower	$150.00	12.5	$1,875.00
Materials	1288	Variable Speed Drive, 50 HP	Variable speed drive for 50 Horsepower electric motor. Does not include motor. Materials only.	Horsepower	$146.80	12.5	$1,835.00
Materials	1289	Variable Speed Drive, 100 HP	Variable speed drive for 100 Horsepower electric motor. Does not include motor. Materials only.	Horsepower	$101.00	12.5	$1,262.50
Materials	1290	Variable Speed Drive, 200 HP	Variable speed drive for 200 Horsepower electric motor. Does not include motor. Materials only.	Horsepower	$107.50	12.5	$1,343.75
Labor	230	Skilled Labor	Labor requiring a high level skill set: Includes carpenters, welders, electricians, conservation professionals involved with data collection, monitoring, and or record keeping, etc.	Hour	$23.53	16	$376.48
Mobilization	1141	Mobilization, Skilled labor	Mobilization of skilled labor: Includes carpenters, welders, electricians, conservation professionals involved with data collection, monitoring, and or record keeping, etc.	Hour	$22.08	1	$22.08

Scenario Worksheet

Practice and Scenario Description:

Information Type	Data
Region	Northern Plains
State	South Dakota
Discipline Group	Agricultural Engineering
Practice Code/Name	374 - Farmstead Energy Improvement
Scenario ID	9
Scenario Name	Automatic Controller System
Scenario Description	The typical scenario consists of an automatic control system installed on an existing manually controlled agricultural system. Typical components may include any of the following: wiring, sensors, data logger, logic controller, communication link, software, switches, and relay.
Before Practice Situation	A manually controlled system is existing in an agricultural facility that causes the inefficient use of energy, as evidenced by an on-farm energy audit.
After Practice Situation	An on-farm energy audit has determined that energy use can be reduced through use of an automatic controller that helps regulates the energy consumption of the existing system. Associated practices/activities may include: 122-AgEMP - HQ, and other activities within 374-Farmstead Energy Improvement. The resource concern is inefficient use of energy in the farm operation which increases dependence on non-renewable energy sources and can be addressed through improved energy efficiency. Any improvements are based on a Type 2 energy audit meeting the requirements of ASABE S612.
Scenario Feature Measure	Each system
Scenario Unit	Each
Scenario Typical Size	1

Cost Summary:

Cost Category	Scenario Cost	Scenario Cost/Unit
Materials	$1,607.00	$1,607.00
Equipment/Installation	$0.00	$0.00
Labor	$188.24	$188.24
Mobilization	$22.08	$22.08
Acquisition of Technical Knowledge	$0.00	$0.00
Foregone Income	$0.00	$0.00
Total	$1,817.32	$1,817.32

Cost Details:

Cost Category	Component ID	Component Name	Component Description	Unit	Price ($/unit)	Quantity	Cost
Materials	1192	Switches and Controls, temp sensors	Temperature and soil moisture sensors installed as part of an electronic monitoring (with or without wireless telecommunications) commonly used to control pumps and irrigation systems	Each	$708.00	1	$708.00
Materials	1194	Switches and Controls, Wi-Fi system and software	Software with built-in cellular or Wi-Fi communication commonly used to control pumps and irrigation systems	Each	$750.00	1	$750.00
Materials	1193	Switches and Controls, programmable controller	Programmable logic controller (with or without wireless telecommunications) commonly used to control pumps and irrigation systems	Each	$149.00	1	$149.00
Labor	230	Skilled Labor	Labor requiring a high level skill set: Includes carpenters, welders, electricians, conservation professionals involved with data collection, monitoring, and or record keeping, etc.	Hour	$23.53	8	$188.24
Mobilization	1141	Mobilization, Skilled labor	Mobilization of skilled labor: Includes carpenters, welders, electricians, conservation professionals involved with data collection, monitoring, and or record keeping, etc.	Hour	$22.08	1	$22.08

Scenario Worksheet

Practice and Scenario Description:

Information Type	Data
Region	Northern Plains
State	South Dakota
Discipline Group	Agricultural Engineering
Practice Code/Name	374 - Farmstead Energy Improvement
Scenario ID	10
Scenario Name	Motor Upgrade > 100 HP
Scenario Description	The typical scenario consists of replacing an existing electric motor used to drive a ventilation fan, irrigation pumps, vacuum pump, or similar equipment involved with agricultural production with a new, high efficiency motor. The motor size is larger than 100 horsepower.
Before Practice Situation	The system is inefficient with a standard efficiency motor.
After Practice Situation	An on-farm energy audit has determined that energy use can be reduced through use of a NEMA premium motor. Associated practices/activities may include: 122-AgEMP - HQ, and other activities within 374-Farmstead Energy Improvement. The resource concern is inefficient use of energy in the farm operation which increases dependence on non-renewable energy sources and can be addressed through improved energy efficiency. Any improvements are based on a Type 2 energy audit meeting the requirements of ASABE S612.
Scenario Feature Measure	Each
Scenario Unit	Horse Power
Scenario Typical Size	150

Cost Summary:

Cost Category	Scenario Cost	Scenario Cost/Unit
Materials	$16,107.25	$107.38
Equipment/Installation	$0.00	$0.00
Labor	$376.48	$2.51
Mobilization	$0.00	$0.00
Acquisition of Technical Knowledge	$0.00	$0.00
Foregone Income	$0.00	$0.00
Total	$16,483.73	$109.89

Cost Details:

Cost Category	Component ID	Component Name	Component Description	Unit	Price ($/unit)	Quantity	Cost
Materials	1175	Motor, electric, NEMA Premium, 200 HP	Premium NEMA approved electric motor, 200 Horsepower and all required appurtenances. Materials only.	Each	$16,107.25	1	$16,107.25
Labor	230	Skilled Labor	Labor requiring a high level skill set: Includes carpenters, welders, electricians, conservation professionals involved with data collection, monitoring, and or record keeping, etc.	Hour	$23.53	16	$376.48

Scenario Worksheet

Practice and Scenario Description:

Information Type	Data
Region	Northern Plains
State	South Dakota
Discipline Group	Agricultural Engineering
Practice Code/Name	374 - Farmstead Energy Improvement
Scenario ID	11
Scenario Name	Motor Upgrade 10 - 100 HP
Scenario Description	The typical scenario consists of replacing an existing electric motor used to drive a ventilation fan, irrigation pumps, vacuum pump, or similar equipment involved with agricultural production with a new, high efficiency motor. The motor size is equal to or larger than 10 and less than or equal to 100 horsepower.
Before Practice Situation	The system is inefficient with a standard efficiency motor.
After Practice Situation	An on-farm energy audit has determined that energy use can be reduced through use of a NEMA premium motor. Associated practices/activities may include: 122-AgEMP - HQ, and other activities within 374-Farmstead Energy Improvement. The resource concern is inefficient use of energy in the farm operation which increases dependence on non-renewable energy sources and can be addressed through improved energy efficiency. Any improvements are based on a Type 2 energy audit meeting the requirements of ASABE S612.
Scenario Feature Measure	Each
Scenario Unit	Horse Power
Scenario Typical Size	50

Cost Summary:

Cost Category	Scenario Cost	Scenario Cost/Unit
Materials	$3,499.31	$69.99
Equipment/Installation	$0.00	$0.00
Labor	$188.24	$3.76
Mobilization	$0.00	$0.00
Acquisition of Technical Knowledge	$0.00	$0.00
Foregone Income	$0.00	$0.00
Total	$3,687.55	$73.75

Cost Details:

Cost Category	Component ID	Component Name	Component Description	Unit	Price ($/unit)	Quantity	Cost
Materials	1173	Motor, electric, NEMA Premium, 50 HP	Premium NEMA approved electric motor, 50 Horsepower and all required appurtenances. Materials only.	Each	$3,499.31	1	$3,499.31
Labor	230	Skilled Labor	Labor requiring a high level skill set: Includes carpenters, welders, electricians, conservation professionals involved with data collection, monitoring, and or record keeping, etc.	Hour	$23.53	8	$188.24

Scenario Worksheet

Practice and Scenario Description:

Information Type	Data
Region	Northern Plains
State	South Dakota
Discipline Group	Agricultural Engineering
Practice Code/Name	374 - Farmstead Energy Improvement
Scenario ID	12
Scenario Name	Motor Upgrade > 1 and < 10 HP
Scenario Description	The typical scenario consists of replacing an existing electric motor used to drive a ventilation fan, irrigation pumps, vacuum pump, or similar equipment involved with agricultural production with a new, high efficiency motor. The motor size is larger than 1 and less than 10 horsepower.
Before Practice Situation	The system is inefficient with a standard efficiency motor.
After Practice Situation	An on-farm energy audit has determined that energy use can be reduced through use of a NEMA premium motor. Associated practices/activities may include: 122-AgEMP - HQ, and other activities within 374-Farmstead Energy Improvement. The resource concern is inefficient use of energy in the farm operation which increases dependence on non-renewable energy sources and can be addressed through improved energy efficiency. Any improvements are based on a Type 2 energy audit meeting the requirements of ASABE S612.
Scenario Feature Measure	Each
Scenario Unit	Horse Power
Scenario Typical Size	5

Cost Summary:

Cost Category	Scenario Cost	Scenario Cost/Unit
Materials	$777.25	$155.45
Equipment/Installation	$0.00	$0.00
Labor	$94.12	$18.82
Mobilization	$0.00	$0.00
Acquisition of Technical Knowledge	$0.00	$0.00
Foregone Income	$0.00	$0.00
Total	$871.37	$174.27

Cost Details:

Cost Category	Component ID	Component Name	Component Description	Unit	Price ($/unit)	Quantity	Cost
Materials	1171	Motor, electric, NEMA Premium, 5 HP	Premium NEMA approved electric motor, 5 Horsepower and all required appurtenances. Materials only.	Each	$777.25	1	$777.25
Labor	230	Skilled Labor	Labor requiring a high level skill set: Includes carpenters, welders, electricians, conservation professionals involved with data collection, monitoring, and or record keeping, etc.	Hour	$23.53	4	$94.12

Scenario Worksheet

Practice and Scenario Description:

Information Type	Data
Region	Northern Plains
State	South Dakota
Discipline Group	Agricultural Engineering
Practice Code/Name	374 - Farmstead Energy Improvement
Scenario ID	13
Scenario Name	Motor Upgrade ≤ 1 HP
Scenario Description	The typical scenario consists of replacing an existing electric motor used to drive a ventilation fan, irrigation pumps, vacuum pump, or similar equipment involved with agricultural production with a new, high efficiency motor. The motor size is less than or equal to 1 horsepower.
Before Practice Situation	The system is inefficient with a standard efficiency motor.
After Practice Situation	An on-farm energy audit has determined that energy use can be reduced through use of a NEMA premium motor. Associated practices/activities may include: 122-AgEMP - HQ, and other activities within 374-Farmstead Energy Improvement. The resource concern is inefficient use of energy in the farm operation which increases dependence on non-renewable energy sources and can be addressed through improved energy efficiency. Any improvements are based on a Type 2 energy audit meeting the requirements of ASABE S612.
Scenario Feature Measure	Each
Scenario Unit	Horse Power
Scenario Typical Size	1

Cost Summary:

Cost Category	Scenario Cost	Scenario Cost/Unit
Materials	$445.52	$445.52
Equipment/Installation	$0.00	$0.00
Labor	$94.12	$94.12
Mobilization	$0.00	$0.00
Acquisition of Technical Knowledge	$0.00	$0.00
Foregone Income	$0.00	$0.00
Total	$539.64	$539.64

Cost Details:

Cost Category	Component ID	Component Name	Component Description	Unit	Price ($/unit)	Quantity	Cost
Materials	1169	Motor, electric, NEMA Premium, 1 HP	Premium NEMA approved electric motor, 1 Horsepower and all required appurtenances. Materials only.	Each	$445.52	1	$445.52
Labor	230	Skilled Labor	Labor requiring a high level skill set: Includes carpenters, welders, electricians, conservation professionals involved with data collection, monitoring, and or record keeping, etc.	Hour	$23.53	4	$94.12

Scenario Worksheet

Practice and Scenario Description:

Information Type	Data
Region	Northern Plains
State	South Dakota
Discipline Group	Agricultural Engineering
Practice Code/Name	374 - Farmstead Energy Improvement
Scenario ID	14
Scenario Name	Heating, Radiant Tube
Scenario Description	Replace "pancake" Brood Heaters in a poultry house with Radiant Tube Heaters. Replacement will require the materials and labor to remove existing heating system, re-plumb gas lines, cables and wench system to retrofit new radiant tube heaters, and miscellaneous items to complete the installation. Alternate acceptable radiant heating systems can include radiant brooders and quad radiant systems as evidenced by the energy audit. The typical scenario consists of the replacement of 28 brood heaters with 6 radiant tube heaters.
Before Practice Situation	Inefficient heat distribution equipment, such as conventional "pancake" brood heaters. The Pancake brooder, mounted at a low installation height, primarily warms the air. They provide a one-to-two foot perimeter at desired temperatures around each brooder. A large number of brooders are required to cover a significant percent of floor space. As the warmed air naturally rises it loses effectiveness for poultry on the ground.
After Practice Situation	Energy use is reduced through installation of a more efficient heater. Radiant tube heaters primarily warm objects within a direct line of sight (similar to the sun or an open fire). Air temperature is of relatively little importance for a radiant heating systems to be effective. As a result, radiant sytems are typically installed 5' or more above the floor level. This height extends the distribution of the radiant heat over a larger area than is possible with pancake style heaters. A roughly 16' diameter radiant heat zone heats over twice that of a convential pancake brooder. Associated practices/activities may include: 122-AgEMP - HQ, and other activities within 374-Farmstead Energy Improvement. The resource concern is inefficient use of energy in the farm operation which increases dependence on non-renewable energy sources and can be addressed through improved energy efficiency. Any improvements are based on a Type 2 energy audit meeting the requirements of ASABE S612.
Scenario Feature Measure	Each
Scenario Unit	Each
Scenario Typical Size	6

Cost Summary:

Cost Category	Scenario Cost	Scenario Cost/Unit
Materials	$7,344.96	$1,224.16
Equipment/Installation	$0.00	$0.00
Labor	$376.48	$62.75
Mobilization	$22.08	$3.68
Acquisition of Technical Knowledge	$0.00	$0.00
Foregone Income	$0.00	$0.00
Total	$7,743.52	$1,290.59

Cost Details:

Cost Category	Component ID	Component Name	Component Description	Unit	Price ($/unit)	Quantity	Cost
Materials	1163	Heater, radiant tube	Radiant tube heater rated at 125000 BTU/hour. Materials only.	Each	$1,224.16	6	$7,344.96
Labor	230	Skilled Labor	Labor requiring a high level skill set: Includes carpenters, welders, electricians, conservation professionals involved with data collection, monitoring, and or record keeping, etc.	Hour	$23.53	16	$376.48
Mobilization	1141	Mobilization, Skilled labor	Mobilization of skilled labor: Includes carpenters, welders, electricians, conservation professionals involved with data collection, monitoring, and or record keeping, etc.	Hour	$22.08	1	$22.08

Scenario Worksheet

Practice and Scenario Description:

Information Type	Data
Region	Northern Plains
State	South Dakota
Discipline Group	Agricultural Engineering
Practice Code/Name	374 - Farmstead Energy Improvement
Scenario ID	15
Scenario Name	Heating (Building)
Scenario Description	Replace existing low efficiency heaters with new high efficiency heaters. High-efficiency heating systems include any heating unit with efficiency rating of 80%+ for fuel oil and 90%+ for natural gas and propane. Applications may be air heating/building environment and hydronic (boiler) heating for agricultural operations, including under bench, or root zone heating. An alternative to heater replacement might be the addition of climate control system and electronic temperature controls with +/- 1 degree F differential, to reduce the annual run time.
Before Practice Situation	Buildings heated with low efficiency heaters or heaters without proper electronic climate controls
After Practice Situation	Higher efficiency heaters reduce energy consumption, energy costs, and GHG emissions. These replacement systems can be fueled by natural gas, propane, or fuel oil. Associated practices/activities: 122-AgEMP - HQ and other activities within 374-Farmstead Energy Improvement. The resource concern is inefficient use of energy in the farm operation which increases dependence on non-renewable energy sources and can be addressed through improved energy efficiency. Any improvements are based on a Type 2 energy audit meeting the requirements of ASABE S612.
Scenario Feature Measure	Rating
Scenario Unit	1000 BTU/Hour
Scenario Typical Size	750

Cost Summary:

Cost Category	Scenario Cost	Scenario Cost/Unit
Materials	$8,272.50	$11.03
Equipment/Installation	$0.00	$0.00
Labor	$376.48	$0.50
Mobilization	$22.08	$0.03
Acquisition of Technical Knowledge	$0.00	$0.00
Foregone Income	$0.00	$0.00
Total	$8,671.06	$11.56

Cost Details:

Cost Category	Component ID	Component Name	Component Description	Unit	Price ($/unit)	Quantity	Cost
Materials	1165	Heater, high efficiency	Natural gas, propane, or fuel oil unit heater or boiler and venting materials.	1,000 BTU/Hour	$11.03	750	$8,272.50
Labor	230	Skilled Labor	Labor requiring a high level skill set: Includes carpenters, welders, electricians, conservation professionals involved with data collection, monitoring, and or record keeping, etc.	Hour	$23.53	16	$376.48
Mobilization	1141	Mobilization, Skilled labor	Mobilization of skilled labor: Includes carpenters, welders, electricians, conservation professionals involved with data collection, monitoring, and or record keeping, etc.	Hour	$22.08	1	$22.08

Scenario Worksheet

Practice and Scenario Description:

Information Type	Data
Region	Northern Plains
State	South Dakota
Discipline Group	Agricultural Engineering
Practice Code/Name	374 - Farmstead Energy Improvement
Scenario ID	16
Scenario Name	Attic Insulation
Scenario Description	A typical scenario is the installation of a minimum 4-in depth of cellulose insulation in attic or ceiling to address energy loss. The increased insulation reduces seasonal heat loss and heat gain which reduces the respective need for heating and cooling equipment to operate.
Before Practice Situation	A poultry house with an inefficient building envelope with limited attic insulation.
After Practice Situation	A more effective and efficient building envelope can be created through addition of, or increased, attic insulation. Associated practices/activities: 122-AgEMP - HQ and other activities within 374-Farmstead Energy Improvement. The resource concern is inefficient use of energy in the farm operation which increases dependence on non-renewable energy sources and can be addressed through improved energy efficiency. Any improvements are based on a Type 2 energy audit meeting the requirements of ASABE S612.
Scenario Feature Measure	Square Feet of Attic Insulated
Scenario Unit	Square Foot
Scenario Typical Size	20000

Cost Summary:

Cost Category	Scenario Cost	Scenario Cost/Unit
Materials	$13,600.00	$0.68
Equipment/Installation	$0.00	$0.00
Labor	$0.00	$0.00
Mobilization	$0.00	$0.00
Acquisition of Technical Knowledge	$0.00	$0.00
Foregone Income	$0.00	$0.00
Total	$13,600.00	$0.68

Cost Details:

Cost Category	Component ID	Component Name	Component Description	Unit	Price ($/unit)	Quantity	Cost
Materials	1196	Insulation, Fiberglass or cellulose, R 15	Fiberglass or cellulose insulation R-15, includes materials, equipment and labor to install.	Square Foot	$0.68	20000	$13,600.00

Scenario Worksheet

Practice and Scenario Description:

Information Type	Data
Region	Northern Plains
State	South Dakota
Discipline Group	Agricultural Engineering
Practice Code/Name	374 - Farmstead Energy Improvement
Scenario ID	17
Scenario Name	Wall Insulation
Scenario Description	Enclose both sidewalls and endwalls from ceiling to floor in one of two manners: 1) metal exterior, 3.5" fiberglass batts (R-11), vapor barrier, & interior plywood or OSB sheathing, or 2) closed-cell polyurethane foam application (minimum 1" thickness (R-7) of 2.5 lbs/cu.ft. or higher density, (3.0 or higher density preferred) with a form of physical protective barrier on lower 2' (may be 6 lbs/cu.ft. or higher density 1/8" thick foam, or treated lumber). Based on a 40' x 500' poultry house.
Before Practice Situation	A poultry house with an inefficient building envelope with limited wall insulation.
After Practice Situation	A more effective and efficient building envelope can be created through addition of, or increased, insulation. Associated practices/activities: may include 122-AgEMP - HQ, and other activities within 374-Farmstead Energy Improvement. The resource concern is inefficient use of energy in the farm operation which increases dependence on non-renewable energy sources and can be addressed through improved energy efficiency. Any improvements are based on a Type 2 energy audit meeting the requirements of ASABE S612.
Scenario Feature Measure	Square Feet of Wall Insulated
Scenario Unit	Square Foot
Scenario Typical Size	20000

Cost Summary:

Cost Category	Scenario Cost	Scenario Cost/Unit
Materials	$55,400.00	$2.77
Equipment/Installation	$0.00	$0.00
Labor	$0.00	$0.00
Mobilization	$0.00	$0.00
Acquisition of Technical Knowledge	$0.00	$0.00
Foregone Income	$0.00	$0.00
Total	$55,400.00	$2.77

Cost Details:

Cost Category	Component ID	Component Name	Component Description	Unit	Price ($/unit)	Quantity	Cost
Materials	1198	Insulation, polyurethane, R-7, with sheathing skirt	Closed-cell polyurethane foam insulation (minimum 1" thickness (R-7) with a protective sheeting barrier on lower 2 feet of wall height. Includes materials, equipment and labor to install.	Square Foot	$1.01	10000	$10,100.00
Materials	1197	Insulation, Panel, R-11 with sheathing	Insulated wall panel typically 3.5" fiberglass batts (R-11), vapor barrier and OSB sheathing, or equal, includes materials, equipment and labor to install.	Square Foot	$4.53	10000	$45,300.00

Scenario Worksheet

Practice and Scenario Description:

Information Type	Data
Region	Northern Plains
State	South Dakota
Discipline Group	Agricultural Engineering
Practice Code/Name	374 - Farmstead Energy Improvement
Scenario ID	18
Scenario Name	Sealant
Scenario Description	A typical scenario is sealing the gaps between walls, gables, ceiling, etc. in a poultry house or greenhouse. Sealing is performed by a professional contractor, not merely use of spray foam from a can. The unit basis of payment in this scenario is each house based on 2400 linear feet of gap.
Before Practice Situation	An agricultural facility with an inefficient building envelope with gaps between walls, ceiling, etc. for a total of 2400 linear feet.
After Practice Situation	A more effective and efficient building envelope can be created through interior sealing of the exterior walls at the footer plate, eaves, ridge cap, and gable ends. The sealant reduces seasonal heat loss and heat gain due to infiltration which reduces the respective need for heating and cooling equipment to operate. Associated practices/activities: may include 122-AgEMP - HQ, and other activities within 374-Farmstead Energy Improvement. The resource concern is inefficient use of energy in the farm operation which increases dependence on non-renewable energy sources and can be addressed through improved energy efficiency. Any improvements are based on a Type 2 energy audit meeting the requirements of ASABE S612.
Scenario Feature Measure	Each house with estimated 2400 lf of gap
Scenario Unit	Foot
Scenario Typical Size	2400

Cost Summary:

Cost Category	Scenario Cost	Scenario Cost/Unit
Materials	$7,800.00	$3.25
Equipment/Installation	$0.00	$0.00
Labor	$0.00	$0.00
Mobilization	$0.00	$0.00
Acquisition of Technical Knowledge	$0.00	$0.00
Foregone Income	$0.00	$0.00
Total	$7,800.00	$3.25

Cost Details:

Cost Category	Component ID	Component Name	Component Description	Unit	Price ($/unit)	Quantity	Cost
Materials	1150	Sealant	Greenhouse and building gap sealant. Performed by a professional contractor spraying the areas with an approved sealant for poultry production facilities. Includes materials, equipment and labor to install.	Foot	$3.25	2400	$7,800.00

Scenario Worksheet

Practice and Scenario Description:

Information Type	Data
Region	Northern Plains
State	South Dakota
Discipline Group	Agricultural Engineering
Practice Code/Name	374 - Farmstead Energy Improvement
Scenario ID	19
Scenario Name	Greenhouse Screens
Scenario Description	The mechanical energy screen system consists of a drive motor, support cables, controls, and shade material, which may be woven, knitted, or non-woven strips of aluminum fiber, polyethylene, nylon or other synthetic material.
Before Practice Situation	Heating and cooling of an existing greenhouse is inefficient due to excessive heat loss and the fact that a greater volume of air is being heated than is necessary.
After Practice Situation	The greenhouse is fitted with a mechanically controlled energy screen installed truss-to-truss or gutter-to-gutter, with side screens as necessary, reducing heat loss in the greenhouse. Associated practices/activities: may include 122-AgEMP - HQ, and other activities within 374-Farmstead Energy Improvement. The resource concern is inefficient use of energy in the farm operation which increases dependence on non-renewable energy sources and can be addressed through improved energy efficiency. Any improvements are based on a Type 2 energy audit meeting the requirements of ASABE S612.
Scenario Feature Measure	Square Feet of Blanket
Scenario Unit	Square Foot
Scenario Typical Size	25000

Cost Summary:

Cost Category	Scenario Cost	Scenario Cost/Unit
Materials	$50,000.00	$2.00
Equipment/Installation	$0.00	$0.00
Labor	$376.48	$0.02
Mobilization	$22.08	$0.00
Acquisition of Technical Knowledge	$0.00	$0.00
Foregone Income	$0.00	$0.00
Total	$50,398.56	$2.02

Cost Details:

Cost Category	Component ID	Component Name	Component Description	Unit	Price ($/unit)	Quantity	Cost
Materials	1148	Thermal blanket 10,001 - 50,000 square foot	Thermal blanket greenhouse screens: mechanical energy screen system consists of a drive motor, support cables, controls, and shade material, which may be woven, knitted, or non-woven. Size Range is 10,001 to 50,000 square feet. Materials only.	Square Foot	$2.00	25000	$50,000.00
Labor	230	Skilled Labor	Labor requiring a high level skill set: Includes carpenters, welders, electricians, conservation professionals involved with data collection, monitoring, and or record keeping, etc.	Hour	$23.53	16	$376.48
Mobilization	1141	Mobilization, Skilled labor	Mobilization of skilled labor: Includes carpenters, welders, electricians, conservation professionals involved with data collection, monitoring, and or record keeping, etc.	Hour	$22.08	1	$22.08

Scenario Worksheet

Practice and Scenario Description:

Information Type	Data
Region	Northern Plains
State	South Dakota
Discipline Group	Agricultural Engineering
Practice Code/Name	374 - Farmstead Energy Improvement
Scenario ID	20
Scenario Name	Grain Dryer
Scenario Description	A replacement continuous dryer rated for an appropriatle rated bushel/per hour capacity for the operation that includes a microcomputer-based control system that adjusts the amount of time the crop remains in the dryer in order to achieve a consistent and accurate moisture content in the dried product. Alternate types of replacement dryers which reduce energy use are acceptable as evidenced by the energy audit. The typical operation requires a rated capacity of 860 bushels per hour.
Before Practice Situation	Wet crop is loaded in the top of a horizontal, continuous dryer. Dried crop is augured from the bottom of the dryer. The heated air from the unit's burners passes from the burner plenum through the grain. An on-farm energy audit has identified inefficient manual control of the dryer where the operator controls the plenum temperature and the discharge auger speed to achieve the desired final moisture content. Moisture content is based on measurement of grain leaving the dryer. The plenum temperature setting depends on the moisture content of crop with a typical value of 220 F. The burner cycles on and off, automatically, as necessary to maintain the plenum temperature selected by the operator.
After Practice Situation	Energy use is reduced through installation of a more efficient continuous dryer that uses a microcomputer-based controller to reduce overdrying and total time of operation. Associated practices/activities may include: 122-AgEMP - HQ, and other activities within 374-Farmstead Energy Improvement. The resource concern is inefficient use of energy in the farm operation which increases dependence on non-renewable energy sources and can be addressed through improved energy efficiency. Any improvements are based on a Type 2 energy audit meeting the requirements of ASABE S612.
Scenario Feature Measure	Rated capacity of the dryer
Scenario Unit	Bushels/Hour
Scenario Typical Size	860

Cost Summary:

Cost Category	Scenario Cost	Scenario Cost/Unit
Materials	$78,346.00	$91.10
Equipment/Installation	$0.00	$0.00
Labor	$376.48	$0.44
Mobilization	$22.08	$0.03
Acquisition of Technical Knowledge	$0.00	$0.00
Foregone Income	$0.00	$0.00
Total	$78,744.56	$91.56

Cost Details:

Cost Category	Component ID	Component Name	Component Description	Unit	Price ($/unit)	Quantity	Cost
Materials	1160	Grain dryer, Centrifugal, 20'	Grain dryer, 20 foot Centrifugal with rated capacity of 785 bushels/hour. Materials only.	Bushels per Hour	$89.00	172	$15,308.00
Materials	1159	Grain dryer, Axial, 16'	Grain dryer, 16 foot Axial with rated capacity of 600 bushels/hour. Materials only.	Bushels per Hour	$83.50	172	$14,362.00
Materials	1161	Grain dryer, Centrifugal, 24'	Grain dryer, 24 foot Centrifugal with rated capacity of 860 bushels/hr. Materials only.	Bushels per Hour	$94.50	172	$16,254.00
Materials	1162	Grain dryer, Axial 28'	Grain dryer, 28 foot Axial with rated capacity of 990 bushels/hr. Materials only.	Bushels per Hour	$93.00	172	$15,996.00
Materials	1158	Grain dryer, Axial, 12'	Grain dryer, 12 foot Axial with rated capacity of 460 bushels/hour. Materials only.	Bushels per Hour	$95.50	172	$16,426.00
Labor	230	Skilled Labor	Labor requiring a high level skill set: Includes carpenters, welders, electricians, conservation professionals involved with data collection, monitoring, and or record keeping, etc.	Hour	$23.53	16	$376.48
Mobilization	1141	Mobilization, Skilled labor	Mobilization of skilled labor: Includes carpenters, welders, electricians, conservation professionals involved with data collection, monitoring, and or record keeping, etc.	Hour	$22.08	1	$22.08

Scenario Worksheet

Practice and Scenario Description:

Information Type	Data
Region	Northern Plains
State	South Dakota
Discipline Group	Engineering General
Practice Code/Name	378 - Pond
Scenario ID	1
Scenario Name	Excavated Pond
Scenario Description	A low-hazard water impoundment structure on agricultural lands to improve water quality and to provide water for livestock, fish and wildlife, recreation, fire control, crop and orchard irrigation, and other related uses. Pond is created solely by excavation and impounds less than 3 feet against the embankment or spoil. Excavated material is spoiled, not placed in a designed embankment. Earthen spillway is constructed as needed. The resource concerns addressed include inadequate livestock water, excessive suspended sediment and turbidity in surface water, damage from sediment deposition, and reduced capacity of conveyances by sediment deposition.
Before Practice Situation	Area exists where water could naturally pool or run off to create a pond for livestock, wildlife, fire control or irrigation. Failure of the pond will not result in loss of life; damage to homes, commercial or industrial buildings, main highways, or railroads; or in interruption of the use or service of public utilities.
After Practice Situation	The typical pond is constructed by excavating 3000 cubic yards and spreading the spoil outside the pool area using a dozer or similar excavation equipment. Vegetation will be completed under critical area planting (342). Other associated practices include 382, 516, 521A, 533, 614, 587, 396.
Scenario Feature Measure	Excavated Volume
Scenario Unit	Cubic Yard
Scenario Typical Size	3000

Cost Summary:

Cost Category	Scenario Cost	Scenario Cost/Unit
Materials	$0.00	$0.00
Equipment/Installation	$6,576.96	$2.19
Labor	$148.74	$0.05
Mobilization	$144.94	$0.05
Acquisition of Technical Knowledge	$0.00	$0.00
Foregone Income	$0.00	$0.00
Total	$6,870.64	$2.29

Cost Details:

Cost Category	Component ID	Component Name	Component Description	Unit	Price ($/unit)	Quantity	Cost
Equipment/Installation	927	Dozer, 140 HP	Track mounted Dozer with horsepower range of 125 to 160. Equipment and power unit costs. Labor not included.	Hour	$101.16	6	$606.96
Equipment/Installation	48	Excavation, Common Earth, side cast, small equipment	Bulk excavation and side casting of common earth with hydraulic excavator with less than 1 CY capacity. Includes equipment and labor.	Cubic yard	$1.99	3000	$5,970.00
Labor	233	Equipment Operators, Heavy	Includes: Cranes, Hydraulic Excavators >=50 HP, Dozers, Paving Machines, Rock Trenchers, Trenchers >=12", Dump Trucks, Ag Equipment >=150 HP, Scrapers, Water Wagons.	Hour	$24.79	6	$148.74
Mobilization	1139	Mobilization, medium equipment	Equipment with 70-150 HP or typical weights between 14,000 and 30,000 pounds.	Each	$120.38	1	$120.38
Mobilization	1144	Mobilization, Heavy Equipment Operator	Mobilization of heavy equipment operators: Hydraulic Excavators >=50 HP, Dozers, Paving Machines, Rock Trenchers, Trenchers >=12", Dump Trucks, Ag Equipment >=150 HP, Scrapers, Water Wagons.	Hour	$24.56	1	$24.56

Scenario Worksheet

Practice and Scenario Description:

Information Type	Data
Region	Northern Plains
State	South Dakota
Discipline Group	Engineering General
Practice Code/Name	378 - Pond
Scenario ID	3
Scenario Name	Embankment Pond without Pipe
Scenario Description	A water impoundment structure on agricultural land to improve water quality or to provide water for livestock, fish and wildlife, recreation, fire control, crop and orchard irrigation, and other related uses. An earthen embankment will be constructed with an earthen auxiliary spillway. The resource concerns addressed include inadequate livestock water, excessive suspended sediment and turbidity in surface water, damage from sediment deposition, and reduced capacity of conveyances by sediment deposition.
Before Practice Situation	Area exists where water could naturally pool or run off to create a pond for livestock, wildlife, fire control or irrigation. Failure of the embankment will not result in loss of life or damages of any kind.
After Practice Situation	The typical pond is constructed by excavating the pool area, constructing the auxiliary spillway, preparing the foundation as designed, and using 5500 cubic yards to create an embankment. The product of the storage times the effective height of the dam is less than 3,000. The effective height of the dam is 35 feet or less. The earthen auxiliary spillway will be constructed as designed. No principle spillway pipe will be used. Vegetation will be completed under critical area planting (342). Other associated practices include 382, 516, 521A, 533, 614, 587, 396.
Scenario Feature Measure	Embankment Volume
Scenario Unit	Cubic Yard
Scenario Typical Size	5500

Cost Summary:

Cost Category	Scenario Cost	Scenario Cost/Unit
Materials	$0.00	$0.00
Equipment/Installation	$11,025.92	$2.00
Labor	$1,388.24	$0.25
Mobilization	$370.10	$0.07
Acquisition of Technical Knowledge	$0.00	$0.00
Foregone Income	$0.00	$0.00
Total	$12,784.26	$2.32

Cost Details:

Cost Category	Component ID	Component Name	Component Description	Unit	Price ($/unit)	Quantity	Cost
Equipment/Installation	927	Dozer, 140 HP	Track mounted Dozer with horsepower range of 125 to 160. Equipment and power unit costs. Labor not included.	Hour	$101.16	24	$2,427.84
Equipment/Installation	1208	Scraper, self propelled, 21 CY	Self propelled earthmoving scraper with 21 CY capacity. Does not include labor.	Hour	$268.69	32	$8,598.08
Labor	233	Equipment Operators, Heavy	Includes: Cranes, Hydraulic Excavators >=50 HP, Dozers, Paving Machines, Rock Trenchers, Trenchers >=12", Dump Trucks, Ag Equipment >=150 HP, Scrapers, Water Wagons.	Hour	$24.79	56	$1,388.24
Mobilization	1140	Mobilization, large equipment	Equipment >150HP or typical weights greater than 30,000 pounds or loads requiring over width or over length permits.	Each	$225.16	1	$225.16
Mobilization	1139	Mobilization, medium equipment	Equipment with 70-150 HP or typical weights between 14,000 and 30,000 pounds.	Each	$120.38	1	$120.38
Mobilization	1144	Mobilization, Heavy Equipment Operator	Mobilization of heavy equipment operators: Hydraulic Excavators >=50 HP, Dozers, Paving Machines, Rock Trenchers, Trenchers >=12", Dump Trucks, Ag Equipment >=150 HP, Scrapers, Water Wagons.	Hour	$24.56	1	$24.56

Scenario Worksheet

Practice and Scenario Description:

Information Type	Data
Region	Northern Plains
State	South Dakota
Discipline Group	Engineering General
Practice Code/Name	378 - Pond
Scenario ID	4
Scenario Name	Embankment Pond with Pipe <= 6000 CY
Scenario Description	A low-hazard water impoundment structure on agricultural land to improve water quality and to provide water for livestock, fish and wildlife, recreation, fire control, crop and orchard irrigation, and other related uses. An earthen embankment will be constructed with a principle spillway conduit and earthen auxiliary spillway, as designed. The resource concerns addressed include inadequate livestock water, excessive suspended sediment and turbidity in surface water, damage from sediment deposition, and reduced capacity of conveyances by sediment deposition.
Before Practice Situation	Area exists where water could naturally pool or run off to create a pond for livestock, wildlife, fire control or irrigation. Failure of the embankment will not result in loss of life or damages of any kind.
After Practice Situation	The typical low hazard pond is constructed by excavating the pool area, constructing the auxiliary spillway, preparing the foundation as designed, and using 6000 cubic yards to create an embankment. The product of the storage times the effective height of the dam is less than 3,000. The effective height of the dam is 35 feet or less. The principle spillway is installed using an approved conduit material. The earthen auxiliary spillway will be constructed as designed. Vegetation will be completed under critical area planting (342). Other associated practices include 382, 516, 521A, 533, 614, 587, 396.
Scenario Feature Measure	Embankment Volume
Scenario Unit	Cubic Yard
Scenario Typical Size	6000

Cost Summary:

Cost Category	Scenario Cost	Scenario Cost/Unit
Materials	$2,164.67	$0.36
Equipment/Installation	$14,224.62	$2.37
Labor	$1,811.72	$0.30
Mobilization	$394.66	$0.07
Acquisition of Technical Knowledge	$0.00	$0.00
Foregone Income	$0.00	$0.00
Total	$18,595.67	$3.10

Cost Details:

Cost Category	Component ID	Component Name	Component Description	Unit	Price ($/unit)	Quantity	Cost
Materials	1269	Pipe, CMP, 12", 16 Gauge	12" Corrugated Metal Pipe, Galvanized, Uncoated, 16 gage. Material cost only.	Foot	$11.84	80	$947.20
Materials	1608	Trash Guard, metal	Trash Guard, fabricated-steel, includes materials, equipment, and labor to transport and place Conical shaped trash guard for drop inlet spillway. Typically fabricated of CMP and steel. Includes materials, equipment, and labor to fabricate and transport.	Pound	$2.37	118	$279.66
Materials	1368	Pipe, Steel, 24", Std Wt	Materials: - 24" - Steel Std Wt	Foot	$121.50	6	$729.00
Materials	45	Aggregate, Sand, Graded, Washed	Sand, typical ASTM C33 gradation, includes materials, equipment and labor to transport and place	Cubic yard	$24.28	8.6	$208.81
Equipment/Installation	927	Dozer, 140 HP	Track mounted Dozer with horsepower range of 125 to 160. Equipment and power unit costs. Labor not included.	Hour	$101.16	10	$1,011.60
Equipment/Installation	38	Concrete, CIP, formed reinforced	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	$325.24	0.6	$195.14
Equipment/Installation	50	Earthfill, Manually Compacted	Earthfill, manually compacted, includes equipment and labor	Cubic yard	$4.90	45	$220.50
Equipment/Installation	48	Excavation, Common Earth, side cast, small equipment	Bulk excavation and side casting of common earth with hydraulic excavator with less than 1 CY capacity. Includes equipment and labor.	Cubic yard	$1.99	760	$1,512.40
Equipment/Installation	1208	Scraper, self propelled, 21 CY	Self propelled earthmoving scraper with 21 CY capacity. Does not include labor.	Hour	$268.69	42	$11,284.98
Labor	231	General Labor	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	$16.72	20	$334.40
Labor	230	Skilled Labor	Labor requiring a high level skill set: Includes carpenters, welders, electricians, conservation professionals involved with data collection, monitoring, and or record keeping, etc.	Hour	$23.53	8	$188.24
Labor	233	Equipment Operators, Heavy	Includes: Cranes, Hydraulic Excavators >=50 HP, Dozers, Paving Machines, Rock Trenchers, Trenchers >=12", Dump Trucks, Ag Equipment >=150 HP, Scrapers, Water Wagons.	Hour	$24.79	52	$1,289.08
Mobilization	1140	Mobilization, large equipment	Equipment >150HP or typical weights greater than 30,000 pounds or loads requiring over width or over length permits.	Each	$225.16	1	$225.16

Mobilization	1139	Mobilization, medium equipment	Equipment with 70-150 HP or typical weights between 14,000 and 30,000 pounds.	Each	$120.38	1	$120.38
Mobilization	1144	Mobilization, Heavy Equipment Operator	Mobilization of heavy equipment operators: Hydraulic Excavators >=50 HP, Dozers, Paving Machines, Rock Trenchers, Trenchers >=12", Dump Trucks, Ag Equipment >=150 HP, Scrapers, Water Wagons.	Hour	$24.56	2	$49.12

Scenario Worksheet

Practice and Scenario Description:

Information Type	Data
Region	Northern Plains
State	South Dakota
Discipline Group	Engineering General
Practice Code/Name	378 - Pond
Scenario ID	5
Scenario Name	Embankment Pond with Pipe > 6000 CY
Scenario Description	A low-hazard water impoundment structure on agricultural land to improve water quality and to provide water for livestock, fish and wildlife, recreation, fire control, crop and orchard irrigation, and other related uses. An earthen embankment will be constructed with a principle spillway conduit and earthen auxiliary spillway, as designed. The resource concerns addressed include inadequate livestock water, excessive suspended sediment and turbidity in surface water, damage from sediment deposition, and reduced capacity of conveyances by sediment deposition.
Before Practice Situation	Area exists where water could naturally pool or run off to create a pond for livestock, wildlife, fire control or irrigation. Failure of the embankment will not result in loss of life or damages of any kind.
After Practice Situation	The typical low hazard pond is constructed by excavating the pool area, constructing the auxiliary spillway, preparing the foundation as designed, and using 10,000 cubic yards to create an embankment. The product of the storage times the effective height of the dam is less than 3,000. The effective height of the dam is 35 feet or less. The principle spillway is installed using an approved conduit material. The earthen auxiliary spillway will be constructed as designed. Vegetation will be completed under critical area planting (342). Other associated practices include 382, 516, 521A, 533, 614, 587, 396.
Scenario Feature Measure	Embankment Volume
Scenario Unit	Cubic Yard
Scenario Typical Size	10000

Cost Summary:

Cost Category	Scenario Cost	Scenario Cost/Unit
Materials	$4,205.47	$0.42
Equipment/Installation	$24,204.79	$2.42
Labor	$3,182.26	$0.32
Mobilization	$394.66	$0.04
Acquisition of Technical Knowledge	$0.00	$0.00
Foregone Income	$0.00	$0.00
Total	$31,987.18	$3.20

Cost Details:

Cost Category	Component ID	Component Name	Component Description	Unit	Price ($/unit)	Quantity	Cost
Materials	1825	Pipe, CMP, 36", 12 Gauge	36" Corrugated Metal Pipe, Galvanized, Uncoated, 16 gage. Material cost only.	Foot	$40.61	8	$324.88
Materials	1608	Trash Guard, metal	Trash Guard, fabricated-steel, includes materials, equipment, and labor to transport and place Conical shaped trash guard for drop inlet spillway. Typically fabricated of CMP and steel. Includes materials, equipment, and labor to fabricate and transport.	Pound	$2.37	118	$279.66
Materials	1417	Pipe, CMP, 24", 12 Gauge	24" Corrugated Metal Pipe, Galvanized,	Foot	$27.35	110	$3,008.50
Materials	45	Aggregate, Sand, Graded, Washed	Sand, typical ASTM C33 gradation, includes materials, equipment and labor to transport and place	Cubic yard	$24.28	24.4	$592.43
Equipment/Installation	927	Dozer, 140 HP	Track mounted Dozer with horsepower range of 125 to 160. Equipment and power unit costs. Labor not included.	Hour	$101.16	20	$2,023.20
Equipment/Installation	38	Concrete, CIP, formed reinforced	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	$325.24	1.4	$455.34
Equipment/Installation	50	Earthfill, Manually Compacted	Earthfill, manually compacted, includes equipment and labor	Cubic yard	$4.90	98	$480.20
Equipment/Installation	48	Excavation, Common Earth, side cast, small equipment	Bulk excavation and side casting of common earth with hydraulic excavator with less than 1 CY capacity. Includes equipment and labor.	Cubic yard	$1.99	1225	$2,437.75
Equipment/Installation	1208	Scraper, self propelled, 21 CY	Self propelled earthmoving scraper with 21 CY capacity. Does not include labor.	Hour	$268.69	70	$18,808.30
Labor	231	General Labor	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	$16.72	40	$668.80
Labor	230	Skilled Labor	Labor requiring a high level skill set: Includes carpenters, welders, electricians, conservation professionals involved with data collection, monitoring, and or record keeping, etc.	Hour	$23.53	12	$282.36
Labor	233	Equipment Operators, Heavy	Includes: Cranes, Hydraulic Excavators >=50 HP, Dozers, Paving Machines, Rock Trenchers, Trenchers >=12", Dump Trucks, Ag Equipment >=150 HP, Scrapers, Water Wagons.	Hour	$24.79	90	$2,231.10
Mobilization	1140	Mobilization, large equipment	Equipment >150HP or typical weights greater than 30,000 pounds or loads requiring over width or over length permits.	Each	$225.16	1	$225.16

Mobilization	1139	Mobilization, medium equipment	Equipment with 70-150 HP or typical weights between 14,000 and 30,000 pounds.	Each	$120.38	1	$120.38
Mobilization	1144	Mobilization, Heavy Equipment Operator	Mobilization of heavy equipment operators: Hydraulic Excavators >=50 HP, Dozers, Paving Machines, Rock Trenchers, Trenchers >=12", Dump Trucks, Ag Equipment >=150 HP, Scrapers, Water Wagons.	Hour	$24.56	2	$49.12

Scenario Worksheet

Practice and Scenario Description:

Information Type	Data
Region	Northern Plains
State	South Dakota
Discipline Group	Forestry
Practice Code/Name	380 - Windbreak/Shelterbelt Est.
Scenario ID	1
Scenario Name	Windbreak, Shrubs, 1 Row, Hand Planted
Scenario Description	Single 500 foot row of shrubs for wind protection, wildlife habitat, or snow management. Shrubs planted by hand 4 feet apart. This practice is typically applied to crop, pasture or range lands. Resource Concerns to be addressed may include: Soil Erosion (wind); Excess/Insufficient Water (drifted snow, inefficient moisture management); Water Quality Degradation (excess nutrients in surface waters, excessive sediment in surface waters,); Degraded Plant Condition (undesirable plant productivity and health); Inadequate habitat for Fish and Wildlife (food, cover/shelter, continuity); Inefficient Energy Use (facilities, farming/ranching practices and field operations).
Before Practice Situation	Agricultural field, livestock paddock, feedlot or farmstead needing protection from wind, additional wildlife food and cover, or management of snow deposition
After Practice Situation	Wind velocity suitably reduced to reduce soil erosion, or to manage snow deposition. Additional wildlife food and cover.
Scenario Feature Measure	length of windbreak row(s)
Scenario Unit	Foot
Scenario Typical Size	500

Cost Summary:

Cost Category	Scenario Cost	Scenario Cost/Unit
Materials	$89.10	$0.18
Equipment/Installation	$45.00	$0.09
Labor	$50.16	$0.10
Mobilization	$8.45	$0.02
Acquisition of Technical Knowledge	$0.00	$0.00
Foregone Income	$0.00	$0.00
Total	$192.71	$0.39

Cost Details:

Cost Category	Component ID	Component Name	Component Description	Unit	Price ($/unit)	Quantity	Cost
Materials	1586	Wire flags	Small vinyl flags attached to wire stakes, typically, 36" in length, for marking tree rows	Each	$0.08	20	$1.60
Materials	1506	Shrub, seedling or transplant, bare root, 6-18"	Bare root hardwood trees 6-18" tall. Materials only.	Each	$0.70	125	$87.50
Equipment/Installation	1590	Hand tools, tree planting	Various hand tools for digging holes and planting trees such as augers, dibble bars, planting shovel, hoe-dad. Equipment only. Labor not included.	Hour	$9.44	2	$18.88
Equipment/Installation	939	Truck, Pickup	Equipment and power unit costs. Labor not included.	Hour	$26.12	1	$26.12
Labor	231	General Labor	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	$16.72	3	$50.16
Mobilization	1142	Mobilization, General labor	Mobilization of general labor: Ex. pipe layer, herder, concrete placement, materials spreader, flagger, etc.	Hour	$16.89	0.5	$8.45

Scenario Worksheet

Practice and Scenario Description:

Information Type	Data
Region	Northern Plains
State	South Dakota
Discipline Group	Forestry
Practice Code/Name	380 - Windbreak/Shelterbelt Est.
Scenario ID	2
Scenario Name	Windbreak, Trees, 1 Row, Hand Planted
Scenario Description	Single 500 foot row of conifer tree seedlings for wind protection, wildlife habitat, or snow management. Trees planted by hand 10 feet apart. This practice is typically applied to crop, pasture or range lands. Resource Concerns to be addressed may include: Soil Erosion (wind); Excess/Insufficient Water (drifted snow, inefficient moisture management); Water Quality Degradation (excess nutrients in surface waters, excessive sediment in surface waters,); Degraded Plant Condition (undesirable plant productivity and health); Inadequate habitat for Fish and Wildlife (food, cover/shelter, continuity); Inefficient Energy Use (facilities, farming/ranching practices and field operations).
Before Practice Situation	Agricultural field, livestock paddock, feedlot or farmstead needing protection from wind, additional wildlife food and cover, or management of snow deposition
After Practice Situation	Wind velocity suitably reduced to reduce soil erosion, or to manage snow deposition. Additional wildlife food and cover.
Scenario Feature Measure	length of windbreak row(s)
Scenario Unit	Foot
Scenario Typical Size	500

Cost Summary:

Cost Category	Scenario Cost	Scenario Cost/Unit
Materials	$33.10	$0.07
Equipment/Installation	$40.28	$0.08
Labor	$33.44	$0.07
Mobilization	$8.45	$0.02
Acquisition of Technical Knowledge	$0.00	$0.00
Foregone Income	$0.00	$0.00
Total	$115.27	$0.23

Cost Details:

Cost Category	Component ID	Component Name	Component Description	Unit	Price ($/unit)	Quantity	Cost
Materials	1586	Wire flags	Small vinyl flags attached to wire stakes, typically, 36" in length, for marking tree rows	Each	$0.08	20	$1.60
Materials	1519	Tree, conifer, seedling, containerized, 10 cu. in.	Containerized conifer stock, 10 cubic inches (approx 6" plug), 1.7" x 6"). Materials only.	Each	$0.63	50	$31.50
Equipment/Installation	1590	Hand tools, tree planting	Various hand tools for digging holes and planting trees such as augers, dibble bars, planting shovel, hoe-dad. Equipment only. Labor not included.	Hour	$9.44	1.5	$14.16
Equipment/Installation	939	Truck, Pickup	Equipment and power unit costs. Labor not included.	Hour	$26.12	1	$26.12
Labor	231	General Labor	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	$16.72	2	$33.44
Mobilization	1142	Mobilization, General labor	Mobilization of general labor: Ex. pipe layer, herder, concrete placement, materials spreader, flagger, etc.	Hour	$16.89	0.5	$8.45

Scenario Worksheet

Practice and Scenario Description:

Information Type	Data
Region	Northern Plains
State	South Dakota
Discipline Group	Forestry
Practice Code/Name	380 - Windbreak/Shelterbelt Est.
Scenario ID	5
Scenario Name	Windbreak, Trees without Tubes, 2 Rows, Machine Planted
Scenario Description	Two 500 foot rows of trees for wind protection, energy conservation, wildlife habitat, air quality, snow management or to provide a visual screen. The planting may consist of shrubs, hardwood trees, conifers, or a combination. Trees and shrubs planted with a tree planting machine. Shrubs will be planted with a spacing of 4 to 6 feet and hardwoods/conifers 8 to 12 feet apart in the row with rows 16 feet apart. The scenario will include 1/3 shrubs, 1/3 hardwoods, and 1/3 conifers. Herbivores (deer, rabbits, etc.) are NOT expected to browse tree seedlings, tree protection is not needed. This practice is typically applied to crop, pasture or range lands. Resource Concerns to be addressed include: Soil Erosion (wind); Excess/Insufficient Water (drifted snow, inefficient moisture management); Water Quality Degradation (excess nutrients in surface waters, pesticides transported to surface waters, excessive sediment in surface waters,); Degraded Plant Condition (undesirable plant productivity and health); Inadequate habitat for Fish and Wildlife (food, cover/shelter, continuity); Livestock Production Limitation (inadequate shelter); Air Quality Impacts (emission of particulate matter, objectionable odors); Inefficient Energy Use (facilities, farming/ranching practices and field operations).
Before Practice Situation	Agricultural field, livestock paddock, feedlot or farmstead needing protection from wind, additional wildlife food and cover, odor mitigation, visual screen or management of snow deposition
After Practice Situation	Wind velocity suitably reduced to reduce soil erosion, energy loss or to manage snow deposition. Additional wildlife food and cover, mixing of odor plumes and visual screening.
Scenario Feature Measure	length of planted windbreak
Scenario Unit	Foot
Scenario Typical Size	1000

Cost Summary:

Cost Category	Scenario Cost	Scenario Cost/Unit
Materials	$79.43	$0.08
Equipment/Installation	$49.78	$0.05
Labor	$87.49	$0.09
Mobilization	$25.34	$0.03
Acquisition of Technical Knowledge	$0.00	$0.00
Foregone Income	$0.00	$0.00
Total	$242.04	$0.24

Cost Details:

Cost Category	Component ID	Component Name	Component Description	Unit	Price ($/unit)	Quantity	Cost
Materials	1586	Wire flags	Small vinyl flags attached to wire stakes, typically, 36" in length, for marking tree rows	Each	$0.08	40	$3.20
Materials	1513	Tree, conifer, seedling, bare root, 1-1	Bare root conifer trees, 1-1 (2 years old). Materials only.	Each	$0.39	33	$12.87
Materials	1506	Shrub, seedling or transplant, bare root, 6-18"	Bare root hardwood trees 6-18" tall. Materials only.	Each	$0.70	66	$46.20
Materials	1509	Tree, hardwood, seedling or transplant, bare root, 6-18"	Bare root hardwood trees 6-18" tall. Materials only.	Each	$0.52	33	$17.16
Equipment/Installation	939	Truck, Pickup	Equipment and power unit costs. Labor not included.	Hour	$26.12	1	$26.12
Equipment/Installation	963	Tractor, agricultural, 60 HP	Agricultural tractor with horsepower range of 50 to 90. Equipment and power unit costs. Labor not included.	Hour	$19.28	1	$19.28
Equipment/Installation	1600	Mechanical tree planter	Mechanical tree planter. Requires a pulling unit of either tractor or small dozer depending upon site conditions. Does not include labor.	Hour	$4.38	1	$4.38
Labor	231	General Labor	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	$16.72	4	$66.88
Labor	232	Equipment Operators, Light	Includes: Skid Steer Loaders, Hydraulic Excavators <50 HP, Trenchers <12", Ag Equipment <150 HP, Pickup Trucks, Forklifts, Mulchers	Hour	$20.61	1	$20.61
Mobilization	1142	Mobilization, General labor	Mobilization of general labor: Ex. pipe layer, herder, concrete placement, materials spreader, flagger, etc.	Hour	$16.89	1.5	$25.34

Scenario Worksheet

Practice and Scenario Description:

Information Type	Data
Region	Northern Plains
State	South Dakota
Discipline Group	Forestry
Practice Code/Name	380 - Windbreak/Shelterbelt Est.
Scenario ID	6
Scenario Name	Windbreak, Trees with Tubes, 2 Rows, Machine Planted
Scenario Description	Two 500 foot rows of hardwood tree seedlings for wind protection, energy conservation, wildlife habitat, air quality, snow management or to provide a visual screen. Trees planted with a tree planting machine 10 feet apart in the row with rows 16 feet apart. Herbivore (deer, rabbits, etc.) damage is likely, so each tree must be protected with a rigid tube tree shelter. This practice is typically applied to crop, pasture or range lands. Resource Concerns to be addressed include: Soil Erosion (wind); Excess/Insufficient Water (drifted snow, inefficient moisture management); Water Quality Degradation (excess nutrients in surface waters, pesticides transported to surface waters, excessive sediment in surface waters,); Degraded Plant Condition (undesirable plant productivity and health); Inadequate habitat for Fish and Wildlife (food, cover/shelter, continuity); Livestock Production Limitation (inadequate shelter); Air Quality Impacts (emission of particulate matter, objectionable odors); Inefficient Energy Use (facilities, farming/ranching practices and field operations).
Before Practice Situation	Agricultural field, livestock paddock, feedlot or farmstead needing protection from wind, additional wildlife food and cover, odor mitigation, visual screen or management of snow deposition
After Practice Situation	Wind velocity suitably reduced to reduce soil erosion, energy loss or to manage snow deposition. Additional wildlife food and cover, mixing of odor plumes and visual screening.
Scenario Feature Measure	length of planted windbreak
Scenario Unit	Foot
Scenario Typical Size	1000

Cost Summary:

Cost Category	Scenario Cost	Scenario Cost/Unit
Materials	$399.20	$0.40
Equipment/Installation	$75.90	$0.08
Labor	$120.93	$0.12
Mobilization	$25.34	$0.03
Acquisition of Technical Knowledge	$0.00	$0.00
Foregone Income	$0.00	$0.00
Total	$621.37	$0.62

Cost Details:

Cost Category	Component ID	Component Name	Component Description	Unit	Price ($/unit)	Quantity	Cost
Materials	1583	Stakes, wood, 3/4" x 3/4" x 60"	3/4" x 3/4" x 60" wood stakes to fasten items in place. Materials only.	Each	$1.44	100	$144.00
Materials	1586	Wire flags	Small vinyl flags attached to wire stakes, typically, 36" in length, for marking tree rows	Each	$0.08	40	$3.20
Materials	1575	Cable ties, plastic	Plastic cable ties (typ. 8-12") to assist in securing items. Materials only.	Each	$0.07	100	$7.00
Materials	1571	Tree shelter, solid tube type, 5" x 48"	5" x 48" tree tube for protection from animal damage. Materials only.	Each	$1.93	100	$193.00
Materials	1509	Tree, hardwood, seedling or transplant, bare root, 6-18"	Bare root hardwood trees 6-18" tall. Materials only.	Each	$0.52	100	$52.00
Equipment/Installation	939	Truck, Pickup	Equipment and power unit costs. Labor not included.	Hour	$26.12	2	$52.24
Equipment/Installation	963	Tractor, agricultural, 60 HP	Agricultural tractor with horsepower range of 50 to 90. Equipment and power unit costs. Labor not included.	Hour	$19.28	1	$19.28
Equipment/Installation	1600	Mechanical tree planter	Mechanical tree planter. Requires a pulling unit of either tractor or small dozer depending upon site conditions. Does not include labor.	Hour	$4.38	1	$4.38
Labor	231	General Labor	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	$16.72	6	$100.32
Labor	232	Equipment Operators, Light	Includes: Skid Steer Loaders, Hydraulic Excavators <50 HP, Trenchers <12", Ag Equipment <150 HP, Pickup Trucks, Forklifts, Mulchers	Hour	$20.61	1	$20.61
Mobilization	1142	Mobilization, General labor	Mobilization of general labor: Ex. pipe layer, herder, concrete placement, materials spreader, flagger, etc.	Hour	$16.89	1.5	$25.34

Scenario Worksheet

Practice and Scenario Description:

Information Type	Data
Region	Northern Plains
State	South Dakota
Discipline Group	Forestry
Practice Code/Name	380 - Windbreak/Shelterbelt Est.
Scenario ID	7
Scenario Name	Windbreak, Trees without Tubes, 3 or more Rows, Machine Planted
Scenario Description	Three or more 500 foot rows of trees for wind protection, energy conservation, wildlife habitat, air quality, snow management or to provide a visual screen. The scenario is based on 4 rows consisting of one row shrubs, two rows hardwoods and one row conifer. Trees and conifers are spaced 8-12 feet apart and the shrubs 4-6 feet apart with rows 16 feet apart, planted with a tree planting machine. Herbivores are not expected to browse planted seedlings, so tree shelters are not needed. This practice is typically applied to crop, pasture or range lands. Resource Concerns to be addressed include: Soil Erosion (wind); Excess/Insufficient Water (drifted snow, inefficient moisture management); Water Quality Degradation (excess nutrients in surface waters, pesticides transported to surface waters, excessive sediment in surface waters,); Degraded Plant Condition (undesirable plant productivity and health); Inadequate habitat for Fish and Wildlife (food, cover/shelter, continuity); Livestock Production Limitation (inadequate shelter); Air Quality Impacts (emission of particulate matter, objectionable odors); Inefficient Energy Use (facilities, farming/ranching practices and field operations).
Before Practice Situation	Agricultural field, livestock paddock, feedlot or farmstead needing protection from wind, additional wildlife food and cover, odor mitigation, visual screening or management of snow deposition
After Practice Situation	Wind velocity suitably reduced to reduce soil erosion, energy loss or to manage snow deposition. Additional wildlife food and cover, mixing of odor plumes and visual screening.
Scenario Feature Measure	length of planted windbreak
Scenario Unit	Foot
Scenario Typical Size	2000

Cost Summary:

Cost Category	Scenario Cost	Scenario Cost/Unit
Materials	$165.40	$0.08
Equipment/Installation	$99.56	$0.05
Labor	$120.93	$0.06
Mobilization	$25.34	$0.01
Acquisition of Technical Knowledge	$0.00	$0.00
Foregone Income	$0.00	$0.00
Total	$411.23	$0.21

Cost Details:

Cost Category	Component ID	Component Name	Component Description	Unit	Price ($/unit)	Quantity	Cost
Materials	1586	Wire flags	Small vinyl flags attached to wire stakes, typically, 36" in length, for marking tree rows	Each	$0.08	80	$6.40
Materials	1513	Tree, conifer, seedling, bare root, 1-1	Bare root conifer trees, 1-1 (2 years old). Materials only.	Each	$0.39	50	$19.50
Materials	1506	Shrub, seedling or transplant, bare root, 6-18"	Bare root hardwood trees 6-18" tall. Materials only.	Each	$0.70	125	$87.50
Materials	1509	Tree, hardwood, seedling or transplant, bare root, 6-18"	Bare root hardwood trees 6-18" tall. Materials only.	Each	$0.52	100	$52.00
Equipment/Installation	939	Truck, Pickup	Equipment and power unit costs. Labor not included.	Hour	$26.12	2	$52.24
Equipment/Installation	963	Tractor, agricultural, 60 HP	Agricultural tractor with horsepower range of 50 to 90. Equipment and power unit costs. Labor not included.	Hour	$19.28	2	$38.56
Equipment/Installation	1600	Mechanical tree planter	Mechanical tree planter. Requires a pulling unit of either tractor or small dozer depending upon site conditions. Does not include labor.	Hour	$4.38	2	$8.76
Labor	231	General Labor	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	$16.72	6	$100.32
Labor	232	Equipment Operators, Light	Includes: Skid Steer Loaders, Hydraulic Excavators <50 HP, Trenchers <12", Ag Equipment <150 HP, Pickup Trucks, Forklifts, Mulchers	Hour	$20.61	1	$20.61
Mobilization	1142	Mobilization, General labor	Mobilization of general labor: Ex. pipe layer, herder, concrete placement, materials spreader, flagger, etc.	Hour	$16.89	1.5	$25.34

Scenario Worksheet

Practice and Scenario Description:

Information Type	Data
Region	Northern Plains
State	South Dakota
Discipline Group	Forestry
Practice Code/Name	380 - Windbreak/Shelterbelt Est.
Scenario ID	8
Scenario Name	Windbreak, Trees with Tubes, 3 or more Rows, Machine Planted
Scenario Description	Three or more 500 foot rows of trees for wind protection, energy conservation, wildlife habitat, air quality, snow management or to provide a visual screen. The scenario is based on 4 rows consisting of one row shrubs, two rows hardwoods and one row conifer. Trees and conifers are spaced 8-12 feet apart and the shrubs 4-6 feet apart with rows 16 feet apart, planted with a tree planting machine. Herbivore (deer, rabbits, etc.) damage is likely, so each tree must be protected with a rigid tube tree shelter. The tree shelters are place on the hardwoods. This practice is typically applied to crop, pasture or range lands. Resource Concerns to be addressed include: Soil Erosion (wind); Excess/Insufficient Water (drifted snow, inefficient moisture management); Water Quality Degradation (excess nutrients in surface waters, pesticides transported to surface waters, excessive sediment in surface waters,); Degraded Plant Condition (undesirable plant productivity and health); Inadequate habitat for Fish and Wildlife (food, cover/shelter, continuity); Livestock Production Limitation (inadequate shelter); Air Quality Impacts (emission of particulate matter, objectionable odors); Inefficient Energy Use (facilities, farming/ranching practices and field operations).
Before Practice Situation	Agricultural field, livestock paddock, feedlot or farmstead needing protection from wind, additional wildlife food and cover, odor mitigation, visual screening or management of snow deposition
After Practice Situation	Wind velocity suitably reduced to reduce soil erosion, energy loss or to manage snow deposition. Additional wildlife food and cover, mixing of odor plumes and visual screening.
Scenario Feature Measure	length of planted windbreak
Scenario Unit	Foot
Scenario Typical Size	2000

Cost Summary:

Cost Category	Scenario Cost	Scenario Cost/Unit
Materials	$509.40	$0.25
Equipment/Installation	$99.56	$0.05
Labor	$208.42	$0.10
Mobilization	$25.34	$0.01
Acquisition of Technical Knowledge	$0.00	$0.00
Foregone Income	$0.00	$0.00
Total	$842.72	$0.42

Cost Details:

Cost Category	Component ID	Component Name	Component Description	Unit	Price ($/unit)	Quantity	Cost
Materials	1583	Stakes, wood, 3/4" x 3/4" x 60"	3/4" x 3/4" x 60" wood stakes to fasten items in place. Materials only.	Each	$1.44	100	$144.00
Materials	1586	Wire flags	Small vinyl flags attached to wire stakes, typically, 36" in length, for marking tree rows	Each	$0.08	80	$6.40
Materials	1575	Cable ties, plastic	Plastic cable ties (typ. 8-12") to assist in securing items. Materials only.	Each	$0.07	100	$7.00
Materials	1571	Tree shelter, solid tube type, 5" x 48"	5" x 48" tree tube for protection from animal damage. Materials only.	Each	$1.93	100	$193.00
Materials	1513	Tree, conifer, seedling, bare root, 1-1	Bare root conifer trees, 1-1 (2 years old). Materials only.	Each	$0.39	50	$19.50
Materials	1506	Shrub, seedling or transplant, bare root, 6-18"	Bare root hardwood trees 6-18" tall. Materials only.	Each	$0.70	125	$87.50
Materials	1509	Tree, hardwood, seedling or transplant, bare root, 6-18"	Bare root hardwood trees 6-18" tall. Materials only.	Each	$0.52	100	$52.00
Equipment/Installation	939	Truck, Pickup	Equipment and power unit costs. Labor not included.	Hour	$26.12	2	$52.24
Equipment/Installation	963	Tractor, agricultural, 60 HP	Agricultural tractor with horsepower range of 50 to 90. Equipment and power unit costs. Labor not included.	Hour	$19.28	2	$38.56
Equipment/Installation	1600	Mechanical tree planter	Mechanical tree planter. Requires a pulling unit of either tractor or small dozer depending upon site conditions. Does not include labor.	Hour	$4.38	2	$8.76
Labor	231	General Labor	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	$16.72	10	$167.20
Labor	232	Equipment Operators, Light	Includes: Skid Steer Loaders, Hydraulic Excavators <50 HP, Trenchers <12", Ag Equipment <150 HP, Pickup Trucks, Forklifts, Mulchers	Hour	$20.61	2	$41.22
Mobilization	1142	Mobilization, General labor	Mobilization of general labor: Ex. pipe layer, herder, concrete placement, materials spreader, flagger, etc.	Hour	$16.89	1.5	$25.34

Scenario Worksheet

Practice and Scenario Description:

Information Type	Data
Region	Northern Plains
State	South Dakota
Discipline Group	Range/Pasture Grazing
Practice Code/Name	382 - Fence
Scenario ID	1
Scenario Name	Barbed Wire, Multi-strand
Scenario Description	Multi-strand, Barbed Wire - Installation of fence will allow for implementation of grazing management that allows for an adequate rest and recovery period, protection of sensitive area, improved water quality, reduction of noxious and invasive weeds. Constructed using fencing materials rather than a pre-manufactured gate.
Before Practice Situation	On grazing lands health and vigor are negatively impacted by poor grazing distribution, timing of grazing and inadequate rest and recovery periods. Water quality is impacted by increased erosion and runoff, cattle access to water bodies is uncontrolled. Reduced vegetative cover increases the opportunity for encroachment of noxious and invasive weeds.
After Practice Situation	Installation of fence will allow for implementation of grazing management that allows for an adequate rest and recovery period, protection of sensitive area, improved water quality, reduction of noxious and invasive weeds. Fence includes posts, wire, fasteners, gates, etc... Four strand wire is commonly installed. Fence will be installed with wildlife friendly considerations.
Scenario Feature Measure	Length of Fence
Scenario Unit	Foot
Scenario Typical Size	3960

Cost Summary:

Cost Category	Scenario Cost	Scenario Cost/Unit
Materials	$3,776.67	$0.95
Equipment/Installation	$263.90	$0.07
Labor	$571.21	$0.14
Mobilization	$238.94	$0.06
Acquisition of Technical Knowledge	$0.00	$0.00
Foregone Income	$0.00	$0.00
Total	$4,850.72	$1.22

Cost Details:

Cost Category	Component ID	Component Name	Component Description	Unit	Price ($/unit)	Quantity	Cost
Materials	30	Fence, Wire Assembly, Barbed Wire, 3 Strand	Brace pins, battens, clips, staples	Foot	$0.16	5280	$844.80
Materials	11	Post, Wood, CCA treated, 5" x 8'	Wood Post, End 5" X 8', CCA Treated	Each	$15.72	10	$157.20
Materials	10	Post, Wood, CCA treated, 4" x 8'	Wood Post, Line 4" X 8', CCA Treated	Each	$10.69	7	$74.83
Materials	9	Post, Wood, CCA treated, 3-4" x 7'	Wood Post, Line 3-4" X 7', CCA Treated	Each	$9.04	80	$723.20
Materials	1	Wire, Barbed, Galvanized, 12.5 Gauge, 1,320' roll	Galvanized 12.5 gauge, 1,320' roll	Each	$63.52	12	$762.24
Materials	15	Post, Steel T, 1.33 lbs, 6'	Steel Post, Studded 6' - 1.33 lb	Each	$7.59	160	$1,214.40
Equipment/Installation	963	Tractor, agricultural, 60 HP	Agricultural tractor with horsepower range of 50 to 90. Equipment and power unit costs. Labor not included.	Hour	$19.28	5	$96.40
Equipment/Installation	939	Truck, Pickup	Equipment and power unit costs. Labor not included.	Hour	$26.12	5	$130.60
Equipment/Installation	934	Auger, Post driver attachment	Auger or post driver attachment to a tractor or skidsteer. Does not include power unit. Labor not included.	Hour	$7.38	5	$36.90
Labor	231	General Labor	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	$16.72	28	$468.16
Labor	232	Equipment Operators, Light	Includes: Skid Steer Loaders, Hydraulic Excavators <50 HP, Trenchers <12", Ag Equipment <150 HP, Pickup Trucks, Forklifts, Mulchers	Hour	$20.61	5	$103.05
Mobilization	1143	Mobilization, Light Equipment Operator	Mobilization of light equipment operators: Skid Steer Loaders, Hydraulic Excavators <50 HP, Trenchers <12", Ag Equipment <150 HP, Pickup Trucks, Forklifts, Mulchers	Hour	$20.42	2	$40.84
Mobilization	1138	Mobilization, small equipment	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	$82.16	2	$164.32
Mobilization	1142	Mobilization, General labor	Mobilization of general labor: Ex. pipe layer, herder, concrete placement, materials spreader, flagger, etc.	Hour	$16.89	2	$33.78

Scenario Worksheet

Practice and Scenario Description:

Information Type	Data
Region	Northern Plains
State	South Dakota
Discipline Group	Range/Pasture Grazing
Practice Code/Name	382 - Fence
Scenario ID	2
Scenario Name	Barbed Wire, Multi-strand with Fence Markers
Scenario Description	Multi-strand, Barbed Wire - Installation of fence will allow for implementation of grazing management that allows for an adequate rest and recovery period, protection of sensitive area, improved water quality, reduction of noxious and invasive weeds. Constructed using fencing materials rather than a pre-manufactured gate.
Before Practice Situation	On grazing lands health and vigor are negatively impacted by poor grazing distribution, timing of grazing and inadequate rest and recovery periods. Water quality is impacted by increased erosion and runoff, cattle access to water bodies is uncontrolled. Reduced vegetative cover increases the opportunity for encroachment of noxious and invasive weeds.
After Practice Situation	Installation of fence will allow for implementation of grazing management that allows for an adequate rest and recovery period, protection of sensitive area, improved water quality, reduction of noxious and invasive weeds. Fence includes posts, wire, fasteners, gates, etc... Four strand wire is commonly installed. Fence will be installed with wildlife friendly considerations.
Scenario Feature Measure	Length of Fence
Scenario Unit	Foot
Scenario Typical Size	3960

Cost Summary:

Cost Category	Scenario Cost	Scenario Cost/Unit
Materials	$4,172.67	$1.05
Equipment/Installation	$263.90	$0.07
Labor	$604.65	$0.15
Mobilization	$238.94	$0.06
Acquisition of Technical Knowledge	$0.00	$0.00
Foregone Income	$0.00	$0.00
Total	$5,280.16	$1.33

Cost Details:

Cost Category	Component ID	Component Name	Component Description	Unit	Price ($/unit)	Quantity	Cost
Materials	30	Fence, Wire Assembly, Barbed Wire, 3 Strand	Brace pins, battens, clips, staples	Foot	$0.16	5280	$844.80
Materials	241	Vinyl Undersill Strips	Marking material using the "undersill" strips of vinyl siding made by Georgia Pacific. Priced per foot of fence per each wire. Materials only.	Foot	$0.05	7920	$396.00
Materials	11	Post, Wood, CCA treated, 5" x 8'	Wood Post, End 5" X 8', CCA Treated	Each	$15.72	10	$157.20
Materials	10	Post, Wood, CCA treated, 4" x 8'	Wood Post, Line 4" X 8', CCA Treated	Each	$10.69	7	$74.83
Materials	9	Post, Wood, CCA treated, 3-4" x 7'	Wood Post, Line 3-4" X 7', CCA Treated	Each	$9.04	80	$723.20
Materials	1	Wire, Barbed, Galvanized, 12.5 Gauge, 1,320' roll	Galvanized 12.5 gauge, 1,320' roll	Each	$63.52	12	$762.24
Materials	15	Post, Steel T, 1.33 lbs, 6'	Steel Post, Studded 6' - 1.33 lb	Each	$7.59	160	$1,214.40
Equipment/Installation	963	Tractor, agricultural, 60 HP	Agricultural tractor with horsepower range of 50 to 90. Equipment and power unit costs. Labor not included.	Hour	$19.28	5	$96.40
Equipment/Installation	939	Truck, Pickup	Equipment and power unit costs. Labor not included.	Hour	$26.12	5	$130.60
Equipment/Installation	934	Auger, Post driver attachment	Auger or post driver attachment to a tractor or skidsteer. Does not include power unit. Labor not included.	Hour	$7.38	5	$36.90
Labor	231	General Labor	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	$16.72	30	$501.60
Labor	232	Equipment Operators, Light	Includes: Skid Steer Loaders, Hydraulic Excavators <50 HP, Trenchers <12", Ag Equipment <150 HP, Pickup Trucks, Forklifts, Mulchers	Hour	$20.61	5	$103.05
Mobilization	1143	Mobilization, Light Equipment Operator	Mobilization of light equipment operators: Skid Steer Loaders, Hydraulic Excavators <50 HP, Trenchers <12", Ag Equipment <150 HP, Pickup Trucks, Forklifts, Mulchers	Hour	$20.42	2	$40.84
Mobilization	1138	Mobilization, small equipment	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	$82.16	2	$164.32
Mobilization	1142	Mobilization, General labor	Mobilization of general labor: Ex. pipe layer, herder, concrete placement, materials spreader, flagger, etc.	Hour	$16.89	2	$33.78

Scenario Worksheet

Practice and Scenario Description:

Information Type	Data
Region	Northern Plains
State	South Dakota
Discipline Group	Range/Pasture Grazing
Practice Code/Name	382 - Fence
Scenario ID	5
Scenario Name	Woven Wire
Scenario Description	Woven - Installation of fence will allow for implementation of a grazing management that allows for an adequate rest and recovery period, protection of sensitive area, improved water quality, reduction of noxious and invasive weeds. Woven wire is typically used in applications with sheep, goats, hogs, wildlife exclusion, shelterbelt/tree protection, etc. Constructed using fencing materials rather than a pre-manufactured gate. Includes 32" woven wire with 2 strands of barbed wire.
Before Practice Situation	On grazing lands health and vigor are negatively impacted by poor grazing distribution, timing of grazing and inadequate rest and recovery periods. Water quality is impacted by increased erosion and runoff, livestock access to water bodies is uncontrolled. Reduced vegetative cover increases opportunity for encroachment of noxious and invasive weeds.
After Practice Situation	Installation of fence will allow for implementation of a rotational grazing plan that allows for an adequate rest and recovery period, protection of sensitive area, improved water quality, reduction of noxious and invasive weeds. Woven wire fence includes posts, wire, fasteners, gates, etc... Woven wire is typically used in applications with sheep, goats, hogs, wildlife exclusion, shelterbelt/tree protection, etc.
Scenario Feature Measure	Length of Fence
Scenario Unit	Foot
Scenario Typical Size	3960

Cost Summary:

Cost Category	Scenario Cost	Scenario Cost/Unit
Materials	$5,445.27	$1.38
Equipment/Installation	$263.90	$0.07
Labor	$571.21	$0.14
Mobilization	$238.94	$0.06
Acquisition of Technical Knowledge	$0.00	$0.00
Foregone Income	$0.00	$0.00
Total	$6,519.32	$1.65

Cost Details:

Cost Category	Component ID	Component Name	Component Description	Unit	Price ($/unit)	Quantity	Cost
Materials	30	Fence, Wire Assembly, Barbed Wire, 3 Strand	Brace pins, battens, clips, staples	Foot	$0.16	2640	$422.40
Materials	35	Fence, Wire Assembly, Woven Wire	Brace pins, twist sticks, staples	Foot	$0.12	3960	$475.20
Materials	3	Wire, Woven, Galvanized, 12.5 Gauge, 32"	Galvanized 12.5 gauge, 32" - 330' roll	Each	$166.41	12	$1,996.92
Materials	11	Post, Wood, CCA treated, 5" x 8'	Wood Post, End 5" X 8', CCA Treated	Each	$15.72	10	$157.20
Materials	10	Post, Wood, CCA treated, 4" x 8'	Wood Post, Line 4" X 8', CCA Treated	Each	$10.69	7	$74.83
Materials	9	Post, Wood, CCA treated, 3-4" x 7'	Wood Post, Line 3-4" X 7', CCA Treated	Each	$9.04	80	$723.20
Materials	1	Wire, Barbed, Galvanized, 12.5 Gauge, 1,320' roll	Galvanized 12.5 gauge, 1,320' roll	Each	$63.52	6	$381.12
Materials	15	Post, Steel T, 1.33 lbs, 6'	Steel Post, Studded 6' - 1.33 lb	Each	$7.59	160	$1,214.40
Equipment/Installation	963	Tractor, agricultural, 60 HP	Agricultural tractor with horsepower range of 50 to 90. Equipment and power unit costs. Labor not included.	Hour	$19.28	5	$96.40
Equipment/Installation	939	Truck, Pickup	Equipment and power unit costs. Labor not included.	Hour	$26.12	5	$130.60
Equipment/Installation	934	Auger, Post driver attachment	Auger or post driver attachment to a tractor or skidsteer. Does not include power unit. Labor not included.	Hour	$7.38	5	$36.90
Labor	231	General Labor	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	$16.72	28	$468.16
Labor	232	Equipment Operators, Light	Includes: Skid Steer Loaders, Hydraulic Excavators <50 HP, Trenchers <12", Ag Equipment <150 HP, Pickup Trucks, Forklifts, Mulchers	Hour	$20.61	5	$103.05
Mobilization	1143	Mobilization, Light Equipment Operator	Mobilization of light equipment operators: Skid Steer Loaders, Hydraulic Excavators <50 HP, Trenchers <12", Ag Equipment <150 HP, Pickup Trucks, Forklifts, Mulchers	Hour	$20.42	2	$40.84
Mobilization	1138	Mobilization, small equipment	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	$82.16	2	$164.32
Mobilization	1142	Mobilization, General labor	Mobilization of general labor: Ex. pipe layer, herder, concrete placement, materials spreader, flagger, etc.	Hour	$16.89	2	$33.78

Scenario Worksheet

Practice and Scenario Description:

Information Type	Data
Region	Northern Plains
State	South Dakota
Discipline Group	Range/Pasture Grazing
Practice Code/Name	382 - Fence
Scenario ID	6
Scenario Name	Electric, high tensil with energizer
Scenario Description	Electric - Installation of fence will allow for implementation of a grazing management that allows for an adequate rest and recovery period, protection of sensitive area, improved water quality, reduction of noxious and invasive weeds. Includes 3 strands of high-tensil wire with energizer
Before Practice Situation	On grazinglands health and vigor are negatively impacted by poor grazing distribution, timing of grazing and inadequate rest and recovery periods. Water quality is impacted by increased erosion and runoff, cattle access to water bodies is uncontrolled. Reduced vegetative cover increases the opportunity for encroachment of noxious and invasive weeds.
After Practice Situation	Installation of fence will allow for implementation of grazing management that allows for an adequate rest and recovery period, protection of sensitive area, improved water quality, reduction of noxious and invasive weeds. Fence includes posts, wire, fasteners, gates, fence charger, etc... Two to three strand wire is commonly installed. Fence will be installed with wildlife friendly considerations.
Scenario Feature Measure	Length of Fence
Scenario Unit	Foot
Scenario Typical Size	2640

Cost Summary:

Cost Category	Scenario Cost	Scenario Cost/Unit
Materials	$1,333.25	$0.51
Equipment/Installation	$158.34	$0.06
Labor	$262.47	$0.10
Mobilization	$119.47	$0.05
Acquisition of Technical Knowledge	$0.00	$0.00
Foregone Income	$0.00	$0.00
Total	$1,873.53	$0.71

Cost Details:

Cost Category	Component ID	Component Name	Component Description	Unit	Price ($/unit)	Quantity	Cost
Materials	34	Fence, Wire Assembly, High Tensile, Electric, 3 Strand	Brace pins, springs, strainers, battens, clips, crimp sleeves, staples, insulators, wrap around sleeves	Foot	$0.12	2640	$316.80
Materials	29	Electric, Energizer, 6 joule	Electric, Energizer, 6 joule for electric fence	Each	$331.70	1	$331.70
Materials	11	Post, Wood, CCA treated, 5" x 8'	Wood Post, End 5" X 8', CCA Treated	Each	$15.72	8	$125.76
Materials	10	Post, Wood, CCA treated, 4" x 8'	Wood Post, Line 4" X 8', CCA Treated	Each	$10.69	4	$42.76
Materials	2	Wire, High Tensile, 12.5 Gauge, 4,000' roll	High Tensile 12.5 gauge, 4,000' roll	Each	$116.48	2	$232.96
Materials	15	Post, Steel T, 1.33 lbs, 6'	Steel Post, Studded 6' - 1.33 lb	Each	$7.59	35	$265.65
Materials	21	Electric, Ground Rod Clamps	Electric, Ground Rod Clamps for electric fence	Each	$2.39	2	$4.78
Materials	20	Electric, Ground Rods	Electric, Ground Rod for electric fence	Each	$12.84	1	$12.84
Equipment/Installation	963	Tractor, agricultural, 60 HP	Agricultural tractor with horsepower range of 50 to 90. Equipment and power unit costs. Labor not included.	Hour	$19.28	3	$57.84
Equipment/Installation	939	Truck, Pickup	Equipment and power unit costs. Labor not included.	Hour	$26.12	3	$78.36
Equipment/Installation	934	Auger, Post driver attachment	Auger or post driver attachment to a tractor or skidsteer. Does not include power unit. Labor not included.	Hour	$7.38	3	$22.14
Labor	231	General Labor	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	$16.72	12	$200.64
Labor	232	Equipment Operators, Light	Includes: Skid Steer Loaders, Hydraulic Excavators <50 HP, Trenchers <12", Ag Equipment <150 HP, Pickup Trucks, Forklifts, Mulchers	Hour	$20.61	3	$61.83
Mobilization	1143	Mobilization, Light Equipment Operator	Mobilization of light equipment operators: Skid Steer Loaders, Hydraulic Excavators <50 HP, Trenchers <12", Ag Equipment <150 HP, Pickup Trucks, Forklifts, Mulchers	Hour	$20.42	1	$20.42
Mobilization	1138	Mobilization, small equipment	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	$82.16	1	$82.16
Mobilization	1142	Mobilization, General labor	Mobilization of general labor: Ex. pipe layer, herder, concrete placement, materials spreader, flagger, etc.	Hour	$16.89	1	$16.89

Scenario Worksheet

Practice and Scenario Description:

Information Type	Data
Region	Northern Plains
State	South Dakota
Discipline Group	Range/Pasture Grazing
Practice Code/Name	382 - Fence
Scenario ID	8
Scenario Name	Protective Fence
Scenario Description	A barrier (fence) implemented on an NRCS constructed waste storage system according to engineering design to exclude human access. Permanently installed fence built to (1) keep humans away from waste ponds & lagoons, (2) to protect sensitive areas (riparian areas, wetlands, springs, etc.) from heavy livestock pressure, (3) to protect newly installed conservation practices where vulnerable to livestock damage. Heavy grade fence materials and close post spacing required.
Before Practice Situation	Where a NRCS designed and constructed waste storage pond is planned whereby significant risk to human safety is determined to be evident. Livestock has access to sensitive areas or area with newly installed conservation practices that may cause detrimental effect to animal/human health and wilidlife habitat. Resouce concerns affected are plant health and vigor, wildlife habitat, compaction of soils, runoff of sediment or water quality due to turbidity..
After Practice Situation	Humans and livestock are excluded from the waste storage pond for safety purposes by installing a fence around a waste holding pond. Improved livestock control and access to water or other sensative areas will promote saftey for livestock/humans improve health, vigor of sensitive species, limiting soil erosion, and condition.
Scenario Feature Measure	Length of Fence
Scenario Unit	Foot
Scenario Typical Size	1320

Cost Summary:

Cost Category	Scenario Cost	Scenario Cost/Unit
Materials	$1,414.23	$1.07
Equipment/Installation	$290.56	$0.22
Labor	$591.82	$0.45
Mobilization	$238.94	$0.18
Acquisition of Technical Knowledge	$0.00	$0.00
Foregone Income	$0.00	$0.00
Total	$2,535.55	$1.92

Cost Details:

Cost Category	Component ID	Component Name	Component Description	Unit	Price ($/unit)	Quantity	Cost
Materials	30	Fence, Wire Assembly, Barbed Wire, 3 Strand	Brace pins, battens, clips, staples	Foot	$0.16	1760	$281.60
Materials	11	Post, Wood, CCA treated, 5" x 8'	Wood Post, End 5" X 8', CCA Treated	Each	$15.72	8	$125.76
Materials	10	Post, Wood, CCA treated, 4" x 8'	Wood Post, Line 4" X 8', CCA Treated	Each	$10.69	6	$64.14
Materials	9	Post, Wood, CCA treated, 3-4" x 7'	Wood Post, Line 3-4" X 7', CCA Treated	Each	$9.04	30	$271.20
Materials	1	Wire, Barbed, Galvanized, 12.5 Gauge, 1,320' roll	Galvanized 12.5 gauge, 1,320' roll	Each	$63.52	4	$254.08
Materials	15	Post, Steel T, 1.33 lbs, 6'	Steel Post, Studded 6' - 1.33 lb	Each	$7.59	55	$417.45
Equipment/Installation	963	Tractor, agricultural, 60 HP	Agricultural tractor with horsepower range of 50 to 90. Equipment and power unit costs. Labor not included.	Hour	$19.28	6	$115.68
Equipment/Installation	939	Truck, Pickup	Equipment and power unit costs. Labor not included.	Hour	$26.12	5	$130.60
Equipment/Installation	934	Auger, Post driver attachment	Auger or post driver attachment to a tractor or skidsteer. Does not include power unit. Labor not included.	Hour	$7.38	6	$44.28
Labor	231	General Labor	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	$16.72	28	$468.16
Labor	232	Equipment Operators, Light	Includes: Skid Steer Loaders, Hydraulic Excavators <50 HP, Trenchers <12", Ag Equipment <150 HP, Pickup Trucks, Forklifts, Mulchers	Hour	$20.61	6	$123.66
Mobilization	1143	Mobilization, Light Equipment Operator	Mobilization of light equipment operators: Skid Steer Loaders, Hydraulic Excavators <50 HP, Trenchers <12", Ag Equipment <150 HP, Pickup Trucks, Forklifts, Mulchers	Hour	$20.42	2	$40.84
Mobilization	1138	Mobilization, small equipment	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	$82.16	2	$164.32
Mobilization	1142	Mobilization, General labor	Mobilization of general labor: Ex. pipe layer, herder, concrete placement, materials spreader, flagger, etc.	Hour	$16.89	2	$33.78

Scenario Worksheet

Practice and Scenario Description:

Information Type	Data
Region	Northern Plains
State	South Dakota
Discipline Group	Forestry
Practice Code/Name	383 - Fuel Break
Scenario ID	1
Scenario Name	FuelBreak
Scenario Description	Fuel Break installation requires tree thinning, treating woody residue, pruning, and mowing. Thinning treatment and pruning is done by hand, treating woody residue (piling/burning, crushing, or off-site removal) and mowing are mechanized. Resource concerns are degraded plant condition - wildfire hazard, excess biomass accumulation & undesirable productivity and health.
Before Practice Situation	Forest stand is overstocked with desirable and undesirable trees. Overstocking creates conditions conducive to wildfire movement across the landscape, and severe loss/damage of the forest stand. Shrub levels are high and significanly increase wildfire risk. Tree crowns are touching, trees retain limbs down to understory vegetation creating a "ladder" for fire movement into the overstory, and understory vegetation (brush and grasses) create a significant fuel load to rate a high to severe fire hazard. The terrain is moderately to steeply sloped (1-30%), increasing difficulty as slope steepens.
After Practice Situation	Fuel Break is installed at the property line or a key locations to reduce crown fire spread. Size of fuel break is 4 acres; the width varies due to site conditions. The trees are thinned so open gaps are created in crown overstory, branches on remaining trees are pruned to 8 to 10 feet in height, all woody residue (thinned trees and pruned branches) are treated (piled/burned or lopped/scattered) so little remains in the fuel break and understory vegetation is mowed down to less than 1 foot in height. Cut stumps have been chemically treated to control sprouting.
Scenario Feature Measure	Area of Treatment
Scenario Unit	Acre
Scenario Typical Size	4

Cost Summary:

Cost Category	Scenario Cost	Scenario Cost/Unit
Materials	$264.12	$66.03
Equipment/Installation	$2,503.52	$625.88
Labor	$2,147.70	$536.93
Mobilization	$980.50	$245.13
Acquisition of Technical Knowledge	$0.00	$0.00
Foregone Income	$0.00	$0.00
Total	$5,895.84	$1,473.96

Cost Details:

Cost Category	Component ID	Component Name	Component Description	Unit	Price ($/unit)	Quantity	Cost
Materials	338	Herbicide, Triclopyor	Triclopyr butoxyethyl ester (BEE) is a selective foliar and root absorbed, translocated herbicide used for control of woody and broadleaf plants. Product is typically used in these practices 595, 314, 645 and 666. Refer to WIN-PST for product names and active ingredients. Materials only.	Acre	$61.01	4	$244.04
Materials	313	Tree Marking Paint	Trees to be cut through tree marking are physically identified through the application of paint on the tree. Typically one quart of paint is used to mark one acre of trees.	Acre	$5.02	4	$20.08
Equipment/Installation	940	Mower, Bush Hog	Equipment and power unit costs. Labor not included.	Hour	$42.50	8	$340.00
Equipment/Installation	964	Chemical, spot treatment, single stem application	Ground applied chemical to individual plants or group of plants, e.g., backpack sprayer treatment. Equipment and labor cost included.	Hour	$55.87	8	$446.96
Equipment/Installation	939	Truck, Pickup	Equipment and power unit costs. Labor not included.	Hour	$26.12	8	$208.96
Equipment/Installation	1319	Pruning tool, pole saw	Gasoline powered pole chainsaw. Labor not included.	Hour	$6.00	8	$48.00
Equipment/Installation	1318	Pruning tools, hand tools	Pruning tools, hand tools, shears, loppers, pole saw, handsaw Equipment costs only. Labor not included.	Hour	$2.00	8	$16.00
Equipment/Installation	927	Dozer, 140 HP	Track mounted Dozer with horsepower range of 125 to 160. Equipment and power unit costs. Labor not included.	Hour	$101.16	10	$1,011.60
Equipment/Installation	937	Chainsaw	Equipment and power unit costs. Labor not included.	Hour	$5.40	80	$432.00
Labor	231	General Labor	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	$16.72	80	$1,337.60
Labor	232	Equipment Operators, Light	Includes: Skid Steer Loaders, Hydraulic Excavators <50 HP, Trenchers <12", Ag Equipment <150 HP, Pickup Trucks, Forklifts, Mulchers	Hour	$20.61	8	$164.88
Labor	233	Equipment Operators, Heavy	Includes: Cranes, Hydraulic Excavators >=50 HP, Dozers, Paving Machines, Rock Trenchers, Trenchers >=12", Dump Trucks, Ag Equipment >=150 HP, Scrapers, Water Wagons.	Hour	$24.79	10	$247.90

Labor	234	Supervisor or Manager	Labor involving supervision or management activities. Includes crew supervisors, foremen and farm/ranch managers time required for adopting new technology, etc.	Hour	$33.11	12	$397.32
Mobilization	1142	Mobilization, General labor	Mobilization of general labor: Ex. pipe layer, herder, concrete placement, materials spreader, flagger, etc.	Hour	$16.89	12	$202.68
Mobilization	1143	Mobilization, Light Equipment Operator	Mobilization of light equipment operators: Skid Steer Loaders, Hydraulic Excavators <50 HP, Trenchers <12", Ag Equipment <150 HP, Pickup Trucks, Forklifts, Mulchers	Hour	$20.42	4	$81.68
Mobilization	1139	Mobilization, medium equipment	Equipment with 70-150 HP or typical weights between 14,000 and 30,000 pounds.	Each	$120.38	1	$120.38
Mobilization	1138	Mobilization, small equipment	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	$82.16	1	$82.16
Mobilization	1145	Mobilization, Supervisor or Manager	Mobilization of supervisors or management. Includes crew supervisors, foremen and farm/ranch managers, etc.	Hour	$32.80	12	$393.60
Mobilization	1043	Mobilization, Material, distance > 50 miles	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	$1.00	100	$100.00

Scenario Worksheet

Practice and Scenario Description:

Information Type	Data
Region	Northern Plains
State	South Dakota
Discipline Group	Agronomy
Practice Code/Name	386 - Field Border
Scenario ID	1
Scenario Name	Native species
Scenario Description	A strip of permanent vegetation established at the edge or around the perimeter of a field. This practice may also apply to recreation land or other land uses where agronomic crops including forages are grown. Practice includes seedbed prep and planting of native species. The area of the field border is taken out of production.
Before Practice Situation	Before practice conditions may vary widely. Fields may have erosion issues from wind or water, a field border may be needed to manage pest populations, protect soil and water quality, provide wildlife food and cover, provide pollinator habitat, or a field border may be used to increase carbon storage and improve air quality. Water quality, soil erosion and/or wildlife food and cover may all be primary resource concerns.
After Practice Situation	This practice when applied around a field will support and connect other buffer practices within and between fields. Native grasses, legumes and forbs will be established around the field edges to the extent needed to meet the resource needs and producer objectives. Minimum field border widths shall be based on NRCS local design criteria specific to the purpose for installing the practice. Native species shall be selected that do not function as a host for diseases of a field crop and have physical charactaristics necessary to control wind and water erosion to tolerable levels on the field border area.
Scenario Feature Measure	number of acres
Scenario Unit	Acre
Scenario Typical Size	1

Cost Summary:

Cost Category	Scenario Cost	Scenario Cost/Unit
Materials	$97.07	$97.07
Equipment/Installation	$18.72	$18.72
Labor	$0.00	$0.00
Mobilization	$0.00	$0.00
Acquisition of Technical Knowledge	$0.00	$0.00
Foregone Income	$228.11	$228.11
Total	$343.90	$343.90

Cost Details:

Cost Category	Component ID	Component Name	Component Description	Unit	Price ($/unit)	Quantity	Cost
Materials	334	Herbicide, Glyphosate	A broad-spectrum, non-selective systemic herbicide. Product is typically used in these practices 340, 645, 314, 666, and 512. Refer to WIN-PST for product names and active ingredients. Materials only.	Acre	$11.04	1	$11.04
Materials	104	Alfalfa (Medicago sativa)	Introduced Legumes and shipping.	Pound	$4.15	5	$20.75
Materials	82	Switchgrass, Blackwell (Panicum virgatum)	Native Grasses and shipping.	Pound	$9.62	0.6	$5.77
Materials	81	Side Oats Grama (Bouteloua curtipendula)	Native Grasses and shipping.	Pound	$14.86	1.2	$17.83
Materials	79	Little Blue Stem (Schizachyrium scoparium)	Native Grasses and shipping.	Pound	$15.43	0.8	$12.34
Materials	78	Indian Grass, Tomahawk (Sorghastrum nutans)	Native Grasses and shipping.	Pound	$12.63	1.2	$15.16
Materials	76	Big Blue Stem (Andropogon gerardii)	Native Grasses and shipping.	Pound	$11.81	1.2	$14.17
Equipment/Installation	948	Chemical, ground application	Chemical application performed by ground equipment. Includes equipment, power unit and labor costs.	Acre	$4.37	1	$4.37
Equipment/Installation	960	Seeding Operation, No Till/Grass Drill	No Till drill or grass drill for seeding. Includes equipment, power unit and labor costs.	Acre	$14.35	1	$14.35
Foregone Income	1959	FI, Corn Dryland	Dryland Corn is Primary Crop	Acre	$292.03	0.5	$146.02
Foregone Income	1963	FI, Wheat Dryland	Dryland Wheat is Primary Crop	Acre	$164.19	0.5	$82.10

Scenario Worksheet

Practice and Scenario Description:

Information Type	Data
Region	Northern Plains
State	South Dakota
Discipline Group	Agronomy
Practice Code/Name	386 - Field Border
Scenario ID	2
Scenario Name	Introduced species
Scenario Description	A strip of permanent vegetation established at the edge or around the perimeter of a field. This practice may also apply to recreation land or other land uses where agronomic crops including forages are grown. Practice includes seedbed prep and planting of introduced species. The area of the field border is taken out of production.
Before Practice Situation	Before practice conditions may vary widely. Fields may have erosion issues from wind or water, a field border may be needed to manage pest populations, protect soil and water quality, provide wildlife food and cover, provide pollinator habitat, or a field border may be used to increase carbon storage and improve air quality. Water quality, soil erosion and/or wildlife food and cover may all be primary resource concerns.
After Practice Situation	This practice when applied around a field will support and connect other buffer practices within and between fields. Introduced grasses and legumes will be established around the field edges to the extent needed to meet the resource needs and producer objectives. Minimum field border widths shall be based on NRCS local design criteria specific to the purpose for installing the practice. Introduced species of grasses, legumes, forbs or shrubs shall be selected that are adapted to site, will not function as a host for diseases of a field crop and have physical charactaristics necessary to control wind and water erosion to tolerable levels on the field border area.
Scenario Feature Measure	Number of acres
Scenario Unit	Acre
Scenario Typical Size	1

Cost Summary:

Cost Category	Scenario Cost	Scenario Cost/Unit
Materials	$99.84	$99.84
Equipment/Installation	$25.76	$25.76
Labor	$0.00	$0.00
Mobilization	$0.00	$0.00
Acquisition of Technical Knowledge	$0.00	$0.00
Foregone Income	$228.11	$228.11
Total	$353.71	$353.71

Cost Details:

Cost Category	Component ID	Component Name	Component Description	Unit	Price ($/unit)	Quantity	Cost
Materials	334	Herbicide, Glyphosate	A broad-spectrum, non-selective systemic herbicide. Product is typically used in these practices 340, 645, 314, 666, and 512. Refer to WIN-PST for product names and active ingredients. Materials only.	Acre	$11.04	1	$11.04
Materials	95	Smooth Bromegrass (Bromus inermis)	Introduced Perennial Grasses and shipping.	Pound	$3.15	10	$31.50
Materials	104	Alfalfa (Medicago sativa)	Introduced Legumes and shipping.	Pound	$4.15	6	$24.90
Materials	73	Phosphorus, P2O5	Price per pound of P2O5 supplied by Superphosphate. Price is not per pound of total product applied, no conversion is needed.	Pound	$0.75	20	$15.00
Materials	71	Nitrogen (N), Urea	Price per pound of N supplied by Urea. Price is not per pound of total product applied, no conversion is needed.	Pound	$0.58	30	$17.40
Equipment/Installation	948	Chemical, ground application	Chemical application performed by ground equipment. Includes equipment, power unit and labor costs.	Acre	$4.37	1	$4.37
Equipment/Installation	960	Seeding Operation, No Till/Grass Drill	No Till drill or grass drill for seeding. Includes equipment, power unit and labor costs.	Acre	$14.35	1	$14.35
Equipment/Installation	950	Fertilizer, ground application, dry bulk	Dry bulk fertilizer application performed by ground equipment. Includes equipment, power unit and labor costs.	Acre	$7.04	1	$7.04
Foregone Income	1959	FI, Corn Dryland	Dryland Corn is Primary Crop	Acre	$292.03	0.5	$146.02
Foregone Income	1963	FI, Wheat Dryland	Dryland Wheat is Primary Crop	Acre	$164.19	0.5	$82.10

Scenario Worksheet

Practice and Scenario Description:

Information Type	Data
Region	Northern Plains
State	South Dakota
Discipline Group	Agronomy
Practice Code/Name	386 - Field Border
Scenario ID	3
Scenario Name	Pollinator Habitat
Scenario Description	A strip of permanent vegetation established at the edge or around the perimeter of a field. This practice may also apply to recreation land or other land uses where agronomic crops including forages are grown. Practice includes seedbed prep and planting of pollinator friendly herbaceous species. The area of the field border is taken out of production.
Before Practice Situation	Before practice conditions may vary widely. Fields may have erosion issues from wind or water, a field border may be needed to manage pest populations, protect soil and water quality, provide wildlife food and cover, provide pollinator habitat, or a field border may be used to increase carbon storage and improve air quality. Water quality, soil erosion and/or wildlife food and cover may all be primary resource concerns.
After Practice Situation	This practice when applied around a field will support and connect other buffer practices within and between fields. Pollinator herbaceous plantings will provide species which flower throughout the growing season. This provides a source of nectar for adult pollinators and a diversity of herbaceous material for immature pollinator life stages and for nesting. Minimum field border widths shall be based on NRCS local design criteria specific to the purpose for installing the practice. Species selected shall meet the pollinator habitat requirements of the state and be adapted to site; not function as a host for diseases of a field crop and; have physical charactaristics necessary to control wind and water erosion to tolerable levels on the field border area.
Scenario Feature Measure	Number of acres
Scenario Unit	Acre
Scenario Typical Size	1

Cost Summary:

Cost Category	Scenario Cost	Scenario Cost/Unit
Materials	$381.45	$381.45
Equipment/Installation	$18.72	$18.72
Labor	$0.00	$0.00
Mobilization	$0.00	$0.00
Acquisition of Technical Knowledge	$0.00	$0.00
Foregone Income	$228.11	$228.11
Total	$628.28	$628.28

Cost Details:

Cost Category	Component ID	Component Name	Component Description	Unit	Price ($/unit)	Quantity	Cost
Materials	132	Butterfly Milkweed (Asclepias tuberosa)	Native Forbs and shipping.	Pound	$437.08	0.13	$56.82
Materials	127	Slender Bush Clover (Lespedeza virginica)	Native Legumes and shipping.	Pound	$224.95	0.06	$13.50
Materials	126	Round Headed Bush Clover (Lespedeza capitata)	Native Legumes and shipping.	Pound	$202.95	0.05	$10.15
Materials	125	Partidge Pea (Chamaecrista fasciculata)	Native Legumes and shipping.	Pound	$15.70	1.4	$21.98
Materials	123	Leadplant (Amorpha canescens)	Native Legumes and shipping.	Pound	$148.45	0.21	$31.17
Materials	151	Stiff Goldenrod (Solidago rigida)	Native Forbs and shipping.	Pound	$143.45	0.02	$2.87
Materials	148	Black-Eyed Susan (Rudbeckia hirta)	Native Forbs and shipping.	Pound	$33.55	0.05	$1.68
Materials	161	Compass Plant (Silphium laciniatum)	Native Forbs and shipping.	Pound	$164.62	0.35	$57.62
Materials	164	Lanceleaf Coreopsis (Coreopsis lanceolata)	Native Forbs and shipping.	Pound	$33.34	0.4	$13.34
Materials	165	Upright Coneflower (Ratibida columnifera)	Native Forbs and shipping.	Pound	$40.59	0.1	$4.06
Materials	144	Wild Begamot (Monarda fistulosa)	Native Forbs and shipping.	Pound	$212.42	0.01	$2.12
Materials	146	Gray Headed Coneflower (Ratibida pinnata)	Native Forbs and shipping.	Pound	$46.27	0.2	$9.25
Materials	334	Herbicide, Glyphosate	A broad-spectrum, non-selective systemic herbicide. Product is typically used in these practices 340, 645, 314, 666, and 512. Refer to WIN-PST for product names and active ingredients. Materials only.	Acre	$11.04	1	$11.04
Materials	134	New England Aster (Aster novae-angliae)	Native Forbs and shipping.	Pound	$335.30	0.01	$3.35
Materials	104	Alfalfa (Medicago sativa)	Introduced Legumes and shipping.	Pound	$4.15	0.4	$1.66
Materials	79	Little Blue Stem (Schizachyrium scoparium)	Native Grasses and shipping.	Pound	$15.43	6	$92.58
Materials	120	Canadian Milk Vetch (Astragalus canadensis)	Native Legumes and shipping.	Pound	$64.70	0.3	$19.41
Materials	122	Illinois Bundleflower (Desmanthus illinoensis)	Native Legumes and shipping.	Pound	$27.94	1	$27.94
Materials	113	Sweet Clover (Melilotus spp.)	Introduced Legumes and shipping.	Pound	$3.04	0.3	$0.91
Equipment/Installation	948	Chemical, ground application	Chemical application performed by ground equipment. Includes equipment, power unit and labor costs.	Acre	$4.37	1	$4.37
Equipment/Installation	960	Seeding Operation, No Till/Grass Drill	No Till drill or grass drill for seeding. Includes equipment, power unit and labor costs.	Acre	$14.35	1	$14.35
Foregone Income	1959	FI, Corn Dryland	Dryland Corn is Primary Crop	Acre	$292.03	0.5	$146.02
Foregone Income	1963	FI, Wheat Dryland	Dryland Wheat is Primary Crop	Acre	$164.19	0.5	$82.10

Scenario Worksheet

Practice and Scenario Description:

Information Type	Data
Region	Northern Plains
State	South Dakota
Discipline Group	Agronomy
Practice Code/Name	386 - Field Border
Scenario ID	5
Scenario Name	Organic Seed
Scenario Description	A strip of permanent vegetation established at the edge or around the perimeter of a field. This practice may also apply to recreation land or other land uses where agronomic crops including forages are grown. Practice includes seedbed prep and planting of organic seed for herbaceous species. The area of the field border is taken out of production.
Before Practice Situation	Before practice conditions may vary widely. Fields may have erosion issues from wind or water, a field border may be needed to manage pest populations, protect soil and water quality, provide wildlife food and cover, provide pollinator habitat, or a field border may be used to increase carbon storage and improve air quality. Water quality, soil erosion and/or wildlife food and cover may all be primary resource concerns.
After Practice Situation	This practice when applied around a field will support and connect other buffer practices while creating a buffer between organic systems and conventional cropping systems. Organic grasses and legumes will be established around the field edges to the extent needed to meet the resource needs and producer objectives. Minimum field border widths shall be based on NRCS local design criteria specific to the purpose for installing the practice. Species selected shall be adapted to site, not function as a host for diseases of a field crop and have physical charactaristics necessary to control wind and water erosion to tolerable levels on the field border area.
Scenario Feature Measure	Number of Acres
Scenario Unit	Acre
Scenario Typical Size	1

Cost Summary:

Cost Category	Scenario Cost	Scenario Cost/Unit
Materials	$80.88	$80.88
Equipment/Installation	$88.95	$88.95
Labor	$0.00	$0.00
Mobilization	$0.00	$0.00
Acquisition of Technical Knowledge	$0.00	$0.00
Foregone Income	$228.11	$228.11
Total	$397.94	$397.94

Cost Details:

Cost Category	Component ID	Component Name	Component Description	Unit	Price ($/unit)	Quantity	Cost
Materials	82	Switchgrass, Blackwell (Panicum virgatum)	Native Grasses and shipping.	Pound	$9.62	0.6	$5.77
Materials	81	Side Oats Grama (Bouteloua curtipendula)	Native Grasses and shipping.	Pound	$14.86	1.2	$17.83
Materials	79	Little Blue Stem (Schizachyrium scoparium)	Native Grasses and shipping.	Pound	$15.43	0.8	$12.34
Materials	78	Indian Grass, Tomahawk (Sorghastrum nutans)	Native Grasses and shipping.	Pound	$12.63	1.2	$15.16
Materials	76	Big Blue Stem (Andropogon gerardii)	Native Grasses and shipping.	Pound	$11.81	1.2	$14.17
Materials	118	Certified Organic, Sweet Clover (Melilotus spp.)	Introduced Legumes and shipping.	Pound	$3.12	5	$15.60
Equipment/Installation	944	Site Preparation, Mechanical	Aerator, rolling drum chopper, etc. Includes equipment, power unit and labor costs.	Acre	$59.67	1	$59.67
Equipment/Installation	946	Tillage, Primary	Includes heavy disking (offset) or chisel plow. Includes equipment, power unit and labor costs.	Acre	$14.93	1	$14.93
Equipment/Installation	960	Seeding Operation, No Till/Grass Drill	No Till drill or grass drill for seeding. Includes equipment, power unit and labor costs.	Acre	$14.35	1	$14.35
Foregone Income	1959	FI, Corn Dryland	Dryland Corn is Primary Crop	Acre	$292.03	0.5	$146.02
Foregone Income	1963	FI, Wheat Dryland	Dryland Wheat is Primary Crop	Acre	$164.19	0.5	$82.10

Scenario Worksheet

Practice and Scenario Description:

Information Type	Data
Region	Northern Plains
State	South Dakota
Discipline Group	Wildlife Wetland
Practice Code/Name	390 - Riparian Herbaceous Cover
Scenario ID	1
Scenario Name	Native Species, Pollinator Planting
Scenario Description	Native Species: This scenario addresses inadequate herbaceous plant community function or diversity within the specific transitional zone between terrestrial and aquatic habitats in rangeland, pasture, cropland, and forest where natural seeding methods and/or management is unlikely to improve the plant community within a reasonable time period. This scenario applies to work not covered under NRCS Conservation Practice Range Planting (528), Forage and Biomass Planting (512), Critical Area Planting (342), Filter Strip (393), Restoration and Management of Rare and Declining Habitats (643), Streambank and Shoreline Protection (580), Vegetated Treatment Area (635), Wetland Enhancement (659), or Wetland Restoration (657). The typical setting for this scenario is usually a narrow strip between the aquatic and terrestrial habitats subject to intermittant flooding and saturated soils where the exising plant community has been disturbed, destroyed, or the species diversity is unable to provide proper function and/or adequate habitat. Where the establishment of a diverse riparian herbaceous plant community is desired, an adapted mix of native grasses, legumes, and/or forbs tolerant to the site conditions will be planted by broadcast and/or no-till or range drill seeding methods as necessary to accomplish the intended purpose(s). Where chemical control of undesirable vegetation, including invasives, is required to reduce competition for the desired plant community the Herbaceous Weed Control (315) practice should be used. Seedbed preparation may require LIGHT TILLAGE (disking). WHEN POLLINATOR HABITAT IS A CONSIDERATION: Include 5-10 adapted forb species that bloom sequentially throughout the growing season where feasible
Before Practice Situation	The riparian zone, the specific area between terrestrial and aquatic habitats, is currently an undesirable or inadequate stand of perennial or annual vegetation and natural reseeding or vegetation management is unlikely to improve the plant community within a reasonable amount of time to adequately address streambank and/or shoreline stability, dissipate stream energy and trap sediment, improve and/or maintain water quality, and/or provide adequate habitat corridors, food and/or cover for fish, wildlife, pollinators, and/or livestock resource conern(s). Existing conditions often require suppression or eradication of current vegetation by conventional mechanical or chemical (Herbaceous Weed Control (315)) methods to ensure establishment success of the new planting. Soil quality may be reduced due to compaction and may require light tillage to prepare a proper seedbed.
After Practice Situation	The riparian zone, the transitional zone between the terrestrial and aquatic habitats, is established to an adapted, diverse vegetative plant community and is under close management to insure long term survival and ecological succession. The quality and quantity of the riparian zone components are managed to support the species that depend on it for habitat as well as the functions it performs for stabilizing the streambank and/or shoreline, dissipating stream energy and trapping sediment, and improving and/or maintaining water quality. These functions include: stream temperature moderation through shading, recruitment of non-woody organic matter, habitat for terrestrial insects and other riparian dependent species, streambank integrity, and filtration of contaminants from surface run-off into the stream.
Scenario Feature Measure	Acres of Riparian Herbaceous Cover
Scenario Unit	Acre
Scenario Typical Size	5

Cost Summary:

Cost Category	Scenario Cost	Scenario Cost/Unit
Materials	$578.04	$115.61
Equipment/Installation	$143.55	$28.71
Labor	$0.00	$0.00
Mobilization	$33.78	$6.76
Acquisition of Technical Knowledge	$0.00	$0.00
Foregone Income	$114.65	$22.93
Total	$870.02	$174.00

Cost Details:

Cost Category	Component ID	Component Name	Component Description	Unit	Price ($/unit)	Quantity	Cost
Materials	1463	Blue Flax (Linum perenne)	Native Forbs & shipping	Pound	$21.47	0.95	$20.40
Materials	1089	Western Wheatgrass (Pascopyrum smithii)	Native Grasses and shipping.	Pound	$7.79	15	$116.85
Materials	76	Big Blue Stem (Andropogon gerardii)	Native Grasses and shipping.	Pound	$11.81	7.5	$88.58
Materials	82	Switchgrass, Blackwell (Panicum virgatum)	Native Grasses and shipping.	Pound	$9.62	4.5	$43.29
Materials	83	Wild Rye, Canada (Elymus canadensis)	Native Grasses and shipping.	Pound	$9.32	3.75	$34.95
Materials	165	Upright Coneflower (Ratibida columnifera)	Native Forbs and shipping.	Pound	$40.59	6.75	$273.98
Equipment/Installation	945	Tillage, Light	Includes light disking (tandem) or field cultivator. Includes equipment, power unit and labor costs.	Acre	$9.63	5	$48.15
Equipment/Installation	960	Seeding Operation, No Till/Grass Drill	No Till drill or grass drill for seeding. Includes equipment, power unit and labor costs.	Acre	$19.08	5	$95.40
Mobilization	1142	Mobilization, General labor	Mobilization of general labor: Ex. pipe layer, herder, concrete placement, materials spreader, flagger, etc.	Hour	$16.89	2	$33.78
Foregone Income	2079	FI, Grazing AUMs	Grazing is the Primary Land Use	AUM	$22.93	5	$114.65

Scenario Worksheet

Practice and Scenario Description:

Information Type	Data
Region	Northern Plains
State	South Dakota
Discipline Group	Wildlife Wetland
Practice Code/Name	390 - Riparian Herbaceous Cover
Scenario ID	2
Scenario Name	Native Species
Scenario Description	Native Species: This scenario addresses inadequate herbaceous plant community function or diversity within the specific transitional zone between terrestrial and aquatic habitats in rangeland, pasture, cropland, and forest where natural seeding methods and/or management is unlikely to improve the plant community within a reasonable time period. This scenario applies to work not covered under NRCS Conservation Practice Range Planting (528), Forage and Biomass Planting (512), Critical Area Planting (342), Filter Strip (393), Restoration and Management of Rare and Declining Habitats (643), Streambank and Shoreline Protection (580), Vegetated Treatment Area (635), Wetland Enhancement (659), or Wetland Restoration (657). The typical setting for this scenario is usually a narrow strip between the aquatic and terrestrial habitats subject to intermittant flooding and saturated soils where the exising plant community has been disturbed, destroyed, or the species diversity is unable to provide proper function and/or adequate habitat. Where the establishment of a diverse riparian herbaceous plant community is desired, an adapted mix of native grasses, legumes, and/or forbs tolerant to the site conditions will be planted by broadcast and/or no-till or range drill seeding methods as necessary to accomplish the intended purpose(s). Where chemical control of undesirable vegetation, including invasives, is required to reduce competition for the desired plant community the Herbaceous Weed Control (315) practice should be used. Seedbed preparation may require LIGHT TILLAGE (disking). WHEN POLLINATOR HABITAT IS A CONSIDERATION: Include 5-10 adapted forb species that bloom sequentially throughout the growing season where feasible
Before Practice Situation	The riparian zone, the specific area between terrestrial and aquatic habitats, is currently an undesirable or inadequate stand of perennial or annual vegetation and natural reseeding or vegetation management is unlikely to improve the plant community within a reasonable amount of time to adequately address streambank and/or shoreline stability, dissipate stream energy and trap sediment, improve and/or maintain water quality, and/or provide adequate habitat corridors, food and/or cover for fish, wildlife, pollinators, and/or livestock resource conern(s). Existing conditions often require suppression or eradication of current vegetation by conventional mechanical or chemical (Herbaceous Weed Control (315)) methods to ensure establishment success of the new planting. Soil quality may be reduced due to compaction and may require light tillage to prepare a proper seedbed.
After Practice Situation	The riparian zone, the transitional zone between the terrestrial and aquatic habitats, is established to an adapted, diverse vegetative plant community and is under close management to insure long term survival and ecological succession. The quality and quantity of the riparian zone components are managed to support the species that depend on it for habitat as well as the functions it performs for stabilizing the streambank and/or shoreline, dissipating stream energy and trapping sediment, and improving and/or maintaining water quality. These functions include: stream temperature moderation through shading, recruitment of non-woody organic matter, habitat for terrestrial insects and other riparian dependent species, streambank integrity, and filtration of contaminants from surface run-off into the stream.
Scenario Feature Measure	Acres of Riparian Herbaceous Cover
Scenario Unit	Acre
Scenario Typical Size	5

Cost Summary:

Cost Category	Scenario Cost	Scenario Cost/Unit
Materials	$374.00	$74.80
Equipment/Installation	$143.55	$28.71
Labor	$0.00	$0.00
Mobilization	$33.78	$6.76
Acquisition of Technical Knowledge	$0.00	$0.00
Foregone Income	$114.65	$22.93
Total	$665.98	$133.20

Cost Details:

Cost Category	Component ID	Component Name	Component Description	Unit	Price ($/unit)	Quantity	Cost
Materials	1089	Western Wheatgrass (Pascopyrum smithii)	Native Grasses and shipping.	Pound	$7.79	17.5	$136.33
Materials	76	Big Blue Stem (Andropogon gerardii)	Native Grasses and shipping.	Pound	$11.81	13.5	$159.44
Materials	82	Switchgrass, Blackwell (Panicum virgatum)	Native Grasses and shipping.	Pound	$9.62	4.5	$43.29
Materials	83	Wild Rye, Canada (Elymus canadensis)	Native Grasses and shipping.	Pound	$9.32	3.75	$34.95
Equipment/Installation	960	Seeding Operation, No Till/Grass Drill	No Till drill or grass drill for seeding. Includes equipment, power unit and labor costs.	Acre	$19.08	5	$95.40
Equipment/Installation	945	Tillage, Light	Includes light disking (tandem) or field cultivator. Includes equipment, power unit and labor costs.	Acre	$9.63	5	$48.15
Mobilization	1142	Mobilization, General labor	Mobilization of general labor: Ex. pipe layer, herder, concrete placement, materials spreader, flagger, etc.	Hour	$16.89	2	$33.78
Foregone Income	2079	FI, Grazing AUMs	Grazing is the Primary Land Use	AUM	$22.93	5	$114.65

Scenario Worksheet

Practice and Scenario Description:

Information Type	Data
Region	Northern Plains
State	South Dakota
Discipline Group	Forestry
Practice Code/Name	391 - Riparian Forest Buffer
Scenario ID	2
Scenario Name	Bare-root, machine planted
Scenario Description	Establish a buffer of trees and/or shrubs into a suitably prepared site to restore riparian plant communities and associated benefits. The buffer will be located adjacent to and up-gradient from a watercourse or water body extending a minimum of 35 feet wide. The planting will consist of machine planted bare-root shrubs, evergreen, and deciduous trees in rows. Area will be planted using 3 rows and will use each of the woody plant types. Spacing between plants in-row - shrubs will be 6' , evergreen tree spacing will be 12', and deciduous tree spacing at 15'. Tree rows will be 15' apart. A total tree row length of 3000'. Tree shelters will be placed on the hardwoods and evergreens. Resource concerns to be addressed are Soil Erosion - excessive bank erosion; Water Quality - excess sediment and organics in surface waters and elevated temperature; Degraded Plant Condition - inadequate structure and composition; and Inadequate Habitat for Fish and Wildlife - habitat degradation.
Before Practice Situation	Typical sites include former riparian forests and habitat used for forage, cropland, speculation property, or other nonforest condition which contains undesirable amounts or types of vegetation. Active bank erosion is depositing sediment, nutrients and organics in the riparian area. Water temperature is high due to lack of shade. Habitat is not desirable for wildlife.
After Practice Situation	A buffer of trees and shrubs will be established along the riparian corridor which will provide stability, filtration, shade, and desirable habitat to address the above mentioned resource concerns.
Scenario Feature Measure	Area of planting
Scenario Unit	Acre
Scenario Typical Size	3

Cost Summary:

Cost Category	Scenario Cost	Scenario Cost/Unit
Materials	$2,167.50	$722.50
Equipment/Installation	$350.80	$116.93
Labor	$707.70	$235.90
Mobilization	$99.05	$33.02
Acquisition of Technical Knowledge	$0.00	$0.00
Foregone Income	$787.46	$262.49
Total	$4,112.51	$1,370.84

Cost Details:

Cost Category	Component ID	Component Name	Component Description	Unit	Price ($/unit)	Quantity	Cost
Materials	1507	Shrub, seedling or transplant, bare root, 18"-36"	Bare root hardwood trees 18-36" tall. Materials only.	Each	$0.85	500	$425.00
Materials	1510	Tree, hardwood, seedling or transplant, bare root, 16-36"	Bare root hardwood trees 18-36" tall. Materials only.	Each	$0.62	200	$124.00
Materials	1513	Tree, conifer, seedling, bare root, 1-1	Bare root conifer trees, 1-1 (2 years old). Materials only.	Each	$0.39	250	$97.50
Materials	1577	Stakes, wood, 1" x 1" x 36"	1" x 1" x 36" wood stakes to fasten items in place. Materials only.	Each	$0.36	450	$162.00
Materials	1565	Tree shelter, solid tube type, 4" x 36"	4" x 36" tree tube for protection from animal damage. Materials only.	Each	$3.02	450	$1,359.00
Equipment/Installation	963	Tractor, agricultural, 60 HP	Agricultural tractor with horsepower range of 50 to 90. Equipment and power unit costs. Labor not included.	Hour	$19.28	10	$192.80
Equipment/Installation	1600	Mechanical tree planter	Mechanical tree planter. Requires a pulling unit of either tractor or small dozer depending upon site conditions. Does not include labor.	Hour	$4.38	10	$43.80
Equipment/Installation	965	All terrain vehicles, ATV	Includes equipment, power unit and labor costs.	Hour	$28.55	4	$114.20
Labor	231	General Labor	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	$16.72	30	$501.60
Labor	232	Equipment Operators, Light	Includes: Skid Steer Loaders, Hydraulic Excavators <50 HP, Trenchers <12", Ag Equipment <150 HP, Pickup Trucks, Forklifts, Mulchers	Hour	$20.61	10	$206.10
Mobilization	1138	Mobilization, small equipment	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	$82.16	1	$82.16
Mobilization	1142	Mobilization, General labor	Mobilization of general labor: Ex. pipe layer, herder, concrete placement, materials spreader, flagger, etc.	Hour	$16.89	1	$16.89
Foregone Income	1959	FI, Corn Dryland	Dryland Corn is Primary Crop	Acre	$292.03	1.5	$438.05
Foregone Income	1961	FI, Soybeans Dryland	Dryland Soybeans is Primary Crop	Acre	$232.94	1.5	$349.41

Scenario Worksheet

Practice and Scenario Description:

Information Type	Data
Region	Northern Plains
State	South Dakota
Discipline Group	Forestry
Practice Code/Name	391 - Riparian Forest Buffer
Scenario ID	3
Scenario Name	Small container, machine planted
Scenario Description	Establish a buffer of trees and/or shrubs into a suitably prepared site to restore riparian plant communities and associated benefits. The buffer will be located adjacent to and up-gradient from a watercourse or water body extending a minimum of 35 feet wide. The planting will consist of machine planted containerized shrubs, evergreen, and deciduous trees in rows. Area will be planted using 3 rows. Spacing between plants in-row - shrubs will be 6' , evergreen tree spacing will be 12', and deciduous tree spacing at 15'. Tree rows will be 15' apart. Tree row is a total length of 3000'. Tree shelters will be placed on the hardwoods and evergreens. Resource concerns to be addressed are Soil Erosion - excessive bank erosion; Water Quality - excess sediment and organics in surface waters and elevated temperature; Degraded Plant Condition - inadequate structure and composition; and Inadequate Habitat for Fish and Wildlife - habitat degradation.
Before Practice Situation	Typical sites include former riparian forests and habitat used for forage, cropland, speculation property, or other nonforest condition which contains undesirable amounts or types of vegetation. Active bank erosion is depositing sediment, nutrients and organics in the riparian area. Water temperature is high due to lack of shade. Habitat is not desirable for wildlife.
After Practice Situation	A buffer of trees and shrubs will be established along the riparian corridor which will provide stability, filtration, shade, and desirable habitat to address the above mentioned resource concerns.
Scenario Feature Measure	Area of planting
Scenario Unit	Acre
Scenario Typical Size	3

Cost Summary:

Cost Category	Scenario Cost	Scenario Cost/Unit
Materials	$3,478.50	$1,159.50
Equipment/Installation	$701.60	$233.87
Labor	$1,415.40	$471.80
Mobilization	$115.94	$38.65
Acquisition of Technical Knowledge	$0.00	$0.00
Foregone Income	$787.46	$262.49
Total	$6,498.90	$2,166.30

Cost Details:

Cost Category	Component ID	Component Name	Component Description	Unit	Price ($/unit)	Quantity	Cost
Materials	1578	Stakes, wood, 1" x 1" x 48"	1" x 1" x 48" wood stakes to fasten items in place. Materials only.	Each	$1.98	450	$891.00
Materials	1566	Tree shelter, solid tube type, 4" x 48"	4" x 48" tree tube for protection from animal damage. Materials only.	Each	$3.85	450	$1,732.50
Materials	1520	Tree, conifer, seedling, containerized, 15 cu. in.	Containerized conifer stock, 15 cubic inches (e.g. 2.0" x 6"). Materials only.	Each	$0.90	950	$855.00
Equipment/Installation	963	Tractor, agricultural, 60 HP	Agricultural tractor with horsepower range of 50 to 90. Equipment and power unit costs. Labor not included.	Hour	$19.28	20	$385.60
Equipment/Installation	1600	Mechanical tree planter	Mechanical tree planter. Requires a pulling unit of either tractor or small dozer depending upon site conditions. Does not include labor.	Hour	$4.38	20	$87.60
Equipment/Installation	965	All terrain vehicles, ATV	Includes equipment, power unit and labor costs.	Hour	$28.55	8	$228.40
Labor	231	General Labor	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	$16.72	60	$1,003.20
Labor	232	Equipment Operators, Light	Includes: Skid Steer Loaders, Hydraulic Excavators <50 HP, Trenchers <12", Ag Equipment <150 HP, Pickup Trucks, Forklifts, Mulchers	Hour	$20.61	20	$412.20
Mobilization	1138	Mobilization, small equipment	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	$82.16	1	$82.16
Mobilization	1142	Mobilization, General labor	Mobilization of general labor: Ex. pipe layer, herder, concrete placement, materials spreader, flagger, etc.	Hour	$16.89	2	$33.78
Foregone Income	1959	FI, Corn Dryland	Dryland Corn is Primary Crop	Acre	$292.03	1.5	$438.05
Foregone Income	1961	FI, Soybeans Dryland	Dryland Soybeans is Primary Crop	Acre	$232.94	1.5	$349.41

Scenario Worksheet

Practice and Scenario Description:

Information Type	Data
Region	Northern Plains
State	South Dakota
Discipline Group	Agronomy
Practice Code/Name	393 - Filter Strip
Scenario ID	1
Scenario Name	Native species
Scenario Description	A strip or area of native herbaceous vegetation situated between cropland, grazing land or disturbed land and sensitive areas. Practice includes seedbed prep and planting of native species. The area of the filter strip is taken out of production.
Before Practice Situation	Annual cropland, grazing land, or disturbed land (including forestland) allows for runoff of suspended solids, dissolved and/or associated contaminants into environmentally-sensitive areas such as wetlands, riparian zones, critical habitat and neighboring non-ag properties. Water Quality resource concerns are associated with this practice.
After Practice Situation	The planned filter strip will be established and mainatined per the practice plan that will meet the criteria for the planned purpose(s). The vegetation will consist of native species. The filter strip will have adequate width to filter the planned pollutants. The practice includes seedbed preparation, seeding, and operation and maintenance to maintain the vegetation and the function of the filter strip. Species selected shall be able to withstand partial burial by sediment and tolerant of herbicides used on contribution area while protecting environmentally-sensitive areas. The area of the filter strip is taken out of production.
Scenario Feature Measure	number of acres
Scenario Unit	Acre
Scenario Typical Size	1

Cost Summary:

Cost Category	Scenario Cost	Scenario Cost/Unit
Materials	$101.22	$101.22
Equipment/Installation	$18.72	$18.72
Labor	$0.00	$0.00
Mobilization	$0.00	$0.00
Acquisition of Technical Knowledge	$0.00	$0.00
Foregone Income	$292.03	$292.03
Total	$411.97	$411.97

Cost Details:

Cost Category	Component ID	Component Name	Component Description	Unit	Price ($/unit)	Quantity	Cost
Materials	334	Herbicide, Glyphosate	A broad-spectrum, non-selective systemic herbicide. Product is typically used in these practices 340, 645, 314, 666, and 512. Refer to WIN-PST for product names and active ingredients. Materials only.	Acre	$11.04	1	$11.04
Materials	82	Switchgrass, Blackwell (Panicum virgatum)	Native Grasses and shipping.	Pound	$9.62	0.6	$5.77
Materials	81	Side Oats Grama (Bouteloua curtipendula)	Native Grasses and shipping.	Pound	$14.86	1.2	$17.83
Materials	79	Little Blue Stem (Schizachyrium scoparium)	Native Grasses and shipping.	Pound	$15.43	0.8	$12.34
Materials	78	Indian Grass, Tomahawk (Sorghastrum nutans)	Native Grasses and shipping.	Pound	$12.63	1.2	$15.16
Materials	76	Big Blue Stem (Andropogon gerardii)	Native Grasses and shipping.	Pound	$11.81	1.2	$14.17
Materials	104	Alfalfa (Medicago sativa)	Introduced Legumes and shipping.	Pound	$4.15	6	$24.90
Equipment/Installation	960	Seeding Operation, No Till/Grass Drill	No Till drill or grass drill for seeding. Includes equipment, power unit and labor costs.	Acre	$14.35	1	$14.35
Equipment/Installation	948	Chemical, ground application	Chemical application performed by ground equipment. Includes equipment, power unit and labor costs.	Acre	$4.37	1	$4.37
Foregone Income	1959	FI, Corn Dryland	Dryland Corn is Primary Crop	Acre	$292.03	1	$292.03

Scenario Worksheet

Practice and Scenario Description:

Information Type	Data
Region	Northern Plains
State	South Dakota
Discipline Group	Forestry
Practice Code/Name	394 - Firebreak
Scenario ID	1
Scenario Name	Constructed, tree clearing
Scenario Description	Installation of a short vegetative firebreak a minimum width of 50' on the upwind side of unit and 100' on the downwind side of unit around an entire 160 acre field/farm using mechanical trees shears, chainsaws, and bush hog mowers. Vegetation is reduced in height but not down to bare mineral soil. Generally water control devices such as water bars are not needed due either to the lack of steep terrain or the temporary nature of the firebreak. Typical slopes are between 5 and 45%. Resource concerns include Wildfire hazard from excessive biomass accumulation, Undesirable plant productivity and health, Inadequate plant structure and composition, and Habitat degradation.
Before Practice Situation	Tract, field, or farm lacks adequate firebreaks to either reduce the spread of wildfires or contain a prescribed burn.
After Practice Situation	The property is adequately protected from wildfire or can be safely prescribe burned.
Scenario Feature Measure	Length of firebreak
Scenario Unit	Foot
Scenario Typical Size	10560

Cost Summary:

Cost Category	Scenario Cost	Scenario Cost/Unit
Materials	$0.00	$0.00
Equipment/Installation	$5,940.20	$0.56
Labor	$1,777.10	$0.17
Mobilization	$442.82	$0.04
Acquisition of Technical Knowledge	$0.00	$0.00
Foregone Income	$0.00	$0.00
Total	$8,160.12	$0.77

Cost Details:

Cost Category	Component ID	Component Name	Component Description	Unit	Price ($/unit)	Quantity	Cost
Equipment/Installation	943	Mechanical cutter, chopper	Masticator, flail shredder, hydro axe, brush cutter, etc. Equipment and power unit costs. Labor not included.	Hour	$117.78	40	$4,711.20
Equipment/Installation	933	Skidsteer, 80 HP	Skidsteer loader with horsepower range of 60 to 90. Equipment and power unit costs. Labor not included.	Hour	$34.80	20	$696.00
Equipment/Installation	937	Chainsaw	Equipment and power unit costs. Labor not included.	Hour	$5.40	20	$108.00
Equipment/Installation	940	Mower, Bush Hog	Equipment and power unit costs. Labor not included.	Hour	$42.50	10	$425.00
Labor	232	Equipment Operators, Light	Includes: Skid Steer Loaders, Hydraulic Excavators <50 HP, Trenchers <12", Ag Equipment <150 HP, Pickup Trucks, Forklifts, Mulchers	Hour	$20.61	70	$1,442.70
Labor	231	General Labor	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	$16.72	20	$334.40
Mobilization	1143	Mobilization, Light Equipment Operator	Mobilization of light equipment operators: Skid Steer Loaders, Hydraulic Excavators <50 HP, Trenchers <12", Ag Equipment <150 HP, Pickup Trucks, Forklifts, Mulchers	Hour	$20.42	4	$81.68
Mobilization	1139	Mobilization, medium equipment	Equipment with 70-150 HP or typical weights between 14,000 and 30,000 pounds.	Each	$120.38	3	$361.14

Scenario Worksheet

Practice and Scenario Description:

Information Type	Data
Region	Northern Plains
State	South Dakota
Discipline Group	Engineering General
Practice Code/Name	410 - Grade Stabilization Structure
Scenario ID	1
Scenario Name	Embankment, No Principle Spillway
Scenario Description	An earthen embankment dam without a principal spillway pipe. A low flow tube of 6 inches or less to reduce saturation of the emergency spillway is installed, anti-seep collars or sand diaphragms are not required. To stabilized the grade and control erosion in natural or artificial channels, to prevent the formation or advancing of gullies, and to enhance environmental quality and reduce pollution hazards. Applied in areas where the concentration and flow velocity of water require structures to stabilize the grade in channels or to control gully erosion. Cost estimate is based upon a typical amount of earthfill of 2,000 cubic yards, and 80 feet of pipe 6" PVC pipe. Disturbed areas are protected with permanent vegetative cover. Addresses resource concerns such as soil erosion-concentrated flow erosion and water quality degradation.
Before Practice Situation	The operator presently has gullies forming and/or worsening on the farmland and impacting the useable area and the downstream water quality. Erosion from the gullies is allowing soil and possibly nutrients to be transported to downstream receiving waters degrading water quality and causing soil loss.
After Practice Situation	Area is stabilized. The advancement and/or formation of gullies is stopped, soil from gullies no longer leaves the farm, useable farm area is increased, sedimentation and other pollution hazards are decreased, and water quality downstream is protected. Any needed re-vegetation of disturbed areas use Critical Area Planting (342). Other associated practices such as; Pond (378), Dam (402), Fence (382), Pumping Plant (533), Watering Facility (614), and Livestock Pipeline (516) will use the corresponding Standard(s) as appropriate.
Scenario Feature Measure	Cubic Yards of Earthfill
Scenario Unit	Cubic Yard
Scenario Typical Size	2000

Cost Summary:

Cost Category	Scenario Cost	Scenario Cost/Unit
Materials	$0.00	$0.00
Equipment/Installation	$7,545.40	$3.77
Labor	$241.60	$0.12
Mobilization	$240.76	$0.12
Acquisition of Technical Knowledge	$0.00	$0.00
Foregone Income	$0.00	$0.00
Total	$8,027.76	$4.01

Cost Details:

Cost Category	Component ID	Component Name	Component Description	Unit	Price ($/unit)	Quantity	Cost
Equipment/Installation	49	Earthfill, Roller Compacted	Earthfill, roller or machine compacted, includes equipment and labor	Cubic yard	$3.67	2000	$7,340.00
Equipment/Installation	1199	Stripping and stockpiling, topsoil	Stripping and stockpiling of topsoil adjacent to stripping area. Includes equipment and labor.	Cubic Yard	$0.79	260	$205.40
Labor	233	Equipment Operators, Heavy	Includes: Cranes, Hydraulic Excavators >=50 HP, Dozers, Paving Machines, Rock Trenchers, Trenchers >=12", Dump Trucks, Ag Equipment >=150 HP, Scrapers, Water Wagons.	Hour	$24.79	5	$123.95
Labor	230	Skilled Labor	Labor requiring a high level skill set: Includes carpenters, welders, electricians, conservation professionals involved with data collection, monitoring, and or record keeping, etc.	Hour	$23.53	5	$117.65
Mobilization	1139	Mobilization, medium equipment	Equipment with 70-150 HP or typical weights between 14,000 and 30,000 pounds.	Each	$120.38	2	$240.76

Scenario Worksheet

Practice and Scenario Description:

Information Type	Data
Region	Northern Plains
State	South Dakota
Discipline Group	Engineering General
Practice Code/Name	410 - Grade Stabilization Structure
Scenario ID	2
Scenario Name	Embankment, Pipe <24"
Scenario Description	An earthen embankment dam with a principle spillway pipe less than 24 inches, anti-seep collars or sand diaphragm, and excavated plunge pool basin. Installed to stabilized the grade and control erosion in natural or artificial channels, to prevent the formation or advancing of gullies, and to enhance environmental quality and reduce pollution hazards. Applied in areas where the concentration and flow velocity of water require structures to stabilize the grade in channels or to control gully erosion. Cost estimate is based upon a typical amount of earthfill of 4000 cubic yards, 90 feet of 18" PVC, pipe with a canopy inlet, and 3 cubic yard sand diaphragm. A non-lined plunge pool protects the outlet channel. Disturbed areas are protected with permanent vegetative cover. Addresses resource concerns such as soil erosion-concentrated flow erosion and water quality degradation.
Before Practice Situation	The operator presently has gullies forming and/or worsening on the farmland and impacting the useable area and the downstream water quality. Erosion from the gullies is allowing soil and possibly nutrients to be transported to downstream receiving waters degrading water quality and causing soil loss.
After Practice Situation	Area is stabilized. The advancement and/or formation of gullies is stopped, soil from gullies no longer leaves the farm, useable farm area is increased, sedimentation and other pollution hazards are decreased, and water quality downstream is protected. Any needed re-vegetation of disturbed areas use Critical Area Planting (342). Other associated practices such as; Pond (378), Dam (402), Fence (382), Pumping Plant (533), Watering Facility (614), and Livestock Pipeline (516) will use the corresponding Standard(s) as appropriate.
Scenario Feature Measure	Cubic Yards of Earthfill
Scenario Unit	Cubic Yard
Scenario Typical Size	4000

Cost Summary:

Cost Category	Scenario Cost	Scenario Cost/Unit
Materials	$2,815.88	$0.70
Equipment/Installation	$15,748.50	$3.94
Labor	$758.14	$0.19
Mobilization	$120.38	$0.03
Acquisition of Technical Knowledge	$0.00	$0.00
Foregone Income	$0.00	$0.00
Total	$19,442.90	$4.86

Cost Details:

Cost Category	Component ID	Component Name	Component Description	Unit	Price ($/unit)	Quantity	Cost
Materials	45	Aggregate, Sand, Graded, Washed	Sand, typical ASTM C33 gradation, includes materials, equipment and labor to transport and place	Cubic yard	$24.28	11	$267.08
Materials	1373	Pipe, PVC, 18", SCH 40	Materials: - 18" - PVC - SCH 40 - ASTM D1785	Foot	$28.32	90	$2,548.80
Equipment/Installation	931	Hydraulic Excavator, 1 CY	Track mounted hydraulic excavator with bucket capacity range of 0.8 to 1.5 CY. Equipment and power unit costs. Labor not included.	Hour	$92.64	10	$926.40
Equipment/Installation	50	Earthfill, Manually Compacted	Earthfill, manually compacted, includes equipment and labor	Cubic yard	$4.90	29	$142.10
Equipment/Installation	49	Earthfill, Roller Compacted	Earthfill, roller or machine compacted, includes equipment and labor	Cubic yard	$3.67	4000	$14,680.00
Labor	233	Equipment Operators, Heavy	Includes: Cranes, Hydraulic Excavators >=50 HP, Dozers, Paving Machines, Rock Trenchers, Trenchers >=12", Dump Trucks, Ag Equipment >=150 HP, Scrapers, Water Wagons.	Hour	$24.79	10	$247.90
Labor	231	General Labor	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	$16.72	8	$133.76
Labor	230	Skilled Labor	Labor requiring a high level skill set: Includes carpenters, welders, electricians, conservation professionals involved with data collection, monitoring, and or record keeping, etc.	Hour	$23.53	16	$376.48
Mobilization	1139	Mobilization, medium equipment	Equipment with 70-150 HP or typical weights between 14,000 and 30,000 pounds.	Each	$120.38	1	$120.38

Scenario Worksheet

Practice and Scenario Description:

Information Type	Data
Region	Northern Plains
State	South Dakota
Discipline Group	Engineering General
Practice Code/Name	410 - Grade Stabilization Structure
Scenario ID	3
Scenario Name	Embankment, Pipe >=24"
Scenario Description	An earthen embankment dam with a principle spillway pipe equal to or greater than 24 inches. Installed to stabilized the grade and control erosion in natural or artificial channels, to prevent the formation or advancing of gullies, and to enhance environmental quality and reduce pollution hazards. Applied in areas where the concentration and flow velocity of water require structures to stabilize the grade in channels or to control gully erosion. Cost estimate is based upon a typical amount of earthfill of 10,000 cubic yards, smooth steel drop inlet principle spillway with a 11 ft riser and 100 ft barrel, and 82 Square feet of anti-seep collars. A rock lined plunge pool protects the outlet channel. Disturbed areas are protected with permanent vegetative cover. Addresses resource concerns such as soil erosion-concentrated flow erosion and water quality degradation.
Before Practice Situation	The operator presently has gullies forming and/or worsening on the farmland and impacting the useable area and the downstream water quality. Erosion from the gullies is allowing soil and possibly nutrients to be transported to downstream receiving waters degrading water quality and causing soil loss.
After Practice Situation	Area is stabilized. The advancement and/or formation of gullies is stopped, soil from gullies no longer leaves the farm, useable farm area is increased, sedimentation and other pollution hazards are decreased, and water quality downstream is protected. Any needed re-vegetation of disturbed areas use Critical Area Planting (342). Other associated practices such as; Pond (378), Dam (402), Fence (382), Pumping Plant (533), Watering Facility (614), and Livestock Pipeline (516) will use the corresponding Standard(s) as appropriate.
Scenario Feature Measure	Cubic Yards of Earthfill
Scenario Unit	Cubic Yard
Scenario Typical Size	10000

Cost Summary:

Cost Category	Scenario Cost	Scenario Cost/Unit
Materials	$4,270.22	$0.43
Equipment/Installation	$39,287.38	$3.93
Labor	$1,342.75	$0.13
Mobilization	$240.76	$0.02
Acquisition of Technical Knowledge	$0.00	$0.00
Foregone Income	$0.00	$0.00
Total	$45,141.11	$4.51

Cost Details:

Cost Category	Component ID	Component Name	Component Description	Unit	Price ($/unit)	Quantity	Cost
Materials	1417	Pipe, CMP, 24", 12 Gauge	24" Corrugated Metal Pipe, Galvanized, Uncoated, 12 gage. Material cost only.	Foot	$27.35	100	$2,735.00
Materials	1824	Pipe, CMP, 30", 12 Gauge	30" Corrugated Metal Pipe, Galvanized, Uncoated, 16 gage. Material cost only.	Foot	$33.98	12	$407.76
Materials	45	Aggregate, Sand, Graded, Washed	Sand, typical ASTM C33 gradation, includes materials, equipment and labor to transport and place	Cubic yard	$24.28	11	$267.08
Materials	44	Rock Riprap, Placed with geotextile	Rock Riprap, placed with geotextile, includes materials, equipment and labor to transport and place	Cubic yard	$59.87	14	$838.18
Materials	1044	Dimension Lumber, Treated	Treated dimension lumber with nominal thickness equal or less than 2". Includes lumber and fasteners	Board Foot	$0.74	30	$22.20
Equipment/Installation	931	Hydraulic Excavator, 1 CY	Track mounted hydraulic excavator with bucket capacity range of 0.8 to 1.5 CY. Equipment and power unit costs. Labor not included.	Hour	$92.64	13	$1,204.32
Equipment/Installation	50	Earthfill, Manually Compacted	Earthfill, manually compacted, includes equipment and labor	Cubic yard	$4.90	129	$632.10
Equipment/Installation	49	Earthfill, Roller Compacted	Earthfill, roller or machine compacted, includes equipment and labor	Cubic yard	$3.67	10000	$36,700.00
Equipment/Installation	38	Concrete, CIP, formed reinforced	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	$325.24	2	$650.48
Equipment/Installation	36	Concrete, CIP, formless, non reinforced	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	$100.48	1	$100.48
Labor	233	Equipment Operators, Heavy	Includes: Cranes, Hydraulic Excavators >=50 HP, Dozers, Paving Machines, Rock Trenchers, Trenchers >=12", Dump Trucks, Ag Equipment >=150 HP, Scrapers, Water Wagons.	Hour	$24.79	13	$322.27
Labor	231	General Labor	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	$16.72	16	$267.52
Labor	230	Skilled Labor	Labor requiring a high level skill set: Includes carpenters, welders, electricians, conservation professionals involved with data collection, monitoring, and or record keeping, etc.	Hour	$23.53	32	$752.96

Mobilization	1139	Mobilization, medium equipment	Equipment with 70-150 HP or typical weights between 14,000 and 30,000 pounds.	Each	$120.38	2	$240.76

Scenario Worksheet

Practice and Scenario Description:

Information Type	Data
Region	Northern Plains
State	South Dakota
Discipline Group	Engineering General
Practice Code/Name	410 - Grade Stabilization Structure
Scenario ID	4
Scenario Name	Pipe Drop, Plastic
Scenario Description	A pipe drop (ie: riser and barrel) grade stabilization structure designed and constructed using plastic pipe without anti-seep collars. This is typically a earthen dry dam structure with no permanent storage (water or sediment), however some structures may have some permanent pool / storage but do not have 35 years of sediment life. Payment rate is based upon the riser weir length (Diameter x 3.14) in feet times the length of the pipe barrel in (feet). Installed to stabilized the grade and control erosion in natural or artificial channels, to prevent the formation or advancing of gullies, and to enhance environmental quality and reduce pollution hazards. Applied in areas where the concentration and flow velocity of water require structures to stabilize the grade in channels or to control gully erosion. Cost estimate is based upon 6 ft high 18" (1.5') PVC riser with a 40 ft long barrel (1.5' x 3.14 x 40' = 188 SF). Disturbed areas are protected with permanent vegetative cover. Addresses resource concerns such as soil erosion-concentrated flow erosion and water quality degradation.
Before Practice Situation	The operator presently has gullies forming and/or worsening on the farmland and impacting the useable area and the downstream water quality. Erosion from the gullies is allowing soil and possibly nutrients to be transported to downstream receiving waters degrading water quality and causing soil loss.
After Practice Situation	Area is stabilized. The advancement and/or formation of gullies is stopped, soil from gullies no longer leaves the farm, useable farm area is increased, sedimentation and other pollution hazards are decreased, and water quality downstream is protected. Any needed re-vegetation of disturbed areas use Critical Area Planting (342). Other associated practices such as; Pond (378), Dam (402), Fence (382), Channel Bed Stabilization (584), Dike (356), Grassed Waterway (412), Structure for Water Control (587), and Irrigation Canal or Lateral (320) will use the corresponding Standard(s) as appropriate.
Scenario Feature Measure	Riser Weir Length x Barrel Length
Scenario Unit	Square Foot
Scenario Typical Size	251

Cost Summary:

Cost Category	Scenario Cost	Scenario Cost/Unit
Materials	$3,766.32	$15.01
Equipment/Installation	$7,948.52	$31.67
Labor	$183.34	$0.73
Mobilization	$120.38	$0.48
Acquisition of Technical Knowledge	$0.00	$0.00
Foregone Income	$0.00	$0.00
Total	$12,018.56	$47.88

Cost Details:

Cost Category	Component ID	Component Name	Component Description	Unit	Price ($/unit)	Quantity	Cost
Materials	45	Aggregate, Sand, Graded, Washed	Sand, typical ASTM C33 gradation, includes materials, equipment and labor to transport and place	Cubic yard	$24.28	7	$169.96
Materials	1373	Pipe, PVC, 18", SCH 40	Materials: - 18" - PVC - SCH 40 - ASTM D1785	Foot	$28.32	40	$1,132.80
Materials	2046	Pipe, PVC, 24", SCH 40	Materials: - 24" - PVC - SCH 40 - ASTM D1785	Foot	$36.67	6	$220.02
Materials	1374	Coupling, PVC, Tee, 24x18, SCH 40	Materials: - Tee, 24"x18" - PVC - SCH 40 - ASTM D1785	Each	$2,243.54	1	$2,243.54
Equipment/Installation	931	Hydraulic Excavator, 1 CY	Track mounted hydraulic excavator with bucket capacity range of 0.8 to 1.5 CY. Equipment and power unit costs. Labor not included.	Hour	$92.64	2	$185.28
Equipment/Installation	50	Earthfill, Manually Compacted	Earthfill, manually compacted, includes equipment and labor	Cubic yard	$4.90	20	$98.00
Equipment/Installation	49	Earthfill, Roller Compacted	Earthfill, roller or machine compacted, includes equipment and labor	Cubic yard	$3.67	2000	$7,340.00
Equipment/Installation	38	Concrete, CIP, formed reinforced	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	$325.24	1	$325.24
Labor	233	Equipment Operators, Heavy	Includes: Cranes, Hydraulic Excavators >=50 HP, Dozers, Paving Machines, Rock Trenchers, Trenchers >=12", Dump Trucks, Ag Equipment >=150 HP, Scrapers, Water Wagons.	Hour	$24.79	2	$49.58
Labor	231	General Labor	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	$16.72	8	$133.76
Mobilization	1139	Mobilization, medium equipment	Equipment with 70-150 HP or typical weights between 14,000 and 30,000 pounds.	Each	$120.38	1	$120.38

Scenario Worksheet

Practice and Scenario Description:

Information Type	Data
Region	Northern Plains
State	South Dakota
Discipline Group	Engineering General
Practice Code/Name	410 - Grade Stabilization Structure
Scenario ID	6
Scenario Name	Concrete Box Drop
Scenario Description	A Straight, semicircular, or Box Drop structure composed of reinforced concrete used to stabilized the grade and control erosion in natural or artificial channels, to prevent the formation or advancing of gullies, and to enhance environmental quality and reduce pollution hazards. Applied in areas where the concentration and flow velocity of water require structures to stabilize the grade in channels or to control gully erosion. Cost estimate is based upon a wall structure with a drop of 4 ft and weir length of 6 ft wide and is 6 ft deep with 3 ft above the crest. The unit of payment measurement is defined as cubic yards of concrete. Disturbed areas are protected with permanent vegetative cover. Addresses resource concerns such as soil erosion-concentrated flow erosion and water quality degradation.
Before Practice Situation	The operator presently has gullies forming and/or worsening on the farmland and impacting the useable area and the downstream water quality. Erosion from the gullies is allowing soil and possibly nutrients to be transported to downstream receiving waters degrading water quality and causing soil loss.
After Practice Situation	Area is stabilized. The advancement and/or formation of gullies is stopped, soil from gullies no longer leaves the farm, useable farm area is increased, sedimentation and other pollution hazards are decreased, and water quality downstream is protected. Any needed re-vegetation of disturbed areas use Critical Area Planting (342). Other associated practices such as; Pond (378), Dam (402), Fence (382), Channel Bed Stabilization (584), Dike (356), Grassed Waterway (412), Structure for Water Control (587), Subsurface Drain (606), and Underground Outlet (620) will use the corresponding Standard(s) as appropriate.
Scenario Feature Measure	Cubic Yards of Concrete
Scenario Unit	Cubic Yard
Scenario Typical Size	11

Cost Summary:

Cost Category	Scenario Cost	Scenario Cost/Unit
Materials	$564.58	$51.33
Equipment/Installation	$7,078.96	$643.54
Labor	$442.85	$40.26
Mobilization	$120.38	$10.94
Acquisition of Technical Knowledge	$0.00	$0.00
Foregone Income	$0.00	$0.00
Total	$8,206.77	$746.07

Cost Details:

Cost Category	Component ID	Component Name	Component Description	Unit	Price ($/unit)	Quantity	Cost
Materials	45	Aggregate, Sand, Graded, Washed	Sand, typical ASTM C33 gradation, includes materials, equipment and labor to transport and place	Cubic yard	$24.28	7.5	$182.10
Materials	1200	Rock Riprap, graded, angular, material and shipping	Graded Rock Riprap for all gradation ranges. Includes materials and delivery only.	Ton	$27.32	14	$382.48
Equipment/Installation	931	Hydraulic Excavator, 1 CY	Track mounted hydraulic excavator with bucket capacity range of 0.8 to 1.5 CY. Equipment and power unit costs. Labor not included.	Hour	$92.64	5	$463.20
Equipment/Installation	49	Earthfill, Roller Compacted	Earthfill, roller or machine compacted, includes equipment and labor	Cubic yard	$3.67	800	$2,936.00
Equipment/Installation	38	Concrete, CIP, formed reinforced	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	$325.24	11	$3,577.64
Equipment/Installation	42	Geotextile, woven	Woven Geotextile Fabric. Includes materials, equipment and labor	Square Yard	$2.22	46	$102.12
Labor	233	Equipment Operators, Heavy	Includes: Cranes, Hydraulic Excavators >=50 HP, Dozers, Paving Machines, Rock Trenchers, Trenchers >=12", Dump Trucks, Ag Equipment >=150 HP, Scrapers, Water Wagons.	Hour	$24.79	5	$123.95
Labor	231	General Labor	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	$16.72	5	$83.60
Labor	230	Skilled Labor	Labor requiring a high level skill set: Includes carpenters, welders, electricians, conservation professionals involved with data collection, monitoring, and or record keeping, etc.	Hour	$23.53	10	$235.30
Mobilization	1139	Mobilization, medium equipment	Equipment with 70-150 HP or typical weights between 14,000 and 30,000 pounds.	Each	$120.38	1	$120.38

Scenario Worksheet

Practice and Scenario Description:

Information Type	Data
Region	Northern Plains
State	South Dakota
Discipline Group	Engineering General
Practice Code/Name	410 - Grade Stabilization Structure
Scenario ID	5
Scenario Name	Pipe Drop, CMP
Scenario Description	A pipe drop (ie: riser and barrel) grade stabilization structure designed and constructed with a metal anti-seep collar. This is typically a earthen dry dam structure with no permanent storage (water or sediment), however some structures may have some permanent pool / storage but do not have 35 years of sediment life. Payment rate is based upon the riser weir length (Diameter x 3.14) in feet times the length of the pipe barrel in (feet). Installed to stabilized the grade and control erosion in natural or artificial channels, to prevent the formation or advancing of gullies, and to enhance environmental quality and reduce pollution hazards. Applied in areas where the concentration and flow velocity of water require structures to stabilize the grade in channels or to control gully erosion. Cost estimate is based upon a corrugated metal pipe drop structure with a 30", 12' tall riser and a 100' long 24" barrel (Riser Weir length x Barrel Length = 2.5ft x 3.14 x 100ft = 785). Disturbed areas are protected with permanent vegetative cover. Addresses resource concerns such as soil erosion-concentrated flow erosion and water quality degradation.
Before Practice Situation	The operator presently has gullies forming and/or worsening on the farmland and impacting the useable area and the downstream water quality. Erosion from the gullies is allowing soil and possibly nutrients to be transported to downstream receiving waters degrading water quality and causing soil loss.
After Practice Situation	Area is stabilized. The advancement and/or formation of gullies is stopped, soil from gullies no longer leaves the farm, useable farm area is increased, sedimentation and other pollution hazards are decreased, and water quality downstream is protected. Any needed re-vegetation of disturbed areas use Critical Area Planting (342). Other associated practices such as; Pond (378), Dam (402), Fence (382), Channel Bed Stabilization (584), Dike (356), Grassed Waterway (412), Structure for Water Control (587), and Irrigation Canal or Lateral (320) will use the corresponding Standard(s) as appropriate.
Scenario Feature Measure	Riser Weir Length x Barrel Length
Scenario Unit	Square Foot
Scenario Typical Size	785

Cost Summary:

Cost Category	Scenario Cost	Scenario Cost/Unit
Materials	$3,470.77	$4.42
Equipment/Installation	$8,092.38	$10.31
Labor	$1,918.65	$2.44
Mobilization	$120.38	$0.15
Acquisition of Technical Knowledge	$0.00	$0.00
Foregone Income	$0.00	$0.00
Total	$13,602.18	$17.33

Cost Details:

Cost Category	Component ID	Component Name	Component Description	Unit	Price ($/unit)	Quantity	Cost
Materials	1417	Pipe, CMP, 24", 12 Gauge	24" Corrugated Metal Pipe, Galvanized, Uncoated, 12 gage. Material cost only.	Foot	$27.35	100	$2,735.00
Materials	1609	Lumber, planks, posts and timbers, treated	Treated dimension lumber with nominal thickness greater than 2". Includes lumber and fasteners. Does not include labor.	Board Foot	$1.19	30	$35.70
Materials	1824	Pipe, CMP, 30", 12 Gauge	30" Corrugated Metal Pipe, Galvanized, Uncoated, 16 gage. Material cost only.	Foot	$33.98	12	$407.76
Materials	46	Aggregate, Gravel, Graded	Gravel, includes materials, equipment and labor to transport and place. Includes washed and unwashed gravel.	Cubic yard	$25.23	1	$25.23
Materials	45	Aggregate, Sand, Graded, Washed	Sand, typical ASTM C33 gradation, includes materials, equipment and labor to transport and place	Cubic yard	$24.28	11	$267.08
Equipment/Installation	931	Hydraulic Excavator, 1 CY	Track mounted hydraulic excavator with bucket capacity range of 0.8 to 1.5 CY. Equipment and power unit costs. Labor not included.	Hour	$92.64	13	$1,204.32
Equipment/Installation	50	Earthfill, Manually Compacted	Earthfill, manually compacted, includes equipment and labor	Cubic yard	$4.90	129	$632.10
Equipment/Installation	49	Earthfill, Roller Compacted	Earthfill, roller or machine compacted, includes equipment and labor	Cubic yard	$3.67	1500	$5,505.00
Equipment/Installation	38	Concrete, CIP, formed reinforced	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	$325.24	2	$650.48
Equipment/Installation	36	Concrete, CIP, formless, non reinforced	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	$100.48	1	$100.48
Labor	233	Equipment Operators, Heavy	Includes: Cranes, Hydraulic Excavators >=50 HP, Dozers, Paving Machines, Rock Trenchers, Trenchers >=12", Dump Trucks, Ag Equipment >=150 HP, Scrapers, Water Wagons.	Hour	$24.79	13	$322.27
Labor	231	General Labor	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	$16.72	42	$702.24

Labor	230	Skilled Labor	Labor requiring a high level skill set: Includes carpenters, welders, electricians, conservation professionals involved with data collection, monitoring, and or record keeping, etc.	Hour	$23.53	38	$894.14
Mobilization	1139	Mobilization, medium equipment	Equipment with 70-150 HP or typical weights between 14,000 and 30,000 pounds.	Each	$120.38	1	$120.38

Scenario Worksheet

Practice and Scenario Description:

Information Type	Data
Region	Northern Plains
State	South Dakota
Discipline Group	Engineering General
Practice Code/Name	410 - Grade Stabilization Structure
Scenario ID	7
Scenario Name	Sheet Pile Weir Drop
Scenario Description	A Straight structure composed of sheet pile metal used to stabilized the grade and control erosion in natural or artificial channels, to prevent the formation or advancing of gullies, and to enhance environmental quality and reduce pollution hazards. Applied in areas where the concentration and flow velocity of water require structures to stabilize the grade in channels or to control gully erosion. Cost estimate is based upon a structure with a crest of 30 ft. The unit of payment measurement is defined as the area of sheet piling in square feet. Disturbed areas are protected with permanent vegetative cover. Addresses resource concerns such as soil erosion-concentrated flow erosion and water quality degradation.
Before Practice Situation	The operator presently has gullies forming and/or worsening on the farmland and impacting the useable area and the downstream water quality. Erosion from the gullies is allowing soil and possibly nutrients to be transported to downstream receiving waters degrading water quality and causing soil loss.
After Practice Situation	Area is stabilized. The advancement and/or formation of gullies is stopped, soil from gullies no longer leaves the farm, useable farm area is increased, sedimentation and other pollution hazards are decreased, and water quality downstream is protected. Any needed re-vegetation of disturbed areas use Critical Area Planting (342). Other associated practices such as; Pond (378), Dam (402), Fence (382), Channel Bed Stabilization (584), Dike (356), Grassed Waterway (412), Structure for Water Control (587), Subsurface Drain (606), and Underground Outlet (620) will use the corresponding Standard(s) as appropriate.
Scenario Feature Measure	Area of Sheet piling
Scenario Unit	Square Foot
Scenario Typical Size	350

Cost Summary:

Cost Category	Scenario Cost	Scenario Cost/Unit
Materials	$1,796.10	$5.13
Equipment/Installation	$14,963.00	$42.75
Labor	$0.00	$0.00
Mobilization	$450.32	$1.29
Acquisition of Technical Knowledge	$0.00	$0.00
Foregone Income	$0.00	$0.00
Total	$17,209.42	$49.17

Cost Details:

Cost Category	Component ID	Component Name	Component Description	Unit	Price ($/unit)	Quantity	Cost
Materials	44	Rock Riprap, Placed with geotextile	Rock Riprap, placed with geotextile, includes materials, equipment and labor to transport and place	Cubic yard	$59.87	30	$1,796.10
Equipment/Installation	1337	Sheet piling, steel, 15'	Steel sheet pile, panels or barrier driven up to 15 feet and left in place. Includes materials, equipment and labor.	Square Foot	$24.18	350	$8,463.00
Equipment/Installation	48	Excavation, Common Earth, side cast, small equipment	Bulk excavation and side casting of common earth with hydraulic excavator with less than 1 CY capacity. Includes equipment and labor.	Cubic yard	$1.99	500	$995.00
Equipment/Installation	49	Earthfill, Roller Compacted	Earthfill, roller or machine compacted, includes equipment and labor	Cubic yard	$3.67	1500	$5,505.00
Mobilization	1140	Mobilization, large equipment	Equipment >150HP or typical weights greater than 30,000 pounds or loads requiring over width or over length permits.	Each	$225.16	2	$450.32

Scenario Worksheet

Practice and Scenario Description:

Information Type	Data
Region	Northern Plains
State	South Dakota
Discipline Group	Engineering General
Practice Code/Name	410 - Grade Stabilization Structure
Scenario ID	8
Scenario Name	Gabion Rock Drop Structures
Scenario Description	A Straight Drop structure constructed of rock riprap held in place by galvanized wire, such as, gabion baskets, fence panels, or "sausage" baskets. These structures are used to stabilized the grade and control erosion in natural or artificial channels, to prevent the formation or advancing of gullies, and to enhance environmental quality and reduce pollution hazards. Applied in areas where the concentration and flow velocity of water require structures to stabilize the grade in channels or to control gully erosion. Cost estimate is based upon a gabion wall structure with a drop of 3ft and weir length of 18ft (54 square feet). The unit of payment measurement is defined as volume of rock used in the gabion basket or mat. Disturbed areas are protected with permanent vegetative cover. Addresses resource concerns such as soil erosion-concentrated flow erosion and water quality degradation.
Before Practice Situation	The operator presently has gullies forming and/or worsening on the farmland and impacting the useable area and the downstream water quality. Erosion from the gullies is allowing soil and possibly nutrients to be transported to downstream receiving waters degrading water quality and causing soil loss.
After Practice Situation	Area is stabilized. The advancement and/or formation of gullies is stopped, soil from gullies no longer leaves the farm, useable farm area is increased, sedimentation and other pollution hazards are decreased, and water quality downstream is protected. Any needed re-vegetation of disturbed areas use Critical Area Planting (342). Other associated practices such as; Pond (378), Dam (402), Fence (382), Channel Bed Stabilization (584), Dike (356), Grassed Waterway (412), Structure for Water Control (587), Subsurface Drain (606), and Underground Outlet (620) will use the corresponding Standard(s) as appropriate.
Scenario Feature Measure	Volume of Gabion Rock
Scenario Unit	Cubic Yard
Scenario Typical Size	72

Cost Summary:

Cost Category	Scenario Cost	Scenario Cost/Unit
Materials	$10,195.92	$141.61
Equipment/Installation	$1,064.63	$14.79
Labor	$0.00	$0.00
Mobilization	$0.00	$0.00
Acquisition of Technical Knowledge	$0.00	$0.00
Foregone Income	$0.00	$0.00
Total	$11,260.55	$156.40

Cost Details:

Cost Category	Component ID	Component Name	Component Description	Unit	Price ($/unit)	Quantity	Cost
Materials	1378	Gabion basket or mat	Gabion baskets or mats installed and filled on grade, includes materials, transport, equipment, and labor, does not include geotextile fabric.	Cubic Yard	$141.61	72	$10,195.92
Equipment/Installation	48	Excavation, Common Earth, side cast, small equipment	Bulk excavation and side casting of common earth with hydraulic excavator with less than 1 CY capacity. Includes equipment and labor.	Cubic yard	$1.99	7	$13.93
Equipment/Installation	49	Earthfill, Roller Compacted	Earthfill, roller or machine compacted, includes equipment and labor	Cubic yard	$3.67	250	$917.50
Equipment/Installation	42	Geotextile, woven	Woven Geotextile Fabric. Includes materials, equipment and labor	Square Yard	$2.22	60	$133.20

Scenario Worksheet

Practice and Scenario Description:

Information Type	Data
Region	Northern Plains
State	South Dakota
Discipline Group	Agricultural Engineering
Practice Code/Name	412 - Grassed Waterway
Scenario ID	1
Scenario Name	Waterway, < 25 sqft
Scenario Description	Typical practice is 1500 ' long, 12' bottom, 8:1 side slopes, 1.1' depth. A grass waterway that is a shaped or graded channel and is established with suitable vegetation to carry surface water at a non-erosive velocity to a stable outlet. This practice addresses Concentrated Flow Erosion (Classic Gully & Ephemeral Erosion) and Excessive Sediment in surface waters. Waterway area measured from top of bank to top of bank. Seeding will be completed under the Critical Area Planting (342) Practice Standard with seeding area up to 20% greater than waterway area to account for buffer area along the waterway. Costs include excavation and associated work to construct the overall shape and grade of the waterway. This scenario would apply to Grassed Waterways with a design cross sectional area less than 25 square feet per lineal foot of waterway.
Before Practice Situation	The field has a small gulley which is cutting deeper into the field as time goes on, so it needs to be stopped or controlled. Excessive sedimentation and soil erosion as a result from ephemeral or classic gully erosion. Gully has formed in field as a result of excessive runoff and/or poor cropping techniques. Grassed waterway is also commonly installed to covey runoff from concentrated flows, terrarces, diversions, or water control structures or similar practices to a suitable, stable outlet.
After Practice Situation	Installed grassed waterway is 1500 ' long, 12' bottom, 8:1 side slopes, 1.1' depth. The practice is installed using a dozer and/or scraper, with final grading with motor grader. Use Critical Area Planting (342) for establishment of waterway vegetation. If erosion control blankets or mulching for seedbed establishment/protection are needed, use conservation practice Mulching (484). Drainage tile, if needed, will be installed accoring to Subsurface Drain (606). Outlets, if needed will be installed using Structure for Water Control (587). If inlet Structures are needed with the drainage tile, then those will be installed using Underground Outlet (620).
Scenario Feature Measure	Acre of Waterway
Scenario Unit	Acre
Scenario Typical Size	1.02

Cost Summary:

Cost Category	Scenario Cost	Scenario Cost/Unit
Materials	$0.00	$0.00
Equipment/Installation	$1,669.83	$1,637.09
Labor	$99.99	$98.03
Mobilization	$120.38	$118.02
Acquisition of Technical Knowledge	$0.00	$0.00
Foregone Income	$0.00	$0.00
Total	$1,890.20	$1,853.14

Cost Details:

Cost Category	Component ID	Component Name	Component Description	Unit	Price ($/unit)	Quantity	Cost
Equipment/Installation	1199	Stripping and stockpiling, topsoil	Stripping and stockpiling of topsoil adjacent to stripping area. Includes equipment and labor.	Cubic Yard	$0.79	411	$324.69
Equipment/Installation	1222	Excavation, common earth, large equipment, 50 ft	Bulk excavation of common earth including sand and gravel with dozer >100 HP with average push distance of 50 feet. Includes equipment and labor.	Cubic Yard	$1.41	954	$1,345.14
Labor	234	Supervisor or Manager	Labor involving supervision or management activities. Includes crew supervisors, foremen and farm/ranch managers time required for adopting new technology, etc.	Hour	$33.11	1	$33.11
Labor	231	General Labor	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	$16.72	4	$66.88
Mobilization	1139	Mobilization, medium equipment	Equipment with 70-150 HP or typical weights between 14,000 and 30,000 pounds.	Each	$120.38	1	$120.38

Scenario Worksheet

Practice and Scenario Description:

Information Type	Data
Region	Northern Plains
State	South Dakota
Discipline Group	Agricultural Engineering
Practice Code/Name	412 - Grassed Waterway
Scenario ID	2
Scenario Name	Waterway, > 25 sqft
Scenario Description	Typical practice is 1500 ' long, 12' bottom, 8:1 side slopes, 1.5' depth. A grass waterway that is a shaped or graded channel and is established with suitable vegetation to carry surface water at a non-erosive velocity to a stable outlet. This practice addresses Concentrated Flow Erosion (Classic Gully & Ephemeral Erosion) and Excessive Sediment in surface waters. Waterway area measured from top of bank to top of bank. Seeding will be completed under the Critical Area Planting (342) Practice Standard with seeding area up to 20% greater than waterway area to account for buffer area along the waterway. Costs include excavation and associated work to construct the overall shape and grade of the waterway. This scenario would apply to Grassed Waterways with a design cross sectional area greater than 25 square feet per lineal foot of waterway.
Before Practice Situation	The field has a small gulley which is cutting deeper into the field as time goes on, so it needs to be stopped or controlled. Excessive sedimentation and soil erosion as a result from ephemeral or classic gully erosion. Gully has formed in field as a result of excessive runoff and/or poor cropping techniques. Grassed waterway is also commonly installed to covey runoff from concentrated flows, terrarces, diversions, or water control structures or similar practices to a suitable, stable outlet.
After Practice Situation	Installed grassed waterway is 1500 ' long, 12' bottom, 8:1 side slopes, 1.5' depth. The practice is installed using a dozer and/or scraper, with final grading with motor grader. Use Critical Area Planting (342) for establishment of waterway vegetation. If erosion control blankets or mulching for seedbed establishment/protection are needed, use conservation practice Mulching (484). Drainage tile, if needed, will be installed accoring to Subsurface Drain (606). Outlets, if needed will be installed using Structure for Water Control (587). If inlet Structures are needed with the drainage tile, then those will be installed using Underground Outlet (620).
Scenario Feature Measure	Acre of Waterway
Scenario Unit	Acre
Scenario Typical Size	1.24

Cost Summary:

Cost Category	Scenario Cost	Scenario Cost/Unit
Materials	$0.00	$0.00
Equipment/Installation	$2,510.00	$2,024.19
Labor	$199.98	$161.27
Mobilization	$120.38	$97.08
Acquisition of Technical Knowledge	$0.00	$0.00
Foregone Income	$0.00	$0.00
Total	$2,830.36	$2,282.55

Cost Details:

Cost Category	Component ID	Component Name	Component Description	Unit	Price ($/unit)	Quantity	Cost
Equipment/Installation	1199	Stripping and stockpiling, topsoil	Stripping and stockpiling of topsoil adjacent to stripping area. Includes equipment and labor.	Cubic Yard	$0.79	500	$395.00
Equipment/Installation	1222	Excavation, common earth, large equipment, 50 ft	Bulk excavation of common earth including sand and gravel with dozer >100 HP with average push distance of 50 feet. Includes equipment and labor.	Cubic Yard	$1.41	1500	$2,115.00
Labor	234	Supervisor or Manager	Labor involving supervision or management activities. Includes crew supervisors, foremen and farm/ranch managers time required for adopting new technology, etc.	Hour	$33.11	2	$66.22
Labor	231	General Labor	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	$16.72	8	$133.76
Mobilization	1139	Mobilization, medium equipment	Equipment with 70-150 HP or typical weights between 14,000 and 30,000 pounds.	Each	$120.38	1	$120.38

Scenario Worksheet

Practice and Scenario Description:

Information Type	Data
Region	Northern Plains
State	South Dakota
Discipline Group	Agricultural Engineering
Practice Code/Name	412 - Grassed Waterway
Scenario ID	3
Scenario Name	Waterway with Checks
Scenario Description	Typical practice is 1500 ' long, 12' bottom, 8:1 side slopes, 1.1' depth. A grass waterway that is a shaped or graded channel and is established with suitable vegetation to carry surface water at a non-erosive velocity to a stable outlet. Fabric or stone checks are installed every 100 feet along the length of the waterway perpendicular to waterflow and are 2/3 the waterway top width to reduce maintenance and provide temporary protection until vegetation is established. Fabric Checks are installed 18" deep with 12" laid over on the surface. (Alternatively, rock checks could be installed). This practice addresses Concentrated Flow Erosion (Classic Gully & Ephemeral Erosion) and Excessive Sediment in surface waters. Waterway area measured from top of bank to top of bank. Seeding will be completed under the Critical Area Planting (342) Practice Standard with seeding area up to 20% greater than waterway area to account for buffer area along the waterway. Costs include excavation and associated work to construct the overall shape and grade of the waterway.
Before Practice Situation	The field has a small gulley which is cutting deeper into the field as time goes on, so it needs to be stopped or controlled. Excessive sedimentation and soil erosion as a result from ephemeral or classic gully erosion. Gully has formed in field as a result of excessive runoff and poor cropping techniques. Grassed waterway is also commonly installed to covey runoff from concentrated flows, terrarces, diversions, or water control structures or similar practices to a suitable, stable outlet.
After Practice Situation	Installed grassed waterway is 1500 ' long, 12' bottom, 8:1 side slopes, 1.1' depth. Fabric checks are installed every 100 feet along the length of the waterway. The practice is installed using a dozer and/or scraper, with final grading with motor grader. Fabric or stone checks are installed with small backhoe and labor. Use Critical Area Planting (342) for establishment of waterway vegetation. If erosion control blankets or mulching for seedbed establishment/protection are needed, use conservation practice Mulching (484). Drainage tile, if needed, will be installed accoring to Subsurface Drain (606). Outlets, if needed will be installed using Structure for Water Control (587). If inlet Structures are needed with the drainage tile, then those will be installed using Underground Outlet (620).
Scenario Feature Measure	Acre of Waterway
Scenario Unit	Acre
Scenario Typical Size	1.02

Cost Summary:

Cost Category	Scenario Cost	Scenario Cost/Unit
Materials	$172.04	$168.67
Equipment/Installation	$2,192.08	$2,149.10
Labor	$266.86	$261.63
Mobilization	$235.87	$231.25
Acquisition of Technical Knowledge	$0.00	$0.00
Foregone Income	$0.00	$0.00
Total	$2,866.85	$2,810.64

Cost Details:

Cost Category	Component ID	Component Name	Component Description	Unit	Price ($/unit)	Quantity	Cost
Materials	1209	Geotextile, non-woven, light weight	Non-woven less than 8 ounce/square yard geotextile with staple anchoring. Materials only.	Square Yard	$1.87	92	$172.04
Equipment/Installation	1199	Stripping and stockpiling, topsoil	Stripping and stockpiling of topsoil adjacent to stripping area. Includes equipment and labor.	Cubic Yard	$0.79	411	$324.69
Equipment/Installation	1222	Excavation, common earth, large equipment, 50 ft	Bulk excavation of common earth including sand and gravel with dozer >100 HP with average push distance of 50 feet. Includes equipment and labor.	Cubic Yard	$1.41	1212	$1,708.92
Equipment/Installation	48	Excavation, Common Earth, side cast, small equipment	Bulk excavation and side casting of common earth with hydraulic excavator with less than 1 CY capacity. Includes equipment and labor.	Cubic yard	$1.99	23	$45.77
Equipment/Installation	50	Earthfill, Manually Compacted	Earthfill, manually compacted, includes equipment and labor	Cubic yard	$4.90	23	$112.70
Labor	234	Supervisor or Manager	Labor involving supervision or management activities. Includes crew supervisors, foremen and farm/ranch managers time required for adopting new technology, etc.	Hour	$33.11	2	$66.22
Labor	231	General Labor	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	$16.72	12	$200.64
Mobilization	1138	Mobilization, small equipment	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	$82.16	1	$82.16
Mobilization	1137	Mobilization, very small equipment	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	$33.33	1	$33.33
Mobilization	1139	Mobilization, medium equipment	Equipment with 70-150 HP or typical weights between 14,000 and 30,000 pounds.	Each	$120.38	1	$120.38

Scenario Worksheet

Practice and Scenario Description:

Information Type	Data
Region	Northern Plains
State	South Dakota
Discipline Group	Water Management Engineering
Practice Code/Name	430 - Irrigation Pipeline
Scenario ID	1
Scenario Name	PVC, by the pound
Scenario Description	Description: Below ground installation of PVC pipeline. Typical practice sizes range from 6-inch to 12-inch. Construct 1,300 feet of 6-inch, pressure rating 80 psi (SDR 51), PVC plastic irrigation pipe (PIP) with appurtenances, installed below ground with a minimum of 2.5 feet of ground cover. The unit is weight of pipe in pounds. 1,300 feet of 6-inch, SDR 51 PVC PIP weighs 1.49 lb/ft, or a total of 1,937 pounds. Appurtenances include: couplings, fittings, air vents, pressure relief valves, thrust blocks, dog-legs (risers), and inline valves. Cost of appurtenances does not include flow meters or backflow preventers. Typical installation applies to soils with no special bedding requirements. Resource Concerns: Inefficient Use of Irrigation Water; Inefficient Energy Use. Associated Practices: 436 - Irrigation Reservoir; 441 - Irrigation System, Microirrigation; 442 - Irrigation System, Sprinkler; 443 - Irrigation System, Surface & Subsurface; 447 - Irrigation System, Tailwater Recovery; 533 - Pumping Plant
Before Practice Situation	Pipeline needed to replace or supplement inefficient irrigation conveyance systems.
After Practice Situation	Pipeline installed to convey and/or distribute water to irrigation systems, minimizing non-beneficial water use, reducing soil erosion, and/or reducing energy use.
Scenario Feature Measure	Weight of pipe
Scenario Unit	Pound
Scenario Typical Size	1937

Cost Summary:

Cost Category	Scenario Cost	Scenario Cost/Unit
Materials	$3,529.80	$1.82
Equipment/Installation	$1,962.84	$1.01
Labor	$455.76	$0.24
Mobilization	$240.76	$0.12
Acquisition of Technical Knowledge	$0.00	$0.00
Foregone Income	$0.00	$0.00
Total	$6,189.16	$3.20

Cost Details:

Cost Category	Component ID	Component Name	Component Description	Unit	Price ($/unit)	Quantity	Cost
Materials	1381	Pipe, steel, smooth wall, galvanized, weight priced	Steel manufactured into galvanized smooth wall pipe	Pound	$1.69	220	$371.80
Materials	1323	Pipe, PVC, dia. < 18", weight priced	Polyvinyl Chloride (PVC) pressure rated pipe priced by the weight of the pipe materials for pipes with diameters less than 18". Materials only.	Pound	$1.41	1937	$2,731.17
Materials	2127	Valve, Alfalfa valve with riser, PVC, 8"	Alfalfa valve assembly including, 8" diameter metal alfalfa valve, PVC tee, 36" PVC riser for connection to a pipeline. Materials only.	Each	$426.83	1	$426.83
Equipment/Installation	1407	Portable Welder	Portable field welder. Equipment only. Labor not included.	Hour	$16.55	8	$132.40
Equipment/Installation	36	Concrete, CIP, formless, non reinforced	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	$100.48	1	$100.48
Equipment/Installation	53	Trenching, Earth, 12" x 48"	Trenching, earth, 12" wide x 48" depth, includes equipment and labor for trenching and backfilling	Foot	$1.17	1300	$1,521.00
Equipment/Installation	939	Truck, Pickup	Equipment and power unit costs. Labor not included.	Hour	$26.12	8	$208.96
Labor	231	General Labor	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	$16.72	16	$267.52
Labor	230	Skilled Labor	Labor requiring a high level skill set: Includes carpenters, welders, electricians, conservation professionals involved with data collection, monitoring, and or record keeping, etc.	Hour	$23.53	8	$188.24
Mobilization	1139	Mobilization, medium equipment	Equipment with 70-150 HP or typical weights between 14,000 and 30,000 pounds.	Each	$120.38	2	$240.76

Scenario Worksheet

Practice and Scenario Description:

Information Type	Data
Region	Northern Plains
State	South Dakota
Discipline Group	Water Management Engineering
Practice Code/Name	430 - Irrigation Pipeline
Scenario ID	2
Scenario Name	PVC, 8-in by the foot
Scenario Description	Description: Below ground installation of PVC pipeline. Construct 1,300 feet of 8-inch, pressure rating 100 psi (SDR 41), PVC plastic irrigation pipe (PIP) with appurtenances, installed below ground with a minimum of 2.5 feet of ground cover. Appurtenances include: couplings, fittings, air vents, pressure relief valves, thrust blocks, dog-legs (risers), and inline valves. Cost of appurtenances does not include flow meters or backflow preventers. Typical installation applies to soils with no special bedding requirements. Resource Concerns: Inefficient Use of Irrigation Water; Inefficient Energy Use. Associated Practices: 436 - Irrigation Reservoir; 441 - Irrigation System, Microirrigation; 442 - Irrigation System, Sprinkler; 443 - Irrigation System, Surface & Subsurface; 447 - Irrigation System, Tailwater Recovery; 533 - Pumping Plant
Before Practice Situation	Pipeline needed to replace or supplement inefficient irrigation conveyance systems.
After Practice Situation	Pipeline installed to convey and/or distribute water to irrigation systems or reservoirs, minimizing non-beneficial water use, reducing soil erosion, and/or reducing energy use.
Scenario Feature Measure	Length of pipe
Scenario Unit	Linear Foot
Scenario Typical Size	1300

Cost Summary:

Cost Category	Scenario Cost	Scenario Cost/Unit
Materials	$6,829.00	$5.25
Equipment/Installation	$1,962.84	$1.51
Labor	$455.76	$0.35
Mobilization	$240.76	$0.19
Acquisition of Technical Knowledge	$0.00	$0.00
Foregone Income	$0.00	$0.00
Total	$9,488.36	$7.30

Cost Details:

Cost Category	Component ID	Component Name	Component Description	Unit	Price ($/unit)	Quantity	Cost
Materials	1381	Pipe, steel, smooth wall, galvanized, weight priced	Steel manufactured into galvanized smooth wall pipe	Pound	$1.69	320	$540.80
Materials	1323	Pipe, PVC, dia. < 18", weight priced	Polyvinyl Chloride (PVC) pressure rated pipe priced by the weight of the pipe materials for pipes with diameters less than 18". Materials only.	Pound	$1.41	4157	$5,861.37
Materials	2127	Valve, Alfalfa valve with riser, PVC, 8"	Alfalfa valve assembly including, 8" diameter metal alfalfa valve, PVC tee, 36" PVC riser for connection to a pipeline. Materials only.	Each	$426.83	1	$426.83
Equipment/Installation	1407	Portable Welder	Portable field welder. Equipment only. Labor not included.	Hour	$16.55	8	$132.40
Equipment/Installation	36	Concrete, CIP, formless, non reinforced	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	$100.48	1	$100.48
Equipment/Installation	53	Trenching, Earth, 12" x 48"	Trenching, earth, 12" wide x 48" depth, includes equipment and labor for trenching and backfilling	Foot	$1.17	1300	$1,521.00
Equipment/Installation	939	Truck, Pickup	Equipment and power unit costs. Labor not included.	Hour	$26.12	8	$208.96
Labor	231	General Labor	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	$16.72	16	$267.52
Labor	230	Skilled Labor	Labor requiring a high level skill set: Includes carpenters, welders, electricians, conservation professionals involved with data collection, monitoring, and or record keeping, etc.	Hour	$23.53	8	$188.24
Mobilization	1139	Mobilization, medium equipment	Equipment with 70-150 HP or typical weights between 14,000 and 30,000 pounds.	Each	$120.38	2	$240.76

Scenario Worksheet

Practice and Scenario Description:

Information Type	Data
Region	Northern Plains
State	South Dakota
Discipline Group	Water Management Engineering
Practice Code/Name	430 - Irrigation Pipeline
Scenario ID	3
Scenario Name	PVC, 10-in by the foot
Scenario Description	Description: Below ground installation of PVC pipeline. Construct 1,300 feet of 10-inch, pressure rating 80 psi (SDR 51), PVC plastic irrigation pipe (PIP) with appurtenances, installed below ground with a minimum of 2.5 feet of ground cover. Appurtenances include: couplings, fittings, air vents, pressure relief valves, thrust blocks, dog-legs (risers), and inline valves. Cost of appurtenances does not include flow meters or backflow preventers. Typical installation applies to soils with no special bedding requirements. Resource Concerns: Inefficient Use of Irrigation Water; Inefficient Energy Use. Associated Practices: 436 - Irrigation Reservoir; 441 - Irrigation System, Microirrigation; 442 - Irrigation System, Sprinkler; 443 - Irrigation System, Surface & Subsurface; 447 - Irrigation System, Tailwater Recovery; 533 - Pumping Plant
Before Practice Situation	Pipeline needed to replace or supplement inefficient irrigation conveyance systems.
After Practice Situation	Pipeline installed to convey and/or distribute water to irrigation systems or reservoirs, minimizing non-beneficial water use, reducing soil erosion, and/or reducing energy use.
Scenario Feature Measure	Length of pipe
Scenario Unit	Linear Foot
Scenario Typical Size	1300

Cost Summary:

Cost Category	Scenario Cost	Scenario Cost/Unit
Materials	$8,434.91	$6.49
Equipment/Installation	$3,899.84	$3.00
Labor	$455.76	$0.35
Mobilization	$240.76	$0.19
Acquisition of Technical Knowledge	$0.00	$0.00
Foregone Income	$0.00	$0.00
Total	$13,031.27	$10.02

Cost Details:

Cost Category	Component ID	Component Name	Component Description	Unit	Price ($/unit)	Quantity	Cost
Materials	1381	Pipe, steel, smooth wall, galvanized, weight priced	Steel manufactured into galvanized smooth wall pipe	Pound	$1.69	360	$608.40
Materials	1323	Pipe, PVC, dia. < 18", weight priced	Polyvinyl Chloride (PVC) pressure rated pipe priced by the weight of the pipe materials for pipes with diameters less than 18". Materials only.	Pound	$1.41	5248	$7,399.68
Materials	2127	Valve, Alfalfa valve with riser, PVC, 8"	Alfalfa valve assembly including, 8" diameter metal alfalfa valve, PVC tee, 36" PVC riser for connection to a pipeline. Materials only.	Each	$426.83	1	$426.83
Equipment/Installation	1407	Portable Welder	Portable field welder. Equipment only. Labor not included.	Hour	$16.55	8	$132.40
Equipment/Installation	54	Trenching, Earth, loam, 24" x 48"	Trenching, earth, loam, 24" wide x 48" depth, includes equipment and labor for trenching and backfilling	Foot	$2.66	1300	$3,458.00
Equipment/Installation	36	Concrete, CIP, formless, non reinforced	Non reinforced concrete cast-in-placed without forms by chute placement. Typical strength is 3000 to 4000 psi. Includes	Cubic yard	$100.48	1	$100.48
Equipment/Installation	939	Truck, Pickup	Equipment and power unit costs. Labor not included.	Hour	$26.12	8	$208.96
Labor	231	General Labor	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	$16.72	16	$267.52
Labor	230	Skilled Labor	Labor requiring a high level skill set: Includes carpenters, welders, electricians, conservation professionals involved with data collection, monitoring, and or record keeping, etc.	Hour	$23.53	8	$188.24
Mobilization	1139	Mobilization, medium equipment	Equipment with 70-150 HP or typical weights between 14,000 and 30,000 pounds.	Each	$120.38	2	$240.76

Scenario Worksheet

Practice and Scenario Description:

Information Type	Data
Region	Northern Plains
State	South Dakota
Discipline Group	Water Management Engineering
Practice Code/Name	436 - Irrigation Reservoir
Scenario ID	1
Scenario Name	Embankment Dam
Scenario Description	The reservoir, created by an embankment built across a natural depression, with an 18" diameter principal spillway outlet through the embankment, is controlled by a canal-style gate. Outlet structure is constructed with watertight plasatic pipe appropriate for this use, commonly PVC pipe. Outlet can also serve as overflow protection with a 12" diameter standpipe and tee to the 18" pipe. Any watershed runoff will be diverted around reservoir. It will be built with approximately 4,500 cubic yards of on-site material. It will be about 19.9 feet high and 200 feet long and hold approximately 1,000,000 gallons (3 acre-feet). The top of berm will be 10 feet wide and the embankment side slopes will be 2.5 H to 1 V up and down stream. Resource concern: Insufficient Water - Inefficient use of irrigation water. Associated practices include: 521 - Pond Sealing or Lining (various); 320 - Irrigation Canal or Lateral; 430 - Irrigation Pipeline; 428 - Irrigation Ditch Lining; 533 - Pumping Plant; 440 series - Irrigation Systems; 378 - Pond; 447 - Irrigation System, Tailwater Recovery; 484 - Mulching; and 342 - Critical Area Planting.
Before Practice Situation	Current system relies on an intermittent or low-flow rate water source. This results in untimely and/or inefficient water application. Divert water around - no spillway
After Practice Situation	This is an embankment, installed across a natural off-stream intermittent watercourse, used to store water for subsequent irrigation. It will be used to accumulate and store water for timely and efficient application of water through an irrigation system The water source could be a well, irrigation district pipeline, and/or a pump from a stream. It is designed to deliver water by gravity to an open ditch or non-pressurized pipeline, generally in excess of 5 cfs. All earthen materials will be from on-site sources.
Scenario Feature Measure	Volume of Compacted Eartfill
Scenario Unit	Cubic Yard
Scenario Typical Size	4500

Cost Summary:

Cost Category	Scenario Cost	Scenario Cost/Unit
Materials	$2,957.76	$0.66
Equipment/Installation	$16,515.00	$3.67
Labor	$532.40	$0.12
Mobilization	$691.08	$0.15
Acquisition of Technical Knowledge	$0.00	$0.00
Foregone Income	$0.00	$0.00
Total	$20,696.24	$4.60

Cost Details:

Cost Category	Component ID	Component Name	Component Description	Unit	Price ($/unit)	Quantity	Cost
Materials	1917	Screw gate, cast iron, 18" diameter, 10/0 head	18" diameter cast iron screw (canal) gate rated at 10 seating head 0 feet unseating head. Materials only.	Each	$958.00	1	$958.00
Materials	1244	Pipe, HDPE, CPT, Double Wall, Soil Tight, 12"	Pipe, Corrugated HDPE Double Wall, 12" diameter with soil tight joints - AASHTO M294. Material cost only.	Foot	$8.29	20	$165.80
Materials	1245	Pipe, HDPE, CPT, Double Wall, Soil Tight, 18"	Pipe, Corrugated HDPE Double Wall, 18" diameter with soil tight joints - AASHTO M294. Material cost only.	Foot	$10.70	136	$1,455.20
Materials	1921	Coupling, HDPE CPT Dual Wall, Tee, 18"x18"x12"	Tee, 18"x18"x12" - HDPE CPT Tee. Materials only.	Each	$378.76	1	$378.76
Equipment/Installation	49	Earthfill, Roller Compacted	Earthfill, roller or machine compacted, includes equipment and labor	Cubic yard	$3.67	4500	$16,515.00
Labor	234	Supervisor or Manager	Labor involving supervision or management activities. Includes crew supervisors, foremen and farm/ranch managers time required for adopting new technology, etc.	Hour	$33.11	8	$264.88
Labor	231	General Labor	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	$16.72	16	$267.52
Mobilization	1140	Mobilization, large equipment	Equipment >150HP or typical weights greater than 30,000 pounds or loads requiring over width or over length permits.	Each	$225.16	2	$450.32
Mobilization	1139	Mobilization, medium equipment	Equipment with 70-150 HP or typical weights between 14,000 and 30,000 pounds.	Each	$120.38	2	$240.76
Foregone Income	1276	Foregone income, place holder	This is a place holder component for foregone income. The existence of this component indicates that the practice is eligible for foregone income payment. The component will be replaced when the actual FI components become available.	Acre	$0.00	1	$0.00

Scenario Worksheet

Practice and Scenario Description:

Information Type	Data
Region	Northern Plains
State	South Dakota
Discipline Group	Water Management Engineering
Practice Code/Name	441 - Irrigation System, Microirrigation
Scenario ID	2
Scenario Name	Surface PE with emitters
Scenario Description	A micro-irrigation system, utilizing surface PE tubing (can be placed on trelis or above ground) with emitters to provide irrigation for an orchard, vinyard, or other specialty crop grown in a grid pattern. The typical system is a permanent system, installed on a 3 row 1000' windbreak on the ground surface (total of 3000' lf). The windbreak has a plant spacing of 8 feet between trees. This system utilizes emitters at each tree or plant as the water application device. This system typically includes a filter system, PE tubing, PVC manifolds, emitters, etc. This practice applies to systems designed to discharge < 60 gal/hr at each individual lateral discharge point. Does not include Pump, Power source, Water source (well or reservoir). Resource Concerns: Insufficient Water - Inefficient use of irrigation water, Degraded Plant Condition - Undesirable plant productivity and health, Water Quality Degradation - Excessive sediment in surface waters, and Inefficient Energy Use - Equipment and facilities. Associated Practices: 380-Windbreak/Shelterbelt Establishment, 533-Pumping Plant, 449- Irrigation Water Management, 430 - Irrigation Pipeline, 433 - Irrigation Flow
Before Practice Situation	A tree row has an insufficient available water source causing plant health (establishement and persistence) concerns.
After Practice Situation	A surface placed microirrigation system is utilized to provide highly efficient irrigation to an tree row to address plant health concerns.
Scenario Feature Measure	Acre of Windbreak
Scenario Unit	Acre
Scenario Typical Size	1.033

Cost Summary:

Cost Category	Scenario Cost	Scenario Cost/Unit
Materials	$734.40	$710.94
Equipment/Installation	$101.00	$97.77
Labor	$0.00	$0.00
Mobilization	$82.16	$79.54
Acquisition of Technical Knowledge	$0.00	$0.00
Foregone Income	$0.00	$0.00
Total	$917.56	$888.25

Cost Details:

Cost Category	Component ID	Component Name	Component Description	Unit	Price ($/unit)	Quantity	Cost
Materials	1489	Micro Irrigation, emitters or sprays and tubing	Emitters or sprays that are installed above ground for micro or drip irrigation. Includes installation and connections to the supply and flushing laterals. Tubing for the emitters is included in this item.	Foot	$0.16	3000	$480.00
Materials	1617	Micro Irrigation, screen filter, < 100 gpm	Screen filter for Micro Irrigation used in small systems. Includes filter. No controls are included or needed.	Each	$39.85	1	$39.85
Materials	978	Pipe, PVC, 4", SCH 40	Materials: - 4" - PVC - SCH 40 - ASTM D1785	Foot	$3.05	55	$167.75
Materials	976	Pipe, PVC, 2", SCH 40	Materials: - 2" - PVC - SCH 40 - ASTM D1785	Foot	$1.04	45	$46.80
Equipment/Installation	1096	Trenching, Pipeline Plowing	Includes equipment and labor for plowing small diameter lines in common earth (< 3")	Foot	$1.01	100	$101.00
Mobilization	1138	Mobilization, small equipment	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	$82.16	1	$82.16

Scenario Worksheet

Practice and Scenario Description:

Information Type	Data
Region	Northern Plains
State	South Dakota
Discipline Group	Water Management Engineering
Practice Code/Name	442 - Irrigation System, Sprinkler
Scenario ID	1
Scenario Name	Gravity to Pivot Conversion
Scenario Description	Decription: Installation of a low pressure center pivot system. Resource concerns include: Soil Erosion (Concentrated flow erosion e.g. irrigation induced), Insufficient Water (Inefficient use of irrigation water), Water Quality Degradation (Excess nutrients in surface and ground waters, Excessive salts in surface and ground waters, Excess pathogens and chemicals from manure, bio-solids or compost applications). Associated Practices: Irrigation Pipeline (430), Pumping Plant (533), Irrigation Water Management (449)
Before Practice Situation	A 160 acre field is flood irrigated. Application of irrigation water is inefficient and non-uniform. Irrigation water is typically over applied in some parts of the field, and under applied in others. Deep percolation from the excess irrigation delivers excess nutrients salts, and chemicals to the ground water. Runoff from the field contains excess nutrients and degrades the receiving waters. Irrigated induced erosion is excessive.
After Practice Situation	The existing surface irrigation system is converted to a low pressure center pivot. Corners are converted to non-irrigated cropland. The pivot is 1300 feet in length with pressure regulators and low pressure sprinklers. The new irrigation system applies water efficiently and uniformly to maintain adequate soil water for the desired level of plant growth. Deep percolation and field runoff is eliminated and there are no excess nutrients, salts or pathogens delivered to the receiving waters. Irrigation induced runoff is eliminated. This center pivot scenario includes all hardware from the pivot point, including the concrete pad the pivot is placed on.
Scenario Feature Measure	Length of Center Pivot Lateral
Scenario Unit	Linear Foot
Scenario Typical Size	1300

Cost Summary:

Cost Category	Scenario Cost	Scenario Cost/Unit
Materials	$82,217.00	$63.24
Equipment/Installation	$0.00	$0.00
Labor	$0.00	$0.00
Mobilization	$153.71	$0.12
Acquisition of Technical Knowledge	$0.00	$0.00
Foregone Income	$0.00	$0.00
Total	$82,370.71	$63.36

Cost Details:

Cost Category	Component ID	Component Name	Component Description	Unit	Price ($/unit)	Quantity	Cost
Materials	317	Irrigation, Center pivot system with appurtenances, fixed cost portion	Fixed cost portion of the center pivot system with appurtenances. This portion includes the following items: pivot point, pipe, towers, pad, controls, sprinklers, installation.	Each	$11,705.00	1	$11,705.00
Materials	318	Irrigation, Center pivot system with appurtenances, variable cost portion	Variable cost portion of the center pivot system with appurtenances. This portion includes the following items: pivot point, pipe, towers, pad, controls, sprinklers, installation.	Foot	$54.24	1300	$70,512.00
Mobilization	1137	Mobilization, very small equipment	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	$33.33	1	$33.33
Mobilization	1139	Mobilization, medium equipment	Equipment with 70-150 HP or typical weights between 14,000 and 30,000 pounds.	Each	$120.38	1	$120.38

Scenario Worksheet

Practice and Scenario Description:

Information Type	Data
Region	Northern Plains
State	South Dakota
Discipline Group	Water Management Engineering
Practice Code/Name	442 - Irrigation System, Sprinkler
Scenario ID	3
Scenario Name	System Renovation, Renozzle
Scenario Description	Center Pivot and Linear Move sprinkler systems are used in large crop fields with fairly regular field borders and flat topography. The scenario involves changing nozzles on center pivot or lateral move irrigation systems to low-pressure systems to improve efficiency of water use and reduce energy use. This scenario is intended for cropland areas where the objective is water or energy conservation. A typical scenario assumes a 1300 LF span, renozzled with low-pressure nozzles. Resource concerns include: Soil Erosion (Concentrated flow erosion e.g. irrigation induced), Insufficient Water (Inefficient use of irrigation water), Water Quality Degradation (Excess nutrients in surface and ground waters, Excessive salts in surface and ground waters, Excess pathogens and chemicals from manure, bio-solids or compost applications), Inefficient Energy Use (Equipment and facilities e.g. pumping) Associated Practices: Irrigation Pipeline (430), Pumping Plant (533), Irrigation Water Management (449)
Before Practice Situation	A center pivot is irrigating cropland that is being irrigated using a system in which all nozzles are operating above 35 psi on the mainline pipe. The nozzles are worn and water is applied non-uniformly. Water runs off the field and degrades the receiving waters. Deep percolation in some parts of the field degrades the ground water quality. The runoff from the field causes soil erosion. The high pressure requirement for the system requires excess energy use.
After Practice Situation	A Center Pivot or Linear Move sprinkler system with a span of 1300 linear feet is re-nozzled with low-pressure nozzles (<=35 psi). The irrigation water is applied efficiently and uniformly to maintain adequate soil moisture for optimum plant growth. Runoff and deep percolation are eliminated, and the surface and ground water is no longer degraded. The irrigation induced soil erosion caused by runoff is also eliminated. The lower pressure sprinklers reduce the energy used by the pump when the pump is modified to match lower pressure requirements.
Scenario Feature Measure	Length of Lateral Retrofitted
Scenario Unit	Linear Foot
Scenario Typical Size	1300

Cost Summary:

Cost Category	Scenario Cost	Scenario Cost/Unit
Materials	$6,630.00	$5.10
Equipment/Installation	$0.00	$0.00
Labor	$0.00	$0.00
Mobilization	$33.33	$0.03
Acquisition of Technical Knowledge	$0.00	$0.00
Foregone Income	$0.00	$0.00
Total	$6,663.33	$5.13

Cost Details:

Cost Category	Component ID	Component Name	Component Description	Unit	Price ($/unit)	Quantity	Cost
Materials	1480	Irrigation, Sprinkler Package, Renozzle or Retrofit, with drops and pressure regulators	Sprinkler Package - Rennovation including sprinkler nozzle addition, and/or replacement, including new pressure regulators and drops.	Foot	$5.10	1300	$6,630.00
Mobilization	1137	Mobilization, very small equipment	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	$33.33	1	$33.33

Scenario Worksheet

Practice and Scenario Description:

Information Type	Data
Region	Northern Plains
State	South Dakota
Discipline Group	Water Management Engineering
Practice Code/Name	449 - Irrigation Water Management
Scenario ID	1
Scenario Name	Basic Irrigation Water Management
Scenario Description	A low Intensity irrigation water management system for producers using a checkbook method (crop grown, soil moisture conditions prior to irrigation, dates of irrigation start and stop, depths of irrigation applied, duration of irrigations, and amount of rainfall). For a typical scenario, soil moisture is determined by the feel method, volumes of irrigation water are based on energy or water district bills, records are kept on paper copies, and calculations are made by hand. Resource Concerns: Insufficient Water Supply-Inefficient use of irrigation water; Degraded Plant Condition-Undesirable plant productivity and health, and Inefficient Energy Use-Equipment and facilities. Associated Practices: 441-Irrigation System Microirrigation, 442-Irrigation System Sprinkler, 443-Irrigation System Surface and Subsurface, 449- Irrigation Water Management, 587-Structure for water Control.
Before Practice Situation	The irrigator decides when to irrigate based on general crop or soil appearance or limited soil moisture monitoring. System run times are based on past apparent success. The typical irrigated field is a 125 acre corn field with a sprinkler irrigation system.
After Practice Situation	Irrigations are scheduled based on measured crop water requirements. Records are used to evaluate results of past irrigation events and influence future irrigations. The irrigator keeps records of soil moisture, crop water use, rainfall amounts and irrigation timing and amounts. At the end of the irrigation season all the data has been reviewed and evaluated. Improvements planned for the next season have been determined.
Scenario Feature Measure	Acres under irrigation
Scenario Unit	Acre
Scenario Typical Size	125

Cost Summary:

Cost Category	Scenario Cost	Scenario Cost/Unit
Materials	$0.00	$0.00
Equipment/Installation	$0.00	$0.00
Labor	$532.40	$4.26
Mobilization	$0.00	$0.00
Acquisition of Technical Knowledge	$0.00	$0.00
Foregone Income	$0.00	$0.00
Total	$532.40	$4.26

Cost Details:

Cost Category	Component ID	Component Name	Component Description	Unit	Price ($/unit)	Quantity	Cost
Labor	231	General Labor	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	$16.72	16	$267.52
Labor	234	Supervisor or Manager	Labor involving supervision or management activities. Includes crew supervisors, foremen and farm/ranch managers time required for adopting new technology, etc.	Hour	$33.11	8	$264.88

Scenario Worksheet

Practice and Scenario Description:

Information Type	Data
Region	Northern Plains
State	South Dakota
Discipline Group	Water Management Engineering
Practice Code/Name	449 - Irrigation Water Management
Scenario ID	2
Scenario Name	Intermediate Irrigation Water Management
Scenario Description	This practice includes the installation of electrical soil moisture sensors such as capacitance or resistance sensors that are monitored to determine soil moisture. The installation includes the purchase of soil moisture sensors, installation equipment (probe or auger), and a data logger to log continuous soil moisture data that can be downloaded to a personal computer and associated graphing software. Typical Scenario involves installation of sensors at a single location in a 125 acre field of sprinkler irrigated cropland. Producer periodically monitors soil moisture sensors during the growing season. Resource Concerns: Insufficient Water - Inefficient use of irrigation water, and Degraded Plant Condition - Undesirable plant productivity and health, and Inefficient Energy Use - Equipment and facilities. Associated Practices: 449- Irrigation Water Management, 587-Structure for water Control, 328-Conservation Crop Rotation, 590-Nutrient Management, 442-Irrigation System, Sprinkler, and Irrigation System, Microirrigation 441.
Before Practice Situation	Producer uses feel method to estimate soil moisture for scheduling irrigation in the field.
After Practice Situation	Producer has installed at least three sensors at each monitoring site to a depth of three feet with one sensor representing each foot of depth. Producer periodically downloads continuously recorded soil moisture measurements that are used to schedule irrigation more effectively resulting in improved irrigation water managment and reduced energy use.
Scenario Feature Measure	Acres under irrigation
Scenario Unit	Acre
Scenario Typical Size	125

Cost Summary:

Cost Category	Scenario Cost	Scenario Cost/Unit
Materials	$701.65	$5.61
Equipment/Installation	$0.00	$0.00
Labor	$465.52	$3.72
Mobilization	$66.66	$0.53
Acquisition of Technical Knowledge	$0.00	$0.00
Foregone Income	$0.00	$0.00
Total	$1,233.83	$9.87

Cost Details:

Cost Category	Component ID	Component Name	Component Description	Unit	Price ($/unit)	Quantity	Cost
Materials	1456	Soil Moisture Sensor	Soil moisture resistance sensor W/10' cables. Equipment only.	Each	$44.80	3	$134.40
Materials	1453	Data Logger	Data Logger W/Graphic Output for water management. Materials only.	Each	$567.25	1	$567.25
Labor	231	General Labor	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	$16.72	12	$200.64
Labor	234	Supervisor or Manager	Labor involving supervision or management activities. Includes crew supervisors, foremen and farm/ranch managers time required for adopting new technology, etc.	Hour	$33.11	8	$264.88
Mobilization	1137	Mobilization, very small equipment	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	$33.33	2	$66.66

Scenario Worksheet

Practice and Scenario Description:

Information Type	Data
Region	Northern Plains
State	South Dakota
Discipline Group	Water Management Engineering
Practice Code/Name	464 - Irrigation Land Leveling
Scenario ID	1
Scenario Name	Land Leveling
Scenario Description	This is scenario will level a typical 30 acres of irrigated crop land surface to enhance uniform flow of surface water to improve irrigation efficiency using self-propelled scraper equipment and land plane equipment. The typical volume of earth moved is 450 cubic yards per acre. Resource Concern: Excess/Insufficient - Inefficient Use of Irrigation Water Associated Conservation Practices: 433 - Irrigation System, Surface and Subsurface; 607 - Surface Drain, Field Ditch; 388 - Irrigation Field Ditch; 449 - Irrigation Water Management; or 587 - Structure for Water Control.
Before Practice Situation	Irregular field surface reduces uniformity of surface application and thus irrigation efficiency by localized ponding and/or excess runoff/runon.
After Practice Situation	Cropland will be reshaped to provide uniform distribution of irrigation water in order to promote irrigation efficiencies.
Scenario Feature Measure	Volume of Earth Moved
Scenario Unit	Cubic Yard
Scenario Typical Size	13500

Cost Summary:

Cost Category	Scenario Cost	Scenario Cost/Unit
Materials	$0.00	$0.00
Equipment/Installation	$35,393.95	$2.62
Labor	$198.32	$0.01
Mobilization	$450.32	$0.03
Acquisition of Technical Knowledge	$0.00	$0.00
Foregone Income	$0.00	$0.00
Total	$36,042.59	$2.67

Cost Details:

Cost Category	Component ID	Component Name	Component Description	Unit	Price ($/unit)	Quantity	Cost
Equipment/Installation	1199	Stripping and stockpiling, topsoil	Stripping and stockpiling of topsoil adjacent to stripping area. Includes equipment and labor.	Cubic Yard	$0.79	3375	$2,666.25
Equipment/Installation	1781	Motor Grader, 150 HP	Motor Grader or Maintainer, 150 hp. Typical of equipment with HP in range of 130-170. Equipment cost, does not include labor.	Hour	$83.15	8	$665.20
Equipment/Installation	1222	Excavation, common earth, large equipment, 50 ft	Bulk excavation of common earth including sand and gravel with dozer >100 HP with average push distance of 50 feet. Includes equipment and labor.	Cubic Yard	$1.41	6750	$9,517.50
Equipment/Installation	1223	Excavation, common earth, large equipment, 150 ft	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	$3.34	6750	$22,545.00
Labor	233	Equipment Operators, Heavy	Includes: Cranes, Hydraulic Excavators >=50 HP, Dozers, Paving Machines, Rock Trenchers, Trenchers >=12", Dump Trucks, Ag Equipment >=150 HP, Scrapers, Water Wagons.	Hour	$24.79	8	$198.32
Mobilization	1140	Mobilization, large equipment	Equipment >150HP or typical weights greater than 30,000 pounds or loads requiring over width or over length permits.	Each	$225.16	2	$450.32

Scenario Worksheet

Practice and Scenario Description:

Information Type	Data
Region	Northern Plains
State	South Dakota
Discipline Group	Agricultural Engineering
Practice Code/Name	468 - Lined Waterway or Outlet
Scenario ID	1
Scenario Name	Turf Reinforced Matting
Scenario Description	Install 300 ' long by 15' wide by 1.5' deep trapezoidal or parabolic shaped waterway lined with Turf Reinforced Matting (TRM). 1/2 the channel is excavated. Excess excavation is spoiled in the immediate area. TRM is installed over 100% of the width of the waterway to prevent scour and aid in waterway establishment. Cost include excavation, spoiling of excess material, and furnishing and installing TRM. Lined waterway width is measured from top of bank to top of bank.
Before Practice Situation	Excessive sedimentation and soil erosion as a result of ephemeral or classic gully erosion. Velocities are generally too high or saturated soil conditions make it difficult to establish a grassed waterway.
After Practice Situation	TRM lined waterway is 300 ' long by 15' wide by 1.5' deep. The practice is installed using a hydraulic excavator. TRM is installed by laborers. Associated practices are Subsurface Drain (606), Underground Outlet (620), Structure for Water Control (587), and Critical Area Seeding (342).
Scenario Feature Measure	Square Foot of Waterway
Scenario Unit	Square Foot
Scenario Typical Size	4500

Cost Summary:

Cost Category	Scenario Cost	Scenario Cost/Unit
Materials	$5,184.15	$1.15
Equipment/Installation	$179.10	$0.04
Labor	$66.22	$0.01
Mobilization	$120.38	$0.03
Acquisition of Technical Knowledge	$0.00	$0.00
Foregone Income	$0.00	$0.00
Total	$5,549.85	$1.23

Cost Details:

Cost Category	Component ID	Component Name	Component Description	Unit	Price ($/unit)	Quantity	Cost
Materials	1212	Turf reinforcement mat	Synthetic turf reinforcement mat with staple anchoring. Includes materials, equipment and labor.	Square Yard	$9.69	535	$5,184.15
Equipment/Installation	48	Excavation, Common Earth, side cast, small equipment	Bulk excavation and side casting of common earth with hydraulic excavator with less than 1 CY capacity. Includes equipment and labor.	Cubic yard	$1.99	90	$179.10
Labor	234	Supervisor or Manager	Labor involving supervision or management activities. Includes crew supervisors, foremen and farm/ranch managers time required for adopting new technology, etc.	Hour	$33.11	2	$66.22
Mobilization	1139	Mobilization, medium equipment	Equipment with 70-150 HP or typical weights between 14,000 and 30,000 pounds.	Each	$120.38	1	$120.38

Scenario Worksheet

Practice and Scenario Description:

Information Type	Data
Region	Northern Plains
State	South Dakota
Discipline Group	Agricultural Engineering
Practice Code/Name	468 - Lined Waterway or Outlet
Scenario ID	2
Scenario Name	Rock Lined - 12"
Scenario Description	Install 300 ' long by 15' wide by 1.5' deep trapezoidal or parabolic shaped waterway lined with 12" thick riprap (D100 = 9", Velocity ~ 8 ft/sec). 1/2 the channel is excavated, before excavation for riprap. Excess excavation is spoiled in the immediate area. Riprap is installed over 100% of the width of the waterway to prevent scour. Cost include excavation, spoiling of excess material, geotextile underlayment and installing 9" Rock Riprap. Lined waterway width is measured from top of bank to top of bank.
Before Practice Situation	Excessive sedimentation and soil erosion as a result of ephemeral or classic gully erosion. Velocities are generally too high or saturated soil conditions make it difficult to establish a grassed waterway.
After Practice Situation	Rock lined waterway is 300 ' long by 15' wide by 1.5' deep with 2:1 sideslopes. Waterway is excavated and rock is placed using a hydraulic excavator. Geotextile underlayment is installed by laborers. Associated practices are Subsurface Drain (606), Underground Outlet (620), Structure for Water Control (587), and Critical Area Seeding (342).
Scenario Feature Measure	Square Foot of Waterway
Scenario Unit	Square Foot
Scenario Typical Size	4500

Cost Summary:

Cost Category	Scenario Cost	Scenario Cost/Unit
Materials	$12,273.35	$2.73
Equipment/Installation	$587.05	$0.13
Labor	$99.66	$0.02
Mobilization	$120.38	$0.03
Acquisition of Technical Knowledge	$0.00	$0.00
Foregone Income	$0.00	$0.00
Total	$13,080.44	$2.91

Cost Details:

Cost Category	Component ID	Component Name	Component Description	Unit	Price ($/unit)	Quantity	Cost
Materials	44	Rock Riprap, Placed with geotextile	Rock Riprap, placed with geotextile, includes materials, equipment and labor to transport and place	Cubic yard	$59.87	205	$12,273.35
Equipment/Installation	48	Excavation, Common Earth, side cast, small equipment	Bulk excavation and side casting of common earth with hydraulic excavator with less than 1 CY capacity. Includes equipment and labor.	Cubic yard	$1.99	295	$587.05
Labor	234	Supervisor or Manager	Labor involving supervision or management activities. Includes crew supervisors, foremen and farm/ranch managers time required for adopting new technology, etc.	Hour	$33.11	2	$66.22
Labor	231	General Labor	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	$16.72	2	$33.44
Mobilization	1139	Mobilization, medium equipment	Equipment with 70-150 HP or typical weights between 14,000 and 30,000 pounds.	Each	$120.38	1	$120.38

Scenario Worksheet

Practice and Scenario Description:

Information Type	Data
Region	Northern Plains
State	South Dakota
Discipline Group	Agricultural Engineering
Practice Code/Name	468 - Lined Waterway or Outlet
Scenario ID	3
Scenario Name	Rock Lined - 24"
Scenario Description	Install 300 ' long by 15' wide by 1.5' deep trapezoidal or parabolic shaped waterway lined with 24" thick riprap (D100 = 18", Velocity ~ 11 ft/sec). 1/2 the channel is excavated, before excavation for riprap. Excess excavation is spoiled in the immediate area. Riprap is installed over 100% of the width of the waterway to prevent scour. Cost include excavation, spoiling of excess material, geotextile underlayment and installing 18" Rock Riprap. Lined waterway width is measured from top of bank to top of bank.
Before Practice Situation	Excessive sedimentation and soil erosion as a result of ephemeral or classic gully erosion. Velocities are generally too high or saturated soil conditions make it difficult to establish a grassed waterway.
After Practice Situation	Rock lined waterway is 300 ' long by 15' wide by 1.5' deep with 2:1 sideslopes. Waterway is excavated and rock is placed using a hydraulic excavator. Geotextile underlayment is installed by laborers. Associated practices are Subsurface Drain (606), Underground Outlet (620), Structure for Water Control (587), and Critical Area Seeding (342).
Scenario Feature Measure	Square Foot of Waterway
Scenario Unit	Square Foot
Scenario Typical Size	4500

Cost Summary:

Cost Category	Scenario Cost	Scenario Cost/Unit
Materials	$27,839.55	$6.19
Equipment/Installation	$1,104.45	$0.25
Labor	$99.66	$0.02
Mobilization	$120.38	$0.03
Acquisition of Technical Knowledge	$0.00	$0.00
Foregone Income	$0.00	$0.00
Total	$29,164.04	$6.48

Cost Details:

Cost Category	Component ID	Component Name	Component Description	Unit	Price ($/unit)	Quantity	Cost
Materials	44	Rock Riprap, Placed with geotextile	Rock Riprap, placed with geotextile, includes materials, equipment and labor to transport and place	Cubic yard	$59.87	465	$27,839.55
Equipment/Installation	48	Excavation, Common Earth, side cast, small equipment	Bulk excavation and side casting of common earth with hydraulic excavator with less than 1 CY capacity. Includes equipment and labor.	Cubic yard	$1.99	555	$1,104.45
Labor	234	Supervisor or Manager	Labor involving supervision or management activities. Includes crew supervisors, foremen and farm/ranch managers time required for adopting new technology, etc.	Hour	$33.11	2	$66.22
Labor	231	General Labor	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	$16.72	2	$33.44
Mobilization	1139	Mobilization, medium equipment	Equipment with 70-150 HP or typical weights between 14,000 and 30,000 pounds.	Each	$120.38	1	$120.38

Scenario Worksheet

Practice and Scenario Description:

Information Type	Data
Region	Northern Plains
State	South Dakota
Discipline Group	Forestry
Practice Code/Name	472 - Access Control
Scenario ID	1
Scenario Name	Animal Exclusion From Sensitive Areas
Scenario Description	Exclude animals from an area in order to address identified resource concerns. This is for facilitating exclusion of animals to protect or enhance natural resource values. Control will be by temporary electric fencing. Any need for permanent fencing will be planned and installed using the Fence practice (382). Clearing of brush and trees is not necessary. Resource concerns include wildlife habitat degradation, undesirable plant productivity and health, and/or excessive sediment in surface waters.
Before Practice Situation	Sensitive areas are threatened by the adverse actions of domestic and/or wild animals. The importance of the sensitive areas can include (but are not limited to): wildlife habitat, plant species composition, newly established trees and/or plants, stream bank stability, and/or water quality.
After Practice Situation	Sensitive areas are protected from the adverse actions of domestic and/or wild animals by excluding them from the area.
Scenario Feature Measure	Acres of Treatment
Scenario Unit	Acre
Scenario Typical Size	40

Cost Summary:

Cost Category	Scenario Cost	Scenario Cost/Unit
Materials	$0.00	$0.00
Equipment/Installation	$0.00	$0.00
Labor	$66.88	$1.67
Mobilization	$0.00	$0.00
Acquisition of Technical Knowledge	$0.00	$0.00
Foregone Income	$871.34	$21.78
Total	$938.22	$23.46

Cost Details:

Cost Category	Component ID	Component Name	Component Description	Unit	Price ($/unit)	Quantity	Cost
Labor	231	General Labor	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	$16.72	4	$66.88
Foregone Income	2079	FI, Grazing AUMs	Grazing is the Primary Land Use	AUM	$22.93	38	$871.34

Scenario Worksheet

Practice and Scenario Description:

Information Type	Data
Region	Northern Plains
State	South Dakota
Discipline Group	Agronomy
Practice Code/Name	484 - Mulching
Scenario ID	1
Scenario Name	Natural Material, Straw
Scenario Description	Application of straw mulch or other other state approved natural material to reduce erosion and facilitate the establishment of vegetative cover. Mulch provides full coverage and is typically used with critical area planting. 2 tons per acre of straw applied and anchored with light tillage equipment, treader, knifed in, etc.
Before Practice Situation	Typical scenario is applying mulch on 2.0 acres of a disturbed site around a newly constructed structural practice. The potential for soil erosion is high and mulch is needed to stabilize the soil and facilitate the establishment of vegetative cover.
After Practice Situation	Straw mulch has been applied to areas needing mulch. Erosion and sedimentation is reduced, water and soil quality is protected, and vegetative cover is established.
Scenario Feature Measure	Area Covered by Mulch
Scenario Unit	Acre
Scenario Typical Size	2

Cost Summary:

Cost Category	Scenario Cost	Scenario Cost/Unit
Materials	$480.00	$240.00
Equipment/Installation	$64.68	$32.34
Labor	$108.10	$54.05
Mobilization	$0.00	$0.00
Acquisition of Technical Knowledge	$0.00	$0.00
Foregone Income	$0.00	$0.00
Total	$652.78	$326.39

Cost Details:

Cost Category	Component ID	Component Name	Component Description	Unit	Price ($/unit)	Quantity	Cost
Materials	1237	Straw	Small grain straw (non organic and certified organic). Materials and shipping only.	Ton	$120.00	4	$480.00
Equipment/Installation	963	Tractor, agricultural, 60 HP	Agricultural tractor with horsepower range of 50 to 90. Equipment and power unit costs. Labor not included.	Hour	$19.28	2	$38.56
Equipment/Installation	939	Truck, Pickup	Equipment and power unit costs. Labor not included.	Hour	$26.12	1	$26.12
Labor	232	Equipment Operators, Light	Includes: Skid Steer Loaders, Hydraulic Excavators <50 HP, Trenchers <12", Ag Equipment <150 HP, Pickup Trucks, Forklifts, Mulchers	Hour	$20.61	2	$41.22
Labor	231	General Labor	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	$16.72	4	$66.88

Scenario Worksheet

Practice and Scenario Description:

Information Type	Data
Region	Northern Plains
State	South Dakota
Discipline Group	Agronomy
Practice Code/Name	484 - Mulching
Scenario ID	2
Scenario Name	Erosion Control Blanket
Scenario Description	Installation of erosion control blanket on critical areas with steep slopes, grassed waterways or diversions.. Blanket is typically made of coconut coir, wood fiber, straw and is typically covered on both sides with polypropylene netting. Used to help control erosion and establish vegetative cover.
Before Practice Situation	There are areas of concentrated flow and a grassed waterway is being installed and seeded to permanent cover. Soil erosion is a concern and there is little to no vegetation.
After Practice Situation	The erosion control blanket is placed on concentrated flow areas and secured with ground stables. Soil erosion is minimized and vegetative cover is established.
Scenario Feature Measure	Total Area Mulched
Scenario Unit	Square Foot
Scenario Typical Size	5000

Cost Summary:

Cost Category	Scenario Cost	Scenario Cost/Unit
Materials	$811.76	$0.16
Equipment/Installation	$0.00	$0.00
Labor	$267.52	$0.05
Mobilization	$0.00	$0.00
Acquisition of Technical Knowledge	$0.00	$0.00
Foregone Income	$0.00	$0.00
Total	$1,079.28	$0.22

Cost Details:

Cost Category	Component ID	Component Name	Component Description	Unit	Price ($/unit)	Quantity	Cost
Materials	1213	Erosion Control Blanket, biodegradable	Biodegradable erosion control blanket, typically a composite of natural fibers with reinforcing polymer netting. Materials only.	Square Yard	$1.46	556	$811.76
Labor	231	General Labor	Labor performed using basic tools such as power tool, shovels, and other tools that do not require extensive training. Ex. pipe layer,	Hour	$16.72	16	$267.52

Scenario Worksheet

Practice and Scenario Description:

Information Type	Data
Region	Northern Plains
State	South Dakota
Discipline Group	Agronomy
Practice Code/Name	484 - Mulching
Scenario ID	3
Scenario Name	Tree and Shrub, Squares
Scenario Description	Weed barrier fabric or other suitable natural or synthetic mulch is installed with a new tree and shrub planting. Typically used to prevent weed competition during the installation of conservation practices. Rate is per tree/shrub and assumes 1 square yard of weed barrier fabric and 5 staples/tree.
Before Practice Situation	Site conditions vary. Typical scenario is an installation of 100 native trees and shrubs to enhance wildlife habitat. Sites are often remote and trees may not be planted in rows, requiring each tree to be mulched individually
After Practice Situation	Weed barrier fabric squares are installed with 5 sod staples each, around individual trees and shrubs to control weed competition. Weeds are controlled and tree/shrub growth is minimally influenced by weed competition.
Scenario Feature Measure	Number of Trees Mulched
Scenario Unit	Each
Scenario Typical Size	100

Cost Summary:

Cost Category	Scenario Cost	Scenario Cost/Unit
Materials	$0.00	$0.00
Equipment/Installation	$222.00	$2.22
Labor	$0.00	$0.00
Mobilization	$0.00	$0.00
Acquisition of Technical Knowledge	$0.00	$0.00
Foregone Income	$0.00	$0.00
Total	$222.00	$2.22

Cost Details:

Cost Category	Component ID	Component Name	Component Description	Unit	Price ($/unit)	Quantity	Cost
Equipment/Installation	42	Geotextile, woven	Woven Geotextile Fabric. Includes materials, equipment and labor	Square Yard	$2.22	100	$222.00

Scenario Worksheet

Practice and Scenario Description:

Information Type	Data
Region	Northern Plains
State	South Dakota
Discipline Group	Agronomy
Practice Code/Name	484 - Mulching
Scenario ID	4
Scenario Name	Tree and Shrub, Rolls
Scenario Description	Weed barrier fabric or other suitable natural or synthetic mulch is installed with a new tree and shrub planting. Typically used to prevent weed competition during the installation of conservation practices. Two 300 feet tree rows will use weed barrier to reduce weed copetition and conserve moisture. Rate is per square feet (300' roll x 6' wide = equals 1800 square feet) and 3 staples/pins per tree.
Before Practice Situation	Site conditions vary. Typical scenario is an installation of 50 trees and shrubs to enhance wildlife habitat. Trees are planted in rows, requiring fabric to be applied to the entire row.
After Practice Situation	Weed barrier fabric rolls are installed with 3 metal pins/staples each. Weeds are controlled and tree/shrub growth is minimally influenced by weed competition.
Scenario Feature Measure	Number of Trees Installed
Scenario Unit	Square Foot
Scenario Typical Size	3600

Cost Summary:

Cost Category	Scenario Cost	Scenario Cost/Unit
Materials	$0.00	$0.00
Equipment/Installation	$888.00	$0.25
Labor	$0.00	$0.00
Mobilization	$0.00	$0.00
Acquisition of Technical Knowledge	$0.00	$0.00
Foregone Income	$0.00	$0.00
Total	$888.00	$0.25

Cost Details:

Cost Category	Component ID	Component Name	Component Description	Unit	Price ($/unit)	Quantity	Cost
Equipment/Installation	42	Geotextile, woven	Woven Geotextile Fabric. Includes materials, equipment and labor	Square Yard	$2.22	400	$888.00

Scenario Worksheet

Practice and Scenario Description:

Information Type	Data
Region	Northern Plains
State	South Dakota
Discipline Group	Agronomy
Practice Code/Name	484 - Mulching
Scenario ID	5
Scenario Name	Hydro-mulching
Scenario Description	Installation of mulch thru hydraulic methods on critical areas with steep slopes, grassed waterways or diversions. The mulch is comprised of wood cellulose fiber pulp and may include seed, fertilizer, and other approved materials. Mulch is typically applied at a rate of 1500 pounds per acre as a slurry by using hydroseed methods. Used to help control erosion and establish vegetative cover.
Before Practice Situation	Areas being seeded to permanent cover. Soil erosion is a concern and there is little to no vegetation.
After Practice Situation	The hydro-mulch is applied to appropriate areas as needed for vegetation establishment. Soil erosion is minimized and vegetative cover is established.
Scenario Feature Measure	Area Covered by Mulch
Scenario Unit	Acre
Scenario Typical Size	1

Cost Summary:

Cost Category	Scenario Cost	Scenario Cost/Unit
Materials	$0.00	$0.00
Equipment/Installation	$2,701.74	$2,701.74
Labor	$0.00	$0.00
Mobilization	$0.00	$0.00
Acquisition of Technical Knowledge	$0.00	$0.00
Foregone Income	$0.00	$0.00
Total	$2,701.74	$2,701.74

Cost Details:

Cost Category	Component ID	Component Name	Component Description	Unit	Price ($/unit)	Quantity	Cost
Equipment/Installation	1291	Seeding Operation, hydroseeder	Hydroseeding with typical 1500 to 3600 gallon seeder. Includes all costs for equipment, power unit, and labor.	Acre	$2,701.74	1	$2,701.74

Scenario Worksheet

Practice and Scenario Description:

Information Type	Data
Region	Northern Plains
State	South Dakota
Discipline Group	Agricultural Engineering
Practice Code/Name	500 - Obstruction Removal
Scenario ID	2
Scenario Name	Removal and Disposal of Fence
Scenario Description	Remove and disposal of all existing fences by demolition, excavation or other means required for removal. Dispose of all fence materials from the site so that it does not impede subsequent work or cause onsite or offsite damage. Dispose of all materials by removal to an approved landfill, wood chipping and land distribution, or recycling center, burial at an approved location or burning. If burning is used, implement appropriate smoke management to protect public health and safety. Remove and dispose of the unwanted fence obstruction in order to apply conservation practices such as Upland Wildlife Habitat Management (645) or facilitate the planned land use. Fence removal will address the resource concerns of the prevention or hindrance to the installation of conservation practices or present a hazard to their use and enjoyment and reduce hazards to wildlife.
Before Practice Situation	On any land where existing fence interferes with planned land use development, public safety, wildlife movement and habitat, or infrastructure. The site may be abandoned mine lands, construction sites, recreation areas, farms, ranches, and areas affected by natural disasters. This is not intended for the removal of obstructions from aquatic environments.
After Practice Situation	The typical fence will be 2640 in linear feet. The removal of the fence will be performed with the use of equipment and hand labor. Dispose of all debris from the fence removal so that it does not impede subsequent work or cause onsite or offsite damage. Revegetate or otherwise protect from erosion disturbed areas as soon as possible. Refer to NRCS Conservation Practice Standard 342, Critical Area Planting for seedbed preparation, seeding, fertilizing, and mulching requirements. The practice is to improve site conditions in order to apply conservation practices or facilitate better use of the landscape such as Upland Wildlife Habitat Management (645).
Scenario Feature Measure	Length of Fence
Scenario Unit	Linear Foot
Scenario Typical Size	2640

Cost Summary:

Cost Category	Scenario Cost	Scenario Cost/Unit
Materials	$0.00	$0.00
Equipment/Installation	$1,218.40	$0.46
Labor	$746.60	$0.28
Mobilization	$137.27	$0.05
Acquisition of Technical Knowledge	$0.00	$0.00
Foregone Income	$0.00	$0.00
Total	$2,102.27	$0.80

Cost Details:

Cost Category	Component ID	Component Name	Component Description	Unit	Price ($/unit)	Quantity	Cost
Equipment/Installation	933	Skidsteer, 80 HP	Skidsteer loader with horsepower range of 60 to 90. Equipment and power unit costs. Labor not included.	Hour	$34.80	20	$696.00
Equipment/Installation	939	Truck, Pickup	Equipment and power unit costs. Labor not included.	Hour	$26.12	20	$522.40
Labor	232	Equipment Operators, Light	Includes: Skid Steer Loaders, Hydraulic Excavators <50 HP, Trenchers <12", Ag Equipment <150 HP, Pickup Trucks, Forklifts, Mulchers	Hour	$20.61	20	$412.20
Labor	231	General Labor	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	$16.72	20	$334.40
Mobilization	1139	Mobilization, medium equipment	Equipment with 70-150 HP or typical weights between 14,000 and 30,000 pounds.	Each	$120.38	1	$120.38
Mobilization	1142	Mobilization, General labor	Mobilization of general labor: Ex. pipe layer, herder, concrete placement, materials spreader, flagger, etc.	Hour	$16.89	1	$16.89

Scenario Worksheet

Practice and Scenario Description:

Information Type	Data
Region	Northern Plains
State	South Dakota
Discipline Group	Agricultural Engineering
Practice Code/Name	500 - Obstruction Removal
Scenario ID	3
Scenario Name	Removal and Disposal of Power Lines and Poles
Scenario Description	Remove and disposal of power lines and poles thru demolition, excavation or other means required for removal. Dispose of all power lines and poles so that it does not impede subsequent work or cause onsite or offsite damage. Dispose of all power lines and poles by removal to an approved location, or reuse location. Remove and dispose all power lines and poles in order to apply conservation practices or facilitate the planned land use. Rocks and or boulders will address the resource concerns of the prevention or hindrance to the installation of conservation practices or present a hazard to their use and enjoyment.
Before Practice Situation	On any land where existing obstructions interfere with planned land use development, public safety or infrastructure. The site may be abandoned mine lands, construction sites, recreation areas, farms, ranches, and areas affected by natural disasters. This is not intended for the removal of obstructions from aquatic environments.
After Practice Situation	The typical length is 2640 linear feet of an impaired area. The removal of power lines and poles will be performed by using means required for removal with the use of heavy equipment and hand labor. Dispose of all lines and poles from the obstruction removal so that it does not impede subsequent work or cause onsite or offsite damage. Revegetate or otherwise protect from erosion disturbed areas as soon as possible. Refer to NRCS Conservation Practice Standard 342, Critical Area Planting for seedbed preparation, seeding, fertilizing, and mulching requirements. The practice is to improve site conditions in order to apply conservation practices or facilitate better use of the landscape.
Scenario Feature Measure	Length of Power Lines
Scenario Unit	Linear Foot
Scenario Typical Size	2640

Cost Summary:

Cost Category	Scenario Cost	Scenario Cost/Unit
Materials	$0.00	$0.00
Equipment/Installation	$5,688.60	$2.15
Labor	$1,615.70	$0.61
Mobilization	$257.65	$0.10
Acquisition of Technical Knowledge	$0.00	$0.00
Foregone Income	$0.00	$0.00
Total	$7,561.95	$2.86

Cost Details:

Cost Category	Component ID	Component Name	Component Description	Unit	Price ($/unit)	Quantity	Cost
Equipment/Installation	1400	Truck, dump, 18 CY	Dump truck for moving bulk material. Typically capacity is 25 ton or 18 cubic yards. Includes equipment only.	Hour	$92.20	30	$2,766.00
Equipment/Installation	933	Skidsteer, 80 HP	Skidsteer loader with horsepower range of 60 to 90. Equipment and power unit costs. Labor not included.	Hour	$34.80	30	$1,044.00
Equipment/Installation	929	Dozer, 80 HP	Track mounted Dozer with horsepower range of 60 to 90. Equipment and power unit costs. Labor not included.	Hour	$54.75	20	$1,095.00
Equipment/Installation	939	Truck, Pickup	Equipment and power unit costs. Labor not included.	Hour	$26.12	30	$783.60
Labor	232	Equipment Operators, Light	Includes: Skid Steer Loaders, Hydraulic Excavators <50 HP, Trenchers <12", Ag Equipment <150 HP, Pickup Trucks, Forklifts, Mulchers	Hour	$20.61	30	$618.30
Labor	231	General Labor	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	$16.72	30	$501.60

Scenario Worksheet

Practice and Scenario Description:

Information Type	Data
Region	Northern Plains
State	South Dakota
Discipline Group	Agricultural Engineering
Practice Code/Name	500 - Obstruction Removal
Scenario ID	4
Scenario Name	Removal and Disposal of Steel and or Concrete Structures
Scenario Description	Remove and disposal of large steel and or concrete structures by demolition, excavation or other means required for removal. Dispose of all steel and or concrete structures so that it does not impede subsequent work or cause onsite or offsite damage. Dispose of all steel and or concrete structures by removal to an approved location, or reuse location. Remove and dispose all steel and or concrete structures in order to apply conservation practices or facilitate the planned land use. Steel and or concrete structure removal will address the resource concerns of the prevention or hindrance to the installation of conservation practices or present a hazard to their use and enjoyment.
Before Practice Situation	On any land where existing obstructions interfere with planned land use development, public safety or infrastructure. The site may be abandoned mine lands, construction sites, recreation areas, farms, ranches, and areas affected by natural disasters. This is not intended for the removal of obstructions from aquatic environments.
After Practice Situation	The typical area will be a 2000 square feet of impaired land. The removal of steel and or concrete structures will be performed by demolition, excavation or other means required for removal with the use of heavy equipment and hand labor. Dispose of all steel and or concrete structures from the obstruction removal so that it does not impede subsequent work or cause onsite or offsite damage. Revegetate or otherwise protect from erosion disturbed areas as soon as possible. Refer to NRCS Conservation Practice Standard 342, Critical Area Planting for seedbed preparation, seeding, fertilizing, and mulching requirements. The practice is to improve site conditions in order to apply conservation practices or facilitate better use of the landscape.
Scenario Feature Measure	Land Area
Scenario Unit	Square Foot
Scenario Typical Size	2000

Cost Summary:

Cost Category	Scenario Cost	Scenario Cost/Unit
Materials	$0.00	$0.00
Equipment/Installation	$18,688.00	$9.34
Labor	$4,162.56	$2.08
Mobilization	$63.53	$0.03
Acquisition of Technical Knowledge	$0.00	$0.00
Foregone Income	$0.00	$0.00
Total	$22,914.09	$11.46

Cost Details:

Cost Category	Component ID	Component Name	Component Description	Unit	Price ($/unit)	Quantity	Cost
Equipment/Installation	1400	Truck, dump, 18 CY	Dump truck for moving bulk material. Typically capacity is 25 ton or 18 cubic yards. Includes equipment only.	Hour	$92.20	64	$5,900.80
Equipment/Installation	930	Hydraulic Excavator, .5 CY	Track mounted hydraulic excavator with bucket capacity range of 0.3 to 0.8 CY. Equipment and power unit costs. Labor not included.	Hour	$45.97	64	$2,942.08
Equipment/Installation	928	Dozer, 200 HP	Track mounted Dozer with horsepower range of 160 to 250. Equipment and power unit costs. Labor not included.	Hour	$153.83	64	$9,845.12
Labor	231	General Labor	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	$16.72	64	$1,070.08
Labor	233	Equipment Operators, Heavy	Includes: Cranes, Hydraulic Excavators >=50 HP, Dozers, Paving Machines, Rock Trenchers, Trenchers >=12", Dump Trucks, Ag Equipment >=150 HP, Scrapers, Water Wagons.	Hour	$24.79	64	$1,586.56
Labor	230	Skilled Labor	Labor requiring a high level skill set: Includes carpenters, welders, electricians, conservation professionals involved with data collection, monitoring, and or record keeping, etc.	Hour	$23.53	64	$1,505.92
Mobilization	1144	Mobilization, Heavy Equipment Operator	Mobilization of heavy equipment operators: Hydraulic Excavators >=50 HP, Dozers, Paving Machines, Rock Trenchers, Trenchers >=12", Dump Trucks, Ag Equipment >=150 HP, Scrapers, Water Wagons.	Hour	$24.56	1	$24.56
Mobilization	1142	Mobilization, General labor	Mobilization of general labor: Ex. pipe layer, herder, concrete placement, materials spreader, flagger, etc.	Hour	$16.89	1	$16.89
Mobilization	1141	Mobilization, Skilled labor	Mobilization of skilled labor: Includes carpenters, welders, electricians, conservation professionals involved with data collection, monitoring, and or record keeping, etc.	Hour	$22.08	1	$22.08

Scenario Worksheet

Practice and Scenario Description:

Information Type	Data
Region	Northern Plains
State	South Dakota
Discipline Group	Agricultural Engineering
Practice Code/Name	500 - Obstruction Removal
Scenario ID	5
Scenario Name	Removal and Disposal of Wood Structures
Scenario Description	Remove and disposal of wood structures (including large isolated trees) by demolition, excavation or other similar means required for removal. Dispose of all wood structures so that it does not impede subsequent work or cause onsite or offsite damage. Dispose of all wood structures by removal to an approved location, landfill, or reuse location. Remove and dispose all wood structures in order to apply conservation practices or facilitate the planned land use. Wood structure removal will address the resource concerns of the prevention or hindrance to the installation of conservation practices or present a hazard to their use and enjoyment.
Before Practice Situation	On any land where existing obstructions interfere with planned land use development, public safety or infrastructure. The site may be abandoned mine lands, construction sites, recreation areas, farms, ranches, and areas affected by natural disasters. This is not intended for the removal of obstructions from aquatic environments.
After Practice Situation	The typical area will be a 2000 square feet of impaired land. The removal of wood structures will be performed by demolition, excavation or other similar means required for removal with the use of heavy equipment and hand labor. Dispose of all wood structures from the obstruction removal so that it does not impede subsequent work or cause onsite or offsite damage. Revegetate or otherwise protect from erosion disturbed areas as soon as possible. Refer to NRCS Conservation Practice Standard 342, Critical Area Planting for seedbed preparation, seeding, fertilizing, and mulching requirements. The practice is to improve site conditions in order to apply conservation practices or facilitate better use of the landscape.
Scenario Feature Measure	Land Area
Scenario Unit	Square Foot
Scenario Typical Size	2000

Cost Summary:

Cost Category	Scenario Cost	Scenario Cost/Unit
Materials	$0.00	$0.00
Equipment/Installation	$9,344.00	$4.67
Labor	$2,081.28	$1.04
Mobilization	$63.53	$0.03
Acquisition of Technical Knowledge	$0.00	$0.00
Foregone Income	$0.00	$0.00
Total	$11,488.81	$5.74

Cost Details:

Cost Category	Component ID	Component Name	Component Description	Unit	Price ($/unit)	Quantity	Cost
Equipment/Installation	1400	Truck, dump, 18 CY	Dump truck for moving bulk material. Typically capacity is 25 ton or 18 cubic yards. Includes equipment only.	Hour	$92.20	32	$2,950.40
Equipment/Installation	928	Dozer, 200 HP	Track mounted Dozer with horsepower range of 160 to 250. Equipment and power unit costs. Labor not included.	Hour	$153.83	32	$4,922.56
Equipment/Installation	930	Hydraulic Excavator, .5 CY	Track mounted hydraulic excavator with bucket capacity range of 0.3 to 0.8 CY. Equipment and power unit costs. Labor not included.	Hour	$45.97	32	$1,471.04
Labor	233	Equipment Operators, Heavy	Includes: Cranes, Hydraulic Excavators >=50 HP, Dozers, Paving Machines, Rock Trenchers, Trenchers >=12", Dump Trucks, Ag Equipment >=150 HP, Scrapers, Water Wagons.	Hour	$24.79	32	$793.28
Labor	230	Skilled Labor	Labor requiring a high level skill set: Includes carpenters, welders, electricians, conservation professionals involved with data collection, monitoring, and or record keeping, etc.	Hour	$23.53	32	$752.96
Labor	231	General Labor	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	$16.72	32	$535.04
Mobilization	1141	Mobilization, Skilled labor	Mobilization of skilled labor: Includes carpenters, welders, electricians, conservation professionals involved with data collection, monitoring, and or record keeping, etc.	Hour	$22.08	1	$22.08
Mobilization	1142	Mobilization, General labor	Mobilization of general labor: Ex. pipe layer, herder, concrete placement, materials spreader, flagger, etc.	Hour	$16.89	1	$16.89
Mobilization	1144	Mobilization, Heavy Equipment Operator	Mobilization of heavy equipment operators: Hydraulic Excavators >=50 HP, Dozers, Paving Machines, Rock Trenchers, Trenchers >=12", Dump Trucks, Ag Equipment >=150 HP, Scrapers, Water Wagons.	Hour	$24.56	1	$24.56

Scenario Worksheet

Practice and Scenario Description:

Information Type	Data
Region	Northern Plains
State	South Dakota
Discipline Group	Agricultural Engineering
Practice Code/Name	500 - Obstruction Removal
Scenario ID	6
Scenario Name	Removal and disposal of individual landscape structures
Scenario Description	Remove and disposal of individual landscape structures (windmills, large trees, etc.) by demolition, excavation or other means required for removal. Dispose of all landscape structures so that it does not impede wildlife movement and/or subsequent work or cause onsite or offsite damage. Dispose of all associated materials by removal to an approved location, or reuse location. Remove and dispose all materials in order to apply conservation practices or facilitate the planned land use. Landscape structure removal will address the resource concerns of wildlife collision or avoidance at the landscape level.
Before Practice Situation	On any land where existing obstructions interfere with planned land use development, public safety or infrastructure. The site may be recreation areas, farms, ranches, and areas. This is not intended for the removal of obstructions from aquatic environments.
After Practice Situation	The typical area will be an area of 15 feet by 15 feet (225 square feet) of impaired land. The removal of landscape structures will be performed by demolition, excavation or other means required for removal with the use of heavy equipment and hand labor. Dispose of all materials from the obstruction removal so that it does not impede wildlife movement or cause onsite or offsite damage. Revegetate or otherwise protect from erosion disturbed areas as soon as possible. Refer to NRCS Conservation Practice Standard 342, Critical Area Planting for seedbed preparation, seeding, fertilizing, and mulching requirements. The practice is to improve site conditions in order to apply conservation practices or facilitate better use of the landscape.
Scenario Feature Measure	Land Area
Scenario Unit	Square Foot
Scenario Typical Size	225

Cost Summary:

Cost Category	Scenario Cost	Scenario Cost/Unit
Materials	$0.00	$0.00
Equipment/Installation	$343.28	$1.53
Labor	$224.56	$1.00
Mobilization	$240.76	$1.07
Acquisition of Technical Knowledge	$0.00	$0.00
Foregone Income	$0.00	$0.00
Total	$808.60	$3.59

Cost Details:

Cost Category	Component ID	Component Name	Component Description	Unit	Price ($/unit)	Quantity	Cost
Equipment/Installation	1401	Truck, dump, 8 CY	Dump truck for moving bulk material. Typically capacity is 12 ton or 8 cubic yards. Includes equipment only.	Hour	$44.20	2	$88.40
Equipment/Installation	933	Skidsteer, 80 HP	Skidsteer loader with horsepower range of 60 to 90. Equipment and power unit costs. Labor not included.	Hour	$34.80	2	$69.60
Equipment/Installation	931	Hydraulic Excavator, 1 CY	Track mounted hydraulic excavator with bucket capacity range of 0.8 to 1.5 CY. Equipment and power unit costs. Labor not included.	Hour	$92.64	2	$185.28
Labor	232	Equipment Operators, Light	Includes: Skid Steer Loaders, Hydraulic Excavators <50 HP, Trenchers <12", Ag Equipment <150 HP, Pickup Trucks, Forklifts, Mulchers	Hour	$20.61	2	$41.22
Labor	231	General Labor	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	$16.72	8	$133.76
Labor	233	Equipment Operators, Heavy	Includes: Cranes, Hydraulic Excavators >=50 HP, Dozers, Paving Machines, Rock Trenchers, Trenchers >=12", Dump Trucks, Ag Equipment >=150 HP, Scrapers, Water Wagons.	Hour	$24.79	2	$49.58
Mobilization	1139	Mobilization, medium equipment	Equipment with 70-150 HP or typical weights between 14,000 and 30,000 pounds.	Each	$120.38	2	$240.76

Scenario Worksheet

Practice and Scenario Description:

Information Type	Data
Region	Northern Plains
State	South Dakota
Discipline Group	Range/Pasture Grazing
Practice Code/Name	511 - Forage Harvest Management
Scenario ID	2
Scenario Name	Organic Preemptive Harvest
Scenario Description	Preemptive harvest of forage crops to prevent damage from insects (such as leafhopper on alfalfa) or other pests results in better forage quality and better livestock performance.
Before Practice Situation	Forage pests are usually controlled with pesticides.
After Practice Situation	In organic or transitioning to organic systems, forage pests are controlled by executing a preemptive harvest before pests can damage forage quality. Forage yields are reduced because of immature stage of forage growth. Forage tests are submitted to an accredited lab for analysis. Records of forage quality components are used to adjust feeding rations.
Scenario Feature Measure	Relative Feed Value Maintained
Scenario Unit	Acre
Scenario Typical Size	40

Cost Summary:

Cost Category	Scenario Cost	Scenario Cost/Unit
Materials	$49.22	$1.23
Equipment/Installation	$0.00	$0.00
Labor	$23.53	$0.59
Mobilization	$0.00	$0.00
Acquisition of Technical Knowledge	$348.92	$8.72
Foregone Income	$0.00	$0.00
Total	$421.67	$10.54

Cost Details:

Cost Category	Component ID	Component Name	Component Description	Unit	Price ($/unit)	Quantity	Cost
Materials	301	Test, Plant Tissue Test	Tissue analysis for crops	Each	$24.61	2	$49.22
Labor	230	Skilled Labor	Labor requiring a high level skill set: Includes carpenters, welders, electricians, conservation professionals involved with data collection, monitoring, and or record keeping, etc.	Hour	$23.53	1	$23.53
Acquisition of Technical Knowledge	294	Training, Workshops	Educational seminar or series of meetings emphasizing interaction and exchange of information among a usually small number of participants.	Each	$116.67	1	$116.67
Acquisition of Technical Knowledge	297	Transportation	Mileage to attend a training conference, workshop, or TSP travel associated with developing Conservation Activity Plan.	Mile	$0.56	100	$56.00
Acquisition of Technical Knowledge	296	Training, Registration Costs	Conference Registration Fees	Each	$176.25	1	$176.25

Scenario Worksheet

Practice and Scenario Description:

Information Type	Data
Region	Northern Plains
State	South Dakota
Discipline Group	Range/Pasture Grazing
Practice Code/Name	512 - Forage and Biomass Planting
Scenario ID	1
Scenario Name	Native Perennial Grasses
Scenario Description	Establish or reseed adapted perennial native warm season grasses to improve or maintain livestock/wildlife nutrition and health, extend the length of the grazing season, and provide soil cover to reduce erosion. Used for either conventional or no-till seeding of perennial native warm season grasses for pasture, hayland, and wildlife openings. This practice may be utilized for organic or regular production. This scenario assumes seed, equipment and labor for seed bed prep, tillage, seeding.
Before Practice Situation	Poorly managed/degraded pasture land or cropland being converted to pasture and/or hay.
After Practice Situation	Suitable species are established to improve forage quality and quantity and reduce soil erosion on cropland ,hayland, pasture, and/or biomass production.
Scenario Feature Measure	Acres of Forgage and Biomass Planting
Scenario Unit	Acre
Scenario Typical Size	80

Cost Summary:

Cost Category	Scenario Cost	Scenario Cost/Unit
Materials	$5,703.20	$71.29
Equipment/Installation	$2,724.00	$34.05
Labor	$0.00	$0.00
Mobilization	$0.00	$0.00
Acquisition of Technical Knowledge	$0.00	$0.00
Foregone Income	$0.00	$0.00
Total	$8,427.20	$105.34

Cost Details:

Cost Category	Component ID	Component Name	Component Description	Unit	Price ($/unit)	Quantity	Cost
Materials	76	Big Blue Stem (Andropogon gerardii)	Native Grasses and shipping.	Pound	$11.81	320	$3,779.20
Materials	82	Switchgrass, Blackwell (Panicum virgatum)	Native Grasses and shipping.	Pound	$9.62	200	$1,924.00
Equipment/Installation	960	Seeding Operation, No Till/Grass Drill	No Till drill or grass drill for seeding. Includes equipment, power unit and labor costs.	Acre	$14.35	80	$1,148.00
Equipment/Installation	945	Tillage, Light	Includes light disking (tandem) or field cultivator. Includes equipment, power unit and labor costs.	Acre	$9.85	160	$1,576.00

Scenario Worksheet

Practice and Scenario Description:

Information Type	Data
Region	Northern Plains
State	South Dakota
Discipline Group	Range/Pasture Grazing
Practice Code/Name	512 - Forage and Biomass Planting
Scenario ID	3
Scenario Name	Introduced Perennial Grasses with legume
Scenario Description	Establish or reseed adapted perennial introduced grasses and legumes to improve or maintain livestock/wildlife nutrition and health, extend the length of the grazing season, and provide soil cover to reduce erosion. Used for either conventional or no-till seeding of perennial introduced grasses for pasture, hayland, and wildlife openings. This practice may be utilized for organic or regular production. This scenario assumes seed, equipment and labor for seed bed prep, tillage, seeding.
Before Practice Situation	Poor or nonexistent stand of grass species. Resource concerns may include undesireable plant productivity and health, inadequate feed and forage for livestock, soil erosion and soil quality.
After Practice Situation	Suitable species are established to improve forage quality and quantity and reduce soil erosion on cropland ,hayland, pasture, and/or biomass production.
Scenario Feature Measure	Acres of Forgage and Biomass Planting
Scenario Unit	Acre
Scenario Typical Size	60

Cost Summary:

Cost Category	Scenario Cost	Scenario Cost/Unit
Materials	$1,086.00	$18.10
Equipment/Installation	$2,043.00	$34.05
Labor	$0.00	$0.00
Mobilization	$0.00	$0.00
Acquisition of Technical Knowledge	$0.00	$0.00
Foregone Income	$0.00	$0.00
Total	$3,129.00	$52.15

Cost Details:

Cost Category	Component ID	Component Name	Component Description	Unit	Price ($/unit)	Quantity	Cost
Materials	104	Alfalfa (Medicago sativa)	Introduced Legumes and shipping.	Pound	$4.15	120	$498.00
Materials	92	Orchard Grass (Dactylis glomerata)	Introduced Perennial Grasses and shipping.	Pound	$2.04	60	$122.40
Materials	93	Perennial Ryegrass (Lolium perenne)	Introduced Perennial Grasses and shipping.	Pound	$1.94	240	$465.60
Equipment/Installation	960	Seeding Operation, No Till/Grass Drill	No Till drill or grass drill for seeding. Includes equipment, power unit and labor costs.	Acre	$14.35	60	$861.00
Equipment/Installation	945	Tillage, Light	Includes light disking (tandem) or field cultivator. Includes equipment, power unit and labor costs.	Acre	$9.85	120	$1,182.00

Scenario Worksheet

Practice and Scenario Description:

Information Type	Data
Region	Northern Plains
State	South Dakota
Discipline Group	Range/Pasture Grazing
Practice Code/Name	512 - Forage and Biomass Planting
Scenario ID	4
Scenario Name	Introduced Perennial and Native Grass Mix.
Scenario Description	Establish or reseed adapted introduced grasses and at least one native species to improve or maintain livestock/wildlife nutrition and health, extend the length of the grazing season, and provide soil cover to reduce erosion. Used for either conventional or no-till seeding of grasses for pasture, hayland, and wildlife openings. Native grass species which have a significantly greater cost than introduced species comprise one third of the grass mixture. This practice may be utilized for organic or regular production. This scenario assumes seed, equipment and labor for seed bed prep, tillage, seeding.
Before Practice Situation	Existing stand of perennial grasses or monoculture or no grasses present. Resource concerns may include undesireable plant productivity and health, inadequate feed and forage for livestock, soil erosion and soil quality.
After Practice Situation	Suitable species are established to improve forage quality and quantity and reduce soil erosionon cropland ,hayland, pasture, and/or biomass production.
Scenario Feature Measure	Acres of Forgage and Biomass Planting
Scenario Unit	Acre
Scenario Typical Size	80

Cost Summary:

Cost Category	Scenario Cost	Scenario Cost/Unit
Materials	$2,813.80	$35.17
Equipment/Installation	$2,724.00	$34.05
Labor	$0.00	$0.00
Mobilization	$0.00	$0.00
Acquisition of Technical Knowledge	$0.00	$0.00
Foregone Income	$0.00	$0.00
Total	$5,537.80	$69.22

Cost Details:

Cost Category	Component ID	Component Name	Component Description	Unit	Price ($/unit)	Quantity	Cost
Materials	1089	Western Wheatgrass (Pascopyrum smithii)	Native Grasses and shipping.	Pound	$7.79	195	$1,519.05
Materials	104	Alfalfa (Medicago sativa)	Introduced Legumes and shipping.	Pound	$4.15	125	$518.75
Materials	93	Perennial Ryegrass (Lolium perenne)	Introduced Perennial Grasses and shipping.	Pound	$1.94	400	$776.00
Equipment/Installation	960	Seeding Operation, No Till/Grass Drill	No Till drill or grass drill for seeding. Includes equipment, power unit and labor costs.	Acre	$14.35	80	$1,148.00
Equipment/Installation	945	Tillage, Light	Includes light disking (tandem) or field cultivator. Includes equipment, power unit and labor costs.	Acre	$9.85	160	$1,576.00

Scenario Worksheet

Practice and Scenario Description:

Information Type	Data
Region	Northern Plains
State	South Dakota
Discipline Group	Range/Pasture Grazing
Practice Code/Name	512 - Forage and Biomass Planting
Scenario ID	8
Scenario Name	Introduced Perennial Grasses with legume on irrigated cropland
Scenario Description	Establish or reseed adapted perennial introduced grasses and legumes to improve or maintain livestock/wildlife nutrition and health, extend the length of the grazing season, and provide soil cover to reduce erosion. Used for either conventional or no-till seeding of perennial introduced grasses for pasture, hayland, and wildlife openings. This practice may be utilized for organic or regular production. This scenario assumes seed, equipment and labor for seed bed prep, tillage, seeding.
Before Practice Situation	Irrigated cropland being converted to pasture and/or hay. Resource concerns may include undesireable plant productivity and health, inadequate feed and forage for livestock, soil erosion and soil quality.
After Practice Situation	Suitable species are established to improve forage quality and quantity and reduce soil erosion on cropland ,hayland, pasture, and/or biomass production.
Scenario Feature Measure	Acres of Forgage and Biomass Planting
Scenario Unit	Acre
Scenario Typical Size	60

Cost Summary:

Cost Category	Scenario Cost	Scenario Cost/Unit
Materials	$3,527.40	$58.79
Equipment/Installation	$2,043.00	$34.05
Labor	$0.00	$0.00
Mobilization	$0.00	$0.00
Acquisition of Technical Knowledge	$0.00	$0.00
Foregone Income	$0.00	$0.00
Total	$5,570.40	$92.84

Cost Details:

Cost Category	Component ID	Component Name	Component Description	Unit	Price ($/unit)	Quantity	Cost
Materials	1093	Meadow Bromegrass (Bromus biebersteinii)	Introduced Perennial Grasses and shipping.	Pound	$3.32	420	$1,394.40
Materials	95	Smooth Bromegrass (Bromus inermis)	Introduced Perennial Grasses and shipping.	Pound	$3.15	240	$756.00
Materials	104	Alfalfa (Medicago sativa)	Introduced Legumes and shipping.	Pound	$4.15	120	$498.00
Materials	92	Orchard Grass (Dactylis glomerata)	Introduced Perennial Grasses and shipping.	Pound	$2.04	60	$122.40
Materials	93	Perennial Ryegrass (Lolium perenne)	Introduced Perennial Grasses and shipping.	Pound	$1.94	390	$756.60
Equipment/Installation	960	Seeding Operation, No Till/Grass Drill	No Till drill or grass drill for seeding. Includes equipment, power unit and labor costs.	Acre	$14.35	60	$861.00
Equipment/Installation	945	Tillage, Light	Includes light disking (tandem) or field cultivator. Includes equipment, power unit and labor costs.	Acre	$9.85	120	$1,182.00

Scenario Worksheet

Practice and Scenario Description:

Information Type	Data
Region	Northern Plains
State	South Dakota
Discipline Group	Water Management Engineering
Practice Code/Name	516 - Pipeline
Scenario ID	1
Scenario Name	Shallow or Above Ground Pipeline
Scenario Description	Description: 1,320 feet of 1 1/4" PE pipe installed at a 12" depth to supply water for domestic animals. Installation includes all appurtenances and labor. Appurtenances include: couplings, fittings, thrust blocks, gate valves, air release valves, drain valve, and pressure relief valve, and are included in the cost of pipe material. Revegetation is not included. Resource Concerns: Inadequate Livestock Water, Inefficient Energy Use. Associated Practices: Critical Area Planting (342), Pumping Plant (533), Watering Facility (614),Water Harvesting Catchment (636), Spring Development (574), and Prescribed Grazing (528).
Before Practice Situation	Inadequate water supply for domestic animals located on grazed range, pasture, or grazed forest in the northern plains region. This practice will be installed either above ground or within 18" of the surface due to site conditions (i.e., difficult to install pipe below frost depth) or areas where allowed by waiver or state specific practice standard allows for installation of portable pipelines.
After Practice Situation	Pipeline(s) convey and/or distribute water to storage and/or watering facilities, for use by livestock or wildlife.
Scenario Feature Measure	Length of Pipe Installed
Scenario Unit	Foot
Scenario Typical Size	1320

Cost Summary:

Cost Category	Scenario Cost	Scenario Cost/Unit
Materials	$1,364.88	$1.03
Equipment/Installation	$1,333.20	$1.01
Labor	$133.76	$0.10
Mobilization	$240.76	$0.18
Acquisition of Technical Knowledge	$0.00	$0.00
Foregone Income	$0.00	$0.00
Total	$3,072.60	$2.33

Cost Details:

Cost Category	Component ID	Component Name	Component Description	Unit	Price ($/unit)	Quantity	Cost
Materials	998	Pipe, PE, 1 ¼", DR 9	Materials: - 1 1/4" - PE - 160 psi - ASTM D3035 DR 9	Foot	$0.94	1452	$1,364.88
Equipment/Installation	1096	Trenching, Pipeline Plowing	Includes equipment and labor for plowing small diameter lines in common earth (< 3")	Foot	$1.01	1320	$1,333.20
Labor	231	General Labor	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	$16.72	8	$133.76
Mobilization	1139	Mobilization, medium equipment	Equipment with 70-150 HP or typical weights between 14,000 and 30,000 pounds.	Each	$120.38	2	$240.76

Scenario Worksheet

Practice and Scenario Description:

Information Type	Data
Region	Northern Plains
State	South Dakota
Discipline Group	Water Management Engineering
Practice Code/Name	516 - Pipeline
Scenario ID	3
Scenario Name	Small diameter <= 2 inch
Scenario Description	Description: The 2,640 foot 1 1/2" PVC pipeline installed at a depth of 72" will meet the needs of domestic animals. This type of installation is only appropriate in the colder climate of the northern plains region (ND & SD). This item includes installation, all materials, appurtenances, and labor required to construct and install the pipeline. Appurtenances include: couplings, fittings, anchors, thrust blocks, gate valves, air release valves, drain valve, and pressure relief valve, and are included in the cost of pipe material. Revegetation is not included. Resource Concerns: Inadequate Livestock Water, Inefficient Energy Use. Associated Practices: Critical Area Planting (342), Pumping Plant (533), Watering Facility (614), and Water Harvesting Catchment (636), Spring Development (574), and Prescribed Grazing (528).
Before Practice Situation	Inadequate water supply for domestic animals located on grazed range, pasture, or grazed forest in the colder climate of the northern plains region (ND & SD).
After Practice Situation	Pipeline(s) convey and/or distribute water to storage and/or watering facilities, for use by livestock or wildlife. Pipeline will supply adequate water for domestic animals on grazed range, pasture, or grazed forest in the northern plains region (ND & SD). The 2,640 feet of 1 1/2" diameter PVC pipe will be installed below ground at a depth of greater than 60" to meet the water quantity requirements of domestic animals.
Scenario Feature Measure	Length of Pipe Installed
Scenario Unit	Foot
Scenario Typical Size	2640

Cost Summary:

Cost Category	Scenario Cost	Scenario Cost/Unit
Materials	$2,322.32	$0.88
Equipment/Installation	$4,620.00	$1.75
Labor	$668.80	$0.25
Mobilization	$240.76	$0.09
Acquisition of Technical Knowledge	$0.00	$0.00
Foregone Income	$0.00	$0.00
Total	$7,851.88	$2.97

Cost Details:

Cost Category	Component ID	Component Name	Component Description	Unit	Price ($/unit)	Quantity	Cost
Materials	975	Pipe, PVC, 1 ½", SCH 40	Materials: - 1 1/2" - PVC - SCH 40 - ASTM D1785	Foot	$0.78	2904	$2,265.12
Materials	240	Freeze Proof Hydrant	Freeze Proof Hydrant, 3 ft bury	Each	$57.20	1	$57.20
Equipment/Installation	1459	Trenching, Earth, 12" x 60"	Trenching, earth, 12" wide x 60" depth, includes equipment and labor for trenching, laying 3"-6" CPP drain line with envelope, and backfilling.	Foot	$1.75	2640	$4,620.00
Labor	231	General Labor	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	$16.72	40	$668.80
Mobilization	1139	Mobilization, medium equipment	Equipment with 70-150 HP or typical weights between 14,000 and 30,000 pounds.	Each	$120.38	2	$240.76

Scenario Worksheet

Practice and Scenario Description:

Information Type	Data
Region	Northern Plains
State	South Dakota
Discipline Group	Water Management Engineering
Practice Code/Name	516 - Pipeline
Scenario ID	4
Scenario Name	Large Diameter (2 1/2 to 8 inch)
Scenario Description	Description: The 5,000 feet of 3" PVC pipeline installed at a depth of 72" will meet the needs of domestic animals. This type of installation is appropriate in the the northern plains region. This item includes installation, all materials, appurtenances, and labor required to construct and install the pipeline. Appurtenances include: couplings, fittings, thrust blocks, gate valves, air release valves, drain valve, and pressure relief valve, and are included in the cost of pipe material. Revegetation is not included. Resource Concerns: Inadequate Livestock Water, Inefficient Energy Use. Associated Practices: Critical Area Planting (342), Pumping Plant (533), Watering Facility (614), and Water Harvesting Catchment (636), Spring Development (574), and Prescribed Grazing (528).
Before Practice Situation	Water supplies need to be conveyed through pipelines for use by livestock or wildlife.
After Practice Situation	Pipeline(s) convey and/or distribute water to storage and/or watering facilities, for use by livestock or wildlife. Pipeline will supply adequate water for domestic animals on grazed range, pasture, or grazed forest in the northern plains region (ND & SD). The 5,000 feet of 3" diameter PVC pipe will be installed below ground at a depth of greater than 60" to meet the water quantity requirements of domestic animals.
Scenario Feature Measure	Length of Pipe Installed
Scenario Unit	Foot
Scenario Typical Size	5000

Cost Summary:

Cost Category	Scenario Cost	Scenario Cost/Unit
Materials	$11,827.20	$2.37
Equipment/Installation	$2,358.08	$0.47
Labor	$1,662.72	$0.33
Mobilization	$240.76	$0.05
Acquisition of Technical Knowledge	$0.00	$0.00
Foregone Income	$0.00	$0.00
Total	$16,088.76	$3.22

Cost Details:

Cost Category	Component ID	Component Name	Component Description	Unit	Price ($/unit)	Quantity	Cost
Materials	977	Pipe, PVC, 3", SCH 40	Materials: - 3" - PVC - SCH 40 - ASTM D1785	Foot	$2.14	5500	$11,770.00
Materials	240	Freeze Proof Hydrant	Freeze Proof Hydrant, 3 ft bury	Each	$57.20	1	$57.20
Equipment/Installation	936	Trencher, 8"	Equipment and power unit costs. Labor not included.	Hour	$73.69	32	$2,358.08
Labor	232	Equipment Operators, Light	Includes: Skid Steer Loaders, Hydraulic Excavators <50 HP, Trenchers <12", Ag Equipment <150 HP, Pickup Trucks, Forklifts, Mulchers	Hour	$20.61	32	$659.52
Labor	231	General Labor	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	$16.72	60	$1,003.20
Mobilization	1139	Mobilization, medium equipment	Equipment with 70-150 HP or typical weights between 14,000 and 30,000 pounds.	Each	$120.38	2	$240.76

Scenario Worksheet

Practice and Scenario Description:

Information Type	Data
Region	Northern Plains
State	South Dakota
Discipline Group	Water Management Engineering
Practice Code/Name	516 - Pipeline
Scenario ID	5
Scenario Name	Small Diameter, Backhoe
Scenario Description	Description: The 2,640 feet 2" PVC pipeline installed at a depth of 60" in rocky conditions to meet the needs of domestic animals. Trencher installation is not possible due to site conditions. This item includes installation, all materials, appurtenances, and labor required to construct and install the pipeline. Appurtenances include: couplings, fittings, expansion joints, anchors, thrust blocks, gate valves, air release valves, drain valve, and pressure relief valve, and are included in the cost of pipe material. Revegetation is not included. Resource Concerns: Inadequate Livestock Water, Inefficient Energy Use. Associated Practices: Critical Area Planting (342), Pumping Plant (533), Watering Facility (614), and Water Harvesting Catchment (636), Spring Development (574), and Prescribed Grazing (528).
Before Practice Situation	Water supplies need to be conveyed through pipelines for use by livestock or wildlife.
After Practice Situation	Pipeline(s) convey and/or distribute water to storage and/or watering facilities, for use by livestock or wildlife. Pipeline will supply adequate water for domestic animals on grazed range, pasture, or grazed forest in the northern plains. The 2,640 feet of 2" diameter PVC pipe will be installed in rocky conditions at a depth of 60" or more to meet the water quantity requirements of domestic animals.
Scenario Feature Measure	Length of Pipe Installed
Scenario Unit	Foot
Scenario Typical Size	2640

Cost Summary:

Cost Category	Scenario Cost	Scenario Cost/Unit
Materials	$3,873.86	$1.47
Equipment/Installation	$3,602.40	$1.36
Labor	$2,986.40	$1.13
Mobilization	$240.76	$0.09
Acquisition of Technical Knowledge	$0.00	$0.00
Foregone Income	$0.00	$0.00
Total	$10,703.42	$4.05

Cost Details:

Cost Category	Component ID	Component Name	Component Description	Unit	Price ($/unit)	Quantity	Cost
Materials	976	Pipe, PVC, 2", SCH 40	Materials: - 2" - PVC - SCH 40 - ASTM D1785	Foot	$1.04	2904	$3,020.16
Materials	240	Freeze Proof Hydrant	Freeze Proof Hydrant, 3 ft bury	Each	$57.20	1	$57.20
Materials	2060	Earthfill Material, purchased, common	Purchased earthfill materials includes both silt or clay. Material only.	Cubic Yard	$15.93	50	$796.50
Equipment/Installation	926	Backhoe, 80 HP	Wheel mounted backhoe excavator with horsepower range of 60 to 90. Equipment and power unit costs. Labor not included.	Hour	$45.03	80	$3,602.40
Labor	231	General Labor	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	$16.72	80	$1,337.60
Labor	232	Equipment Operators, Light	Includes: Skid Steer Loaders, Hydraulic Excavators <50 HP, Trenchers <12", Ag Equipment <150 HP, Pickup Trucks, Forklifts, Mulchers	Hour	$20.61	80	$1,648.80
Mobilization	1139	Mobilization, medium equipment	Equipment with 70-150 HP or typical weights between 14,000 and 30,000 pounds.	Each	$120.38	2	$240.76

Scenario Worksheet

Practice and Scenario Description:

Information Type	Data
Region	Northern Plains
State	South Dakota
Discipline Group	Water Management Engineering
Practice Code/Name	516 - Pipeline
Scenario ID	6
Scenario Name	Rural Water Connection Equipment
Scenario Description	The rural water connection includes the 4' manhole, meter, 500' of pipe, valves, and necessary installation for connecting from a rural water pipeline to a livestock distribution pipeline. This item includes installation, all materials, appurtenances, and labor required to construct and install the meter pit. This item does not include the hook-up fees to the rural water system. Resource Concerns: Inadequate Livestock Water, Inefficient Energy Use. Associated Practices: Critical Area Planting (342), Pumping Plant (533), Watering Facility (614), and Water Harvesting Catchment (636), Spring Development (574), and Prescribed Grazing (528).
Before Practice Situation	Inadequate water supply for domestic animals located on grazed range, pasture, or grazed forest in the northern plains region.
After Practice Situation	A rural water connection which provides access to a reliable, high quality water supply for meeting the needs of domestic animals on grazed range, pasture, or grazed forest in the northern plains region. The 4' manhole, meter, pipe and appurtenances will enable the pipeline to meet the quantity requirements of domestic animals.
Scenario Feature Measure	Rural Water Connection
Scenario Unit	Each
Scenario Typical Size	1

Cost Summary:

Cost Category	Scenario Cost	Scenario Cost/Unit
Materials	$2,383.39	$2,383.39
Equipment/Installation	$622.26	$622.26
Labor	$339.86	$339.86
Mobilization	$481.52	$481.52
Acquisition of Technical Knowledge	$0.00	$0.00
Foregone Income	$0.00	$0.00
Total	$3,827.03	$3,827.03

Cost Details:

Cost Category	Component ID	Component Name	Component Description	Unit	Price ($/unit)	Quantity	Cost
Materials	976	Pipe, PVC, 2", SCH 40	Materials: - 2" - PVC - SCH 40 - ASTM D1785	Foot	$1.04	600	$624.00
Materials	1053	Manhole, 4' x 4'	Precast Manhole with base and top delivered. 4' diameter x 4' depth.	Each	$1,759.39	1	$1,759.39
Equipment/Installation	926	Backhoe, 80 HP	Wheel mounted backhoe excavator with horsepower range of 60 to 90. Equipment and power unit costs. Labor not included.	Hour	$45.03	4	$180.12
Equipment/Installation	936	Trencher, 8"	Equipment and power unit costs. Labor not included.	Hour	$73.69	6	$442.14
Labor	232	Equipment Operators, Light	Includes: Skid Steer Loaders, Hydraulic Excavators <50 HP, Trenchers <12", Ag Equipment <150 HP, Pickup Trucks, Forklifts, Mulchers	Hour	$20.61	10	$206.10
Labor	231	General Labor	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	$16.72	8	$133.76
Mobilization	1139	Mobilization, medium equipment	Equipment with 70-150 HP or typical weights between 14,000 and 30,000 pounds.	Each	$120.38	4	$481.52

Scenario Worksheet

Practice and Scenario Description:

Information Type	Data
Region	Northern Plains
State	South Dakota
Discipline Group	Engineering General
Practice Code/Name	521A - Pond Sealing or Lining, Flexible Membrane
Scenario ID	2
Scenario Name	Flexible Membrane - Uncovered with liner drainage or venting
Scenario Description	Installation of a flexible geosynthetic membrane liner, uncovered, to reduce seepage from ponds or waste storage impoundment structures. Practice implementation includes a geotextile or soil cushion to protect the liner from subgrade damage, and liner drainage or venting. Associated practices include PS378 Pond, PS313 Waste Storage Facility.
Before Practice Situation	In-place soils at site exhibit seepage rates in excess of acceptable limits.
After Practice Situation	Water conservation and enviromental protection provided by limiting seepage losses from ponds or waste storage impoundments.
Scenario Feature Measure	Surface area of Liner Material (including anchorage)
Scenario Unit	Square Yard
Scenario Typical Size	2420

Cost Summary:

Cost Category	Scenario Cost	Scenario Cost/Unit
Materials	$22,336.60	$9.23
Equipment/Installation	$5,372.40	$2.22
Labor	$3,593.36	$1.48
Mobilization	$108.43	$0.04
Acquisition of Technical Knowledge	$0.00	$0.00
Foregone Income	$0.00	$0.00
Total	$31,410.79	$12.98

Cost Details:

Cost Category	Component ID	Component Name	Component Description	Unit	Price ($/unit)	Quantity	Cost
Materials	1387	Synthetic Liner, 40 mil	Synthetic 40 mil HDPE, LLDPE, EPDM, etc membrane liner material. Materials only.	Square Yard	$6.48	2420	$15,681.60
Materials	1778	Geonet	Geosynthetic drainage liner, typically HDPE of 300 mil thickness. Materials only.	Square Yard	$2.75	2420	$6,655.00
Equipment/Installation	42	Geotextile, woven	Woven Geotextile Fabric. Includes materials, equipment and labor	Square Yard	$2.22	2420	$5,372.40
Labor	235	Specialist Labor	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	$82.88	32	$2,652.16
Labor	230	Skilled Labor	Labor requiring a high level skill set: Includes carpenters, welders, electricians, conservation professionals involved with data collection, monitoring, and or record keeping, etc.	Hour	$23.53	40	$941.20
Mobilization	1141	Mobilization, Skilled labor	Mobilization of skilled labor: Includes carpenters, welders, electricians, conservation professionals involved with data collection, monitoring, and or record keeping, etc.	Hour	$22.08	1	$22.08
Mobilization	1146	Mobilization, Specialist Labor	Mobilization of Specialist Labor. Includes Agronomists, Foresters, Biologists, etc.	Hour	$85.35	1	$85.35
Mobilization	1043	Mobilization, Material, distance > 50 miles	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	$1.00	1	$1.00

Scenario Worksheet

Practice and Scenario Description:

Information Type	Data
Region	Northern Plains
State	South Dakota
Discipline Group	Engineering General
Practice Code/Name	521A - Pond Sealing or Lining, Flexible Membrane
Scenario ID	4
Scenario Name	Flexible Membrane - Covered with liner drainage or venting
Scenario Description	Installation of a flexible geosynthetic membrane liner to reduce seepage from ponds or waste storage impoundment structures. Practice implementation includes 1 foot of soil cover for liner protection, a geotextile or soil cushion to protect liner from subgrade damage, and liner drainage or venting. Associated practices include PS378 Pond, PS313 Waste Storage Facility.
Before Practice Situation	In-place soils at site exhibit seepage rates in excess of acceptable limits.
After Practice Situation	Water conservation and enviromental protection provided by limiting seepage losses from ponds or waste storage impoundments.
Scenario Feature Measure	Surface area of Liner Material (including anchorage)
Scenario Unit	Square Yard
Scenario Typical Size	2420

Cost Summary:

Cost Category	Scenario Cost	Scenario Cost/Unit
Materials	$22,336.60	$9.23
Equipment/Installation	$8,334.09	$3.44
Labor	$3,593.36	$1.48
Mobilization	$108.43	$0.04
Acquisition of Technical Knowledge	$0.00	$0.00
Foregone Income	$0.00	$0.00
Total	$34,372.48	$14.20

Cost Details:

Cost Category	Component ID	Component Name	Component Description	Unit	Price ($/unit)	Quantity	Cost
Materials	1387	Synthetic Liner, 40 mil	Synthetic 40 mil HDPE, LLDPE, EPDM, etc membrane liner material. Materials only.	Square Yard	$6.48	2420	$15,681.60
Materials	1778	Geonet	Geosynthetic drainage liner, typically HDPE of 300 mil thickness. Materials only.	Square Yard	$2.75	2420	$6,655.00
Equipment/Installation	49	Earthfill, Roller Compacted	Earthfill, roller or machine compacted, includes equipment and labor	Cubic yard	$3.67	807	$2,961.69
Equipment/Installation	42	Geotextile, woven	Woven Geotextile Fabric. Includes materials, equipment and labor	Square Yard	$2.22	2420	$5,372.40
Labor	235	Specialist Labor	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	$82.88	32	$2,652.16
Labor	230	Skilled Labor	Labor requiring a high level skill set: Includes carpenters, welders, electricians, conservation professionals involved with data collection, monitoring, and or record keeping, etc.	Hour	$23.53	40	$941.20
Mobilization	1141	Mobilization, Skilled labor	Mobilization of skilled labor: Includes carpenters, welders, electricians, conservation professionals involved with data collection, monitoring, and or record keeping, etc.	Hour	$22.08	1	$22.08
Mobilization	1146	Mobilization, Specialist Labor	Mobilization of Specialist Labor. Includes Agronomists, Foresters, Biologists, etc.	Hour	$85.35	1	$85.35
Mobilization	1043	Mobilization, Material, distance > 50 miles	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	$1.00	1	$1.00

Scenario Worksheet

Practice and Scenario Description:

Information Type	Data
Region	Northern Plains
State	South Dakota
Discipline Group	Engineering General
Practice Code/Name	521B - Pond Sealing or Lining, Soil Dispersant
Scenario ID	1
Scenario Name	Soil Dispersant, Uncovered
Scenario Description	Construction of a compacted soil liner, treated with a soil dispersant, to reduce seepage from ponds or waste storage impoundment structures. Practice implementation includes incorporation of the dispersant with the soil liner under proper moisture conditions and compaction to the designed liner thickness. Practice implementation may require filter compatibility with the subgrade (graded filter or geotextile). Associated practice PS378, PS313.
Before Practice Situation	In-place soils at site exhibit seepage rates in excess of acceptable limits. Soils are suitable for treatment with dispersants.
After Practice Situation	Water conservation and environmental protection provided by limiting seepage losses from ponds or waste storage impoundments.
Scenario Feature Measure	Volume of Liner Material
Scenario Unit	Cubic Yard
Scenario Typical Size	1613

Cost Summary:

Cost Category	Scenario Cost	Scenario Cost/Unit
Materials	$3,113.05	$1.93
Equipment/Installation	$6,947.67	$4.31
Labor	$842.84	$0.52
Mobilization	$1,426.15	$0.88
Acquisition of Technical Knowledge	$0.00	$0.00
Foregone Income	$0.00	$0.00
Total	$12,329.71	$7.64

Cost Details:

Cost Category	Component ID	Component Name	Component Description	Unit	Price ($/unit)	Quantity	Cost
Materials	1490	Soil Dispersant	Soil Amendment (tetrasodium pyrophosphate (TSPP), sodium tripolyphosphate (STPP), or soda ash or approved equivalent)	Ton	$476.73	6.53	$3,113.05
Equipment/Installation	49	Earthfill, Roller Compacted	Earthfill, roller or machine compacted, includes equipment and labor	Cubic yard	$3.67	1613	$5,919.71
Equipment/Installation	962	Tractor, agricultural, 120 HP	Agricultural tractor with horsepower range of 90 to 140. Equipment and power unit costs. Labor not included.	Hour	$47.06	20	$941.20
Equipment/Installation	946	Tillage, Primary	Includes heavy disking (offset) or chisel plow, Equipment and power unit costs. Labor is included.	Acre	$14.46	6	$86.76
Labor	232	Equipment Operators, Light	Includes: Skid Steer Loaders, Hydraulic Excavators <50 HP, Trenchers <12", Ag Equipment <150 HP, Pickup Trucks, Forklifts, Mulchers	Hour	$20.61	20	$412.20
Labor	234	Supervisor or Manager	Labor involving supervision or management activities. Includes crew supervisors, foremen and farm/ranch managers time required for adopting new technology, etc.	Hour	$33.11	8	$264.88
Labor	235	Specialist Labor	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	$82.88	2	$165.76
Mobilization	1043	Mobilization, Material, distance > 50 miles	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	$1.00	1200	$1,200.00
Mobilization	1143	Mobilization, Light Equipment Operator	Mobilization of light equipment operators: Skid Steer Loaders, Hydraulic Excavators <50 HP, Trenchers <12", Ag Equipment <150 HP, Pickup Trucks, Forklifts, Mulchers	Hour	$20.42	1	$20.42
Mobilization	1139	Mobilization, medium equipment	Equipment with 70-150 HP or typical weights between 14,000 and 30,000 pounds.	Each	$120.38	1	$120.38
Mobilization	1146	Mobilization, Specialist Labor	Mobilization of Specialist Labor. Includes Agronomists, Foresters, Biologists, etc.	Hour	$85.35	1	$85.35

Scenario Worksheet

Practice and Scenario Description:

Information Type	Data
Region	Northern Plains
State	South Dakota
Discipline Group	Engineering General
Practice Code/Name	521B - Pond Sealing or Lining, Soil Dispersant
Scenario ID	2
Scenario Name	Soil Dispersant, Covered
Scenario Description	Construction of a compacted soil liner, treated with a soil dispersant, to reduce seepage from ponds or waste storage impoundment structures. Practice implementation includes incorporation of the dispersant with the soil liner under proper moisture conditions, compaction to the designed liner thickness, and placement of soil cover over the treated liner. Practice implementation may require filter compatibility with the subgrade (graded filter or geotextile). Associated practice PS378, PS313.
Before Practice Situation	In-place soils at site exhibit seepage rates in excess of acceptable limits. Soils are suitable for treatment with dispersants.
After Practice Situation	Water conservation and environmental protection provided by limiting seepage losses from ponds or waste storage impoundments.
Scenario Feature Measure	Volume of Liner Material including Soil Cover over Liner
Scenario Unit	Cubic Yard
Scenario Typical Size	3226

Cost Summary:

Cost Category	Scenario Cost	Scenario Cost/Unit
Materials	$3,113.05	$0.96
Equipment/Installation	$10,379.96	$3.22
Labor	$1,048.94	$0.33
Mobilization	$1,426.15	$0.44
Acquisition of Technical Knowledge	$0.00	$0.00
Foregone Income	$0.00	$0.00
Total	$15,968.10	$4.95

Cost Details:

Cost Category	Component ID	Component Name	Component Description	Unit	Price ($/unit)	Quantity	Cost
Materials	1490	Soil Dispersant	Soil Amendment (tetrasodium pyrophosphate (TSPP), sodium tripolyphosphate (STPP), or soda ash or approved equivalent)	Ton	$476.73	6.53	$3,113.05
Equipment/Installation	49	Earthfill, Roller Compacted	Earthfill, roller or machine compacted, includes equipment and labor	Cubic yard	$3.67	2420	$8,881.40
Equipment/Installation	962	Tractor, agricultural, 120 HP	Agricultural tractor with horsepower range of 90 to 140. Equipment and power unit costs. Labor not included.	Hour	$47.06	30	$1,411.80
Equipment/Installation	946	Tillage, Primary	Includes heavy disking (offset) or chisel plow, Equipment and power unit costs. Labor is included.	Acre	$14.46	6	$86.76
Labor	232	Equipment Operators, Light	Includes: Skid Steer Loaders, Hydraulic Excavators <50 HP, Trenchers <12", Ag Equipment <150 HP, Pickup Trucks, Forklifts, Mulchers	Hour	$20.61	30	$618.30
Labor	234	Supervisor or Manager	Labor involving supervision or management activities. Includes crew supervisors, foremen and farm/ranch managers time required for adopting new technology, etc.	Hour	$33.11	8	$264.88
Labor	235	Specialist Labor	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	$82.88	2	$165.76
Mobilization	1043	Mobilization, Material, distance > 50 miles	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	$1.00	1200	$1,200.00
Mobilization	1143	Mobilization, Light Equipment Operator	Mobilization of light equipment operators: Skid Steer Loaders, Hydraulic Excavators <50 HP, Trenchers <12", Ag Equipment <150 HP, Pickup Trucks, Forklifts, Mulchers	Hour	$20.42	1	$20.42
Mobilization	1139	Mobilization, medium equipment	Equipment with 70-150 HP or typical weights between 14,000 and 30,000 pounds.	Each	$120.38	1	$120.38
Mobilization	1146	Mobilization, Specialist Labor	Mobilization of Specialist Labor. Includes Agronomists, Foresters, Biologists, etc.	Hour	$85.35	1	$85.35

Scenario Worksheet

Practice and Scenario Description:

Information Type	Data
Region	Northern Plains
State	South Dakota
Discipline Group	Engineering General
Practice Code/Name	521C - Pond Sealing or Lining, Bentonite Sealant
Scenario ID	1
Scenario Name	Bentonite Treatment - Uncovered
Scenario Description	Construction of a compacted soil liner, treated with bentonite, to reduce seepage from ponds or waste storage impoundment structures. Practice implementation includes incorporation of the bentonite with the soil under proper moisture conditions, compaction to the designed liner thickness. Practice implementation may require filter compatibility with the subgrade (graded filter or geotextile). Associated practice PS378, PS313.
Before Practice Situation	In-place soils at site exhibit seepage rates in excess of acceptable limits. Soils are suitable for treatment with dispersants.
After Practice Situation	Water conservation and environmental protection provided by limiting seepage losses from ponds or waste storage impoundments.
Scenario Feature Measure	Volume of Liner Material
Scenario Unit	Cubic Yard
Scenario Typical Size	1613

Cost Summary:

Cost Category	Scenario Cost	Scenario Cost/Unit
Materials	$54,674.42	$33.90
Equipment/Installation	$6,259.91	$3.88
Labor	$355.64	$0.22
Mobilization	$276.15	$0.17
Acquisition of Technical Knowledge	$0.00	$0.00
Foregone Income	$0.00	$0.00
Total	$61,566.12	$38.17

Cost Details:

Cost Category	Component ID	Component Name	Component Description	Unit	Price ($/unit)	Quantity	Cost
Materials	41	Bentonite	Bentonite, includes materials (50# bag)	Each	$10.46	5227	$54,674.42
Equipment/Installation	49	Earthfill, Roller Compacted	Earthfill, roller or machine compacted, includes equipment and labor	Cubic yard	$3.67	1613	$5,919.71
Equipment/Installation	946	Tillage, Primary	Includes heavy disking (offset) or chisel plow, Equipment and power unit costs. Labor is included.	Acre	$14.46	4	$57.84
Equipment/Installation	962	Tractor, agricultural, 120 HP	Agricultural tractor with horsepower range of 90 to 140. Equipment and power unit costs. Labor not included.	Hour	$47.06	6	$282.36
Labor	232	Equipment Operators, Light	Includes: Skid Steer Loaders, Hydraulic Excavators <50 HP, Trenchers <12", Ag Equipment <150 HP, Pickup Trucks, Forklifts, Mulchers	Hour	$20.61	6	$123.66
Labor	234	Supervisor or Manager	Labor involving supervision or management activities. Includes crew supervisors, foremen and farm/ranch managers time required for adopting new technology, etc.	Hour	$33.11	2	$66.22
Labor	235	Specialist Labor	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	$82.88	2	$165.76
Mobilization	1043	Mobilization, Material, distance > 50 miles	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	$1.00	50	$50.00
Mobilization	1139	Mobilization, medium equipment	Equipment with 70-150 HP or typical weights between 14,000 and 30,000 pounds.	Each	$120.38	1	$120.38
Mobilization	1143	Mobilization, Light Equipment Operator	Mobilization of light equipment operators: Skid Steer Loaders, Hydraulic Excavators <50 HP, Trenchers <12", Ag Equipment <150 HP, Pickup Trucks, Forklifts, Mulchers	Hour	$20.42	1	$20.42
Mobilization	1146	Mobilization, Specialist Labor	Mobilization of Specialist Labor. Includes Agronomists, Foresters, Biologists, etc.	Hour	$85.35	1	$85.35

Scenario Worksheet

Practice and Scenario Description:

Information Type	Data
Region	Northern Plains
State	South Dakota
Discipline Group	Engineering General
Practice Code/Name	521C - Pond Sealing or Lining, Bentonite Sealant
Scenario ID	2
Scenario Name	Bentonite Treatment - Covered
Scenario Description	Construction of a compacted soil liner, treated with bentonite, to reduce seepage from ponds or waste storage impoundment structures. Practice implementation includes incorporation of the bentonite with the soil under proper moisture conditions, compaction to the designed liner thickness, and placement of soil cover over the treated liner. Practice implementation may require filter compatibility with the subgrade (graded filter or geotextile). Associated practice PS378, PS313.
Before Practice Situation	In-place soils at site exhibit seepage rates in excess of acceptable limits. Soils are suitable for treatment with bentonite.
After Practice Situation	Water conservation and environmental protection provided by limiting seepage losses from ponds or waste storage impoundments.
Scenario Feature Measure	Volume of Liner Material including 1 foot of soil cover over liner
Scenario Unit	Cubic Yard
Scenario Typical Size	3227

Cost Summary:

Cost Category	Scenario Cost	Scenario Cost/Unit
Materials	$54,674.42	$16.94
Equipment/Installation	$12,183.29	$3.78
Labor	$355.64	$0.11
Mobilization	$476.15	$0.15
Acquisition of Technical Knowledge	$0.00	$0.00
Foregone Income	$0.00	$0.00
Total	$67,689.50	$20.98

Cost Details:

Cost Category	Component ID	Component Name	Component Description	Unit	Price ($/unit)	Quantity	Cost
Materials	41	Bentonite	Bentonite, includes materials (50# bag)	Each	$10.46	5227	$54,674.42
Equipment/Installation	49	Earthfill, Roller Compacted	Earthfill, roller or machine compacted, includes equipment and labor	Cubic yard	$3.67	3227	$11,843.09
Equipment/Installation	946	Tillage, Primary	Includes heavy disking (offset) or chisel plow, Equipment and power unit costs. Labor is included.	Acre	$14.46	4	$57.84
Equipment/Installation	962	Tractor, agricultural, 120 HP	Agricultural tractor with horsepower range of 90 to 140. Equipment and power unit costs. Labor not included.	Hour	$47.06	6	$282.36
Labor	232	Equipment Operators, Light	Includes: Skid Steer Loaders, Hydraulic Excavators <50 HP, Trenchers <12", Ag Equipment <150 HP, Pickup Trucks, Forklifts, Mulchers	Hour	$20.61	6	$123.66
Labor	234	Supervisor or Manager	Labor involving supervision or management activities. Includes crew supervisors, foremen and farm/ranch managers time required for adopting new technology, etc.	Hour	$33.11	2	$66.22
Labor	235	Specialist Labor	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	$82.88	2	$165.76
Mobilization	1043	Mobilization, Material, distance > 50 miles	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	$1.00	250	$250.00
Mobilization	1139	Mobilization, medium equipment	Equipment with 70-150 HP or typical weights between 14,000 and 30,000 pounds.	Each	$120.38	1	$120.38
Mobilization	1143	Mobilization, Light Equipment Operator	Mobilization of light equipment operators: Skid Steer Loaders, Hydraulic Excavators <50 HP, Trenchers <12", Ag Equipment <150 HP, Pickup Trucks, Forklifts, Mulchers	Hour	$20.42	1	$20.42
Mobilization	1146	Mobilization, Specialist Labor	Mobilization of Specialist Labor. Includes Agronomists, Foresters, Biologists, etc.	Hour	$85.35	1	$85.35

Scenario Worksheet

Practice and Scenario Description:

Information Type	Data
Region	Northern Plains
State	South Dakota
Discipline Group	Engineering General
Practice Code/Name	521D - Pond Sealing or Lining, Compacted Clay Treatment
Scenario ID	2
Scenario Name	Material haul > 1 mile
Scenario Description	Construction of a compacted soil liner, treated with compacted clay, to reduce seepage from ponds or waste storage impoundment structures. Practice implementation includes compaction of the soil liner under proper moisture conditions to the designed liner thickness, and protection of the finished liner. Material haul > 1 mile. Associated practices include PS378, PS313, & other waste water impoundments.
Before Practice Situation	In-place soils at site exhibit seepage rates in excess of acceptable limits. An adequate quantity of soil suitable for constructing a clay liner without amendments is available at an economical haul distance.
After Practice Situation	Water conservation and environmental protection provided by limiting seepage losses from ponds or waste storage impoundments.
Scenario Feature Measure	Volume of Liner Material (including volume of soil cover, as needed)
Scenario Unit	Cubic Yard
Scenario Typical Size	2420

Cost Summary:

Cost Category	Scenario Cost	Scenario Cost/Unit
Materials	$0.00	$0.00
Equipment/Installation	$24,038.20	$9.93
Labor	$663.04	$0.27
Mobilization	$1,307.96	$0.54
Acquisition of Technical Knowledge	$0.00	$0.00
Foregone Income	$0.00	$0.00
Total	$26,009.20	$10.75

Cost Details:

Cost Category	Component ID	Component Name	Component Description	Unit	Price ($/unit)	Quantity	Cost
Equipment/Installation	1223	Excavation, common earth, large equipment, 150 ft	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	$3.34	2420	$8,082.80
Equipment/Installation	1615	Hauling, bulk, highway truck	Hauling of bulk earthfill, rockfill, waste or debris. One-way travel distance using fully loaded highway dump trucks (typically 16 CY or 20 TN capacity). Includes equipment and labor for truck only. Does not include cost for loading truck.	Cubic Yard Mile	$0.28	8065	$2,258.20
Equipment/Installation	49	Earthfill, Roller Compacted	Earthfill, roller or machine compacted, includes equipment and labor	Cubic yard	$3.67	2420	$8,881.40
Equipment/Installation	48	Excavation, Common Earth, side cast, small equipment	Bulk excavation and side casting of common earth with hydraulic excavator with less than 1 CY capacity. Includes equipment and labor.	Cubic yard	$1.99	2420	$4,815.80
Labor	235	Specialist Labor	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	$82.88	8	$663.04
Mobilization	1146	Mobilization, Specialist Labor	Mobilization of Specialist Labor. Includes Agronomists, Foresters, Biologists, etc.	Hour	$85.35	6	$512.10
Mobilization	1140	Mobilization, large equipment	Equipment >150HP or typical weights greater than 30,000 pounds or loads requiring over width or over length permits.	Each	$225.16	3	$675.48
Mobilization	1139	Mobilization, medium equipment	Equipment with 70-150 HP or typical weights between 14,000 and 30,000 pounds.	Each	$120.38	1	$120.38

Scenario Worksheet

Practice and Scenario Description:

Information Type	Data
Region	Northern Plains
State	South Dakota
Discipline Group	Engineering General
Practice Code/Name	521D - Pond Sealing or Lining, Compacted Clay Treatment
Scenario ID	3
Scenario Name	Use On-Site Material
Scenario Description	Construction of a compacted soil liner, using materials available on-site, to reduce seepage from ponds or waste storage impoundment structures. Practice implementation includes compaction of the subgrade and soil liner under proper moisture conditions to the designed liner thickness using materials available at the construction site. Associated practices include PS378, PS313, & other waste water impoundments.
Before Practice Situation	In-place soils at site exhibit seepage rates in excess of acceptable limits without proper moisture and density control. An adequate quantity of soil suitable for constructing a clay liner without amendments is available on-site.
After Practice Situation	Water conservation and environmental protection provided by limiting seepage losses from ponds or waste storage impoundments.
Scenario Feature Measure	Volume of Liner Material (including volume of soil cover, as needed)
Scenario Unit	Cubic Yard
Scenario Typical Size	1613

Cost Summary:

Cost Category	Scenario Cost	Scenario Cost/Unit
Materials	$0.00	$0.00
Equipment/Installation	$14,968.64	$9.28
Labor	$663.04	$0.41
Mobilization	$857.64	$0.53
Acquisition of Technical Knowledge	$0.00	$0.00
Foregone Income	$0.00	$0.00
Total	$16,489.32	$10.22

Cost Details:

Cost Category	Component ID	Component Name	Component Description	Unit	Price ($/unit)	Quantity	Cost
Equipment/Installation	1219	Excavation, clay, large equipment, 150 ft	Bulk excavation of clay with dozer >100 HP with average push distance of 150 feet. Includes equipment and labor.	Cubic Yard	$5.61	1613	$9,048.93
Equipment/Installation	49	Earthfill, Roller Compacted	Earthfill, roller or machine compacted, includes equipment and labor	Cubic yard	$3.67	1613	$5,919.71
Labor	235	Specialist Labor	Labor requiring a specialized skill set: Includes Agronomists, Foresters, Biologists, etc. to	Hour	$82.88	8	$663.04
Mobilization	1146	Mobilization, Specialist Labor	Mobilization of Specialist Labor. Includes Agronomists, Foresters, Biologists, etc.	Hour	$85.35	6	$512.10
Mobilization	1140	Mobilization, large equipment	Equipment >150HP or typical weights greater than 30,000 pounds or loads requiring over width or over length permits.	Each	$225.16	1	$225.16
Mobilization	1139	Mobilization, medium equipment	Equipment with 70-150 HP or typical weights between 14,000 and 30,000 pounds.	Each	$120.38	1	$120.38

Scenario Worksheet

Practice and Scenario Description:

Information Type	Data
Region	Northern Plains
State	South Dakota
Discipline Group	Engineering General
Practice Code/Name	521D - Pond Sealing or Lining, Compacted Clay Treatment
Scenario ID	4
Scenario Name	On-site Material with Soil Cover
Scenario Description	Construction of a compacted soil liner, treated with compacted clay, to reduce seepage from ponds or waste storage impoundment structures. Practice implementation includes compaction of the soil liner under proper moisture conditions to the designed liner thickness, and soil cover to protect the finished liner using materials available at the construction site. Associated practices include PS378, PS313, & other waste water impoundments.
Before Practice Situation	In-place soils at site exhibit seepage rates in excess of acceptable limits. An adequate quantity of soil suitable for constructing a clay liner without amendments is available at an econical haul distance. Material haul < 1 mile.
After Practice Situation	Water conservation and environmental protection provided by limiting seepage losses from ponds or waste storage impoundments.
Scenario Feature Measure	Volume of Liner Material (including volume of soil cover, as needed)
Scenario Unit	Cubic Yard
Scenario Typical Size	2420

Cost Summary:

Cost Category	Scenario Cost	Scenario Cost/Unit
Materials	$0.00	$0.00
Equipment/Installation	$21,916.91	$9.06
Labor	$663.04	$0.27
Mobilization	$857.64	$0.35
Acquisition of Technical Knowledge	$0.00	$0.00
Foregone Income	$0.00	$0.00
Total	$23,437.59	$9.68

Cost Details:

Cost Category	Component ID	Component Name	Component Description	Unit	Price ($/unit)	Quantity	Cost
Equipment/Installation	1219	Excavation, clay, large equipment, 150 ft	Bulk excavation of clay with dozer >100 HP with average push distance of 150 feet. Includes equipment and labor.	Cubic Yard	$5.61	2420	$13,576.20
Equipment/Installation	49	Earthfill, Roller Compacted	Earthfill, roller or machine compacted, includes equipment and labor	Cubic yard	$3.67	1613	$5,919.71
Equipment/Installation	51	Earthfill, Dumped and Spread	Earthfill, dumped and spread without compaction effort, includes equipment and labor	Cubic yard	$3.00	807	$2,421.00
Labor	235	Specialist Labor	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	$82.88	8	$663.04
Mobilization	1146	Mobilization, Specialist Labor	Mobilization of Specialist Labor. Includes Agronomists, Foresters, Biologists, etc.	Hour	$85.35	6	$512.10
Mobilization	1140	Mobilization, large equipment	Equipment >150HP or typical weights greater than 30,000 pounds or loads requiring over width or over length permits.	Each	$225.16	1	$225.16
Mobilization	1139	Mobilization, medium equipment	Equipment with 70-150 HP or typical weights between 14,000 and 30,000 pounds.	Each	$120.38	1	$120.38

Scenario Worksheet

Practice and Scenario Description:

Information Type	Data
Region	Northern Plains
State	South Dakota
Discipline Group	Range/Pasture Grazing
Practice Code/Name	528 - Prescribed Grazing
Scenario ID	1
Scenario Name	Small Ranch Unit
Scenario Description	Design and implementation of a grazing system on small pasture less than 320 acres that will enhance rangeland health and ecosystem function as well as optimize efficiency and economic return through monitoring (ex:photo points, stubble height after grazing, etc) & record keeping. Beginning ranchers implementing an initial grazing system on small ranchettes
Before Practice Situation	Current grazing system on a small ranch unit (<320 acres) exhibits undesirable and inefficient use of forage plants and such use may have a negative impact on rangeland health, as well as soil and water resources. Stocking rates are likely higher than the current level of production and efficiency of use can support without management changes. There is currently no monitoring plan in place to evaluate change on the landscape.
After Practice Situation	Prescribed grazing system is designed to protect the health and vigor of the plant communities that are in place. Livestock are managed in a way that enhances rangeland health and function through protection of sensitive areas, and efficient harvest of forage resources. Grazing system success will be evaluated through short term monitoring.
Scenario Feature Measure	0
Scenario Unit	Acre
Scenario Typical Size	80

Cost Summary:

Cost Category	Scenario Cost	Scenario Cost/Unit
Materials	$44.24	$0.55
Equipment/Installation	$1,713.00	$21.41
Labor	$860.86	$10.76
Mobilization	$0.00	$0.00
Acquisition of Technical Knowledge	$116.67	$1.46
Foregone Income	$0.00	$0.00
Total	$2,734.77	$34.18

Cost Details:

Cost Category	Component ID	Component Name	Component Description	Unit	Price ($/unit)	Quantity	Cost
Materials	967	Rangeland/grassland field monitoring kit	Miscellaneous tools needed to complete rangeland/grassland monitoring. Materials may include camera, clippers, plot frame, scale, tape measure, etc. Includes equipment costs only.	Each	$44.24	1	$44.24
Equipment/Installation	965	All terrain vehicles, ATV	Includes equipment, power unit and labor costs.	Hour	$28.55	60	$1,713.00
Labor	234	Supervisor or Manager	Labor involving supervision or management activities. Includes crew supervisors, foremen and farm/ranch managers time required for adopting new technology, etc.	Hour	$33.11	26	$860.86
Acquisition of Technical Knowledge	294	Training, Workshops	Educational seminar or series of meetings emphasizing interaction and exchange of information among a usually small number of participants.	Each	$116.67	1	$116.67

Scenario Worksheet

Practice and Scenario Description:

Information Type	Data
Region	Northern Plains
State	South Dakota
Discipline Group	Range/Pasture Grazing
Practice Code/Name	528 - Prescribed Grazing
Scenario ID	2
Scenario Name	Range, 3-6 Pastures
Scenario Description	Design and implementation of a grazing system using a minimum of 3, and not more than 6, pastures in rotation that will enhance rangeland health and ecosystem function as well as optimize efficiency and economic return through monitoring (ex: trend, composition, production, etc), record keeping.
Before Practice Situation	Current grazing system exhibits undesirable and inefficient use of forage plants and such use may have a negative impact on rangeland health, as well as soil and water resources. Stocking rates are likely higher than the current level of production and efficiency of use can support without management changes. There is currently no monitoring plan in place to evaluate change on the landscape.
After Practice Situation	Prescribed grazing system is designed to protect the health and vigor of the plant communities that are in place. Livestock are managed in rotation in a way that enhances rangeland health and function through proper rest and recovery periods, protection of sensitive areas, proper utilization, and efficient harvest of forage resources. Grazing system success will be evaluated through long term monitoring.
Scenario Feature Measure	0
Scenario Unit	Acre
Scenario Typical Size	1000

Cost Summary:

Cost Category	Scenario Cost	Scenario Cost/Unit
Materials	$44.24	$0.04
Equipment/Installation	$2,855.00	$2.86
Labor	$3,484.80	$3.48
Mobilization	$0.00	$0.00
Acquisition of Technical Knowledge	$116.67	$0.12
Foregone Income	$0.00	$0.00
Total	$6,500.71	$6.50

Cost Details:

Cost Category	Component ID	Component Name	Component Description	Unit	Price ($/unit)	Quantity	Cost
Materials	967	Rangeland/grassland field monitoring kit	Miscellaneous tools needed to complete rangeland/grassland monitoring. Materials may include camera, clippers, plot frame, scale, tape measure, etc. Includes equipment costs only.	Each	$44.24	1	$44.24
Equipment/Installation	965	All terrain vehicles, ATV	Includes equipment, power unit and labor costs.	Hour	$28.55	100	$2,855.00
Labor	234	Supervisor or Manager	Labor involving supervision or management activities. Includes crew supervisors, foremen and farm/ranch managers time required for adopting new technology, etc.	Hour	$33.11	80	$2,648.80
Labor	231	General Labor	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	$16.72	50	$836.00
Acquisition of Technical Knowledge	294	Training, Workshops	Educational seminar or series of meetings emphasizing interaction and exchange of information among a usually small number of participants.	Each	$116.67	1	$116.67

Scenario Worksheet

Practice and Scenario Description:

Information Type	Data
Region	Northern Plains
State	South Dakota
Discipline Group	Range/Pasture Grazing
Practice Code/Name	528 - Prescribed Grazing
Scenario ID	3
Scenario Name	Range, 7 or More Pastures
Scenario Description	Design and implementation of a grazing system using a minimum of 7 pastures in rotation that will enhance rangeland health and ecosystem function as well as optimize efficiency and economic return through monitoring (ex: trend, composition, production, etc), record keeping.
Before Practice Situation	Current grazing system exhibits undesirable and inefficient use of forage plants and such use may have a negative impact on rangeland health, as well as soil and water resources. Stocking rates are likely higher than the current level of production and efficiency of use can support without management changes. There is currently no monitoring plan in place to evaluate change on the landscape.
After Practice Situation	Prescribed grazing system is designed to protect the health and vigor of the plant communities that are in place. Livestock are managed in rotation in a way that enhances rangeland health and function through proper rest and recovery periods, protection of sensitive areas, proper utilization, and efficient harvest of forage resources. Grazing system success will be evaluated through long term monitoring.
Scenario Feature Measure	0
Scenario Unit	Acre
Scenario Typical Size	1000

Cost Summary:

Cost Category	Scenario Cost	Scenario Cost/Unit
Materials	$44.24	$0.04
Equipment/Installation	$4,282.50	$4.28
Labor	$4,481.40	$4.48
Mobilization	$0.00	$0.00
Acquisition of Technical Knowledge	$116.67	$0.12
Foregone Income	$0.00	$0.00
Total	$8,924.81	$8.92

Cost Details:

Cost Category	Component ID	Component Name	Component Description	Unit	Price ($/unit)	Quantity	Cost
Materials	967	Rangeland/grassland field monitoring kit	Miscellaneous tools needed to complete rangeland/grassland monitoring. Materials may include camera, clippers, plot frame, scale, tape measure, etc. Includes equipment costs only.	Each	$44.24	1	$44.24
Equipment/Installation	965	All terrain vehicles, ATV	Includes equipment, power unit and labor costs.	Hour	$28.55	150	$4,282.50
Labor	234	Supervisor or Manager	Labor involving supervision or management activities. Includes crew supervisors, foremen and farm/ranch managers time required for adopting new technology, etc.	Hour	$33.11	100	$3,311.00
Labor	231	General Labor	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	$16.72	70	$1,170.40
Acquisition of Technical Knowledge	294	Training, Workshops	Educational seminar or series of meetings emphasizing interaction and exchange of information among a usually small number of participants.	Each	$116.67	1	$116.67

Scenario Worksheet

Practice and Scenario Description:

Information Type	Data
Region	Northern Plains
State	South Dakota
Discipline Group	Range/Pasture Grazing
Practice Code/Name	528 - Prescribed Grazing
Scenario ID	5
Scenario Name	Range, 30-73% Rest
Scenario Description	Design and implementation of a grazing system that will enhance pasture condition and ecosystem function by providing rest to the pastures during the growing season (30-73% rest) as well as optimize efficiency and economic return through monitoring (ex: trend, composition, production, etc), record keeping.
Before Practice Situation	Current grazing system exhibits undesirable and inefficient use of forage plants and such use may have a negative impact on pasture condition, as well as soil and water resources. Stocking rates are likely higher than the current level of production and efficiency of use can support without management changes. There is currently no monitoring plan in place to evaluate change on the landscape.
After Practice Situation	Prescribed grazing system is designed to protect the health and vigor of the plant communities that are in place. Livestock are managed in a way that enhances pasture condition and function through proper rest and recovery periods, protection of sensitive areas, proper utilization, and efficient harvest of forage resources. Grazing system success will be evaluated through long term monitoring.
Scenario Feature Measure	0
Scenario Unit	Acre
Scenario Typical Size	160

Cost Summary:

Cost Category	Scenario Cost	Scenario Cost/Unit
Materials	$44.24	$0.28
Equipment/Installation	$742.30	$4.64
Labor	$860.86	$5.38
Mobilization	$0.00	$0.00
Acquisition of Technical Knowledge	$0.00	$0.00
Foregone Income	$0.00	$0.00
Total	$1,647.40	$10.30

Cost Details:

Cost Category	Component ID	Component Name	Component Description	Unit	Price ($/unit)	Quantity	Cost
Materials	967	Rangeland/grassland field monitoring kit	Miscellaneous tools needed to complete rangeland/grassland monitoring. Materials may include camera, clippers, plot frame, scale, tape measure, etc. Includes equipment costs only.	Each	$44.24	1	$44.24
Equipment/Installation	965	All terrain vehicles, ATV	Includes equipment, power unit and labor costs.	Hour	$28.55	26	$742.30
Labor	234	Supervisor or Manager	Labor involving supervision or management activities. Includes crew supervisors, foremen and farm/ranch managers time required for adopting new technology, etc.	Hour	$33.11	26	$860.86

Scenario Worksheet

Practice and Scenario Description:

Information Type	Data
Region	Northern Plains
State	South Dakota
Discipline Group	Range/Pasture Grazing
Practice Code/Name	528 - Prescribed Grazing
Scenario ID	7
Scenario Name	Habitat Management, Grouse
Scenario Description	Development and implementation of a grazing schedule that will creat, restore, and/or enhance habitat components for grouse species including Lesser prairie-chicken and Sage grouse (identified wildlife species of concern).
Before Practice Situation	Wildlife cover, shelter, food, water and movement are limited due to grazingland condition. Plant health and vigor are negatively impacted by one or more of the following: poor grazing distribution, timing of grazing and inadequate rest and recovery periods. Water quality may be impacted by increased runoff and erosion. In addition reduced vegetative cover increases the opportunity for encroachment of noxious and invasive weeds.
After Practice Situation	A grazing system is altered and/or enhanced to benefit habitat for targeted wildlife species. Additional benefits include improved rangeland and/or pasture health, adequate rest and recovery periods, protection of sensitive areas, improved water quality and reduced risk of invasive or noxious weed encroachment. In order to achieve this, implementation of a rest/rotation or deferred grazing system will be required. A portion of the acres (20% for Sage Grouse Initiative) may be deferred during periods of critical wildlife use, deferment is implemented under 472-Access Control.
Scenario Feature Measure	0
Scenario Unit	Acre
Scenario Typical Size	160

Cost Summary:

Cost Category	Scenario Cost	Scenario Cost/Unit
Materials	$44.24	$0.28
Equipment/Installation	$742.30	$4.64
Labor	$1,042.21	$6.51
Mobilization	$0.00	$0.00
Acquisition of Technical Knowledge	$172.67	$1.08
Foregone Income	$0.00	$0.00
Total	$2,001.42	$12.51

Cost Details:

Cost Category	Component ID	Component Name	Component Description	Unit	Price ($/unit)	Quantity	Cost
Materials	967	Rangeland/grassland field monitoring kit	Miscellaneous tools needed to complete rangeland/grassland monitoring. Materials may include camera, clippers, plot frame, scale, tape measure, etc. Includes equipment costs only.	Each	$44.24	1	$44.24
Equipment/Installation	965	All terrain vehicles, ATV	Includes equipment, power unit and labor costs.	Hour	$28.55	26	$742.30
Labor	234	Supervisor or Manager	Labor involving supervision or management activities. Includes crew supervisors, foremen and farm/ranch managers time required for adopting new technology, etc.	Hour	$33.11	13	$430.43
Labor	230	Skilled Labor	Labor requiring a high level skill set: Includes carpenters, welders, electricians, conservation professionals involved with data collection, monitoring, and or record keeping, etc.	Hour	$23.53	26	$611.78
Acquisition of Technical Knowledge	294	Training, Workshops	Educational seminar or series of meetings emphasizing interaction and exchange of information among a usually small number of participants.	Each	$116.67	1	$116.67
Acquisition of Technical Knowledge	297	Transportation	Mileage to attend a training conference, workshop, or TSP travel associated with developing Conservation Activity Plan.	Mile	$0.56	100	$56.00

Scenario Worksheet

Practice and Scenario Description:

Information Type	Data
Region	Northern Plains
State	South Dakota
Discipline Group	Water Management Engineering
Practice Code/Name	533 - Pumping Plant
Scenario ID	3
Scenario Name	Variable Frequency Drive
Scenario Description	Description: This is an installation of electrical and electronic components designed to vary the frequency of the voltage to an electric motor and thus the ability to vary the speed of the motor. This directly affects pressure and flowrate. This also could give the operator the flexibility to operate several systems separately or at the same time. Resource concerns: Insufficient water - Inefficient use of irrigation water; Inefficient energy use - Equipment and facilities and Farming/ranching practices and field operations. Associated Practices: 374 - Farmstead Energy Improvement; 430 - Irrigation Pipeline; 441 - Irrigation System, Microirrigation; 449 - Irrigation Water Management; 516 - Livestock Pipeline; and 614 - Watering Facility.
Before Practice Situation	Standard electrical connection from electrical utility to pump motor. No capability to match pump output pressure and/or flowrate to field(s) need(s). Result is over/under pressure(s) and/or flow rate(s), possible hydraulic anomalies, energy loss, and or inefficient water application in the irrigation system.
After Practice Situation	VFD Modifications are implemented at the pump site to allow for varying the speed of a 50 Hp electric motor to match the pressure and flow requirements for a center pivot irrigation system.
Scenario Feature Measure	Pump Power Requirement
Scenario Unit	Horse Power
Scenario Typical Size	50

Cost Summary:

Cost Category	Scenario Cost	Scenario Cost/Unit
Materials	$7,340.00	$146.80
Equipment/Installation	$0.00	$0.00
Labor	$322.00	$6.44
Mobilization	$0.00	$0.00
Acquisition of Technical Knowledge	$0.00	$0.00
Foregone Income	$0.00	$0.00
Total	$7,662.00	$153.24

Cost Details:

Cost Category	Component ID	Component Name	Component Description	Unit	Price ($/unit)	Quantity	Cost
Materials	1288	Variable Speed Drive, 50 HP	Variable speed drive for 50 Horsepower electric motor. Does not include motor. Materials only.	Horsepower	$146.80	50	$7,340.00
Labor	230	Skilled Labor	Labor requiring a high level skill set: Includes carpenters, welders, electricians, conservation professionals involved with data collection, monitoring, and or record keeping, etc.	Hour	$23.53	8	$188.24
Labor	231	General Labor	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	$16.72	8	$133.76

Scenario Worksheet

Practice and Scenario Description:

Information Type	Data
Region	Northern Plains
State	South Dakota
Discipline Group	Water Management Engineering
Practice Code/Name	533 - Pumping Plant
Scenario ID	4
Scenario Name	Irrigation, Surface Water
Scenario Description	Decription: This scenario includes the installation of an electric motor and pump with surface water (such as an irrigation canal) as the water source. This is done in conjunction with an irrigation conversion practice to ensure energy and water savings are realized. This scenario includes all materials, equipment and labor to install the pump and motor, including intake screens. Resource Concerns: Water Quality degradation - Excess nutrients in surface and ground waters; Insufficient water - Inefficient use of irrigation water. Associated Practices include: 374 - Farmstead Energy Improvement; 430 - Irrigation Pipeline; 441 - Irrigation System, Microirrigation; 449 - Irrigation Water Management; 313 - Waste Storage Facility; 634 - Waste Transfer; 436 - Irrigation Reservoir; and 447 - Irrigation System, Tailwater Recovery; and 614 - Watering Facility.
Before Practice Situation	Irrigation: 160 acres of cropland that is being irrigated under a less efficient system than a center pivot or linear move system with low pressure nozzles which is being serviced by a pump set up for the existing system. The existing irrigation system employs an inefficient, improperly sized pump that prevents efficient water application resulting in water loss and high energy use.
After Practice Situation	Irrigation: 160 acres of cropland that has undergone an irrigation conversion practice to use a more efficient method of irrigation, including installation of a pumping plant with an irrigation canal as the water source. The properly designed and efficient pumping plant is installed, reducing energy use and improving irrigation efficiency.
Scenario Feature Measure	Pump Power Requirement
Scenario Unit	Horse Power
Scenario Typical Size	50

Cost Summary:

Cost Category	Scenario Cost	Scenario Cost/Unit
Materials	$10,607.00	$212.14
Equipment/Installation	$589.74	$11.79
Labor	$614.84	$12.30
Mobilization	$120.38	$2.41
Acquisition of Technical Knowledge	$0.00	$0.00
Foregone Income	$0.00	$0.00
Total	$11,931.96	$238.64

Cost Details:

Cost Category	Component ID	Component Name	Component Description	Unit	Price ($/unit)	Quantity	Cost
Materials	1011	Pump, > 5 HP - Pump and motor, fixed cost portion	Fixed cost portion of the Pump: > 5 HP - Pump and motor, 2.5" through 10" discharge size, flows to 7000 gpm and heads to 325 ft. This portion is a base cost for all Pump: > 5 HP and is not dependant on horsepower. The total cost of any Pump: > 5 HP will include this fixed cost plus a variable cost portion. The completed Pump: > 5 HP - Pump and motor will include the motor and controls. This cost will include materials only.	Each	$2,247.40	1	$2,247.40
Materials	1012	Pump, > 5 HP - Pump and motor, variable cost portion	Variable cost portion of the Pump: > 5 HP - Pump and motor, 2.5" through 10" discharge size, flows to 7000 gpm and heads to 325 ft. This portion IS dependent on the total horsepower for the Pump: > 5 HP. The total cost of any Pump: > 5 HP will include this variable cost plus the fixed cost portion. The completed Pump: > 5 HP - Pump and motor will include the motor and controls. This cost will include materials only.	Horsepower	$105.45	50	$5,272.50
Materials	2070	Pump intake screen, Linear, variable cost portion	Variable cost portion of linear fish intake pump screen including all adapters, o-rings, mounting tabs, and other accessories. Includes materials and shipping only.	Gallons per Minute	$2.91	900	$2,619.00
Materials	2069	Pump intake screen, Linear, fixed cost portion	Fixed cost portion of linear fish intake pump screen including all adapters, o-rings, mounting tabs, and other accessories. This is the base cost for the system. Includes materials and shipping only.	Each	$468.10	1	$468.10
Equipment/Installation	926	Backhoe, 80 HP	Wheel mounted backhoe excavator with horsepower range of 60 to 90. Equipment and power unit costs. Labor not included.	Hour	$45.03	4	$180.12
Equipment/Installation	37	Concrete, CIP, slab on grade, reinforced	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	$204.81	2	$409.62

Labor	231	General Labor	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	$16.72	16	$267.52
Labor	232	Equipment Operators, Light	Includes: Skid Steer Loaders, Hydraulic Excavators <50 HP, Trenchers <12", Ag Equipment <150 HP, Pickup Trucks, Forklifts, Mulchers	Hour	$20.61	4	$82.44
Labor	234	Supervisor or Manager	Labor involving supervision or management activities. Includes crew supervisors, foremen and farm/ranch managers time required for adopting new technology, etc.	Hour	$33.11	8	$264.88
Mobilization	1139	Mobilization, medium equipment	Equipment with 70-150 HP or typical weights between 14,000 and 30,000 pounds.	Each	$120.38	1	$120.38

Scenario Worksheet

Practice and Scenario Description:

Information Type	Data
Region	Northern Plains
State	South Dakota
Discipline Group	Water Management Engineering
Practice Code/Name	533 - Pumping Plant
Scenario ID	5
Scenario Name	Livestock, Manure Transfer
Scenario Description	Description: Pump and accessories to move manure from storage location to manure distribution site/equipment. Part of a animal waste management system. Resource Concerns: Water Quality degradation - Excess nutrients in surface and ground waters. Associated Practices include: 313 - Waste Storage Facility; 634 - Waste Transfer
Before Practice Situation	Livestock facility that is not in compliance with federal and/or state regulations for animal feeding operations for handling livestock manure.
After Practice Situation	A manure transfer pump is installed as part of animal manure handling system. The typical installation includes a 15 hp chopper/screw pump installed at the facility with all necessary appurtenances and controls. Other pump types may be substituted as needed to transfer manure. Waste is properly managed in accordance federal and/or state regulations for animal feeding operations to address water quality concerns.
Scenario Feature Measure	Pump Power Requirement
Scenario Unit	Horse Power
Scenario Typical Size	15

Cost Summary:

Cost Category	Scenario Cost	Scenario Cost/Unit
Materials	$5,223.27	$348.22
Equipment/Installation	$2,506.29	$167.09
Labor	$1,993.84	$132.92
Mobilization	$120.38	$8.03
Acquisition of Technical Knowledge	$0.00	$0.00
Foregone Income	$0.00	$0.00
Total	$9,843.78	$656.25

Cost Details:

Cost Category	Component ID	Component Name	Component Description	Unit	Price ($/unit)	Quantity	Cost
Materials	1922	Pumping Plant Pit, Concrete, 1200 Gallon	Precast concrete septic tank structure, 1200 gal capacity, with access port and ladder. Materials only.	Each	$1,394.12	1	$1,394.12
Materials	1011	Pump, > 5 HP - Pump and motor, fixed cost portion	Fixed cost portion of the Pump: > 5 HP - Pump and motor, 2.5" through 10" discharge size, flows to 7000 gpm and heads to 325 ft. This portion is a base cost for all Pump: > 5 HP and is not dependant on horsepower. The total cost of any Pump: > 5 HP will include this fixed cost plus a variable cost portion. The completed Pump: > 5 HP - Pump and motor will include the motor and controls. This cost will include materials only.	Each	$2,247.40	1	$2,247.40
Materials	1012	Pump, > 5 HP - Pump and motor, variable cost portion	Variable cost portion of the Pump: > 5 HP - Pump and motor, 2.5" through 10" discharge size, flows to 7000 gpm and heads to 325 ft. This portion IS dependent on the total horsepower for the Pump: > 5 HP. The total cost of any Pump: > 5 HP will include this variable cost plus the fixed cost portion. The completed Pump: > 5 HP - Pump and motor will include the motor and controls. This cost will include materials only.	Horsepower	$105.45	15	$1,581.75
Equipment/Installation	37	Concrete, CIP, slab on grade, reinforced	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	$204.81	5	$1,024.05
Equipment/Installation	931	Hydraulic Excavator, 1 CY	Track mounted hydraulic excavator with bucket capacity range of 0.8 to 1.5 CY. Equipment and power unit costs. Labor not included.	Hour	$92.64	16	$1,482.24
Labor	231	General Labor	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	$16.72	48	$802.56
Labor	233	Equipment Operators, Heavy	Includes: Cranes, Hydraulic Excavators >=50 HP, Dozers, Paving Machines, Rock Trenchers, Trenchers >=12", Dump Trucks, Ag Equipment >=150 HP, Scrapers, Water Wagons.	Hour	$24.79	16	$396.64

Labor	234	Supervisor or Manager	Labor involving supervision or management activities. Includes crew supervisors, foremen and farm/ranch managers time required for adopting new technology, etc.	Hour	$33.11	24	$794.64
Mobilization	1139	Mobilization, medium equipment	Equipment with 70-150 HP or typical weights between 14,000 and 30,000 pounds.	Each	$120.38	1	$120.38

Scenario Worksheet

Practice and Scenario Description:

Information Type	Data
Region	Northern Plains
State	South Dakota
Discipline Group	Water Management Engineering
Practice Code/Name	533 - Pumping Plant
Scenario ID	6
Scenario Name	Livestock, with Pressure Tank
Scenario Description	Descriptions: A 2 Hp submersible electric-powered pump is installed in a well or structure. It is used for watering livestock as part of a prescribed grazing system. Submersible pump installed to deliver stockwater from a well or waterbody to a watering facility. Installation includes drop pipe, pump, and all necessary appurtenances and includes a pressure tank. Resource Concerns: Livestock Production Limitation - Inadequate livestock water; Insufficient water - Inefficient use of irrigation water. Associated Practices include: 374 - Farmstead Energy Improvement; 516 - Livestock Pipeline.
Before Practice Situation	Grazing system that has an inadequate water supply for livestock
After Practice Situation	Water is transferred at a sufficient rate and pressure to meet the requirements of a prescribed grazing system. Irrigation: A properly designed pump is installed to improve irrigation efficiency and reduce energy usage.
Scenario Feature Measure	Pump Power Requirement
Scenario Unit	Horse Power
Scenario Typical Size	2

Cost Summary:

Cost Category	Scenario Cost	Scenario Cost/Unit
Materials	$3,170.18	$1,585.09
Equipment/Installation	$569.20	$284.60
Labor	$563.52	$281.76
Mobilization	$120.38	$60.19
Acquisition of Technical Knowledge	$0.00	$0.00
Foregone Income	$0.00	$0.00
Total	$4,423.28	$2,211.64

Cost Details:

Cost Category	Component ID	Component Name	Component Description	Unit	Price ($/unit)	Quantity	Cost
Materials	1922	Pumping Plant Pit, Concrete, 1200 Gallon	Precast concrete septic tank structure, 1200 gal capacity, with access port and ladder. Materials only.	Each	$1,394.12	1	$1,394.12
Materials	998	Pipe, PE, 1 ¼", DR 9	Materials: - 1 1/4" - PE - 160 psi - ASTM D3035 DR 9	Foot	$0.94	300	$282.00
Materials	1009	Pump, < 5 HP - Pump and motor, fixed cost portion	Fixed cost portion of the Pump: < 5 HP - Pump and motor. This portion is a base cost for all Pump: < 5 HP and is not dependant on horsepower. The total cost of any Pump: < 5 HP will include this fixed cost plus a variable cost portion. The completed Pump: < 5 HP - Pump and motor will include the motor and controls. This cost will include material, labor and equipment	Each	$175.60	1	$175.60
Materials	1010	Pump, < 5 HP - Pump and motor, variable cost portion	Variable cost portion of the Pump: < 5 HP - Pump and motor. This portion IS dependent on the total horsepower for the Pump: < 5 HP. The total cost of any Pump: < 5 HP will include this variable cost plus the fixed cost portion. The completed Pump: < 5 HP - Pump and motor will include the motor and controls. This cost will include material, labor and equipment.	Horsepower	$229.73	2	$459.46
Materials	1039	Pressure Tank, 80 gallon	0	Each	$859.00	1	$859.00
Equipment/Installation	939	Truck, Pickup	Equipment and power unit costs. Labor not included.	Hour	$26.12	8	$208.96
Equipment/Installation	926	Backhoe, 80 HP	Wheel mounted backhoe excavator with horsepower range of 60 to 90. Equipment and power unit costs. Labor not included.	Hour	$45.03	8	$360.24
Labor	231	General Labor	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	$16.72	8	$133.76
Labor	232	Equipment Operators, Light	Includes: Skid Steer Loaders, Hydraulic Excavators <50 HP, Trenchers <12", Ag Equipment <150 HP, Pickup Trucks, Forklifts, Mulchers	Hour	$20.61	8	$164.88
Labor	234	Supervisor or Manager	Labor involving supervision or management activities. Includes crew supervisors, foremen and farm/ranch managers time required for adopting new technology, etc.	Hour	$33.11	8	$264.88
Mobilization	1139	Mobilization, medium equipment	Equipment with 70-150 HP or typical weights between 14,000 and 30,000 pounds.	Each	$120.38	1	$120.38

Scenario Worksheet

Practice and Scenario Description:

Information Type	Data
Region	Northern Plains
State	South Dakota
Discipline Group	Water Management Engineering
Practice Code/Name	533 - Pumping Plant
Scenario ID	7
Scenario Name	Livestock, without Pressure Tank
Scenario Description	Description: A 2 Hp submersible electric-powered pump is installed in a well or structure. It is used for watering livestock as part of a prescribed grazing system. Submersible pump installed to deliver stockwater from a well or waterbody to a watering facility. Installation includes drop pipe, pump, and all necessary appurtenances. Installation without pressure tank is typically used during warm seasons. Resource Concerns: Livestock Production Limitation - Inadequate livestock water; Insufficient water - Inefficient use of irrigation water. Associated Practices include: 374 - Farmstead Energy Improvement; 516 - Livestock Pipeline.
Before Practice Situation	Grazing system that has an inadequate water supply for livestock.
After Practice Situation	Water is transferred at a sufficient rate and pressure to meet the requirements of a prescribed grazing system. Irrigation: A properly designed pump is installed to improve irrigation efficiency and reduce energy usage.
Scenario Feature Measure	Pump Power Requirement
Scenario Unit	Horse Power
Scenario Typical Size	2

Cost Summary:

Cost Category	Scenario Cost	Scenario Cost/Unit
Materials	$917.06	$458.53
Equipment/Installation	$208.96	$104.48
Labor	$398.64	$199.32
Mobilization	$0.00	$0.00
Acquisition of Technical Knowledge	$0.00	$0.00
Foregone Income	$0.00	$0.00
Total	$1,524.66	$762.33

Cost Details:

Cost Category	Component ID	Component Name	Component Description	Unit	Price ($/unit)	Quantity	Cost
Materials	998	Pipe, PE, 1 ¼", DR 9	Materials: - 1 1/4" - PE - 160 psi - ASTM D3035 DR 9	Foot	$0.94	300	$282.00
Materials	1009	Pump, < 5 HP - Pump and motor, fixed cost portion	Fixed cost portion of the Pump: < 5 HP - Pump and motor. This portion is a base cost for all Pump: < 5 HP and is not dependant on horsepower. The total cost of any Pump: < 5 HP will include this fixed cost plus a variable cost portion. The completed Pump: < 5 HP - Pump and motor will include the motor and controls. This cost will include material, labor and equipment	Each	$175.60	1	$175.60
Materials	1010	Pump, < 5 HP - Pump and motor, variable cost portion	Variable cost portion of the Pump: < 5 HP - Pump and motor. This portion IS dependent on the total horsepower for the Pump: < 5 HP. The total cost of any Pump: < 5 HP will include this variable cost plus the fixed cost portion. The completed Pump: < 5 HP - Pump and motor will include the motor and controls. This cost will include material, labor and equipment.	Horsepower	$229.73	2	$459.46
Equipment/Installation	939	Truck, Pickup	Equipment and power unit costs. Labor not included.	Hour	$26.12	8	$208.96
Labor	231	General Labor	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	$16.72	8	$133.76
Labor	234	Supervisor or Manager	Labor involving supervision or management activities. Includes crew supervisors, foremen and farm/ranch managers time required for adopting new technology, etc.	Hour	$33.11	8	$264.88

Scenario Worksheet

Practice and Scenario Description:

Information Type	Data
Region	Northern Plains
State	South Dakota
Discipline Group	Water Management Engineering
Practice Code/Name	533 - Pumping Plant
Scenario ID	8
Scenario Name	Windmill-Powered Pump
Scenario Description	Description: A windmill is installed in order to supply a reliable water source for livestock and/or wildlife. The windmill includes the tower, concrete footings, wheel blade unit, sucker rod, down pipe, gear box, pump, plumbing, and well head protection concrete pad. The typical scenario will be a windmill system with a 8 ft diameter mill and 27-foot tower which is pumping from a 100-foot well. As a result of installing this windmill, resource concerns of inadequate stock water, plant establishment, growth, productivity, health, and vigor, and water quantity can be addressed. Resource Concerns: Insufficient stockwater. Associated Practices include: 374 - Farmstead Energy Improvement; 516 - Livestock Pipeline.
Before Practice Situation	In a rangeland or pasture setting, a reliable source of water for livestock is not available, or the spacing between water sources is such that grazing distribution and plant health are adversely impacted.
After Practice Situation	A windmill, will be installed over a well that is located to provide a reliable source of livestock water at the rate of at least 2 gpm, to facilitate proper grazing distribution and improved plant health. To increase reliability, water is pumped into a storage tank to provide a given number of days of supply. Installation includes the footings, wellhead protection concrete pad, tower, gear box, sail, sucker rod, down hole accessories, and a short outlet pipe to a storage tank.
Scenario Feature Measure	Windmill Units
Scenario Unit	Each
Scenario Typical Size	1

Cost Summary:

Cost Category	Scenario Cost	Scenario Cost/Unit
Materials	$4,554.34	$4,554.34
Equipment/Installation	$618.58	$618.58
Labor	$532.40	$532.40
Mobilization	$0.00	$0.00
Acquisition of Technical Knowledge	$0.00	$0.00
Foregone Income	$0.00	$0.00
Total	$5,705.32	$5,705.32

Cost Details:

Cost Category	Component ID	Component Name	Component Description	Unit	Price ($/unit)	Quantity	Cost
Materials	1035	Windmill, 6 or 8', fan diameter	Includes materials costs for windmill head and 27' tower	Each	$4,554.34	1	$4,554.34
Equipment/Installation	37	Concrete, CIP, slab on grade, reinforced	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	$204.81	2	$409.62
Equipment/Installation	939	Truck, Pickup	Equipment and power unit costs. Labor not included.	Hour	$26.12	8	$208.96
Labor	234	Supervisor or Manager	Labor involving supervision or management activities. Includes crew supervisors, foremen and farm/ranch managers time required for adopting new technology, etc.	Hour	$33.11	8	$264.88
Labor	231	General Labor	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	$16.72	16	$267.52

Scenario Worksheet

Practice and Scenario Description:

Information Type	Data
Region	Northern Plains
State	South Dakota
Discipline Group	Water Management Engineering
Practice Code/Name	533 - Pumping Plant
Scenario ID	9
Scenario Name	Solar-Powered Pump, 0.5 hp
Scenario Description	Description: The typical scenario assumes installation of a submersible solar-powered pump in a well or a live stream. The installation includes the pump, wiring, drop pipe, solar panels, mounts, inverter, and all appurtenances. Grazing - Livestock exclusion from surface water will result in improved surface water quality and reduced erosion. Irrigation - energy consumption will be reduced and the increased pressure and flow rates will improve irrigation efficiency. Resource Concerns: Insufficient stockwater. Associated Practices include: 374 - Farmstead Energy Improvement; 382 - Fence; 516 - Livestock Pipeline; 561 - Heavy Use Area Protection; and, 614 - Watering Facility.
Before Practice Situation	Inadequate supply or location of water for a prescribed grazing system. Eroded stream banks and degraded water quality due to livestock access to stream. Cattle are not well-distributed because of remote water location.
After Practice Situation	The typical scenario assumes installation of a 373-watt photovoltaic (PV) panel, capable of operating a 1/2 Hp (0.5 Hp) solar-powered submersible pump in a well or other water source (Notes: 1) A PV panel is rated under standard and ideal conditions which will most likely not be replicated in the field; 2) 1 Hp is defined as 746 watts; 3) It is reasonable to expect a 0.5 Hp solar-powered submersible pump to deliver about 3 gpm and develop a pressure at the pump outlet of about 20 psi.). The installation includes the pump, wiring, pipeline in the well, solar panels, frame mounts, inverter, and all appurtenances. Water will be pumped to pressurize the Livestock Pipeline (516). Grazing - Livestock exclusion from surface water will result in improved surface water quality and reduced erosion. Grazing has potential to be well distributed.
Scenario Feature Measure	Each Pumping Plant
Scenario Unit	Each
Scenario Typical Size	1

Cost Summary:

Cost Category	Scenario Cost	Scenario Cost/Unit
Materials	$3,875.25	$3,875.25
Equipment/Installation	$0.00	$0.00
Labor	$0.00	$0.00
Mobilization	$0.00	$0.00
Acquisition of Technical Knowledge	$0.00	$0.00
Foregone Income	$0.00	$0.00
Total	$3,875.25	$3,875.25

Cost Details:

Cost Category	Component ID	Component Name	Component Description	Unit	Price ($/unit)	Quantity	Cost
Materials	1031	Solar Panels, fixed cost portion	Fixed cost portion of the Solar Panels. This portion is a base cost for all Solar Panels and is not dependant on KiloWatt. The total cost of any Solar Panels will include this fixed cost plus a variable cost portion. The completed Solar Panels will include all materials (electrical, controllers, service drops and etc). This cost will include material, labor and equipment.	Each	$2,155.70	1	$2,155.70
Materials	1135	Solar Panels, variable cost portion	Variable cost portion of the Solar Panels. This portion IS dependent on the total Kilowatt for the Solar Panels. The total cost of any Solar Panels will include this variable cost plus the fixed cost portion. The completed Solar Panels will include all materials (electrical, controllers, and service drop, etc). This cost will include material, labor and equipment.	Kilowatt	$3,337.70	0.4	$1,335.08
Materials	1010	Pump, < 5 HP - Pump and motor, variable cost portion	Variable cost portion of the Pump: < 5 HP - Pump and motor. This portion IS dependent on the total horsepower for the Pump: < 5 HP. The total cost of any Pump: < 5 HP will include this variable cost plus the fixed cost portion. The completed Pump: < 5 HP - Pump and motor will include the motor and controls. This cost will include material, labor and equipment.	Horsepower	$229.73	0.5	$114.87
Materials	1009	Pump, < 5 HP - Pump and motor, fixed cost portion	Fixed cost portion of the Pump: < 5 HP - Pump and motor. This portion is a base cost for all Pump: < 5 HP and is not dependant on horsepower. The total cost of any Pump: < 5 HP will include this fixed cost plus a variable cost portion. The completed Pump: < 5 HP - Pump and motor will include the motor and controls. This cost will include material, labor and equipment	Each	$175.60	1	$175.60
Materials	998	Pipe, PE, 1 ¼", DR 9	Materials: - 1 1/4" - PE - 160 psi - ASTM D3035 DR 9	Foot	$0.94	100	$94.00

Scenario Worksheet

Practice and Scenario Description:

Information Type	Data
Region	Northern Plains
State	South Dakota
Discipline Group	Water Management Engineering
Practice Code/Name	533 - Pumping Plant
Scenario ID	10
Scenario Name	Solar-Powered Pump, 1 hp
Scenario Description	Description: The typical scenario assumes installation of a submersible solar-powered pump in a well or a live stream. The installation includes the pump, wiring, drop pipe, solar panels, mounts, inverter, and all appurtenances. Grazing - Livestock exclusion from surface water will result in improved surface water quality and reduced erosion. Irrigation - energy consumption will be reduced and the increased pressure and flow rates will improve irrigation efficiency. Resource Concerns: Insufficient stockwater. Associated Practices include: 374 - Farmstead Energy Improvement; 382 - Fence; 516 - Livestock Pipeline; 561 - Heavy Use Area Protection; and, 614 - Watering Facility.
Before Practice Situation	Inadequate supply or location of water for a prescribed grazing system. Eroded stream banks and degraded water quality due to livestock access to stream. Cattle are not well-distributed because of remote water location.
After Practice Situation	The typical scenario assumes installation of a 746-watt photovoltaic (PV) panel, capable of operating a 1 Hp solar-powered submersible pump in a well or other water source (Notes: 1) A PV panel is rated under standard and ideal conditions which will most likely not be replicated in the field; 2) 1 Hp is defined as 746 watts; 3) It is reasonable to expect a 1 Hp solar-powered submersible pump to deliver about 3 gpm and develop a pressure at the pump outlet of about 20 psi.). The installation includes the pump, wiring, pipeline in the well, solar panels, frame mounts, inverter, and all appurtenances. Water will be pumped to pressurize the Livestock Pipeline (516). Grazing - Livestock exclusion from surface water will result in improved surface water quality and reduced erosion. Grazing has potential to be well distributed.
Scenario Feature Measure	Each Pumping Plant
Scenario Unit	Each
Scenario Typical Size	1

Cost Summary:

Cost Category	Scenario Cost	Scenario Cost/Unit
Materials	$5,238.95	$5,238.95
Equipment/Installation	$0.00	$0.00
Labor	$0.00	$0.00
Mobilization	$0.00	$0.00
Acquisition of Technical Knowledge	$0.00	$0.00
Foregone Income	$0.00	$0.00
Total	$5,238.95	$5,238.95

Cost Details:

Cost Category	Component ID	Component Name	Component Description	Unit	Price ($/unit)	Quantity	Cost
Materials	1031	Solar Panels, fixed cost portion	Fixed cost portion of the Solar Panels. This portion is a base cost for all Solar Panels and is not dependant on KiloWatt. The total cost of any Solar Panels will include this fixed cost plus a variable cost portion. The completed Solar Panels will include all materials (electrical, controllers, service drops and etc). This cost will include material, labor and equipment.	Each	$2,155.70	1	$2,155.70
Materials	1135	Solar Panels, variable cost portion	Variable cost portion of the Solar Panels. This portion IS dependent on the total Kilowatt for the Solar Panels. The total cost of any Solar Panels will include this variable cost plus the fixed cost portion. The completed Solar Panels will include all materials (electrical, controllers, and service drop, etc). This cost will include material, labor and equipment.	Kilowatt	$3,337.70	0.746	$2,489.92
Materials	1010	Pump, < 5 HP - Pump and motor, variable cost portion	Variable cost portion of the Pump: < 5 HP - Pump and motor. This portion IS dependent on the total horsepower for the Pump: < 5 HP. The total cost of any Pump: < 5 HP will include this variable cost plus the fixed cost portion. The completed Pump: < 5 HP - Pump and motor will include the motor and controls. This cost will include material, labor and equipment.	Horsepower	$229.73	1	$229.73
Materials	1009	Pump, < 5 HP - Pump and motor, fixed cost portion	Fixed cost portion of the Pump: < 5 HP - Pump and motor. This portion is a base cost for all Pump: < 5 HP and is not dependant on horsepower. The total cost of any Pump: < 5 HP will include this fixed cost plus a variable cost portion. The completed Pump: < 5 HP - Pump and motor will include the motor and controls. This cost will include material, labor and equipment	Each	$175.60	1	$175.60
Materials	998	Pipe, PE, 1 ¼", DR 9	Materials: - 1 1/4" - PE - 160 psi - ASTM D3035 DR 9	Foot	$0.94	200	$188.00

Scenario Worksheet

Practice and Scenario Description:

Information Type	Data
Region	Northern Plains
State	South Dakota
Discipline Group	Water Management Engineering
Practice Code/Name	533 - Pumping Plant
Scenario ID	11
Scenario Name	Solar-Powered Pump, 2 hp
Scenario Description	Description: The typical scenario assumes installation of a submersible solar-powered pump in a well or a live stream. The installation includes the pump, wiring, drop pipe, solar panels, mounts, inverter, and all appurtenances. Grazing - Livestock exclusion from surface water will result in improved surface water quality and reduced erosion. Irrigation - energy consumption will be reduced and the increased pressure and flow rates will improve irrigation efficiency. Resource Concerns: Insufficient stockwater. Associated Practices include: 374 - Farmstead Energy Improvement; 382 - Fence; 516 - Livestock Pipeline; 561 - Heavy Use Area Protection; and, 614 - Watering Facility.
Before Practice Situation	Inadequate supply or location of water for a prescribed grazing system. Eroded stream banks and degraded water quality due to livestock access to stream. Cattle are not well-distributed because of remote water location.
After Practice Situation	The typical scenario assumes installation of a 1.5-kW photovoltaic (PV) panel, capable of operating a 2 Hp solar-powered submersible pump in a well or other water source (Notes: 1) A PV panel is rated under standard and ideal conditions which will most likely not be replicated in the field; 2) 1 Hp is defined as 746 watts; 3) It is reasonable to expect a 2 Hp solar-powered submersible pump to deliver about 3 gpm and develop a pressure at the pump outlet of about 20 psi.). The installation includes the pump, wiring, pipeline in the well, solar panels, frame mounts, inverter, and all appurtenances. Water will be pumped to pressurize the Livestock Pipeline (516). Grazing - Livestock exclusion from surface water will result in improved surface water quality and reduced erosion. Grazing has potential to be well distributed.
Scenario Feature Measure	Each Pumping Plant
Scenario Unit	Each
Scenario Typical Size	1

Cost Summary:

Cost Category	Scenario Cost	Scenario Cost/Unit
Materials	$8,079.31	$8,079.31
Equipment/Installation	$0.00	$0.00
Labor	$0.00	$0.00
Mobilization	$0.00	$0.00
Acquisition of Technical Knowledge	$0.00	$0.00
Foregone Income	$0.00	$0.00
Total	$8,079.31	$8,079.31

Cost Details:

Cost Category	Component ID	Component Name	Component Description	Unit	Price ($/unit)	Quantity	Cost
Materials	1031	Solar Panels, fixed cost portion	Fixed cost portion of the Solar Panels. This portion is a base cost for all Solar Panels and is not dependant on KiloWatt. The total cost of any Solar Panels will include this fixed cost plus a variable cost portion. The completed Solar Panels will include all materials (electrical, controllers, service drops and etc). This cost will include material, labor and equipment.	Each	$2,155.70	1	$2,155.70
Materials	1135	Solar Panels, variable cost portion	Variable cost portion of the Solar Panels. This portion IS dependent on the total Kilowatt for the Solar Panels. The total cost of any Solar Panels will include this variable cost plus the fixed cost portion. The completed Solar Panels will include all materials (electrical, controllers, and service drop, etc). This cost will include material, labor and equipment.	Kilowatt	$3,337.70	1.5	$5,006.55
Materials	1010	Pump, < 5 HP - Pump and motor, variable cost portion	Variable cost portion of the Pump: < 5 HP - Pump and motor. This portion IS dependent on the total horsepower for the Pump: < 5 HP. The total cost of any Pump: < 5 HP will include this variable cost plus the fixed cost portion. The completed Pump: < 5 HP - Pump and motor will include the motor and controls. This cost will include material, labor and equipment.	Horsepower	$229.73	2	$459.46
Materials	1009	Pump, < 5 HP - Pump and motor, fixed cost portion	Fixed cost portion of the Pump: < 5 HP - Pump and motor. This portion is a base cost for all Pump: < 5 HP and is not dependant on horsepower. The total cost of any Pump: < 5 HP will include this fixed cost plus a variable cost portion. The completed Pump: < 5 HP - Pump and motor will include the motor and controls. This cost will include material, labor and equipment	Each	$175.60	1	$175.60
Materials	998	Pipe, PE, 1 ¼", DR 9	Materials: - 1 1/4" - PE - 160 psi - ASTM D3035 DR 9	Foot	$0.94	300	$282.00

Scenario Worksheet

Practice and Scenario Description:

Information Type	Data
Region	Northern Plains
State	South Dakota
Discipline Group	Range/Pasture Grazing
Practice Code/Name	548 - Grazing Land Mechanical Treatment
Scenario ID	1
Scenario Name	Mechanical Treatment
Scenario Description	Using heavy modified plow or combinations of equipment that modifies physical soil layer or plant conditions on rangelands.
Before Practice Situation	Desired Ecological plant community is limited by a plant or soil layer that physically restricts change over a threshold.
After Practice Situation	Desired Ecological plant community has changed by overcoming the threshold or the seeded vegetaion establishes and sustains its function and ecological processes for the life of the practice.
Scenario Feature Measure	area of treatment
Scenario Unit	Acre
Scenario Typical Size	25

Cost Summary:

Cost Category	Scenario Cost	Scenario Cost/Unit
Materials	$8.00	$0.32
Equipment/Installation	$686.50	$27.46
Labor	$0.00	$0.00
Mobilization	$20.42	$0.82
Acquisition of Technical Knowledge	$0.00	$0.00
Foregone Income	$0.00	$0.00
Total	$714.92	$28.60

Cost Details:

Cost Category	Component ID	Component Name	Component Description	Unit	Price ($/unit)	Quantity	Cost
Materials	1586	Wire flags	Small vinyl flags attached to wire stakes, typically, 36" in length, for marking tree rows	Each	$0.08	100	$8.00
Equipment/Installation	2024	Grazingland Renovation, Furrowing	Contour furrowing on existing grazingland including tillage implement, power unit and labor.	Acre	$27.46	25	$686.50
Mobilization	1143	Mobilization, Light Equipment Operator	Mobilization of light equipment operators: Skid Steer Loaders, Hydraulic Excavators <50 HP, Trenchers <12", Ag Equipment <150 HP, Pickup Trucks, Forklifts, Mulchers	Hour	$20.42	1	$20.42

Scenario Worksheet

Practice and Scenario Description:

Information Type	Data
Region	Northern Plains
State	South Dakota
Discipline Group	Range/Pasture Grazing
Practice Code/Name	550 - Range Planting
Scenario ID	1
Scenario Name	Native Seed
Scenario Description	Establishment of a mixture of NATIVE adapted perennial species on a rangeland unit to improve forage condition, improve wildlife habitat and/or reduce erosion. Seed mix of Native species is chosen based on range conditions and availability of seed. Planting by preparing a seedbed with a LIGHT TO MODERATE TILLAGE and seeding with a no-till drill, range drill, or broadcasting.
Before Practice Situation	Rangeland or cropland with or without existing stand of perennial or annual grasses OR monoculture OR no grasses present where natural reseeding or vegetation enhancement by grazing management alone is unlikely. Resource concerns may include: undesireable plant productivity and health, inadequate feed and forage for livestock, soil erosion and soil quality.
After Practice Situation	Establishment of NATIVE adapted perennial vegetation such as grasses, forbs, legumes, to improve forage quality and quantity and reduce soil erosion on rangeland, native or naturalized pasture, grazed forest or other suitable location.
Scenario Feature Measure	Acres of Range Planting
Scenario Unit	Acre
Scenario Typical Size	80

Cost Summary:

Cost Category	Scenario Cost	Scenario Cost/Unit
Materials	$9,870.40	$123.38
Equipment/Installation	$2,296.80	$28.71
Labor	$0.00	$0.00
Mobilization	$33.78	$0.42
Acquisition of Technical Knowledge	$0.00	$0.00
Foregone Income	$1,834.40	$22.93
Total	$14,035.38	$175.44

Cost Details:

Cost Category	Component ID	Component Name	Component Description	Unit	Price ($/unit)	Quantity	Cost
Materials	76	Big Blue Stem (Andropogon gerardii)	Native Grasses and shipping.	Pound	$11.81	240	$2,834.40
Materials	1467	Indian Ricegrass (Oryzopsis hymeonoides)	Native Grasses & shipping	Pound	$7.58	160	$1,212.80
Materials	1463	Blue Flax (Linum perenne)	Native Forbs & shipping	Pound	$21.47	80	$1,717.60
Materials	1464	Bluebunch Wheatgrass (Pseudoroegneria spicata)	Native Grasses & shipping	Pound	$8.05	320	$2,576.00
Materials	1475	Thickspike Wheatgrass (Elymus lanceolatus)	Native Grasses & shipping	Pound	$4.78	320	$1,529.60
Equipment/Installation	945	Tillage, Light	Includes light disking (tandem) or field cultivator. Includes equipment, power unit and labor costs.	Acre	$9.63	80	$770.40
Equipment/Installation	960	Seeding Operation, No Till/Grass Drill	No Till drill or grass drill for seeding. Includes equipment, power unit and labor costs.	Acre	$19.08	80	$1,526.40
Mobilization	1142	Mobilization, General labor	Mobilization of general labor: Ex. pipe layer, herder, concrete placement, materials spreader, flagger, etc.	Hour	$16.89	2	$33.78
Foregone Income	2079	FI, Grazing AUMs	Grazing is the Primary Land Use	AUM	$22.93	80	$1,834.40

Scenario Worksheet

Practice and Scenario Description:

Information Type	Data
Region	Northern Plains
State	South Dakota
Discipline Group	Range/Pasture Grazing
Practice Code/Name	550 - Range Planting
Scenario ID	3
Scenario Name	Native, Wildlife or Pollinator
Scenario Description	Establishment of a mixture of PREDOMINANTLY NATIVE adapted perennial species on a rangeland unit to improve wildlife habitat, benefit pollinators & beneficial insects, improve forage condition, and/or reduce erosion. Seed mix of PREDOMINANTLY NATIVE SPECIES IS CHOSEN TO SPECIFICALLY BENEFIT WILDLIFE (ex: big game spp, Sage grouse, Lesser Prairie Chicken, others) or POLLINATORS (ex: inclusion of 5-10 forb species) based on range conditions and availability of seed. FOR POLLINATOR HABITAT: Consideration is given to selecting plants that bloom sequentially throughout the growing season where feasible. Planting by preparing a seedbed with MODERATE TO HEAVY TILLAGE (ex: ripping & heavy disk) and seeding with a no-till drill, range drill, or broadcasting.
Before Practice Situation	Rangeland or cropland with or without existing stand of perennial or annual grasses OR monoculture OR no grasses present where natural reseeding or vegetation enhancement by grazing management alone is unlikely. Existing conditions often require complete removal, suppression, or eradication of existing vegetation to ensure success of planting. Pollinator plantings should Resource concerns may include: inadequate habitat for wildlife (ex: big game spp, Sage grouse, Lesser Prairie Chicken, others) undesireable plant productivity and health, inadequate feed and forage for livestock, soil erosion and soil quality.
After Practice Situation	Establishment of PREDOMINANTLY NATIVE adapted perennial vegetation such as grasses, forbs, legumes, with an emphasis on species beneficial to wildlife or Pollinators on rangeland, native or naturalized pasture, grazed forest or other suitable location. For Pollinator habitat: Plants that bloom sequentially throughout the growing season are established, where feasible.
Scenario Feature Measure	Acres of Range Planting
Scenario Unit	Acre
Scenario Typical Size	50

Cost Summary:

Cost Category	Scenario Cost	Scenario Cost/Unit
Materials	$26,418.50	$528.37
Equipment/Installation	$2,158.50	$43.17
Labor	$0.00	$0.00
Mobilization	$50.67	$1.01
Acquisition of Technical Knowledge	$0.00	$0.00
Foregone Income	$8,209.50	$164.19
Total	$36,837.17	$736.74

Cost Details:

Cost Category	Component ID	Component Name	Component Description	Unit	Price ($/unit)	Quantity	Cost
Materials	1467	Indian Ricegrass (Oryzopsis hymeonoides)	Native Grasses & shipping	Pound	$7.58	100	$758.00
Materials	1462	Arrowleaf balsamroot (Balsamoriza sagittata)	Native Forbs & shipping	Pound	$46.70	50	$2,335.00
Materials	1463	Blue Flax (Linum perenne)	Native Forbs & shipping	Pound	$21.47	50	$1,073.50
Materials	1464	Bluebunch Wheatgrass (Pseudoroegneria spicata)	Native Grasses & shipping	Pound	$8.05	150	$1,207.50
Materials	1466	Firecracker Penstemon (Penstemon eatonii)	Native Forbs & shipping	Pound	$142.12	50	$7,106.00
Materials	1470	Pacific aster (Aster chilensis)	Native Forbs & shipping	Pound	$220.45	50	$11,022.50
Materials	1472	Russian Wildrye (Psathyrostachys juncea)	Introduced Grasses & shipping	Pound	$7.05	50	$352.50
Materials	1475	Thickspike Wheatgrass (Elymus lanceolatus)	Native Grasses & shipping	Pound	$4.78	150	$717.00
Materials	104	Alfalfa (Medicago sativa)	Introduced Legumes and shipping.	Pound	$4.15	50	$207.50
Materials	136	Purple Coneflower (Echinacea purpurea)	Native Forbs and shipping.	Pound	$32.78	50	$1,639.00
Equipment/Installation	945	Tillage, Light	Includes light disking (tandem) or field cultivator. Includes equipment, power unit and labor costs.	Acre	$9.63	50	$481.50
Equipment/Installation	946	Tillage, Primary	Includes heavy disking (offset) or chisel plow. Includes equipment, power unit and labor costs.	Acre	$14.46	50	$723.00
Equipment/Installation	960	Seeding Operation, No Till/Grass Drill	No Till drill or grass drill for seeding. Includes equipment, power unit and labor costs.	Acre	$19.08	50	$954.00
Mobilization	1142	Mobilization, General labor	Mobilization of general labor: Ex. pipe layer, herder, concrete placement, materials spreader, flagger, etc.	Hour	$16.89	3	$50.67
Foregone Income	1963	FI, Wheat Dryland	Dryland Wheat is Primary Crop	Acre	$164.19	50	$8,209.50

Scenario Worksheet

Practice and Scenario Description:

Information Type	Data
Region	Northern Plains
State	South Dakota
Discipline Group	Water Management Engineering
Practice Code/Name	554 - Drainage Water Management
Scenario ID	1
Scenario Name	Drainage Water Management
Scenario Description	This scenario is the process of managing water discharges from surface and/or subsurface agricultural drainage systems by reducing nutrient loading into surface waters. Typical systems consist of a 80 acre field with existing drainage tile lines and installed water control structures. The operator goes to the field in order to adjust water control structures (riser boards). While on site the date and adjustment information is recorded/logged. The number of yearly adjustments is based on 6 trips to a field 5 miles from headquarters. The field time to make and record each adjustment is 0.5 hours per structure (including travel time). The typical field will contain 3 structures to control field water levels. Resource Concern: Water Quality - Excess Nutrients in surface and ground waters. Associated Practices: 606-Subsurface Drain; 607-Surface Drain, Field Ditch; 608-Surface Drain, Main or Lateral; 587-Structure for Water Control; 590-Nutrient Management .
Before Practice Situation	Existing drainage systems are in place and water flows uncontrolled.
After Practice Situation	Existing drainage systems are managed to reduce flow of field drainage waters from the site and reduce nitrate loading.
Scenario Feature Measure	Number of Control Structures
Scenario Unit	Each
Scenario Typical Size	3

Cost Summary:

Cost Category	Scenario Cost	Scenario Cost/Unit
Materials	$0.00	$0.00
Equipment/Installation	$0.00	$0.00
Labor	$211.77	$70.59
Mobilization	$0.00	$0.00
Acquisition of Technical Knowledge	$75.46	$25.15
Foregone Income	$0.00	$0.00
Total	$287.23	$95.74

Cost Details:

Cost Category	Component ID	Component Name	Component Description	Unit	Price ($/unit)	Quantity	Cost
Labor	230	Skilled Labor	Labor requiring a high level skill set: Includes carpenters, welders, electricians, conservation professionals involved with data collection, monitoring, and or record keeping, etc.	Hour	$23.53	9	$211.77
Acquisition of Technical Knowledge	294	Training, Workshops	Educational seminar or series of meetings emphasizing interaction and exchange of information among a usually small number of participants.	Each	$116.67	0.33	$38.50
Acquisition of Technical Knowledge	297	Transportation	Mileage to attend a training conference, workshop, or TSP travel associated with developing Conservation Activity Plan.	Mile	$0.56	66	$36.96

Scenario Worksheet

Practice and Scenario Description:

Information Type	Data
Region	Northern Plains
State	South Dakota
Discipline Group	Agricultural Engineering
Practice Code/Name	561 - Heavy Use Area Protection
Scenario ID	1
Scenario Name	Reinforced Concrete with sand or gravel foundation
Scenario Description	The stabilization of areas around facilities that are frequently and intensively used by people, animals or vehicles by surfacing with reinforced concrete on a sand or gravel foundation to provide a stable, non-eroding surface. Installation includes all materials, equipment, and labor to install this practice, The stabilized area will address the resource concerns soil erosion and water quality degradation.
Before Practice Situation	This practice applies to agricultural, urban, recreational and other frequently and/or intensively used areas requiring treatment to address soil erosion and water quality degradation.
After Practice Situation	The stabilized area is surfaced with approximately 600 square feet of approximately 11 cubic yards of welded wire mesh reinforced concrete with 11 cubic yards of sand or gravel foundation material for surfacing areas around facilities that are frequently and intensively used by people, animals or vehicles and will address soil erosion and water quality degradation. All needed roads must use Access Road (560). Any needed treatment of stream crossings must use Stream Crossing (578). Any needed vegetation of disturbed areas must use Critical Area Planting (342). Provisions to collect, store, utilize, and or treat contaminated runoff must use Sediment Basin (350), Waste Storage Facility (313), or Waste Treatment (629) as appropriate. To reduce the potential for air quality problems from particulate matter associated with heavy use areas, consider the use of Windbreak/Shelterbelt Establishment (380) or Herbaceous Wind Barriers (603).
Scenario Feature Measure	Volume of Concrete
Scenario Unit	Cubic Yard
Scenario Typical Size	11

Cost Summary:

Cost Category	Scenario Cost	Scenario Cost/Unit
Materials	$267.08	$24.28
Equipment/Installation	$2,302.66	$209.33
Labor	$0.00	$0.00
Mobilization	$128.83	$11.71
Acquisition of Technical Knowledge	$0.00	$0.00
Foregone Income	$0.00	$0.00
Total	$2,698.57	$245.32

Cost Details:

Cost Category	Component ID	Component Name	Component Description	Unit	Price ($/unit)	Quantity	Cost
Materials	45	Aggregate, Sand, Graded, Washed	Sand, typical ASTM C33 gradation, includes materials, equipment and labor to transport and place	Cubic yard	$24.28	11	$267.08
Equipment/Installation	37	Concrete, CIP, slab on grade, reinforced	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	$204.81	11	$2,252.91
Equipment/Installation	48	Excavation, Common Earth, side cast, small equipment	Bulk excavation and side casting of common earth with hydraulic excavator with less than 1 CY capacity. Includes equipment and labor.	Cubic yard	$1.99	25	$49.75
Mobilization	1142	Mobilization, General labor	Mobilization of general labor: Ex. pipe layer, herder, concrete placement, materials spreader, flagger, etc.	Hour	$16.89	0.5	$8.45
Mobilization	1139	Mobilization, medium equipment	Equipment with 70-150 HP or typical weights between 14,000 and 30,000 pounds.	Each	$120.38	1	$120.38

Scenario Worksheet

Practice and Scenario Description:

Information Type	Data
Region	Northern Plains
State	South Dakota
Discipline Group	Agricultural Engineering
Practice Code/Name	561 - Heavy Use Area Protection
Scenario ID	2
Scenario Name	Rock/Gravel on Geotextile
Scenario Description	The stabilization of areas around facilities that are frequently and intensively used by people, animals or vehicles by surfacing with rock and or gravel on a geotextile fabric foundation to provide a stable, non-eroding surface. Installation includes all materials, equipment, and labor to install this practice, The stabilized area will address the resource concerns of soil erosion and water quality degradation.
Before Practice Situation	This practice applies to agricultural, urban, recreational and other frequently and/or intensively used areas requiring treatment to address soil erosion and water quality degradation.
After Practice Situation	The stabilized area is surfaced with approximately 40 cubic yards of rock and or gravel on approximately 160 square yards of geotextile fabric foundation material for surfacing areas around facilities that are frequently and intensively used by people, animals or vehicles and will address soil erosion and water quality degradation. All needed roads must use Access Road (560). Any needed treatment of stream crossings must use Stream Crossing (578). Any needed vegetation of disturbed areas must use Critical Area Planting (342). Provisions to collect, store, utilize, and or treat contaminated runoff must use Sediment Basin (350), Waste Storage Facility (313), or Waste Treatment (629) as appropriate. To reduce the potential for air quality problems from particulate matter associated with heavy use areas, consider the use of Windbreak/Shelterbelt Establishment (380) or Herbaceous Wind Barriers (603).
Scenario Feature Measure	Area of Rock and or Gravel
Scenario Unit	Square Yard
Scenario Typical Size	160

Cost Summary:

Cost Category	Scenario Cost	Scenario Cost/Unit
Materials	$726.40	$4.54
Equipment/Installation	$474.60	$2.97
Labor	$0.00	$0.00
Mobilization	$128.83	$0.81
Acquisition of Technical Knowledge	$0.00	$0.00
Foregone Income	$0.00	$0.00
Total	$1,329.83	$8.31

Cost Details:

Cost Category	Component ID	Component Name	Component Description	Unit	Price ($/unit)	Quantity	Cost
Materials	1099	Aggregate, Gravel, Ungraded, Quarry Run	Includes materials, equipment and labor	Cubic yard	$18.16	40	$726.40
Equipment/Installation	42	Geotextile, woven	Woven Geotextile Fabric. Includes materials, equipment and labor	Square Yard	$2.22	160	$355.20
Equipment/Installation	48	Excavation, Common Earth, side cast, small equipment	Bulk excavation and side casting of common earth with hydraulic excavator with less than 1 CY capacity. Includes equipment and labor.	Cubic yard	$1.99	60	$119.40
Mobilization	1142	Mobilization, General labor	Mobilization of general labor: Ex. pipe layer, herder, concrete placement, materials spreader, flagger, etc.	Hour	$16.89	0.5	$8.45
Mobilization	1139	Mobilization, medium equipment	Equipment with 70-150 HP or typical weights between 14,000 and 30,000 pounds.	Each	$120.38	1	$120.38

Scenario Worksheet

Practice and Scenario Description:

Information Type	Data
Region	Northern Plains
State	South Dakota
Discipline Group	Agricultural Engineering
Practice Code/Name	561 - Heavy Use Area Protection
Scenario ID	3
Scenario Name	Rock/Gravel
Scenario Description	The stabilization of areas around facilities that are frequently and intensively used by people, animals or vehicles by surfacing with rock and or gravel to provide a stable, non-eroding surface. Installation includes all materials, equipment, and labor to install this practice. The stabilized area will address the resource concerns of soil erosion and water quality degradation.
Before Practice Situation	This practice applies to agricultural, urban, recreational and other frequently and/or intensively used areas requiring treatment to address soil erosion and water quality degradation.
After Practice Situation	The stabilized area is surfaced with approximately 270 cubic yards of rock and or gravel for surfacing areas around facilities that are frequently and intensively used by people, animals or vehicles and will address soil erosion and water quality degradation. All needed roads must use Access Road (560). Any needed treatment of stream crossings must use Stream Crossing (578). Any needed vegetation of disturbed areas must use Critical Area Planting (342). Provisions to collect, store, utilize, and or treat contaminated runoff must use Sediment Basin (350), Waste Storage Facility (313), or Waste Treatment (629) as appropriate. To reduce the potential for air quality problems from particulate matter associated with heavy use areas, consider the use of Windbreak/Shelterbelt Establishment (380) or Herbaceous Wind Barriers (603).
Scenario Feature Measure	Volume of Rock and/or Gravel
Scenario Unit	Cubic Yard
Scenario Typical Size	270

Cost Summary:

Cost Category	Scenario Cost	Scenario Cost/Unit
Materials	$4,903.20	$18.16
Equipment/Installation	$0.00	$0.00
Labor	$0.00	$0.00
Mobilization	$128.83	$0.48
Acquisition of Technical Knowledge	$0.00	$0.00
Foregone Income	$0.00	$0.00
Total	$5,032.03	$18.64

Cost Details:

Cost Category	Component ID	Component Name	Component Description	Unit	Price ($/unit)	Quantity	Cost
Materials	1099	Aggregate, Gravel, Ungraded, Quarry Run	Includes materials, equipment and labor	Cubic yard	$18.16	270	$4,903.20
Mobilization	1142	Mobilization, General labor	Mobilization of general labor: Ex. pipe layer, herder, concrete placement, materials spreader, flagger, etc.	Hour	$16.89	0.5	$8.45
Mobilization	1139	Mobilization, medium equipment	Equipment with 70-150 HP or typical weights between 14,000 and 30,000 pounds.	Each	$120.38	1	$120.38

Scenario Worksheet

Practice and Scenario Description:

Information Type	Data
Region	Northern Plains
State	South Dakota
Discipline Group	Agricultural Engineering
Practice Code/Name	561 - Heavy Use Area Protection
Scenario ID	4
Scenario Name	Fabricated Windbreak - Permanent
Scenario Description	The stabilization of areas that are frequently and intensively used by animals by consructing a permanent fabricated wind shelter to provide an alternative site offering livestock wind protection. Installation includes all materials, equipment, and labor to install this practice. The stabilized area will address the resource concerns of soil erosion and water quality degradation.
Before Practice Situation	This practice applies to agricultural, urban, recreational and other frequently and/or intensively used areas requiring treatment to address soil erosion and water quality degradation.
After Practice Situation	A permanent fabricated wind shelter is installed to provide an alternative site offering livestock protection from wind which is located away from the area of concern. The alternative site is protected from wind by a permanent 160' long, 10' tall structure constructed of wooden posts, lumber, and corrugated metal sheeting. All needed roads must use Access Road (560). Any needed treatment of stream crossings must use Stream Crossing (578). Any needed vegetation of disturbed areas must use Critical Area Planting (342). Provisions to collect, store, utilize, and or treat contaminated runoff must use Sediment Basin (350), Waste Storage Facility (313), or Waste Treatment (629) as appropriate. To reduce the potential for air quality problems from particulate matter associated with heavy use areas, consider the use of Windbreak/Shelterbelt Establishment (380) or Herbaceous Wind Barriers (603).
Scenario Feature Measure	Length of Windbreak
Scenario Unit	Linear Foot
Scenario Typical Size	160

Cost Summary:

Cost Category	Scenario Cost	Scenario Cost/Unit
Materials	$6,468.40	$40.43
Equipment/Installation	$79.98	$0.50
Labor	$162.15	$1.01
Mobilization	$137.27	$0.86
Acquisition of Technical Knowledge	$0.00	$0.00
Foregone Income	$0.00	$0.00
Total	$6,847.80	$42.80

Cost Details:

Cost Category	Component ID	Component Name	Component Description	Unit	Price ($/unit)	Quantity	Cost
Materials	224	Corrugated Steel, 21 gauge	Corrugated or ribbed, galvanized, 21 gauge, includes fasteners, materials only.	sq ft	$3.38	1600	$5,408.00
Materials	1044	Dimension Lumber, Treated	Treated dimension lumber with nominal thickness equal or less than 2". Includes lumber and fasteners	Board Foot	$0.74	320	$236.80
Materials	13	Post, Wood, CCA treated, 6" x 12-14'	Wood Post, Line/End 6" X 12-14', CCA Treated	Each	$41.18	20	$823.60
Equipment/Installation	963	Tractor, agricultural, 60 HP	Agricultural tractor with horsepower range of 50 to 90. Equipment and power unit costs. Labor not included.	Hour	$19.28	3	$57.84
Equipment/Installation	934	Auger, Post driver attachment	Auger or post driver attachment to a tractor or skidsteer. Does not include power unit. Labor not included.	Hour	$7.38	3	$22.14
Labor	232	Equipment Operators, Light	Includes: Skid Steer Loaders, Hydraulic Excavators <50 HP, Trenchers <12", Ag Equipment <150 HP, Pickup Trucks, Forklifts, Mulchers	Hour	$20.61	3	$61.83
Labor	231	General Labor	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	$16.72	6	$100.32
Mobilization	1142	Mobilization, General labor	Mobilization of general labor: Ex. pipe layer, herder, concrete placement, materials spreader, flagger, etc.	Hour	$16.89	1	$16.89
Mobilization	1139	Mobilization, medium equipment	Equipment with 70-150 HP or typical weights between 14,000 and 30,000 pounds.	Each	$120.38	1	$120.38

Scenario Worksheet

Practice and Scenario Description:

Information Type	Data
Region	Northern Plains
State	South Dakota
Discipline Group	Water Management Engineering
Practice Code/Name	574 - Spring Development
Scenario ID	1
Scenario Name	Spring, up to 50 ft. Collection
Scenario Description	Develop a water source from a natural spring or seep (i.e., spring development) to provide water for livestock and/or wildlife needs. This typical scenario includes excavating and exposing the water source at the spring/seep (typically on a hillside), constructing a water collection structure by installing a 30 ft long, 4 inch diameter HDPE perforated pipe enclosed in a sand/gravel envelope overlaid by 3 ft wide filter fabric (30 ft long) and behind a two layer vinyl cutoff wall (4 ft height x 30 ft long) to retain water. Water is directed (via 50 ft long, 4 inch PVC) to a spring box (48 inch diameter x 6 ft long CMP) that is located below the cutoff wall. The spring box is equipped with a watertight lid and two outlets. One outlet serves as overflow pipe to account for occasions where inflow exceeds outflow. The collection system is commonly composed of a single or a network of perforated 4 inch diameter drainage pipe placed in an excavated collection trench that runs across the slope. The second outflow pipe from the spring box is directed to buried large storage (not included) or to a watering facility (not included) for use. Resource Concern: Livestock production limitation - Inadequate livestock water. Associated Practices: 516-Livestock Pipeline; 614-Watering Facility; 382-Fence; Critical Area Planting (342).
Before Practice Situation	Livestock operation with inadequate fresh water for livestock and an on-site undeveloped spring/seep.
After Practice Situation	Spring development system provides adequate water for the intended use. The system typically runs all year long in most zones.
Scenario Feature Measure	Number of Developments
Scenario Unit	Each
Scenario Typical Size	1

Cost Summary:

Cost Category	Scenario Cost	Scenario Cost/Unit
Materials	$923.89	$923.89
Equipment/Installation	$971.96	$971.96
Labor	$597.28	$597.28
Mobilization	$240.76	$240.76
Acquisition of Technical Knowledge	$0.00	$0.00
Foregone Income	$0.00	$0.00
Total	$2,733.89	$2,733.89

Cost Details:

Cost Category	Component ID	Component Name	Component Description	Unit	Price ($/unit)	Quantity	Cost
Materials	45	Aggregate, Sand, Graded, Washed	Sand, typical ASTM C33 gradation, includes materials, equipment and labor to transport and place	Cubic yard	$24.28	10	$242.80
Materials	975	Pipe, PVC, 1 ½", SCH 40	Materials: - 1 1/2" - PVC - SCH 40 - ASTM D1785	Foot	$0.78	100	$78.00
Materials	1281	Spring Collection Box Cover, steel, 4' diameter	4' diameter x 1/4" thick Steel lid with handle for spring collection box. Materials and fabrication.	Each	$180.71	1	$180.71
Materials	1280	Pipe, CMP, 48", 14 Gauge	48" Corrugated Metal Pipe, Galvanized, Uncoated, 14 gage. Material cost only.	Foot	$39.78	6	$238.68
Materials	1270	Pipe, HDPE, 4", PCPT, Single Wall	Pipe, Corrugated Plastic Tubing, Single Wall, Perforated, 4" diameter - ASTM F405. Material cost only.	Foot	$0.48	30	$14.40
Materials	245	Poly film, 6 mil.	6 mil, polyethylene, black	Square Foot	$0.07	240	$16.80
Materials	978	Pipe, PVC, 4", SCH 40	Materials: - 4" - PVC - SCH 40 - ASTM D1785	Foot	$3.05	50	$152.50
Equipment/Installation	926	Backhoe, 80 HP	Wheel mounted backhoe excavator with horsepower range of 60 to 90. Equipment and power unit costs. Labor not included.	Hour	$45.03	8	$360.24
Equipment/Installation	936	Trencher, 8"	Equipment and power unit costs. Labor not included.	Hour	$73.69	8	$589.52
Equipment/Installation	42	Geotextile, woven	Woven Geotextile Fabric. Includes materials, equipment and labor	Square Yard	$2.22	10	$22.20
Labor	232	Equipment Operators, Light	Includes: Skid Steer Loaders, Hydraulic Excavators <50 HP, Trenchers <12", Ag Equipment <150 HP, Pickup Trucks, Forklifts, Mulchers	Hour	$20.61	16	$329.76
Labor	231	General Labor	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	$16.72	16	$267.52
Mobilization	1139	Mobilization, medium equipment	Equipment with 70-150 HP or typical weights between 14,000 and 30,000 pounds.	Each	$120.38	2	$240.76

Scenario Worksheet

Practice and Scenario Description:

Information Type	Data
Region	Northern Plains
State	South Dakota
Discipline Group	Water Management Engineering
Practice Code/Name	574 - Spring Development
Scenario ID	2
Scenario Name	Spring, > 50 ft. Collection
Scenario Description	Develop a water source from a natural spring or seep (i.e., spring development) to provide water for livestock and/or wildlife needs. This typical scenario includes excavating and exposing the water source at the spring/seep (typically on a hillside), constructing a water collection structure by installing a 90 ft long, 4 inch diameter HDPE perforated pipe enclosed in a sand/gravel envelope overlaid by 3 ft wide filter fabric (90 ft long) and behind a two layer vinyl cutoff wall (4 ft height x 90 ft long) to retain water. Water is directed (via 100 ft long, 4 inch PVC) to a spring box (48 inch diameter x 8 ft long CMP) that is located below the cutoff wall and away from the spring collection area. The spring box is equipped with a watertight lid and two outlets. One outlet serves as overflow pipe to account for occasions where inflow exceeds outflow. The collection system is commonly composed of a single or a network of perforated 4 inch diameter drainage pipe placed in an excavated collection trench that runs across the slope. The second outflow pipe from the spring box is directed to buried large storage (not included), or to a watering facility (not included) for use. Resource Concern: Livestock production limitation - Inadequate livestock water. Associated Practices: 516-Livestock Pipeline; 614-Watering Facility; 382-Fence; Critical Area Planting (342).
Before Practice Situation	Livestock operation with inadequate fresh water for livestock and an on-site undeveloped spring/seep.
After Practice Situation	Spring development system provides adequate water for the intended use. The system typically runs all year long in most zones.
Scenario Feature Measure	Number of Developments
Scenario Unit	Each
Scenario Typical Size	1

Cost Summary:

Cost Category	Scenario Cost	Scenario Cost/Unit
Materials	$1,703.95	$1,703.95
Equipment/Installation	$1,376.60	$1,376.60
Labor	$1,029.68	$1,029.68
Mobilization	$240.76	$240.76
Acquisition of Technical Knowledge	$0.00	$0.00
Foregone Income	$0.00	$0.00
Total	$4,350.99	$4,350.99

Cost Details:

Cost Category	Component ID	Component Name	Component Description	Unit	Price ($/unit)	Quantity	Cost
Materials	45	Aggregate, Sand, Graded, Washed	Sand, typical ASTM C33 gradation, includes materials, equipment and labor to transport and place	Cubic yard	$24.28	30	$728.40
Materials	975	Pipe, PVC, 1 ½", SCH 40	Materials: - 1 1/2" - PVC - SCH 40 - ASTM D1785	Foot	$0.78	100	$78.00
Materials	1281	Spring Collection Box Cover, steel, 4' diameter	4' diameter x 1/4" thick Steel lid with handle for spring collection box. Materials and fabrication.	Each	$180.71	1	$180.71
Materials	1280	Pipe, CMP, 48", 14 Gauge	48" Corrugated Metal Pipe, Galvanized, Uncoated, 14 gage. Material cost only.	Foot	$39.78	8	$318.24
Materials	1270	Pipe, HDPE, 4", PCPT, Single Wall	Pipe, Corrugated Plastic Tubing, Single Wall, Perforated, 4" diameter - ASTM F405. Material cost only.	Foot	$0.48	90	$43.20
Materials	245	Poly film, 6 mil.	6 mil, polyethylene, black	Square Foot	$0.07	720	$50.40
Materials	978	Pipe, PVC, 4", SCH 40	Materials: - 4" - PVC - SCH 40 - ASTM D1785	Foot	$3.05	100	$305.00
Equipment/Installation	926	Backhoe, 80 HP	Wheel mounted backhoe excavator with horsepower range of 60 to 90. Equipment and power unit costs. Labor not included.	Hour	$45.03	16	$720.48
Equipment/Installation	936	Trencher, 8"	Equipment and power unit costs. Labor not included.	Hour	$73.69	8	$589.52
Equipment/Installation	42	Geotextile, woven	Woven Geotextile Fabric. Includes materials, equipment and labor	Square Yard	$2.22	30	$66.60
Labor	232	Equipment Operators, Light	Includes: Skid Steer Loaders, Hydraulic Excavators <50 HP, Trenchers <12", Ag Equipment <150 HP, Pickup Trucks, Forklifts, Mulchers	Hour	$20.61	24	$494.64
Labor	231	General Labor	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	$16.72	32	$535.04
Mobilization	1139	Mobilization, medium equipment	Equipment with 70-150 HP or typical weights between 14,000 and 30,000 pounds.	Each	$120.38	2	$240.76

Scenario Worksheet

Practice and Scenario Description:

Information Type	Data
Region	Northern Plains
State	South Dakota
Discipline Group	Engineering General
Practice Code/Name	578 - Stream Crossing
Scenario ID	3
Scenario Name	Hard armored, rock low water crossing
Scenario Description	Stabilize the bottom and slope of a stream channel using rock riprap. This scenario includes site preparation, dewatering, acquiring and installing gravel or geotextile with rock riprap on channel bottom and approaches. Final travel surface shall be rock. If a different travel surface is needed, refer to another appropriate standard for the surfacing. Typical stream has 75 foot bottom width and approaches. Width is 12 feet for a total area as 900 square feet. Use (396) Aquatic Organism Passage instead, when the primary intent is biological concerns, not hydrologic.
Before Practice Situation	Water flow could not cross access road or trail without erosion; or access road or trail could not cross channel.
After Practice Situation	Stream flow is not impeded and a stable base exists for equipment, people and/or animals to cross. Associated practices could be (342) Critical Area Planting, (560) Access Road, (575) Animal Trails and Walkways, (566) Recreational Trails and Walkways, (500) Obstruction Removal, or (584) Channel Stabilization.
Scenario Feature Measure	Crossing dimensions
Scenario Unit	Square Foot
Scenario Typical Size	900

Cost Summary:

Cost Category	Scenario Cost	Scenario Cost/Unit
Materials	$2,566.58	$2.85
Equipment/Installation	$355.80	$0.40
Labor	$99.16	$0.11
Mobilization	$240.76	$0.27
Acquisition of Technical Knowledge	$0.00	$0.00
Foregone Income	$0.00	$0.00
Total	$3,262.30	$3.62

Cost Details:

Cost Category	Component ID	Component Name	Component Description	Unit	Price ($/unit)	Quantity	Cost
Materials	43	Silt Fence	Silt Fence with support post, includes materials, equipment and labor	Foot	$0.70	100	$70.00
Materials	44	Rock Riprap, Placed with geotextile	Rock Riprap, placed with geotextile, includes materials, equipment and labor to transport and place	Cubic yard	$59.87	41.7	$2,496.58
Equipment/Installation	1215	Truck, dump, 12 CY	Dump truck for moving bulk material. Typically capacity is 16 ton or 12 cubic yards. Includes equipment only.	Hour	$72.35	4	$289.40
Equipment/Installation	1227	Excavation, common earth, side cast, large equipment	Bulk excavation and side casting of common earth with hydraulic excavator with less greater than 1 CY capacity. Includes equipment and labor.	Cubic Yard	$1.66	40	$66.40
Labor	233	Equipment Operators, Heavy	Includes: Cranes, Hydraulic Excavators >=50 HP, Dozers, Paving Machines, Rock Trenchers, Trenchers >=12", Dump Trucks, Ag Equipment >=150 HP, Scrapers, Water Wagons.	Hour	$24.79	4	$99.16
Mobilization	1139	Mobilization, medium equipment	Equipment with 70-150 HP or typical weights between 14,000 and 30,000 pounds.	Each	$120.38	2	$240.76

Scenario Worksheet

Practice and Scenario Description:

Information Type	Data
Region	Northern Plains
State	South Dakota
Discipline Group	Engineering General
Practice Code/Name	578 - Stream Crossing
Scenario ID	4
Scenario Name	Hard armored, concrete low water crossing
Scenario Description	Stabilize the bottom and slope of a stream channel using concrete in place. This scenario includes site preparation, dewatering, acquiring and installing cast in place concrete on channel bottom and approaches. Final travel surface shall be concrete. If a different travel surface is needed, refer to another appropriate standard for the surfacing. Typical stream has 50 foot bottom width and approaches. Width is 12 feet for a total area as 600 square feet. Use (396) Aquatic Organism Passage instead, when the primary intent is biological concerns, not hydrologic.
Before Practice Situation	Water flow could not cross access road or trail without erosion; or access road or trail could not cross channel.
After Practice Situation	Stream flow is not impeded and a stable base exists for equipment, people and/or animals to cross. Associated practices could be (342) Critical Area Planting, (560) Access Road, (575) Animal Trails and Walkways, (566) Recreational Trails and Walkways, (500) Obstruction Removal, or (584) Channel Stabilization.
Scenario Feature Measure	Crossing dimensions
Scenario Unit	Square Foot
Scenario Typical Size	600

Cost Summary:

Cost Category	Scenario Cost	Scenario Cost/Unit
Materials	$70.00	$0.12
Equipment/Installation	$4,056.18	$6.76
Labor	$99.16	$0.17
Mobilization	$240.76	$0.40
Acquisition of Technical Knowledge	$0.00	$0.00
Foregone Income	$0.00	$0.00
Total	$4,466.10	$7.44

Cost Details:

Cost Category	Component ID	Component Name	Component Description	Unit	Price ($/unit)	Quantity	Cost
Materials	43	Silt Fence	Silt Fence with support post, includes materials, equipment and labor	Foot	$0.70	100	$70.00
Equipment/Installation	1215	Truck, dump, 12 CY	Dump truck for moving bulk material. Typically capacity is 16 ton or 12 cubic yards. Includes equipment only.	Hour	$72.35	4	$289.40
Equipment/Installation	1227	Excavation, common earth, side cast, large equipment	Bulk excavation and side casting of common earth with hydraulic excavator with less greater than 1 CY capacity. Includes equipment and labor.	Cubic Yard	$1.66	110	$182.60
Equipment/Installation	37	Concrete, CIP, slab on grade, reinforced	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	$204.81	17.5	$3,584.18
Labor	233	Equipment Operators, Heavy	Includes: Cranes, Hydraulic Excavators >=50 HP, Dozers, Paving Machines, Rock Trenchers, Trenchers >=12", Dump Trucks, Ag Equipment >=150 HP, Scrapers, Water Wagons.	Hour	$24.79	4	$99.16
Mobilization	1139	Mobilization, medium equipment	Equipment with 70-150 HP or typical weights between 14,000 and 30,000 pounds.	Each	$120.38	2	$240.76

Scenario Worksheet

Practice and Scenario Description:

Information Type	Data
Region	Northern Plains
State	South Dakota
Discipline Group	Engineering General
Practice Code/Name	580 - Streambank and Shoreline Protection
Scenario ID	2
Scenario Name	Bioengineered
Scenario Description	Protection of streambanks consisting of a bioengineered technique comprised of non-structural measures such as earth revetments and benches with vegetative measures to stabilize and protect the streambank against scour and erosion. Soil bioengineering is a system of living plant materials used as structural components. Adapted types of woody vegetation (shrubs and trees) are initially installed in specified configurations that offer immediate soil protection and reinforcement. In addition, soil bioengineering systems create resistance to sliding or shear displacement in a streambank as they develop roots or fibrous inclusions. Environmental benefits derived from woody vegetation include diverse and productive riparian habitats, shade, organic additions to the stream, cover for fish, and improvements in aesthetic value and water quality. Under certain conditions, soil bioengineering installations work well in conjunction with structures to provide more permanent protection and healthy function, enhance aesthetics, and create a more environmentally acceptable product. Soil bioengineering systems normally use unrooted plant parts in the form of cut branches and rooted plants. For streambanks, living systems include brushmattresses, live stakes, joint plantings, vegetated geogrids, branchpacking, and live fascines. The purpose of this practice is to maintain, improve, or restore physical, chemical, and biological functions of a stream to provide diverse aquatic communities to improve habitat for desired aquatic species. Payment cost include shaping bank, livestake, rootwads and revetments: a 6-foot high bank at 3(H):1(V) slope for 1000 linear feet (0.46 acres) is used for estimation purposes. In order to ensure plant community establishment and integrity, a vegetative management plan shall be prepared and paid in accordance with Conservation Practice Standard (CPS) 342, Critical Area Planting. Resource Concerns: Soil Erosion - Excessive Bank Erosion from Streams, Shoreline and Water Conveyance Channels; Water Quality Degradation - Excessive Sediment in Surface Waters; Water Quality Degradation - Elevated Water Temperature; Excess/Insufficient Water - Excessive Sediment in Surface Waters; Inadequate Habitat for Fish and Wildlife- Habitat Degradation. Associated Practices include: 560 - Access Road; 342 - Critical Area Planting; 382 - Fence; 391 - Riparian Forest Buffer; 390 - Riparian Herbaceous Cover; 395 - Stream Habitat Improvement and Management; 614 - Watering Facility
Before Practice Situation	A stream bisects the agricultural property and has had all of the woody vegetation removed due to overgrazing or human manipulation; the stream has moderately degraded streambanks that are unstable and show signs of active erosion. Soil Erosion: The streambank is unstable. Water Quality Degradation: The sediment load has increased in the stream resulting in elevated water temperatures. Excess/Insufficient Water: The excessive sediment load has reduced the water conveyance capacity, storage capacity and flow within the stream. Inadequate Habitat for Fish and Wildlife: The deficiencies in the stream's habitat limit survival, growth, reproduction, and/or diversity of aquatic organisms within the stream.
After Practice Situation	The streambank is stable against further erosion and encourages natural sediment transport and deposition. Loss of riparian areas and sediment load is reduced in the stream. For Soil Erosion: The streambank is stable. For Water Quality Degradation: The sediment load has decreased in the stream resulting in improved aquatic habitat. For Excess/Insufficient Water: The water conveyance capacity, storage capacity and flow within the stream has been stabilized. For Inadequate Habitat for Fish and Wildlife: The reduction in the sediment load promotes survival, growth, reproduction, and/or diversity of aquatic organisms within the stream's habitat.
Scenario Feature Measure	Lineal Feet of Bioengineering Installed
Scenario Unit	Linear Foot
Scenario Typical Size	1000

Cost Summary:

Cost Category	Scenario Cost	Scenario Cost/Unit
Materials	$3,964.12	$3.96
Equipment/Installation	$9,726.25	$9.73
Labor	$11,024.21	$11.02
Mobilization	$858.04	$0.86
Acquisition of Technical Knowledge	$0.00	$0.00
Foregone Income	$0.00	$0.00
Total	$25,572.62	$25.57

Cost Details:

Cost Category	Component ID	Component Name	Component Description	Unit	Price ($/unit)	Quantity	Cost
Materials	1213	Erosion Control Blanket, biodegradable	Biodegradable erosion control blanket, typically a composite of natural fibers with reinforcing polymer netting. Materials only.	Square Yard	$1.46	2222	$3,244.12
Materials	1426	Tree, willow	Willow tree for planting, 18" to 36" seedling. Materials only.	Each	$0.72	1000	$720.00
Equipment/Installation	932	Hydraulic Excavator, 2 CY	Track mounted hydraulic excavator with bucket capacity range of 1.5 to 2.5 CY. Equipment and power unit costs. Labor not included.	Hour	$155.01	25	$3,875.25
Equipment/Installation	929	Dozer, 80 HP	Track mounted Dozer with horsepower range of 60 to 90. Equipment and power unit costs. Labor not included.	Hour	$54.75	16	$876.00
Equipment/Installation	48	Excavation, Common Earth, side cast, small equipment	Bulk excavation and side casting of common earth with hydraulic excavator with less than 1 CY capacity. Includes equipment and labor.	Cubic yard	$1.99	2500	$4,975.00
Labor	232	Equipment Operators, Light	Includes: Skid Steer Loaders, Hydraulic Excavators <50 HP, Trenchers <12", Ag Equipment <150 HP, Pickup Trucks, Forklifts, Mulchers	Hour	$20.61	16	$329.76
Labor	231	General Labor	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	$16.72	370	$6,186.40

Labor	234	Supervisor or Manager	Labor involving supervision or management activities. Includes crew supervisors, foremen and farm/ranch managers time required for adopting new technology, etc.	Hour	$33.11	80	$2,648.80
Labor	233	Equipment Operators, Heavy	Includes: Cranes, Hydraulic Excavators >=50 HP, Dozers, Paving Machines, Rock Trenchers, Trenchers >=12", Dump Trucks, Ag Equipment >=150 HP, Scrapers, Water Wagons.	Hour	$24.79	75	$1,859.25
Mobilization	1145	Mobilization, Supervisor or Manager	Mobilization of supervisors or management. Includes crew supervisors, foremen and farm/ranch managers, etc.	Hour	$32.80	10	$328.00
Mobilization	1142	Mobilization, General labor	Mobilization of general labor: Ex. pipe layer, herder, concrete placement, materials spreader, flagger, etc.	Hour	$16.89	10	$168.90
Mobilization	1139	Mobilization, medium equipment	Equipment with 70-150 HP or typical weights between 14,000 and 30,000 pounds.	Each	$120.38	3	$361.14

Scenario Worksheet

Practice and Scenario Description:

Information Type	Data
Region	Northern Plains
State	South Dakota
Discipline Group	Engineering General
Practice Code/Name	580 - Streambank and Shoreline Protection
Scenario ID	3
Scenario Name	Rock Riprap
Scenario Description	Protection of streambanks using riprap to stabilize and protect banks of streams or excavated channels against scour and erosion. The purpose of this practice is to maintain, improve, or restore physical, chemical, and biological functions of a stream to provide diverse aquatic communities to improve habitat for desired aquatic species. Payment cost include shaping bank, geotextile, and rock rip rap; a 6-foot high bank at 3(H):1(V) slope for 1000 linear feet (0.46 acres) is used for estimation purposes. The rock toe will be 3' thick and 5' high. The bank above the riprap will be graded to a stable slope and revegetated. In order to ensure plant community establishment and integrity, a vegetative management plan shall be prepared and paid in accordance with Conservation Practice Standard (CPS) 342, Critical Area Planting. Resource Concerns: Soil Erosion - Excessive Bank Erosion from Streams, Shoreline and Water Conveyance Channels; Water Quality Degradation - Excessive Sediment in Surface Waters; Water Quality Degradation - Elevated Water Temperature; Excess/Insufficient Water - Excessive Sediment in Surface Waters; Inadequate Habitat for Fish and Wildlife- Habitat Degradation. Associated Practices include: 560 - Access Road; 342 - Critical Area Planting; 382 - Fence; 391 - Riparian Forest Buffer; 390 - Riparian Herbaceous Cover; 395 - Stream Habitat Improvement and Management; 614 - Watering Facility
Before Practice Situation	A stream bisects the agricultural property and has had all of the woody vegetation removed due to overgrazing or human manipulation; the stream has severely degraded streambanks that are unstable and show signs of active erosion. Soil Erosion: The streambank is unstable. Water Quality Degradation: The sediment load has increased in the stream resulting in elevated water temperatures. Excess/Insufficient Water: The excessive sediment load has reduced the water conveyance capacity, storage capacity and flow within the stream. Inadequate Habitat for Fish and Wildlife: The deficiencies in the stream's habitat limit survival, growth, reproduction, and/or diversity of aquatic organisms within the stream.
After Practice Situation	The streambank is stable against further erosion and encourages natural sediment transport and deposition. Loss of riparian areas and sediment load is reduced in the stream. For Soil Erosion: The streambank is stable. For Water Quality Degradation: The sediment load has decreased in the stream resulting in improved aquatic habitat. For Excess/Insufficient Water: The water conveyance capacity, storage capacity and flow within the stream has been stabilized. For Inadequate Habitat for Fish and Wildlife: The reduction in the sediment load promotes survival, growth, reproduction, and/or diversity of aquatic organisms within the stream's habitat.
Scenario Feature Measure	Volume of Riprap Installed
Scenario Unit	Cubic Yard
Scenario Typical Size	1667

Cost Summary:

Cost Category	Scenario Cost	Scenario Cost/Unit
Materials	$67,686.55	$40.60
Equipment/Installation	$5,026.00	$3.01
Labor	$2,724.24	$1.63
Mobilization	$842.44	$0.51
Acquisition of Technical Knowledge	$0.00	$0.00
Foregone Income	$0.00	$0.00
Total	$76,279.23	$45.76

Cost Details:

Cost Category	Component ID	Component Name	Component Description	Unit	Price ($/unit)	Quantity	Cost
Materials	1213	Erosion Control Blanket, biodegradable	Biodegradable erosion control blanket, typically a composite of natural fibers with reinforcing polymer netting. Materials only.	Square Yard	$1.46	556	$811.76
Materials	44	Rock Riprap, Placed with geotextile	Rock Riprap, placed with geotextile, includes materials, equipment and labor to transport and place	Cubic yard	$59.87	1117	$66,874.79
Equipment/Installation	1227	Excavation, common earth, side cast, large equipment	Bulk excavation and side casting of common earth with hydraulic excavator with less greater than 1 CY capacity. Includes equipment and labor.	Cubic Yard	$1.66	2500	$4,150.00
Equipment/Installation	929	Dozer, 80 HP	Track mounted Dozer with horsepower range of 60 to 90. Equipment and power unit costs. Labor not included.	Hour	$54.75	16	$876.00
Labor	232	Equipment Operators, Light	Includes: Skid Steer Loaders, Hydraulic Excavators <50 HP, Trenchers <12", Ag Equipment <150 HP, Pickup Trucks, Forklifts, Mulchers	Hour	$20.61	16	$329.76
Labor	231	General Labor	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	$16.72	64	$1,070.08
Labor	234	Supervisor or Manager	Labor involving supervision or management activities. Includes crew supervisors, foremen and farm/ranch managers time required for adopting new technology, etc.	Hour	$33.11	40	$1,324.40
Mobilization	1145	Mobilization, Supervisor or Manager	Mobilization of supervisors or management. Includes crew supervisors, foremen and farm/ranch managers, etc.	Hour	$32.80	10	$328.00

Mobilization	1140	Mobilization, large equipment	Equipment >150HP or typical weights greater than 30,000 pounds or loads requiring over width or over length permits.	Each	$225.16	1	$225.16
Mobilization	1142	Mobilization, General labor	Mobilization of general labor: Ex. pipe layer, herder, concrete placement, materials spreader, flagger, etc.	Hour	$16.89	10	$168.90
Mobilization	1139	Mobilization, medium equipment	Equipment with 70-150 HP or typical weights between 14,000 and 30,000 pounds.	Each	$120.38	1	$120.38

Scenario Worksheet

Practice and Scenario Description:

Information Type	Data
Region	Northern Plains
State	South Dakota
Discipline Group	Engineering General
Practice Code/Name	580 - Streambank and Shoreline Protection
Scenario ID	4
Scenario Name	Gabion
Scenario Description	Protection of streambanks using gabions to stabilize and protect banks of streams or excavated channels against scour and erosion. The purpose of this practice is to maintain, improve, or restore physical, chemical, and biological functions of a stream to provide diverse aquatic communities to improve habitat for desired aquatic species. Payment cost include shaping bank, geotextile, and rock gabions; a 12-foot high bank for 48 linear feet is used for estimation purposes. The gabions will be 3' thick and 3' long stacked 12' high. The bank around the gabion will be graded to a stable slope and revegetated. In order to ensure plant community establishment and integrity, a vegetative management plan shall be prepared and paid in accordance with Conservation Practice Standard (CPS) 342, Critical Area Planting. Resource Concerns: Soil Erosion - Excessive Bank Erosion from Streams, Shoreline and Water Conveyance Channels; Water Quality Degradation - Excessive Sediment in Surface Waters; Water Quality Degradation - Elevated Water Temperature; Excess/Insufficient Water - Excessive Sediment in Surface Waters; Inadequate Habitat for Fish and Wildlife- Habitat Degradation. Associated Practices include: 560 - Access Road; 342 - Critical Area Planting; 382 - Fence; 391 - Riparian Forest Buffer; 390 - Riparian Herbaceous Cover; 395 - Stream Habitat Improvement and Management; 614 - Watering Facility
Before Practice Situation	A stream bisects the agricultural property and has had all of the woody vegetation removed due to overgrazing or human manipulation; the stream has severely degraded streambanks that are unstable and show signs of active erosion. Soil Erosion: The streambank is unstable. Water Quality Degradation: The sediment load has increased in the stream resulting in elevated water temperatures. Excess/Insufficient Water: The excessive sediment load has reduced the water conveyance capacity, storage capacity and flow within the stream. Inadequate Habitat for Fish and Wildlife: The deficiencies in the stream's habitat limit survival, growth, reproduction, and/or diversity of aquatic organisms within the stream.
After Practice Situation	The streambank is stable against further erosion and encourages natural sediment transport and deposition. Loss of riparian areas and sediment load is reduced in the stream. For Soil Erosion: The streambank is stable. For Water Quality Degradation: The sediment load has decreased in the stream resulting in improved aquatic habitat. For Excess/Insufficient Water: The water conveyance capacity, storage capacity and flow within the stream has been stabilized. For Inadequate Habitat for Fish and Wildlife: The reduction in the sediment load promotes survival, growth, reproduction, and/or diversity of aquatic organisms within the stream's habitat.
Scenario Feature Measure	Length of Shoreline protected
Scenario Unit	Linear Foot
Scenario Typical Size	48

Cost Summary:

Cost Category	Scenario Cost	Scenario Cost/Unit
Materials	$18,429.08	$383.94
Equipment/Installation	$1,425.00	$29.69
Labor	$1,654.16	$34.46
Mobilization	$673.54	$14.03
Acquisition of Technical Knowledge	$0.00	$0.00
Foregone Income	$0.00	$0.00
Total	$22,181.78	$462.12

Cost Details:

Cost Category	Component ID	Component Name	Component Description	Unit	Price ($/unit)	Quantity	Cost
Materials	1210	Geotextile, non-woven, heavy weight	Non-woven greater than 8 ounce/square yard geotextile with staple anchoring. Materials only.	Square Yard	$4.04	75	$303.00
Materials	1378	Gabion basket or mat	Gabion baskets or mats installed and filled on grade, includes materials, transport, equipment, and labor, does not include geotextile fabric.	Cubic Yard	$141.61	128	$18,126.08
Equipment/Installation	1227	Excavation, common earth, side cast, large equipment	Bulk excavation and side casting of common earth with hydraulic excavator with less greater than 1 CY capacity. Includes equipment and labor.	Cubic Yard	$1.66	150	$249.00
Equipment/Installation	929	Dozer, 80 HP	Track mounted Dozer with horsepower range of 60 to 90. Equipment and power unit costs. Labor not included.	Hour	$54.75	16	$876.00
Equipment/Installation	51	Earthfill, Dumped and Spread	Earthfill, dumped and spread without compaction effort, includes equipment and labor	Cubic yard	$3.00	100	$300.00
Labor	232	Equipment Operators, Light	Includes: Skid Steer Loaders, Hydraulic Excavators <50 HP, Trenchers <12", Ag Equipment <150 HP, Pickup Trucks, Forklifts, Mulchers	Hour	$20.61	16	$329.76
Labor	234	Supervisor or Manager	Labor involving supervision or management activities. Includes crew supervisors, foremen and farm/ranch managers time required for adopting new technology, etc.	Hour	$33.11	40	$1,324.40
Mobilization	1145	Mobilization, Supervisor or Manager	Mobilization of supervisors or management. Includes crew supervisors, foremen and farm/ranch managers, etc.	Hour	$32.80	10	$328.00
Mobilization	1140	Mobilization, large equipment	Equipment >150HP or typical weights greater than 30,000 pounds or loads requiring over width or over length permits.	Each	$225.16	1	$225.16
Mobilization	1139	Mobilization, medium equipment	Equipment with 70-150 HP or typical weights between 14,000 and 30,000 pounds.	Each	$120.38	1	$120.38

Scenario Worksheet

Practice and Scenario Description:

Information Type	Data
Region	Northern Plains
State	South Dakota
Discipline Group	Engineering General
Practice Code/Name	582 - Open Channel
Scenario ID	1
Scenario Name	Excavation, normal conditions
Scenario Description	This scenario is the construction or improvement of a channel in which water flows with a free surface. Typical construction dimensions are 3-4' deep x 30' wide bottom x 2000' length with a side slope of 6:1. The practice is used for the restoration of a natural or artificial channel to improve the process and ecological function in a degraded and eroding stream. Excavation and earth fill is required. Conditions are difficult. Difficult conditions include: a location that requires a significant drive off the main road, soils with large rock or difficult clay to excavate, and/or other aspects that create difficulty in excavation compared to similar work in the area. Construction may include vegetation and/or a lightly armored bank toe. This scenario assists in addressing the resource concerns: streambank erosion, sediment deposition, excessive flooding or ponding. Conservation practices that may be associated are: 356-Dike, 587-Structure For Water Control, 533-Pumping Plant, 580 Streambank and Shoreline Protection, 584 Channel Stabilization, 578 Stream Crossing.
Before Practice Situation	A stream or channel with active streambank erosion or headcuts and inadequate capacity to handle the flow needed for flood prevention, drainage or erosion prevention.
After Practice Situation	An earthen channel was excavated to allow unrestricted flow of water and to stabilize the bottom and side slopes. Flooding and erosion is no longer a resource concern.
Scenario Feature Measure	Volume of earth excavated in CY's
Scenario Unit	Cubic Yard
Scenario Typical Size	9920

Cost Summary:

Cost Category	Scenario Cost	Scenario Cost/Unit
Materials	$0.00	$0.00
Equipment/Installation	$21,359.36	$2.15
Labor	$396.64	$0.04
Mobilization	$202.54	$0.02
Acquisition of Technical Knowledge	$0.00	$0.00
Foregone Income	$0.00	$0.00
Total	$21,958.54	$2.21

Cost Details:

Cost Category	Component ID	Component Name	Component Description	Unit	Price ($/unit)	Quantity	Cost
Equipment/Installation	927	Dozer, 140 HP	Track mounted Dozer with horsepower range of 125 to 160. Equipment and power unit costs. Labor not included.	Hour	$101.16	16	$1,618.56
Equipment/Installation	48	Excavation, Common Earth, side cast, small equipment	Bulk excavation and side casting of common earth with hydraulic excavator with less than 1 CY capacity. Includes equipment and labor.	Cubic yard	$1.99	9920	$19,740.80
Labor	233	Equipment Operators, Heavy	Includes: Cranes, Hydraulic Excavators >=50 HP, Dozers, Paving Machines, Rock Trenchers, Trenchers >=12", Dump Trucks, Ag Equipment >=150 HP, Scrapers, Water Wagons.	Hour	$24.79	16	$396.64
Mobilization	1139	Mobilization, medium equipment	Equipment with 70-150 HP or typical weights between 14,000 and 30,000 pounds.	Each	$120.38	1	$120.38
Mobilization	1138	Mobilization, small equipment	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	$82.16	1	$82.16

Scenario Worksheet

Practice and Scenario Description:

Information Type	Data
Region	Northern Plains
State	South Dakota
Discipline Group	Engineering General
Practice Code/Name	584 - Channel Bed Stabilization
Scenario ID	1
Scenario Name	Bio-engineering
Scenario Description	Stabilize the bottom and slope of a stream channel using bioengineering methods. Bio-engineering methods include live stakes, fascines, plantings, bare root stock, willow waddles, and live stakes. Re-vegetation of exposed surfaces will be completed using 342 - Critical Area Planting. Typical stream has 50 foot bottom width and 6 foot banks. Length of area 100 feet. Planting bank area at a 2x2 grid with live stakes, potted plants, and bare root mix
Before Practice Situation	Bed of an existing or newly constructed alluvial or threshold channel is undergoing damaging aggradation or degradation. Stream cannot be feasibly controlled with clearing and snagging, vegetation, bank protection or upstream water control. Soil Erosion: The stream is unstable. Water Quality Degradation: The sediment load has increased in the stream resulting in elevated water temperatures. Excess/Insufficient Water: The excessive sediment load has reduced the water conveyance capacity, storage capacity and flow within the stream. Inadequate Habitat for Fish and Wildlife: The deficiencies in the stream's habitat limit survival, growth, reproduction, and/or diversity of aquatic organisms within the stream.
After Practice Situation	Stream channel is stable and vegetated. Other associated practices could be (326) Clearing and Snagging, (396) Aquatic Organism Passage, (395) Stream Habitat Improvement and Management, (580) Streambank and Shoreline Protection, or (587) Structure for Water Control. For Soil Erosion: The streambank is stable. For Water Quality Degradation: The sediment load has decreased in the stream resulting in improved aquatic habitat. For Excess/Insufficient Water: The water conveyance capacity, storage capacity and flow within the stream has been stabilized. For Inadequate Habitat for Fish and Wildlife: The reduction in the sediment load promotes survival, growth, reproduction, and/or diversity of aquatic organisms within the stream's habitat.
Scenario Feature Measure	Area of planting
Scenario Unit	Square Foot
Scenario Typical Size	2500

Cost Summary:

Cost Category	Scenario Cost	Scenario Cost/Unit
Materials	$2,972.00	$1.19
Equipment/Installation	$929.20	$0.37
Labor	$3,152.00	$1.26
Mobilization	$83.47	$0.03
Acquisition of Technical Knowledge	$0.00	$0.00
Foregone Income	$0.00	$0.00
Total	$7,136.67	$2.85

Cost Details:

Cost Category	Component ID	Component Name	Component Description	Unit	Price ($/unit)	Quantity	Cost
Materials	1213	Erosion Control Blanket, biodegradable	Biodegradable erosion control blanket, typically a composite of natural fibers with reinforcing polymer netting. Materials only.	Square Yard	$1.46	800	$1,168.00
Materials	1904	Wattles or facines, 6 to 8 inch diameter	Facines, or wattles: bundles of live tree stems of species that sprout roots, bound together. 6"-8" diameter. Materials only.	Foot	$6.50	200	$1,300.00
Materials	1426	Tree, willow	Willow tree for planting, 18" to 36" seedling. Materials only.	Each	$0.72	700	$504.00
Equipment/Installation	1199	Stripping and stockpiling, topsoil	Stripping and stockpiling of topsoil adjacent to stripping area. Includes equipment and labor.	Cubic Yard	$0.79	200	$158.00
Equipment/Installation	963	Tractor, agricultural, 60 HP	Agricultural tractor with horsepower range of 50 to 90. Equipment and power unit costs. Labor not included.	Hour	$19.28	40	$771.20
Labor	232	Equipment Operators, Light	Includes: Skid Steer Loaders, Hydraulic Excavators <50 HP, Trenchers <12", Ag Equipment <150 HP, Pickup Trucks, Forklifts, Mulchers	Hour	$20.61	40	$824.40
Labor	231	General Labor	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	$16.72	60	$1,003.20
Labor	234	Supervisor or Manager	Labor involving supervision or management activities. Includes crew supervisors, foremen and farm/ranch managers time required for adopting new technology, etc.	Hour	$33.11	40	$1,324.40
Mobilization	1145	Mobilization, Supervisor or Manager	Mobilization of supervisors or management. Includes crew supervisors, foremen and farm/ranch managers, etc.	Hour	$32.80	1	$32.80
Mobilization	1142	Mobilization, General labor	Mobilization of general labor: Ex. pipe layer, herder, concrete placement, materials spreader, flagger, etc.	Hour	$16.89	3	$50.67

Scenario Worksheet

Practice and Scenario Description:

Information Type	Data
Region	Northern Plains
State	South Dakota
Discipline Group	Engineering General
Practice Code/Name	584 - Channel Bed Stabilization
Scenario ID	2
Scenario Name	Rock structures
Scenario Description	Stabilize the bottom and slope of a stream channel using rock riprap or engineered products that consist primarily of rock or concrete. This includes but not limited to gabions, rock veins, rock weirs, concrete blocks,etc. Typical stream has 50 foot bottom width and 6 foot banks. Length of area 100 feet. Based on degrading channel that needs to be riprapped its entire wetted perimeter.
Before Practice Situation	Bed of an existing or newly constructed alluvial or threshold channel is undergoing damaging aggradation or degradation. Changes cannot be controlled feasibly with clearing and snagging, vegetation, bank protection or upstream water control. Soil Erosion: The stream is unstable. Water Quality Degradation: The sediment load has increased in the stream resulting in elevated water temperatures. Excess/Insufficient Water: The excessive sediment load has reduced the water conveyance capacity, storage capacity and flow within the stream. Inadequate Habitat for Fish and Wildlife: The deficiencies in the stream's habitat limit survival, growth, reproduction, and/or diversity of aquatic organisms within the stream.
After Practice Situation	Stream channel is stable. Re-vegetation of exposed surfaces will be completed using 342 - Critical Area Planting. Other associated practices could be (326) Clearing and Snagging, (396) Aquatic Organism Passage, (395) Stream Habitat Improvement and Management, (580) Streambank and Shoreline Protection, or (587) Structure for Water Control. For Soil Erosion: The streambank is stable. For Water Quality Degradation: The sediment load has decreased in the stream resulting in improved aquatic habitat. For Excess/Insufficient Water: The water conveyance capacity, storage capacity and flow within the stream has been stabilized. For Inadequate Habitat for Fish and Wildlife: The reduction in the sediment load promotes survival, growth, reproduction, and/or diversity of aquatic organisms within the stream's habitat.
Scenario Feature Measure	Volume of Rock installed
Scenario Unit	Cubic Yard
Scenario Typical Size	575

Cost Summary:

Cost Category	Scenario Cost	Scenario Cost/Unit
Materials	$35,994.00	$62.60
Equipment/Installation	$52.56	$0.09
Labor	$167.20	$0.29
Mobilization	$120.38	$0.21
Acquisition of Technical Knowledge	$0.00	$0.00
Foregone Income	$0.00	$0.00
Total	$36,334.14	$63.19

Cost Details:

Cost Category	Component ID	Component Name	Component Description	Unit	Price ($/unit)	Quantity	Cost
Materials	1426	Tree, willow	Willow tree for planting, 18" to 36" seedling. Materials only.	Each	$0.72	100	$72.00
Materials	44	Rock Riprap, Placed with geotextile	Rock Riprap, placed with geotextile, includes materials, equipment and labor to transport and place	Cubic yard	$59.87	600	$35,922.00
Equipment/Installation	40	Clearing and Grubbing	Clearing and Grubbing, includes materials, equipment and labor	Acre	$262.81	0.2	$52.56
Labor	231	General Labor	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	$16.72	10	$167.20
Mobilization	1139	Mobilization, medium equipment	Equipment with 70-150 HP or typical weights between 14,000 and 30,000 pounds.	Each	$120.38	1	$120.38

Scenario Worksheet

Practice and Scenario Description:

Information Type	Data
Region	Northern Plains
State	South Dakota
Discipline Group	Engineering General
Practice Code/Name	584 - Channel Bed Stabilization
Scenario ID	3
Scenario Name	Wood structures
Scenario Description	Stabilize the bottom and slope of a stream channel using engineered structures consisting primarily of wood. This includes but not limited to toe wood, log weirs, log vanes, root wads, log step pools, etc. Re-vegetation of exposed surfaces will be completed using 342 - Critical Area Planting. Typical stream has 50 foot bottom width and 6 foot banks. Length of area 100 feet. Structures spaced at 50 foot intervals.
Before Practice Situation	Bed of an existing or newly constructed alluvial or threshold channel is undergoing damaging aggradation or degradation. Changes cannot be controlled feasibly with clearing and snagging, vegetation, bank protection or upstream water control. Soil Erosion: The stream is unstable. Water Quality Degradation: The sediment load has increased in the stream resulting in elevated water temperatures. Excess/Insufficient Water: The excessive sediment load has reduced the water conveyance capacity, storage capacity and flow within the stream. Inadequate Habitat for Fish and Wildlife: The deficiencies in the stream's habitat limit survival, growth, reproduction, and/or diversity of aquatic organisms within the stream.
After Practice Situation	Stream channel is stable. Re-vegetation of exposed surfaces will be completed using 342 - Critical Area Planting. Other associated practices could be (326) Clearing and Snagging, (396) Aquatic Organism Passage, (395) Stream Habitat Improvement and Management, (580) Streambank and Shoreline Protection, or (587) Structure for Water Control. For Soil Erosion: The streambank is stable. For Water Quality Degradation: The sediment load has decreased in the stream resulting in improved aquatic habitat. For Excess/Insufficient Water: The water conveyance capacity, storage capacity and flow within the stream has been stabilized. For Inadequate Habitat for Fish and Wildlife: The reduction in the sediment load promotes survival, growth, reproduction, and/or diversity of aquatic organisms within the stream's habitat.
Scenario Feature Measure	Number of structures
Scenario Unit	Each
Scenario Typical Size	3

Cost Summary:

Cost Category	Scenario Cost	Scenario Cost/Unit
Materials	$6,132.75	$2,044.25
Equipment/Installation	$79.60	$26.53
Labor	$668.80	$222.93
Mobilization	$126.32	$42.11
Acquisition of Technical Knowledge	$0.00	$0.00
Foregone Income	$0.00	$0.00
Total	$7,007.47	$2,335.82

Cost Details:

Cost Category	Component ID	Component Name	Component Description	Unit	Price ($/unit)	Quantity	Cost
Materials	1905	Wattles or facines, 9 to 12 inch diameter	Facines, or wattles: bundles of live tree stems of species that sprout roots, bound together. 9"- 12" diameter. Materials only.	Foot	$10.95	150	$1,642.50
Materials	44	Rock Riprap, Placed with geotextile	Rock Riprap, placed with geotextile, includes materials, equipment and labor to transport and place	Cubic yard	$59.87	75	$4,490.25
Equipment/Installation	48	Excavation, Common Earth, side cast, small equipment	Bulk excavation and side casting of common earth with hydraulic excavator with less than 1 CY capacity. Includes equipment and labor.	Cubic yard	$1.99	40	$79.60
Labor	231	General Labor	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	$16.72	40	$668.80
Mobilization	1138	Mobilization, small equipment	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	$82.16	1	$82.16
Mobilization	1141	Mobilization, Skilled labor	Mobilization of skilled labor: Includes carpenters, welders, electricians, conservation professionals involved with data collection, monitoring, and or record keeping, etc.	Hour	$22.08	2	$44.16

Scenario Worksheet

Practice and Scenario Description:

Information Type	Data
Region	Northern Plains
State	South Dakota
Discipline Group	Engineering General
Practice Code/Name	587 - Structure for Water Control
Scenario ID	1
Scenario Name	Inlet Flashboard Riser, Metal
Scenario Description	A Flashboard Riser fabricated of metal and used in a water management system that maintains a desired water surface elevation, controls the direction or rate of flow, or conveys water to address the resource concerns: Inadequate Water - Inefficient use of Irrigation Water and Inadequate habitat for Fish and Wildlife. The water surface elevation is controlled by addition or removal of slats or "stoplogs". This scenario is applicable to variable crest weir structures where the elevation is controlled at the inlet (Half-Rounds). They are often fabricated from half pipes (i.e. half-rounds) or sheet steel in a box shape. Payment rate is based upon the Flashboard Weir Length in inches multiplied by the outlet length in feet (Inch-Foot). Cost estimate is based on a "Half-Round" flashboard riser shop fabricated using a longitudinal cut 36" smooth steel pipe, a 50' long - 30" outlet pipe passing through an embankment. Earthwork is included in the associated pracitce.
Before Practice Situation	The operator presently flood irrigates his field and has no means to accurately maintain a constant water level at various elevations resulting in a lack of flexibility, and inefficient use of water and energy during pumping. The operator also desires to maintain a permanent pool for water fowl during the winter.
After Practice Situation	The operator has the capability to more efficiently control and maintain a range of water surface elevations thereby reducing the flow rate needed. Less water is wasted and both water and energy are conserved. The operator is able to maintain adequate water during the winter as a benefit to waterfowl. Any needed re-vegetation of disturbed areas use Critical Area Planting (342). Other associated practices such as; Irrigation Water Management (449), Irrigation Land Leveling (464), Irrigation Canal or Lateral (320), Irrigation System, Tailwater Recovery (447), Dike (356), and Grade Stabilization Structure (410) will use the corresponding Standard(s) as appropriate.
Scenario Feature Measure	Flashboard Weir Length (in) x barrel Length (ft)
Scenario Unit	Inch-Foot
Scenario Typical Size	1800

Cost Summary:

Cost Category	Scenario Cost	Scenario Cost/Unit
Materials	$8,673.94	$4.82
Equipment/Installation	$617.83	$0.34
Labor	$400.15	$0.22
Mobilization	$120.38	$0.07
Acquisition of Technical Knowledge	$0.00	$0.00
Foregone Income	$0.00	$0.00
Total	$9,812.30	$5.45

Cost Details:

Cost Category	Component ID	Component Name	Component Description	Unit	Price ($/unit)	Quantity	Cost
Materials	1609	Lumber, planks, posts and timbers, treated	Treated dimension lumber with nominal thickness greater than 2". Includes lumber and fasteners. Does not include labor.	Board Foot	$1.19	30	$35.70
Materials	1370	Pipe, Steel, 36", Std Wt	Materials: - 36" - Steel Std Wt	Foot	$182.90	6	$1,097.40
Materials	1372	Steel, Angle, 3" x 3" x 1/4"	Materials: Angle, 3" x 3" x 1/4", Meets ASTM A36	Foot	$3.46	24	$83.04
Materials	1369	Pipe, Steel, 30", Std Wt	Materials: - 30" - Steel Std Wt	Foot	$152.20	49	$7,457.80
Equipment/Installation	37	Concrete, CIP, slab on grade, reinforced	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	$204.81	1	$204.81
Equipment/Installation	50	Earthfill, Manually Compacted	Earthfill, manually compacted, includes equipment and labor	Cubic yard	$4.90	28	$137.20
Equipment/Installation	930	Hydraulic Excavator, .5 CY	Track mounted hydraulic excavator with bucket capacity range of 0.3 to 0.8 CY. Equipment and power unit costs. Labor not included.	Hour	$45.97	6	$275.82
Labor	231	General Labor	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	$16.72	8	$133.76
Labor	230	Skilled Labor	Labor requiring a high level skill set: Includes carpenters, welders, electricians, conservation professionals involved with data collection, monitoring, and or record keeping, etc.	Hour	$23.53	5	$117.65
Labor	233	Equipment Operators, Heavy	Includes: Cranes, Hydraulic Excavators >=50 HP, Dozers, Paving Machines, Rock Trenchers, Trenchers >=12", Dump Trucks, Ag Equipment >=150 HP, Scrapers, Water Wagons.	Hour	$24.79	6	$148.74
Mobilization	1139	Mobilization, medium equipment	Equipment with 70-150 HP or typical weights between 14,000 and 30,000 pounds.	Each	$120.38	1	$120.38

Scenario Worksheet

Practice and Scenario Description:

Information Type	Data
Region	Northern Plains
State	South Dakota
Discipline Group	Engineering General
Practice Code/Name	587 - Structure for Water Control
Scenario ID	2
Scenario Name	Inline Flashboard Riser, Metal
Scenario Description	A Flashboard Riser fabricated of metal and used in a water management system that maintains a desired water surface elevation, controls the direction or rate of flow, or conveys water to address the resource concerns: Inadequate Water - Inefficient use of Irrigation Water and Inadequate habitat for Fish and Wildlife. The water surface elevation is controlled by addition or removal of slats or "stoplogs". This scenario is applicable to variable crest weir structures where the elevation is controlled at the embankment. They are often fabricated from vertical pipes with the stoplogs are located in the middle (i.e. Full-Rounds) or sheet steel in a box shape. Payment rate is based upon the Flashboard Weir Length in inches multiplied by the outlet length in feet (Inch-Foot). Cost estimate is based on a 36" smooth steel flashboard riser shop fabricated with flashboard channels at the midpoint, and a 50' long - 30" outlet pipe passing through an embankment. Earthwork is included in the associated pracitce.
Before Practice Situation	The operator presently flood irrigates his field and has no means to accurately maintain a constant water level at varying elevations resulting in a lack of flexibility, and inefficient use of water and energy during pumping. The operator also desires to maintain a permanent pool for water fowl during the winter.
After Practice Situation	The operator has the capability to more efficiently control and maintain a range of water surface elevations thereby reducing the flow rate needed. Less water is wasted and both water and energy is conserved. The operator is now able to maintain adequate water during the winter as a benefit to waterfowl. Any needed re-vegetation of disturbed areas use Critical Area Planting (342). Other associated practices such as; Irrigation Water Management (449), Irrigation Land Leveling (464), Irrigation Canal or Lateral (320), Irrigation System, Tailwater Recovery (447), Dike (356), and Grade Stabilization Structure (410) will use the corresponding Standard(s) as appropriate.
Scenario Feature Measure	Flashboard Weir Length (in) x Barrel Length (ft)
Scenario Unit	Inch-Foot
Scenario Typical Size	1800

Cost Summary:

Cost Category	Scenario Cost	Scenario Cost/Unit
Materials	$8,673.94	$4.82
Equipment/Installation	$617.83	$0.34
Labor	$400.15	$0.22
Mobilization	$120.38	$0.07
Acquisition of Technical Knowledge	$0.00	$0.00
Foregone Income	$0.00	$0.00
Total	$9,812.30	$5.45

Cost Details:

Cost Category	Component ID	Component Name	Component Description	Unit	Price ($/unit)	Quantity	Cost
Materials	1609	Lumber, planks, posts and timbers, treated	Treated dimension lumber with nominal thickness greater than 2". Includes lumber and fasteners. Does not include labor.	Board Foot	$1.19	30	$35.70
Materials	1370	Pipe, Steel, 36", Std Wt	Materials: - 36" - Steel Std Wt	Foot	$182.90	6	$1,097.40
Materials	1372	Steel, Angle, 3" x 3" x 1/4"	Materials: Angle, 3" x 3" x 1/4", Meets ASTM A36	Foot	$3.46	24	$83.04
Materials	1369	Pipe, Steel, 30", Std Wt	Materials: - 30" - Steel Std Wt	Foot	$152.20	49	$7,457.80
Equipment/Installation	37	Concrete, CIP, slab on grade, reinforced	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	$204.81	1	$204.81
Equipment/Installation	50	Earthfill, Manually Compacted	Earthfill, manually compacted, includes equipment and labor	Cubic yard	$4.90	28	$137.20
Equipment/Installation	930	Hydraulic Excavator, .5 CY	Track mounted hydraulic excavator with bucket capacity range of 0.3 to 0.8 CY. Equipment and power unit costs. Labor not included.	Hour	$45.97	6	$275.82
Labor	231	General Labor	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	$16.72	8	$133.76
Labor	230	Skilled Labor	Labor requiring a high level skill set: Includes carpenters, welders, electricians, conservation professionals involved with data collection, monitoring, and or record keeping, etc.	Hour	$23.53	5	$117.65
Labor	233	Equipment Operators, Heavy	Includes: Cranes, Hydraulic Excavators >=50 HP, Dozers, Paving Machines, Rock Trenchers, Trenchers >=12", Dump Trucks, Ag Equipment >=150 HP, Scrapers, Water Wagons.	Hour	$24.79	6	$148.74
Mobilization	1139	Mobilization, medium equipment	Equipment with 70-150 HP or typical weights between 14,000 and 30,000 pounds.	Each	$120.38	1	$120.38

Scenario Worksheet

Practice and Scenario Description:

Information Type	Data
Region	Northern Plains
State	South Dakota
Discipline Group	Engineering General
Practice Code/Name	587 - Structure for Water Control
Scenario ID	3
Scenario Name	Commercial Inline Flashboard Riser
Scenario Description	An Inline Water Control Structure (WCS) composed of plastic that maintains a desired water surface elevation, controls the direction or rate of flow, or conveys water to address the resource concern: Inadequate habitat for Fish and Wildlife. The water surface elevation is controlled by addition or removal of slats or "stoplogs". This scenario is applicable to variable crest weir structures where the elevation is controlled at point along a pipe extending through an embankment, providing ease of access to the structure and provide better protection against beaver activity. There are commercially available models composed of plastic that are commonly used when the width of the is 24" or less. Payment rate is based upon the Flashboard Weir Length in inches multiplied by the outlet length in feet (Inch-Foot). Cost estimate is based on a using such a commercial product. The typical scenario is an inline structure with a width of 20", height of six feet, The pipe is 50' of 16" SCH 80 PVC (inlet and outlet combined). Earthwork is included in the associated practice.
Before Practice Situation	The landowner wishes to provide for a way to control the water surface elevation in a wetland area. The landowner wishes to enhance and enlarge the area to provide habitat for fish and wildlife.
After Practice Situation	A WCS is installed in a flow line allowing shallow water impoundments. A wetland area is enhanced and water levels can be varied to better accommodate wildlife needs. Any needed re-vegetation of disturbed areas use Critical Area Planting (342). Other associated practices such as; Wetland Creation (658), Wetland Enhancement (659) Wetland Wildlife Habitat Management (644), Dike (356), and Grade Stabilization Structure (410) will use the corresponding Standard(s) as appropriate.
Scenario Feature Measure	Flashboard Weir Length (in) x Barrel Length (ft)
Scenario Unit	Inch-Foot
Scenario Typical Size	1000

Cost Summary:

Cost Category	Scenario Cost	Scenario Cost/Unit
Materials	$3,121.93	$3.12
Equipment/Installation	$136.04	$0.14
Labor	$183.34	$0.18
Mobilization	$153.71	$0.15
Acquisition of Technical Knowledge	$0.00	$0.00
Foregone Income	$0.00	$0.00
Total	$3,595.02	$3.60

Cost Details:

Cost Category	Component ID	Component Name	Component Description	Unit	Price ($/unit)	Quantity	Cost
Materials	1353	Pipe, PVC, 16", SCH 80	Materials: - 16" - PVC - SCH 80 - ASTM D1785	Foot	$35.83	49	$1,755.67
Materials	1425	Water Control Structure, Stoplog, Inline, 20"x24"x6', 15" diameter	Water Level Control Structure, Inline stoplog type, 20" wide x 24" deep x 6' high suitable for a 15" diameter pipe. Typically made of PVC or fiberglass materials. Materials only.	Each	$1,366.26	1	$1,366.26
Equipment/Installation	50	Earthfill, Manually Compacted	Earthfill, manually compacted, includes equipment and labor	Cubic yard	$4.90	9	$44.10
Equipment/Installation	930	Hydraulic Excavator, .5 CY	Track mounted hydraulic excavator with bucket capacity range of 0.3 to 0.8 CY. Equipment and power unit costs. Labor not included.	Hour	$45.97	2	$91.94
Labor	231	General Labor	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	$16.72	8	$133.76
Labor	233	Equipment Operators, Heavy	Includes: Cranes, Hydraulic Excavators >=50 HP, Dozers, Paving Machines, Rock Trenchers, Trenchers >=12", Dump Trucks, Ag Equipment >=150 HP, Scrapers, Water Wagons.	Hour	$24.79	2	$49.58
Mobilization	1137	Mobilization, very small equipment	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	$33.33	1	$33.33
Mobilization	1139	Mobilization, medium equipment	Equipment with 70-150 HP or typical weights between 14,000 and 30,000 pounds.	Each	$120.38	1	$120.38

Scenario Worksheet

Practice and Scenario Description:

Information Type	Data
Region	Northern Plains
State	South Dakota
Discipline Group	Engineering General
Practice Code/Name	587 - Structure for Water Control
Scenario ID	4
Scenario Name	Culvert <30 inches HDPE
Scenario Description	Install a new HDPE culvert under 30 inches in diameter to convey water under roads or other barriers. A typical scenario would be an 24 inch diameter pipe, 40 feet in length. Work includes site preparation, acquiring and installing culvert pipe with gravel bedding and fill (compacted), and riprap protection of side slopes. Use (396) Aquatic Organism Passage when the primary intent is biological concerns, not hydrologic. Use (578) Stream Crossing for culverts ≥ 30 inches or perennial flow. Earthwork is included in the associated practice.
Before Practice Situation	Water flow needs to be conveyed under an access road, ditch or other barrier. Water must be conveyed in a controlled fashion.
After Practice Situation	Water is conveyed in a controlled manner. Associated practices could be Access Road (560), Animal Trails and Walkways (575), Critical Area Planting (342), Drainage Water Management (554), Irrigation Canal or Lateral (320), Irrigation Pipeline (430), Irrigation Reservoir (436), Irrigation System, Surface and Subsurface (443), Irrigation System, Tailwater Recovery (447), Irrigation Water Management (449), Lined Waterway or Outlet (468), Obstruction Removal (500), Pond (378), Stormwater Runoff Control (570), Surface Drain, Field Ditch (607), Surface Drain, Main or Lateral (608), and Trails and Walkways (568).
Scenario Feature Measure	Pipe Diameter (In) x Pipe Length (Ft)
Scenario Unit	Inch-Foot
Scenario Typical Size	960

Cost Summary:

Cost Category	Scenario Cost	Scenario Cost/Unit
Materials	$2,178.49	$2.27
Equipment/Installation	$419.79	$0.44
Labor	$311.47	$0.32
Mobilization	$137.27	$0.14
Acquisition of Technical Knowledge	$0.00	$0.00
Foregone Income	$0.00	$0.00
Total	$3,047.02	$3.17

Cost Details:

Cost Category	Component ID	Component Name	Component Description	Unit	Price ($/unit)	Quantity	Cost
Materials	1246	Pipe, HDPE, CPT, Double Wall, Soil Tight, 24"	Pipe, Corrugated HDPE Double Wall, 24" diameter with soil tight joints - AASHTO M294. Material cost only.	Foot	$18.38	40	$735.20
Materials	46	Aggregate, Gravel, Graded	Gravel, includes materials, equipment and labor to transport and place. Includes washed and unwashed gravel.	Cubic yard	$25.23	5	$126.15
Materials	44	Rock Riprap, Placed with geotextile	Rock Riprap, placed with geotextile, includes materials, equipment and labor to transport and place	Cubic yard	$59.87	22	$1,317.14
Equipment/Installation	50	Earthfill, Manually Compacted	Earthfill, manually compacted, includes equipment and labor	Cubic yard	$4.90	20	$98.00
Equipment/Installation	930	Hydraulic Excavator, .5 CY	Track mounted hydraulic excavator with bucket capacity range of 0.3 to 0.8 CY. Equipment and power unit costs. Labor not included.	Hour	$45.97	7	$321.79
Labor	231	General Labor	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	$16.72	10	$167.20
Labor	232	Equipment Operators, Light	Includes: Skid Steer Loaders, Hydraulic Excavators <50 HP, Trenchers <12", Ag Equipment <150 HP, Pickup Trucks, Forklifts, Mulchers	Hour	$20.61	7	$144.27
Mobilization	1142	Mobilization, General labor	Mobilization of general labor: Ex. pipe layer, herder, concrete placement, materials spreader, flagger, etc.	Hour	$16.89	1	$16.89
Mobilization	1139	Mobilization, medium equipment	Equipment with 70-150 HP or typical weights between 14,000 and 30,000 pounds.	Each	$120.38	1	$120.38

Scenario Worksheet

Practice and Scenario Description:

Information Type	Data
Region	Northern Plains
State	South Dakota
Discipline Group	Engineering General
Practice Code/Name	587 - Structure for Water Control
Scenario ID	5
Scenario Name	Culvert <30 inches CMP
Scenario Description	Install a new Corrugated Metal Pipe (CMP) culvert under 30 inches in diameter to convey water under roads or other barriers. A typical scenario would be an 24 inch diameter pipe, 40 feet in length. Work includes site preparation, acquiring and installing culvert pipe with gravel bedding and fill (compacted), and riprap protection of side slopes. Use (396) Aquatic Organism Passage when the primary intent is biological concerns, not hydrologic. Use (578) Stream Crossing instead for culverts ≥ 30 inches or perennial flow. Earthwork is included in the associated practice.
Before Practice Situation	Water flow needs to be conveyed under an access road, ditch or other barrier. Water must be conveyed in a controlled fashion.
After Practice Situation	Water is conveyed in a controlled manner. Associated practices could be Access Road (560), Animal Trails and Walkways (575), Critical Area Planting (342), Drainage Water Management (554), Irrigation Canal or Lateral (320), Irrigation Pipeline (430), Irrigation Reservoir (436), Irrigation System, Surface and Subsurface (443), Irrigation System, Tailwater Recovery (447), Irrigation Water Management (449), Lined Waterway or Outlet (468), Obstruction Removal (500), Pond (378), Stormwater Runoff Control (570), Surface Drain, Field Ditch (607), Surface Drain, Main or Lateral (608), and Trails and Walkways (568).
Scenario Feature Measure	Pipe Diameter (In) x Pipe Length (Ft)
Scenario Unit	Inch-Foot
Scenario Typical Size	960

Cost Summary:

Cost Category	Scenario Cost	Scenario Cost/Unit
Materials	$2,537.29	$2.64
Equipment/Installation	$511.73	$0.53
Labor	$419.57	$0.44
Mobilization	$137.27	$0.14
Acquisition of Technical Knowledge	$0.00	$0.00
Foregone Income	$0.00	$0.00
Total	$3,605.86	$3.76

Cost Details:

Cost Category	Component ID	Component Name	Component Description	Unit	Price ($/unit)	Quantity	Cost
Materials	1417	Pipe, CMP, 24", 12 Gauge	24" Corrugated Metal Pipe, Galvanized, Uncoated, 12 gage. Material cost only.	Foot	$27.35	40	$1,094.00
Materials	46	Aggregate, Gravel, Graded	Gravel, includes materials, equipment and labor to transport and place. Includes washed and unwashed gravel.	Cubic yard	$25.23	5	$126.15
Materials	44	Rock Riprap, Placed with geotextile	Rock Riprap, placed with geotextile, includes materials, equipment and labor to transport and place	Cubic yard	$59.87	22	$1,317.14
Equipment/Installation	50	Earthfill, Manually Compacted	Earthfill, manually compacted, includes equipment and labor	Cubic yard	$4.90	20	$98.00
Equipment/Installation	930	Hydraulic Excavator, .5 CY	Track mounted hydraulic excavator with bucket capacity range of 0.3 to 0.8 CY. Equipment and power unit costs. Labor not included.	Hour	$45.97	9	$413.73
Labor	231	General Labor	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	$16.72	14	$234.08
Labor	232	Equipment Operators, Light	Includes: Skid Steer Loaders, Hydraulic Excavators <50 HP, Trenchers <12", Ag Equipment <150 HP, Pickup Trucks, Forklifts, Mulchers	Hour	$20.61	9	$185.49
Mobilization	1142	Mobilization, General labor	Mobilization of general labor: Ex. pipe layer, herder, concrete placement, materials spreader, flagger, etc.	Hour	$16.89	1	$16.89
Mobilization	1139	Mobilization, medium equipment	Equipment with 70-150 HP or typical weights between 14,000 and 30,000 pounds.	Each	$120.38	1	$120.38

Scenario Worksheet

Practice and Scenario Description:

Information Type	Data
Region	Northern Plains
State	South Dakota
Discipline Group	Engineering General
Practice Code/Name	587 - Structure for Water Control
Scenario ID	6
Scenario Name	Slide Gate - Flood Dike
Scenario Description	This scenario includes installation of 15" CMP with a 15" slide gate (screw activated) through a flood control dike. Pipe is typically 44 feet long. During normal conditions the pipe provides un-restricted drainage from areas protedcted by the dike. During high water events on the downstream side of the dike, the gate can be closed to prevent flood water from backing into the protected area above the dike.
Before Practice Situation	A dike to protect an area from flooding is either in place or planned. Adequate drainage is required during normal operating periods to prevent saturating the area being protected, and flood waters need to be prevented from entering during periods of flooding.
After Practice Situation	Tide or flood inundation is controlled. Associated practices could be Dike (356), Field Ditch (607), Surface Drain, Main or Lateral (608). After installation of the Dike and Water Control Structure, the area protected by the dike will have proper drainage and protection during high water conditions downstream.
Scenario Feature Measure	Length of Pipe
Scenario Unit	Foot
Scenario Typical Size	48

Cost Summary:

Cost Category	Scenario Cost	Scenario Cost/Unit
Materials	$943.32	$19.65
Equipment/Installation	$566.79	$11.81
Labor	$407.61	$8.49
Mobilization	$157.69	$3.29
Acquisition of Technical Knowledge	$0.00	$0.00
Foregone Income	$0.00	$0.00
Total	$2,075.41	$43.24

Cost Details:

Cost Category	Component ID	Component Name	Component Description	Unit	Price ($/unit)	Quantity	Cost
Materials	1269	Pipe, CMP, 12", 16 Gauge	12" Corrugated Metal Pipe, Galvanized, Uncoated, 16 gage. Material cost only.	Foot	$11.84	48	$568.32
Materials	1829	Slide gate, steel, 2' diameter, low head	2' diameter steel slide gate for low head installations	Each	$375.00	1	$375.00
Equipment/Installation	50	Earthfill, Manually Compacted	Earthfill, manually compacted, includes equipment and labor	Cubic yard	$4.90	50	$245.00
Equipment/Installation	930	Hydraulic Excavator, .5 CY	Track mounted hydraulic excavator with bucket capacity range of 0.3 to 0.8 CY. Equipment and power unit costs. Labor not included.	Hour	$45.97	7	$321.79
Labor	233	Equipment Operators, Heavy	Includes: Cranes, Hydraulic Excavators >=50 HP, Dozers, Paving Machines, Rock Trenchers, Trenchers >=12", Dump Trucks, Ag Equipment >=150 HP, Scrapers, Water Wagons.	Hour	$24.79	7	$173.53
Labor	231	General Labor	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	$16.72	14	$234.08
Mobilization	1142	Mobilization, General labor	Mobilization of general labor: Ex. pipe layer, herder, concrete placement, materials spreader, flagger, etc.	Hour	$16.89	1	$16.89
Mobilization	1139	Mobilization, medium equipment	Equipment with 70-150 HP or typical weights between 14,000 and 30,000 pounds.	Each	$120.38	1	$120.38
Mobilization	1143	Mobilization, Light Equipment Operator	Mobilization of light equipment operators: Skid Steer Loaders, Hydraulic Excavators <50 HP, Trenchers <12", Ag Equipment <150 HP, Pickup Trucks, Forklifts, Mulchers	Hour	$20.42	1	$20.42

Scenario Worksheet

Practice and Scenario Description:

Information Type	Data
Region	Northern Plains
State	South Dakota
Discipline Group	Engineering General
Practice Code/Name	587 - Structure for Water Control
Scenario ID	7
Scenario Name	Flow Meter with Mechanical Index
Scenario Description	Permanently installed water flow meter with mechanical, cumulative volume and rate index. Meters can be any flow measurement device that meets CPS 433, (i.e. meters: turbine, propeller, acoustic, magnetic, venturi, orifice, etc.) with or without straightening vanes. Resource Concerns: Insufficient Water - Inefficient use of irrigation water, and Degraded Plant Condition - Undesirable plant productivity and health, and Inefficient Energy Use - Equipment and facilities
Before Practice Situation	Producer estimates seasonal and individual irrigation application flow rate and volumes based on energy costs, system operating pressure, or other means.
After Practice Situation	Producer is able to access instantaneous rate and cumulative flow volume data at the meter location. The information gained will enable the irrigator to improve irrigation water management, recognize system performance issues before they become critical, and reduce energy use.
Scenario Feature Measure	Nominal Diameter of Meter
Scenario Unit	inch
Scenario Typical Size	10

Cost Summary:

Cost Category	Scenario Cost	Scenario Cost/Unit
Materials	$1,141.12	$114.11
Equipment/Installation	$0.00	$0.00
Labor	$0.00	$0.00
Mobilization	$33.33	$3.33
Acquisition of Technical Knowledge	$0.00	$0.00
Foregone Income	$0.00	$0.00
Total	$1,174.45	$117.45

Cost Details:

Cost Category	Component ID	Component Name	Component Description	Unit	Price ($/unit)	Quantity	Cost
Materials	1450	Flow Meter, with mechanical Index	10 inch, Turbine Type Flow Meter with Mechanical Index, permanently installed. Includes material, labor and installation.	Each	$1,141.12	1	$1,141.12
Mobilization	1137	Mobilization, very small equipment	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	$33.33	1	$33.33

Scenario Worksheet

Practice and Scenario Description:

Information Type	Data
Region	Northern Plains
State	South Dakota
Discipline Group	Engineering General
Practice Code/Name	587 - Structure for Water Control
Scenario ID	8
Scenario Name	Flow Meter with Electronic Index
Scenario Description	Permanently installed water flow meter with an electronic index . Meters can be any flow measurement device that meets CPS 433, (i.e., meters: turbine, propeller, acoustic, magnetic, venturi, orifice, etc.) with or without straightening vanes or data logging capability. Meter nominal diameter for insert type turbine meters will be installation pipe size. Typical installation would include installation of a 10 inch turbine flow meter, with electronic index output. Resource Concerns: Insufficient Water - Inefficient use of irrigation water, and Degraded Plant Condition - Undesirable plant productivity and health, and Inefficient Energy Use - Equipment and facilities
Before Practice Situation	Producer estimates seasonal and individual irrigation application flow rate and volumes based on energy costs, system operating pressure, or other means.
After Practice Situation	Producer is able to access instantaneous rate and cumulative flow volume data at the meter location. The information gained will enable the irrigator to improve irrigation water management, recognize system performance issues before they become critical, and reduce energy use.
Scenario Feature Measure	Nominal Diameter of Meter
Scenario Unit	Inch
Scenario Typical Size	10

Cost Summary:

Cost Category	Scenario Cost	Scenario Cost/Unit
Materials	$1,387.50	$138.75
Equipment/Installation	$0.00	$0.00
Labor	$0.00	$0.00
Mobilization	$33.33	$3.33
Acquisition of Technical Knowledge	$0.00	$0.00
Foregone Income	$0.00	$0.00
Total	$1,420.83	$142.08

Cost Details:

Cost Category	Component ID	Component Name	Component Description	Unit	Price ($/unit)	Quantity	Cost
Materials	1452	Flow Meter, with Electronic Index	10 inch Turbine Irrigation flow meter, with Electronic Index, Rate and Volume, permanently installed. Materials only.	Each	$1,387.50	1	$1,387.50
Mobilization	1137	Mobilization, very small equipment	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	$33.33	1	$33.33

Scenario Worksheet

Practice and Scenario Description:

Information Type	Data
Region	Northern Plains
State	South Dakota
Discipline Group	Engineering General
Practice Code/Name	587 - Structure for Water Control
Scenario ID	9
Scenario Name	Flow Meter with Electronic Index & Telemetry
Scenario Description	Permanently installed water flow meter with an electronic flow rate and volume index and data telemetry transmission system. Meters can be any flow measurement device that meets CPS 433, (i.e. meters: turbine, propeller, acoustic, magnetic, venturi, orifice, etc.) with or without straightening vanes. Meter nominal diameter for insert type turbine meters will be installation pipe size. Typical installation would include installation of a 10 inch magnetic flow meter, with electronic index output and telemetry data transfer system for monitoring irrigation system flow rate. Resource Concerns: Insufficient Water - Inefficient use of irrigation water, and Degraded Plant Condition - Undesirable plant productivity and health, and Inefficient Energy Use - Equipment and facilities Associated Practices: 533-Pumping Plant, 449-Irrigation Water Management, 441-Irrigation System, Microirrigation, 443-Irrigation System Surface and Subsurface, 442-Irrigation System, Sprinkler, 328-Conservation Crop Rotation, 634-Waste Transfer, and 590-Nutrient Management.
Before Practice Situation	Producer estimates seasonal and individual irrigation application flow rate and volumes based on energy costs, system operating pressure, or other means.
After Practice Situation	Producer is able to access instantaneous rate and cumulative flow volume data from a personal computer or cell phone at any time. The information gained will enable the irrigator to improve irrigation water management, recognize system performance issues before they become critical, and reduce energy use.
Scenario Feature Measure	Nominal Diameter of Meter
Scenario Unit	Inch
Scenario Typical Size	10

Cost Summary:

Cost Category	Scenario Cost	Scenario Cost/Unit
Materials	$2,667.80	$266.78
Equipment/Installation	$0.00	$0.00
Labor	$0.00	$0.00
Mobilization	$66.66	$6.67
Acquisition of Technical Knowledge	$0.00	$0.00
Foregone Income	$0.00	$0.00
Total	$2,734.46	$273.45

Cost Details:

Cost Category	Component ID	Component Name	Component Description	Unit	Price ($/unit)	Quantity	Cost
Materials	1451	Flow Meter, with electronic Index and telemetry	10 inch Magnetic Irrigation Flow Meter, with electronic index and equipped for telemetry, permanently installed. Includes material, meter appurtenances, and installation.	Each	$2,667.80	1	$2,667.80
Mobilization	1137	Mobilization, very small equipment	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	$33.33	2	$66.66

Scenario Worksheet

Practice and Scenario Description:

Information Type	Data
Region	Northern Plains
State	South Dakota
Discipline Group	Engineering General
Practice Code/Name	587 - Structure for Water Control
Scenario ID	10
Scenario Name	Rock Check
Scenario Description	This is a structure constructed with rock placed in existing, recently formed and activeminor gullies located near the uppern end of a watershed. Multiple structures are generally required, with downstream structures placed to force tail water at an upstream structure. The furthest upstream structure is located to control existing head cutting. Resource concerns addressed included gully erosion and water quality.
Before Practice Situation	Small gullies are actively forming in locations with reletively small drainage areas that result in increased downstream sedimentation and decreased water quality.
After Practice Situation	Construction of the structures will result in preventing further head cutting in the channel and improved downstream water quality due to a decrease of sediment in the runoff. Construction will consist of minor site shaping, excavaton to tie rock into the embankment, and placement of rock rip rap. Typical dimensions used are 2:1 upstream slope, 5:1 downstream slope with a 3' top width, approximately 4' wide within the channel. The rock will be placed in a key way 1' deep with 1:1 side slopes located below the level top section. The typical height is 3' above the existing channel elevation.
Scenario Feature Measure	Number of Structures
Scenario Unit	Each
Scenario Typical Size	1

Cost Summary:

Cost Category	Scenario Cost	Scenario Cost/Unit
Materials	$273.20	$273.20
Equipment/Installation	$277.92	$277.92
Labor	$140.92	$140.92
Mobilization	$161.83	$161.83
Acquisition of Technical Knowledge	$0.00	$0.00
Foregone Income	$0.00	$0.00
Total	$853.87	$853.87

Cost Details:

Cost Category	Component ID	Component Name	Component Description	Unit	Price ($/unit)	Quantity	Cost
Materials	1200	Rock Riprap, graded, angular, material and shipping	Graded Rock Riprap for all gradation ranges. Includes materials and delivery only.	Ton	$27.32	10	$273.20
Equipment/Installation	931	Hydraulic Excavator, 1 CY	Track mounted hydraulic excavator with bucket capacity range of 0.8 to 1.5 CY. Equipment and power unit costs. Labor not included.	Hour	$92.64	3	$277.92
Labor	234	Supervisor or Manager	Labor involving supervision or management activities. Includes crew supervisors, foremen and farm/ranch managers time required for adopting new technology, etc.	Hour	$33.11	1	$33.11
Labor	233	Equipment Operators, Heavy	Includes: Cranes, Hydraulic Excavators >=50 HP, Dozers, Paving Machines, Rock Trenchers, Trenchers >=12", Dump Trucks, Ag Equipment >=150 HP, Scrapers, Water Wagons.	Hour	$24.79	3	$74.37
Labor	231	General Labor	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	$16.72	2	$33.44
Mobilization	1142	Mobilization, General labor	Mobilization of general labor: Ex. pipe layer, herder, concrete placement, materials spreader, flagger, etc.	Hour	$16.89	1	$16.89
Mobilization	1139	Mobilization, medium equipment	Equipment with 70-150 HP or typical weights between 14,000 and 30,000 pounds.	Each	$120.38	1	$120.38
Mobilization	1144	Mobilization, Heavy Equipment Operator	Mobilization of heavy equipment operators: Hydraulic Excavators >=50 HP, Dozers, Paving Machines, Rock Trenchers, Trenchers >=12", Dump Trucks, Ag Equipment >=150 HP, Scrapers, Water Wagons.	Hour	$24.56	1	$24.56

Scenario Worksheet

Practice and Scenario Description:

Information Type	Data
Region	Northern Plains
State	South Dakota
Discipline Group	Engineering General
Practice Code/Name	587 - Structure for Water Control
Scenario ID	11
Scenario Name	Earth Check
Scenario Description	This is a structure constructed with compacted earth placed in existing, recently formed and active, minor gullies located near the uppern end of a watershed. Multiple structures are generally required, with downstream structures placed to force tail water at an upstream structure. The furthest upstream structure is located to control existing head cutting. Resource concerns addressed included gully erosion and water quality.
Before Practice Situation	Small gullies are actively forming in locations with reletively small drainage areas that result in increased downstream sedimentation and decreased water quality.
After Practice Situation	Construction of the structures will result in preventing further head cutting in the channel and improved downstream water quality due to a decrease of sediment in the runoff. Construction will consist of minor site shaping, and placement of earthfill. Typical dimensions used are 3:1 upstream slope, 5:1 downstream slope with a 3' top width, approximately 4' wide within the channel. The typical height is 3' above the existing channel elevation.
Scenario Feature Measure	Number of Structures
Scenario Unit	Each
Scenario Typical Size	1

Cost Summary:

Cost Category	Scenario Cost	Scenario Cost/Unit
Materials	$174.42	$174.42
Equipment/Installation	$227.06	$227.06
Labor	$49.58	$49.58
Mobilization	$144.94	$144.94
Acquisition of Technical Knowledge	$0.00	$0.00
Foregone Income	$0.00	$0.00
Total	$596.00	$596.00

Cost Details:

Cost Category	Component ID	Component Name	Component Description	Unit	Price ($/unit)	Quantity	Cost
Materials	1212	Turf reinforcement mat	Synthetic turf reinforcement mat with staple anchoring. Includes materials, equipment and labor.	Square Yard	$9.69	18	$174.42
Equipment/Installation	935	Track Loader, 95HP	Equipment and power unit costs. Labor not included.	Hour	$74.03	2	$148.06
Equipment/Installation	50	Earthfill, Manually Compacted	Earthfill, manually compacted, includes equipment and labor	Cubic yard	$4.90	10	$49.00
Equipment/Installation	51	Earthfill, Dumped and Spread	Earthfill, dumped and spread without compaction effort, includes equipment and labor	Cubic yard	$3.00	10	$30.00
Labor	233	Equipment Operators, Heavy	Includes: Cranes, Hydraulic Excavators >=50 HP, Dozers, Paving Machines, Rock Trenchers, Trenchers >=12", Dump Trucks, Ag Equipment >=150 HP, Scrapers, Water Wagons.	Hour	$24.79	2	$49.58
Mobilization	1144	Mobilization, Heavy Equipment Operator	Mobilization of heavy equipment operators: Hydraulic Excavators >=50 HP, Dozers, Paving Machines, Rock Trenchers, Trenchers >=12", Dump Trucks, Ag Equipment >=150 HP, Scrapers, Water Wagons.	Hour	$24.56	1	$24.56
Mobilization	1139	Mobilization, medium equipment	Equipment with 70-150 HP or typical weights between 14,000 and 30,000 pounds.	Each	$120.38	1	$120.38

Scenario Worksheet

Practice and Scenario Description:

Information Type	Data
Region	Northern Plains
State	South Dakota
Discipline Group	Engineering General
Practice Code/Name	587 - Structure for Water Control
Scenario ID	10
Scenario Name	Rock Check
Scenario Description	This is a structure constructed with rock placed in existing, recently formed and activeminor gullies located near the uppern end of a watershed. Multiple structures are generally required, with downstream structures placed to force tail water at an upstream structure. The furthest upstream structure is located to control existing head cutting. Resource concerns addressed included gully erosion and water quality.
Before Practice Situation	Small gullies are actively forming in locations with reletively small drainage areas that result in increased downstream sedimentation and decreased water quality.
After Practice Situation	Construction of the structures will result in preventing further head cutting in the channel and improved downstream water quality due to a decrease of sediment in the runoff. Construction will consist of minor site shaping, excavaton to tie rock into the embankment, and placement of rock rip rap. Typical dimensions used are 2:1 upstream slope, 5:1 downstream slope with a 3' top width, approximately 4' wide within the channel. The rock will be placed in a key way 1' deep with 1:1 side slopes located below the level top section. The typical height is 3' above the existing channel elevation.
Scenario Feature Measure	Number of Structures
Scenario Unit	Each
Scenario Typical Size	1

Cost Summary:

Cost Category	Scenario Cost	Scenario Cost/Unit
Materials	$273.20	$273.20
Equipment/Installation	$277.92	$277.92
Labor	$140.92	$140.92
Mobilization	$161.83	$161.83
Acquisition of Technical Knowledge	$0.00	$0.00
Foregone Income	$0.00	$0.00
Total	$853.87	$853.87

Cost Details:

Cost Category	Component ID	Component Name	Component Description	Unit	Price ($/unit)	Quantity	Cost
Materials	1200	Rock Riprap, graded, angular, material and shipping	Graded Rock Riprap for all gradation ranges. Includes materials and delivery only.	Ton	$27.32	10	$273.20
Equipment/Installation	931	Hydraulic Excavator, 1 CY	Track mounted hydraulic excavator with bucket capacity range of 0.8 to 1.5 CY. Equipment and power unit costs. Labor not included.	Hour	$92.64	3	$277.92
Labor	234	Supervisor or Manager	Labor involving supervision or management activities. Includes crew supervisors, foremen and farm/ranch managers time required for adopting new technology, etc.	Hour	$33.11	1	$33.11
Labor	233	Equipment Operators, Heavy	Includes: Cranes, Hydraulic Excavators >=50 HP, Dozers, Paving Machines, Rock Trenchers, Trenchers >=12", Dump Trucks, Ag Equipment >=150 HP, Scrapers, Water Wagons.	Hour	$24.79	3	$74.37
Labor	231	General Labor	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	$16.72	2	$33.44
Mobilization	1142	Mobilization, General labor	Mobilization of general labor: Ex. pipe layer, herder, concrete placement, materials spreader, flagger, etc.	Hour	$16.89	1	$16.89
Mobilization	1139	Mobilization, medium equipment	Equipment with 70-150 HP or typical weights between 14,000 and 30,000 pounds.	Each	$120.38	1	$120.38
Mobilization	1144	Mobilization, Heavy Equipment Operator	Mobilization of heavy equipment operators: Hydraulic Excavators >=50 HP, Dozers, Paving Machines, Rock Trenchers, Trenchers >=12", Dump Trucks, Ag Equipment >=150 HP, Scrapers, Water Wagons.	Hour	$24.56	1	$24.56

Scenario Worksheet

Practice and Scenario Description:

Information Type	Data
Region	Northern Plains
State	South Dakota
Discipline Group	Engineering General
Practice Code/Name	587 - Structure for Water Control
Scenario ID	11
Scenario Name	Earth Check
Scenario Description	This is a structure constructed with compacted earth placed in existing, recently formed and active, minor gullies located near the uppern end of a watershed. Multiple structures are generally required, with downstream structures placed to force tail water at an upstream structure. The furthest upstream structure is located to control existing head cutting. Resource concerns addressed included gully erosion and water quality.
Before Practice Situation	Small gullies are actively forming in locations with reletively small drainage areas that result in increased downstream sedimentation and decreased water quality.
After Practice Situation	Construction of the structures will result in preventing further head cutting in the channel and improved downstream water quality due to a decrease of sediment in the runoff. Construction will consist of minor site shaping, and placement of earthfill. Typical dimensions used are 3:1 upstream slope, 5:1 downstream slope with a 3' top width, approximately 4' wide within the channel. The typical height is 3' above the existing channel elevation.
Scenario Feature Measure	Number of Structures
Scenario Unit	Each
Scenario Typical Size	1

Cost Summary:

Cost Category	Scenario Cost	Scenario Cost/Unit
Materials	$174.42	$174.42
Equipment/Installation	$227.06	$227.06
Labor	$49.58	$49.58
Mobilization	$144.94	$144.94
Acquisition of Technical Knowledge	$0.00	$0.00
Foregone Income	$0.00	$0.00
Total	$596.00	$596.00

Cost Details:

Cost Category	Component ID	Component Name	Component Description	Unit	Price ($/unit)	Quantity	Cost
Materials	1212	Turf reinforcement mat	Synthetic turf reinforcement mat with staple anchoring. Includes materials, equipment and labor.	Square Yard	$9.69	18	$174.42
Equipment/Installation	935	Track Loader, 95HP	Equipment and power unit costs. Labor not included.	Hour	$74.03	2	$148.06
Equipment/Installation	50	Earthfill, Manually Compacted	Earthfill, manually compacted, includes equipment and labor	Cubic yard	$4.90	10	$49.00
Equipment/Installation	51	Earthfill, Dumped and Spread	Earthfill, dumped and spread without compaction effort, includes equipment and labor	Cubic yard	$3.00	10	$30.00
Labor	233	Equipment Operators, Heavy	Includes: Cranes, Hydraulic Excavators >=50 HP, Dozers, Paving Machines, Rock Trenchers, Trenchers >=12", Dump Trucks, Ag Equipment >=150 HP, Scrapers, Water Wagons.	Hour	$24.79	2	$49.58
Mobilization	1144	Mobilization, Heavy Equipment Operator	Mobilization of heavy equipment operators: Hydraulic Excavators >=50 HP, Dozers, Paving Machines, Rock Trenchers, Trenchers >=12", Dump Trucks, Ag Equipment >=150 HP, Scrapers, Water Wagons.	Hour	$24.56	1	$24.56
Mobilization	1139	Mobilization, medium equipment	Equipment with 70-150 HP or typical weights between 14,000 and 30,000 pounds.	Each	$120.38	1	$120.38

Scenario Worksheet

Practice and Scenario Description:

Information Type	Data
Region	Northern Plains
State	South Dakota
Discipline Group	Agronomy
Practice Code/Name	590 - Nutrient Management
Scenario ID	1
Scenario Name	Basic Nutrient Management
Scenario Description	This scenario describes the implementation of a basic nutrient management system on > = 40 acres of cropland or hayland where there is no manure application. The planned NM system will meet the current 590 standard. Implementation will result in the proper rate, source, method of placement, and timing of nutrients. Payment for implementation is to defray the costs of soil testing, analysis, consultant services that provide nutrient recommendations based on LGU recommendations or crop removal rates and an associated nutrient budget, and recordkeeping. Records demonstrating implementation of the 4 R's of the NM criteria will be required.
Before Practice Situation	In this geographic area, a fertility program is either non existent or does not meet the 590 nutrient management standard. Soil testing is not completed on a regular basis and applications of fertilizers are not based on land grant university recommendations or a nutrient budget. An environmental evaluation or risk assessment is not completed. Nutrients are transported to surface waters through runoff or soil erosion or to ground water from leaching in quantities that degrade water quality and limit use of intended purposes. Soil quality may be degraded by excess or inadequate nutrients.
After Practice Situation	A nutrient management system will be developed to meet the NRCS 590 standard. The development and implementation of a nutrient management plan (NMP) will benefit plant productivity and reduce off-site degradation. A nutrient management budget will be developed for each field(s) based on soil test analysis and land grant university recommendations or crop removal rates. On planning units typically 40 acres or larger, soil testing is completed according to LGU recommendations. The use of pre-plant soil tests will assist with the proper development of the annual nutrient budget. The use post-harvest of soil and/or tissue tests (results interpreted by crop consultant) will help establish the adequacy of the plan in meeting crop needs while minimizing P application rate and residual N, thus reducing the potential for off-site impacts. Records will be provided annually of the current soil test, analysis, amount of application, forms and rates of nutrients for each field, including post harvest analysis. Applications will be completed in a manner that minimizes nutrient runoff and leaching or build up of excess nutrient concentrations.
Scenario Feature Measure	0
Scenario Unit	Acre
Scenario Typical Size	40

Cost Summary:

Cost Category	Scenario Cost	Scenario Cost/Unit
Materials	$9.53	$0.24
Equipment/Installation	$0.00	$0.00
Labor	$165.76	$4.14
Mobilization	$0.00	$0.00
Acquisition of Technical Knowledge	$0.00	$0.00
Foregone Income	$0.00	$0.00
Total	$175.29	$4.38

Cost Details:

Cost Category	Component ID	Component Name	Component Description	Unit	Price ($/unit)	Quantity	Cost
Materials	299	Test, Soil Test, Standard	Includes materials, labor, and equipment costs.	Each	$9.53	1	$9.53
Labor	235	Specialist Labor	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	$82.88	2	$165.76

Scenario Worksheet

Practice and Scenario Description:

Information Type	Data
Region	Northern Plains
State	South Dakota
Discipline Group	Agronomy
Practice Code/Name	590 - Nutrient Management
Scenario ID	2
Scenario Name	Basic Nutrient Management, Organic
Scenario Description	The planned Nutrient Management (NM) system for organic production will meet the current 590 standard. Implementation will result in the proper rate, source, method of placement, and timing of nutrients. Payment for implementation is to defray the costs of soil testing, manure and/or compost analysis, training attendance, consultant services that provide nutrient recommendations. Records demonstrating implementation of the 4 R's of NM standard will be required. This Scenario is designed to encourage organic producers to effectively utilize organic fertilizers, manure, and/or compost appropriately improving soil quality and minimizing runoff of nutrients from fields to surface waters. The basis for nutrient applications will be recommendations based on soil and manure analyses.
Before Practice Situation	In this geographic area, an organic fertility program does not meet the 590 nutrient management standard. Soil testing is not completed on a regular basis and applications of organic fertilizers and amendments are not based on a nutrient budget. Nutrients are transported to surface waters through runoff or erosion and to ground waters through leaching in quantities that degrade water quality and limit use of intended purposes. Soil quality may be degraded by excess or inadequate nutrients. Fields have little or no erosion protection during critical periods often times resulting in sheet, rill, and ephemeral erosion.
After Practice Situation	A nutrient management system will be developed to meet the NRCS 590 standard and NOP regulations. A nutrient management budget will be developed annually for each field(s) based on soil test analysis and crop needs. Soil testing is completed according to LGU (or comparable) instructions. Application of nutrients will be completed at the proper rate, timing, and methods, and sources. Applications will be completed in a manner that minimizes nutrient runoff and leaching or build up of excess nutrient concentrations. Application of nutrients via manures, cover crops or approved commercial forms are applied in a manner that minimizes nutrient runoff and leaching. Specialized training is required by attending annual workshops and/or conferences. Records will be provided annually of the current soil test, analysis, amount of application, forms and rates of nutrients for each field.
Scenario Feature Measure	0
Scenario Unit	Acre
Scenario Typical Size	40

Cost Summary:

Cost Category	Scenario Cost	Scenario Cost/Unit
Materials	$92.11	$2.30
Equipment/Installation	$0.00	$0.00
Labor	$165.76	$4.14
Mobilization	$0.00	$0.00
Acquisition of Technical Knowledge	$326.52	$8.16
Foregone Income	$0.00	$0.00
Total	$584.39	$14.61

Cost Details:

Cost Category	Component ID	Component Name	Component Description	Unit	Price ($/unit)	Quantity	Cost
Materials	307	Test, Compost Analysis	Moisture, Total N, P, K	Each	$39.52	1	$39.52
Materials	306	Test, Manure Analysis	Moisture, Total N, P, K	Each	$43.06	1	$43.06
Materials	299	Test, Soil Test, Standard	Includes materials, labor, and equipment costs.	Each	$9.53	1	$9.53
Labor	235	Specialist Labor	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	$82.88	2	$165.76
Acquisition of Technical Knowledge	296	Training, Registration Costs	Conference Registration Fees	Each	$176.25	1	$176.25
Acquisition of Technical Knowledge	294	Training, Workshops	Educational seminar or series of meetings emphasizing interaction and exchange of information among a usually small number of participants.	Each	$116.67	1	$116.67
Acquisition of Technical Knowledge	297	Transportation	Mileage to attend a training conference, workshop, or TSP travel associated with developing Conservation Activity Plan.	Mile	$0.56	60	$33.60

Scenario Worksheet

Practice and Scenario Description:

Information Type	Data
Region	Northern Plains
State	South Dakota
Discipline Group	Agronomy
Practice Code/Name	590 - Nutrient Management
Scenario ID	3
Scenario Name	Basic Nutrient Management With Manure
Scenario Description	This scenario describes the implementation of a basic nutrient management system on planning units 40 ac or larger of cropland or hayland where there is manure or compost application in addition to commercial fertilizer applications. The planned NM system will meet the current 590 standard. Implementation will result in the proper rate, source, method of placement, and timing of nutrients while minimizing off-site degradation or the excessive built up of N and P. Payment for implementation is to defray the costs of soil testing, manure testing, analysis, proper implementation, consultant services that provide nutrient recommendations based on LGU recommendations or crop removal rates and an associated nutrient budget, and recordkeeping. Risk assessments including PI (phosphorus index) and NI (nitrogen index) will be completed with applications of manure completed based on risk results. Records demonstrating implementation of the 4 R's of the NM plan will be required along with copies of risk assessments. The producer will attend one extension crop school or nutrient management workshop or similar activity annually to stay current on crop-specific nutrient management.
Before Practice Situation	In this geographic area, a fertility program is either non existent or does not meet the 590 nutrient management standard. Soil testing and manure testing is not completed on a regular basis and applications of nutrients are not based on land grant university recommendations or a nutrient budget. Nutrients and manure solids are transported to surface waters through runoff or erosion or to groundwater through leaching in quantities that degrade water quality and limit use of intended purposes. Soil quality may be degraded by excess or inadequate nutrients. Fields have little or no erosion protection often times resulting in wind, sheet, rill, and ephemeral erosion.
After Practice Situation	A nutrient management system that includes manure as a source will be developed to meet the NRCS 590 standard. The development and implementation of a nutrient management plan (NMP) will benefit plant productivity and reduce off-site degradation. A nutrient management budget will be developed for each field(s) based on soil tests and manure test analysis along with land grant university recommendations or crop removal rates. On a planning unit soil testing is completed according to LGU recommendations. The use of pre-plant soil tests will assist with the proper development of the annual nutrient budget. Applications of manure are based on risk assessments (PI - phosphorus index). The use of post-harvest soil and/or tissue tests (results interpreted by crop consultant) will help establish the adequacy of the plan in meeting crop needs while minimizing P application rate and residual N, The use of Pre side-dress soil nitrogen test (PSNT) or a Pre Top Dress Tissue test (PTDTT) prior to the rapid biomass growth of the plant will assist the producer in evaluating the mineralization of Nitrogen from manures / cover crops in providing adequate nitrogen to meet the crop requirements, thus reducing the potential for off-site impacts. Records will be provided annually documenting current soil tests, manure tests, analyses, amount of application, forms and rates of nutrients for each field, including post harvest analysis. Applications will be completed in a manner that minimizes nutrient runoff and leaching or build up of excess nutrient concentrations. The producer will attend one extension crop school or nutrient management workshop or similar activity annually to stay current on crop-specific nutrient management.
Scenario Feature Measure	0
Scenario Unit	Acre
Scenario Typical Size	40

Cost Summary:

Cost Category	Scenario Cost	Scenario Cost/Unit
Materials	$52.59	$1.31
Equipment/Installation	$0.00	$0.00
Labor	$165.76	$4.14
Mobilization	$0.00	$0.00
Acquisition of Technical Knowledge	$292.92	$7.32
Foregone Income	$0.00	$0.00
Total	$511.27	$12.78

Cost Details:

Cost Category	Component ID	Component Name	Component Description	Unit	Price ($/unit)	Quantity	Cost
Materials	306	Test, Manure Analysis	Moisture, Total N, P, K	Each	$43.06	1	$43.06
Materials	299	Test, Soil Test, Standard	Includes materials, labor, and equipment costs.	Each	$9.53	1	$9.53
Labor	235	Specialist Labor	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	$82.88	2	$165.76
Acquisition of Technical Knowledge	296	Training, Registration Costs	Conference Registration Fees	Each	$176.25	1	$176.25
Acquisition of Technical Knowledge	294	Training, Workshops	Educational seminar or series of meetings emphasizing interaction and exchange of information among a usually small number of participants.	Each	$116.67	1	$116.67

Scenario Worksheet

Practice and Scenario Description:

Information Type	Data
Region	Northern Plains
State	South Dakota
Discipline Group	Agronomy
Practice Code/Name	590 - Nutrient Management
Scenario ID	4
Scenario Name	Enhanced Nutrient Management
Scenario Description	This scenario takes a conventional cropping system where either no nutrient management or only a basic nutrient management is being practiced. An enhanced nutrient management system includes split applications and multiple nutrient concentration tests (other than only soil tests) and methods that more concisely enable scheduling of appropriate fertilizer applications. Nutrients are transported to surface waters through runoff or wind erosion in quantities that degrade water quality and limit use of intended purposes. Inefficient energy utilization occurs due to traditional methods and forms of fertilizer applications.
Before Practice Situation	In this geographic area, conventional fertility programs involve very little or no soil or manure testing. Application of fertilizers, including manures and amendments, are completed annually based upon tradition that does not specifically consider the detrimental affects of improper timing or rates of nutrients, or excess nutrient build-up in the soil. Fields are overwintered with little or no erosion protection often times resulting in sheet, rill, and ephemeral erosion by spring. Runoff flows into adjacent streams, water courses, tile drains, field surface drains, or other water courses causing degradation to receiving waters or leaching of nutrients to shallow ground water sources. There is typically no environmental evaluation of the potential for off-site movement. Soil quality may also be detrimentally affected. The current system is also typically inefficient energy user due to traditional methods, forms, and amounts of nutrient applications.
After Practice Situation	The development and implementation of a Nutrient Management Plan (NMP) will benefit plant productivity and reduce off-site movement of nutrients. The use of pre-plant soil tests will assist with the development of the annual nutrient budget in accordance with Land Grant University fertilizer guides. The NMP will stress the use of the four R's (Right Source of Nutrients, Right Time of Application, Right Rate, and Right Method of Application). These include practices such as use of split applications, slow release nutrients, nitrogen inhibitors, proper timing of application, more appropriate formulations, banding, etc. Additional nutrient tests including PSNT (pre-sidedress nitrogen test), CSNT (corn stalk nitrate test), and PPSN (pre-plant soil nitrate test), chlorophyll meters, spectral analysis, etc., may be used to further refine nutrient applications. Record keeping will document application of nutrients based on the 4 R's. Use of a post-harvest soil test or tissue tests (interpreted by a crop consultant) will help establish the adequacy of the plan in meeting crop needs while minimizing P application rate and residual N, thus reducing the potential for off-site impacts. Soil testing is completed annually for N and at least once every three years for P-K. Further minimization of risk is accomplished by identifying the variability across the field(s) by using soil survey maps or other simple techniques to establish zones, along with zonal soil testing. Nutrients are applied at rates based on soil test zone analyses. Typical treatment area is 40 acres. Soil testing is completed according to LGU (or comparable) recommendations. Analysis are completed at least once every three years for N-P-K, and for N annually. A nutrient budget is developed for each field or section of field annually. Application of nutrients via fertilizers, and/or manures applied in a manner that minimizes nutrient runoff and leaching. Application rates of all sources of nutrients are based upon soil tests and either LGU recommendations, crop removal rates, or industry standard.
Scenario Feature Measure	0
Scenario Unit	Acre
Scenario Typical Size	40

Cost Summary:

Cost Category	Scenario Cost	Scenario Cost/Unit
Materials	$465.40	$11.64
Equipment/Installation	$0.00	$0.00
Labor	$212.82	$5.32
Mobilization	$0.00	$0.00
Acquisition of Technical Knowledge	$292.92	$7.32
Foregone Income	$0.00	$0.00
Total	$971.14	$24.28

Cost Details:

Cost Category	Component ID	Component Name	Component Description	Unit	Price ($/unit)	Quantity	Cost
Materials	300	Test, Soil Test, Precision, Grid or Zone	Includes materials, labor, and equipment costs.	Each	$12.45	4	$49.80
Materials	260	Nitrogen-Urease inhibitor	Nitrogen-Urease inhibitor	Acre	$10.39	40	$415.60
Labor	235	Specialist Labor	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	$82.88	2	$165.76
Labor	230	Skilled Labor	Labor requiring a high level skill set: Includes carpenters, welders, electricians, conservation professionals involved with data collection, monitoring, and or record keeping, etc.	Hour	$23.53	2	$47.06
Acquisition of Technical Knowledge	296	Training, Registration Costs	Conference Registration Fees	Each	$176.25	1	$176.25
Acquisition of Technical Knowledge	294	Training, Workshops	Educational seminar or series of meetings emphasizing interaction and exchange of information among a usually small number of participants.	Each	$116.67	1	$116.67

Scenario Worksheet

Practice and Scenario Description:

Information Type	Data
Region	Northern Plains
State	South Dakota
Discipline Group	Agronomy
Practice Code/Name	590 - Nutrient Management
Scenario ID	5
Scenario Name	Advanced Precision Nutrient Management
Scenario Description	This scenario describes the implementation of an advanced precision nutrient management system on cropland. The planned NM system will meet the current 590 standard. Payment for implementation is to defray the costs of soil testing, analysis, consultant services, skilled labor and specialized nutrient application that provide nutrient proper recommendations based on LGU recommendations or crop removal rates and an associated nutrient budget, recordkeeping, and monitoring on a precision level that includes split applications, NDVI sensing, and aerial imaging. Records demonstrating implementation of the 4 R's of the NM plan will be required. This scenario goes beyond the basic precision system by using technologies that improve efficiency and effectiveness of nutrient management by utilizing specialized precision techniques and tools (variable rate applicators, NDVI, aerial photography, yield monitoring). Precision nutrient mgmt techniques ensure that the right rate, proper timing, and proper placement of nutrients minimize non-point source pollution and provide proper amounts of nutrients to the crop where it is needed and not applying where it is not needed.
Before Practice Situation	In this geographic area, a fertility program is already in place, however, application of nutrients across large acreages is based on a lack of representative soil samples or analyses. The current NM system may or may not meet 590 standards, however, could be improved by reducing energy inputs and utilizing precise mapping and diagnostic equipment. Because whole fields are often fertilized with the same rate, excess nutrients may be applied in some areas while inadequate amounts of nutrients are applied in other areas. Excess nutrients are transported to surface waters through runoff or erosion or to ground water from leaching in quantities that degrade water quality and limit use of intended purposes. Soil quality may be degraded by excess or inadequate nutrients. Fertilizer applications are made in their entirety more than 30 days prior to planting. Applications do not consider the detrimental affects of improper timing or improper rates. Whole fields with like crops and rotation are fertilized the same.
After Practice Situation	Soil testing is completed in a fashion that provides a representative assessment of nutrient concentrations in each field or planning unit including zone directed sampling, real time NDVI (normalized differenced vegetative index) sensing, EC Index type sampling, or via high definition aerial photography that allows for the identification of numerous variations (zones) in a planning unit. Zone maps are created and a nutrient budget developed for each zone. An application rate (prescription) is developed for each zone based on representative soil analysis and a zone nutrient budget. Soil testing is completed annually for N and at least once every three years for P-K. A nutrient budget is developed for each field annually. Application of nutrients is completed so that non-point source pollution is minimized. Nutrients are applied based on realistic yield expectations. The average field size is >=40acres. Applications of nutrients are completed using a GPS guided variable rate fertilizer applicator. Applications of nutrients will be completed in split applications where a majority of the N needs are applied based on the needs of the crop based on growing season requirements. Advanced training may be needed to effectively implement the practice. Producer will attend training courses and use specialized labor where needed in the annual maintenance of the NM plan. Record keeping will include all soil tests, analysis, zone maps, nutrient prescriptions and budgets, and as-applied applications. Yield monitoring maps will be collected and utilized (where technology allows) to develop the following year nutrient applications.
Scenario Feature Measure	0
Scenario Unit	Acre
Scenario Typical Size	40

Cost Summary:

Cost Category	Scenario Cost	Scenario Cost/Unit
Materials	$522.61	$13.07
Equipment/Installation	$470.80	$11.77
Labor	$212.82	$5.32
Mobilization	$0.00	$0.00
Acquisition of Technical Knowledge	$292.92	$7.32
Foregone Income	$0.00	$0.00
Total	$1,499.15	$37.48

Cost Details:

Cost Category	Component ID	Component Name	Component Description	Unit	Price ($/unit)	Quantity	Cost
Materials	301	Test, Plant Tissue Test	Tissue analysis for crops	Each	$24.61	1	$24.61
Materials	300	Test, Soil Test, Precision, Grid or Zone	Includes materials, labor, and equipment costs.	Each	$12.45	40	$498.00
Equipment/Installation	952	Fertilizer, precision application	Fertilizer application performed by light bar/GPS navigation system. Includes equipment, power unit and labor costs.	Acre	$11.77	40	$470.80
Labor	235	Specialist Labor	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	$82.88	2	$165.76
Labor	230	Skilled Labor	Labor requiring a high level skill set: Includes carpenters, welders, electricians, conservation professionals involved with data collection, monitoring, and or record keeping, etc.	Hour	$23.53	2	$47.06
Acquisition of Technical Knowledge	296	Training, Registration Costs	Conference Registration Fees	Each	$176.25	1	$176.25
Acquisition of Technical Knowledge	294	Training, Workshops	Educational seminar or series of meetings emphasizing interaction and exchange of information among a usually small number of participants.	Each	$116.67	1	$116.67

Scenario Worksheet

Practice and Scenario Description:

Information Type	Data
Region	Northern Plains
State	South Dakota
Discipline Group	Agronomy
Practice Code/Name	595 - Integrated Pest Management
Scenario ID	1
Scenario Name	Basic Field, One Resource Concern
Scenario Description	A basic IPM plan with LGU-approved pest monitoring techniques and pest thresholds (where available) is applied in Large Scale Field/Forage Crops to address one identified resource concern (e.g. Water Quality - Impacts to Human Drinking Water) with either risk prevention (e.g. planned pesticides have no risk to the identified resource concern) or risk mitigation (e.g. planned pesticides have appropriate mitigation planned from Agronomy Technical Note 5 for "Intermediate", "High" or "Extra High" WIN-PST Final Hazard Ratings).
Before Practice Situation	Before practice conditions vary widely. Conditions range from the client is not using many pest suppression techniques (pesticides, tillage for weed control, burning, etc.) to the client is using many different pest suppression techniques for many different pests, but in all cases at least one planned pest suppression technique has risk to an identified resource concern (e.g. Water Quality – Impacts to Human Drinking Water).
After Practice Situation	After implementing the 595 practice, a basic IPM system has been implemented with Land Grant University approved pest monitoring techniques and pest thresholds (where available) to help meet the minimum criteria for one identified resource concern (e.g. Water Quality - Impacts to Human Drinking Water) with either risk prevention (e.g. planned pesticides have no risk to the identified resource concern) or risk mitigation (e.g. planned pesticides have appropriate mitigation planned from Agronomy Technical Note 5 for "Intermediate", "High" or "Extra High" WIN-PST Final Hazard Ratings).
Scenario Feature Measure	Acres of management applied
Scenario Unit	Acre
Scenario Typical Size	40

Cost Summary:

Cost Category	Scenario Cost	Scenario Cost/Unit
Materials	$0.00	$0.00
Equipment/Installation	$0.00	$0.00
Labor	$544.34	$13.61
Mobilization	$0.00	$0.00
Acquisition of Technical Knowledge	$0.00	$0.00
Foregone Income	$0.00	$0.00
Total	$544.34	$13.61

Cost Details:

Cost Category	Component ID	Component Name	Component Description	Unit	Price ($/unit)	Quantity	Cost
Labor	230	Skilled Labor	Labor requiring a high level skill set: Includes carpenters, welders, electricians, conservation professionals involved with data collection, monitoring, and or record keeping, etc.	Hour	$23.53	2	$47.06
Labor	235	Specialist Labor	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	$82.88	6	$497.28

Scenario Worksheet

Practice and Scenario Description:

Information Type	Data
Region	Northern Plains
State	South Dakota
Discipline Group	Agronomy
Practice Code/Name	595 - Integrated Pest Management
Scenario ID	2
Scenario Name	Advanced Field, All Resource Concerns
Scenario Description	A comprehensive IPM plan with LGU-approved pest prevention, avoidance and monitoring techniques and pest thresholds (where available) is applied in Large Scale Field/Forage Crops to address all identified resource concerns with either risk prevention (e.g. planned pesticides have no risk to the identified resource concerns) or risk mitigation (e.g. planned pesticides have appropriate mitigation planned from Agronomy Technical Note 5 for "Intermediate", "High" or "Extra High" WIN-PST Final Hazard Ratings).
Before Practice Situation	Before practice conditions vary widely. Conditions range from the client is not using many pest suppression techniques (pesticides, tillage for weed control, burning, etc.) to the client is using many different pest suppression techniques for many different pests, but in all cases at least one planned pest suppression technique has risk to an identified resource concern (e.g. Water Quality – Impacts to Human Drinking Water).
After Practice Situation	After implementing the 595 practice, a comprehensive IPM plan with Land Grant University approved pest prevention, avoidance and monitoring techniques and pest thresholds (where available) is applied to help meet the minimum criteria for all identified resource concerns with either risk prevention (e.g. planned pesticides have no risk to the identified resource concerns) or risk mitigation (e.g. planned pesticides have appropriate mitigation planned from Agronomy Technical Note 5 for "Intermediate", "High" or "Extra High" WIN-PST Final Hazard Ratings).
Scenario Feature Measure	Acres of management applied
Scenario Unit	Acre
Scenario Typical Size	40

Cost Summary:

Cost Category	Scenario Cost	Scenario Cost/Unit
Materials	$0.00	$0.00
Equipment/Installation	$0.00	$0.00
Labor	$1,088.68	$27.22
Mobilization	$0.00	$0.00
Acquisition of Technical Knowledge	$0.00	$0.00
Foregone Income	$0.00	$0.00
Total	$1,088.68	$27.22

Cost Details:

Cost Category	Component ID	Component Name	Component Description	Unit	Price ($/unit)	Quantity	Cost
Labor	230	Skilled Labor	Labor requiring a high level skill set: Includes carpenters, welders, electricians, conservation professionals involved with data collection, monitoring, and or record keeping, etc.	Hour	$23.53	4	$94.12
Labor	235	Specialist Labor	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	$82.88	12	$994.56

Scenario Worksheet

Practice and Scenario Description:

Information Type	Data
Region	Northern Plains
State	South Dakota
Discipline Group	Agronomy
Practice Code/Name	595 - Integrated Pest Management
Scenario ID	4
Scenario Name	Small Farm, More Than One Resource Concern
Scenario Description	A basic IPM plan with LGU-approved pest monitoring techniques and pest thresholds (where available) is applied in Small Farm/ Diversified Systems (e.g. CSA, organic, etc.) to address multiple identified resource concerns (e.g. Water Quality - Impacts to Human Drinking Water and Pollinator Impacts) with either risk prevention (e.g. planned pesticides have no risk to the identified resource concerns) or risk mitigation (e.g. planned pesticides have appropriate mitigation planned from Agronomy Technical Note 5 for "Intermediate", "High" or "Extra High" WIN-PST Final Hazard Ratings). This scenario attempts to capture the higher cost/acre of planning and implementing IPM techniques on smaller acreages with very diverse cropping systems.
Before Practice Situation	Before practice conditions vary widely. Conditions range from the client is not using many pest suppression techniques (pesticides, tillage for weed control, burning, etc.) to the client is using many different pest suppression techniques for many different pests, but in all cases at least one planned pest suppression technique has risk to two or more identified resource concerns (e.g. Water Quality – Impacts to Human Drinking Water and Impacts on Pollinators).
After Practice Situation	After implementing the 595 practice, a basic IPM system has been implemented with Land Grant University approved pest monitoring techniques and pest thresholds (where available) to help meet the minimum criteria for two or more identified resource concerns (e.g. Water Quality - Impacts to Human Drinking Water and Impacts on Pollinators) with either risk prevention (e.g. planned pesticides have no risk to the identified resource concerns) or risk mitigation (e.g. planned pesticides have appropriate mitigation planned from Agronomy Technical Note 5 for "Intermediate", "High" or "Extra High" WIN-PST Final Hazard Ratings).
Scenario Feature Measure	Management applied
Scenario Unit	Each
Scenario Typical Size	1

Cost Summary:

Cost Category	Scenario Cost	Scenario Cost/Unit
Materials	$0.00	$0.00
Equipment/Installation	$0.00	$0.00
Labor	$591.40	$591.40
Mobilization	$0.00	$0.00
Acquisition of Technical Knowledge	$0.00	$0.00
Foregone Income	$0.00	$0.00
Total	$591.40	$591.40

Cost Details:

Cost Category	Component ID	Component Name	Component Description	Unit	Price ($/unit)	Quantity	Cost
Labor	230	Skilled Labor	Labor requiring a high level skill set: Includes carpenters, welders, electricians, conservation professionals involved with data collection, monitoring, and or record keeping, etc.	Hour	$23.53	4	$94.12
Labor	235	Specialist Labor	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	$82.88	6	$497.28

Scenario Worksheet

Practice and Scenario Description:

Information Type	Data
Region	Northern Plains
State	South Dakota
Discipline Group	Agronomy
Practice Code/Name	595 - Integrated Pest Management
Scenario ID	5
Scenario Name	Risk Prevention, All Resource Concerns
Scenario Description	A comprehensive IPM plan based primarily on LGU-approved pest prevention and avoidance techniques is applied to prevent negative impacts on all identified resource concerns. LGU-approved pest monitoring techniques and pest thresholds may also be included, but suppression techniques cannot pose any hazards to identified resource concerns. This type of system is very difficult to achieve, but may be most commonly achieved in Organic Systems that already rely heavily on prevention and avoidance techniques.
Before Practice Situation	Before practice conditions vary widely. Conditions range from the client is not using many pest suppression techniques (pesticides, tillage for weed control, burning, etc.) to the client is using many different pest suppression techniques for many different pests, but in all cases at least one planned pest suppression technique has risk to an identified resource concern (e.g. Water Quality – Impacts to Human Drinking Water).
After Practice Situation	After implementing the 595 practice, a comprehensive IPM plan based primarily on Land Grant University approved pest prevention and avoidance techniques is applied to prevent negative impacts on all identified resource concerns. Land Grant University approved pest monitoring techniques and pest thresholds may also be included, but suppression techniques cannot pose any hazards to identified resource concerns.
Scenario Feature Measure	Acres of management applied
Scenario Unit	Acre
Scenario Typical Size	10

Cost Summary:

Cost Category	Scenario Cost	Scenario Cost/Unit
Materials	$0.00	$0.00
Equipment/Installation	$0.00	$0.00
Labor	$1,181.75	$118.18
Mobilization	$0.00	$0.00
Acquisition of Technical Knowledge	$0.00	$0.00
Foregone Income	$0.00	$0.00
Total	$1,181.75	$118.18

Cost Details:

Cost Category	Component ID	Component Name	Component Description	Unit	Price ($/unit)	Quantity	Cost
Labor	230	Skilled Labor	Labor requiring a high level skill set: Includes carpenters, welders, electricians, conservation professionals involved with data collection, monitoring, and or record keeping, etc.	Hour	$23.53	15	$352.95
Labor	235	Specialist Labor	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	$82.88	10	$828.80

Scenario Worksheet

Practice and Scenario Description:

Information Type	Data
Region	Northern Plains
State	South Dakota
Discipline Group	Agricultural Engineering
Practice Code/Name	600 - Terrace
Scenario ID	2
Scenario Name	Broad Base
Scenario Description	An earthen embankment with channel constructed across the field slope as part of a system to shorten slope lengths and reduce sheet, rill, and gully erosion in a cropped field. The typical installation is a broadbased terrace having 5:1 upstream and 5:1 downstream slopes measuring 4,700 feet in a field with slopes from 2% to 8% constructed in loam soils or similar with regard to workability. Channel and embankment slopes are farmed. A stable outlet is provided in the form of a Grassed Waterway, Underground Outlet or through soil infiltration. Costs include all equipment and forces necessary to excavate, shape, and compact terrace. This practice addresses Concentrated Flow Erosion and Excessive Sediment in surface waters.
Before Practice Situation	Long slope lengths contribute to excessive sedimentation and soil erosion in cropped fields as a result of gully, rill, and sheet erosion. The excessive erosion may lead to deterioration of receiving waters due to excessive sedimentation and nutrient transport.
After Practice Situation	A system of level or gradient, broadbased terraces measuring 4,700 feet in length, 2.5 height, and 5:1 front and back slopes is installed with spacing designed to intercept flow of water and shorten slope length to reduce erosion to acceptable levels. Work is done with dozer, scraper, or road grader. The slopes of the installed terrace are typically farmed. Associated practices are Critical Area Planting (342), Grassed Waterway (412), and Underground Outlet (620).
Scenario Feature Measure	Length of Terrace
Scenario Unit	Foot
Scenario Typical Size	4700

Cost Summary:

Cost Category	Scenario Cost	Scenario Cost/Unit
Materials	$0.00	$0.00
Equipment/Installation	$2,978.32	$0.63
Labor	$892.78	$0.19
Mobilization	$345.54	$0.07
Acquisition of Technical Knowledge	$0.00	$0.00
Foregone Income	$0.00	$0.00
Total	$4,216.64	$0.90

Cost Details:

Cost Category	Component ID	Component Name	Component Description	Unit	Price ($/unit)	Quantity	Cost
Equipment/Installation	1782	Motor Grader, 200 HP	Motor Grader or Maintainer, 200 hp. Typical of equipment with HP in range of 170-240. Equipment cost, does not include labor.	Hour	$137.62	4	$550.48
Equipment/Installation	927	Dozer, 140 HP	Track mounted Dozer with horsepower range of 125 to 160. Equipment and power unit costs. Labor not included.	Hour	$101.16	24	$2,427.84
Labor	234	Supervisor or Manager	Labor involving supervision or management activities. Includes crew supervisors, foremen and farm/ranch managers time required for adopting new technology, etc.	Hour	$33.11	6	$198.66
Labor	233	Equipment Operators, Heavy	Includes: Cranes, Hydraulic Excavators >=50 HP, Dozers, Paving Machines, Rock Trenchers, Trenchers >=12", Dump Trucks, Ag Equipment >=150 HP, Scrapers, Water Wagons.	Hour	$24.79	28	$694.12
Mobilization	1140	Mobilization, large equipment	Equipment >150HP or typical weights greater than 30,000 pounds or loads requiring over width or over length permits.	Each	$225.16	1	$225.16
Mobilization	1139	Mobilization, medium equipment	Equipment with 70-150 HP or typical weights between 14,000 and 30,000 pounds.	Each	$120.38	1	$120.38

Scenario Worksheet

Practice and Scenario Description:

Information Type	Data
Region	Northern Plains
State	South Dakota
Discipline Group	Agricultural Engineering
Practice Code/Name	600 - Terrace
Scenario ID	3
Scenario Name	Grass Back
Scenario Description	An earthen embankment with channel constructed across the field slope as part of a system to shorten slope lengths and reduce sheet, rill, and gully erosion in a cropped field. The typical installation is a system of terraces (2,500 feet in length) that have one relatively flat (5:1) front slope and one steep (2:1) back slope constructed in a field with slopes from 2% to 8% installed in loam soils or similar soils with regard to workability. The steep slope is established to permanent vegetation with the flatter slope farmed. A stable outlet is provided in the form of a Grassed Waterway, Underground Outlet or through soil infiltration. Costs include all equipment and forces necessary to excavate, shape, and compact terrace. Seeding is not included. This practice addresses Concentrated Flow Erosion and Excessive Sediment in surface waters.
Before Practice Situation	Long slope lengths contribute to excessive sedimentation and soil erosion in cropped fields as a result of gully, rill, and sheet erosion. The excessive erosion may lead to deterioration of receiving waters due to excessive sedimentation and nutrient transport.
After Practice Situation	A system of terraces with one steep (2:1) and one flat (5:1) slope measuring 2,500 feet in length and 2.5' height is installed with spacing designed to intercept flow of water and shorten slope length to reduce erosion to acceptable levels. Work is done with dozer, scraper, or road grader. Associated practices are Critical Area Planting (342), Grassed Waterway (412), and Underground Outlet (620).
Scenario Feature Measure	Length of Terrace
Scenario Unit	Foot
Scenario Typical Size	2500

Cost Summary:

Cost Category	Scenario Cost	Scenario Cost/Unit
Materials	$0.00	$0.00
Equipment/Installation	$2,096.12	$0.84
Labor	$595.13	$0.24
Mobilization	$345.54	$0.14
Acquisition of Technical Knowledge	$0.00	$0.00
Foregone Income	$0.00	$0.00
Total	$3,036.79	$1.21

Cost Details:

Cost Category	Component ID	Component Name	Component Description	Unit	Price ($/unit)	Quantity	Cost
Equipment/Installation	1782	Motor Grader, 200 HP	Motor Grader or Maintainer, 200 hp. Typical of equipment with HP in range of 170-240. Equipment cost, does not include labor.	Hour	$137.62	2	$275.24
Equipment/Installation	927	Dozer, 140 HP	Track mounted Dozer with horsepower range of 125 to 160. Equipment and power unit costs. Labor not included.	Hour	$101.16	18	$1,820.88
Labor	234	Supervisor or Manager	Labor involving supervision or management activities. Includes crew supervisors, foremen and farm/ranch managers time required for adopting new technology, etc.	Hour	$33.11	3	$99.33
Labor	233	Equipment Operators, Heavy	Includes: Cranes, Hydraulic Excavators >=50 HP, Dozers, Paving Machines, Rock Trenchers, Trenchers >=12", Dump Trucks, Ag Equipment >=150 HP, Scrapers, Water Wagons.	Hour	$24.79	20	$495.80
Mobilization	1140	Mobilization, large equipment	Equipment >150HP or typical weights greater than 30,000 pounds or loads requiring over width or over length permits.	Each	$225.16	1	$225.16
Mobilization	1139	Mobilization, medium equipment	Equipment with 70-150 HP or typical weights between 14,000 and 30,000 pounds.	Each	$120.38	1	$120.38

Scenario Worksheet

Practice and Scenario Description:

Information Type	Data
Region	Northern Plains
State	South Dakota
Discipline Group	Agricultural Engineering
Practice Code/Name	600 - Terrace
Scenario ID	4
Scenario Name	Narrow Base
Scenario Description	An earthen embankment with channel constructed across the field slope as part of a system to shorten slope lengths and reduce sheet, rill, and gully erosion in a cropped field. The typical installation is a system of narrow base terraces with 2:1 slopes, 4,500' length, and 2.5' height in a field with slopes exceeding 8% constructed in loam soils or similar in regards to workability. A stable outlet is provided in the form of a Grassed Waterway, Underground Outlet or through soil infiltration. Costs include all equipment and forces necessary to excavate, shape, and compact terrace. Permanent vegetation is established. Seeding is not included. This practice addresses Concentrated Flow Erosion and Excessive Sediment in surface waters.
Before Practice Situation	Long slope lengths contribute to excessive sedimentation and soil erosion in cropped fields as a result of gully, rill, and sheet erosion. The excessive erosion may lead to deterioration of receiving waters due to excessive sedimentation and nutrient transport.
After Practice Situation	A system of narrow base terraces with approximately 2:1 front and back slopes measuring 4,500 feet in length and 2.5' height is constructed with spacing designed to intercept flow of water and shorten slope length to reduce erosion to acceptable levels. Work is typically done with dozer. Associated practices are Critical Area Planting (342), Grassed Waterway (412), and Underground Outlet (620).
Scenario Feature Measure	Length of Terrace
Scenario Unit	Foot
Scenario Typical Size	4500

Cost Summary:

Cost Category	Scenario Cost	Scenario Cost/Unit
Materials	$0.00	$0.00
Equipment/Installation	$10,291.34	$2.29
Labor	$1,595.05	$0.35
Mobilization	$450.32	$0.10
Acquisition of Technical Knowledge	$0.00	$0.00
Foregone Income	$0.00	$0.00
Total	$12,336.71	$2.74

Cost Details:

Cost Category	Component ID	Component Name	Component Description	Unit	Price ($/unit)	Quantity	Cost
Equipment/Installation	1199	Stripping and stockpiling, topsoil	Stripping and stockpiling of topsoil adjacent to stripping area. Includes equipment and labor.	Cubic Yard	$0.79	1600	$1,264.00
Equipment/Installation	928	Dozer, 200 HP	Track mounted Dozer with horsepower range of 160 to 250. Equipment and power unit costs. Labor not included.	Hour	$153.83	56	$8,614.48
Equipment/Installation	1782	Motor Grader, 200 HP	Motor Grader or Maintainer, 200 hp. Typical of equipment with HP in range of 170-240. Equipment cost, does not include labor.	Hour	$137.62	3	$412.86
Labor	234	Supervisor or Manager	Labor involving supervision or management activities. Includes crew supervisors, foremen and farm/ranch managers time required for adopting new technology, etc.	Hour	$33.11	4	$132.44
Labor	233	Equipment Operators, Heavy	Includes: Cranes, Hydraulic Excavators >=50 HP, Dozers, Paving Machines, Rock Trenchers, Trenchers >=12", Dump Trucks, Ag Equipment >=150 HP, Scrapers, Water Wagons.	Hour	$24.79	59	$1,462.61
Mobilization	1140	Mobilization, large equipment	Equipment >150HP or typical weights greater than 30,000 pounds or loads requiring over width or over length permits.	Each	$225.16	2	$450.32

Scenario Worksheet

Practice and Scenario Description:

Information Type	Data
Region	Northern Plains
State	South Dakota
Discipline Group	Agricultural Engineering
Practice Code/Name	600 - Terrace
Scenario ID	5
Scenario Name	Narrow Base > 10% Slopes
Scenario Description	An earthen embankment with channel constructed across the field slope as part of a system to shorten slope lengths and reduce sheet, rill, and gully erosion in a cropped field. The typical installation is a system of narrow base terraces with 2:1 slopes, 4,500' length, and 2.5' height in a field with slopes exceeding 10% constructed in loam soils or similar in regards to workability. A stable outlet is provided in the form of a Grassed Waterway, Underground Outlet or through soil infiltration. Costs include all equipment and forces necessary to excavate, shape, and compact terrace. Permanent vegetation is established. Seeding is not included. This practice addresses Concentrated Flow Erosion and Excessive Sediment in surface waters.
Before Practice Situation	Long slope lengths contribute to excessive sedimentation and soil erosion in cropped fields as a result of gully, rill, and sheet erosion. The excessive erosion may lead to deterioration of receiving waters due to excessive sedimentation and nutrient transport.
After Practice Situation	A system of narrow base terraces with approximately 2:1 front and back slopes measuring 4,500 feet in length and 2.5' height is constructed with spacing designed to intercept flow of water and shorten slope length to reduce erosion to acceptable levels. Work is typically done with dozer. Associated practices are Critical Area Planting (342), Grassed Waterway (412), and Underground Outlet (620).
Scenario Feature Measure	Length of Terrace
Scenario Unit	Foot
Scenario Typical Size	4500

Cost Summary:

Cost Category	Scenario Cost	Scenario Cost/Unit
Materials	$0.00	$0.00
Equipment/Installation	$12,977.58	$2.88
Labor	$1,966.90	$0.44
Mobilization	$450.32	$0.10
Acquisition of Technical Knowledge	$0.00	$0.00
Foregone Income	$0.00	$0.00
Total	$15,394.80	$3.42

Cost Details:

Cost Category	Component ID	Component Name	Component Description	Unit	Price ($/unit)	Quantity	Cost
Equipment/Installation	1199	Stripping and stockpiling, topsoil	Stripping and stockpiling of topsoil adjacent to stripping area. Includes equipment and labor.	Cubic Yard	$0.79	2100	$1,659.00
Equipment/Installation	928	Dozer, 200 HP	Track mounted Dozer with horsepower range of 160 to 250. Equipment and power unit costs. Labor not included.	Hour	$153.83	70	$10,768.10
Equipment/Installation	1782	Motor Grader, 200 HP	Motor Grader or Maintainer, 200 hp. Typical of equipment with HP in range of 170-240. Equipment cost, does not include labor.	Hour	$137.62	4	$550.48
Labor	234	Supervisor or Manager	Labor involving supervision or management activities. Includes crew supervisors, foremen and farm/ranch managers time required for adopting new technology, etc.	Hour	$33.11	4	$132.44
Labor	233	Equipment Operators, Heavy	Includes: Cranes, Hydraulic Excavators >=50 HP, Dozers, Paving Machines, Rock Trenchers, Trenchers >=12", Dump Trucks, Ag Equipment >=150 HP, Scrapers, Water Wagons.	Hour	$24.79	74	$1,834.46
Mobilization	1140	Mobilization, large equipment	Equipment >150HP or typical weights greater than 30,000 pounds or loads requiring over width or over length permits.	Each	$225.16	2	$450.32

Scenario Worksheet

Practice and Scenario Description:

Information Type	Data
Region	Northern Plains
State	South Dakota
Discipline Group	Water Management Engineering
Practice Code/Name	610 - Salinity and Sodic Soil Management
Scenario ID	2
Scenario Name	Soil Management (Irrigated)
Scenario Description	The producer secures training in Salinity and Sodic Soil Management and develops and carries out a Salinity and Sodic Soil Management Plan. Scenario includes cost of attending a 6 hr University, NRCS, or commodity group sponsored training session and 12 hours of mgt labor a year to analyze available data and field situation, develop (or review and modify as necessary) plan and carry it out. Sampling on a 3-5 year interval is recommended if conditional soils are irrigated or marginal irrigation water is used.. Monitor (sample) one site per 40 acres of each major soil. Monitoring prodedures include; GPS reference all sites, duplicate (2 samples) all sites of each major soil, sample after harvest, sampled to a depth of 6 feet and examined to 10 feet noting water table depth. Also sample each genetic soil horizon or portion no greater than 12 inches. Monitoring should be done by or under the supervision of an experienced soil scientist. Resource Concerns: Soil Quality Degradation - Concentration of salts or other chemicals, and Water Quality Degradation- Excessive salts in surface and ground waters. Associated Practices: 328-Conservation Crop Rotation; 449-Irrigation Water Management; and 590-Nutrient Management.
Before Practice Situation	Salintiy and or Sodic conditions have developed in the root zone of a 100 acre irrigated cropland field resulting in decreased soil quality, plant health problems, and yield reductions.
After Practice Situation	Producer conducts soil conductivity and salinity test to determine the root zone depth of water application necessary for flushing accumulated salts and maintaining a proper salt balance. Producer conducts irrigation suitability test of water supply results to determine suitability of applied water for irrigation and additional irrigation volumes needed for leaching. Routine periodic checks of water EC will be conducted by producer to monitor for water salinity which might require changes to Salinity and Sodic Soil Management Plan. The Salinity and Sodic Soil Management Plan is carried out employing soil and water testing and as applicable changes in Irrigation Water Management (449), Conservation Crop Rotation (328), tillage, and use of soil amendments. The producer has developed and is carrying out a Salinity and Sodic Soil Management Plan resulting in improved soil quality and plant health.
Scenario Feature Measure	Acres included in Salinity and Sodic Soil Management Plan
Scenario Unit	Acre
Scenario Typical Size	100

Cost Summary:

Cost Category	Scenario Cost	Scenario Cost/Unit
Materials	$768.10	$7.68
Equipment/Installation	$0.00	$0.00
Labor	$264.88	$2.65
Mobilization	$0.00	$0.00
Acquisition of Technical Knowledge	$172.67	$1.73
Foregone Income	$0.00	$0.00
Total	$1,205.65	$12.06

Cost Details:

Cost Category	Component ID	Component Name	Component Description	Unit	Price ($/unit)	Quantity	Cost
Materials	310	Test, Standard Water Test, Irrigation Suitability	Irrigation water suitability lab analysis. Includes pH, alkalinity, carbonates/bicarbonates, EC, dissolved solids, B, Cl, Ca, Mg, Na, SAR, and hardness.	Each	$41.98	1	$41.98
Labor	234	Supervisor or Manager	Labor involving supervision or management activities. Includes crew supervisors, foremen and farm/ranch managers time required for adopting new technology, etc.	Hour	$33.11	8	$264.88
Acquisition of Technical Knowledge	297	Transportation	Mileage to attend a training conference, workshop, or TSP travel associated with developing Conservation Activity Plan.	Mile	$0.56	100	$56.00
Acquisition of Technical Knowledge	294	Training, Workshops	Educational seminar or series of meetings emphasizing interaction and exchange of information among a usually small number of participants.	Each	$116.67	1	$116.67
Materials	2055	Testing, soil sampling and EC analysis, bore hole	Collecting and testing 5 soil samples per 60" bore hole. Inclueds EC measurements. Includes equipment and labor.	Hour	$181.53	4	$726.12

Scenario Worksheet

Practice and Scenario Description:

Information Type	Data
Region	Northern Plains
State	South Dakota
Discipline Group	Water Management Engineering
Practice Code/Name	610 - Salinity and Sodic Soil Management
Scenario ID	1
Scenario Name	Soil Management (Nonirrigated)
Scenario Description	The producer secures training in Salinity and Sodic Soil Management, analyzes subsurface conditions in areas in and around a saline seep and using information gained from training and field observations carrys out a Salinity and Sodic Soil Management Plan employing as applicable changes in Conservation Cropping Systems, Critical Area Planting, Nutrient Management and use of soil amendments. Scenario includes cost of attending a 6 hr University, NRCS, or commodity group sponsored training session and 40 hours of mgt labor a year to analyze available data and field situation, then review, and modify as necessary the Salinity and Sodic Soil Management Plan and continue to carry it out. Resource Concerns: Soil Quality Degradation - Concentration of salts or other chemicals, and Water Quality Degradation- Excessive salts in surface and ground waters. Associated Practices: 328 -Conservation Cropping System; 342- Critical Area Planting; and 590 - Nutrient Management.
Before Practice Situation	A crop-fallow system on sodic and saline soils has resulted in saline seeps. The recharge area of the seep must be determined before the extents of the treatment can be planned. An analyses of the subsurface conditions in areas in and around a saline is completed on 95 acres of recharge area surrounding a 5 acre saline seep in order to determine groundwater gradients and limits of the recharge area.
After Practice Situation	A determination of extent of recharge area has been made. The area to be treated has been identified. The producer has developed and is carrying out a Salinity and Sodic Soil Management Plan. Deep percolation in the recharge area is eliminated and salts no longer leach into the ground or surface water.
Scenario Feature Measure	Acres included in Salinity and Sodic Soil Management Plan
Scenario Unit	Acre
Scenario Typical Size	100

Cost Summary:

Cost Category	Scenario Cost	Scenario Cost/Unit
Materials	$0.00	$0.00
Equipment/Installation	$0.00	$0.00
Labor	$264.88	$2.65
Mobilization	$0.00	$0.00
Acquisition of Technical Knowledge	$172.67	$1.73
Foregone Income	$0.00	$0.00
Total	$437.55	$4.38

Cost Details:

Cost Category	Component ID	Component Name	Component Description	Unit	Price ($/unit)	Quantity	Cost
Labor	234	Supervisor or Manager	Labor involving supervision or management activities. Includes crew supervisors, foremen and farm/ranch managers time required for adopting new technology, etc.	Hour	$33.11	8	$264.88
Acquisition of Technical Knowledge	294	Training, Workshops	Educational seminar or series of meetings emphasizing interaction and exchange of information among a usually small number of participants.	Each	$116.67	1	$116.67
Acquisition of Technical Knowledge	297	Transportation	Mileage to attend a training conference, workshop, or TSP travel associated with developing Conservation Activity Plan.	Mile	$0.56	100	$56.00

Scenario Worksheet

Practice and Scenario Description:

Information Type	Data
Region	Northern Plains
State	South Dakota
Discipline Group	Forestry
Practice Code/Name	612 - Tree & Shrub Establishment
Scenario ID	1
Scenario Name	Individual tree, hand planting
Scenario Description	Tree seedlings will be hand planted in the forested area where few or no forest trees are growing, the existing stand of trees needs underplanting, or the previously planted seedling tree stocking level is below desirable conditions. Wildlife habitat is degraded by loss of forest conditions. This resource concern addressed is degraded plant condition -- and inadequate structure and composition, and inadequate wildlife & fish habitat.
Before Practice Situation	The stocking level of the forest does not meet the minimum recommended number of trees per acre. The existing condition of the forest stand does not meet the landowners objectives. To be a viable forest additional seedlings need planting. Wildlife habitat is rated poor.
After Practice Situation	The prescribed number of trees are hand planted on 20 acres, and the objectives of the landowner are met. The forest will provide wildlife habitat, provide a long term ground cover, and capture atmospheric carbon.
Scenario Feature Measure	Area Planted
Scenario Unit	Each
Scenario Typical Size	6000

Cost Summary:

Cost Category	Scenario Cost	Scenario Cost/Unit
Materials	$3,360.00	$0.56
Equipment/Installation	$1,152.96	$0.19
Labor	$1,804.44	$0.30
Mobilization	$403.40	$0.07
Acquisition of Technical Knowledge	$0.00	$0.00
Foregone Income	$0.00	$0.00
Total	$6,720.80	$1.12

Cost Details:

Cost Category	Component ID	Component Name	Component Description	Unit	Price ($/unit)	Quantity	Cost
Materials	1518	Tree, conifer, seedling, containerized, 8 cu. in.	Containerized conifer stock, 8 cubic inches (e.g. 1.5" x 6"). Materials only.	Each	$0.56	6000	$3,360.00
Equipment/Installation	1590	Hand tools, tree planting	Various hand tools for digging holes and planting trees such as augers, dibble bars, planting shovel, hoe-dad. Equipment only. Labor not included.	Hour	$9.44	100	$944.00
Equipment/Installation	939	Truck, Pickup	Equipment and power unit costs. Labor not included.	Hour	$26.12	8	$208.96
Labor	234	Supervisor or Manager	Labor involving supervision or management activities. Includes crew supervisors, foremen and farm/ranch managers time required for adopting new technology, etc.	Hour	$33.11	4	$132.44
Labor	231	General Labor	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	$16.72	100	$1,672.00
Mobilization	1142	Mobilization, General labor	Mobilization of general labor: Ex. pipe layer, herder, concrete placement, materials spreader, flagger, etc.	Hour	$16.89	20	$337.80
Mobilization	1145	Mobilization, Supervisor or Manager	Mobilization of supervisors or management. Includes crew supervisors, foremen and farm/ranch managers, etc.	Hour	$32.80	2	$65.60

Scenario Worksheet

Practice and Scenario Description:

Information Type	Data
Region	Northern Plains
State	South Dakota
Discipline Group	Agricultural Engineering
Practice Code/Name	614 - Watering Facility
Scenario ID	2
Scenario Name	Steel Tank
Scenario Description	A permanent watering facility for livestock constructed of galvanized steel with 1,200 gallon capacity that stores adequate quantity and quality of water for storage and or direct drinking access. All watering facilities will be constructed from approved durable materials that have a life expectancy that meets or exceeds the planned useful life of the installation. The watering facility will be placed on a gravel or compacted earthen base. This watering facility will address the resource concerns of inadequate supply of water for livestock and or wildlife, habitat degradation, water quality, and undesirable plant productivity and health.
Before Practice Situation	This practice applies to all land uses where there is a need for new or improved watering facilities for livestock and or wildlife, where water is not available in sufficient quantities at specific locations, and habitat, water quality, plant productivity and health needs to be improved.
After Practice Situation	A permanent watering facility with a capacity of 1,200 gallons constructed of galvinized steel is installed with all tank materials, tank plumbing and float valve, to provide adequate water storage capacity to ensure an adequate supply and quality of water for livestock or wildlife for storage and or direct drinking access and provides improved plant productivity and health, water quality, and habit. All watering facilities are constructed from approved durable materials that have a life expectancy that meets or exceeds the planned useful life of the installation and placed on a gravel or compacted earth foundation with required plumbing. All needed pipelines are installed using Livestock Pipeline (516). Any needed vegetation of disturbed areas will use Critical Area Planting (342). All collectors or catchments for collecting precipitation will be addressed by using Water Harvesting Catchment (636). Any needed water source installation will use Water Well (642), Pumping Plant (533), Spring Development (574), or Livestock Pipeline (516) as appropriate. Areas around watering facilities where animal concentrations or overflow from the watering facility will cause resource concerns will be protected by using Heavy Use Area Protection (561) as appropriate.
Scenario Feature Measure	Capacity in Gallons
Scenario Unit	Gallon
Scenario Typical Size	1200

Cost Summary:

Cost Category	Scenario Cost	Scenario Cost/Unit
Materials	$864.82	$0.72
Equipment/Installation	$159.66	$0.13
Labor	$149.32	$0.12
Mobilization	$240.76	$0.20
Acquisition of Technical Knowledge	$0.00	$0.00
Foregone Income	$0.00	$0.00
Total	$1,414.56	$1.18

Cost Details:

Cost Category	Component ID	Component Name	Component Description	Unit	Price ($/unit)	Quantity	Cost
Materials	1050	Post, Wood, CCA Treated, 4-5" X 7'	Wood Post, Line 4-5" X 7', CCA Treated	Each	$11.30	3	$33.90
Materials	1044	Dimension Lumber, Treated	Treated dimension lumber with nominal thickness equal or less than 2". Includes lumber and fasteners	Board Foot	$0.74	30	$22.20
Materials	1099	Aggregate, Gravel, Ungraded, Quarry Run	Includes materials, equipment and labor	Cubic yard	$18.16	1.5	$27.24
Materials	1068	Tank, Galvanized Steel Livestock, > 300 - 1,000 gallon	Includes tank materials and float valve	Gallon	$0.59	1200	$708.00
Materials	240	Freeze Proof Hydrant	Freeze Proof Hydrant, 3 ft bury	Each	$57.20	0	$0.00
Materials	242	Wildlife Escape Ramp	Pool size 15' x 30', for small mammals less than one pound	Each	$36.74	2	$73.48
Equipment/Installation	933	Skidsteer, 80 HP	Skidsteer loader with horsepower range of 60 to 90. Equipment and power unit costs. Labor not included.	Hour	$34.80	2	$69.60
Equipment/Installation	926	Backhoe, 80 HP	Wheel mounted backhoe excavator with horsepower range of 60 to 90. Equipment and power unit costs. Labor not included.	Hour	$45.03	2	$90.06
Labor	231	General Labor	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	$16.72	4	$66.88
Labor	232	Equipment Operators, Light	Includes: Skid Steer Loaders, Hydraulic Excavators <50 HP, Trenchers <12", Ag Equipment <150 HP, Pickup Trucks, Forklifts, Mulchers	Hour	$20.61	4	$82.44
Mobilization	1139	Mobilization, medium equipment	Equipment with 70-150 HP or typical weights between 14,000 and 30,000 pounds.	Each	$120.38	2	$240.76

Scenario Worksheet

Practice and Scenario Description:

Information Type	Data
Region	Northern Plains
State	South Dakota
Discipline Group	Agricultural Engineering
Practice Code/Name	614 - Watering Facility
Scenario ID	3
Scenario Name	Rubber-Fiberglass on Earth
Scenario Description	A permanent watering facility for livestock constructed using a rubber equipment tire with concrete plug or fiberglass tank with 1,200 gallon capacity placed on a gravel or compacted earth foundation that stores adequate quantity and quality of water for storage and or direct drinking access. All watering facilities will be constructed from approved durable materials that have a life expectancy that meets or exceeds the planned useful life of the installation. This watering facility will address the resource concerns of inadequate supply of water for livestock, habitat degradation, water quality, and undesirable plant productivity and health.
Before Practice Situation	This practice applies to all land uses where there is a need for new or improved watering facilities for livestock and or wildlife, where water is not available in sufficient quantities at specific locations, and habitat, water quality, plant productivity and health needs to be improved.
After Practice Situation	A permanent watering facility with a capacity of greater than 1,200 gallons constructed using a rubber equipment tire with concrete plug or fiberglass tank is installed on a gravel or compacted earth foundation with all tank materials, tank plumbing and float valve, to provide adequate water storage capacity to ensure an adequate supply and quality of water for livestock or wildlife for storage and or direct drinking access and provides improved plant productivity and health, water quality, and habitat. All watering facilities are constructed from approved durable materials that have a life expectancy that meets or exceeds the planned useful life of the installation and placed on a properly prepared foundation with required plumbing. All needed pipelines are installed using Livestock Pipeline (516). Any needed vegetation of disturbed areas will use Critical Area Planting (342). All collectors or catchments for collecting precipitation will be addressed by using Water Harvesting Catchment (636). Any needed water source installation will use Water Well (642), Pumping Plant (533), Spring Development (574), or Livestock Pipeline (516) as appropriate. Areas around watering facilities where animal concentrations or overflow from the watering facility will cause resource concerns will be protected by using Heavy Use Area Protection (561) as appropriate.
Scenario Feature Measure	Capacity in Gallons
Scenario Unit	Gallon
Scenario Typical Size	1200

Cost Summary:

Cost Category	Scenario Cost	Scenario Cost/Unit
Materials	$931.02	$0.78
Equipment/Installation	$104.95	$0.09
Labor	$74.66	$0.06
Mobilization	$240.76	$0.20
Acquisition of Technical Knowledge	$0.00	$0.00
Foregone Income	$0.00	$0.00
Total	$1,351.39	$1.13

Cost Details:

Cost Category	Component ID	Component Name	Component Description	Unit	Price ($/unit)	Quantity	Cost
Materials	1050	Post, Wood, CCA Treated, 4-5" X 7'	Wood Post, Line 4-5" X 7', CCA Treated	Each	$11.30	3	$33.90
Materials	1044	Dimension Lumber, Treated	Treated dimension lumber with nominal thickness equal or less than 2". Includes lumber and fasteners	Board Foot	$0.74	30	$22.20
Materials	287	Tank, Tire, 10' diameter	Tire, includes material cost for tank and shipping. Labor and other appurtenance costs not included.	Each	$717.00	1	$717.00
Materials	1099	Aggregate, Gravel, Ungraded, Quarry Run	Includes materials, equipment and labor	Cubic yard	$18.16	1.5	$27.24
Materials	240	Freeze Proof Hydrant	Freeze Proof Hydrant, 3 ft bury	Each	$57.20	1	$57.20
Materials	242	Wildlife Escape Ramp	Pool size 15' x 30', for small mammals less than one pound	Each	$36.74	2	$73.48
Equipment/Installation	36	Concrete, CIP, formless, non reinforced	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	$100.48	0.25	$25.12
Equipment/Installation	933	Skidsteer, 80 HP	Skidsteer loader with horsepower range of 60 to 90. Equipment and power unit costs. Labor not included.	Hour	$34.80	1	$34.80
Equipment/Installation	926	Backhoe, 80 HP	Wheel mounted backhoe excavator with horsepower range of 60 to 90. Equipment and power unit costs. Labor not included.	Hour	$45.03	1	$45.03
Labor	231	General Labor	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	$16.72	2	$33.44
Labor	232	Equipment Operators, Light	Includes: Skid Steer Loaders, Hydraulic Excavators <50 HP, Trenchers <12", Ag Equipment <150 HP, Pickup Trucks, Forklifts, Mulchers	Hour	$20.61	2	$41.22
Mobilization	1139	Mobilization, medium equipment	Equipment with 70-150 HP or typical weights between 14,000 and 30,000 pounds.	Each	$120.38	2	$240.76

Scenario Worksheet

Practice and Scenario Description:

Information Type	Data
Region	Northern Plains
State	South Dakota
Discipline Group	Agricultural Engineering
Practice Code/Name	614 - Watering Facility
Scenario ID	4
Scenario Name	Rubber-Fiberglass on Concrete
Scenario Description	A permanent watering facility for livestock constructed using a rubber equipment tire with concrete plug or fiberglass tank with 1,200 gallon capacity placed on a concrete foundation that stores adequate quantity and quality of water for storage and or direct drinking access. All watering facilities will be constructed from approved durable materials that have a life expectancy that meets or exceeds the planned useful life of the installation. This watering facility will address the resource concerns of inadequate supply of water for livestock, habitat degradation, water quality, and undesirable plant productivity and health.
Before Practice Situation	This practice applies to all land uses where there is a need for new or improved watering facilities for livestock and or wildlife, where water is not available in sufficient quantities at specific locations, and habitat, water quality, plant productivity and health needs to be improved.
After Practice Situation	A permanent watering facility with a capacity of greater than 1,200 gallons constructed using a rubber equipment tire with concrete plug or fiberglass tank is installed on a concrete foundation with all tank materials, tank plumbing and float valve, to provide adequate water storage capacity to ensure an adequate supply and quality of water for livestock or wildlife for storage and or direct drinking access and provides improved plant productivity and health, water quality, and habitat. All watering facilities are constructed from approved durable materials that have a life expectancy that meets or exceeds the planned useful life of the installation and placed on a properly prepared foundation with required plumbing. All needed pipelines are installed using Livestock Pipeline (516). Any needed vegetation of disturbed areas will use Critical Area Planting (342). All collectors or catchments for collecting precipitation will be addressed by using Water Harvesting Catchment (636). Any needed water source installation will use Water Well (642), Pumping Plant (533), Spring Development (574), or Livestock Pipeline (516) as appropriate. Areas around watering facilities where animal concentrations or overflow from the watering facility will cause resource concerns will be protected by using Heavy Use Area Protection (561) as appropriate.
Scenario Feature Measure	Capacity in Gallons
Scenario Unit	Gallon
Scenario Typical Size	1200

Cost Summary:

Cost Category	Scenario Cost	Scenario Cost/Unit
Materials	$923.20	$0.77
Equipment/Installation	$412.17	$0.34
Labor	$74.66	$0.06
Mobilization	$240.76	$0.20
Acquisition of Technical Knowledge	$0.00	$0.00
Foregone Income	$0.00	$0.00
Total	$1,650.79	$1.38

Cost Details:

Cost Category	Component ID	Component Name	Component Description	Unit	Price ($/unit)	Quantity	Cost
Materials	1050	Post, Wood, CCA Treated, 4-5" X 7'	Wood Post, Line 4-5" X 7', CCA Treated	Each	$11.30	3	$33.90
Materials	1044	Dimension Lumber, Treated	Treated dimension lumber with nominal thickness equal or less than 2". Includes lumber and fasteners	Board Foot	$0.74	30	$22.20
Materials	287	Tank, Tire, 10' diameter	Tire, includes material cost for tank and shipping. Labor and other appurtenance costs not included.	Each	$717.00	1	$717.00
Materials	45	Aggregate, Sand, Graded, Washed	Sand, typical ASTM C33 gradation, includes materials, equipment and labor to transport and place	Cubic yard	$24.28	0.8	$19.42
Materials	240	Freeze Proof Hydrant	Freeze Proof Hydrant, 3 ft bury	Each	$57.20	1	$57.20
Materials	242	Wildlife Escape Ramp	Pool size 15' x 30', for small mammals less than one pound	Each	$36.74	2	$73.48
Equipment/Installation	36	Concrete, CIP, formless, non reinforced	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	$100.48	0.25	$25.12
Equipment/Installation	37	Concrete, CIP, slab on grade, reinforced	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	$204.81	1.5	$307.22
Equipment/Installation	933	Skidsteer, 80 HP	Skidsteer loader with horsepower range of 60 to 90. Equipment and power unit costs. Labor not included.	Hour	$34.80	1	$34.80
Equipment/Installation	926	Backhoe, 80 HP	Wheel mounted backhoe excavator with horsepower range of 60 to 90. Equipment and power unit costs. Labor not included.	Hour	$45.03	1	$45.03
Labor	231	General Labor	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	$16.72	2	$33.44
Labor	232	Equipment Operators, Light	Includes: Skid Steer Loaders, Hydraulic Excavators <50 HP, Trenchers <12", Ag Equipment <150 HP, Pickup Trucks, Forklifts, Mulchers	Hour	$20.61	2	$41.22
Mobilization	1139	Mobilization, medium equipment	Equipment with 70-150 HP or typical weights between 14,000 and 30,000 pounds.	Each	$120.38	2	$240.76

Scenario Worksheet

Practice and Scenario Description:

Information Type	Data
Region	Northern Plains
State	South Dakota
Discipline Group	Agricultural Engineering
Practice Code/Name	614 - Watering Facility
Scenario ID	5
Scenario Name	Steel Rim-Bottomless
Scenario Description	A permanent watering facility for livestock constructed of a 30' diameter galvanized steel rim with impermeable membrane or bentonite treated earthen bottom with 10,500 gallons of capacity that stores adequate quantity and quality of water for storage and or direct drinking access. All watering facilities will be constructed from approved durable materials that have a life expectancy that meets or exceeds the planned useful life of the installation. This watering facility will address the resource concerns of inadequate supply of water for livestock, habitat degradation, water quality, and undesirable plant productivity and health.
Before Practice Situation	This practice applies to all land uses where there is a need for new or improved watering facilities for livestock and or wildlife, where water is not available in sufficient quantities at specific locations, and habitat, water quality, plant productivity and health needs to be improved.
After Practice Situation	A permanent watering facility constructed of a galvanized steel rim with impermeable membrane or bentonite treated earthen bottom with a capacity of 10,500 gallons is installed with all tank materials, tank plumbing and float valve, to provide adequate water storage capacity to ensure an adequate supply and quality of water for livestock or wildlife for storage and or direct drinking access and provides improved plant productivity and health, water quality, and habitat. All watering facilities are constructed from approved durable materials that have a life expectancy that meets or exceeds the planned useful life of the installation and placed on a properly prepared foundation with required plumbing. All needed pipelines are installed using Livestock Pipeline (516). Any needed vegetation of disturbed areas will use Critical Area Planting (342). All collectors or catchments for collecting precipitation will be addressed by using Water Harvesting Catchment (636). Any needed water source installation will use Water Well (642), Pumping Plant (533), Spring Development (574), or Livestock Pipeline (516) as appropriate. Areas around watering facilities where animal concentrations or overflow from the watering facility will cause resource concerns must be protected by using Heavy Use Area Protection (561) as appropriate.
Scenario Feature Measure	Capacity in Gallons
Scenario Unit	Gallon
Scenario Typical Size	10500

Cost Summary:

Cost Category	Scenario Cost	Scenario Cost/Unit
Materials	$6,512.62	$0.62
Equipment/Installation	$239.49	$0.02
Labor	$223.98	$0.02
Mobilization	$240.76	$0.02
Acquisition of Technical Knowledge	$0.00	$0.00
Foregone Income	$0.00	$0.00
Total	$7,216.85	$0.69

Cost Details:

Cost Category	Component ID	Component Name	Component Description	Unit	Price ($/unit)	Quantity	Cost
Materials	45	Aggregate, Sand, Graded, Washed	Sand, typical ASTM C33 gradation, includes materials, equipment and labor to transport and place	Cubic yard	$24.28	13.1	$318.07
Materials	1044	Dimension Lumber, Treated	Treated dimension lumber with nominal thickness equal or less than 2". Includes lumber and fasteners	Board Foot	$0.74	30	$22.20
Materials	240	Freeze Proof Hydrant	Freeze Proof Hydrant, 3 ft bury	Each	$57.20	1	$57.20
Materials	277	Liner, Bottomless, 25' diameter	Tank Liner for bottomless tank as alternative to concrete	Each	$3,431.48	1.2	$4,117.78
Materials	1050	Post, Wood, CCA Treated, 4-5" X 7'	Wood Post, Line 4-5" X 7', CCA Treated	Each	$11.30	3	$33.90
Materials	1070	Tank, Galvanized Steel Bottomless Livestock, > 6,000 gallon	Includes tank materials and float valve, no liner	Gallon	$0.18	10500	$1,890.00
Materials	242	Wildlife Escape Ramp	Pool size 15' x 30', for small mammals less than one pound	Each	$36.74	2	$73.48
Equipment/Installation	926	Backhoe, 80 HP	Wheel mounted backhoe excavator with horsepower range of 60 to 90. Equipment and power unit costs. Labor not included.	Hour	$45.03	3	$135.09
Equipment/Installation	933	Skidsteer, 80 HP	Skidsteer loader with horsepower range of 60 to 90. Equipment and power unit costs. Labor not included.	Hour	$34.80	3	$104.40
Labor	232	Equipment Operators, Light	Includes: Skid Steer Loaders, Hydraulic Excavators <50 HP, Trenchers <12", Ag Equipment <150 HP, Pickup Trucks, Forklifts, Mulchers	Hour	$20.61	6	$123.66
Labor	231	General Labor	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	$16.72	6	$100.32
Mobilization	1139	Mobilization, medium equipment	Equipment with 70-150 HP or typical weights between 14,000 and 30,000 pounds.	Each	$120.38	2	$240.76

Scenario Worksheet

Practice and Scenario Description:

Information Type	Data
Region	Northern Plains
State	South Dakota
Discipline Group	Agricultural Engineering
Practice Code/Name	614 - Watering Facility
Scenario ID	6
Scenario Name	Steel Rim-Concrete Base
Scenario Description	A permanent watering facility for livestock constructed of a 30' diameter galvanized steel rim set in a reinforced concrete base with 10,500 gallons of capacity that stores adequate quantity and quality of water for storage and or direct drinking access. All watering facilities will be constructed from approved durable materials that have a life expectancy that meets or exceeds the planned useful life of the installation. This watering facility will address the resource concerns of inadequate supply of water for livestock, habitat degradation, water quality, and undesirable plant productivity and health.
Before Practice Situation	This practice applies to all land uses where there is a need for new or improved watering facilities for livestock and or wildlife, where water is not available in sufficient quantities at specific locations, and habitat, water quality, plant productivity and health needs to be improved.
After Practice Situation	A permanent watering facility constructed of a galvanized steel rim set in a reinforced concrete base with a capacity of 10,500 gallons is installed with all tank materials, tank plumbing and float valve, to provide adequate water storage capacity to ensure an adequate supply and quality of water for livestock or wildlife for storage and or direct drinking access and provides improved plant productivity and health, water quality, and habitat. All watering facilities are constructed from approved durable materials that have a life expectancy that meets or exceeds the planned useful life of the installation and placed on a properly prepared foundation with required plumbing. All needed pipelines are installed using Livestock Pipeline (516). Any needed vegetation of disturbed areas will use Critical Area Planting (342). All collectors or catchments for collecting precipitation will be addressed by using Water Harvesting Catchment (636). Any needed water source installation will use Water Well (642), Pumping Plant (533), Spring Development (574), or Livestock Pipeline (516) as appropriate. Areas around watering facilities where animal concentrations or overflow from the watering facility will cause resource concerns must be protected by using Heavy Use Area Protection (561) as appropriate.
Scenario Feature Measure	Capacity in Gallons
Scenario Unit	Gallon
Scenario Typical Size	10500

Cost Summary:

Cost Category	Scenario Cost	Scenario Cost/Unit
Materials	$2,348.72	$0.22
Equipment/Installation	$4,976.66	$0.47
Labor	$539.18	$0.05
Mobilization	$240.76	$0.02
Acquisition of Technical Knowledge	$0.00	$0.00
Foregone Income	$0.00	$0.00
Total	$8,105.32	$0.77

Cost Details:

Cost Category	Component ID	Component Name	Component Description	Unit	Price ($/unit)	Quantity	Cost
Materials	45	Aggregate, Sand, Graded, Washed	Sand, typical ASTM C33 gradation, includes materials, equipment and labor to transport and place	Cubic yard	$24.28	11.2	$271.94
Materials	1044	Dimension Lumber, Treated	Treated dimension lumber with nominal thickness equal or less than 2". Includes lumber and fasteners	Board Foot	$0.74	30	$22.20
Materials	240	Freeze Proof Hydrant	Freeze Proof Hydrant, 3 ft bury	Each	$57.20	1	$57.20
Materials	1050	Post, Wood, CCA Treated, 4-5" X 7'	Wood Post, Line 4-5" X 7', CCA Treated	Each	$11.30	3	$33.90
Materials	1070	Tank, Galvanized Steel Bottomless Livestock, > 6,000 gallon	Includes tank materials and float valve, no liner	Gallon	$0.18	10500	$1,890.00
Materials	242	Wildlife Escape Ramp	Pool size 15' x 30', for small mammals less than one pound	Each	$36.74	2	$73.48
Equipment/Installation	926	Backhoe, 80 HP	Wheel mounted backhoe excavator with horsepower range of 60 to 90. Equipment and power unit costs. Labor not included.	Hour	$45.03	4	$180.12
Equipment/Installation	37	Concrete, CIP, slab on grade, reinforced	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	$204.81	22.4	$4,587.74
Equipment/Installation	933	Skidsteer, 80 HP	Skidsteer loader with horsepower range of 60 to 90. Equipment and power unit costs. Labor not included.	Hour	$34.80	6	$208.80
Labor	232	Equipment Operators, Light	Includes: Skid Steer Loaders, Hydraulic Excavators <50 HP, Trenchers <12", Ag Equipment <150 HP, Pickup Trucks, Forklifts, Mulchers	Hour	$20.61	10	$206.10
Labor	231	General Labor	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	$16.72	12	$200.64
Labor	234	Supervisor or Manager	Labor involving supervision or management activities. Includes crew supervisors, foremen and farm/ranch managers time required for adopting new technology, etc.	Hour	$33.11	4	$132.44
Mobilization	1139	Mobilization, medium equipment	Equipment with 70-150 HP or typical weights between 14,000 and 30,000 pounds.	Each	$120.38	2	$240.76

Scenario Worksheet

Practice and Scenario Description:

Information Type	Data
Region	Northern Plains
State	South Dakota
Discipline Group	Agricultural Engineering
Practice Code/Name	614 - Watering Facility
Scenario ID	7
Scenario Name	Water Fountain
Scenario Description	A permanent watering facility consisting of a commercially available water fountain for livestock set on a concrete base to be installed with all tank materials, and plumbing, to provide adequate water supply capacity to ensure an adequate quality of water for livestock and direct drinking access and provide improved plant productivity and health, water quality, and habitat. All watering facilities are constructed from approved durable materials that have a life expectancy that meets or exceeds the planned useful life of the installation and placed on a properly prepared foundation with required plumbing. All needed pipelines are installed using Livestock Pipeline (516). Any needed vegetation of disturbed areas will use Critical Area Planting (342). All collectors or catchments for collecting precipitation will be addressed by using Water Harvesting Catchment (636). Any needed water source installation will use Water Well (642), Pumping Plant (533), Spring Development (574), or Livestock Pipeline (516) as appropriate. Areas around watering facilities where animal concentrations or overflow from the watering facility will cause resource concerns will be protected by using Heavy Use Area Protection (561) as appropriate.
Before Practice Situation	This practice applies to all land uses where there is a need for new or improved watering facilities for livestock and or wildlife, where water is not available in sufficient quantities at specific locations, and habitat, water quality, plant productivity and health needs to be improved.
After Practice Situation	A permanent watering facility consisting of a commercially available water fountain for livestock set on a concrete base is installed with tank plumbing to to ensure an adequate supply and quality of water for livestock or wildlife for direct drinking access and provides improved plant productivity and health, water quality, and habitat. All watering facilities are constructed from approved durable materials that have a life expectancy that meets or exceeds the planned useful life of the installation and placed on a properly prepared foundation with required plumbing. All needed pipelines are installed using Livestock Pipeline (516). Any needed vegetation of disturbed areas will use Critical Area Planting (342). All collectors or catchments for collecting precipitation will be addressed by using Water Harvesting Catchment (636). Any needed water source installation will use Water Well (642), Pumping Plant (533), Spring Development (574), or Livestock Pipeline (516) as appropriate. Areas around watering facilities where animal concentrations or overflow from the watering facility will cause resource concerns will be protected by using Heavy Use Area Protection (561) as appropriate.
Scenario Feature Measure	Capacity in Gallons
Scenario Unit	Each
Scenario Typical Size	1

Cost Summary:

Cost Category	Scenario Cost	Scenario Cost/Unit
Materials	$939.62	$939.62
Equipment/Installation	$397.30	$397.30
Labor	$74.66	$74.66
Mobilization	$120.38	$120.38
Acquisition of Technical Knowledge	$0.00	$0.00
Foregone Income	$0.00	$0.00
Total	$1,531.96	$1,531.96

Cost Details:

Cost Category	Component ID	Component Name	Component Description	Unit	Price ($/unit)	Quantity	Cost
Materials	45	Aggregate, Sand, Graded, Washed	Sand, typical ASTM C33 gradation, includes materials, equipment and labor to transport and place	Cubic yard	$24.28	0.8	$19.42
Materials	240	Freeze Proof Hydrant	Freeze Proof Hydrant, 3 ft bury	Each	$57.20	1	$57.20
Materials	281	Tank, Freeze Proof, 4 hole	Tank, Freeze Proof with 4 drinking holes	Each	$863.00	1	$863.00
Equipment/Installation	37	Concrete, CIP, slab on grade, reinforced	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	$204.81	1.6	$327.70
Equipment/Installation	933	Skidsteer, 80 HP	Skidsteer loader with horsepower range of 60 to 90. Equipment and power unit costs. Labor not included.	Hour	$34.80	2	$69.60
Labor	232	Equipment Operators, Light	Includes: Skid Steer Loaders, Hydraulic Excavators <50 HP, Trenchers <12", Ag Equipment <150 HP, Pickup Trucks, Forklifts, Mulchers	Hour	$20.61	2	$41.22
Labor	231	General Labor	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	$16.72	2	$33.44
Mobilization	1139	Mobilization, medium equipment	Equipment with 70-150 HP or typical weights between 14,000 and 30,000 pounds.	Each	$120.38	1	$120.38

Scenario Worksheet

Practice and Scenario Description:

Information Type	Data
Region	Northern Plains
State	South Dakota
Discipline Group	Agricultural Engineering
Practice Code/Name	614 - Watering Facility
Scenario ID	8
Scenario Name	Pre-Cast Concrete
Scenario Description	A permanent watering facility with a capacity of 500 gallons constructed of PreCast Concrete is installed with all tank materials, plumbing and float valve, to provide adequate water storage capacity to ensure an adequate supply and quality of water for livestock for storage and or direct drinking access and provide improved plant productivity and health, water quality, and habitat. All watering facilities are constructed from approved durable materials that have a life expectancy that meets or exceeds the planned useful life of the installation and placed on a properly prepared foundation with required plumbing. All needed pipelines are installed using Livestock Pipeline (516). Any needed vegetation of disturbed areas will use Critical Area Planting (342). All collectors or catchments for collecting precipitation will be addressed by using Water Harvesting Catchment (636). Any needed water source installation will use Water Well (642), Pumping Plant (533), Spring Development (574), or Livestock Pipeline (516) as appropriate. Areas around watering facilities where animal concentrations or overflow from the watering facility will cause resource concerns will be protected by using Heavy Use Area Protection (561) as appropriate.
Before Practice Situation	This practice applies to all land uses where there is a need for new or improved watering facilities for livestock and or wildlife, where water is not available in sufficient quantities at specific locations, and habitat, water quality, plant productivity and health needs to be improved.
After Practice Situation	A permanent watering facility with a capacity of 500 gallons is constructed of PreCast concrete, tank plumbing and float valve, to provide adequate water storage capacity to ensure an adequate supply and quality of water for livestock or wildlife for storage and or direct drinking access and provides improved plant productivity and health, water quality, and habitat. All watering facilities are constructed from approved durable materials that have a life expectancy that meets or exceeds the planned useful life of the installation and placed on a properly prepared foundation with required plumbing. All needed pipelines are installed using Livestock Pipeline (516). Any needed vegetation of disturbed areas will use Critical Area Planting (342). All collectors or catchments for collecting precipitation will be addressed by using Water Harvesting Catchment (636). Any needed water source installation will use Water Well (642), Pumping Plant (533), Spring Development (574), or Livestock Pipeline (516) as appropriate. Areas around watering facilities where animal concentrations or overflow from the watering facility will cause resource concerns will be protected by using Heavy Use Area Protection (561) as appropriate.
Scenario Feature Measure	Capacity in Gallons
Scenario Unit	Gallon
Scenario Typical Size	500

Cost Summary:

Cost Category	Scenario Cost	Scenario Cost/Unit
Materials	$1,366.48	$2.73
Equipment/Installation	$79.83	$0.16
Labor	$74.66	$0.15
Mobilization	$240.76	$0.48
Acquisition of Technical Knowledge	$0.00	$0.00
Foregone Income	$0.00	$0.00
Total	$1,761.73	$3.52

Cost Details:

Cost Category	Component ID	Component Name	Component Description	Unit	Price ($/unit)	Quantity	Cost
Materials	1050	Post, Wood, CCA Treated, 4-5" X 7'	Wood Post, Line 4-5" X 7', CCA Treated	Each	$11.30	3	$33.90
Materials	1049	Tank, Concrete, 500 gallon	Materials and delivery	Each	$1,207.50	1	$1,207.50
Materials	1044	Dimension Lumber, Treated	Treated dimension lumber with nominal thickness equal or less than 2". Includes lumber and fasteners	Board Foot	$0.74	20	$14.80
Materials	1099	Aggregate, Gravel, Ungraded, Quarry Run	Includes materials, equipment and labor	Cubic yard	$18.16	0.9	$16.34
Materials	240	Freeze Proof Hydrant	Freeze Proof Hydrant, 3 ft bury	Each	$57.20	1	$57.20
Materials	242	Wildlife Escape Ramp	Pool size 15' x 30', for small mammals less than one pound	Each	$36.74	1	$36.74
Equipment/Installation	933	Skidsteer, 80 HP	Skidsteer loader with horsepower range of 60 to 90. Equipment and power unit costs. Labor not included.	Hour	$34.80	1	$34.80
Equipment/Installation	926	Backhoe, 80 HP	Wheel mounted backhoe excavator with horsepower range of 60 to 90. Equipment and power unit costs. Labor not included.	Hour	$45.03	1	$45.03
Labor	231	General Labor	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	$16.72	2	$33.44
Labor	232	Equipment Operators, Light	Includes: Skid Steer Loaders, Hydraulic Excavators <50 HP, Trenchers <12", Ag Equipment <150 HP, Pickup Trucks, Forklifts, Mulchers	Hour	$20.61	2	$41.22
Mobilization	1139	Mobilization, medium equipment	Equipment with 70-150 HP or typical weights between 14,000 and 30,000 pounds.	Each	$120.38	2	$240.76

Scenario Worksheet

Practice and Scenario Description:

Information Type	Data
Region	Northern Plains
State	South Dakota
Discipline Group	Agricultural Engineering
Practice Code/Name	614 - Watering Facility
Scenario ID	9
Scenario Name	Insulated Tank with Cover
Scenario Description	A permanent watering facility for livestock constructed using a rubber equipment tire with concrete plug or fiberglass tank with 1,200 gallon capacity placed on a gravel or compacted earth foundation that stores adequate quantity and quality of water for storage and or direct drinking access. All watering facilities will be constructed from approved durable materials that have a life expectancy that meets or exceeds the planned useful life of the installation. This watering facility will address the resource concerns of inadequate supply of water for livestock, habitat degradation, water quality, and undesirable plant productivity and health.
Before Practice Situation	This practice applies to all land uses where there is a need for new or improved watering facilities for livestock and or wildlife, where water is not available in sufficient quantities at specific locations, and habitat, water quality, plant productivity and health needs to be improved.
After Practice Situation	A permanent watering facility with a capacity of greater than 1,200 gallons constructed using a rubber equipment tire with concrete plug or fiberglass tank is installed on a gravel or compacted earth foundation with all tank materials, tank plumbing and float valve, to provide adequate water storage capacity to ensure an adequate supply and quality of water for livestock or wildlife for storage and or direct drinking access and provides improved plant productivity and health, water quality, and habitat. All watering facilities are constructed from approved durable materials that have a life expectancy that meets or exceeds the planned useful life of the installation and placed on a properly prepared foundation with required plumbing. All needed pipelines are installed using Livestock Pipeline (516). Any needed vegetation of disturbed areas will use Critical Area Planting (342). All collectors or catchments for collecting precipitation will be addressed by using Water Harvesting Catchment (636). Any needed water source installation will use Water Well (642), Pumping Plant (533), Spring Development (574), or Livestock Pipeline (516) as appropriate. Areas around watering facilities where animal concentrations or overflow from the watering facility will cause resource concerns will be protected by using Heavy Use Area Protection (561) as appropriate.
Scenario Feature Measure	Capacity in Gallons
Scenario Unit	Gallon
Scenario Typical Size	1200

Cost Summary:

Cost Category	Scenario Cost	Scenario Cost/Unit
Materials	$2,043.34	$1.70
Equipment/Installation	$104.95	$0.09
Labor	$108.10	$0.09
Mobilization	$240.76	$0.20
Acquisition of Technical Knowledge	$0.00	$0.00
Foregone Income	$0.00	$0.00
Total	$2,497.15	$2.08

Cost Details:

Cost Category	Component ID	Component Name	Component Description	Unit	Price ($/unit)	Quantity	Cost
Materials	1099	Aggregate, Gravel, Ungraded, Quarry Run	Includes materials, equipment and labor	Cubic yard	$18.16	1.5	$27.24
Materials	1044	Dimension Lumber, Treated	Treated dimension lumber with nominal thickness equal or less than 2". Includes lumber and fasteners	Board Foot	$0.74	20	$14.80
Materials	240	Freeze Proof Hydrant	Freeze Proof Hydrant, 3 ft bury	Each	$57.20	1	$57.20
Materials	1050	Post, Wood, CCA Treated, 4-5" X 7'	Wood Post, Line 4-5" X 7', CCA Treated	Each	$11.30	3	$33.90
Materials	1076	Tank, Fiberglass Cover	Includes materials	Square Foot	$15.20	78.5	$1,193.20
Materials	287	Tank, Tire, 10' diameter	Tire, includes material cost for tank and shipping. Labor and other appurtenance costs not included.	Each	$717.00	1	$717.00
Equipment/Installation	926	Backhoe, 80 HP	Wheel mounted backhoe excavator with horsepower range of 60 to 90. Equipment and power unit costs. Labor not included.	Hour	$45.03	1	$45.03
Equipment/Installation	36	Concrete, CIP, formless, non reinforced	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	$100.48	0.25	$25.12
Equipment/Installation	933	Skidsteer, 80 HP	Skidsteer loader with horsepower range of 60 to 90. Equipment and power unit costs. Labor not included.	Hour	$34.80	1	$34.80
Labor	232	Equipment Operators, Light	Includes: Skid Steer Loaders, Hydraulic Excavators <50 HP, Trenchers <12", Ag Equipment <150 HP, Pickup Trucks, Forklifts, Mulchers	Hour	$20.61	2	$41.22
Labor	231	General Labor	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	$16.72	4	$66.88
Mobilization	1139	Mobilization, medium equipment	Equipment with 70-150 HP or typical weights between 14,000 and 30,000 pounds.	Each	$120.38	2	$240.76

Scenario Worksheet

Practice and Scenario Description:

Information Type	Data
Region	Northern Plains
State	South Dakota
Discipline Group	Agricultural Engineering
Practice Code/Name	614 - Watering Facility
Scenario ID	10
Scenario Name	Below Ground Storage Tank
Scenario Description	A permanent below ground storage facility to provide water for a watering facility for livestock, wildlife and/or other conservation practices. All water storage facilities will be constructed from approved durable materials that have a life expectancy that meets or exceeds the planned useful life of the installation. This watering facility will address the resource concerns of inadequate supply of water for livestock and or wildlife, habitat degradation, water quality, and undesirable plant productivity and health.
Before Practice Situation	This practice applies to all land uses where there is a need for new or improved watering facilities for livestock and or wildlife; where water is not available in sufficient quantities at specific locations; and habitat, water quality, plant productivity and health needs to be improved.
After Practice Situation	A permanent water storage facility using a below ground concrete tank is installed with all tank materials, tank plumbing and float valve, to provide adequate water storage capacity to ensure an adequate supply and quality of water for livestock, wildlife or other conservation practices for storage and/or direct drinking access and provides improved plant productivity and health, water quality, and habitat. All water storage facilities are constructed from approved durable materials that have a life expectancy that meets or exceeds the planned useful life of the installation and placed on a properly prepared foundation with required plumbing. All needed pipelines are installed using Livestock Pipeline (516). Any needed vegetation of disturbed areas will use Critical Area Planting (342). All collectors or catchments for collecting precipitation will be addressed by using Water Harvesting Catchment (636). Any needed water source installation will use Water Well (642), Pumping Plant (533), Spring Development (574), or Livestock Pipeline (516) as appropriate. Areas around watering facilities where animal concentrations or overflow from the watering facility will cause resource concerns will be protected by using Heavy Use Area Protection (561) as appropriate.
Scenario Feature Measure	Capacity in Gallons
Scenario Unit	Gallon
Scenario Typical Size	5000

Cost Summary:

Cost Category	Scenario Cost	Scenario Cost/Unit
Materials	$5,559.07	$1.11
Equipment/Installation	$839.04	$0.17
Labor	$598.28	$0.12
Mobilization	$0.00	$0.00
Acquisition of Technical Knowledge	$0.00	$0.00
Foregone Income	$0.00	$0.00
Total	$6,996.39	$1.40

Cost Details:

Cost Category	Component ID	Component Name	Component Description	Unit	Price ($/unit)	Quantity	Cost
Materials	1055	Tank, Concrete, 2500 gallon	Concrete tank for water storage, with riser and lid	Each	$2,721.00	2	$5,442.00
Materials	1077	Tank, Float Valve Assembly	Float Valve, Stem, Swivel, Float Ball	Each	$84.27	1	$84.27
Materials	46	Aggregate, Gravel, Graded	Gravel, includes materials, equipment and labor to transport and place. Includes washed and unwashed gravel.	Cubic yard	$25.23	1.3	$32.80
Equipment/Installation	929	Dozer, 80 HP	Track mounted Dozer with horsepower range of 60 to 90. Equipment and power unit costs. Labor not included.	Hour	$54.75	4	$219.00
Equipment/Installation	932	Hydraulic Excavator, 2 CY	Track mounted hydraulic excavator with bucket capacity range of 1.5 to 2.5 CY. Equipment and power unit costs. Labor not included.	Hour	$155.01	4	$620.04
Labor	234	Supervisor or Manager	Labor involving supervision or management activities. Includes crew supervisors, foremen and farm/ranch managers time required for adopting new technology, etc.	Hour	$33.11	4	$132.44
Labor	231	General Labor	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	$16.72	16	$267.52
Labor	233	Equipment Operators, Heavy	Includes: Cranes, Hydraulic Excavators >=50 HP, Dozers, Paving Machines, Rock Trenchers, Trenchers >=12", Dump Trucks, Ag Equipment >=150 HP, Scrapers, Water Wagons.	Hour	$24.79	8	$198.32

Scenario Worksheet

Practice and Scenario Description:

Information Type	Data
Region	Northern Plains
State	South Dakota
Discipline Group	Agricultural Engineering
Practice Code/Name	614 - Watering Facility
Scenario ID	10
Scenario Name	Below Ground Storage Tank
Scenario Description	A permanent below ground storage facility to provide water for a watering facility for livestock, wildlife and/or other conservation practices. All water storage facilities will be constructed from approved durable materials that have a life expectancy that meets or exceeds the planned useful life of the installation. This watering facility will address the resource concerns of inadequate supply of water for livestock and or wildlife, habitat degradation, water quality, and undesirable plant productivity and health.
Before Practice Situation	This practice applies to all land uses where there is a need for new or improved watering facilities for livestock and or wildlife; where water is not available in sufficient quantities at specific locations; and habitat, water quality, plant productivity and health needs to be improved.
After Practice Situation	A permanent water storage facility using a below ground concrete tank is installed with all tank materials, tank plumbing and float valve, to provide adequate water storage capacity to ensure an adequate supply and quality of water for livestock, wildlife or other conservation practices for storage and/or direct drinking access and provides improved plant productivity and health, water quality, and habitat. All water storage facilities are constructed from approved durable materials that have a life expectancy that meets or exceeds the planned useful life of the installation and placed on a properly prepared foundation with required plumbing. All needed pipelines are installed using Livestock Pipeline (516). Any needed vegetation of disturbed areas will use Critical Area Planting (342). All collectors or catchments for collecting precipitation will be addressed by using Water Harvesting Catchment (636). Any needed water source installation will use Water Well (642), Pumping Plant (533), Spring Development (574), or Livestock Pipeline (516) as appropriate. Areas around watering facilities where animal concentrations or overflow from the watering facility will cause resource concerns will be protected by using Heavy Use Area Protection (561) as appropriate.
Scenario Feature Measure	Capacity in Gallons
Scenario Unit	Gallon
Scenario Typical Size	5000

Cost Summary:

Cost Category	Scenario Cost	Scenario Cost/Unit
Materials	$5,559.07	$1.11
Equipment/Installation	$839.04	$0.17
Labor	$598.28	$0.12
Mobilization	$0.00	$0.00
Acquisition of Technical Knowledge	$0.00	$0.00
Foregone Income	$0.00	$0.00
Total	$6,996.39	$1.40

Cost Details:

Cost Category	Component ID	Component Name	Component Description	Unit	Price ($/unit)	Quantity	Cost
Materials	1055	Tank, Concrete, 2500 gallon	Concrete tank for water storage, with riser and lid	Each	$2,721.00	2	$5,442.00
Materials	1077	Tank, Float Valve Assembly	Float Valve, Stem, Swivel, Float Ball	Each	$84.27	1	$84.27
Materials	46	Aggregate, Gravel, Graded	Gravel, includes materials, equipment and labor to transport and place. Includes washed and unwashed gravel.	Cubic yard	$25.23	1.3	$32.80
Equipment/Installation	929	Dozer, 80 HP	Track mounted Dozer with horsepower range of 60 to 90. Equipment and power unit costs. Labor not included.	Hour	$54.75	4	$219.00
Equipment/Installation	932	Hydraulic Excavator, 2 CY	Track mounted hydraulic excavator with bucket capacity range of 1.5 to 2.5 CY. Equipment and power unit costs. Labor not included.	Hour	$155.01	4	$620.04
Labor	234	Supervisor or Manager	Labor involving supervision or management activities. Includes crew supervisors, foremen and farm/ranch managers time required for adopting new technology, etc.	Hour	$33.11	4	$132.44
Labor	231	General Labor	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	$16.72	16	$267.52
Labor	233	Equipment Operators, Heavy	Includes: Cranes, Hydraulic Excavators >=50 HP, Dozers, Paving Machines, Rock Trenchers, Trenchers >=12", Dump Trucks, Ag Equipment >=150 HP, Scrapers, Water Wagons.	Hour	$24.79	8	$198.32

Scenario Worksheet

Practice and Scenario Description:

Information Type	Data
Region	Northern Plains
State	South Dakota
Discipline Group	Agricultural Engineering
Practice Code/Name	620 - Underground Outlet
Scenario ID	1
Scenario Name	<=6" Single Wall PE w/ Riser
Scenario Description	Install 500 feet of 6" approved plastic pipe to convey stormwater from one location to a suitable and stable outlet. Trench is excavated approximately 54"" deep and 15" wide by trencher. Costs include 6" HDPE corrugated single wall plastic tubing, 6" Perforated PVC Riser Inlet, labor to install pipe, trench excavation, trench backfill, and rodent guard. This practice is often installed in conjunction with terraces, diversions, sediment control basins, waterways or simlar practices.
Before Practice Situation	Excessive sedimentation and soil erosion as a result of gully, rill or sheet erosion which exceeds "T" from farm fields and other locations. Also, roof runoff or surface runoff that becomes contminated with agricultural wastes that significantly contributes to the amount of runoff that has to be stored or treated.
After Practice Situation	Field system meets "T" or "clean" storm water runoff is diverted away from an agricultural waste management system to minimize the volume of runoff that is contaminated by agricultural waste. Associated practices are Critical Area Planting (342), Grassed Waterway (412), Terrace (600), Diversion (342), Water and Sediment Control Basin (638), and Subsurface Drainage (606)
Scenario Feature Measure	Length of Conduit
Scenario Unit	Feet
Scenario Typical Size	500

Cost Summary:

Cost Category	Scenario Cost	Scenario Cost/Unit
Materials	$708.28	$1.42
Equipment/Installation	$586.95	$1.17
Labor	$99.99	$0.20
Mobilization	$240.76	$0.48
Acquisition of Technical Knowledge	$0.00	$0.00
Foregone Income	$0.00	$0.00
Total	$1,635.98	$3.27

Cost Details:

Cost Category	Component ID	Component Name	Component Description	Unit	Price ($/unit)	Quantity	Cost
Materials	1261	Inlet, riser, 6"	Riser, polymer, complete vertical perforated UGO inlet with Tee, orifice plate if needed, 6" diameter. Materials only.	Each	$76.64	2	$153.28
Materials	1242	Pipe, HDPE, 6", CPT, Single Wall	Pipe, Corrugated Plastic Tubing, Single Wall, 6" diameter - ASTM F405. Material cost only.	Foot	$1.11	500	$555.00
Equipment/Installation	1227	Excavation, common earth, side cast, large equipment	Bulk excavation and side casting of common earth with hydraulic excavator with less greater than 1 CY capacity. Includes equipment and labor.	Cubic Yard	$1.66	210	$348.60
Equipment/Installation	1220	Excavation, common earth, small equipment, 50 ft	Bulk excavation of common earth with dozer <100 HP with average push distance of 50 feet. Includes equipment and labor.	Cubic Yard	$2.27	105	$238.35
Labor	231	General Labor	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	$16.72	4	$66.88
Labor	234	Supervisor or Manager	Labor involving supervision or management activities. Includes crew supervisors, foremen and farm/ranch managers time required for adopting new technology, etc.	Hour	$33.11	1	$33.11
Mobilization	1139	Mobilization, medium equipment	Equipment with 70-150 HP or typical weights between 14,000 and 30,000 pounds.	Each	$120.38	2	$240.76

Scenario Worksheet

Practice and Scenario Description:

Information Type	Data
Region	Northern Plains
State	South Dakota
Discipline Group	Agricultural Engineering
Practice Code/Name	620 - Underground Outlet
Scenario ID	2
Scenario Name	6" to 8" Single Wall PE w/ Riser
Scenario Description	Install 500 feet of 6" and 8" approved plastic pipe to convey stormwater from one location to a suitable and stable outlet. Trench Excavation is 58" deep and 28" wide. Typical costs include 6" and 8" PVC pipe, 6" riser inlet , labor to install pipe, trench excavation, trench backfill, and rodent guard. This practice is often installed in conjunction with terraces, diversions, sediment control basins, waterways or simlar practices.
Before Practice Situation	Excessive sedimentation and soil erosion as a result of gully, rill or sheet erosion which exceeds "T" from farm fields and other locations. Also, roof runoff or surface runoff that becomes contminated with agricultural wastes that significantly contributes to the amount of runoff that has to be stored or treated.
After Practice Situation	Field system meets "T" or "clean" storm water runoff is diverted away from an agricultural waste management system to minimize the volume of runoff that is contaminated by agricultural waste. Associated practices are Critical Area Planting (342), Grassed Waterway (412), Terrace (600), Diversion (342), Water and Sediment Control Basin (638), and Subsurface Drainage (606)
Scenario Feature Measure	Length of Conduit
Scenario Unit	Feet
Scenario Typical Size	500

Cost Summary:

Cost Category	Scenario Cost	Scenario Cost/Unit
Materials	$3,447.92	$6.90
Equipment/Installation	$825.30	$1.65
Labor	$99.99	$0.20
Mobilization	$240.76	$0.48
Acquisition of Technical Knowledge	$0.00	$0.00
Foregone Income	$0.00	$0.00
Total	$4,613.97	$9.23

Cost Details:

Cost Category	Component ID	Component Name	Component Description	Unit	Price ($/unit)	Quantity	Cost
Materials	1261	Inlet, riser, 6"	Riser, polymer, complete vertical perforated UGO inlet with Tee, orifice plate if needed, 6" diameter. Materials only.	Each	$76.64	3	$229.92
Materials	993	Pipe, PVC, 6", SDR 35	Materials: - 6" - PVC - SDR 35 - ASTM D3034	Foot	$3.52	200	$704.00
Materials	991	Pipe, PVC, 8", SDR 26	Materials: - 8" - PVC - SDR 26 160 psi - ASTM D2241	Foot	$8.38	300	$2,514.00
Equipment/Installation	1227	Excavation, common earth, side cast, large equipment	Bulk excavation and side casting of common earth with hydraulic excavator with less greater than 1 CY capacity. Includes equipment and labor.	Cubic Yard	$1.66	210	$348.60
Equipment/Installation	1220	Excavation, common earth, small equipment, 50 ft	Bulk excavation of common earth with dozer <100 HP with average push distance of 50 feet. Includes equipment and labor.	Cubic Yard	$2.27	210	$476.70
Labor	231	General Labor	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	$16.72	4	$66.88
Labor	234	Supervisor or Manager	Labor involving supervision or management activities. Includes crew supervisors, foremen and farm/ranch managers time required for adopting new technology, etc.	Hour	$33.11	1	$33.11
Mobilization	1139	Mobilization, medium equipment	Equipment with 70-150 HP or typical weights between 14,000 and 30,000 pounds.	Each	$120.38	2	$240.76

Scenario Worksheet

Practice and Scenario Description:

Information Type	Data
Region	Northern Plains
State	South Dakota
Discipline Group	Agricultural Engineering
Practice Code/Name	620 - Underground Outlet
Scenario ID	4
Scenario Name	10" to 18" Single Wall PE w/ Riser
Scenario Description	Install 500 feet of 12" and 18" approved plastic pipe to convey stormwater from one location to a suitable and stable outlet. Trench Excavation is 58" deep and 28" wide. Costs include 12" and 18" HDPE pipe, 10" Perforated PVC Riser Inlet, labor to install pipe, trench excavation, trench backfill, and rodent guard. This practice is often installed in conjunction with terraces, diversions, sediment control basins, waterways or simlar practices.
Before Practice Situation	Excessive sedimentation and soil erosion as a result of gully, rill or sheet erosion which exceeds "T" from farm fields and other locations. Also, roof runoff or surface runoff that becomes contminated with agricultural wastes that significantly contributes to the amount of runoff that has to be stored or treated.
After Practice Situation	Field system meets "T" or "clean" storm water runoff is diverted away from an agricultural waste management system to minimize the volume of runoff that is contaminated by agricultural waste. Associated practices are Critical Area Planting (342), Grassed Waterway (412), Terrace (600), Diversion (342), Water and Sediment Control Basin (638), and Subsurface Drainage (606)
Scenario Feature Measure	Length of Conduit
Scenario Unit	Feet
Scenario Typical Size	500

Cost Summary:

Cost Category	Scenario Cost	Scenario Cost/Unit
Materials	$6,232.48	$12.46
Equipment/Installation	$825.30	$1.65
Labor	$99.99	$0.20
Mobilization	$240.76	$0.48
Acquisition of Technical Knowledge	$0.00	$0.00
Foregone Income	$0.00	$0.00
Total	$7,398.53	$14.80

Cost Details:

Cost Category	Component ID	Component Name	Component Description	Unit	Price ($/unit)	Quantity	Cost
Materials	1263	Inlet, riser, 10"	Riser, polymer, complete vertical perforated UGO inlet with Tee, orifice plate if needed, 10" diameter. Materials only.	Foot	$170.56	8	$1,364.48
Materials	1244	Pipe, HDPE, CPT, Double Wall, Soil Tight, 12"	Pipe, Corrugated HDPE Double Wall, 12" diameter with soil tight joints - AASHTO M294. Material cost only.	Foot	$8.29	200	$1,658.00
Materials	1245	Pipe, HDPE, CPT, Double Wall, Soil Tight, 18"	Pipe, Corrugated HDPE Double Wall, 18" diameter with soil tight joints - AASHTO M294. Material cost only.	Foot	$10.70	300	$3,210.00
Equipment/Installation	1227	Excavation, common earth, side cast, large equipment	Bulk excavation and side casting of common earth with hydraulic excavator with less greater than 1 CY capacity. Includes equipment and labor.	Cubic Yard	$1.66	210	$348.60
Equipment/Installation	1220	Excavation, common earth, small equipment, 50 ft	Bulk excavation of common earth with dozer <100 HP with average push distance of 50 feet. Includes equipment and labor.	Cubic Yard	$2.27	210	$476.70
Labor	231	General Labor	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	$16.72	4	$66.88
Labor	234	Supervisor or Manager	Labor involving supervision or management activities. Includes crew supervisors, foremen and farm/ranch managers time required for adopting new technology, etc.	Hour	$33.11	1	$33.11
Mobilization	1139	Mobilization, medium equipment	Equipment with 70-150 HP or typical weights between 14,000 and 30,000 pounds.	Each	$120.38	2	$240.76

Scenario Worksheet

Practice and Scenario Description:

Information Type	Data
Region	Northern Plains
State	South Dakota
Discipline Group	Environmental Engineering
Practice Code/Name	632 - Solid/Liquid Waste Separation Facility
Scenario ID	1
Scenario Name	Mechanical Separation Facility
Scenario Description	A small mechanical separation facility to partition solids, liquids, and/or associated nutrients from animal waste streams. The partitioning of the previously mentioned components facilitates the protection of air and water quality, protects animal health, and improves the management of an animal waste management system. Mechanical separators may include, but are not limited to: static inclined screens , vibratory screens, rotating screens, centrifuges, screw or roller presses, or other systems.
Before Practice Situation	Applicable to situations where partitioning solids, liquids, and nutrients will facilitate the management of an animal waste management system, improve air quality (reduce odors), and address water quality concerns.
After Practice Situation	One small mechanical separation facility (a screw press) installed at livestock facility before storage or treatment or after treatment, for example, after an anaerobic digester. Part of an animal waste management system.
Scenario Feature Measure	Item
Scenario Unit	Each
Scenario Typical Size	1

Cost Summary:

Cost Category	Scenario Cost	Scenario Cost/Unit
Materials	$29,184.84	$29,184.84
Equipment/Installation	$1,536.08	$1,536.08
Labor	$911.52	$911.52
Mobilization	$202.54	$202.54
Acquisition of Technical Knowledge	$0.00	$0.00
Foregone Income	$0.00	$0.00
Total	$31,834.97	$31,834.97

Cost Details:

Cost Category	Component ID	Component Name	Component Description	Unit	Price ($/unit)	Quantity	Cost
Materials	1948	Vibratory or Rotating Screen	Vibratory or Rotating Screen, includes materials, shipping and equipment.	Each	$29,095.00	1	$29,095.00
Materials	45	Aggregate, Sand, Graded, Washed	Sand, typical ASTM C33 gradation, includes materials, equipment and labor to transport and place	Cubic yard	$24.28	3.7	$89.84
Equipment/Installation	37	Concrete, CIP, slab on grade, reinforced	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	$204.81	7.5	$1,536.08
Labor	231	General Labor	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	$16.72	32	$535.04
Labor	230	Skilled Labor	Labor requiring a high level skill set: Includes carpenters, welders, electricians, conservation professionals involved with data collection, monitoring, and or record keeping, etc.	Hour	$23.53	16	$376.48
Mobilization	1138	Mobilization, small equipment	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	$82.16	1	$82.16
Mobilization	1139	Mobilization, medium equipment	Equipment with 70-150 HP or typical weights between 14,000 and 30,000 pounds.	Each	$120.38	1	$120.38

Scenario Worksheet

Practice and Scenario Description:

Information Type	Data
Region	Northern Plains
State	South Dakota
Discipline Group	Environmental Engineering
Practice Code/Name	632 - Solid/Liquid Waste Separation Facility
Scenario ID	3
Scenario Name	Earthen, Pipe Outlet
Scenario Description	An earthen structure, such as a basin or a terrace or dike like structure, used to capture and separate a portion of the solids from a liquid stream from a feedlot or confinement facility. A concrete pad should be installed on the bottom of the basin and around outlet structures to facilitate cleanout. Removes as portion of the solids to facilitate waste handling and to address water quality concerns. Associated practices include Nutrient Management (590), Composting Facility (317), Anaerobic Digester (366), Waste Storage Facility (313), Waste Recycling (633), Waste Transfer (634), Vegetated Treatment Area (635), Pond Lining or Sealing (521A-D), and Waste Treatment (629).
Before Practice Situation	Applicable to situations where partitioning solids, liquids, and nutrients will facilitate the management of an animal waste management system, improve air quality (reduce odors), and address water quality concerns.
After Practice Situation	One earthen settling basin structure (60 ft wide by 200 ft long by 3 ft deep, with one screening outlet structure) constructed around or at a livestock feeding operation. Removes a portion of the solids that otherwise would leave with the runoff from an animal feeding operation. Part of an animal waste management system.
Scenario Feature Measure	Cubic Foot of Design Storage
Scenario Unit	Cubic Foot
Scenario Typical Size	30000

Cost Summary:

Cost Category	Scenario Cost	Scenario Cost/Unit
Materials	$1,599.51	$0.05
Equipment/Installation	$4,345.87	$0.14
Labor	$267.52	$0.01
Mobilization	$405.08	$0.01
Acquisition of Technical Knowledge	$0.00	$0.00
Foregone Income	$0.00	$0.00
Total	$6,617.98	$0.22

Cost Details:

Cost Category	Component ID	Component Name	Component Description	Unit	Price ($/unit)	Quantity	Cost
Materials	1229	Wire Mesh Screen, galvanized, 1/16 in	Wire Mesh Screen, galvanized, 1/16 inch grid spacing. Materials only.	Square Foot	$2.45	32	$78.40
Materials	1609	Lumber, planks, posts and timbers, treated	Treated dimension lumber with nominal thickness greater than 2". Includes lumber and fasteners. Does not include labor.	Board Foot	$1.19	37.3	$44.39
Materials	1352	Pipe, PVC, 12", SCH 80	Materials: - 12" - PVC - SCH 80 - ASTM D1785	Foot	$23.24	60	$1,394.40
Materials	12	Post, Wood, CCA treated, 6" x 8'	Wood Post, End 6" X 8', CCA Treated	Each	$20.58	4	$82.32
Equipment/Installation	37	Concrete, CIP, slab on grade, reinforced	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	$204.81	3.3	$675.87
Equipment/Installation	49	Earthfill, Roller Compacted	Earthfill, roller or machine compacted, includes equipment and labor	Cubic yard	$3.67	1000	$3,670.00
Labor	231	General Labor	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	$16.72	16	$267.52
Mobilization	1139	Mobilization, medium equipment	Equipment with 70-150 HP or typical weights between 14,000 and 30,000 pounds.	Each	$120.38	2	$240.76
Mobilization	1138	Mobilization, small equipment	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	$82.16	2	$164.32

Scenario Worksheet

Practice and Scenario Description:

Information Type	Data
Region	Northern Plains
State	South Dakota
Discipline Group	Environmental Engineering
Practice Code/Name	632 - Solid/Liquid Waste Separation Facility
Scenario ID	4
Scenario Name	Earth Basin with Concrete Bottom, Pipe Outlet
Scenario Description	An earthen structure, such as a basin or a terrace or dike like structure, used to capture and separate a portion of the solids from a liquid stream from a feedlot or confinement facility. A concrete pad should be installed on the bottom of the basin and around outlet structures to facilitate cleanout. Removes as portion of the solids to facilitate waste handling and to address water quality concerns. Associated practices include Nutrient Management (590), Composting Facility (317), Anaerobic Digester (366), Waste Storage Facility (313), Waste Recycling (633), Waste Transfer (634), Vegetated Treatment Area (635), Pond Lining or Sealing (521A-D), and Waste Treatment (629).
Before Practice Situation	Applicable to situations where partitioning solids, liquids, and nutrients will facilitate the management of an animal waste management system, improve air quality (reduce odors), and address water quality concerns.
After Practice Situation	One earthen settling basin structure with a 30 ft wide by 200 ft long bottom area, 5 ft deep with 3:1 sideslopes. 4.0' depth is used for storage volume computation with 1.0' freeboard. One screening outlet structure is constructed around or at a livestock feeding operation. Removes a portion of the solids that otherwise would leave with the runoff from an animal feeding operation. Part of an animal waste management system.
Scenario Feature Measure	Cubic Foot of Design Storage
Scenario Unit	Cubic Foot
Scenario Typical Size	35800

Cost Summary:

Cost Category	Scenario Cost	Scenario Cost/Unit
Materials	$3,469.05	$0.10
Equipment/Installation	$23,708.70	$0.66
Labor	$267.52	$0.01
Mobilization	$405.08	$0.01
Acquisition of Technical Knowledge	$0.00	$0.00
Foregone Income	$0.00	$0.00
Total	$27,850.35	$0.78

Cost Details:

Cost Category	Component ID	Component Name	Component Description	Unit	Price ($/unit)	Quantity	Cost
Materials	1352	Pipe, PVC, 12", SCH 80	Materials: - 12" - PVC - SCH 80 - ASTM D1785	Foot	$23.24	60	$1,394.40
Materials	1609	Lumber, planks, posts and timbers, treated	Treated dimension lumber with nominal thickness greater than 2". Includes lumber and fasteners. Does not include labor.	Board Foot	$1.19	37.3	$44.39
Materials	1229	Wire Mesh Screen, galvanized, 1/16 in	Wire Mesh Screen, galvanized, 1/16 inch grid spacing. Materials only.	Square Foot	$2.45	32	$78.40
Materials	12	Post, Wood, CCA treated, 6" x 8'	Wood Post, End 6" X 8', CCA Treated	Each	$20.58	4	$82.32
Materials	46	Aggregate, Gravel, Graded	Gravel, includes materials, equipment and labor to transport and place. Includes washed and unwashed gravel.	Cubic yard	$25.23	74.1	$1,869.54
Equipment/Installation	37	Concrete, CIP, slab on grade, reinforced	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	$204.81	92.6	$18,965.41
Equipment/Installation	38	Concrete, CIP, formed reinforced	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	$325.24	3.3	$1,073.29
Equipment/Installation	49	Earthfill, Roller Compacted	Earthfill, roller or machine compacted, includes equipment and labor	Cubic yard	$3.67	1000	$3,670.00
Labor	231	General Labor	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	$16.72	16	$267.52
Mobilization	1139	Mobilization, medium equipment	Equipment with 70-150 HP or typical weights between 14,000 and 30,000 pounds.	Each	$120.38	2	$240.76
Mobilization	1138	Mobilization, small equipment	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	$82.16	2	$164.32

Scenario Worksheet

Practice and Scenario Description:

Information Type	Data
Region	Northern Plains
State	South Dakota
Discipline Group	Environmental Engineering
Practice Code/Name	632 - Solid/Liquid Waste Separation Facility
Scenario ID	6
Scenario Name	Concrete Sand Settling Lane
Scenario Description	A concrete structure, a concrete lane with curbs, used to capture and separate a portion of the solids, mainly sand, from a liquid stream from a confinement facility. Removes as portion of the solids to facilitate waste handling and to address water quality concerns. Associated practices include Nutrient Management (590), Composting Facility (317), Anaerobic Digester (366), Waste Storage Facility (313), Waste Recycling (633), Waste Transfer (634), Pumping Plant (533), Vegetated Treatment Area (635), Pond Lining or Sealing (521A-D), and Waste Treatment (629).
Before Practice Situation	Applicable to situations where partitioning solids, liquids, and nutrients will facilitate the management of an animal waste management system, improve air quality (reduce odors), and address water quality concerns.
After Practice Situation	One concrete settling lane structure (22 ft wide by 740 ft long by 5 in. thick) constructed around or at a livestock feeding operation. A 20' long opening in wall is allowed as an outlet for this lane. Removes a portion of the solids (sand) that otherwise would leave with the runoff from an animal feeding operation. Part of an animal waste management system.
Scenario Feature Measure	Square Foot of Settling Lane Footprint
Scenario Unit	Square Foot
Scenario Typical Size	16280

Cost Summary:

Cost Category	Scenario Cost	Scenario Cost/Unit
Materials	$5,071.23	$0.31
Equipment/Installation	$79,697.96	$4.90
Labor	$0.00	$0.00
Mobilization	$405.08	$0.02
Acquisition of Technical Knowledge	$0.00	$0.00
Foregone Income	$0.00	$0.00
Total	$85,174.27	$5.23

Cost Details:

Cost Category	Component ID	Component Name	Component Description	Unit	Price ($/unit)	Quantity	Cost
Materials	46	Aggregate, Gravel, Graded	Gravel, includes materials, equipment and labor to transport and place. Includes washed and unwashed gravel.	Cubic yard	$25.23	201	$5,071.23
Equipment/Installation	37	Concrete, CIP, slab on grade, reinforced	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	$204.81	251.2	$51,448.27
Equipment/Installation	38	Concrete, CIP, formed reinforced	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	$325.24	72.1	$23,449.80
Equipment/Installation	48	Excavation, Common Earth, side cast, small equipment	Bulk excavation and side casting of common earth with hydraulic excavator with less than 1 CY capacity. Includes equipment and labor.	Cubic yard	$1.99	2412	$4,799.88
Mobilization	1139	Mobilization, medium equipment	Equipment with 70-150 HP or typical weights between 14,000 and 30,000 pounds.	Each	$120.38	2	$240.76
Mobilization	1138	Mobilization, small equipment	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	$82.16	2	$164.32

Scenario Worksheet

Practice and Scenario Description:

Information Type	Data
Region	Northern Plains
State	South Dakota
Discipline Group	Environmental Engineering
Practice Code/Name	634 - Waste Transfer
Scenario ID	1
Scenario Name	Concrete Channel
Scenario Description	Installation of a concrete channel that consists of a slab with curb and footing on each side of the slab for the entire length of the channel to enable the facility manager to direct liquid waste to an existing collection basin and/or waste storage facility. Water quality concerns will be addressed by preventing liquid waste from entering surface waters, and to facilitate timely land application of manure and wastewater at agronomic rates according to the CNMP. This scenario addresses the potential for surface water and groundwater quality degradation. Associated practices may include: PS 313 Waste Storage Facility for storage structures; PS 533, Pumping Plant; PS 430, Irrigation Pipeline; PS 632, Solid/Liquid Waste Separation Facility; PS 468, Lined Waterway or Outlet; PS 590 Nutrient Management for waste application; PS 633, Waste Recycling.
Before Practice Situation	Current facility operations are allowing liquid waste to flow uncontrolled during periods of precipitation events or cleaning operations such that water resources can be contaminated.
After Practice Situation	Typical installation of a 12 foot wide 100' long concrete channel that consists of a 5" thick concrete slab with curbing on each side of the slab that is 2' high, 6" thick with footing for the entire length. The purpose is to transfer liquids or manure slurry from one area to an existing collection basin or waste storage facility. Includes safety chain for equipment. Alternative configurations can consist of the installation of a more narrow or wider channel that may or may not have curbs or a deeper shaped channel and may include a half pipe on the bottom.
Scenario Feature Measure	Bottom surface area of concrete channel
Scenario Unit	Square Foot
Scenario Typical Size	1200

Cost Summary:

Cost Category	Scenario Cost	Scenario Cost/Unit
Materials	$1,272.16	$1.06
Equipment/Installation	$8,530.54	$7.11
Labor	$1,661.76	$1.38
Mobilization	$240.76	$0.20
Acquisition of Technical Knowledge	$0.00	$0.00
Foregone Income	$0.00	$0.00
Total	$11,705.22	$9.75

Cost Details:

Cost Category	Component ID	Component Name	Component Description	Unit	Price ($/unit)	Quantity	Cost
Materials	1952	Safety gate, span manure transfer channel or chute	Safety gate to span manure transfer channel at push off wall or chute outlet. Minium of 4' tall with openings that will not pass a 6" or lager sphere. Materials and shipping only.	Foot	$50.00	16	$800.00
Materials	1099	Aggregate, Gravel, Ungraded, Quarry Run	Includes materials, equipment and labor	Cubic yard	$18.16	26	$472.16
Equipment/Installation	37	Concrete, CIP, slab on grade, reinforced	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	$204.81	22	$4,505.82
Equipment/Installation	929	Dozer, 80 HP	Track mounted Dozer with horsepower range of 60 to 90. Equipment and power unit costs. Labor not included.	Hour	$54.75	8	$438.00
Equipment/Installation	38	Concrete, CIP, formed reinforced	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	$325.24	11	$3,577.64
Equipment/Installation	1220	Excavation, common earth, small equipment, 50 ft	Bulk excavation of common earth with dozer <100 HP with average push distance of 50 feet. Includes equipment and labor.	Cubic Yard	$2.27	4	$9.08
Labor	234	Supervisor or Manager	Labor involving supervision or management activities. Includes crew supervisors, foremen and farm/ranch managers time required for adopting new technology, etc.	Hour	$33.11	24	$794.64
Labor	231	General Labor	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	$16.72	40	$668.80
Labor	233	Equipment Operators, Heavy	Includes: Cranes, Hydraulic Excavators >=50 HP, Dozers, Paving Machines, Rock Trenchers, Trenchers >=12", Dump Trucks, Ag Equipment >=150 HP, Scrapers, Water Wagons.	Hour	$24.79	8	$198.32
Mobilization	1139	Mobilization, medium equipment	Equipment with 70-150 HP or typical weights between 14,000 and 30,000 pounds.	Each	$120.38	2	$240.76

Scenario Worksheet

Practice and Scenario Description:

Information Type	Data
Region	Northern Plains
State	South Dakota
Discipline Group	Environmental Engineering
Practice Code/Name	634 - Waste Transfer
Scenario ID	2
Scenario Name	Gravity flow <= 18" diameter conduit
Scenario Description	Gravity flow conduit is typically a large diameter water tight sanitary sewer pipe used to transfer manure by gravity from one location to another. The gravity transfer system typically consists of an existing inlet structure or hopper with attachment to a smooth interior large diameter pipe. The pipe conveys the slurry waste liquid between the waste collection point and a manure storage or waste treatment structure. Adequate head on the pipe flow or change in elevation must be available for the gravity system to function and should be evaluated by the design engineer. This practice includes the pipe attachment to an existing inlet structure and all other fittings, trench excavation and backfill, labor and a equipment for installation. This conduit is part of a manure transfer system for a planned waste management or comprehensive nutrient management plan. This scenario addresses the transport of liquid waste to a waste storage or treatment facility to prevent a water quality resource concern of excessive nutrients/organics and harmful levels of pathogens in surface water and/or excessive nutrients/organics in ground water. Associated practices may include: PS 313 Waste Storage Facility for storage structures; PS 533, Pumping Plant; PS 430, Irrigation Pipeline; PS 632, Solid/Liquid Waste Separation Facility; PS 468, Lined Waterway or Outlet; PS 590 Nutrient Management for waste application; PS 633, Waste Recycling.
Before Practice Situation	An area of waste production is separated from the waste storage facility and current operations may cause water quality concerns as it is not efficient in transporting the waste to the storage. The site has a change in elevation between production area and treatment or storage structure that is adequate to provide sufficient head for a gravity flow conduit to transport the slurry waste liquid stream.
After Practice Situation	Install a 150 foot long 18" diameter water tight pipe to transfer manure by gravity from one location to another. A gravity transfer system typically consists of a sealed inlet at an existing waste collection structure to a smooth interior 18" sewer grade pipe that will gravity flow to an outlet at a site of manure treatment or storage. This scenario includes the pipe, inlet, outlet, couplers and all other fittings, trench excavation, pipe bedding and backfill. The site should be evaluated by the designing engineer to make sure there is adequate elevation drop before contracting. If required an inlet structure may be contracted under another scenario. The transfer conduit will provide collection and containment of the manure slurry, thereby protecting water quality resources.
Scenario Feature Measure	Length of pipe installed
Scenario Unit	Feet
Scenario Typical Size	150

Cost Summary:

Cost Category	Scenario Cost	Scenario Cost/Unit
Materials	$1,847.80	$12.32
Equipment/Installation	$607.33	$4.05
Labor	$732.38	$4.88
Mobilization	$205.16	$1.37
Acquisition of Technical Knowledge	$0.00	$0.00
Foregone Income	$0.00	$0.00
Total	$3,392.67	$22.62

Cost Details:

Cost Category	Component ID	Component Name	Component Description	Unit	Price ($/unit)	Quantity	Cost
Materials	45	Aggregate, Sand, Graded, Washed	Sand, typical ASTM C33 gradation, includes materials, equipment and labor to transport and place	Cubic yard	$24.28	10	$242.80
Materials	1245	Pipe, HDPE, CPT, Double Wall, Soil Tight, 18"	Pipe, Corrugated HDPE Double Wall, 18" diameter with soil tight joints - AASHTO M294. Material cost only.	Foot	$10.70	150	$1,605.00
Equipment/Installation	50	Earthfill, Manually Compacted	Earthfill, manually compacted, includes equipment and labor	Cubic yard	$4.90	57	$279.30
Equipment/Installation	51	Earthfill, Dumped and Spread	Earthfill, dumped and spread without compaction effort, includes equipment and labor	Cubic yard	$3.00	45	$135.00
Equipment/Installation	48	Excavation, Common Earth, side cast, small equipment	Bulk excavation and side casting of common earth with hydraulic excavator with less than 1 CY capacity. Includes equipment and labor.	Cubic yard	$1.99	97	$193.03
Labor	234	Supervisor or Manager	Labor involving supervision or management activities. Includes crew supervisors, foremen and farm/ranch managers time required for adopting new technology, etc.	Hour	$33.11	10	$331.10
Labor	231	General Labor	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	$16.72	24	$401.28
Mobilization	1138	Mobilization, small equipment	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	$82.16	2	$164.32
Mobilization	1143	Mobilization, Light Equipment Operator	Mobilization of light equipment operators: Skid Steer Loaders, Hydraulic Excavators <50 HP, Trenchers <12", Ag Equipment <150 HP, Pickup Trucks, Forklifts, Mulchers	Hour	$20.42	2	$40.84

Scenario Worksheet

Practice and Scenario Description:

Information Type	Data
Region	Northern Plains
State	South Dakota
Discipline Group	Environmental Engineering
Practice Code/Name	634 - Waste Transfer
Scenario ID	3
Scenario Name	Gravity flow > 18" diameter conduit
Scenario Description	Gravity flow conduit is typically a large diameter water tight sanitary sewer pipe used to transfer manure by gravity from one location to another. The gravity transfer system typically consists of an existing inlet structure or hopper with attachment to a smooth interior large diameter pipe. The pipe conveys the slurry waste liquid between the waste collection point and a manure storage or waste treatment structure. Adequate head on the pipe flow or change in elevation must be available for the gravity system to function and should be evaluated by the design engineer. This practice includes the pipe attachment to an existing inlet structure and all other fittings, trench excavation and backfill, labor and a equipment for installation. This conduit is part of a manure transfer system for a planned waste management or comprehensive nutrient management plan. This scenario addresses the transport of liquid waste to a waste storage or treatment facility to prevent a water quality resource concern of excessive nutrients/organics and harmful levels of pathogens in surface water and/or excessive nutrients/organics in ground water. Associated practices may include: PS 313 Waste Storage Facility for storage structures; PS 533, Pumping Plant; PS 430, Irrigation Pipeline; PS 632, Solid/Liquid Waste Separation Facility; PS 468, Lined Waterway or Outlet; PS 590 Nutrient Management for waste application; PS 633, Waste Recycling.
Before Practice Situation	An area of waste production is separated from the waste storage facility and current operations may cause water quality concerns as it is not efficient in transporting the waste to the storage. The site has a change in elevation between production area and treatment or storage structure that is adequate to provide sufficient head for a gravity flow conduit to transport the slurry waste liquid stream.
After Practice Situation	Install a 150 foot long 30" diameter water tight pipe to transfer manure by gravity from one location to another. A gravity transfer system typically consists of a sealed inlet at an existing waste collection structure to a smooth interior 30" sewer grade pipe that will gravity flow to an outlet at a site of manure treatment or storage. This scenario includes the pipe, inlet, outlet, couplers and all other fittings, trench excavation, pipe bedding and backfill. The site should be evaluated by the designing engineer to make sure there is adequate elevation drop before contracting. If required an inlet structure may be contracted under another scenario. The transfer conduit will provide collection and containment of the manure slurry, thereby protecting water quality resources.
Scenario Feature Measure	Length of pipe installed
Scenario Unit	Feet
Scenario Typical Size	150

Cost Summary:

Cost Category	Scenario Cost	Scenario Cost/Unit
Materials	$4,176.64	$27.84
Equipment/Installation	$663.05	$4.42
Labor	$732.38	$4.88
Mobilization	$205.16	$1.37
Acquisition of Technical Knowledge	$0.00	$0.00
Foregone Income	$0.00	$0.00
Total	$5,777.23	$38.51

Cost Details:

Cost Category	Component ID	Component Name	Component Description	Unit	Price ($/unit)	Quantity	Cost
Materials	45	Aggregate, Sand, Graded, Washed	Sand, typical ASTM C33 gradation, includes materials, equipment and labor to transport and place	Cubic yard	$24.28	13	$315.64
Materials	1247	Pipe, HDPE, CPT, Double Wall, Soil Tight, 30"	Pipe, Corrugated HDPE Double Wall, 30" diameter with soil tight joints - AASHTO M294. Material cost only.	Foot	$25.74	150	$3,861.00
Equipment/Installation	50	Earthfill, Manually Compacted	Earthfill, manually compacted, includes equipment and labor	Cubic yard	$4.90	57	$279.30
Equipment/Installation	51	Earthfill, Dumped and Spread	Earthfill, dumped and spread without compaction effort, includes equipment and labor	Cubic yard	$3.00	45	$135.00
Equipment/Installation	48	Excavation, Common Earth, side cast, small equipment	Bulk excavation and side casting of common earth with hydraulic excavator with less than 1 CY capacity. Includes equipment and labor.	Cubic yard	$1.99	125	$248.75
Labor	234	Supervisor or Manager	Labor involving supervision or management activities. Includes crew supervisors, foremen and farm/ranch managers time required for adopting new technology, etc.	Hour	$33.11	10	$331.10
Labor	231	General Labor	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	$16.72	24	$401.28
Mobilization	1138	Mobilization, small equipment	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	$82.16	2	$164.32
Mobilization	1143	Mobilization, Light Equipment Operator	Mobilization of light equipment operators: Skid Steer Loaders, Hydraulic Excavators <50 HP, Trenchers <12", Ag Equipment <150 HP, Pickup Trucks, Forklifts, Mulchers	Hour	$20.42	2	$40.84

Scenario Worksheet

Practice and Scenario Description:

Information Type	Data
Region	Northern Plains
State	South Dakota
Discipline Group	Environmental Engineering
Practice Code/Name	634 - Waste Transfer
Scenario ID	4
Scenario Name	Pressure flow 6" dia. pipeline
Scenario Description	Pressure flow pipeline used to transfer manure wastewater by pumping from the waste storage pond to the field where it is to be applied according to the CNMP. These pipelines may also be utilized to transfer waste within the waste treatment system. Pressure flow transfer pipelines can be between 3" and 12" diameter but 6" diameter is a commonly used pipe size. Pressure pipe will handle an internal pumping pressure between 130 and 200 psi depending on the designed pumping system and must have gasketted joints to seal for the wastewater transfer. The pressure pipe moves the water by pumping from the intake riser location, through a buried mainline with outlet risers spaced at 300 ft intervals for a traveler applicator. This practice includes the pipe plus an inlet riser structure, clean-out risers and outlet risers plus all other valves and fittings, trench excavation and backfill, labor and a equipment for installation. Appurtenances include: couplings, fittings, air vents, pressure relief valves, thrust blocks, risers, and inline valves, and are included in the cost of pipe material (additional 10% of pipe material quantity). Cost of appurtenances does not include flow meters or backflow preventers. Typical installation applies to soils with no special bedding requirements. This pipeline is part of a manure transfer system for a planned waste management or comprehensive nutrient management plan. This scenario addresses the transport of liquid waste to a waste storage or treatment facility to prevent a water quality resource concern of excessive nutrients/organics and harmful levels of
Before Practice Situation	The waste storage structure is separated from the application fields where wastewater nutrients are needed. Soil nutrients in the near fields have high phosphorus levels from over application near the waste storage facility. The current application operation is high in the use of time and energy and may cause water quality concerns as it is not efficient in transporting the waste to the field.
After Practice Situation	Install a 1000 foot long 6 inch diameter PVC gasketted IPS pipe that has an SDR of 21 and is water tight under pressure flow to transfer the manure wastewater. An inlet riser and is located near the pump site of the waste storage pond and designed for the desired pressure and flow for the application system. This scenario includes the pipe, inlet riser, couplers, air-vac vents, all other fittings, and risers placed as specified by the design, trench excavation, pipe bedding and backfill. The site should be evaluated by the designing engineer to make sure the design will function. The transfer pipeline will deliver the manure slurry to the fields for agronomic nutrient utilization according to the CNMP, thereby protecting water quality resources.
Scenario Feature Measure	Length of pipe installed
Scenario Unit	Feet
Scenario Typical Size	1000

Cost Summary:

Cost Category	Scenario Cost	Scenario Cost/Unit
Materials	$6,710.00	$6.71
Equipment/Installation	$3,201.48	$3.20
Labor	$999.90	$1.00
Mobilization	$40.84	$0.04
Acquisition of Technical Knowledge	$0.00	$0.00
Foregone Income	$0.00	$0.00
Total	$10,952.22	$10.95

Cost Details:

Cost Category	Component ID	Component Name	Component Description	Unit	Price ($/unit)	Quantity	Cost
Materials	987	Pipe, PVC, 6", SDR 21	Materials: - 6" - PVC - SDR 21 200 psi - ASTM D2241	Foot	$6.10	1100	$6,710.00
Equipment/Installation	50	Earthfill, Manually Compacted	Earthfill, manually compacted, includes equipment and labor	Cubic yard	$4.90	90	$441.00
Equipment/Installation	36	Concrete, CIP, formless, non reinforced	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	$100.48	1	$100.48
Equipment/Installation	54	Trenching, Earth, loam, 24" x 48"	Trenching, earth, loam, 24" wide x 48" depth, includes equipment and labor for trenching and backfilling	Foot	$2.66	1000	$2,660.00
Labor	234	Supervisor or Manager	Labor involving supervision or management activities. Includes crew supervisors, foremen and farm/ranch managers time required for adopting new technology, etc.	Hour	$33.11	10	$331.10
Labor	231	General Labor	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	$16.72	40	$668.80
Mobilization	1143	Mobilization, Light Equipment Operator	Mobilization of light equipment operators: Skid Steer Loaders, Hydraulic Excavators <50 HP, Trenchers <12", Ag Equipment <150 HP, Pickup Trucks, Forklifts, Mulchers	Hour	$20.42	2	$40.84

Scenario Worksheet

Practice and Scenario Description:

Information Type	Data
Region	Northern Plains
State	South Dakota
Discipline Group	Environmental Engineering
Practice Code/Name	634 - Waste Transfer
Scenario ID	5
Scenario Name	Pressure flow 8" dia. pipeline
Scenario Description	Pressure flow pipeline used to transfer manure wastewater by pumping from the waste storage pond to the field where it is to be applied according to the CNMP. These pipelines may also be utilized to transfer waste within the waste treatment system. Pressure flow transfer pipelines can be between 3" and 12" diameter but 8" diameter is a commonly used pipe size. Pressure pipe will handle an internal pumping pressure between 130 and 200 psi depending on the designed pumping system and must have gasketted joints to seal for the wastewater transfer. The pressure pipe moves the water by pumping from the intake riser location, through a buried mainline with outlet risers spaced at 300 ft intervals for a traveler applicator. This practice includes the pipe plus an inlet riser structure, clean-out risers and outlet risers plus all other valves and fittings, trench excavation and backfill, labor and a equipment for installation. Appurtenances include: couplings, fittings, air vents, pressure relief valves, thrust blocks, risers, and inline valves, and are included in the cost of pipe material (additional 10% of pipe material quantity). Cost of appurtenances does not include flow meters or backflow preventers. Typical installation applies to soils with no special bedding requirements. This pipeline is part of a manure transfer system for a planned waste management or comprehensive nutrient management plan. This scenario addresses the transport of liquid waste to a waste storage or treatment facility to prevent a water quality resource concern of excessive nutrients/organics and harmful levels of
Before Practice Situation	The waste storage structure is separated from the application fields where wastewater nutrients are needed. Soil nutrients in the near fields have high phosphorus levels from over application near the waste storage facility. The current application operation is high in the use of time and energy and may cause water quality concerns as it is not efficient in transporting the waste to the field.
After Practice Situation	Install a 1000 foot long 8 inch diameter PVC gasketted IPS pipe that has an SDR of 21 and is water tight under pressure flow to transfer the manure wastewater. An inlet riser and is located near the pump site of the waste storage pond and designed for the desired pressure and flow for the application system. This scenario includes the pipe, inlet riser, couplers, air-vac vents, all other fittings, and risers placed as specified by the design, trench excavation, pipe bedding and backfill. The site should be evaluated by the designing engineer to make sure the design will function.
Scenario Feature Measure	Length of pipe installed
Scenario Unit	Feet
Scenario Typical Size	1000

Cost Summary:

Cost Category	Scenario Cost	Scenario Cost/Unit
Materials	$11,297.00	$11.30
Equipment/Installation	$3,201.48	$3.20
Labor	$999.90	$1.00
Mobilization	$40.84	$0.04
Acquisition of Technical Knowledge	$0.00	$0.00
Foregone Income	$0.00	$0.00
Total	$15,539.22	$15.54

Cost Details:

Cost Category	Component ID	Component Name	Component Description	Unit	Price ($/unit)	Quantity	Cost
Materials	988	Pipe, PVC, 8", SDR 21	Materials: - 8" - PVC - SDR 21 200 psi - ASTM D2241	Foot	$10.27	1100	$11,297.00
Equipment/Installation	36	Concrete, CIP, formless, non reinforced	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	$100.48	1	$100.48
Equipment/Installation	50	Earthfill, Manually Compacted	Earthfill, manually compacted, includes equipment and labor	Cubic yard	$4.90	90	$441.00
Equipment/Installation	54	Trenching, Earth, loam, 24" x 48"	Trenching, earth, loam, 24" wide x 48" depth, includes equipment and labor for trenching and backfilling	Foot	$2.66	1000	$2,660.00
Labor	234	Supervisor or Manager	Labor involving supervision or management activities. Includes crew supervisors, foremen and farm/ranch managers time required for adopting new technology, etc.	Hour	$33.11	10	$331.10
Labor	231	General Labor	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	$16.72	40	$668.80
Mobilization	1143	Mobilization, Light Equipment Operator	Mobilization of light equipment operators: Skid Steer Loaders, Hydraulic Excavators <50 HP, Trenchers <12", Ag Equipment <150 HP, Pickup Trucks, Forklifts, Mulchers	Hour	$20.42	2	$40.84

Scenario Worksheet

Practice and Scenario Description:

Information Type	Data
Region	Northern Plains
State	South Dakota
Discipline Group	Environmental Engineering
Practice Code/Name	634 - Waste Transfer
Scenario ID	6
Scenario Name	10" PVC Conduit
Scenario Description	PVC pipelines are used to transfer manure wastewater by a low pressure pump from the waste storage pond to the field where it is applied according to the CNMP. These pipelines may also be utilized to transfer waste within the waste treatment system. PVC transfer pipelines can be between 3" and 30" diameter. This practice includes the pipe plus an inlet riser structure, clean-out risers and outlet risers plus all other valves and fittings, trench excavation and backfill, labor and a equipment for installation. Appurtenances include: couplings, fittings, air vents, pressure relief valves, thrust blocks, risers, and inline valves, and are included in the cost of pipe material (additional 10% of pipe material quantity). Cost of appurtenances does not include flow meters or backflow preventers. Typical installation applies to soils with no special bedding requirements. This pipeline is part of a manure transfer system for a planned waste management or comprehensive nutrient management plan. This scenario addresses the transport of liquid waste to prevent a water quality resource concern of excessive nutrients/organics and harmful levels of pathogens in surface water and/or excessive nutrients/organics in ground water. Associated practices may include: PS 313 Waste Storage Facility for storage structures; PS 533, Pumping Plant; PS 430, Irrigation Pipeline; PS 632, Solid/Liquid Waste Separation Facility; PS 468, Lined Waterway or Outlet; PS 590 Nutrient Management for waste application; PS 633, Waste Recycling; PS 635, Vegetated Treatment Area.
Before Practice Situation	The waste storage structure is separated from the application fields where wastewater nutrients are needed or other components of the waste management system. Soil nutrients in the near fields have high phosphorus levels from over application near the waste storage facility. The current application operation is high in the use of time and energy and may cause water quality concerns as it is not efficient in transporting the waste to the field.
After Practice Situation	Install a 1000 foot long 10 inch diameter PVC gasketted IPS pipe and is water tight to transfer the manure an/or wastewater. This scenario includes the pipe, inlet riser, couplers, air-vac vents, all other fittings, and risers placed as specified by the design, trench excavation, pipe bedding and backfill. The site should be evaluated by the designing engineer to make sure the design will function.
Scenario Feature Measure	Length of pipe installed
Scenario Unit	Feet
Scenario Typical Size	1000

Cost Summary:

Cost Category	Scenario Cost	Scenario Cost/Unit
Materials	$15,807.00	$15.81
Equipment/Installation	$3,382.78	$3.38
Labor	$999.90	$1.00
Mobilization	$40.84	$0.04
Acquisition of Technical Knowledge	$0.00	$0.00
Foregone Income	$0.00	$0.00
Total	$20,230.52	$20.23

Cost Details:

Cost Category	Component ID	Component Name	Component Description	Unit	Price ($/unit)	Quantity	Cost
Materials	1714	Pipe, PVC, 10", SDR 21	Materials: - 10" - PVC - SDR 21 - ASTM D2241	Foot	$14.37	1100	$15,807.00
Equipment/Installation	54	Trenching, Earth, loam, 24" x 48"	Trenching, earth, loam, 24" wide x 48" depth, includes equipment and labor for trenching and backfilling	Foot	$2.66	1000	$2,660.00
Equipment/Installation	50	Earthfill, Manually Compacted	Earthfill, manually compacted, includes equipment and labor	Cubic yard	$4.90	127	$622.30
Equipment/Installation	36	Concrete, CIP, formless, non reinforced	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	$100.48	1	$100.48
Labor	231	General Labor	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	$16.72	40	$668.80
Labor	234	Supervisor or Manager	Labor involving supervision or management activities. Includes crew supervisors, foremen and farm/ranch managers time required for adopting new technology, etc.	Hour	$33.11	10	$331.10
Mobilization	1143	Mobilization, Light Equipment Operator	Mobilization of light equipment operators: Skid Steer Loaders, Hydraulic Excavators <50 HP, Trenchers <12", Ag Equipment <150 HP, Pickup Trucks, Forklifts, Mulchers	Hour	$20.42	2	$40.84

Scenario Worksheet

Practice and Scenario Description:

Information Type	Data
Region	Northern Plains
State	South Dakota
Discipline Group	Environmental Engineering
Practice Code/Name	634 - Waste Transfer
Scenario ID	7
Scenario Name	12" PVC Conduit
Scenario Description	PVC pipelines are used to transfer manure wastewater by a low pressure pump from the waste storage pond to the field where it is applied according to the CNMP. These pipelines may also be utilized to transfer waste within the waste treatment system. PVC transfer pipelines can be between 3" and 30" diameter. This practice includes the pipe plus an inlet riser structure, clean-out risers and outlet risers plus all other valves and fittings, trench excavation and backfill, labor and a equipment for installation. Appurtenances include: couplings, fittings, air vents, pressure relief valves, thrust blocks, risers, and inline valves, and are included in the cost of pipe material (additional 10% of pipe material quantity). Cost of appurtenances does not include flow meters or backflow preventers. Typical installation applies to soils with no special bedding requirements. This pipeline is part of a manure transfer system for a planned waste management or comprehensive nutrient management plan. This scenario addresses the transport of liquid waste to prevent a water quality resource concern of excessive nutrients/organics and harmful levels of pathogens in surface water and/or excessive nutrients/organics in ground water. Associated practices may include: PS 313 Waste Storage Facility for storage structures; PS 533, Pumping Plant; PS 430, Irrigation Pipeline; PS 632, Solid/Liquid Waste Separation Facility; PS 468, Lined Waterway or Outlet; PS 590 Nutrient Management for waste application; PS 633, Waste Recycling; PS 635, Vegetated Treatment Area.
Before Practice Situation	The waste storage structure is separated from the application fields where wastewater nutrients are needed or other components of the waste management system. Soil nutrients in the near fields have high phosphorus levels from over application near the waste storage facility. The current application operation is high in the use of time and energy and may cause water quality concerns as it is not efficient in transporting the waste to the field.
After Practice Situation	Install a 300 foot long 12 inch diameter PVC gasketted IPS pipe and is water tight to transfer the manure an/or wastewater. This scenario includes the pipe, inlet riser, couplers, air-vac vents, all other fittings, and risers placed as specified by the design, trench excavation, pipe bedding and backfill. The site should be evaluated by the designing engineer to make sure the design will function.
Scenario Feature Measure	Length of pipe installed
Scenario Unit	Feet
Scenario Typical Size	300

Cost Summary:

Cost Category	Scenario Cost	Scenario Cost/Unit
Materials	$6,926.70	$23.09
Equipment/Installation	$2,208.35	$7.36
Labor	$1,659.42	$5.53
Mobilization	$40.84	$0.14
Acquisition of Technical Knowledge	$0.00	$0.00
Foregone Income	$0.00	$0.00
Total	$10,835.31	$36.12

Cost Details:

Cost Category	Component ID	Component Name	Component Description	Unit	Price ($/unit)	Quantity	Cost
Materials	1717	Pipe, PVC, 12", SDR 21	Materials: - 12" - PVC - SDR 21 - ASTM D2241	Foot	$20.99	330	$6,926.70
Equipment/Installation	926	Backhoe, 80 HP	Wheel mounted backhoe excavator with horsepower range of 60 to 90. Equipment and power unit costs. Labor not included.	Hour	$45.03	32	$1,440.96
Equipment/Installation	36	Concrete, CIP, formless, non reinforced	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	$100.48	2	$200.96
Equipment/Installation	50	Earthfill, Manually Compacted	Earthfill, manually compacted, includes equipment and labor	Cubic yard	$4.90	56	$274.40
Equipment/Installation	51	Earthfill, Dumped and Spread	Earthfill, dumped and spread without compaction effort, includes equipment and labor	Cubic yard	$3.00	33	$99.00
Equipment/Installation	48	Excavation, Common Earth, side cast, small equipment	Bulk excavation and side casting of common earth with hydraulic excavator with less than 1 CY capacity. Includes equipment and labor.	Cubic yard	$1.99	97	$193.03
Labor	234	Supervisor or Manager	Labor involving supervision or management activities. Includes crew supervisors, foremen and farm/ranch managers time required for adopting new technology, etc.	Hour	$33.11	10	$331.10
Labor	231	General Labor	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	$16.72	40	$668.80
Labor	232	Equipment Operators, Light	Includes: Skid Steer Loaders, Hydraulic Excavators <50 HP, Trenchers <12", Ag Equipment <150 HP, Pickup Trucks, Forklifts, Mulchers	Hour	$20.61	32	$659.52
Mobilization	1143	Mobilization, Light Equipment Operator	Mobilization of light equipment operators: Skid Steer Loaders, Hydraulic Excavators <50 HP, Trenchers <12", Ag Equipment <150 HP, Pickup Trucks, Forklifts, Mulchers	Hour	$20.42	2	$40.84

Scenario Worksheet

Practice and Scenario Description:

Information Type	Data
Region	Northern Plains
State	South Dakota
Discipline Group	Environmental Engineering
Practice Code/Name	634 - Waste Transfer
Scenario ID	8
Scenario Name	Agitator, Liquids Transfer
Scenario Description	This scenario is for a manure and wastewater agitator, piping and reception pit associated with an agricultural production operation to transfer agricultural waste product from the production source to a storage facility for proper utilization. This agitator is typically no more than 15 HP and is used for smaller tanks or pits that are less than 10 feet deep. This scenario does not include a pump. Associated practices may include: PS 313 Waste Storage Facility for storage structures; PS 533, Pumping Plant; PS 430, Irrigation Pipeline; PS 632, Solid/Liquid Waste Separation Facility; PS 468, Lined Waterway or Outlet; PS 590 Nutrient Management for waste application; PS 633, Waste Recycling The waste transfer equipment is installed to address water quality concerns by facilitating timely land application of waste at agronomic rates according to the nutrient management plan. This scenario addresses the potential for surface water and groundwater quality degradation.
Before Practice Situation	In this typical setting, the operator has a small waste storage structure from a confined animal feeding operation without an effective waste handling and transfer system to manage the waste stream departing from the facility.
After Practice Situation	The typical installation would be for a small manure 10 HP agitator to put settled manure solids into suspension for removal from an animal waste storage structure and transfer to the next step of waste treatment, utilization or storage. Part of an animal waste management system to address water quality concerns. If required a wastewater reception pit, concrete channel or transfer conduit scenario may need to be contracted to support the operation of this waste transfer system equipment.
Scenario Feature Measure	Agitator for wastewater, installed
Scenario Unit	Each
Scenario Typical Size	1

Cost Summary:

Cost Category	Scenario Cost	Scenario Cost/Unit
Materials	$13,259.40	$13,259.40
Equipment/Installation	$3,898.48	$3,898.48
Labor	$948.52	$948.52
Mobilization	$187.04	$187.04
Acquisition of Technical Knowledge	$0.00	$0.00
Foregone Income	$0.00	$0.00
Total	$18,293.44	$18,293.44

Cost Details:

Cost Category	Component ID	Component Name	Component Description	Unit	Price ($/unit)	Quantity	Cost
Materials	1768	Manure agitator, mixing depth less than 10 feet.	Agitator to move put settled manure solids into suspension for removal from an animal waste storage structure. Materials only.	Each	$11,000.00	1	$11,000.00
Materials	988	Pipe, PVC, 8", SDR 21	Materials: - 8" - PVC - SDR 21 200 psi - ASTM D2241	Foot	$10.27	220	$2,259.40
Equipment/Installation	37	Concrete, CIP, slab on grade, reinforced	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	$204.81	3.6	$737.32
Equipment/Installation	53	Trenching, Earth, 12" x 48"	Trenching, earth, 12" wide x 48" depth, includes equipment and labor for trenching and backfilling	Foot	$1.17	200	$234.00
Equipment/Installation	38	Concrete, CIP, formed reinforced	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	$325.24	9	$2,927.16
Labor	234	Supervisor or Manager	Labor involving supervision or management activities. Includes crew supervisors, foremen and farm/ranch managers time required for adopting new technology, etc.	Hour	$33.11	8	$264.88
Labor	230	Skilled Labor	Labor requiring a high level skill set: Includes carpenters, welders, electricians, conservation professionals involved with data collection, monitoring, and or record keeping, etc.	Hour	$23.53	12	$282.36
Labor	231	General Labor	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	$16.72	24	$401.28
Mobilization	1137	Mobilization, very small equipment	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	$33.33	2	$66.66
Mobilization	1139	Mobilization, medium equipment	Equipment with 70-150 HP or typical weights between 14,000 and 30,000 pounds.	Each	$120.38	1	$120.38

Scenario Worksheet

Practice and Scenario Description:

Information Type	Data
Region	Northern Plains
State	South Dakota
Discipline Group	Environmental Engineering
Practice Code/Name	634 - Waste Transfer
Scenario ID	9
Scenario Name	Agitator, Slurry Transfer
Scenario Description	This scenario is for a manure and wastewater agitator, piping and reception pit associated with an agricultural production operation to transfer agricultural waste product from the storage facility to a site for proper utilization. This agitator is typically 30 HP and is used where the tank or pond is between 10 and 15 feet deep. This scenario does not include a pump. Associated practices may include: PS 313 Waste Storage Facility for storage structures; PS 533, Pumping Plant; PS 430, Irrigation Pipeline; PS 632, Solid/Liquid Waste Separation Facility; PS 468, Lined Waterway or Outlet; PS 590 Nutrient Management for waste application; PS 633, Waste Recycling The waste transfer equipment is installed to address water quality concerns by facilitating timely land application of waste at agronomic rates according to the nutrient management plan. This scenario addresses the potential for surface water and groundwater quality degradation.
Before Practice Situation	In this typical setting, the operator has waste production from a confined animal feeding operation without an effective waste handling and transfer system to manage the waste stream departing from the facility.
After Practice Situation	A typical installation would be for a medium 30 HP manure agitator to put settled manure solids into suspension for removal from an animal waste storage structure and transfer to the next step of waste treatment, utilization or storage. Part of an animal waste management system to address water quality concerns. Wastewater reception pit, Concrete Pump installation pit and transfer conduit have been included in this scenario to support the operation of this waste transfer system equipment.
Scenario Feature Measure	Agitator for wastewater, installed
Scenario Unit	Each
Scenario Typical Size	1

Cost Summary:

Cost Category	Scenario Cost	Scenario Cost/Unit
Materials	$20,694.24	$20,694.24
Equipment/Installation	$7,116.48	$7,116.48
Labor	$1,745.80	$1,745.80
Mobilization	$187.04	$187.04
Acquisition of Technical Knowledge	$0.00	$0.00
Foregone Income	$0.00	$0.00
Total	$29,743.56	$29,743.56

Cost Details:

Cost Category	Component ID	Component Name	Component Description	Unit	Price ($/unit)	Quantity	Cost
Materials	1766	Manure agitator, mixing depth 10 to 15 feet deep	Agitator to move put settled manure solids into suspension for removal from an animal waste storage structure. Materials only.	Each	$17,000.00	1	$17,000.00
Materials	1717	Pipe, PVC, 12", SDR 21	Materials: - 12" - PVC - SDR 21 - ASTM D2241	Foot	$20.99	176	$3,694.24
Equipment/Installation	53	Trenching, Earth, 12" x 48"	Trenching, earth, 12" wide x 48" depth, includes equipment and labor for trenching and backfilling	Foot	$1.17	160	$187.20
Equipment/Installation	36	Concrete, CIP, formless, non reinforced	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	$100.48	3	$301.44
Equipment/Installation	37	Concrete, CIP, slab on grade, reinforced	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	$204.81	6	$1,228.86
Equipment/Installation	38	Concrete, CIP, formed reinforced	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	$325.24	16.6	$5,398.98
Labor	234	Supervisor or Manager	Labor involving supervision or management activities. Includes crew supervisors, foremen and farm/ranch managers time required for adopting new technology, etc.	Hour	$33.11	24	$794.64
Labor	231	General Labor	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	$16.72	40	$668.80
Labor	230	Skilled Labor	Labor requiring a high level skill set: Includes carpenters, welders, electricians, conservation professionals involved with data collection, monitoring, and or record keeping, etc.	Hour	$23.53	12	$282.36

Mobilization	1137	Mobilization, very small equipment	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	$33.33	2	$66.66
Mobilization	1139	Mobilization, medium equipment	Equipment with 70-150 HP or typical weights between 14,000 and 30,000 pounds.	Each	$120.38	1	$120.38

Scenario Worksheet

Practice and Scenario Description:

Information Type	Data
Region	Northern Plains
State	South Dakota
Discipline Group	Environmental Engineering
Practice Code/Name	635 - Vegetated Treatment Area
Scenario ID	1
Scenario Name	Gravity Flow - Concrete Curb
Scenario Description	This is a permanent herbaceous vegetative area or channel installed down slope from a livestock production area. Wastewater (runoff or milking parlor wastewater) is properly collected and released with a controlled gravity outflow into the VTA. The VTA vegetation is harvested to removed nutrients on a regular basis. This practice addresses water quality degradation due to uncontrolled nutrient rich wastewater that can flow into surface waters or leach into ground water. Associated practices: Waste Storage Facility (313), Fence (382), Solid/Liquid Waste Separation Facility (632), Manure Transfer (634), Roof runoff Management (558), Pumping Plant (533), Subsurface Drain (606), Critical Area Planting (342), Terrace (600), Nutrient Management (590), Diversion (362), Pipeline (516), Land Smoothing (466), Precision Land Forming (462), Waste Treatment (629)
Before Practice Situation	Nutrient rich wastewater is running off from an animal operation that has the potential to pollute surface waters or ponding and leaching into groundwater.
After Practice Situation	Typical VTA is 2.0 ac in size, includes a concrete curb for distribution flow (sheet flow) into the VTA. Typically requires grading and shaping, gravel spreader trenches and perforated pipe to maintain sheet flow throughout the VTA. A settling basin for wastewater collection is contracted using Solid/Liquid Waste Separation Facility (632). For milkhouse waste, Waste Treatment (629) could be contracted to provide pre-treatment prior to being released into the VTA. The VTA practice will provide a controlled release of nutrient rich wastewater into a designed vegetative area for nutrient uptake. This system will improve water quality by treating nutrient rich wastewater and prevent contamination of surface and ground water resources.
Scenario Feature Measure	Amount of VTA installed
Scenario Unit	Acre
Scenario Typical Size	2

Cost Summary:

Cost Category	Scenario Cost	Scenario Cost/Unit
Materials	$1,766.10	$883.05
Equipment/Installation	$4,218.97	$2,109.49
Labor	$929.36	$464.68
Mobilization	$240.76	$120.38
Acquisition of Technical Knowledge	$0.00	$0.00
Foregone Income	$0.00	$0.00
Total	$7,155.19	$3,577.60

Cost Details:

Cost Category	Component ID	Component Name	Component Description	Unit	Price ($/unit)	Quantity	Cost
Materials	46	Aggregate, Gravel, Graded	Gravel, includes materials, equipment and labor to transport and place. Includes washed and unwashed gravel.	Cubic yard	$25.23	70	$1,766.10
Equipment/Installation	48	Excavation, Common Earth, side cast, small equipment	Bulk excavation and side casting of common earth with hydraulic excavator with less than 1 CY capacity. Includes equipment and labor.	Cubic yard	$1.99	70	$139.30
Equipment/Installation	37	Concrete, CIP, slab on grade, reinforced	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	$204.81	7	$1,433.67
Equipment/Installation	42	Geotextile, woven	Woven Geotextile Fabric. Includes materials, equipment and labor	Square Yard	$2.22	600	$1,332.00
Equipment/Installation	929	Dozer, 80 HP	Track mounted Dozer with horsepower range of 60 to 90. Equipment and power unit costs. Labor not included.	Hour	$54.75	24	$1,314.00
Labor	233	Equipment Operators, Heavy	Includes: Cranes, Hydraulic Excavators >=50 HP, Dozers, Paving Machines, Rock Trenchers, Trenchers >=12", Dump Trucks, Ag Equipment >=150 HP, Scrapers, Water Wagons.	Hour	$24.79	24	$594.96
Labor	231	General Labor	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	$16.72	20	$334.40
Mobilization	1139	Mobilization, medium equipment	Equipment with 70-150 HP or typical weights between 14,000 and 30,000 pounds.	Each	$120.38	2	$240.76

Scenario Worksheet

Practice and Scenario Description:

Information Type	Data
Region	Northern Plains
State	South Dakota
Discipline Group	Environmental Engineering
Practice Code/Name	635 - Vegetated Treatment Area
Scenario ID	2
Scenario Name	Surface Application - Gated Pipe
Scenario Description	This is a permanent herbaceous vegetative area or channel installed down slope from a livestock production area. Wastewater (runoff or milking parlor wastewater) is properly collected and released with a controlled outflow into the VTA. The VTA vegetation is harvested to removed nutrients on a regular basis. This practice addresses water quality degradation due to uncontrolled nutrient rich wastewater that can flow into surface waters or leach into ground water. Associated practices: Waste Storage Facility (313), Fence (382), Solid/Liquid Waste Separation Facility (632), Manure Transfer (634), Roof runoff Management (558), Pumping Plant (533), Subsurface Drain (606), Critical Area Planting (342), Terrace (600), Nutrient Management (590), Diversion (362), Pipeline (516), Land Smoothing (466), Precision Land Forming (462), Waste Treatment (629)
Before Practice Situation	Nutrient rich wastewater is running off from an animal operation that has the potential to pollute surface waters or ponding and leaching into groundwater.
After Practice Situation	Typical VTA is 10.0 ac in size, includes a gated irrigation pipe to promote sheet flow through the VTA. Typically requires grading and shaping, gravel spreader trenches to maintain sheet flow throughout the VTA. A settling basin for wastewater collection is contracted using Solid/Liquid Waste Separation Facility (632). For milkhouse waste, Waste Treatment (629) could be contracted to provide pre-treatment prior to being released into the VTA. The establishment of the permanent vegetation within the VTA will be completed under the Critical Area Planting (342) Standard. The VTA practice will provide a controlled release of nutrient rich wastewater into a designed vegetative area for nutrient uptake. This system will improve water quality by treating nutrient rich wastewater and prevent contamination of surface and ground water resources.
Scenario Feature Measure	Acres in the Treatment Area
Scenario Unit	Acre
Scenario Typical Size	10

Cost Summary:

Cost Category	Scenario Cost	Scenario Cost/Unit
Materials	$13,066.80	$1,306.68
Equipment/Installation	$8,205.40	$820.54
Labor	$929.36	$92.94
Mobilization	$240.76	$24.08
Acquisition of Technical Knowledge	$0.00	$0.00
Foregone Income	$0.00	$0.00
Total	$22,442.32	$2,244.23

Cost Details:

Cost Category	Component ID	Component Name	Component Description	Unit	Price ($/unit)	Quantity	Cost
Materials	2029	Pipe, aluminum, smooth wall gated irrigation, 8"	8" diameter smooth wall gated irrigation aluminum pipe. Material only.	Foot	$7.11	700	$4,977.00
Materials	980	Pipe, PVC, 6", SCH 40	Materials: - 6" - PVC - SCH 40 - ASTM D1785	Foot	$5.37	50	$268.50
Materials	46	Aggregate, Gravel, Graded	Gravel, includes materials, equipment and labor to transport and place. Includes washed and unwashed gravel.	Cubic yard	$25.23	310	$7,821.30
Equipment/Installation	48	Excavation, Common Earth, side cast, small equipment	Bulk excavation and side casting of common earth with hydraulic excavator with less than 1 CY capacity. Includes equipment and labor.	Cubic yard	$1.99	310	$616.90
Equipment/Installation	53	Trenching, Earth, 12" x 48"	Trenching, earth, 12" wide x 48" depth, includes equipment and labor for trenching and backfilling	Foot	$1.17	50	$58.50
Equipment/Installation	42	Geotextile, woven	Woven Geotextile Fabric. Includes materials, equipment and labor	Square Yard	$2.22	2800	$6,216.00
Equipment/Installation	929	Dozer, 80 HP	Track mounted Dozer with horsepower range of 60 to 90. Equipment and power unit costs. Labor not included.	Hour	$54.75	24	$1,314.00
Labor	233	Equipment Operators, Heavy	Includes: Cranes, Hydraulic Excavators >=50 HP, Dozers, Paving Machines, Rock Trenchers, Trenchers >=12", Dump Trucks, Ag Equipment >=150 HP, Scrapers, Water Wagons.	Hour	$24.79	24	$594.96
Labor	231	General Labor	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	$16.72	20	$334.40
Mobilization	1139	Mobilization, medium equipment	Equipment with 70-150 HP or typical weights between 14,000 and 30,000 pounds.	Each	$120.38	2	$240.76

Scenario Worksheet

Practice and Scenario Description:

Information Type	Data
Region	Northern Plains
State	South Dakota
Discipline Group	Environmental Engineering
Practice Code/Name	635 - Vegetated Treatment Area
Scenario ID	3
Scenario Name	Sprinkler, Solid Set Distribution
Scenario Description	This is a permanent herbaceous vegetative area located adjacent to a livestock production area. Wastewater (runoff or milking parlor wastewater) is properly collected at the production area and pumped to mechanically distribute wastewater onto the VTA. The VTA vegetation is harvested to removed nutrients on a regular basis. This practice addresses water quality degradation due to uncontrolled nutrient rich wastewater that can flow into surface waters or leach into ground water. Associated practices: Waste Storage Facility (313), Fence (382), Solid/Liquid Waste Separation Facility (632), Manure Transfer (634), Irrigation System, Sprinkler (442), Roof runoff Management (558), Pumping Plant (533), Subsurface Drain (606), Critical Area Planting (342), Terrace (600), Nutrient Management (590), Diversion (362), Pipeline (516), Land Smoothing (466), Precision Land Forming (462), Waste Treatment (629)
Before Practice Situation	Nutrient rich wastewater is running off from an animal operation that has the potential to pollute surface waters or ponding and leaching into groundwater.
After Practice Situation	Typical VTA is 10.0 ac in size. Typically does not require grading and shaping to maintain as uniform application onto the VTA is made through a solid set type sprinkler system. A settling basin for wastewater collection is contracted using Solid/Liquid Waste Separation Facility (632) and Pumping Plant (533) to get the wastewater to the VTA. For milkhouse waste, Waste Treatment (629) could be contracted to provide pretreatment prior to being pumped and distributed onto the VTA. The VTA practice will provide a controlled release of nutrient rich wastewater onto a designed vegetative area for nutrient uptake. This system will improve water quality by treating nutrient rich wastewater and prevent contamination of surface and ground water resources.
Scenario Feature Measure	Amount of VTA installed
Scenario Unit	Acre
Scenario Typical Size	10

Cost Summary:

Cost Category	Scenario Cost	Scenario Cost/Unit
Materials	$4,132.00	$413.20
Equipment/Installation	$1,768.56	$176.86
Labor	$895.92	$89.59
Mobilization	$120.38	$12.04
Acquisition of Technical Knowledge	$0.00	$0.00
Foregone Income	$0.00	$0.00
Total	$6,916.86	$691.69

Cost Details:

Cost Category	Component ID	Component Name	Component Description	Unit	Price ($/unit)	Quantity	Cost
Materials	976	Pipe, PVC, 2", SCH 40	Materials: - 2" - PVC - SCH 40 - ASTM D1785	Foot	$1.04	2800	$2,912.00
Materials	987	Pipe, PVC, 6", SDR 21	Materials: - 6" - PVC - SDR 21 200 psi - ASTM D2241	Foot	$6.10	200	$1,220.00
Equipment/Installation	936	Trencher, 8"	Equipment and power unit costs. Labor not included.	Hour	$73.69	24	$1,768.56
Labor	232	Equipment Operators, Light	Includes: Skid Steer Loaders, Hydraulic Excavators <50 HP, Trenchers <12", Ag Equipment <150 HP, Pickup Trucks, Forklifts, Mulchers	Hour	$20.61	24	$494.64
Labor	231	General Labor	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	$16.72	24	$401.28
Mobilization	1139	Mobilization, medium equipment	Equipment with 70-150 HP or typical weights between 14,000 and 30,000 pounds.	Each	$120.38	1	$120.38

Scenario Worksheet

Practice and Scenario Description:

Information Type	Data
Region	Northern Plains
State	South Dakota
Discipline Group	Environmental Engineering
Practice Code/Name	635 - Vegetated Treatment Area
Scenario ID	4
Scenario Name	Sprinkler, Mobile Pods
Scenario Description	This is a permanent herbaceous vegetative area located adjacent to a livestock production area. Wastewater (runoff or milking parlor wastewater) is properly collected at the production area and pumped to mechanically distribute wastewater onto the VTA. The VTA vegetation is harvested to removed nutrients on a regular basis. This practice addresses water quality degradation due to uncontrolled nutrient rich wastewater that can flow into surface waters or leach into ground water. Associated practices: Waste Storage Facility (313), Fence (382), Solid/Liquid Waste Separation Facility (632), Manure Transfer (634), Irrigation System, Sprinkler (442), Roof runoff Management (558), Pumping Plant (533), Subsurface Drain (606), Critical Area Planting (342), Terrace (600), Nutrient Management (590), Diversion (362), Pipeline (516), Land Smoothing (466), Precision Land Forming (462), Waste Treatment (629)
Before Practice Situation	Nutrient rich wastewater is running off from an animal operation that has the potential to pollute surface waters or ponding and leaching into groundwater.
After Practice Situation	Typical VTA is 2.0 ac in size. Typically does not require grading and shaping to maintain as uniform application onto the VTA is made through a mobile pod type sprinkler system. A settling basin for wastewater collection is contracted using Solid/Liquid Waste Separation Facility (632) and Pumping Plant (533) to get the wastewater to the VTA. For milkhouse waste, Waste Treatment (629) could be contracted to provide pretreatment prior to being pumped and distributed onto the VTA. The VTA practice will provide a controlled release of nutrient rich wastewater onto a designed vegetative area for nutrient uptake. This system will improve water quality by treating nutrient rich wastewater and prevent contamination of surface and ground water resources.
Scenario Feature Measure	Amount of VTA installed
Scenario Unit	Acre
Scenario Typical Size	2

Cost Summary:

Cost Category	Scenario Cost	Scenario Cost/Unit
Materials	$6,770.16	$3,385.08
Equipment/Installation	$1,314.13	$657.07
Labor	$659.11	$329.56
Mobilization	$240.76	$120.38
Acquisition of Technical Knowledge	$0.00	$0.00
Foregone Income	$0.00	$0.00
Total	$8,984.16	$4,492.08

Cost Details:

Cost Category	Component ID	Component Name	Component Description	Unit	Price ($/unit)	Quantity	Cost
Materials	323	Irrigation, Pod System, w/Appurtenances	System: Pod System - w/Appurtenances	Each	$214.73	20	$4,294.60
Materials	986	Pipe, PVC, 4", SDR 21	Materials: - 4" - PVC - SDR 21 200 psi - ASTM D2241	Foot	$2.83	800	$2,264.00
Materials	1379	Pipe, HDPE, smooth wall, weight priced	High Density Polyethylene (HDPE) compound manufactured into smooth wall pipe. Materials only.	Pound	$2.46	86	$211.56
Equipment/Installation	936	Trencher, 8"	Equipment and power unit costs. Labor not included.	Hour	$73.69	16	$1,179.04
Equipment/Installation	926	Backhoe, 80 HP	Wheel mounted backhoe excavator with horsepower range of 60 to 90. Equipment and power unit costs. Labor not included.	Hour	$45.03	3	$135.09
Labor	232	Equipment Operators, Light	Includes: Skid Steer Loaders, Hydraulic Excavators <50 HP, Trenchers <12", Ag Equipment <150 HP, Pickup Trucks, Forklifts, Mulchers	Hour	$20.61	19	$391.59
Labor	231	General Labor	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	$16.72	16	$267.52
Mobilization	1139	Mobilization, medium equipment	Equipment with 70-150 HP or typical weights between 14,000 and 30,000 pounds.	Each	$120.38	2	$240.76

Scenario Worksheet

Practice and Scenario Description:

Information Type	Data
Region	Northern Plains
State	South Dakota
Discipline Group	Environmental Engineering
Practice Code/Name	635 - Vegetated Treatment Area
Scenario ID	5
Scenario Name	Sprinkler, Center Pivot
Scenario Description	This is a permanent herbaceous vegetative area located adjacent to a livestock production area. Wastewater (runoff or milking parlor wastewater) is properly collected at the production area and pumped to mechanically distribute wastewater onto the VTA. The VTA vegetation is harvested to removed nutrients on a regular basis. This practice addresses water quality degradation due to uncontrolled nutrient rich wastewater that can flow into surface waters or leach into ground water. Associated practices: Waste Storage Facility (313), Fence (382), Solid/Liquid Waste Separation Facility (632), Manure Transfer (634), Irrigation System, Sprinkler (442), Roof runoff Management (558), Pumping Plant (533), Subsurface Drain (606), Critical Area Planting (342), Terrace (600), Nutrient Management (590), Diversion (362), Pipeline (516), Land Smoothing (466), Precision Land Forming (462), Waste Treatment (629)
Before Practice Situation	Nutrient rich wastewater is running off from an animal operation that has the potential to pollute surface waters or ponding and leaching into groundwater.
After Practice Situation	Typical VTA is 20.0 ac in size. Typically does not require grading and shaping to maintain as uniform application onto the VTA is made through a center pivt type sprinkler system. A settling basin for wastewater collection is contracted using Solid/Liquid Waste Separation Facility (632) and Pumping Plant (533) to get the wastewater to the VTA. For milkhouse waste, Waste Treatment (629) could be contracted to provide pretreatment prior to being pumped and distributed onto the VTA. The VTA practice will provide a controlled release of nutrient rich wastewater onto a designed vegetative area for nutrient uptake. This system will improve water quality by treating nutrient rich wastewater and prevent contamination of surface and ground water resources.
Scenario Feature Measure	Amount of VTA installed
Scenario Unit	Acre
Scenario Typical Size	20

Cost Summary:

Cost Category	Scenario Cost	Scenario Cost/Unit
Materials	$43,443.84	$2,172.19
Equipment/Installation	$724.61	$36.23
Labor	$360.47	$18.02
Mobilization	$240.76	$12.04
Acquisition of Technical Knowledge	$0.00	$0.00
Foregone Income	$0.00	$0.00
Total	$44,769.68	$2,238.48

Cost Details:

Cost Category	Component ID	Component Name	Component Description	Unit	Price ($/unit)	Quantity	Cost
Materials	317	Irrigation, Center pivot system with appurtenances, fixed cost portion	Fixed cost portion of the center pivot system with appurtenances. This portion includes the following items: pivot point, pipe, towers, pad, controls, sprinklers, installation.	Each	$11,705.00	1	$11,705.00
Materials	318	Irrigation, Center pivot system with appurtenances, variable cost portion	Variable cost portion of the center pivot system with appurtenances. This portion includes the following items: pivot point, pipe, towers, pad, controls, sprinklers, installation.	Foot	$54.24	526	$28,530.24
Materials	987	Pipe, PVC, 6", SDR 21	Materials: - 6" - PVC - SDR 21 200 psi - ASTM D2241	Foot	$6.10	526	$3,208.60
Equipment/Installation	936	Trencher, 8"	Equipment and power unit costs. Labor not included.	Hour	$73.69	8	$589.52
Equipment/Installation	926	Backhoe, 80 HP	Wheel mounted backhoe excavator with horsepower range of 60 to 90. Equipment and power unit costs. Labor not included.	Hour	$45.03	3	$135.09
Labor	232	Equipment Operators, Light	Includes: Skid Steer Loaders, Hydraulic Excavators <50 HP, Trenchers <12", Ag Equipment <150 HP, Pickup Trucks, Forklifts, Mulchers	Hour	$20.61	11	$226.71
Labor	231	General Labor	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	$16.72	8	$133.76
Mobilization	1139	Mobilization, medium equipment	Equipment with 70-150 HP or typical weights between 14,000 and 30,000 pounds.	Each	$120.38	2	$240.76

Scenario Worksheet

Practice and Scenario Description:

Information Type	Data
Region	Northern Plains
State	South Dakota
Discipline Group	Environmental Engineering
Practice Code/Name	635 - Vegetated Treatment Area
Scenario ID	6
Scenario Name	Concrete Curb, No spreader Devices
Scenario Description	This is a permanent herbaceous vegetative area or channel installed down slope from a livestock production area. Wastewater (runoff or milking parlor wastewater) is properly collected and released with a controlled gravity outflow into the VTA. The VTA vegetation is harvested to removed nutrients on a regular basis. This practice addresses water quality degradation due to uncontrolled nutrient rich wastewater that can flow into surface waters or leach into ground water. Associated practices: Waste Storage Facility (313), Fence (382), Solid/Liquid Waste Separation Facility (632), Manure Transfer (634), Roof runoff Management (558), Pumping Plant (533), Subsurface Drain (606), Critical Area Planting (342), Terrace (600), Nutrient Management (590), Diversion (362), Pipeline (516), Land Smoothing (466), Precision Land Forming (462), Waste Treatment (629)
Before Practice Situation	Nutrient rich wastewater is running off from an animal operation that has the potential to pollute surface waters or ponding and leaching into groundwater.
After Practice Situation	Typical VTA is 2.0 ac in size, includes a concrete curb for distribution flow (sheet flow) into the VTA. Typically requires grading and shaping to maintain sheet flow throughout the VTA. A settling basin for wastewater collection is contracted using Solid/Liquid Waste Separation Facility (632). For milkhouse waste, Waste Treatment (629) could be contracted to provide pre-treatment prior to being released into the VTA. The VTA practice will provide a controlled release of nutrient rich wastewater into a designed vegetative area for nutrient uptake. O&M of the VTA to assure sheet flow throughout the length of the area may be required. This system will improve water quality by treating nutrient rich wastewater and prevent contamination of surface and ground water resources.
Scenario Feature Measure	Amount of VTA installed
Scenario Unit	Acre
Scenario Typical Size	2

Cost Summary:

Cost Category	Scenario Cost	Scenario Cost/Unit
Materials	$0.00	$0.00
Equipment/Installation	$4,120.57	$2,060.29
Labor	$582.30	$291.15
Mobilization	$120.38	$60.19
Acquisition of Technical Knowledge	$0.00	$0.00
Foregone Income	$0.00	$0.00
Total	$4,823.25	$2,411.63

Cost Details:

Cost Category	Component ID	Component Name	Component Description	Unit	Price ($/unit)	Quantity	Cost
Equipment/Installation	37	Concrete, CIP, slab on grade, reinforced	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	$204.81	7	$1,433.67
Equipment/Installation	1208	Scraper, self propelled, 21 CY	Self propelled earthmoving scraper with 21 CY capacity. Does not include labor.	Hour	$268.69	10	$2,686.90
Labor	233	Equipment Operators, Heavy	Includes: Cranes, Hydraulic Excavators >=50 HP, Dozers, Paving Machines, Rock Trenchers, Trenchers >=12", Dump Trucks, Ag Equipment >=150 HP, Scrapers, Water Wagons.	Hour	$24.79	10	$247.90
Labor	231	General Labor	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	$16.72	20	$334.40
Mobilization	1139	Mobilization, medium equipment	Equipment with 70-150 HP or typical weights between 14,000 and 30,000 pounds.	Each	$120.38	1	$120.38

Scenario Worksheet

Practice and Scenario Description:

Information Type	Data
Region	Northern Plains
State	South Dakota
Discipline Group	Environmental Engineering
Practice Code/Name	635 - Vegetated Treatment Area
Scenario ID	7
Scenario Name	Gated Pipe, No Spreader Devices
Scenario Description	This is a permanent herbaceous vegetative area or channel installed down slope from a livestock production area. Wastewater (runoff or milking parlor wastewater) is properly collected and released with a controlled outflow into the VTA. The VTA vegetation is harvested to removed nutrients on a regular basis. This practice addresses water quality degradation due to uncontrolled nutrient rich wastewater that can flow into surface waters or leach into ground water. Associated practices: Waste Storage Facility (313), Fence (382), Solid/Liquid Waste Separation Facility (632), Manure Transfer (634), Roof runoff Management (558), Pumping Plant (533), Subsurface Drain (606), Critical Area Planting (342), Terrace (600), Nutrient Management (590), Diversion (362), Pipeline (516), Land Smoothing (466), Precision Land Forming (462), Waste Treatment (629)
Before Practice Situation	Nutrient rich wastewater is running off from an animal operation that has the potential to pollute surface waters or ponding and leaching into groundwater.
After Practice Situation	Typical VTA is 10.0 ac in size, includes a gated irrigation pipe to promote sheet flow through the VTA. Typically requires grading and shaping to maintain sheet flow throughout the VTA. A settling basin for wastewater collection is contracted using Solid/Liquid Waste Separation Facility (632). For milkhouse waste, Waste Treatment (629) could be contracted to provide pre-treatment prior to being released into the VTA. The establishment of the permanent vegetation within the VTA will be completed under the Critical Area Planting (342) Standard. The VTA practice will provide a controlled release of nutrient rich wastewater into a designed vegetative area for nutrient uptake. O&M of the VTA to assure sheet flow throughout the length of the area may be required. This system will improve water quality by treating nutrient rich wastewater and prevent contamination of surface and ground water resources.
Scenario Feature Measure	Amount of VTA installed
Scenario Unit	Acre
Scenario Typical Size	10

Cost Summary:

Cost Category	Scenario Cost	Scenario Cost/Unit
Materials	$5,245.50	$524.55
Equipment/Installation	$10,806.10	$1,080.61
Labor	$991.60	$99.16
Mobilization	$120.38	$12.04
Acquisition of Technical Knowledge	$0.00	$0.00
Foregone Income	$0.00	$0.00
Total	$17,163.58	$1,716.36

Cost Details:

Cost Category	Component ID	Component Name	Component Description	Unit	Price ($/unit)	Quantity	Cost
Materials	2029	Pipe, aluminum, smooth wall gated irrigation, 8"	8" diameter smooth wall gated irrigation aluminum pipe. Material only.	Foot	$7.11	700	$4,977.00
Materials	980	Pipe, PVC, 6", SCH 40	Materials: - 6" - PVC - SCH 40 - ASTM D1785	Foot	$5.37	50	$268.50
Equipment/Installation	53	Trenching, Earth, 12" x 48"	Trenching, earth, 12" wide x 48" depth, includes equipment and labor for trenching and backfilling	Foot	$1.17	50	$58.50
Equipment/Installation	1208	Scraper, self propelled, 21 CY	Self propelled earthmoving scraper with 21 CY capacity. Does not include labor.	Hour	$268.69	40	$10,747.60
Labor	233	Equipment Operators, Heavy	Includes: Cranes, Hydraulic Excavators >=50 HP, Dozers, Paving Machines, Rock Trenchers, Trenchers >=12", Dump Trucks, Ag Equipment >=150 HP, Scrapers, Water Wagons.	Hour	$24.79	40	$991.60
Mobilization	1139	Mobilization, medium equipment	Equipment with 70-150 HP or typical weights between 14,000 and 30,000 pounds.	Each	$120.38	1	$120.38

Scenario Worksheet

Practice and Scenario Description:

Information Type	Data
Region	Northern Plains
State	South Dakota
Discipline Group	Agricultural Engineering
Practice Code/Name	638 - Water & Sediment Control Basin
Scenario ID	1
Scenario Name	WASCOB base
Scenario Description	Typical scenario s for the construction of 700 CY earthen embankment. Outlet is typically an underground outlet. An earthen embankment or combination ridge and channel generally constructed across the slope and minor watercourses to form a sediment trap and water detention basin. Work is done with dozer, scraper, or road grader. Costs include all equipment necessary to excavate, shape, grade and compact the Water and Sediment Control Basin and mobilization of equipment. This practice is utilized to reduce watercourse and gully erosion, trap sediment, reduce and manage onsite and downstream runoff. Sheet and rill erosion will be controlled by other conservation practices.
Before Practice Situation	Farming fields with excessive slope length has resulted in multiple rills and/or ephemeral gullies that will continue to worsen over time. The excessive erosion may lead to deterioration of receiving waters due to excessive sedimentation and nutrient transport. Resource concern addressed includes soil erosion and water quality by trapping sediment and/or reduce erosion in a field to protect riparian areas and water bodies from sediment deposition. Surface water causes erosion and the sediment (and potentially pesticides) to be transported into the riparian areas and water bodies downstream.
After Practice Situation	Water and Sediment Control Basis is constructed with 700 CY of excavation/earthfill with dozer, scraper and/or road grader. Rill and/or gully erosion is reduced. If riser and underground outlet are needed, then include Underground Outlet (620). Include Critical Area Planting (342) where necessary to prevent erosion following construction activities.
Scenario Feature Measure	CY of WASCOB Embankment
Scenario Unit	Cubic Yard
Scenario Typical Size	700

Cost Summary:

Cost Category	Scenario Cost	Scenario Cost/Unit
Materials	$0.00	$0.00
Equipment/Installation	$2,569.00	$3.67
Labor	$33.11	$0.05
Mobilization	$120.38	$0.17
Acquisition of Technical Knowledge	$0.00	$0.00
Foregone Income	$0.00	$0.00
Total	$2,722.49	$3.89

Cost Details:

Cost Category	Component ID	Component Name	Component Description	Unit	Price ($/unit)	Quantity	Cost
Equipment/Installation	49	Earthfill, Roller Compacted	Earthfill, roller or machine compacted, includes equipment and labor	Cubic yard	$3.67	700	$2,569.00
Labor	234	Supervisor or Manager	Labor involving supervision or management activities. Includes crew supervisors, foremen and farm/ranch managers time required for adopting new technology, etc.	Hour	$33.11	1	$33.11
Mobilization	1139	Mobilization, medium equipment	Equipment with 70-150 HP or typical weights between 14,000 and 30,000 pounds.	Each	$120.38	1	$120.38

Scenario Worksheet

Practice and Scenario Description:

Information Type	Data
Region	Northern Plains
State	South Dakota
Discipline Group	Agricultural Engineering
Practice Code/Name	638 - Water & Sediment Control Basin
Scenario ID	2
Scenario Name	WASCOB topsoil
Scenario Description	Typical scenarios for the construction of 700 CY earthen embankment. Prior to building the embankment, 6 inches of topsoil is removed and stockpiled. Outlet is typically an underground outlet. An earthen embankment or combination ridge and channel generally constructed across the slope and minor watercourses to form a sediment trap and water detention basin. Topsoil is replaced following construction of the embankment. Costs include all equipment necessary to strip and stock pile topsoil, excavate, shape, grade and compact the Water and Sediment Control Basin, spread and replace topsoil after construction and mobilization of equipment. Seeding not included. This practice is utilized to reduce watercourse and gully erosion, trap sediment, reduce and manage onsite and downstream runoff. Sheet and rill erosion will be controlled by other conservation practices. Work is done with dozer, scraper, or road grader.
Before Practice Situation	Site has shallow topsoil which if removed by earthwork for construction of embankment will significantly impact yields. Farming fields with excessive slope length has resulted in multiple rills and/or ephemeral gullies that will continue to worsen over time. The excessive erosion may lead to deterioration of receiving waters due to excessive sedimentation and nutrient transport. Resource concern addressed includes soil erosion and water quality by trapping sediment and/or reduce erosion in a field to protect riparian areas and water bodies from sediment deposition. Surface water causes erosion and the sediment (and potentially pesticides) is being transported into the riparian areas and water bodies downstream.
After Practice Situation	Water and Sediment Control Basis is constructed with 700 CY of excavation/earthfill with dozer, scraper and/or road grader. Rill and/or gully erosion is reduced. If riser and underground outlet are needed, then include Underground Outlet (620). Include Critical Area Planting (342) where necessary to prevent erosion following construction activities.
Scenario Feature Measure	CY of WASCOB Embankment
Scenario Unit	Cubic Yard
Scenario Typical Size	700

Cost Summary:

Cost Category	Scenario Cost	Scenario Cost/Unit
Materials	$0.00	$0.00
Equipment/Installation	$2,766.50	$3.95
Labor	$33.11	$0.05
Mobilization	$120.38	$0.17
Acquisition of Technical Knowledge	$0.00	$0.00
Foregone Income	$0.00	$0.00
Total	$2,919.99	$4.17

Cost Details:

Cost Category	Component ID	Component Name	Component Description	Unit	Price ($/unit)	Quantity	Cost
Equipment/Installation	1199	Stripping and stockpiling, topsoil	Stripping and stockpiling of topsoil adjacent to stripping area. Includes equipment and labor.	Cubic Yard	$0.79	250	$197.50
Equipment/Installation	49	Earthfill, Roller Compacted	Earthfill, roller or machine compacted, includes equipment and labor	Cubic yard	$3.67	700	$2,569.00
Labor	234	Supervisor or Manager	Labor involving supervision or management activities. Includes crew supervisors, foremen and farm/ranch managers time required for adopting new technology, etc.	Hour	$33.11	1	$33.11
Mobilization	1139	Mobilization, medium equipment	Equipment with 70-150 HP or typical weights between 14,000 and 30,000 pounds.	Each	$120.38	1	$120.38

Scenario Worksheet

Practice and Scenario Description:

Information Type	Data
Region	Northern Plains
State	South Dakota
Discipline Group	0
Practice Code/Name	640 - Waterspreading
Scenario ID	1
Scenario Name	Dikes
Scenario Description	A waterspreading system of dikes installed to uniformly distribute surface water to the field. Dikes are installed with gates to manage the release of the water.
Before Practice Situation	A field managed for forage with uncontrolled surface water that is not uniformly applied to the field for crop use.
After Practice Situation	A waterspreading system of dikes are installed to uniformly distribute surface water to the field. The dikes are typically built with a height of 3 feet and have a 4 foot top with 5:1 sideslopes to allow the dike to mowed or cut. The dikes are seeded with a sod forming grass. Each dike with retain water on the field and allow the water to be drained through a 18" CMP pipe with a slide gate (typically a Waterman C8E gate). The typical field size would be 20 acres and would have three dikes approximatley 1000' long installed with 200-300 feet between dikes. The system would address the resource concern of Water Quantity - Inefficient water use on nonirrigated land. Associated practices with the system are 342 Critical Area Planting, 412 - Grassed Waterway, 587 - Structure for Water Control, 511 - Forage Harvest Management.
Scenario Feature Measure	Acres with supplemental water
Scenario Unit	Acre
Scenario Typical Size	20

Cost Summary:

Cost Category	Scenario Cost	Scenario Cost/Unit
Materials	$2,824.20	$141.21
Equipment/Installation	$28,307.65	$1,415.38
Labor	$332.08	$16.60
Mobilization	$203.28	$10.16
Acquisition of Technical Knowledge	$0.00	$0.00
Foregone Income	$0.00	$0.00
Total	$31,667.21	$1,583.36

Cost Details:

Cost Category	Component ID	Component Name	Component Description	Unit	Price ($/unit)	Quantity	Cost
Materials	1743	"Pipe, CMP, 18"", 16 Gauge"	"18"" Corrugated Metal Pipe, Galvanized, Uncoated, 16 gage. Material cost only."	Foot	$18.88	90	$1,699.20
Materials	1829	Slide gate, steel, 2' diameter, low head	2' diameter steel slide gate for low head installations	Each	$375.00	3	$1,125.00
Equipment/Installation	1199	Stripping and stockpiling, topsoil	Stripping and stockpiling of topsoil adjacent to stripping area. Includes equipment and labor.	Cubic Yard	$0.79	1055	$833.45
Equipment/Installation	926	Backhoe, 80 HP	Wheel mounted backhoe excavator with horsepower range of 60 to 90. Equipment and power unit costs. Labor not included.	Hour	$45.03	8	$360.24
Equipment/Installation	49	Earthfill, Roller Compacted	Earthfill, roller or machine compacted, includes equipment and labor	Cubic yard	$3.67	7388	$27,113.96
Labor	233	Equipment Operators, Heavy	Includes: Cranes, Hydraulic Excavators >=50 HP, Dozers, Paving Machines, Rock Trenchers, Trenchers >=12", Dump Trucks, Ag Equipment >=150 HP, Scrapers, Water Wagons.	Hour	$24.79	8	$198.32
Labor	231	General Labor	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	$16.72	8	$133.76
Mobilization	1139	Mobilization, medium equipment	Equipment with 70-150 HP or typical weights between 14,000 and 30,000 pounds.	Each	$120.38	1	$120.38
Mobilization	1142	Mobilization, General labor	Mobilization of general labor: Ex. pipe layer, herder, concrete placement, materials spreader, flagger, etc.	Hour	$16.89	2	$33.78
Mobilization	1144	Mobilization, Heavy Equipment Operator	Mobilization of heavy equipment operators: Hydraulic Excavators >=50 HP, Dozers, Paving Machines, Rock Trenchers, Trenchers >=12", Dump Trucks, Ag Equipment >=150 HP, Scrapers, Water Wagons.	Hour	$24.56	2	$49.12

Scenario Worksheet

Practice and Scenario Description:

Information Type	Data
Region	Northern Plains
State	South Dakota
Discipline Group	0
Practice Code/Name	640 - Waterspreading
Scenario ID	2
Scenario Name	Ditches
Scenario Description	A waterspreading system of level lip ditches installed to uniformly distribute surface water to the field. Dikes are commonly installed on 2% slopes.
Before Practice Situation	A field managed for forage with uncontrolled surface water that is not uniformly applied to the field for crop use.
After Practice Situation	A waterspreading system of level lip ditches are installed to uniformly distribute surface water to the field. The ditches are typically built with a depth of 2.5 feet and have a 6 foot top with a V shape. Each ditch with spill water on the field and allow the water to be spread uniformly. The typical field size would be 20 acres and would have four ditches approximatley 1000' long installed with 200-300 feet between dikes. The system would address the resource concern of Water Quantity - Inefficient water use on nonirrigated land. Associated practices with the system are 342 Critical Area Planting, 412 - Grassed Waterway, 587 - Structure for Water Control, 511 - Forage Harvest Management, 362 - Diversion.
Scenario Feature Measure	Acres with supplemental water
Scenario Unit	Acre
Scenario Typical Size	20

Cost Summary:

Cost Category	Scenario Cost	Scenario Cost/Unit
Materials	$0.00	$0.00
Equipment/Installation	$2,388.00	$119.40
Labor	$188.24	$9.41
Mobilization	$82.90	$4.15
Acquisition of Technical Knowledge	$0.00	$0.00
Foregone Income	$0.00	$0.00
Total	$2,659.14	$132.96

Cost Details:

Cost Category	Component ID	Component Name	Component Description	Unit	Price ($/unit)	Quantity	Cost
Equipment/Installation	48	Excavation, Common Earth, side cast, small equipment	Bulk excavation and side casting of common earth with hydraulic excavator with less than 1 CY capacity. Includes equipment and labor.	Cubic yard	$1.99	1200	$2,388.00
Labor	230	Skilled Labor	Labor requiring a high level skill set: Includes carpenters, welders, electricians, conservation professionals involved with data collection, monitoring, and or record keeping, etc.	Hour	$23.53	8	$188.24
Mobilization	1142	Mobilization, General labor	Mobilization of general labor: Ex. pipe layer, herder, concrete placement, materials spreader, flagger, etc.	Hour	$16.89	2	$33.78
Mobilization	1144	Mobilization, Heavy Equipment Operator	Mobilization of heavy equipment operators: Hydraulic Excavators >=50 HP, Dozers, Paving Machines, Rock Trenchers, Trenchers >=12", Dump Trucks, Ag Equipment >=150 HP, Scrapers, Water Wagons.	Hour	$24.56	2	$49.12

Scenario Worksheet

Practice and Scenario Description:

Information Type	Data
Region	Northern Plains
State	South Dakota
Discipline Group	Engineering General
Practice Code/Name	642 - Water Well
Scenario ID	2
Scenario Name	Bored or Dug Well
Scenario Description	Typical construction is for the excavation of a shallow dug well. The purpose of the practice is to provide water for livestock. A typical dug well is 4 foot in diameter and 15 feet in depth. The well is excavated using a backhoe. Excavate to a depth where the water recharge is greater than the equipment can remove. Washed gravel is placed in the base of the dug opening. Concrete manhole risers are installed to hold the water. Pea gravel is placed above the washed gravel to transition to the earth backfill. The hole is backfilled and sloped to direct surface water away from entering the manhole cover.
Before Practice Situation	Livestock have insufficient water or are fenced from their water source.
After Practice Situation	Sufficient water is available for livestock. Utilize Pumping Plant (533) and Pipeline (516) as associated practices. Use Critical Area Seeding (342) where necessary to prevent erosion following construciton activities.
Scenario Feature Measure	Depth of Well
Scenario Unit	Foot
Scenario Typical Size	15

Cost Summary:

Cost Category	Scenario Cost	Scenario Cost/Unit
Materials	$7,351.06	$490.07
Equipment/Installation	$450.30	$30.02
Labor	$415.10	$27.67
Mobilization	$141.11	$9.41
Acquisition of Technical Knowledge	$0.00	$0.00
Foregone Income	$0.00	$0.00
Total	$8,357.57	$557.17

Cost Details:

Cost Category	Component ID	Component Name	Component Description	Unit	Price ($/unit)	Quantity	Cost
Materials	1335	Chlorine	Liquid chlorine bleach. Materials only.	Gallon	$2.32	5	$11.60
Materials	1333	Grout, cement	Cement grout meeting ASTM specifications for well sealing. Includes both neat-cement grout and bentonite gout mixtures. Includes materials, equipment and labor to place.	Cubic Yard	$64.53	2	$129.06
Materials	1331	Aggregate, gravel, washed, pea gravel	Washed and graded pea gravel river stone. Includes materials and transport to site.	Cubic Yard	$44.95	1	$44.95
Materials	1053	Manhole, 4' x 4'	Precast Manhole with base and top delivered	Each	$1,759.39	4	$7,037.56
Materials	309	Test, Standard Water Test, Well Water	Domestic Well Water Suitability	Each	$52.20	1	$52.20
Materials	46	Aggregate, Gravel, Graded	Gravel, includes materials, equipment and labor to transport and place. Includes washed and unwashed gravel.	Cubic yard	$25.23	3	$75.69
Equipment/Installation	926	Backhoe, 80 HP	Wheel mounted backhoe excavator with horsepower range of 60 to 90. Equipment and power unit costs. Labor not included.	Hour	$45.03	10	$450.30
Labor	231	General Labor	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	$16.72	10	$167.20
Labor	233	Equipment Operators, Heavy	Includes: Cranes, Hydraulic Excavators >=50 HP, Dozers, Paving Machines, Rock Trenchers, Trenchers >=12", Dump Trucks, Ag Equipment >=150 HP, Scrapers, Water Wagons.	Hour	$24.79	10	$247.90
Mobilization	1144	Mobilization, Heavy Equipment Operator	Mobilization of heavy equipment operators: Hydraulic Excavators >=50 HP, Dozers, Paving Machines, Rock Trenchers, Trenchers >=12", Dump Trucks, Ag Equipment >=150 HP, Scrapers, Water Wagons.	Hour	$24.56	0.5	$12.28
Mobilization	1139	Mobilization, medium equipment	Equipment with 70-150 HP or typical weights between 14,000 and 30,000 pounds.	Each	$120.38	1	$120.38
Mobilization	1142	Mobilization, General labor	Mobilization of general labor: Ex. pipe layer, herder, concrete placement, materials spreader, flagger, etc.	Hour	$16.89	0.5	$8.45

Scenario Worksheet

Practice and Scenario Description:

Information Type	Data
Region	Northern Plains
State	South Dakota
Discipline Group	Engineering General
Practice Code/Name	642 - Water Well
Scenario ID	3
Scenario Name	Shallow Well <= 100 ft.
Scenario Description	Typical construction is for the installation of a well, in areas where sufficient water is known to occur within 100 feet of the ground surface. The well shall be drilled, dug, driven, bored, jetted or otherwise constructed to an aquifer for water supply. The purpose of the practice is to provide water for livestock or irrigation. An average well depth is 75 feet. Well casings are 4-6" in diameter. Plastic casing is installed to a depth of 55 feet.
Before Practice Situation	Livestock have insufficient water or are fenced from their water source. There is insufficient water for use in micro-irrigation.
After Practice Situation	Sufficient water is available for livestock or irrigation. Utilize Pumping Plant (533) and Pipeline (516) as associated practices. Use Critical Area Seeding (342) where necessary to prevent erosion following construciton activities.
Scenario Feature Measure	Depth of Well
Scenario Unit	Foot
Scenario Typical Size	75

Cost Summary:

Cost Category	Scenario Cost	Scenario Cost/Unit
Materials	$900.65	$12.01
Equipment/Installation	$1,248.00	$16.64
Labor	$0.00	$0.00
Mobilization	$144.94	$1.93
Acquisition of Technical Knowledge	$0.00	$0.00
Foregone Income	$0.00	$0.00
Total	$2,293.59	$30.58

Cost Details:

Cost Category	Component ID	Component Name	Component Description	Unit	Price ($/unit)	Quantity	Cost
Materials	1803	Well Casing, Plastic, 4"	PVC or ABS well casing, 4". Materials only.	Foot	$9.72	55	$534.60
Materials	46	Aggregate, Gravel, Graded	Gravel, includes materials, equipment and labor to transport and place. Includes washed and unwashed gravel.	Cubic yard	$25.23	1	$25.23
Materials	309	Test, Standard Water Test, Well Water	Domestic Well Water Suitability	Each	$52.20	1	$52.20
Materials	1998	Well Screen, plastic, 4"	4" PVC well screen. Materials only.	Foot	$6.68	20	$133.60
Materials	1785	Well Cap, 4"	Well cap, 4". Materials only.	Each	$23.64	1	$23.64
Materials	1333	Grout, cement	Cement grout meeting ASTM specifications for well sealing. Includes both neat-cement grout and bentonite gout mixtures. Includes materials, equipment and labor to place.	Cubic Yard	$64.53	2	$129.06
Materials	1335	Chlorine	Liquid chlorine bleach. Materials only.	Gallon	$2.32	1	$2.32
Equipment/Installation	1595	Rotary Drill Rig with Operator	Rotary drill rig including equipment and power unit costs and labor.	Hour	$156.00	8	$1,248.00
Mobilization	1139	Mobilization, medium equipment	Equipment with 70-150 HP or typical weights between 14,000 and 30,000 pounds.	Each	$120.38	1	$120.38
Mobilization	1144	Mobilization, Heavy Equipment Operator	Mobilization of heavy equipment operators: Hydraulic Excavators >=50 HP, Dozers, Paving Machines, Rock Trenchers, Trenchers >=12", Dump Trucks, Ag Equipment >=150 HP, Scrapers, Water Wagons.	Hour	$24.56	1	$24.56

Scenario Worksheet

Practice and Scenario Description:

Information Type	Data
Region	Northern Plains
State	South Dakota
Discipline Group	Engineering General
Practice Code/Name	642 - Water Well
Scenario ID	4
Scenario Name	Well, >100 to 300 ft.
Scenario Description	Typical construction is for the installation of a well, in areas where sufficient water is known to occur 100 - 300 feet of the ground surface. The well shall be drilled, dug, driven, bored, jetted or otherwise constructed to an aquifer for water supply. The purpose of the practice is to provide water for livestock or micro-irrigation. An average well depth is 200 feet. Well casings are 4-6" in diameter. Plastic casing and screen is installed to a depth of 200 feet.
Before Practice Situation	Livestock have insufficient water or are fenced from their water source. There is insufficient water for use in micro-irrigation.
After Practice Situation	Sufficient water is available for livestock or micro-irrigation. Utilize Pumping Plant (533) and Pipeline (516) as associated practices. Use Critical Area Seeding (342) where necessary to prevent erosion following construciton activities.
Scenario Feature Measure	Depth of Well
Scenario Unit	Foot
Scenario Typical Size	200

Cost Summary:

Cost Category	Scenario Cost	Scenario Cost/Unit
Materials	$2,037.07	$10.19
Equipment/Installation	$3,120.00	$15.60
Labor	$0.00	$0.00
Mobilization	$144.94	$0.72
Acquisition of Technical Knowledge	$0.00	$0.00
Foregone Income	$0.00	$0.00
Total	$5,302.01	$26.51

Cost Details:

Cost Category	Component ID	Component Name	Component Description	Unit	Price ($/unit)	Quantity	Cost
Materials	1803	Well Casing, Plastic, 4"	PVC or ABS well casing, 4". Materials only.	Foot	$9.72	150	$1,458.00
Materials	46	Aggregate, Gravel, Graded	Gravel, includes materials, equipment and labor to transport and place. Includes washed and unwashed gravel.	Cubic yard	$25.23	1.5	$37.85
Materials	309	Test, Standard Water Test, Well Water	Domestic Well Water Suitability	Each	$52.20	1	$52.20
Materials	1998	Well Screen, plastic, 4"	4" PVC well screen. Materials only.	Foot	$6.68	50	$334.00
Materials	1785	Well Cap, 4"	Well cap, 4". Materials only.	Each	$23.64	1	$23.64
Materials	1333	Grout, cement	Cement grout meeting ASTM specifications for well sealing. Includes both neat-cement grout and bentonite gout mixtures. Includes materials, equipment and labor to place.	Cubic Yard	$64.53	2	$129.06
Materials	1335	Chlorine	Liquid chlorine bleach. Materials only.	Gallon	$2.32	1	$2.32
Equipment/Installation	1595	Rotary Drill Rig with Operator	Rotary drill rig including equipment and power unit costs and labor.	Hour	$156.00	20	$3,120.00
Mobilization	1139	Mobilization, medium equipment	Equipment with 70-150 HP or typical weights between 14,000 and 30,000 pounds.	Each	$120.38	1	$120.38
Mobilization	1144	Mobilization, Heavy Equipment Operator	Mobilization of heavy equipment operators: Hydraulic Excavators >=50 HP, Dozers, Paving Machines, Rock Trenchers, Trenchers >=12", Dump Trucks, Ag Equipment >=150 HP, Scrapers, Water Wagons.	Hour	$24.56	1	$24.56

Scenario Worksheet

Practice and Scenario Description:

Information Type	Data
Region	Northern Plains
State	South Dakota
Discipline Group	Engineering General
Practice Code/Name	642 - Water Well
Scenario ID	6
Scenario Name	Deep Well, PVC Casing
Scenario Description	Typical construction is for the installation of a well, in areas where sufficient water is known to occur greater than 300 feet from the ground surface in formations that typically contain artesian pressure. The well shall be drilled, dug, driven, bored, jetted or otherwise constructed to an aquifer for water supply. The purpose of the practice is to provide water for livestock or micro-irrigation. An average well depth is 1200 feet. Surface casings are 4-6" in diameter with grouting to contain artesian pressures, smaller diameter casing (2") extends into water bearing formation. Plastic casing and screen is installed to a typical depth of 1200 feet.
Before Practice Situation	Livestock have insufficient water or are fenced from their water source. There is insufficient water for use in micro-irrigation.
After Practice Situation	Sufficient water is available for livestock or micro-irrigation. Utilize Pumping Plant (533) and Pipeline (516) as associated practices. Use Critical Area Seeding (342) where necessary to prevent erosion following construciton activities.
Scenario Feature Measure	Depth of Well
Scenario Unit	Foot
Scenario Typical Size	1200

Cost Summary:

Cost Category	Scenario Cost	Scenario Cost/Unit
Materials	$7,899.93	$6.58
Equipment/Installation	$4,680.00	$3.90
Labor	$0.00	$0.00
Mobilization	$144.94	$0.12
Acquisition of Technical Knowledge	$0.00	$0.00
Foregone Income	$0.00	$0.00
Total	$12,724.87	$10.60

Cost Details:

Cost Category	Component ID	Component Name	Component Description	Unit	Price ($/unit)	Quantity	Cost
Materials	1802	Well Casing, Plastic, 2"	PVC or ABS well casing, 2". Materials only.	Foot	$4.07	900	$3,663.00
Materials	1804	Well Casing, Plastic, 6"	PVC or ABS well casing, 6". Materials only.	Foot	$18.14	200	$3,628.00
Materials	1335	Chlorine	Liquid chlorine bleach. Materials only.	Gallon	$2.32	1	$2.32
Materials	1786	Well Cap, 6"	Well cap, 6". Materials only.	Each	$32.35	1	$32.35
Materials	1333	Grout, cement	Cement grout meeting ASTM specifications for well sealing. Includes both neat-cement grout and bentonite gout mixtures. Includes materials, equipment and labor to place.	Cubic Yard	$64.53	2	$129.06
Materials	309	Test, Standard Water Test, Well Water	Domestic Well Water Suitability	Each	$52.20	1	$52.20
Materials	1997	Well Screen, plastic, 2"	2" PVC well screen. Materials only.	Foot	$3.93	100	$393.00
Equipment/Installation	1595	Rotary Drill Rig with Operator	Rotary drill rig including equipment and power unit costs and labor.	Hour	$156.00	30	$4,680.00
Mobilization	1144	Mobilization, Heavy Equipment Operator	Mobilization of heavy equipment operators: Hydraulic Excavators >=50 HP, Dozers, Paving Machines, Rock Trenchers, Trenchers >=12", Dump Trucks, Ag Equipment >=150 HP, Scrapers, Water Wagons.	Hour	$24.56	1	$24.56
Mobilization	1139	Mobilization, medium equipment	Equipment with 70-150 HP or typical weights between 14,000 and 30,000 pounds.	Each	$120.38	1	$120.38

Scenario Worksheet

Practice and Scenario Description:

Information Type	Data
Region	Northern Plains
State	South Dakota
Discipline Group	Engineering General
Practice Code/Name	642 - Water Well
Scenario ID	7
Scenario Name	Deep Well, Steel or Copper
Scenario Description	Typical construction is for the installation of a well, in areas where sufficient water is known to occur greater than 2000 feet from the ground surface. The well shall be drilled, dug, driven, bored, jetted or otherwise constructed to an aquifer for water supply. The purpose of the practice is to provide water for livestock or micro-irrigation. An average well depth is 2500 feet. Plastic Surface casings are 6" in diameter with smaller diameter casing and screen extending into the water bearing formation. Steel casing and screen is installed to a typical depth of 2500 feet.
Before Practice Situation	Livestock have insufficient water or are fenced from their water source. There is insufficient water for use in micro-irrigation.
After Practice Situation	Sufficient water is available for livestock or micro-irrigation. Utilize Pumping Plant (533) and Pipeline (516) as associated practices. Use Critical Area Seeding (342) where necessary to prevent erosion following construciton activities.
Scenario Feature Measure	Depth of Well
Scenario Unit	Foot
Scenario Typical Size	2500

Cost Summary:

Cost Category	Scenario Cost	Scenario Cost/Unit
Materials	$85,405.93	$34.16
Equipment/Installation	$4,680.00	$1.87
Labor	$0.00	$0.00
Mobilization	$144.94	$0.06
Acquisition of Technical Knowledge	$0.00	$0.00
Foregone Income	$0.00	$0.00
Total	$90,230.87	$36.09

Cost Details:

Cost Category	Component ID	Component Name	Component Description	Unit	Price ($/unit)	Quantity	Cost
Materials	1804	Well Casing, Plastic, 6"	PVC or ABS well casing, 6". Materials only.	Foot	$18.14	500	$9,070.00
Materials	1796	Well Casing, Stainless Steel/Copper, 2"	Stainless steel or Copper well casing, 2". Materials only.	Foot	$38.06	2000	$76,120.00
Materials	1786	Well Cap, 6"	Well cap, 6". Materials only.	Each	$32.35	1	$32.35
Materials	309	Test, Standard Water Test, Well Water	Domestic Well Water Suitability	Each	$52.20	1	$52.20
Materials	1333	Grout, cement	Cement grout meeting ASTM specifications for well sealing. Includes both neat-cement grout and bentonite gout mixtures. Includes materials, equipment and labor to place.	Cubic Yard	$64.53	2	$129.06
Materials	1335	Chlorine	Liquid chlorine bleach. Materials only.	Gallon	$2.32	1	$2.32
Equipment/Installation	1595	Rotary Drill Rig with Operator	Rotary drill rig including equipment and power unit costs and labor.	Hour	$156.00	30	$4,680.00
Mobilization	1139	Mobilization, medium equipment	Equipment with 70-150 HP or typical weights between 14,000 and 30,000 pounds.	Each	$120.38	1	$120.38
Mobilization	1144	Mobilization, Heavy Equipment Operator	Mobilization of heavy equipment operators: Hydraulic Excavators >=50 HP, Dozers, Paving Machines, Rock Trenchers, Trenchers >=12", Dump Trucks, Ag Equipment >=150 HP, Scrapers, Water Wagons.	Hour	$24.56	1	$24.56

Scenario Worksheet

Practice and Scenario Description:

Information Type	Data
Region	Northern Plains
State	South Dakota
Discipline Group	Wildlife Wetland
Practice Code/Name	644 - Wetland Wildlife Management
Scenario ID	1
Scenario Name	Establish Vegetation, Mats and Plugs
Scenario Description	This scenario covers all wetland habitats not covered under 643. Involves hauling in material (mats and plugs obtained from off site) with a unique soil texture, seedbank, and vegeative reproductive potential. Haul/fill is used as macrotopograpic development of unique texture and seedbank that will provide the soil medium (texture) to increase plant richness and diversity in an otherwise monotypic soil/landscape/plant community. This scenario is utilized when habitat assessment indicates Inadequate Habitat for Fish or Wildlife-habitat degradation. The typical size range for this scenario is 5 to 50 acres. This scenario would be applied on any land use where wetland habitats are utilized by targeted species. This practice scenario is typically used to reduce soil erosion, reduce soil quality degradation, improve water quality and develop wildlife habitat as part of a habitat management system. This scenario is utilized to increase species diversity and richness. Monitoring of site by a biologist post installation will be required to determine management strategies for wetland dependant species. Establishment of vegetation will require methods including the use of seed-bearing topsoil, transplanted vegetation mats and plugs, and other appropriate methods used to cover and treat in patches, 10-25% of each wetland acre. Fertilization will NOT be required.
Before Practice Situation	A habitat assessment (using State Office approved habitat assessment method, protocol or tool) has indicated a lack of annual cover (non-persistent) or vegetation for wetland dependant wildlife. Resource concerns identified may include the current management system provides little to no wildlife habitat with habitat limiting factors such as quality, quantity and continuity of forage, cover, shelter and space being identified.
After Practice Situation	Planning unit is adequately addressed needed cover by adding macrotopography with annual and/or perennial vegetation. Mats and plugs will provide plants for cover and forage for target species. Forage may include the vegetation itself or promote an abundance of beneficial insects. This scenario does not apply to plantings for forage production or critical area plantings and vegetation established under this scenario will remain unharvested. Fetilization will NOT be required.
Scenario Feature Measure	Acres Managed and Monitored
Scenario Unit	Acre
Scenario Typical Size	10

Cost Summary:

Cost Category	Scenario Cost	Scenario Cost/Unit
Materials	$44.24	$4.42
Equipment/Installation	$714.20	$71.42
Labor	$729.92	$72.99
Mobilization	$341.30	$34.13
Acquisition of Technical Knowledge	$0.00	$0.00
Foregone Income	$0.00	$0.00
Total	$1,829.66	$182.97

Cost Details:

Cost Category	Component ID	Component Name	Component Description	Unit	Price ($/unit)	Quantity	Cost
Materials	967	Rangeland/grassland field monitoring kit	Miscellaneous tools needed to complete rangeland/grassland monitoring. Materials may include camera, clippers, plot frame, scale, tape measure, etc. Includes equipment costs only.	Each	$44.24	1	$44.24
Equipment/Installation	51	Earthfill, Dumped and Spread	Earthfill, dumped and spread without compaction effort, includes equipment and labor	Cubic yard	$3.00	200	$600.00
Equipment/Installation	965	All terrain vehicles, ATV	Includes equipment, power unit and labor costs.	Hour	$28.55	4	$114.20
Labor	235	Specialist Labor	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	$82.88	8	$663.04
Labor	231	General Labor	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	$16.72	4	$66.88
Mobilization	1137	Mobilization, very small equipment	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	$33.33	1	$33.33
Mobilization	1146	Mobilization, Specialist Labor	Mobilization of Specialist Labor. Includes Agronomists, Foresters, Biologists, etc.	Hour	$85.35	2	$170.70
Mobilization	1142	Mobilization, General labor	Mobilization of general labor: Ex. pipe layer, herder, concrete placement, materials spreader, flagger, etc.	Hour	$16.89	1	$16.89
Mobilization	1139	Mobilization, medium equipment	Equipment with 70-150 HP or typical weights between 14,000 and 30,000 pounds.	Each	$120.38	1	$120.38

Scenario Worksheet

Practice and Scenario Description:

Information Type	Data
Region	Northern Plains
State	South Dakota
Discipline Group	Wildlife Wetland
Practice Code/Name	644 - Wetland Wildlife Management
Scenario ID	2
Scenario Name	Wildlife Structures of Medium Intensity with Medium Complexity
Scenario Description	Water level manipulation will require the use of Water Control Structures (587) and hand labor implementation techniques on constructed wetlands. The setting is all landuses, but typically is on lands used for the production of crops and/or fish and wildlife where the slope gradient is less than two percent and soils that are not excessivly drained. The State-approved habitat evaluation or appraisal found that a limiting factor for wetland wildlife is the absence of sufficient cover and food in the area. The manipulation of existing cover will be accomplished thru managing water levels to provide a diverse vegetation mosiac with in and adjacent to the existing wetland addressing inadequate habitat for wetland wildlife. Stop log structure is installed under a separate conservation practice code (587) Structure for Water Control.
Before Practice Situation	The site lacks sufficient and diverse cover and food needed for optimal wetland wildlife habitat or target species. Typically the site has been previously manipulated and utilized for agricultural, livestock or forest production. With the loss of abundant and diverse cover and food throughout the site, both plant and animal species that are dependent on these elements are no longer present or are in decline within the planning unit.
After Practice Situation	Wetland water levels are managed to create optimal winter forage and cover for migrating wetland wildlife by drawing down water levels during the summer creating vegetative features essential for identified species. As a result of the installation, adequate habitat needs have been provided.
Scenario Feature Measure	Wetland Wildlife Food and Cover
Scenario Unit	Acres
Scenario Typical Size	5

Cost Summary:

Cost Category	Scenario Cost	Scenario Cost/Unit
Materials	$0.00	$0.00
Equipment/Installation	$57.10	$11.42
Labor	$133.10	$26.62
Mobilization	$83.02	$16.60
Acquisition of Technical Knowledge	$0.00	$0.00
Foregone Income	$0.00	$0.00
Total	$273.22	$54.64

Cost Details:

Cost Category	Component ID	Component Name	Component Description	Unit	Price ($/unit)	Quantity	Cost
Equipment/Installation	965	All terrain vehicles, ATV	Includes equipment, power unit and labor costs.	Hour	$28.55	2	$57.10
Labor	231	General Labor	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	$16.72	4	$66.88
Labor	234	Supervisor or Manager	Labor involving supervision or management activities. Includes crew supervisors, foremen and farm/ranch managers time required for adopting new technology, etc.	Hour	$33.11	2	$66.22
Mobilization	1137	Mobilization, very small equipment	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	$33.33	1	$33.33
Mobilization	1145	Mobilization, Supervisor or Manager	Mobilization of supervisors or management. Includes crew supervisors, foremen and farm/ranch managers, etc.	Hour	$32.80	1	$32.80
Mobilization	1142	Mobilization, General labor	Mobilization of general labor: Ex. pipe layer, herder, concrete placement, materials spreader, flagger, etc.	Hour	$16.89	1	$16.89

Scenario Worksheet

Practice and Scenario Description:

Information Type	Data
Region	Northern Plains
State	South Dakota
Discipline Group	Wildlife Wetland
Practice Code/Name	644 - Wetland Wildlife Management
Scenario ID	3
Scenario Name	Establish Annual Vegetation, Broadcast
Scenario Description	This scenario covers all wetland habitats not covered under 643, for the establishment of annual (non-persistent) vegetation on all land uses. This scenario is utilized when habitat assessment indicates Inadequate Habitat for Fish or Wildlife-habitat degradation. The typical size range for this scenario is 5 to 50 acres. This scenario would be applied on any land use where wetland habitats are utilized by targeted species. This practice scenario is typically used to reduce soil erosion, reduce soil quality degradation, improve water quality and develop wildlife habitat as part of a habitat management system. Often times this scenario is utilized to temporarily provide cover or forage while permanent vegetation is being established. Vegetation will be established utilizing conventional methods including disking, herbicide application and broadcast seeding. Monitoring of site will be required post installation to ensure habitat management is planned correctly.Fertilization will NOT be required.
Before Practice Situation	A habitat assessment (using State Office approved habitat assessment method, protocol or tool) has indicated a need to establish annual (non-persistent) vegetation to bring one or more habitat limiting factors of inadequate habitat for fish and wildlife, up to planning criteria. An evaluation of the site has indicated resource concerns are present, or may become present during the implementation of the habitat management system planned. Resource concerns identified may include soil erosion with visible rills present resultging in sediment moving offsite into surface water degrading water quality. Soil quality (soil organic matter) declines over time as a result of tillage practices, low residue, and long periods of bare soil. Air quality may be impacted during field operations by the creation of particulates. The current system provides little to no wildlife habitat with habitat limiting factors such as quality, quantity and continuity of forage, cover, shelter and space being identified.
After Practice Situation	Planning unit is adequatly covered with annual (non-persistent) vegetation. As a result of installation soil erosion, water/sediment runoff, and/or dust emissions have been eliminated. Plants sown provide cover and forage for target species. Forage may include the vegetation itself or promote an abundance of beneficial insects. This scenario does not apply to plantings for forage production or critical area plantings and vegetation established under this scenario will remain unharvested. Fetilization will NOT be required.
Scenario Feature Measure	Area planted
Scenario Unit	Acre
Scenario Typical Size	25

Cost Summary:

Cost Category	Scenario Cost	Scenario Cost/Unit
Materials	$1,657.74	$66.31
Equipment/Installation	$987.75	$39.51
Labor	$663.04	$26.52
Mobilization	$411.46	$16.46
Acquisition of Technical Knowledge	$0.00	$0.00
Foregone Income	$7,300.75	$292.03
Total	$11,020.74	$440.83

Cost Details:

Cost Category	Component ID	Component Name	Component Description	Unit	Price ($/unit)	Quantity	Cost
Materials	334	Herbicide, Glyphosate	A broad-spectrum, non-selective systemic herbicide. Product is typically used in these practices 340, 645, 314, 666, and 512. Refer to WIN-PST for product names and active ingredients. Materials only.	Acre	$11.04	25	$276.00
Materials	967	Rangeland/grassland field monitoring kit	Miscellaneous tools needed to complete rangeland/grassland monitoring. Materials may include camera, clippers, plot frame, scale, tape measure, etc. Includes equipment costs only.	Each	$44.24	1	$44.24
Materials	109	Ladino Clover (Trifolium repens)	Introduced Legumes and shipping.	Pound	$3.74	125	$467.50
Materials	200	Wheat, Winter (Triticum aestivum)	Small Grains, Cover Crops. Shipping not included.	Pound	$0.58	1500	$870.00
Equipment/Installation	946	Tillage, Primary	Includes heavy disking (offset) or chisel plow. Includes equipment, power unit and labor costs.	Acre	$14.93	25	$373.25
Equipment/Installation	948	Chemical, ground application	Chemical application performed by ground equipment. Includes equipment, power unit and labor costs.	Acre	$4.37	25	$109.25
Equipment/Installation	959	Seeding Operation, Broadcast, Ground	Broadcast seed via ground operation. May require post tillage operation to incorporate seed. Includes equipment, power unit and labor costs.	Acre	$20.21	25	$505.25
Labor	235	Specialist Labor	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	$82.88	8	$663.04
Mobilization	1146	Mobilization, Specialist Labor	Mobilization of Specialist Labor. Includes Agronomists, Foresters, Biologists, etc.	Hour	$85.35	2	$170.70
Mobilization	1139	Mobilization, medium equipment	Equipment with 70-150 HP or typical weights between 14,000 and 30,000 pounds.	Each	$120.38	2	$240.76
Foregone Income	1959	FI, Corn Dryland	Dryland Corn is Primary Crop	Acre	$292.03	25	$7,300.75

Scenario Worksheet

Practice and Scenario Description:

Information Type	Data
Region	Northern Plains
State	South Dakota
Discipline Group	Wildlife Wetland
Practice Code/Name	644 - Wetland Wildlife Management
Scenario ID	4
Scenario Name	Establish Annual Vegetation, Drill
Scenario Description	This scenario covers all wetland habitats not covered under 643, for the establishment of annual (non-persistent) vegetation on all land uses. This scenario is utilized when habitat assessment indicates Inadequate Habitat for Fish or Wildlife-habitat degradation. The typical size range for this scenario is 5 to 50 acres. This scenario would be applied on any land use where wetland habitats are utilized by targeted species. This practice scenario is typically used to reduce soil erosion, reduce soil quality degradation, improve water quality and develop wildlife habitat as part of a habitat management system. Often times this scenario is utilized to temporarily provide cover or forage while permanent vegetation is being established. Establishment of vegetation will require methods including light disking, herbicide applicaiton and use of seed drill for planting. Fertilization will NOT be required.
Before Practice Situation	A habitat assessment (using State Office approved habitat assessment method, protocol or tool) has indicated a need to establish annual (non-persistent) vegetation to bring one or more habitat limiting factors of inadequate habitat for fish and wildlife, up to planning criteria. An evaluation of the site has indicated resource concerns are present, or may become present during the implementation of the habitat management system planned. Resource concerns identified may include soil erosion with visible rills present resultging in sediment moving offsite into surface water degrading water quality. Soil quality (soil organic matter) declines over time as a result of tillage practices, low residue, and long periods of bare soil. Air quality may be impacted during field operations by the creation of particulates. The current system provides little to no wildlife habitat with habitat limiting factors such as quality, quantity and continuity of forage, cover, shelter and space being identified.
After Practice Situation	Planning unit is adequatly covered with annual (non-persistent) vegetation. As a result of installation soil erosion, water/sediment runoff, and/or dust emissions have been eliminated. Plants sown provide cover and forage for target species. Forage may include the vegetation itself or promote an abundance of beneficial insects. This scenario does not apply to plantings for forage production or critical area plantings and vegetation established under this scenario will remain unharvested. Fetilization will NOT be required.
Scenario Feature Measure	Area planted
Scenario Unit	Acre
Scenario Typical Size	25

Cost Summary:

Cost Category	Scenario Cost	Scenario Cost/Unit
Materials	$1,657.74	$66.31
Equipment/Installation	$468.00	$18.72
Labor	$282.36	$11.29
Mobilization	$240.76	$9.63
Acquisition of Technical Knowledge	$0.00	$0.00
Foregone Income	$7,300.75	$292.03
Total	$9,949.61	$397.98

Cost Details:

Cost Category	Component ID	Component Name	Component Description	Unit	Price ($/unit)	Quantity	Cost
Materials	334	Herbicide, Glyphosate	A broad-spectrum, non-selective systemic herbicide. Product is typically used in these practices 340, 645, 314, 666, and 512. Refer to WIN-PST for product names and active ingredients. Materials only.	Acre	$11.04	25	$276.00
Materials	967	Rangeland/grassland field monitoring kit	Miscellaneous tools needed to complete rangeland/grassland monitoring. Materials may include camera, clippers, plot frame, scale, tape measure, etc. Includes equipment costs only.	Each	$44.24	1	$44.24
Materials	109	Ladino Clover (Trifolium repens)	Introduced Legumes and shipping.	Pound	$3.74	125	$467.50
Materials	200	Wheat, Winter (Triticum aestivum)	Small Grains, Cover Crops. Shipping not included.	Pound	$0.58	1500	$870.00
Equipment/Installation	948	Chemical, ground application	Chemical application performed by ground equipment. Includes equipment, power unit and labor costs.	Acre	$4.37	25	$109.25
Equipment/Installation	960	Seeding Operation, No Till/Grass Drill	No Till drill or grass drill for seeding. Includes equipment, power unit and labor costs.	Acre	$14.35	25	$358.75
Labor	230	Skilled Labor	Labor requiring a high level skill set: Includes carpenters, welders, electricians, conservation professionals involved with data collection, monitoring, and or record keeping, etc.	Hour	$23.53	12	$282.36
Mobilization	1139	Mobilization, medium equipment	Equipment with 70-150 HP or typical weights between 14,000 and 30,000 pounds.	Each	$120.38	2	$240.76
Foregone Income	1959	FI, Corn Dryland	Dryland Corn is Primary Crop	Acre	$292.03	25	$7,300.75

Scenario Worksheet

Practice and Scenario Description:

Information Type	Data
Region	Northern Plains
State	South Dakota
Discipline Group	Wildlife Wetland
Practice Code/Name	645 - Upland Wildlife Habitat Management
Scenario ID	1
Scenario Name	Wildlife Structures, Ramp
Scenario Description	This scenario is for the installation of wildlife structures on all land uses where the targeted species has been identified as Rare and Declining. Structures are of low intensity and low complexity, when habitat assessment indicates Inadequate Habitat for Fish or Wildlife-habitat degradation. This scenario includes escape ramps. The typical size range for this scenario is 4 watering facilities retrofitted to include an escape ramp (2 ramps per tank.). This scenario would be applied on any land use where habitats are utilized by species indentified as rare & declining to reduce mortality by drowning in tanks.
Before Practice Situation	A habitat assessment (using State Office approved habitat assessment method, protocol or tool) has indicated a need for wildlife structures of low intensity with low complexity to bring one or more habitat limiting factors under Inadequate Habitat for Fish or Wildlife, up to planning criteria. Upland habitat limiting factors include quality, quantity and continuity of forage, cover, shelter, space and water avalability. Less than 0.5 structure per acre is needed to bring the deficient habitat limiting factor up to planning criteria. The structures can be installed within a quarter mile of a driveable road and terrain is gentle to moderate.
After Practice Situation	Installation of wildlife structures bring the identified deficient habitat limiting factors up to planning criteria. The practice is installed using general labor with minimal supervision or skilled labor without supervision with use of common hand tools and small equipment to reduce mortality by drowning in tanks
Scenario Feature Measure	8
Scenario Unit	Each
Scenario Typical Size	8

Cost Summary:

Cost Category	Scenario Cost	Scenario Cost/Unit
Materials	$293.92	$36.74
Equipment/Installation	$0.00	$0.00
Labor	$66.88	$8.36
Mobilization	$16.89	$2.11
Acquisition of Technical Knowledge	$0.00	$0.00
Foregone Income	$0.00	$0.00
Total	$377.69	$47.21

Cost Details:

Cost Category	Component ID	Component Name	Component Description	Unit	Price ($/unit)	Quantity	Cost
Materials	242	Wildlife Escape Ramp	Pool size 15' x 30', for small mammals less than one pound	Each	$36.74	8	$293.92
Labor	231	General Labor	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	$16.72	4	$66.88
Mobilization	1142	Mobilization, General labor	Mobilization of general labor: Ex. pipe layer, herder, concrete placement, materials spreader, flagger, etc.	Hour	$16.89	1	$16.89

Scenario Worksheet

Practice and Scenario Description:

Information Type	Data
Region	Northern Plains
State	South Dakota
Discipline Group	Wildlife Wetland
Practice Code/Name	645 - Upland Wildlife Habitat Management
Scenario ID	2
Scenario Name	Wildlife Structures, Fence
Scenario Description	This scenario is for the installation of wildlife structures on all land uses where the targeted species has been identified as Rare and Declining. Structures are of low intensity and low complexity, when habitat assessment indicates Inadequate Habitat for Fish or Wildlife-habitat degradation. This scenario include fence markers The typical size range for this scenario is 1 mile of fence. This scenario would be applied on any land use where habitats are utilized by species indentified as rare & declining to reduce mortality by fence collision.
Before Practice Situation	A habitat assessment (using State Office approved habitat assessment method, protocol or tool) has indicated a need for wildlife structures of low intensity with low complexity to bring one or more habitat limiting factors under Inadequate Habitat for Fish or Wildlife, up to planning criteria. Habitat limiting factors include quality, quantity and continuity of forage, cover, shelter, space and water availability. Less than 1 structure per acre is needed to bring the deficient habitat limiting factor up to planning criteria. The structures can be installed within a quarter mile of a drivable road and terrain is gentle to moderate. (consider all the fence markers as one structure)
After Practice Situation	Installation of wildlife structures bring the identified deficient habitat limiting factors up to planning criteria. The practice is installed using general labor with minimal supervision or skilled labor without supervision with use of common hand tools and small equipment to reduce mortality by fence collision.
Scenario Feature Measure	5280
Scenario Unit	Foot
Scenario Typical Size	5280

Cost Summary:

Cost Category	Scenario Cost	Scenario Cost/Unit
Materials	$528.00	$0.10
Equipment/Installation	$57.10	$0.01
Labor	$33.44	$0.01
Mobilization	$0.00	$0.00
Acquisition of Technical Knowledge	$0.00	$0.00
Foregone Income	$0.00	$0.00
Total	$618.54	$0.12

Cost Details:

Cost Category	Component ID	Component Name	Component Description	Unit	Price ($/unit)	Quantity	Cost
Materials	241	Vinyl Undersill Strips	Marking material using the "undersill" strips of vinyl siding made by Georgia Pacific. Priced per foot of fence per each wire. Materials only.	Foot	$0.05	10560	$528.00
Equipment/Installation	965	All terrain vehicles, ATV	Includes equipment, power unit and labor costs.	Hour	$28.55	2	$57.10
Labor	231	General Labor	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	$16.72	2	$33.44

Scenario Worksheet

Practice and Scenario Description:

Information Type	Data
Region	Northern Plains
State	South Dakota
Discipline Group	Wildlife Wetland
Practice Code/Name	645 - Upland Wildlife Habitat Management
Scenario ID	8
Scenario Name	Wildlife Habitat Enhancement
Scenario Description	Exclusion of livestock on 640 acres of rangeland for the enhancement of habitat for wildlife.
Before Practice Situation	Wildlife habitat is grazed during the primary nesting and development of wildlife species.
After Practice Situation	Livestock excluded for wildlife habitat enhancement for the desired wildlife species. Implementation includes exclusion of livestock to allow for adequate deferment for sufficient regrowth and developnet of the habitat.
Scenario Feature Measure	Acres Excluded
Scenario Unit	Acre
Scenario Typical Size	640

Cost Summary:

Cost Category	Scenario Cost	Scenario Cost/Unit
Materials	$0.00	$0.00
Equipment/Installation	$0.00	$0.00
Labor	$0.00	$0.00
Mobilization	$0.00	$0.00
Acquisition of Technical Knowledge	$0.00	$0.00
Foregone Income	$14,675.20	$22.93
Total	$14,675.20	$22.93

Cost Details:

Cost Category	Component ID	Component Name	Component Description	Unit	Price ($/unit)	Quantity	Cost
Foregone Income	2079	FI, Grazing AUMs	Grazing is the Primary Land Use	AUM	$22.93	640	$14,675.20

Scenario Worksheet

Practice and Scenario Description:

Information Type	Data
Region	Northern Plains
State	South Dakota
Discipline Group	Forestry
Practice Code/Name	650 - Windbreak/Shelterbelt Renovation
Scenario ID	1
Scenario Name	Sod Release
Scenario Description	Reduce competition from sod around trees/shrubs within a windbreak/shelterbelt. Apply appropriate herbicide to stress or kill competing sod vegetation between and/or within tree/shrub row. A herbicide application is completed to significantly reduce competition from sod (grass) in the windbreak.
Before Practice Situation	1000 feet of livestock shelterbelt, 4 row mix of deciduous and conifer trees/shrubs deteriorating due to being sod bound. Resouce concerns: Degrade plant condition-undesirable plant productivity and health; Livestock Production-Inadequate livestock shelter..
After Practice Situation	Integrity of windbreak restored. Domestic animal protection restored.
Scenario Feature Measure	Length of Renovation
Scenario Unit	Acre
Scenario Typical Size	1

Cost Summary:

Cost Category	Scenario Cost	Scenario Cost/Unit
Materials	$22.08	$22.08
Equipment/Installation	$39.12	$39.12
Labor	$16.72	$16.72
Mobilization	$33.78	$33.78
Acquisition of Technical Knowledge	$0.00	$0.00
Foregone Income	$0.00	$0.00
Total	$111.70	$111.70

Cost Details:

Cost Category	Component ID	Component Name	Component Description	Unit	Price ($/unit)	Quantity	Cost
Materials	334	Herbicide, Glyphosate	A broad-spectrum, non-selective systemic herbicide. Product is typically used in these practices 340, 645, 314, 666, and 512. Refer to WIN-PST for product names and active ingredients. Materials only.	Acre	$11.04	2	$22.08
Equipment/Installation	939	Truck, Pickup	Equipment and power unit costs. Labor not included.	Hour	$26.12	1	$26.12
Equipment/Installation	964	Chemical, spot treatment, single stem application	Ground applied chemical to individual plants or group of plants, e.g., backpack sprayer treatment. Equipment and labor cost included.	Hour	$55.87	0	$0.00
Equipment/Installation	948	Chemical, ground application	Chemical application performed by ground equipment. Includes equipment, power unit and labor costs.	Acre	$6.50	2	$13.00
Labor	231	General Labor	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	$16.72	1	$16.72
Mobilization	1142	Mobilization, General labor	Mobilization of general labor: Ex. pipe layer, herder, concrete placement, materials spreader, flagger, etc.	Hour	$16.89	2	$33.78

Scenario Worksheet

Practice and Scenario Description:

Information Type	Data
Region	Northern Plains
State	South Dakota
Discipline Group	Forestry
Practice Code/Name	650 - Windbreak/Shelterbelt Renovation
Scenario ID	2
Scenario Name	Thinning
Scenario Description	Thinning of selected trees and understory vegetation in a windbreak/shelterbelt is needed to ensure that species composition and stand structure continue to serve their intended purpose. Typical scenario is 1,000 feet. Resouce concern is Degraded plant condition- undesirable plant productivity and health.
Before Practice Situation	One thousand feet of windbreak/shelterbelt renovation carried out through manipulating species composition, stand structure, and stocking by the thinning of selected trees and understory vegetation so as to not interfere with the intended purpose. This manipulation does not include pruning.
After Practice Situation	The integrity and function of the windbreak is restored.
Scenario Feature Measure	Area of Renovation
Scenario Unit	Linear Foot
Scenario Typical Size	1000

Cost Summary:

Cost Category	Scenario Cost	Scenario Cost/Unit
Materials	$30.51	$0.03
Equipment/Installation	$165.74	$0.17
Labor	$167.20	$0.17
Mobilization	$0.00	$0.00
Acquisition of Technical Knowledge	$0.00	$0.00
Foregone Income	$0.00	$0.00
Total	$363.45	$0.36

Cost Details:

Cost Category	Component ID	Component Name	Component Description	Unit	Price ($/unit)	Quantity	Cost
Materials	338	Herbicide, Triclopyor	Triclopyr butoxyethyl ester (BEE) is a selective foliar and root absorbed, translocated herbicide used for control of woody and broadleaf plants. Product is typically used in these practices 595, 314, 645 and 666. Refer to WIN-PST for product names and active ingredients. Materials only.	Acre	$61.01	0.5	$30.51
Equipment/Installation	937	Chainsaw	Equipment and power unit costs. Labor not included.	Hour	$5.40	10	$54.00
Equipment/Installation	964	Chemical, spot treatment, single stem application	Ground applied chemical to individual plants or group of plants, e.g., backpack sprayer treatment. Equipment and labor cost included.	Hour	$55.87	2	$111.74
Labor	231	General Labor	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	$16.72	10	$167.20

Scenario Worksheet

Practice and Scenario Description:

Information Type	Data
Region	Northern Plains
State	South Dakota
Discipline Group	Forestry
Practice Code/Name	650 - Windbreak/Shelterbelt Renovation
Scenario ID	4
Scenario Name	Tree Removal
Scenario Description	Windbreak renovation requires the removal of degraded or inappropriate trees or shrubs within a windbreak. This may include removal of entire rows, including stumps or roots, or selected trees/shrubs in order to prepare for the necessary planting of a replacement row within the windbreak, improve the health of the remaining rows, and/or allow for supplemental planting to expand the windbreak. Resource concerns include Degraded plant condition- undesirable plant productivity and health; Livestock Production-Inadequate livestock shelter, Soil erosion-wind.
Before Practice Situation	Reduce wind impacts by renovating 1,000 foot windbreaks or shelterbelts using heavy equipment to remove selected trees with average DBH > 8 inches. Typically trees and shrubs are cleared by dozer (D-6 or equivalent) using a brush rake or blade. All slash material from cutting and pruning is either scattered and crushed, piled and crushed, chipped or removed from the treatment area.
After Practice Situation	Integrity and function of windbreak restored.
Scenario Feature Measure	Length of Renovation
Scenario Unit	Linear Foot
Scenario Typical Size	1000

Cost Summary:

Cost Category	Scenario Cost	Scenario Cost/Unit
Materials	$0.00	$0.00
Equipment/Installation	$1,538.30	$1.54
Labor	$247.90	$0.25
Mobilization	$237.44	$0.24
Acquisition of Technical Knowledge	$0.00	$0.00
Foregone Income	$0.00	$0.00
Total	$2,023.64	$2.02

Cost Details:

Cost Category	Component ID	Component Name	Component Description	Unit	Price ($/unit)	Quantity	Cost
Equipment/Installation	928	Dozer, 200 HP	Track mounted Dozer with horsepower range of 160 to 250. Equipment and power unit costs. Labor not included.	Hour	$153.83	10	$1,538.30
Labor	233	Equipment Operators, Heavy	Includes: Cranes, Hydraulic Excavators >=50 HP, Dozers, Paving Machines, Rock Trenchers, Trenchers >=12", Dump Trucks, Ag Equipment >=150 HP, Scrapers, Water Wagons.	Hour	$24.79	10	$247.90
Mobilization	1144	Mobilization, Heavy Equipment Operator	Mobilization of heavy equipment operators: Hydraulic Excavators >=50 HP, Dozers, Paving Machines, Rock Trenchers, Trenchers >=12", Dump Trucks, Ag Equipment >=150 HP, Scrapers, Water Wagons.	Hour	$24.56	0.5	$12.28
Mobilization	1140	Mobilization, large equipment	Equipment >150HP or typical weights greater than 30,000 pounds or loads requiring over width or over length permits.	Each	$225.16	1	$225.16

Scenario Worksheet

Practice and Scenario Description:

Information Type	Data
Region	Northern Plains
State	South Dakota
Discipline Group	Forestry
Practice Code/Name	650 - Windbreak/Shelterbelt Renovation
Scenario ID	7
Scenario Name	Supplemental Plantings, Bare Root
Scenario Description	Parts of the windbreak being renovated have died. Supplemental plantings of bare root trees/shrubs will improve the effectiveness and longevity of the windbreak. Trees and shrubs planted with a tree planting machine. Shrubs will be planted with a spacing of 4 to 6 feet and hardwoods/conifers 8 to 12 feet apart in the row with rows 16 feet apart. The scenario will include 1/3 shrubs, 1/3 hardwoods, and 1/3 conifers. Resource concerns include Soil erosion - Wind erosion, Degraded plant condition - Inadequate structure and composition, and Livestock production limitation - Inadequate livestock shelter.
Before Practice Situation	Dead trees/shrubs are inhibiting windbreak effectiveness. A one (1.0) acre windbreak/shelterbelt is expanded through the planting of bare root tree and shrub seedlings at a average spacing of 8' (shrubs 4'-6', deciduous/conifer trees 8'-12') within row and 15'-20' between rows. Planting is achieved through machine planting.
After Practice Situation	The integrity and function of the windbreak is restored.
Scenario Feature Measure	Area of Renovation
Scenario Unit	Foot
Scenario Typical Size	1000

Cost Summary:

Cost Category	Scenario Cost	Scenario Cost/Unit
Materials	$79.43	$0.08
Equipment/Installation	$49.78	$0.05
Labor	$87.49	$0.09
Mobilization	$25.34	$0.03
Acquisition of Technical Knowledge	$0.00	$0.00
Foregone Income	$0.00	$0.00
Total	$242.04	$0.24

Cost Details:

Cost Category	Component ID	Component Name	Component Description	Unit	Price ($/unit)	Quantity	Cost
Materials	1586	Wire flags	Small vinyl flags attached to wire stakes, typically, 36" in length, for marking tree rows	Each	$0.08	40	$3.20
Materials	1513	Tree, conifer, seedling, bare root, 1-1	Bare root conifer trees, 1-1 (2 years old). Materials only.	Each	$0.39	33	$12.87
Materials	1509	Tree, hardwood, seedling or transplant, bare root, 6-18"	Bare root hardwood trees 6-18" tall. Materials only.	Each	$0.52	33	$17.16
Materials	1506	Shrub, seedling or transplant, bare root, 6-18"	Bare root hardwood trees 6-18" tall. Materials only.	Each	$0.70	66	$46.20
Equipment/Installation	939	Truck, Pickup	Equipment and power unit costs. Labor not included.	Hour	$26.12	1	$26.12
Equipment/Installation	1600	Mechanical tree planter	Mechanical tree planter. Requires a pulling unit of either tractor or small dozer depending upon site conditions. Does not include labor.	Hour	$4.38	1	$4.38
Equipment/Installation	963	Tractor, agricultural, 60 HP	Agricultural tractor with horsepower range of 50 to 90. Equipment and power unit costs. Labor not included.	Hour	$19.28	1	$19.28
Labor	232	Equipment Operators, Light	Includes: Skid Steer Loaders, Hydraulic Excavators <50 HP, Trenchers <12", Ag Equipment <150 HP, Pickup Trucks, Forklifts, Mulchers	Hour	$20.61	1	$20.61
Labor	231	General Labor	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	$16.72	4	$66.88
Mobilization	1142	Mobilization, General labor	Mobilization of general labor: Ex. pipe layer, herder, concrete placement, materials spreader, flagger, etc.	Hour	$16.89	1.5	$25.34

Scenario Worksheet

Practice and Scenario Description:

Information Type	Data
Region	Northern Plains
State	South Dakota
Discipline Group	Environmental Engineering
Practice Code/Name	656 - Constructed Wetland
Scenario ID	1
Scenario Name	Small, <= 0.1 acre
Scenario Description	This practice scenario includes the basic earthwork and native and/or organic wetland vegetation needed to create a constructed wetland to treat contaminated agricultural runoff for a small site (i.e. <0.1 ac). All other components, such as water control structures, dikes or upstream sediment basins, must be paid for under facilitating practices. Soil, water and tissue sampling are required. The purpose of the practice is to address resource concerns related to water quality degradation due to excess nutrient and pathogens. Associated practices: Structure for Water Control (587); Sediment Basin (350); Dike (356); Pond Sealing or Lining, Compacted Clay Treatment (521D); Pond Sealing or Lining, Flexible Membrane (521A); Fence (382); Grade Stabilization Structure (410); Pumping Plant (533); Waste Transfer (634)
Before Practice Situation	Contaminated agricultural runoff causes excess ponding and/or water quality degradation.
After Practice Situation	A 2000 sq foot constructed wetland (i.e. 20' x 100') will be constructed with an average 18" depth. Only the earthwork and wetland vegetation are considered in this scenario. Any structures or sediment basins will be designed under a separate practice. The constructed wetland treats the effluent by reducing excess nutrients and adding oxygen through wetland plants and functions before the effluent is transported to a waste storage facility or discharged off site, if permitted by regulation.
Scenario Feature Measure	Area of Constructed Wetland
Scenario Unit	Square Foot
Scenario Typical Size	2000

Cost Summary:

Cost Category	Scenario Cost	Scenario Cost/Unit
Materials	$926.75	$0.46
Equipment/Installation	$210.35	$0.11
Labor	$0.00	$0.00
Mobilization	$154.16	$0.08
Acquisition of Technical Knowledge	$0.00	$0.00
Foregone Income	$0.00	$0.00
Total	$1,291.26	$0.65

Cost Details:

Cost Category	Component ID	Component Name	Component Description	Unit	Price ($/unit)	Quantity	Cost
Materials	1729	Common Cattail (Typha latifolia)	Wetland plants such as cat tails. Materials and shipping.	Each	$1.09	108	$117.72
Materials	1737	Native Aquatic Plants, emergent - Prairie Cordgrass	Prairie Cordgrass plugs. Initial vegetation for vertical cell constructed wetland. Materials and shipping.	Each	$2.02	108	$218.16
Materials	1843	Native Aquatic Plants, Emergent - Sedges (Carex spp.), Plug	Native aquatic sedge plugs. Plants are emergent. All required materials for establishing vegetation. Includes materials and shipping.	Each	$1.20	108	$129.60
Materials	301	Test, Plant Tissue Test	Tissue analysis for crops	Each	$24.61	1	$24.61
Materials	299	Test, Soil Test, Standard	Includes materials, labor, and equipment costs.	Each	$9.53	2	$19.06
Materials	309	Test, Standard Water Test, Well Water	Domestic Well Water Suitability	Each	$52.20	8	$417.60
Equipment/Installation	1220	Excavation, common earth, small equipment, 50 ft	Bulk excavation of common earth with dozer <100 HP with average push distance of 50 feet. Includes equipment and labor.	Cubic Yard	$2.27	74	$167.98
Equipment/Installation	1199	Stripping and stockpiling, topsoil	Stripping and stockpiling of topsoil adjacent to stripping area. Includes equipment and labor.	Cubic Yard	$0.79	37	$29.23
Equipment/Installation	40	Clearing and Grubbing	Clearing and Grubbing, includes materials, equipment and labor	Acre	$262.81	0.05	$13.14
Mobilization	1139	Mobilization, medium equipment	Equipment with 70-150 HP or typical weights between 14,000 and 30,000 pounds.	Each	$120.38	1	$120.38
Mobilization	1142	Mobilization, General labor	Mobilization of general labor: Ex. pipe layer, herder, concrete placement, materials spreader, flagger, etc.	Hour	$16.89	2	$33.78

Scenario Worksheet

Practice and Scenario Description:

Information Type	Data
Region	Northern Plains
State	South Dakota
Discipline Group	Environmental Engineering
Practice Code/Name	656 - Constructed Wetland
Scenario ID	2
Scenario Name	Medium, > 0.1 and <= 0.5 acre
Scenario Description	This practice scenario includes the basic earthwork and native and/or organic wetland vegetation needed to create a constructed wetland to treat contaminated agricultural runoff for a medium site (i.e. 0.1 - 0.5 ac). All other components, such as water control structures, dikes or upstream sediment basins, must be paid for under facilitating practices. Soil, water and tissue sampling are required. The purpose of the practice is to address resource concerns related to water quality degradation due to excess nutrient and pathogens. Associated practices: Structure for Water Control (587); Sediment Basin (350); Dike (356); Pond Sealing or Lining, Compacted Clay Treatment (521D); Pond Sealing or Lining, Flexible Membrane (521A); Fence (382); Grade Stabilization Structure (410); Pumping Plant (533); Waste Transfer (634)
Before Practice Situation	Contaminated agricultural runoff causes excess ponding and/or water quality degradation.
After Practice Situation	A 0.25 acre constructed wetland (i.e. 45' x 240') will be constructed with an average 18" depth. Only the earthwork and wetland vegetation are considered in this scenario. Any structures or sediment basins will be designed under a separate practice. The constructed wetland is sited near the property boundary, but still takes cropland out of production (1/2 wetland acreage). The constructed wetland treats the effluent by reducing excess nutrients and adding oxygen through wetland plants and functions before the effluent is transported to a waste storage facility or discharged off site, if permitted by regulation.
Scenario Feature Measure	Area of Constructed Wetland
Scenario Unit	Acre
Scenario Typical Size	0.25

Cost Summary:

Cost Category	Scenario Cost	Scenario Cost/Unit
Materials	$2,400.77	$9,603.08
Equipment/Installation	$1,140.09	$4,560.37
Labor	$0.00	$0.00
Mobilization	$154.16	$616.64
Acquisition of Technical Knowledge	$0.00	$0.00
Foregone Income	$0.00	$0.00
Total	$3,695.02	$14,780.09

Cost Details:

Cost Category	Component ID	Component Name	Component Description	Unit	Price ($/unit)	Quantity	Cost
Materials	1729	Common Cattail (Typha latifolia)	Wetland plants such as cat tails. Materials and shipping.	Each	$1.09	450	$490.50
Materials	1737	Native Aquatic Plants, emergent - Prairie Cordgrass	Prairie Cordgrass plugs. Initial vegetation for vertical cell constructed wetland. Materials and shipping.	Each	$2.02	450	$909.00
Materials	1843	Native Aquatic Plants, Emergent - Sedges (Carex spp.), Plug	Native aquatic sedge plugs. Plants are emergent. All required materials for establishing vegetation. Includes materials and shipping.	Each	$1.20	450	$540.00
Materials	301	Test, Plant Tissue Test	Tissue analysis for crops	Each	$24.61	1	$24.61
Materials	299	Test, Soil Test, Standard	Includes materials, labor, and equipment costs.	Each	$9.53	2	$19.06
Materials	309	Test, Standard Water Test, Well Water	Domestic Well Water Suitability	Each	$52.20	8	$417.60
Equipment/Installation	1220	Excavation, common earth, small equipment, 50 ft	Bulk excavation of common earth with dozer <100 HP with average push distance of 50 feet. Includes equipment and labor.	Cubic Yard	$2.27	403	$914.81
Equipment/Installation	1199	Stripping and stockpiling, topsoil	Stripping and stockpiling of topsoil adjacent to stripping area. Includes equipment and labor.	Cubic Yard	$0.79	202	$159.58
Equipment/Installation	40	Clearing and Grubbing	Clearing and Grubbing, includes materials, equipment and labor	Acre	$262.81	0.25	$65.70
Mobilization	1139	Mobilization, medium equipment	Equipment with 70-150 HP or typical weights between 14,000 and 30,000 pounds.	Each	$120.38	1	$120.38
Mobilization	1142	Mobilization, General labor	Mobilization of general labor: Ex. pipe layer, herder, concrete placement, materials spreader, flagger, etc.	Hour	$16.89	2	$33.78

Scenario Worksheet

Practice and Scenario Description:

Information Type	Data
Region	Northern Plains
State	South Dakota
Discipline Group	Environmental Engineering
Practice Code/Name	656 - Constructed Wetland
Scenario ID	3
Scenario Name	Large, > 0.5 and <= 1.0 acre
Scenario Description	This practice scenario includes the basic earthwork and native and/or organic wetland vegetation needed to create a constructed wetland to treat contaminated agricultural runoff for a large site (i.e. >0.5 ac). All other components, such as water control structures, dikes or upstream sediment basins, must be paid for under facilitating practices. Soil, water and tissue sampling are required. The purpose of the practice is to address resource concerns related to water quality degradation due to excess nutrient and pathogens. Associated practices: Structure for Water Control (587); Sediment Basin (350); Dike (356); Pond Sealing or Lining, Compacted Clay Treatment (521D); Pond Sealing or Lining, Flexible Membrane (521A); Fence (382); Grade Stabilization Structure (410); Pumping Plant (533); Waste Transfer (634)
Before Practice Situation	Contaminated agricultural runoff causes excess ponding and/or water quality degradation.
After Practice Situation	A 1 acre constructed wetland (i.e. 95' x 460') will be constructed with an average 18" depth. Only the earthwork and wetland vegetation are considered in this scenario. Any structures or sediment basins will be designed under a separate practice. The constructed wetland is sited near the property boundary, but still takes cropland out of production (1/2 wetland acreage). The constructed wetland treats the effluent by reducing excess nutrients and adding oxygen through wetland plants and functions before the effluent is transported to a waste storage facility or discharged off site, if permitted by regulation.
Scenario Feature Measure	Area of Constructed Wetland
Scenario Unit	Acre
Scenario Typical Size	1

Cost Summary:

Cost Category	Scenario Cost	Scenario Cost/Unit
Materials	$5,641.89	$5,641.89
Equipment/Installation	$4,561.85	$4,561.85
Labor	$0.00	$0.00
Mobilization	$154.16	$154.16
Acquisition of Technical Knowledge	$0.00	$0.00
Foregone Income	$0.00	$0.00
Total	$10,357.90	$10,357.90

Cost Details:

Cost Category	Component ID	Component Name	Component Description	Unit	Price ($/unit)	Quantity	Cost
Materials	1729	Common Cattail (Typha latifolia)	Wetland plants such as cat tails. Materials and shipping.	Each	$1.09	1202	$1,310.18
Materials	1737	Native Aquatic Plants, emergent - Prairie Cordgrass	Prairie Cordgrass plugs. Initial vegetation for vertical cell constructed wetland. Materials and shipping.	Each	$2.02	1202	$2,428.04
Materials	1843	Native Aquatic Plants, Emergent - Sedges (Carex spp.), Plug	Native aquatic sedge plugs. Plants are emergent. All required materials for establishing vegetation. Includes materials and shipping.	Each	$1.20	1202	$1,442.40
Materials	301	Test, Plant Tissue Test	Tissue analysis for crops	Each	$24.61	1	$24.61
Materials	299	Test, Soil Test, Standard	Includes materials, labor, and equipment costs.	Each	$9.53	2	$19.06
Materials	309	Test, Standard Water Test, Well Water	Domestic Well Water Suitability	Each	$52.20	8	$417.60
Equipment/Installation	1220	Excavation, common earth, small equipment, 50 ft	Bulk excavation of common earth with dozer <100 HP with average push distance of 50 feet. Includes equipment and labor.	Cubic Yard	$2.27	1613	$3,661.51
Equipment/Installation	1199	Stripping and stockpiling, topsoil	Stripping and stockpiling of topsoil adjacent to stripping area. Includes equipment and labor.	Cubic Yard	$0.79	807	$637.53
Equipment/Installation	40	Clearing and Grubbing	Clearing and Grubbing, includes materials, equipment and labor	Acre	$262.81	1	$262.81
Mobilization	1139	Mobilization, medium equipment	Equipment with 70-150 HP or typical weights between 14,000 and 30,000 pounds.	Each	$120.38	1	$120.38
Mobilization	1142	Mobilization, General labor	Mobilization of general labor: Ex. pipe layer, herder, concrete placement, materials spreader, flagger, etc.	Hour	$16.89	2	$33.78

Scenario Worksheet

Practice and Scenario Description:

Information Type	Data
Region	Northern Plains
State	South Dakota
Discipline Group	Environmental Engineering
Practice Code/Name	656 - Constructed Wetland
Scenario ID	4
Scenario Name	Xlarge, > 1.0 ac
Scenario Description	This practice scenario includes the basic earthwork needed to create a constructed wetland to improve water quality for a largesite (i.e. >1.0ac). All other components, such as water control structures, dikes or upstream sediment basins, must be paid for under facilitating practices. The purpose of the practice is to address resource concerns related to water quality degradation due to excess nutrient. Associated practices: Structure for Water Control (587); Sediment Basin (350); Dike (356); Pond Sealing or Lining, Compacted Clay Treatment (521D); Pond Sealing or Lining, Flexible Membrane (521A); Fence (382); Grade Stabilization Structure (410); Pumping Plant (533); Waste Transfer (634)
Before Practice Situation	Contaminated agricultural runoff causes excess ponding and/or water quality degradation.
After Practice Situation	A 1.25 acre constructed wetland (i.e. 110' x 500') will be constructed with an average 12" depth. Only the earthwork are considered in this scenario. Any structures or sediment basins will be designed under a separate practice. The constructed wetland is sited near the property boundary, but still takes cropland out of production (1/2 wetland acreage). The constructed wetland treats the effluent by reducing excess nutrients and adding oxygen through wetland plants and functions before the effluent is tdischarged off site.
Scenario Feature Measure	Area of Constructed Wetland
Scenario Unit	Acre
Scenario Typical Size	1.25

Cost Summary:

Cost Category	Scenario Cost	Scenario Cost/Unit
Materials	$6,572.75	$5,258.20
Equipment/Installation	$3,449.71	$2,759.77
Labor	$0.00	$0.00
Mobilization	$154.16	$123.33
Acquisition of Technical Knowledge	$0.00	$0.00
Foregone Income	$0.00	$0.00
Total	$10,176.62	$8,141.30

Cost Details:

Cost Category	Component ID	Component Name	Component Description	Unit	Price ($/unit)	Quantity	Cost
Materials	1729	Common Cattail (Typha latifolia)	Wetland plants such as cat tails. Materials and shipping.	Each	$1.09	1525	$1,662.25
Materials	1737	Native Aquatic Plants, emergent - Prairie Cordgrass	Prairie Cordgrass plugs. Initial vegetation for vertical cell constructed wetland. Materials and shipping.	Each	$2.02	1525	$3,080.50
Materials	1843	Native Aquatic Plants, Emergent - Sedges (Carex spp.), Plug	Native aquatic sedge plugs. Plants are emergent. All required materials for establishing vegetation. Includes materials and shipping.	Each	$1.20	1525	$1,830.00
Equipment/Installation	1220	Excavation, common earth, small equipment, 50 ft	Bulk excavation of common earth with dozer <100 HP with average push distance of 50 feet. Includes equipment and labor.	Cubic Yard	$2.27	1020	$2,315.40
Equipment/Installation	1199	Stripping and stockpiling, topsoil	Stripping and stockpiling of topsoil adjacent to stripping area. Includes equipment and labor.	Cubic Yard	$0.79	1020	$805.80
Equipment/Installation	40	Clearing and Grubbing	Clearing and Grubbing, includes materials, equipment and labor	Acre	$262.81	1.25	$328.51
Mobilization	1139	Mobilization, medium equipment	Equipment with 70-150 HP or typical weights between 14,000 and 30,000 pounds.	Each	$120.38	1	$120.38
Mobilization	1142	Mobilization, General labor	Mobilization of general labor: Ex. pipe layer, herder, concrete placement, materials spreader, flagger, etc.	Hour	$16.89	2	$33.78

Scenario Worksheet

Practice and Scenario Description:

Information Type	Data
Region	Northern Plains
State	South Dakota
Discipline Group	Wildlife Wetland
Practice Code/Name	657 - Wetland Restoration
Scenario ID	4
Scenario Name	Ditchplug, Lateral Restoration
Scenario Description	A Depressional HGM class wetland is to be restored by filling in the drainage ditch. The site is a recharge depression, fed only from surface runoff. Resource Concerns are: 4-SOIL QUALITY DEGRADATION - Organic matter depletion, 11- WATER QUALITY DEGRADATION - Excess nutrients in surface and ground waters, 12 - WATER QUALITY DEGRADATION - Pesticides transported to surface and ground waters, 16 - WATER QUALITY DEGRADATION - Excessive sediment in surface waters, 18 - DEGRADED PLANT CONDITION - Undesirable plant productivity and health, 19 - DEGRADED PLANT CONDITION, Inadequate strucuture and composition, 22- INADEQUATE HABITAT FOR FISH AND WILDLIFE - Habitat degradation.
Before Practice Situation	The wetland has been converted to agricultural production, and the tract has been drained with a surface ditch. The watershed has been converted from native to agricultural landuse.
After Practice Situation	The drain has been closed by lateral restoration. The ditch has been filled for a distance determined by the permeability of the soil. The earthfill is done with compactive effort. Facilitative practices include Conservation Cover. Restoration of hydrology and plant community functions will improve the WATER QUALITY and DEGRADED PLANT CONDITION concerns listed above. The hydrologic and vegetative practices will address the SOIL QUALITY DEGRADATION and INADEQUATE HABITAT FOR FISH AND WILDLIFE concerns. Associated practices in 342-Critical Area Planting, 550-Range Planting, 644-Wetland Wildlife Habitat Management, and 587-Structure for Water Control.
Scenario Feature Measure	Ditch Plugs
Scenario Unit	Each
Scenario Typical Size	1

Cost Summary:

Cost Category	Scenario Cost	Scenario Cost/Unit
Materials	$0.00	$0.00
Equipment/Installation	$407.37	$407.37
Labor	$0.00	$0.00
Mobilization	$225.16	$225.16
Acquisition of Technical Knowledge	$0.00	$0.00
Foregone Income	$0.00	$0.00
Total	$632.53	$632.53

Cost Details:

Cost Category	Component ID	Component Name	Component Description	Unit	Price ($/unit)	Quantity	Cost
Equipment/Installation	49	Earthfill, Roller Compacted	Earthfill, roller or machine compacted, includes equipment and labor	Cubic yard	$3.67	111	$407.37
Mobilization	1140	Mobilization, large equipment	Equipment >150HP or typical weights greater than 30,000 pounds or loads requiring over width or over length permits.	Each	$225.16	1	$225.16

Scenario Worksheet

Practice and Scenario Description:

Information Type	Data
Region	Northern Plains
State	South Dakota
Discipline Group	Wildlife Wetland
Practice Code/Name	657 - Wetland Restoration
Scenario ID	2
Scenario Name	Depression Sediment Removal
Scenario Description	A Depressional HGM class wetland is to be restored by removing sediment. The typical size of sediment removal is 1 acre. The site is a recharge depression, fed only from surface runoff. Resource Concerns are: 4-SOIL QUALITY DEGRADATION - Organic matter depletion, 11- WATER QUALITY DEGRADATION - Excess nutrients in surface and ground waters, 12 - WATER QUALITY DEGRADATION - Pesticides transported to surface and ground waters, 16 - WATER QUALITY DEGRADATION - Excessive sediment in surface waters, 18 - DEGRADED PLANT CONDITION - Undesirable plant productivity and health, 19 - DEGRADED PLANT CONDITION, Inadequate strucuture and composition, 22- INADEQUATE HABITAT FOR FISH AND WILDLIFE - Habitat degradation.
Before Practice Situation	The wetland has been converted to agricultural production, and the tract may or may not be drained with a surface ditch. The watershed has been converted from native to agricultural landuse, and the resultant soil erosion has deposited an average of 9 inches of sediment in the bottom of the depression.
After Practice Situation	The deposition has been removed down to the original topsoil layer. A herbaceous plant community has been seeded. Facilitative practices include Conservation Cover. Restoration of hydrology and plant community functions will improve the WATER QUALITY and DEGRADED PLANT CONDITION concerns listed above. The hydrologic and vegetative practices will address the SOIL QUALITY DEGRADATION and INADEQUATE HABITAT FOR FISH AND WILDLIFE concerns. Associated practices in 342-Critical Area Planting, 550-Range Planting, 644-Wetland Wildlife Habitat Management, and 587-Structure for Water Control.
Scenario Feature Measure	Acres of Excavation
Scenario Unit	Acre
Scenario Typical Size	1

Cost Summary:

Cost Category	Scenario Cost	Scenario Cost/Unit
Materials	$0.00	$0.00
Equipment/Installation	$5,256.24	$5,256.24
Labor	$0.00	$0.00
Mobilization	$225.16	$225.16
Acquisition of Technical Knowledge	$0.00	$0.00
Foregone Income	$0.00	$0.00
Total	$5,481.40	$5,481.40

Cost Details:

Cost Category	Component ID	Component Name	Component Description	Unit	Price ($/unit)	Quantity	Cost
Equipment/Installation	1221	Excavation, common earth, large equipment, 1500 ft	Bulk excavation of common earth including sand and gravel with scrapers with average haul distance of 1500 feet. Includes equipment and labor.	Cubic Yard	$3.62	1452	$5,256.24
Mobilization	1140	Mobilization, large equipment	Equipment >150HP or typical weights greater than 30,000 pounds or loads requiring over width or over length permits.	Each	$225.16	1	$225.16

Scenario Worksheet

Practice and Scenario Description:

Information Type	Data
Region	Northern Plains
State	South Dakota
Discipline Group	Wildlife Wetland
Practice Code/Name	658 - Wetland Creation
Scenario ID	1
Scenario Name	Wetland Creation, Excavation
Scenario Description	A wetland is created on a flat mineral upland at a location where surface runoff may be intercepted and ponded by excavation. The wetland is created by excavating a depression. Resource concerns are 22 - INDEQUATE HABITAT FOR FISH AND WILDLIFE - Habitat degradation.
Before Practice Situation	The site is in cropland on an upland, non floodplain site (interfluve).
After Practice Situation	An excavation with an average depth of 24" has created a shallow depression in a broad swale which intercepts surface runoff. The excavated material has been spread on adjacent areas. The INADEQUATE HABITAT FOR FISH AND WILDLIFE resource concern has been addressed with the provision of seasonal open water for terrestrial, aquatic, and waterfowl species. Associated practices in 342-Critical Area Planting, 550-Range Planting, 644-Wetland Wildlife Habitat Management, and 587-Structure for Water Control.
Scenario Feature Measure	Acres of Excavated Area
Scenario Unit	Acre
Scenario Typical Size	1

Cost Summary:

Cost Category	Scenario Cost	Scenario Cost/Unit
Materials	$0.00	$0.00
Equipment/Installation	$3,209.87	$3,209.87
Labor	$0.00	$0.00
Mobilization	$450.32	$450.32
Acquisition of Technical Knowledge	$0.00	$0.00
Foregone Income	$0.00	$0.00
Total	$3,660.19	$3,660.19

Cost Details:

Cost Category	Component ID	Component Name	Component Description	Unit	Price ($/unit)	Quantity	Cost
Equipment/Installation	48	Excavation, Common Earth, side cast, small equipment	Bulk excavation and side casting of common earth with hydraulic excavator with less than 1 CY capacity. Includes equipment and labor.	Cubic yard	$1.99	1613	$3,209.87
Mobilization	1140	Mobilization, large equipment	Equipment >150HP or typical weights greater than 30,000 pounds or loads requiring over width or over length permits.	Each	$225.16	2	$450.32

Scenario Worksheet

Practice and Scenario Description:

Information Type	Data
Region	Northern Plains
State	South Dakota
Discipline Group	Wildlife Wetland
Practice Code/Name	658 - Wetland Creation
Scenario ID	3
Scenario Name	Excavation and Embankment
Scenario Description	A wetland is created on a flat mineral upland at a location where surface runoff may be intercepted and ponded by excavation. The wetland is created by excavating a depression and building a dike to intercept runoff. Resource concerns are 22 - INDEQUATE HABITAT FOR FISH AND WILDLIFE - Habitat degradation.
Before Practice Situation	The site is in cropland on an upland, non floodplain site (interfluve).
After Practice Situation	An excavation with an average depth of 24" has created a shallow depression in a broad swale which intercepts surface runoff. The excavated material has been spread on adjacent areas. A dike is also constructed at the site with a 8' topwidth, 3:1 sideslopes, 2' fill height for 200 feet. The INADEQUATE HABITAT FOR FISH AND WILDLIFE resource concern has been addressed with the provision of seasonal open water for terrestrial, aquatic, and waterfowl species. Associated practices in 342-Critical Area Planting, 550-Range Planting, 644-Wetland Wildlife Habitat Management, and 587-Structure for Water Control.
Scenario Feature Measure	Acres of Excavated Area
Scenario Unit	Acre
Scenario Typical Size	1

Cost Summary:

Cost Category	Scenario Cost	Scenario Cost/Unit
Materials	$0.00	$0.00
Equipment/Installation	$5,145.11	$5,145.11
Labor	$0.00	$0.00
Mobilization	$450.32	$450.32
Acquisition of Technical Knowledge	$0.00	$0.00
Foregone Income	$0.00	$0.00
Total	$5,595.43	$5,595.43

Cost Details:

Cost Category	Component ID	Component Name	Component Description	Unit	Price ($/unit)	Quantity	Cost
Equipment/Installation	49	Earthfill, Roller Compacted	Earthfill, roller or machine compacted, includes equipment and labor	Cubic yard	$3.67	207	$759.69
Equipment/Installation	1223	Excavation, common earth, large equipment, 150 ft	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	$3.34	1313	$4,385.42
Mobilization	1140	Mobilization, large equipment	Equipment >150HP or typical weights greater than 30,000 pounds or loads requiring over width or over length permits.	Each	$225.16	2	$450.32

Scenario Worksheet

Practice and Scenario Description:

Information Type	Data
Region	Northern Plains
State	South Dakota
Discipline Group	Wildlife Wetland
Practice Code/Name	659 - Wetland Enhancement
Scenario ID	1
Scenario Name	Excavation
Scenario Description	A Depressional HGM class wetland is to be enhanced. The tract size is 15 acres, and the actual wetland size is 10 acres. The site is a recharge depression, fed only from surface runoff. Resource Concerns are: 4-SOIL QUALITY DEGRADATION - Organic matter depletion, 11- WATER QUALITY DEGRADATION - Excess nutrients in surface and ground waters, 12 - WATER QUALITY DEGRADATION - Pesticides transported to surface and ground waters, 16 - WATER QUALITY DEGRADATION - Excessive sediment in surface waters, 18 - DEGRADED PLANT CONDITION - Undesirable plant productivity and health, 19 - DEGRADED PLANT CONDITION, Inadequate strucuture and composition, 22- INADEQUATE HABITAT FOR FISH AND WILDLIFE - Habitat degradation.
Before Practice Situation	The wetland has been converted to agricultural production, and the wetland has lost size and storage volume from accumulated sediments. The wetland receives surface runoff from an adjacent upland watershed, and ponds water on a shallow perched layer. The watershed has been converted from native to agricultural landuse, and the resultant soil erosion has deposited 6" of sediment in the bottom of the depression.
After Practice Situation	Any deposited sediment has been exc avated and the depth of wetland has been increased to increase storage volume. A herbaceous plant community has been seeded. Facilitative practices include Conservation Cover. Restoration of hydrology and plant community functions will improve the WATER QUALITY and DEGRADED PLANT CONDITION concerns listed above. The hydrologic and vegetative practices will address the SOIL QUALITY DEGRADATION and INADEQUATE HABITAT FOR FISH AND WILDLIFE concerns. Associated practices in 342-Critical Area Planting, 550-Range Planting, 644-Wetland Wildlife Habitat Management, and 587-Structure for Water Control.
Scenario Feature Measure	Acres of Excavation
Scenario Unit	Acre
Scenario Typical Size	10

Cost Summary:

Cost Category	Scenario Cost	Scenario Cost/Unit
Materials	$0.00	$0.00
Equipment/Installation	$16,053.33	$1,605.33
Labor	$0.00	$0.00
Mobilization	$450.32	$45.03
Acquisition of Technical Knowledge	$0.00	$0.00
Foregone Income	$0.00	$0.00
Total	$16,503.65	$1,650.37

Cost Details:

Cost Category	Component ID	Component Name	Component Description	Unit	Price ($/unit)	Quantity	Cost
Equipment/Installation	48	Excavation, Common Earth, side cast, small equipment	Bulk excavation and side casting of common earth with hydraulic excavator with less than 1 CY capacity. Includes equipment and labor.	Cubic yard	$1.99	8067	$16,053.33
Mobilization	1140	Mobilization, large equipment	Equipment >150HP or typical weights greater than 30,000 pounds or loads requiring over width or over length permits.	Each	$225.16	2	$450.32

Scenario Worksheet

Practice and Scenario Description:

Information Type	Data
Region	Northern Plains
State	South Dakota
Discipline Group	Wildlife Wetland
Practice Code/Name	659 - Wetland Enhancement
Scenario ID	3
Scenario Name	Depression Sediment Removal and Ditch Plug
Scenario Description	A Depressional HGM class wetland is to be enhanced. The tract size is 15 acres, and the actual wetland size is 10 acres. The site is a recharge depression, fed only from surface runoff. Resource Concerns are: 4-SOIL QUALITY DEGRADATION - Organic matter depletion, 11- WATER QUALITY DEGRADATION - Excess nutrients in surface and ground waters, 12 - WATER QUALITY DEGRADATION - Pesticides transported to surface and ground waters, 16 - WATER QUALITY DEGRADATION - Excessive sediment in surface waters, 18 - DEGRADED PLANT CONDITION - Undesirable plant productivity and health, 19 - DEGRADED PLANT CONDITION, Inadequate strucuture and composition, 22- INADEQUATE HABITAT FOR FISH AND WILDLIFE - Habitat degradation.
Before Practice Situation	The wetland has been converted to agricultural production, and the tract drained with a surface ditch. The ditch is 4' average depth, and 12 feet average width. The wetland receives surface runoff from an adjacent upland watershed, and ponds water on a shallow perched layer. The watershed has been converted from native to agricultural landuse, and the resultant soil erosion has deposited 6" of sediment in the bottom of the depression.
After Practice Situation	The ditch has been plugged by the installation of a 50' long section of compacted clay fill, and the deposition has been removed down to the original topsoil layer. A herbaceous plant community has been seeded. Facilitative practices include Conservation Cover. Restoration of hydrology and plant community functions will improve the WATER QUALITY and DEGRADED PLANT CONDITION concerns listed above. The hydrologic and vegetative practices will address the SOIL QUALITY DEGRADATION and INADEQUATE HABITAT FOR FISH AND WILDLIFE concerns. Associated practices in 342-Critical Area Planting, 550-Range Planting, 644-Wetland Wildlife Habitat Management, and 587-Structure for Water Control.
Scenario Feature Measure	Acres of Excavation
Scenario Unit	Acre
Scenario Typical Size	10

Cost Summary:

Cost Category	Scenario Cost	Scenario Cost/Unit
Materials	$0.00	$0.00
Equipment/Installation	$16,970.83	$1,697.08
Labor	$0.00	$0.00
Mobilization	$450.32	$45.03
Acquisition of Technical Knowledge	$0.00	$0.00
Foregone Income	$0.00	$0.00
Total	$17,421.15	$1,742.12

Cost Details:

Cost Category	Component ID	Component Name	Component Description	Unit	Price ($/unit)	Quantity	Cost
Equipment/Installation	49	Earthfill, Roller Compacted	Earthfill, roller or machine compacted, includes equipment and labor	Cubic yard	$3.67	250	$917.50
Equipment/Installation	48	Excavation, Common Earth, side cast, small equipment	Bulk excavation and side casting of common earth with hydraulic excavator with less than 1 CY capacity. Includes equipment and labor.	Cubic yard	$1.99	8067	$16,053.33
Mobilization	1140	Mobilization, large equipment	Equipment >150HP or typical weights greater than 30,000 pounds or loads requiring over width or over length permits.	Each	$225.16	2	$450.32

Scenario Worksheet

Practice and Scenario Description:

Information Type	Data
Region	Northern Plains
State	South Dakota
Discipline Group	Forestry
Practice Code/Name	666 - Forest Stand Improvement
Scenario ID	8
Scenario Name	Thinning for Wildlife and Forest Health
Scenario Description	A combination of hand and chemical treatments used to open the canopy of a stand to improve the wildlife habitat and tree health. Resource concerns include: Inadequate structure and composition, Undesirable plant productivity and health, and Habitat degradation.
Before Practice Situation	The stand of mature trees is overstocked resulting in a closed canopy. This condition is causing a lack of structure, herbaceous layer, and diversity that is needed to meet the landowner's objectives for improved wildlife habitat and forest health. Under the supervision of a consultant forester, it will be marked for thinning and timber stand improvement applications that will include cutting with hand tools (chainsaws) and injection. Costs involved in any commercial harvesting including marking, access, and transportation are not included in this scenario. However the costs involved in marking trees to be treated or left and supervising the TSI work is included.
After Practice Situation	The stand is treated to favor diversity of important commercial and wildlife species. The canopy is opened to the extent necessary to promote herbaceous growth and the work is performed without excessive damage to the residual trees and site.
Scenario Feature Measure	Acres treated
Scenario Unit	Acre
Scenario Typical Size	10

Cost Summary:

Cost Category	Scenario Cost	Scenario Cost/Unit
Materials	$461.20	$46.12
Equipment/Installation	$3,015.60	$301.56
Labor	$3,489.60	$348.96
Mobilization	$1,635.84	$163.58
Acquisition of Technical Knowledge	$0.00	$0.00
Foregone Income	$0.00	$0.00
Total	$8,602.24	$860.22

Cost Details:

Cost Category	Component ID	Component Name	Component Description	Unit	Price ($/unit)	Quantity	Cost
Materials	313	Tree Marking Paint	Trees to be cut through tree marking are physically identified through the application of paint on the tree. Typically one quart of paint is used to mark one acre of trees.	Acre	$5.02	10	$50.20
Materials	1321	Herbicide, Triazine	Broad spectrum herbicide. Refer to WIN-PST for product names and active ingredients. Materials only.	Acre	$41.10	10	$411.00
Equipment/Installation	965	All terrain vehicles, ATV	Includes equipment, power unit and labor costs.	Hour	$28.55	16	$456.80
Equipment/Installation	964	Chemical, spot treatment, single stem application	Ground applied chemical to individual plants or group of plants, e.g., backpack sprayer treatment. Equipment and labor cost included.	Hour	$55.87	40	$2,234.80
Equipment/Installation	937	Chainsaw	Equipment and power unit costs. Labor not included.	Hour	$5.40	60	$324.00
Labor	231	General Labor	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	$16.72	60	$1,003.20
Labor	235	Specialist Labor	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	$82.88	30	$2,486.40
Mobilization	1146	Mobilization, Specialist Labor	Mobilization of Specialist Labor. Includes Agronomists, Foresters, Biologists, etc.	Hour	$85.35	16	$1,365.60
Mobilization	1142	Mobilization, General labor	Mobilization of general labor: Ex. pipe layer, herder, concrete placement, materials spreader, flagger, etc.	Hour	$16.89	16	$270.24

Scenario Worksheet

Practice and Scenario Description:

Information Type	Data
Region	Northern Plains
State	South Dakota
Discipline Group	Forestry
Practice Code/Name	666 - Forest Stand Improvement
Scenario ID	6
Scenario Name	Competition Control - Mechanical, Heavy Equipment
Scenario Description	Using equipment such as a masticator or mulcher to control vegetation that is competing with desirable trees and species or to reduce the stocking level of a stand of desirable trees. The trees to be retained will be marked by a consultant. Resource concerns include Undesirable plant productivity and health; Wildlife habitat degradation; Wildfire hazard; and Inadequate structure and composition.
Before Practice Situation	A stand of desirable trees is adversely affected by competition either from undesirable species, cull trees, or because the stand is overstocked. The vegetation to be controlled is too large to be mowed or shredded. Therefore other mechanical methods such as using masticators or mulchers is necessary.
After Practice Situation	The released stand of trees contains the composition and quality needed to meet the landowner's objectives and address the resource concerns.
Scenario Feature Measure	Area treated
Scenario Unit	Acre
Scenario Typical Size	10

Cost Summary:

Cost Category	Scenario Cost	Scenario Cost/Unit
Materials	$0.00	$0.00
Equipment/Installation	$3,533.40	$353.34
Labor	$1,861.50	$186.15
Mobilization	$291.08	$29.11
Acquisition of Technical Knowledge	$0.00	$0.00
Foregone Income	$0.00	$0.00
Total	$5,685.98	$568.60

Cost Details:

Cost Category	Component ID	Component Name	Component Description	Unit	Price ($/unit)	Quantity	Cost
Equipment/Installation	943	Mechanical cutter, chopper	Masticator, flail shredder, hydro axe, brush cutter, etc. Equipment and power unit costs. Labor not included.	Hour	$117.78	30	$3,533.40
Labor	232	Equipment Operators, Light	Includes: Skid Steer Loaders, Hydraulic Excavators <50 HP, Trenchers <12", Ag Equipment <150 HP, Pickup Trucks, Forklifts, Mulchers	Hour	$20.61	30	$618.30
Labor	235	Specialist Labor	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	$82.88	15	$1,243.20
Mobilization	1146	Mobilization, Specialist Labor	Mobilization of Specialist Labor. Includes Agronomists, Foresters, Biologists, etc.	Hour	$85.35	2	$170.70
Mobilization	1139	Mobilization, medium equipment	Equipment with 70-150 HP or typical weights between 14,000 and 30,000 pounds.	Each	$120.38	1	$120.38

Scenario Worksheet

Practice and Scenario Description:

Information Type	Data
Region	Northern Plains
State	South Dakota
Discipline Group	Water Management Engineering
Practice Code/Name	747 - Denitrifying Bioreactor
Scenario ID	1
Scenario Name	Bioreactor with Liner and Cover
Scenario Description	This bioreactor has geotextile fabric (or polyethylene - PE) between the wood chips and the surrounding soil plus the following components: woodchip filled pit, a soil cover, two water control structures (to allow management of the flow rate and and free water elevation within the bioreactor), and piping to convey water to and from the bioreactor. Woodchips serve as the carbon source necessary to the denitrification process. Associated practices: Subsurface Drain (606), Structure for Water Control (587), Drainage Water Management (554). Resource concern: Water Quality Degradation - Excess nutrients in surface and ground waters. Management and maintenance of the bioreactor (including chip replenishment), as well as monitoring and reporting to demonstrate the performance of the practice are not included in this scenario.
Before Practice Situation	Before the installation, the subsurface drainage system is contributing nitrates to a surface water source (ditch or stream), high nitrates are a resource concern to the receiving water, and it is feasible to install a bioreactor to reduce the nitrate load from drainage outflows.
After Practice Situation	All components of the bioreactor are installed and functional. Nitrates are removed from bioreactor outflow. The approximate bioreactor excavated pit volume is 280 cubic yards (e.g. 5 feet deep, 15 feet wide and 100 feet long). Woodchips occupy the lower ~3.5 feet of the pit (200 cu. yd.) and a soil blanket over the woodchips is mounded 1.0 ft. above the surrounding ground surface to shed water and account for settling. A geotextile fabric (or PE material) surrounds the chips to prevent migration of soil into the pit. Two inline water control structures are in place and connected to the two 6" diameter HDPE dual-wall manifold pipes by 10" diameter dual wall pipe.Flow rates are dependent upon the availability of drainage water from the 10" drainage mainline. The soil excavated from the pit is spoiled onto the nearby field.
Scenario Feature Measure	Volume of Carbon Source
Scenario Unit	Cubic Yard
Scenario Typical Size	200

Cost Summary:

Cost Category	Scenario Cost	Scenario Cost/Unit
Materials	$2,874.40	$14.37
Equipment/Installation	$6,675.50	$33.38
Labor	$524.94	$2.62
Mobilization	$586.30	$2.93
Acquisition of Technical Knowledge	$0.00	$0.00
Foregone Income	$0.00	$0.00
Total	$10,661.14	$53.31

Cost Details:

Cost Category	Component ID	Component Name	Component Description	Unit	Price ($/unit)	Quantity	Cost
Materials	1243	Pipe, HDPE, 10" CPT, Double Wall	Pipe, Corrugated HDPE Double Wall, 10" diameter with soil tight joints - AASHTO M252. Material cost only.	Foot	$6.62	40	$264.80
Materials	2022	Water Level Control Structure, Inline, 1 Baffle	Inline Outlet WCS 6' High x 10" Dia. connections, 1 baffle (2 compartments)	Each	$917.17	1	$917.17
Materials	1992	Pipe, HDPE, 6" CPT, Double Wall	Pipe, Corrugated HDPE Double Wall, 6" diameter with soil tight joints - AASHTO M252. Material cost only.	Foot	$2.98	30	$89.40
Materials	2021	Water Level Control Structure, Inline, 2 Baffle	Inline Inlet WCS 6' High x 10" Dia.connections , 2 baffle (3 compartments)	Each	$1,603.03	1	$1,603.03
Equipment/Installation	1460	Trenching, Earth, 24" x 60"	Trenching, earth, 24" wide x 60" depth, includes equipment and labor for trenching and backfilling.	Foot	$3.43	50	$171.50
Equipment/Installation	1098	Aggregate, Wood Chips	Includes materials, equipment and labor	Cubic yard	$18.28	200	$3,656.00
Equipment/Installation	933	Skidsteer, 80 HP	Skidsteer loader with horsepower range of 60 to 90. Equipment and power unit costs. Labor not included.	Hour	$34.80	4	$139.20
Equipment/Installation	48	Excavation, Common Earth, side cast, small equipment	Bulk excavation and side casting of common earth with hydraulic excavator with less than 1 CY capacity. Includes equipment and labor.	Cubic yard	$1.99	280	$557.20
Equipment/Installation	42	Geotextile, woven	Woven Geotextile Fabric. Includes materials, equipment and labor	Square Yard	$2.22	780	$1,731.60
Equipment/Installation	51	Earthfill, Dumped and Spread	Earthfill, dumped and spread without compaction effort, includes equipment and labor	Cubic yard	$3.00	140	$420.00
Labor	231	General Labor	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	$16.72	24	$401.28
Labor	232	Equipment Operators, Light	Includes: Skid Steer Loaders, Hydraulic Excavators <50 HP, Trenchers <12", Ag Equipment <150 HP, Pickup Trucks, Forklifts, Mulchers	Hour	$20.61	6	$123.66
Mobilization	1139	Mobilization, medium equipment	Equipment with 70-150 HP or typical weights between 14,000 and 30,000 pounds.	Each	$120.38	3	$361.14
Mobilization	1140	Mobilization, large equipment	Equipment >150HP or typical weights greater than 30,000 pounds or loads requiring over width or over length permits.	Each	$225.16	1	$225.16

Scenario Worksheet

Practice and Scenario Description:

Information Type	Data
Region	Northern Plains
State	South Dakota
Discipline Group	Agronomy
Practice Code/Name	798 - Seasonal High Tunnel for Crops
Scenario ID	2
Scenario Name	Contiguous US, Snow
Scenario Description	Used for contiguous US states in areas with high snowfall. A gothic-style (peaked) manufactured frame of tubular steel (30 x 72 ft.) covered with 4-year 6mil plastic. Costs are based on purchase of manufactured kit and landowner installing the structure. Structure must be installed to manufacturer's specifications.
Before Practice Situation	Cropland where extension of the growing season is needed. Additional resource concerns that may need to be addressed include; soil erosion, soil condition, water quality, water quantity, plant condition, and energy use.
After Practice Situation	A seasonal high tunnel has been installed and the growing season has been extended for 1-4 months on average. Plant health and vigor is improved and there is decreased energy use by producing food locally.
Scenario Feature Measure	Area of Tunnel Installed
Scenario Unit	Square Foot
Scenario Typical Size	2160

Cost Summary:

Cost Category	Scenario Cost	Scenario Cost/Unit
Materials	$6,501.60	$3.01
Equipment/Installation	$0.00	$0.00
Labor	$1,187.12	$0.55
Mobilization	$0.00	$0.00
Acquisition of Technical Knowledge	$0.00	$0.00
Foregone Income	$0.00	$0.00
Total	$7,688.72	$3.56

Cost Details:

Cost Category	Component ID	Component Name	Component Description	Unit	Price ($/unit)	Quantity	Cost
Materials	1278	Hoop House, gothic style, base package	Includes heavy-duty, gothic framework complete with all predrilled steel, hardware and instructions. Includes 6 mil 4-year polyethylene film to cover tunnel, roll-up sides, lumber, and polylock for sides and ends for a gothic style (peaked top) hoop house. Materials and shipping only, does not include labor.	Square Foot	$3.01	2160	$6,501.60
Labor	231	General Labor	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	$16.72	71	$1,187.12