

Practice: 329 - Residue and Tillage Management, No-Till

Scenario: #1 - 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 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 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

Total Scenario Cost: \$2,366.90

Scenario Cost/Unit: \$23.67

Cost Details

Component Name	Id	Description	Unit	Cost	Qty	Total
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Equipment Installation

Seeding Operation, No Till/Grass Drill	960	No Till drill or grass drill for seeding. Includes equipment, power unit and labor costs.	Acre	\$25.14	50	\$1,257.06
Seeding Operation, No Till/Strip Till Planter	1230	No Till/Strip Till row planters for seeding. Includes all costs for equipment, power unit, and labor.	Acre	\$22.20	50	\$1,109.84

Practice: 329 - Residue and Tillage Management, No-Till

Scenario: #3 - No Till Adaptive Management

Scenario Description: The practice scenario is for the implementation of no till in small replicated plots to allow the producer to learn how to manage no till on their operation. Scenario includes implementing replicated strip trials on a field plot to evaluate, identify and implement a particular no till management strategy (e.g., no till vs conventional till, drill vs planter, strip till vs no till, residue row cleaners, vs no row cleaners, etc.) This will be done following the interim guidance for no till adaptive management to be issued to all field offices for FY15.

Before 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). The producer is considering using no till technology, but is unsure how to manage on their operation or needs to improve the management of no till to be successful.

After Situation: Installation of this scenario will result in establishment of no till replicated plots to compare to different management strategies for no till and other residue management strategies following the guidance in the Agronomy Technical Note 11 - Adaptive Management and the Interim Guidance for No Till Adaptive Management to be issued to all field offices for FY15. Implementation involves establishing the replicated plots to evaluate one or more no till management strategies. The plot will consist of at least 4 replicated plots designed, laid out, managed and evaluated with the assistance of a consultant knowledgeable in no till management. Results are used to make no till management decisions to address erosion, soil health, and water quality issues. Yields will be measured and statistically summarized following the procedures in Agronomy Technical Note 11 - Adaptive Management. The yields for each plot will be adjusted to the appropriate moisture content. This would be repeated for 3 years.

Scenario Feature Measure: <Unknown>

Scenario Unit: Acre

Scenario Typical Size: 10

Total Scenario Cost: \$3,780.31

Scenario Cost/Unit: \$378.03

Cost Details

Component Name	Id	Description	Unit	Cost	Qty	Total
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Labor

General Labor	231	Labor performed using basic tools such as power tool, shovels, and other tools that do not require extensive training. Ex. pipe layer, herder, concrete placement, materials spreader, flagger, etc.	Hour	\$21.64	30	\$649.32
Specialist Labor	235	Labor requiring a specialized skill set: Includes Agronomists, Foresters, Biologists, etc. to provide additional technical information during the planning and implementation of the practice. Does not include NRCS or TSP services.	Hour	\$96.48	30	\$2,894.29

Equipment Installation

Seeding Operation, No Till/Grass Drill	960	No Till drill or grass drill for seeding. Includes equipment, power unit and labor costs.	Acre	\$25.14	5	\$125.71
Seeding Operation, No Till/Strip Till Planter	1230	No Till/Strip Till row planters for seeding. Includes all costs for equipment, power unit, and labor.	Acre	\$22.20	5	\$110.98

Practice: 345 - Residue and Tillage Management, Reduced Till

Scenario: #1 - 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 by the planter/drill or tillage tools 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 spread or managed over the 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 residue. The RUSLE2 or WEPS 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 Situation: Row crops such as corn, soybeans, or cotton 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 Situation: Mulch tillage applies to all cropland and other lands where crops are planed. 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 disturbs 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. 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

Total Scenario Cost: \$3,678.63

Scenario Cost/Unit: \$36.79

Cost Details

Component Name	Id	Description	Unit	Cost	Qty	Total
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Equipment Installation

Seeding Operation, No Till/Grass Drill	960	No Till drill or grass drill for seeding. Includes equipment, power unit and labor costs.	Acre	\$25.14	50	\$1,257.06
Seeding Operation, No Till/Strip Till Planter	1230	No Till/Strip Till row planters for seeding. Includes all costs for equipment, power unit, and labor.	Acre	\$22.20	50	\$1,109.84
Tillage, Light	945	Includes light disking (tandem) or field cultivator. Includes equipment, power unit and labor costs.	Acre	\$13.12	100	\$1,311.73

Practice: 345 - Residue and Tillage Management, Reduced Till

Scenario: #2 - Mulch till-Drill Only

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 by the planter/drill or tillage tools 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 spread or managed over the 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 residue. The RUSLE2 or WEPS 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 Situation: Row crops such as corn, soybeans, or cotton 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 Situation: Mulch tillage applies to all cropland and other lands where crops are planed. This scenario includes the use of a high disturbance drill, such as a hoe drill that disturbs a large percentage of soil surface using the planting operation. 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. Wind erosion is reduced by standing residues. Winter weeds or the cover crop is terminated with planting or 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

Total Scenario Cost: \$2,514.13

Scenario Cost/Unit: \$25.14

Cost Details

Component Name	Id	Description	Unit	Cost	Qty	Total
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Equipment Installation

Seeding Operation, No Till/Grass Drill	960	No Till drill or grass drill for seeding. Includes equipment, power unit and labor costs.	Acre	\$25.14	100	\$2,514.13
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Practice: 345 - Residue and Tillage Management, Reduced Till

Scenario: #3 - Mulch till-Adaptive Management

Scenario Description: The practice scenario is for the implementation of mulch till in small replicated plots to allow the producer to learn how to manage mulch till on their operation. Scenario includes implementing replicated strip trials on a field plot to evaluate, identify and implement a particular mulch till management strategy (e.g., mulch till vs conventional till, two different mulch till systems, etc.) This will be done following the interim guidance for mulch till adaptive management to be issued to all field offices for FY15.

Before Situation: Row crops such as corn, soybeans, or cotton 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. The producer is considering using mulch till technology, but is unsure how to manage on their operation or needs to improve the management of mulch till to be successful.

After Situation: Installation of this scenario will result in establishment of mulch till replicated plots to compare to different management strategies for mulch till and other residue management strategies following the guidance in the Agronomy Technical Note 11 - Adaptive Management and the Interim Guidance for Mulch Till Adaptive Management to be issued to all field offices for FY15. Implementation involves establishing the replicated plots to evaluate one or more no till management strategies. The plot will consist of at least 4 replicated plots designed, laid out, managed and evaluated with the assistance of a consultant knowledgeable in mulch till management. Results are used to make no till management decisions to address erosion, soil health, and water quality issues. Yields will be measured and statistically summarized following the procedures in Agronomy Technical Note 11 - Adaptive Management. The yields for each plot will be adjusted to the appropriate moisture content. This would be repeated for 3 years.

Scenario Feature Measure: Area planted

Scenario Unit: Acre

Scenario Typical Size: 100

Total Scenario Cost: \$9,176.94

Scenario Cost/Unit: \$91.77

Cost Details

Component Name	Id	Description	Unit	Cost	Qty	Total
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Labor

General Labor	231	Labor performed using basic tools such as power tool, shovels, and other tools that do not require extensive training. Ex. pipe layer, herder, concrete placement, materials spreader, flagger, etc.	Hour	\$21.64	30	\$649.32
Specialist Labor	235	Labor requiring a specialized skill set: Includes Agronomists, Foresters, Biologists, etc. to provide additional technical information during the planning and implementation of the practice. Does not include NRCS or TSP services.	Hour	\$96.48	30	\$2,894.29

Equipment Installation

Seeding Operation, No Till/Grass Drill	960	No Till drill or grass drill for seeding. Includes equipment, power unit and labor costs.	Acre	\$25.14	50	\$1,257.06
Seeding Operation, No Till/Strip Till Planter	1230	No Till/Strip Till row planters for seeding. Includes all costs for equipment, power unit, and labor.	Acre	\$22.20	50	\$1,109.84
Tillage, Light	945	Includes light disking (tandem) or field cultivator. Includes equipment, power unit and labor costs.	Acre	\$13.12	100	\$1,311.73
Tillage, Primary	946	Includes heavy disking (offset) or chisel plow. Includes equipment, power unit and labor costs.	Acre	\$19.55	100	\$1,954.69

Practice: 643 - Restoration and Management of Rare and Declining Habitats

Scenario: #1 - Habitat Monitoring and Management, Very-Low Intensity and Complexity

Scenario Description: This scenario is applied to all landuse types where the native plant condition (i.e. T&E plant species) or wildlife habitat is the resource concern, and where very-low intensity and complexity of monitoring or management will treat the identified resource concern. Only 1-2 monitoring efforts are needed and each requiring less than 2 people and 4 hours per effort. The adaptive management actions such as cutting of limbs that are impeding access of birds into nest boxes, replacing damaged fence markers, cleaning of nest structures and debris around other structures requires only hand labor and less than 16 hours of labor per year.

Before Situation: Rare or declining habitat is deficient and annual monitoring and adaptive management actions of very-low intensity and complexity will improved conditions.

After Situation: Rare and declining habitat is improved by implementation of annual adaptive management actions of very- low intensity and complexity.

Scenario Feature Measure: Monitoring efforts and adaptive management actions

Scenario Unit: Acre

Scenario Typical Size: 640

Total Scenario Cost: \$641.19

Scenario Cost/Unit: \$1.00

Cost Details

Component Name	Id	Description	Unit	Cost	Qty	Total
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Labor

General Labor	231	Labor performed using basic tools such as power tool, shovels, and other tools that do not require extensive training. Ex. pipe layer, herder, concrete placement, materials spreader, flagger, etc.	Hour	\$21.64	10	\$216.44
Specialist Labor	235	Labor requiring a specialized skill set: Includes Agronomists, Foresters, Biologists, etc. to provide additional technical information during the planning and implementation of the practice. Does not include NRCS or TSP services.	Hour	\$96.48	3	\$289.43

Equipment Installation

Chainsaw	937	Equipment and power unit costs. Labor not included.	Hour	\$5.14	2	\$10.28
Rangeland/grassland field monitoring kit	967	Miscellaneous tools needed to complete rangeland/grassland monitoring. Materials may include camera, clippers, plot frame, scale, tape measure, etc. Includes materials and shipping only.	Each	\$48.10	1	\$48.10
Truck, Pickup	939	Equipment and power unit costs. Labor not included.	Hour	\$25.65	3	\$76.94

Practice: 643 - Restoration and Management of Rare and Declining Habitats

Scenario: #2 - Habitat Monitoring and Management, Low Intensity and Complexity

Scenario Description: This scenario is applied to all landuse types including those with wildlife as a modifier, where native plant conditions (T&Eplants) or wildlife have been identified as the resource concern, and where low intensity and complexity of monitoring or management will treat the identified resource concern. Only 1-2 monitoring efforts are needed and each requiring less than 2 people and 4 hours per effort. The adaptive management actions such as cutting of limbs that are impeding access of birds into nest boxes, replacing damaged fence markers, cleaning of nest structures and debris around other structures requires only hand labor and less than 8 hours labor per year.

Before Situation: Rare or declining habitat is deficient due to the absence of annual monitoring and adaptive management actions of low intensity and complexity.

After Situation: Rare and declining habitat is improved by implementation of annual adaptive management actions of low intensity and complexity.

Scenario Feature Measure: Monitoring efforts and adaptive management actions

Scenario Unit: Acre

Scenario Typical Size: 160

Total Scenario Cost: \$532.65

Scenario Cost/Unit: \$3.33

Cost Details

Component Name	Id	Description	Unit	Cost	Qty	Total
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Labor

General Labor	231	Labor performed using basic tools such as power tool, shovels, and other tools that do not require extensive training. Ex. pipe layer, herder, concrete placement, materials spreader, flagger, etc.	Hour	\$21.64	7	\$151.51
Specialist Labor	235	Labor requiring a specialized skill set: Includes Agronomists, Foresters, Biologists, etc. to provide additional technical information during the planning and implementation of the practice. Does not include NRCS or TSP services.	Hour	\$96.48	3	\$289.43

Equipment Installation

Chainsaw	937	Equipment and power unit costs. Labor not included.	Hour	\$5.14	1	\$5.14
Rangeland/grassland field monitoring kit	967	Miscellaneous tools needed to complete rangeland/grassland monitoring. Materials may include camera, clippers, plot frame, scale, tape measure, etc. Includes materials and shipping only.	Each	\$48.10	1	\$48.10
Truck, Pickup	939	Equipment and power unit costs. Labor not included.	Hour	\$25.65	1.5	\$38.47

Practice: 643 - Restoration and Management of Rare and Declining Habitats

Scenario: #3 - Rare or Declining Habitat Monitoring and Management, Medium Intensity and Complexity

Scenario Description: This scenario is applied to all landuse types including those with wildlife as a modifier, where any resource concern is identified related to rare or declining habitats, and where medium intensity and complexity of monitoring or management will treat the identified resource concern. Two or three monitoring efforts are needed and each requiring less than 2 people and less than 8 hours per effort. Two or three adaptive management efforts are required (such as cutting of limbs that impede monitoring efforts, replacing damaged fence markers, or other minor adaptive management activities). The adaptive mgmt requires hand labor and the occasional use of light equipment. A crew of 2 is needed for the hand labor efforts and the crew will require less than 16 total hours of labor per mgmt effort. Mowing of roads and trail is required to provide access for monitoring and management.

Before Situation: Rare or declining habitat is deficient due to the absence of annual monitoring and adaptive management actions of medium intensity and complexity.

After Situation: Rare or declining habitat is improved by implementation of annual adaptive management actions of medium intensity and complexity.

Scenario Feature Measure: Monitoring efforts and adaptive management actions

Scenario Unit: Acre

Scenario Typical Size: 160

Total Scenario Cost: \$2,042.20

Scenario Cost/Unit: \$12.76

Cost Details

Component Name	Id	Description	Unit	Cost	Qty	Total
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Labor

Equipment Operators, Light	232	Includes: Skid Steer Loaders, Hydraulic Excavators <50 HP, Trenchers <12", Ag Equipment <150 HP, Pickup Trucks, Forklifts, Mulchers	Hour	\$23.29	5	\$116.47
General Labor	231	Labor performed using basic tools such as power tool, shovels, and other tools that do not require extensive training. Ex. pipe layer, herder, concrete placement, materials spreader, flagger, etc.	Hour	\$21.64	20	\$432.88
Specialist Labor	235	Labor requiring a specialized skill set: Includes Agronomists, Foresters, Biologists, etc. to provide additional technical information during the planning and implementation of the practice. Does not include NRCS or TSP services.	Hour	\$96.48	10	\$964.76

Equipment Installation

Chainsaw	937	Equipment and power unit costs. Labor not included.	Hour	\$5.14	4	\$20.56
Mower, Bush Hog	940	Equipment and power unit costs. Labor not included.	Hour	\$61.11	5	\$305.54
Rangeland/grassland field monitoring kit	967	Miscellaneous tools needed to complete rangeland/grassland monitoring. Materials may include camera, clippers, plot frame, scale, tape measure, etc. Includes materials and shipping only.	Each	\$48.10	1	\$48.10
Truck, Pickup	939	Equipment and power unit costs. Labor not included.	Hour	\$25.65	6	\$153.88

Practice: 643 - Restoration and Management of Rare and Declining Habitats

Scenario: #4 - Habitat Monitoring and Management, High Intensity and Complexity

Scenario Description: This scenario is applied to all landuse types including those with wildlife as a modifier, where any resource concern is identified for wildlife, and where high intensity and complexity of monitoring or management will treat the identified resource concern. Two - four monitoring efforts are needed and each requiring less than 2 people and less than 8 hours per effort. The adaptive management actions (2 - 5 efforts) such as cutting of limbs that are impeding access of birds into nest boxes, replacing damaged fence markers, cleaning of nest structures and debris around other structures requires hand labor and light equipment, requiring a 2-person crew less than 1 day per effort.

Before Situation: Wildlife habitat is deficient due to the absence of annual monitoring and adaptive management actions of high intensity and complexity.

After Situation: Wildlife habitat is improved by implementation of annual adaptive management actions of high intensity and complexity.

Scenario Feature Measure: Monitoring efforts and adaptive management actions

Scenario Unit: Acre

Scenario Typical Size: 80

Total Scenario Cost: \$1,893.96

Scenario Cost/Unit: \$23.67

Cost Details

Component Name	Id	Description	Unit	Cost	Qty	Total
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Labor

Equipment Operators, Light	232	Includes: Skid Steer Loaders, Hydraulic Excavators <50 HP, Trenchers <12", Ag Equipment <150 HP, Pickup Trucks, Forklifts, Mulchers	Hour	\$23.29	3	\$69.88
General Labor	231	Labor performed using basic tools such as power tool, shovels, and other tools that do not require extensive training. Ex. pipe layer, herder, concrete placement, materials spreader, flagger, etc.	Hour	\$21.64	20	\$432.88
Specialist Labor	235	Labor requiring a specialized skill set: Includes Agronomists, Foresters, Biologists, etc. to provide additional technical information during the planning and implementation of the practice. Does not include NRCS or TSP services.	Hour	\$96.48	10	\$964.76

Equipment Installation

Chainsaw	937	Equipment and power unit costs. Labor not included.	Hour	\$5.14	8	\$41.13
Mower, Bush Hog	940	Equipment and power unit costs. Labor not included.	Hour	\$61.11	3	\$183.32
Rangeland/grassland field monitoring kit	967	Miscellaneous tools needed to complete rangeland/grassland monitoring. Materials may include camera, clippers, plot frame, scale, tape measure, etc. Includes materials and shipping only.	Each	\$48.10	1	\$48.10
Truck, Pickup	939	Equipment and power unit costs. Labor not included.	Hour	\$25.65	6	\$153.88

Practice: 643 - Restoration and Management of Rare and Declining Habitats

Scenario: #5 - Development of Shallow Micro-Topographic Features with Normal Farming Equipment.

Scenario Description: This typical scenario is installed on open non-wetlands. The purpose is to increase plant species richness and diversity, create micro-habitats for invertebrates, increase water infiltration and reduce run-off. The area is plowed to loosen the soil. Then the soil is excavated with normal farming equipment (e.g. tractor and box-blade) to a depth of 2-6 inches and immediately deposited. This lowering and raising of a box-blade restores the original micro-topographic features (6' X 6' depressions and mounds) common to most landscapes and landforms prior to clearing, tilling, and annual mowing. Restoration of shallow but frequent micro-topographic features has been lost by the smoothing action of tillage, mowing and the original land-clearing. This scenario is typically implemented for ecosystem restoration projects such as prairie restoration and range-land restoration, and particularly on moderately well-drained soils.

Before Situation: Micro-topographic features have been eliminated by past conversion to agriculture and/or past cultural practices. This has resulted in the lack of micro-soil moisture gradients within the field. The opportunity for plant species richness and diversity is minimal. Water storage potential is absent. Water rapidly runs off the field after rains and snow melt, carrying nutrients, solids and surface organic materials. No micro-ponding sites are available for invertebrate use.

After Situation: Shallow micro-depressions and mounds are numerous. This varied micro-topographic features provided varied moisture gradients required for high plant species richness and diversity. Wildlife habitat is improved. Water conservation is increased, increasing vegetative production. Water quality is improved as the micro-depressions capture sediments, nutrients and manure. Over time, the micro-depressions become more nutrient rich than the micro-highs, further increasing plant species richness.

Scenario Feature Measure: hours of tractor use

Scenario Unit: Acre

Scenario Typical Size: 20

Total Scenario Cost: \$938.26

Scenario Cost/Unit: \$46.91

Cost Details

Component Name	Id	Description	Unit	Cost	Qty	Total
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Labor

Equipment Operators, Light	232	Includes: Skid Steer Loaders, Hydraulic Excavators <50 HP, Trenchers <12", Ag Equipment <150 HP, Pickup Trucks, Forklifts, Mulchers	Hour	\$23.29	6	\$139.76
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Equipment Installation

Tillage, Primary	946	Includes heavy disking (offset) or chisel plow. Includes equipment, power unit and labor costs.	Acre	\$19.55	20	\$390.94
Tractor, agricultural, 120 HP	962	Agricultural tractor with horsepower range of 90 to 140. Equipment and power unit costs. Labor not included.	Hour	\$67.93	6	\$407.56

Practice: 643 - Restoration and Management of Rare and Declining Habitats

Scenario: #6 - Development of Deep Micro-Topographic Features with Heavy Equipment.

Scenario Description: This typical scenario is installed on open non-wetlands, where micro-topographic features have been removed by past farming and/or ranching cultural practices. The purpose is to increase plant species richness and diversity, create micro-habitats for invertebrates, increase water infiltration and reduce run-off. The area is plowed 2 weeks prior to excavation to kill existing vegetation and allow for proper dirt work. Then the soil is excavated with track equipment (dozer) to a depth of 6-12 inches and immediately deposited. This lowering and raising of a dozer -blade restores the original deep micro-topographic features (10' X10' depressions and mounds) common to many landscapes and landforms prior to the lands conversion to agricultural lands. This scenario it typically implemented for ecosystem restoration projects such as wetland restoration (herbaceous or prior to planting of woody species), prairie restoration and range-land restoration. It is most commonly applied to well-drained soils as the purpose is for the micro-depression to pond water for short duration (less than 7 days).

Before Situation: Micro-topographic features have been eliminated by past conversion to agriculture and/or past cultural practices. This has resulted in the lack of micro-soil moisture gradients within the field. The opportunity for plant species richness and diversity is minimal. Water storage potential is absent. Water rapidly runs off the field after rains and snow melt, carrying nutrients, solids and surface organic materials. No micro-ponding sites are available aquatic dependent invertebrates. Vertebrate wildlife habitat is lacking diversity.

After Situation: Deep (6" - 12" depth) micro-depressions and mounds are numerous. These varied micro-topographic features provide varied moisture gradients required for development of high plant species richness and diversity. Wildlife habitat is improved. Water conservation is increased, increasing vegetative production. Water quality is improved as the deep micro-depressions capture sediments, nutrients and manure. Over time, the micro-depressions become more nutrient rich than the micro-highs, further increasing plant species richness.

Scenario Feature Measure: Hours

Scenario Unit: Acre

Scenario Typical Size: 20

Total Scenario Cost: \$2,595.97

Scenario Cost/Unit: \$129.80

Cost Details

Component Name	Id	Description	Unit	Cost	Qty	Total
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Labor

Equipment Operators, Heavy	233	Includes: Cranes, Hydraulic Excavators >=50 HP, Dozers, Paving Machines, Rock Trenchers, Trenchers >=12", Dump Trucks, Ag Equipment >=150 HP, Scrapers, Water Wagons.	Hour	\$32.34	8	\$258.74
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Equipment Installation

Dozer, 200 HP	928	Track mounted Dozer with horsepower range of 160 to 250. Equipment and power unit costs. Labor not included.	Hour	\$228.55	6	\$1,371.31
Tillage, Primary	946	Includes heavy disking (offset) or chisel plow. Includes equipment, power unit and labor costs.	Acre	\$19.55	20	\$390.94

Mobilization

Mobilization, large equipment	1140	Equipment >150HP or typical weights greater than 30,000 pounds or loads requiring over width or over length permits.	Each	\$574.99	1	\$574.99
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Practice: 643 - Restoration and Management of Rare and Declining Habitats

Scenario: #7 - Oyster Bar Purchase and place 2"

Scenario Description: Restore oyster bar by placing shell on the bottom to create a 2-inch thick shell base. Oyster bar seeded with at least 1M spat on cultch.

Before Situation: Bay or tidal river bottom where conditions are appropriate for oyster growth and survival, but lacking shell and oyster production. The resource concern is lack of habitat associated with oyster bars and oyster reproduction. The lack of living oyster bars negatively effects water quality because oysters can remove significant quantities of nutrients and suspended sediments.

After Situation: One acre of oyster bar is restored. The bar consist of 2 acre-inches of shell bed. The restored oyster bar supports oyster growth and reproduction, and provides habitat for many other aquatic species. The living oysters will remove significant quantities of nutrients and suspended sediments, thereby enhancing water quality. These bars are maintained by oyster farmers to ensure survival of the bar.

Scenario Feature Measure: Area of restored habitat

Scenario Unit: Acre

Scenario Typical Size: 1

Total Scenario Cost: \$13,373.75

Scenario Cost/Unit: \$13,373.75

Cost Details

Component Name	Id	Description	Unit	Cost	Qty	Total
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Labor

Equipment Operators, Heavy	233	Includes: Cranes, Hydraulic Excavators >=50 HP, Dozers, Paving Machines, Rock Trenchers, Trenchers >=12", Dump Trucks, Ag Equipment >=150 HP, Scrapers, Water Wagons.	Hour	\$32.34	4	\$129.37
General Labor	231	Labor performed using basic tools such as power tool, shovels, and other tools that do not require extensive training. Ex. pipe layer, herder, concrete placement, materials spreader, flagger, etc.	Hour	\$21.64	16	\$346.31
Supervisor or Manager	234	Labor involving supervision or management activities. Includes crew supervisors, foremen and farm/ranch managers time required for adopting new technology, etc.	Hour	\$43.40	12	\$520.75

Equipment Installation

Barge with crane and operator	2408	Barge to transport and place 1 ton bags of cultch to form oyster reef habitat.	Hour	\$460.31	8	\$3,682.49
Track Loader, 95HP	935	Equipment and power unit costs. Labor not included.	Hour	\$103.78	4	\$415.13

Materials

Cultch	2409	Cultch material (used and/or slightly crushed, cleaned, medium to large sized shells). Includes materials only.	Ton	\$64.95	110	\$7,144.51
Spat on Shell	2578	Aged bagged shells with spat for Oyster Reef Restoration. Includes materials and shipping from hatchery to dockside.	Bushel	\$3.78	300	\$1,135.18

Practice: 643 - Restoration and Management of Rare and Declining Habitats

Scenario: #8 - Oyster Bar Purchase and place 4"

Scenario Description: Restore oyster bar by placing shell on the bottom to create a 4-inch thick shell base. Oyster bar seeded with at least 1M spat on cultch.

Before Situation: Bay or tidal river bottom where conditions are appropriate for oyster growth and survival, but lacking shell and oyster production. The resource concern is lack of habitat associated with oyster bars and oyster reproduction. The lack of living oyster bars negatively effects water quality because oysters can remove significant quantities of nutrients and suspended sediments.

After Situation: One acre of oyster bar is restored. The bar consist of 4 acre-inches of shell bed. The restored oyster bar supports oyster growth and reproduction, and provides habitat for many other aquatic species. The living oysters will remove significant quantities of nutrients and suspended sediments, thereby enhancing water quality. These bars are maintained by oyster farmers to ensure survival of the bar.

Scenario Feature Measure: Area of restored habitat

Scenario Unit: Acre

Scenario Typical Size: 1

Total Scenario Cost: \$25,352.15

Scenario Cost/Unit: \$25,352.15

Cost Details

Component Name	Id	Description	Unit	Cost	Qty	Total
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Labor

Equipment Operators, Heavy	233	Includes: Cranes, Hydraulic Excavators >=50 HP, Dozers, Paving Machines, Rock Trenchers, Trenchers >=12", Dump Trucks, Ag Equipment >=150 HP, Scrapers, Water Wagons.	Hour	\$32.34	8	\$258.74
General Labor	231	Labor performed using basic tools such as power tool, shovels, and other tools that do not require extensive training. Ex. pipe layer, herder, concrete placement, materials spreader, flagger, etc.	Hour	\$21.64	28	\$606.04
Supervisor or Manager	234	Labor involving supervision or management activities. Includes crew supervisors, foremen and farm/ranch managers time required for adopting new technology, etc.	Hour	\$43.40	20	\$867.92

Equipment Installation

Barge with crane and operator	2408	Barge to transport and place 1 ton bags of cultch to form oyster reef habitat.	Hour	\$460.31	16	\$7,364.98
Track Loader, 95HP	935	Equipment and power unit costs. Labor not included.	Hour	\$103.78	8	\$830.27

Materials

Cultch	2409	Cultch material (used and/or slightly crushed, cleaned, medium to large sized shells). Includes materials only.	Ton	\$64.95	220	\$14,289.03
Spat on Shell	2578	Aged bagged shells with spat for Oyster Reef Restoration. Includes materials and shipping from hatchery to dockside.	Bushel	\$3.78	300	\$1,135.18

Practice: 643 - Restoration and Management of Rare and Declining Habitats

Scenario: #15 - Oyster Bar - Bagged Dredging

Scenario Description: Restore oyster bar by bag-dredging and placing shell on bottom to create a minimum 2-inch thick shell base and then seed the shell base with oyster spat set on cultch (large pieces of shell). Bed will be seeded with at least 1 million spat on cultch. The restored oyster bar will provide habitat for fish and other aquatic organisms.

Before Situation: Bay or tidal river bottom where conditions are appropriate for oyster growth and survival, but with insufficient shell on bottom and oyster production. The site has a significant source of buried shell that can be dredged to provide all of the shell needed for the base. The resource concern is lack of habitat associated with oyster bars and oyster reproduction.

After Situation: One acre of oyster bar will be restored. The bar will consist of a minimum 2-inch thick shell bed and at least 1 million oyster spat on cultch. The restored oyster bar will support oyster growth and reproduction, and provide habitat for many other aquatic species. The living oysters will remove significant quantities of nutrients and sediments, thereby enhancing water quality. These bars will be maintained by oyster farmers to ensure survival of the bar, and will be harvested and replenished to maintain healthy functioning.

Scenario Feature Measure: Acres created/restored

Scenario Unit: Acre

Scenario Typical Size: 1

Total Scenario Cost: \$6,366.92

Scenario Cost/Unit: \$6,366.92

Cost Details

Component Name	Id	Description	Unit	Cost	Qty	Total
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Equipment Installation

Boat, 150 HP	2407	22 foot boat with 150hp motor used to place cultch to create reef habitat.	Hour	\$172.77	22	\$3,800.86
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Labor

General Labor	231	Labor performed using basic tools such as power tool, shovels, and other tools that do not require extensive training. Ex. pipe layer, herder, concrete placement, materials spreader, flagger, etc.	Hour	\$21.64	22	\$476.17
Supervisor or Manager	234	Labor involving supervision or management activities. Includes crew supervisors, foremen and farm/ranch managers time required for adopting new technology, etc.	Hour	\$43.40	22	\$954.71

Materials

Spat on Shell	2578	Aged bagged shells with spat for Oyster Reef Restoration. Includes materials and shipping from hatchery to dockside.	Bushel	\$3.78	300	\$1,135.18
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Practice: 643 - Restoration and Management of Rare and Declining Habitats

Scenario: #17 - Oyster Rack Spacing for Wildlife Movement

Scenario Description: Rebar, mounted in place oyster racks are built and installed to the appropriate height and spacing to allow for wildlife (i.e. Horseshoe crabs) movement underneath and around the racks. Rack height is at least 12 inches. Rack length is 120 inches by 30 inch width. Typical installation is 50 racks.

Before Situation: Wildlife movement is inhibited by the oyster production racks. Wildlife may be trapped beneath the racks in the tide and unable to reach nesting habitat on shore.

After Situation: Oyster racks are disposed and new racks built at the appropriate height to facilitate wildlife movement around and underneath racks.

Scenario Feature Measure: Oyster Rack

Scenario Unit: Each

Scenario Typical Size: 50

Total Scenario Cost: \$2,831.49

Scenario Cost/Unit: \$56.63

Cost Details

Component Name	Id	Description	Unit	Cost	Qty	Total
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Mobilization

Mobilization, very small equipment	1137	Equipment that is small enough to be transported by a pick-up truck with typical weights less than 3,500 pounds. Can be multiple pieces of equipment if all hauled simultaneously.	Each	\$83.16	2	\$166.32
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Labor

General Labor	231	Labor performed using basic tools such as power tool, shovels, and other tools that do not require extensive training. Ex. pipe layer, herder, concrete placement, materials spreader, flagger, etc.	Hour	\$21.64	50	\$1,082.21
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Materials

Steel, rebar	1832	Steel rebar, grade 60. Materials only.	Pound	\$0.55	2881	\$1,582.97
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Practice: 391 - Riparian Forest Buffer

Scenario: #1 - Bareroot, hand planted with tube

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. Trees and shrubs to be planted on 10' x 10' spacing and protected from deer browse with 5' tall shelters. 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. Associated Practices: Access Control (472), Fence (382), Filter Strip (3932), Herbaceous Weed Control (315), Mulching (484), Livestock Pipeline (516), Pond (378), Spring Development (574), Streambank Protection (580), Stream Crossing (578), Tree & Shrub Establishment (612), Tree & Shrub Site Preparation (490), Watering Facility (614), Water Well (642)

Before 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 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

Total Scenario Cost: \$11,223.65

Scenario Cost/Unit: \$3,741.22

Cost Details

Component Name	Id	Description	Unit	Cost	Qty	Total
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Labor

General Labor	231	Labor performed using basic tools such as power tool, shovels, and other tools that do not require extensive training. Ex. pipe layer, herder, concrete placement, materials spreader, flagger, etc.	Hour	\$21.64	27	\$584.39
Supervisor or Manager	234	Labor involving supervision or management activities. Includes crew supervisors, foremen and farm/ranch managers time required for adopting new technology, etc.	Hour	\$43.40	8	\$347.17

Equipment Installation

Hand tools, tree planting	1590	Various hand tools for digging holes and planting trees such as augers, dibble bars, planting shovel, hoe-dad. Equipment only. Labor not included.	Hour	\$12.04	8	\$96.34
Trailer, enclosed, small	1503	Small enclosed trailer (typically less than 30' in length) pulled by a pickup to transport materials and equipment. Truck not included.	Hour	\$7.12	8	\$56.92
Truck, Pickup	939	Equipment and power unit costs. Labor not included.	Hour	\$25.65	8	\$205.17

Foregone Income

FI, Corn Dryland	1959	Dryland Corn is Primary Crop	Acre	\$271.88	1.5	\$407.83
FI, Soybeans Dryland	1961	Dryland Soybeans is Primary Crop	Acre	\$270.29	0.75	\$202.71
FI, Wheat Dryland	1963	Dryland Wheat is Primary Crop	Acre	\$163.26	0.75	\$122.44

Materials

Stakes, wood, 3/4" x 3/4" x 60"	1583	3/4" x 3/4" x 60" wood stakes to fasten items in place. Includes materials only.	Each	\$1.57	1305	\$2,053.70
Tree shelter, solid tube type, 4" x 60"	1567	4" x 60" tree tube for protection from animal damage. Materials only.	Each	\$5.12	1305	\$6,684.58
Tree, hardwood, seedling or transplant, bare root, 16-36"	1510	Bare root hardwood trees 18-36" tall. Includes materials and shipping only.	Each	\$0.35	1305	\$462.39

Practice: 391 - Riparian Forest Buffer

Scenario: #2 - Bareroot, machine planted, with tree tubes

Scenario Description: Establish a buffer of hardwood trees 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. Trees seedlings will be planted on 10' x 10' spacing and protected from deer browse with 5' tall shelters. 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. Associated Practices: Access Control (472), Fence (382), Filter Strip (3932), Herbaceous Weed Control (315), Mulching (484), Livestock Pipeline (516), Pond (378), Spring Development (574), Streambank Protection (580), Stream Crossing (578), Tree & Shrub Establishment (612), Tree & Shrub Site Preparation (490), Watering Facility (614), Water Well (642)

Before 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 Situation: A buffer of hardwood trees 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

Total Scenario Cost: \$11,542.18

Scenario Cost/Unit: \$3,847.39

Cost Details

Component Name	Id	Description	Unit	Cost	Qty	Total
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Labor

Equipment Operators, Light	232	Includes: Skid Steer Loaders, Hydraulic Excavators <50 HP, Trenchers <12", Ag Equipment <150 HP, Pickup Trucks, Forklifts, Mulchers	Hour	\$23.29	5.6	\$130.45
General Labor	231	Labor performed using basic tools such as power tool, shovels, and other tools that do not require extensive training. Ex. pipe layer, herder, concrete placement, materials spreader, flagger, etc.	Hour	\$21.64	16	\$346.31
Supervisor or Manager	234	Labor involving supervision or management activities. Includes crew supervisors, foremen and farm/ranch managers time required for adopting new technology, etc.	Hour	\$43.40	7	\$303.77

Equipment Installation

Mechanical tree planter	1600	Mechanical tree planter. Requires a pulling unit of either tractor or small dozer depending upon site conditions. Does not include labor.	Hour	\$6.84	5.6	\$38.28
Tractor, agricultural, 60 HP	963	Agricultural tractor with horsepower range of 50 to 90. Equipment and power unit costs. Labor not included.	Hour	\$29.16	8.8	\$256.65
Trailer, flatbed, small	1505	Small flatbed trailer (typically less than 30' in length) pulled by a pickup to transport materials and equipment. Truck not included.	Hour	\$18.72	5.6	\$104.83
Truck, Pickup	939	Equipment and power unit costs. Labor not included.	Hour	\$25.65	8.8	\$225.69

Mobilization

Mobilization, small equipment	1138	Equipment <70 HP but can't be transported by a pick-up truck or with typical weights between 3,500 to 14,000 pounds.	Each	\$202.55	1	\$202.55
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Foregone Income

FI, Corn Dryland	1959	Dryland Corn is Primary Crop	Acre	\$271.88	1.5	\$407.83
FI, Soybeans Dryland	1961	Dryland Soybeans is Primary Crop	Acre	\$270.29	0.75	\$202.71
FI, Wheat Dryland	1963	Dryland Wheat is Primary Crop	Acre	\$163.26	0.75	\$122.44

Materials

Stakes, wood, 3/4" x 3/4" x 60"	1583	3/4" x 3/4" x 60" wood stakes to fasten items in place. Includes materials only.	Each	\$1.57	1305	\$2,053.70
Tree shelter, solid tube type, 4" x 60"	1567	4" x 60" tree tube for protection from animal damage. Materials only.	Each	\$5.12	1305	\$6,684.58
Tree, hardwood, seedling or transplant, bare root, 16-36"	1510	Bare root hardwood trees 18-36" tall. Includes materials and shipping only.	Each	\$0.35	1305	\$462.39

Practice: 391 - Riparian Forest Buffer

Scenario: #3 - Small container, hand 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 hand planted small containerized (1 quart) shrubs and/or deciduous trees. Planting for shrubs will be done at 6' x 6' spacing, and deciduous tree spacing at 15 x 15'. Tree shelters will be placed on the hardwoods. 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. Associated Practices: Access Control (472), Fence (382), Filter Strip (3932), Herbaceous Weed Control (315), Mulching (484), Livestock Pipeline (516), Pond (378), Spring Development (574), Streambank Protection (580), Stream Crossing (578), Tree & Shrub Establishment (612), Tree & Shrub Site Preparation (490), Watering Facility (614), Water Well (642)

Before 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 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

Total Scenario Cost: \$10,693.63

Scenario Cost/Unit: \$3,564.54

Cost Details

Component Name	Id	Description	Unit	Cost	Qty	Total
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Labor

General Labor	231	Labor performed using basic tools such as power tool, shovels, and other tools that do not require extensive training. Ex. pipe layer, herder, concrete placement, materials spreader, flagger, etc.	Hour	\$21.64	74	\$1,601.66
Supervisor or Manager	234	Labor involving supervision or management activities. Includes crew supervisors, foremen and farm/ranch managers time required for adopting new technology, etc.	Hour	\$43.40	12	\$520.75

Equipment Installation

Hand tools, tree planting	1590	Various hand tools for digging holes and planting trees such as augers, dibble bars, planting shovel, hoe-dad. Equipment only. Labor not included.	Hour	\$12.04	12	\$144.52
Trailer, enclosed, small	1503	Small enclosed trailer (typically less than 30' in length) pulled by a pickup to transport materials and equipment. Truck not included.	Hour	\$7.12	12	\$85.38
Truck, Pickup	939	Equipment and power unit costs. Labor not included.	Hour	\$25.65	12	\$307.75

Materials

Shrub, seedling or transplant, potted, 1 qt.	1524	Potted shrub, 1 quart. Includes materials and shipping only.	Each	\$3.24	909	\$2,944.14
Stakes, wood, 3/4" x 3/4" x 60"	1583	3/4" x 3/4" x 60" wood stakes to fasten items in place. Includes materials only.	Each	\$1.57	435	\$684.57
Tree shelter, solid tube type, 4" x 60"	1567	4" x 60" tree tube for protection from animal damage. Materials only.	Each	\$5.12	435	\$2,228.19
Tree, hardwood, seedling or transplant, potted, 1 qt.	1529	Potted hardwood tree, 1 quart. Includes materials and shipping only.	Each	\$3.32	435	\$1,443.67

Foregone Income

FI, Corn Dryland	1959	Dryland Corn is Primary Crop	Acre	\$271.88	1.5	\$407.83
FI, Soybeans Dryland	1961	Dryland Soybeans is Primary Crop	Acre	\$270.29	0.75	\$202.71

FI, Wheat Dryland	1963	Dryland Wheat is Primary Crop	Acre	\$163.26	0.75	\$122.44
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Practice: 391 - Riparian Forest Buffer

Scenario: #4 - Large container, hand planted

Scenario Description: A buffer of trees and shrubs is established into a suitable 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 hand planting containerized stock of 1 gallon shrubs and 3 gallon trees. One zone is 15' wide comprised of randomly planted trees spaced approximately 10' to 15' on center and zone 2, 40' wide is comprised of a mixture of trees and shrubs planted at a 5'-7' spacing. Used in limited situations where survivability is an issue. The area is planted with a minimum density of 200 plants per acre. In mature riparian forests, canopy tree stem density is roughly 150 stems per acre of trees and shrubs. A 75% survivability rate is assumed. Larger container stock is necessary due to high deer pressure (browse and rub), competition, and other environmental factors requiring a quick establishment time to ensure survivability to reach desired canopy at maturity. Due to the expense, this option is only appropriate in select situations when needed for rapid establishment and critical pressure. 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. Associated Practices: Access Control (472), Fence (382), Filter Strip (3932), Herbaceous Weed Control (315), Mulching (484), Livestock Pipeline (516), Pond (378), Spring Development (574), Streambank Protection (580), Stream Crossing (578), Tree & Shrub Establishment (612), Tree & Shrub Site Preparation (490), Watering Facility (614), Water Well (642)

Before 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 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: 1

Total Scenario Cost: \$6,232.79

Scenario Cost/Unit: \$6,232.79

Cost Details

Component Name	Id	Description	Unit	Cost	Qty	Total
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Labor

Equipment Operators, Light	232	Includes: Skid Steer Loaders, Hydraulic Excavators <50 HP, Trenchers <12", Ag Equipment <150 HP, Pickup Trucks, Forklifts, Mulchers	Hour	\$23.29	16	\$372.71
General Labor	231	Labor performed using basic tools such as power tool, shovels, and other tools that do not require extensive training. Ex. pipe layer, herder, concrete placement, materials spreader, flagger, etc.	Hour	\$21.64	64	\$1,385.22
Supervisor or Manager	234	Labor involving supervision or management activities. Includes crew supervisors, foremen and farm/ranch managers time required for adopting new technology, etc.	Hour	\$43.40	8	\$347.17

Equipment Installation

All terrain vehicles, ATV	965	Includes equipment, power unit and labor costs.	Hour	\$38.47	12	\$461.65
Hand tools, tree planting	1590	Various hand tools for digging holes and planting trees such as augers, dibble bars, planting shovel, hoe-dad. Equipment only. Labor not included.	Hour	\$12.04	65	\$782.80
Trailer, enclosed, small	1503	Small enclosed trailer (typically less than 30' in length) pulled by a pickup to transport materials and equipment. Truck not included.	Hour	\$7.12	12	\$85.38
Trailer, flatbed, small	1505	Small flatbed trailer (typically less than 30' in length) pulled by a pickup to transport materials and equipment. Truck not included.	Hour	\$18.72	12	\$224.63
Truck, Pickup	939	Equipment and power unit costs. Labor not included.	Hour	\$25.65	16	\$410.34
Water tank, portable	1602	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	\$2.85	4	\$11.41

Mobilization

Mobilization, small equipment	1138	Equipment <70 HP but can't be transported by a pick-up truck or	Each	\$202.55	1	\$202.55
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		with typical weights between 3,500 to 14,000 pounds.				
Mobilization, very small equipment	1137	Equipment that is small enough to be transported by a pick-up truck with typical weights less than 3,500 pounds. Can be multiple pieces of equipment if all hauled simultaneously.	Each	\$83.16	1	\$83.16

Materials

Shrub, seedling or transplant, potted, 1/2 to 1 gal.	1526	Potted shrub, 1/2 to 1 gal. Includes materials and shipping only.	Each	\$4.99	150	\$748.52
Tree, hardwood, seedling or transplant, potted or B&B 2-3 gal.	1532	Potted or balled and burlapped hardwood tree, 2-3 gal. Includes materials and shipping only.	Each	\$7.69	50	\$384.26

Foregone Income

FI, Corn Dryland	1959	Dryland Corn is Primary Crop	Acre	\$271.88	1.5	\$407.83
FI, Soybeans Dryland	1961	Dryland Soybeans is Primary Crop	Acre	\$270.29	0.75	\$202.71
FI, Wheat Dryland	1963	Dryland Wheat is Primary Crop	Acre	\$163.26	0.75	\$122.44

Practice: 390 - Riparian Herbaceous Cover

Scenario: #1 - Native Seeding, Cropland

Scenario Description: Native Grasses with Forbs: This scenario addresses inadequate herbaceous plant community function or diversity within the specific transitional zone between terrestrial and aquatic habitats on cropland 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). This practice can be used nation wide. The typical setting for this scenario is usually a narrow strip between the aquatic and terrestrial habitats subject to intermittent flooding and saturated soils where the existing 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 primarily 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. To address the high diversity of riparian plant communities and their adjacent stream types that exist from the tropics to the tundra, and the deserts, prairies, mountains, and lowlands across the various regions and/or MLRA's, up to 20 adapted riparian plant community-specific scenarios may be required Associated Practices: Herbaceous Weed Control (315), Wetland Wildlife Habitat Management (644), Upland Wildlife Habitat Management (645).

Before 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 concern(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.

After 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: 1

Total Scenario Cost: \$1,856.76

Scenario Cost/Unit: \$1,856.76

Cost Details

Component Name	Id	Description	Unit	Cost	Qty	Total
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Labor

Equipment Operators, Light	232	Includes: Skid Steer Loaders, Hydraulic Excavators <50 HP, Trenchers <12", Ag Equipment <150 HP, Pickup Trucks, Forklifts, Mulchers	Hour	\$23.29	2	\$46.59
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Equipment Installation

Seeding Operation, No Till/Grass Drill	960	No Till drill or grass drill for seeding. Includes equipment, power unit and labor costs.	Acre	\$25.14	1	\$25.14
Tillage, Light	945	Includes light disking (tandem) or field cultivator. Includes equipment, power unit and labor costs.	Acre	\$13.12	1	\$13.12
Tractor, agricultural, 120 HP	962	Agricultural tractor with horsepower range of 90 to 140. Equipment and power unit costs. Labor not included.	Hour	\$67.93	2	\$135.85

Mobilization

Mobilization, small equipment	1138	Equipment <70 HP but can't be transported by a pick-up truck or with typical weights between 3,500 to 14,000 pounds.	Each	\$202.55	2	\$405.11
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Foregone Income

FI, Corn Dryland	1959	Dryland Corn is Primary Crop	Acre	\$271.88	0.5	\$135.94
FI, Soybeans Dryland	1961	Dryland Soybeans is Primary Crop	Acre	\$270.29	0.25	\$67.57

FI, Wheat Dryland	1963	Dryland Wheat is Primary Crop	Acre	\$163.26	0.25	\$40.81
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Materials

Six Species Mix, Native Forb	2334	Native forb mix. Includes material and shipping only.	Acre	\$986.62	1	\$986.62
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Practice: 390 - Riparian Herbaceous Cover

Scenario: #2 - Native Seeding, Pasture

Scenario Description: Native Grasses with Forbs: This scenario addresses inadequate herbaceous plant community function or diversity within the specific transitional zone between terrestrial and aquatic habitats in pasture or forestland 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). This practice can be used nation wide. The typical setting for this scenario is usually a narrow strip between the aquatic and terrestrial habitats subject to intermittent flooding and saturated soils where the existing 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 primarily 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. To address the high diversity of riparian plant communities and their adjacent stream types that exist from the tropics to the tundra, and the deserts, prairies, mountains, and lowlands across the various regions and/or MLRA's, up to 20 adapted riparian plant community-specific scenarios may be required Associated Practices: Brush Management (314), Herbaceous Weed Control (315), Fence (382), Animal Trails and Walkways (575), Stream Crossing (578) Wetland Wildlife Habitat Management (644), Upland Wildlife Habitat Management (645).

Before 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 concern(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.

After 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: 1

Total Scenario Cost: \$1,748.41

Scenario Cost/Unit: \$1,748.41

Cost Details

Component Name	Id	Description	Unit	Cost	Qty	Total
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Labor

Equipment Operators, Light	232	Includes: Skid Steer Loaders, Hydraulic Excavators <50 HP, Trenchers <12", Ag Equipment <150 HP, Pickup Trucks, Forklifts, Mulchers	Hour	\$23.29	2	\$46.59
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Equipment Installation

Seeding Operation, No Till/Grass Drill	960	No Till drill or grass drill for seeding. Includes equipment, power unit and labor costs.	Acre	\$25.14	1	\$25.14
Tillage, Light	945	Includes light disking (tandem) or field cultivator. Includes equipment, power unit and labor costs.	Acre	\$13.12	1	\$13.12
Tractor, agricultural, 120 HP	962	Agricultural tractor with horsepower range of 90 to 140. Equipment and power unit costs. Labor not included.	Hour	\$67.93	2	\$135.85

Mobilization

Mobilization, small equipment	1138	Equipment <70 HP but can't be transported by a pick-up truck or with typical weights between 3,500 to 14,000 pounds.	Each	\$202.55	2	\$405.11
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Foregone Income

FI, Grazing AUMs	2079	Grazing is the Primary Land Use	Animal Unit Month	\$16.00	8.5	\$135.98
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Materials

Six Species Mix, Native Forb	2334	Native forb mix. Includes material and shipping only.	Acre	\$986.62	1	\$986.62
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Practice: 558 - Roof Runoff Structure

Scenario: #1 - Roof Gutter

Scenario Description: A roof runoff structure, consisting of gutter(s), downspout(s), and appropriate outlet facilities. Used to keep roof clean water runoff uncontaminated and provide a stable outlet to ground surface. Facilitates waste management and protects environment by minimizing clean water additions to waste systems and addresses water quality concerns. Associated practices include Waste Storage Facility (313),Roofs and Covers (367), Composting Facility (317), Heavy Use Area Protection (561), Watering Facility (614), Underground Outlet (620), Diversion (362), and any relevant irrigation practices.

Before Situation: Applicable where: (1) a roof runoff management facility is included in an overall plan for an overall plan for a waste management system; (2) roof runoff needs to be diverted away from structures or contaminated areas; (3) there is a need to collect, control, and transport runoff from roofs to a stable outlet.

After Situation: A gutter, downspout, and a separate outlet system servicing the portion of the building roof that would otherwise drain into a waste management system or create erosion. Roof line of 200 ft serviced with gutter, four downspouts, and appurtances. Use underground outlet or other associated practice to carry water beyond end of downspout.

Scenario Feature Measure: Linear Length of gutter

Scenario Unit: Foot

Scenario Typical Size: 200

Total Scenario Cost: \$1,842.57

Scenario Cost/Unit: \$9.21

Cost Details

Component Name	Id	Description	Unit	Cost	Qty	Total
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Labor

General Labor	231	Labor performed using basic tools such as power tool, shovels, and other tools that do not require extensive training. Ex. pipe layer, herder, concrete placement, materials spreader, flagger, etc.	Hour	\$21.64	36	\$779.19
Supervisor or Manager	234	Labor involving supervision or management activities. Includes crew supervisors, foremen and farm/ranch managers time required for adopting new technology, etc.	Hour	\$43.40	2	\$86.79

Mobilization

Mobilization, small equipment	1138	Equipment <70 HP but can't be transported by a pick-up truck or with typical weights between 3,500 to 14,000 pounds.	Each	\$202.55	1	\$202.55
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Materials

Downspout, Aluminum, Small	1700	Aluminum downspout (3" to 5") in width with hangers. Materials only.	Foot	\$2.94	60	\$176.63
Gutter, Aluminum, Small	1689	Aluminum gutter (4" to 6") in width with hangers. Materials only.	Foot	\$2.99	200	\$597.40

Practice: 558 - Roof Runoff Structure

Scenario: #2 - Roof Gutter with Fascia

Scenario Description: A roof runoff structure, consisting of gutter(s), downspout(s), and appropriate outlet facilities. Used to keep roof clean water runoff uncontaminated and provide a stable outlet to ground surface. Facilitates waste management and protects environment by minimizing clean water additions to waste systems and addresses water quality concerns. Associated practices include Waste Storage Facility (313), Composting Facility (317), Roofs and Covers (367), Heavy Use Area Protection (561), Watering Facility (614), Underground Outlet (620), Diversion (362), and any relevant irrigation practices.

Before Situation: Applicable where: (1) a roof runoff management facility is included in an overall plan for a waste management system; (2) roof runoff needs to be diverted away from structures or contaminated areas; (3) there is a need to collect, control, and transport runoff from roofs to a stable outlet.

After Situation: A gutter, downspout, and a separate outlet system servicing the portion of the building roof that would otherwise drain into a waste management system or create erosion. Roof line of 200 ft serviced with gutter, four downspouts, and appurtances. New 2' x8" fascia board needed for proper attachment . Use underground outlet or other associated practice to carry water beyond end of downspout. Payment based on measured length of installed gutters and downspouts.

Scenario Feature Measure: Linear Length of gutter w/fascia

Scenario Unit: Foot

Scenario Typical Size: 200

Total Scenario Cost: \$2,818.78

Scenario Cost/Unit: \$14.09

Cost Details

Component Name	Id	Description	Unit	Cost	Qty	Total
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Labor

General Labor	231	Labor performed using basic tools such as power tool, shovels, and other tools that do not require extensive training. Ex. pipe layer, herder, concrete placement, materials spreader, flagger, etc.	Hour	\$21.64	54	\$1,168.78
Supervisor or Manager	234	Labor involving supervision or management activities. Includes crew supervisors, foremen and farm/ranch managers time required for adopting new technology, etc.	Hour	\$43.40	4	\$173.58

Mobilization

Mobilization, small equipment	1138	Equipment <70 HP but can't be transported by a pick-up truck or with typical weights between 3,500 to 14,000 pounds.	Each	\$202.55	1	\$202.55
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Materials

Dimension Lumber, untreated, rot resistant	1613	Untreated dimension lumber with nominal thickness equal or less than 2" milled from a rot resistant species such as cedar. Includes lumber and fasteners. Does not include labor.	Board Foot	\$1.87	267	\$499.82
Downspout, Aluminum, Small	1700	Aluminum downspout (3" to 5") in width with hangers. Materials only.	Foot	\$2.94	60	\$176.63
Gutter, Aluminum, Small	1689	Aluminum gutter (4" to 6") in width with hangers. Materials only.	Foot	\$2.99	200	\$597.40

Practice: 558 - Roof Runoff Structure

Scenario: #3 - Roof Gutter, 6 inches wide with runoff Storage Tank

Scenario Description: A roof runoff structure, consisting of gutter(s), downspout(s), and a storage tank. Used to keep roof clean water runoff uncontaminated, provide storage for on-farm use of roof water and a stable outlet for any excess to ground surface in a way that avoids erosion. Facilitates waste management and protects environment by minimizing clean water additions to waste systems and addresses water quality concerns. Associated practices include Waste Storage Facility (313), Composting Facility (317), Heavy Use Area Protection (561), Watering Facility (614), Underground Outlet (620), Diversion (362), and any relevant irrigation practices.

Before Situation: Applicable where: (1) a roof runoff management facility is included in an overall plan for a waste management system; (2) roof runoff needs to be diverted away from structures or contaminated areas; (3) there is a need to collect, control, and transport runoff from roofs to a stable outlet.

After Situation: A gutter and downspouts servicing the portion of the building roof that would otherwise drain into a waste management system or create erosion. Roof line of 200 In.ft. serviced with gutter, downspouts, and appurtances. A 1,500 gallon tank is installed for storage and use of roof runoff.

Scenario Feature Measure: Linear Length of Roof to be Guttered

Scenario Unit: Foot

Scenario Typical Size: 200

Total Scenario Cost: \$3,425.08

Scenario Cost/Unit: \$17.13

Cost Details

Component Name	Id	Description	Unit	Cost	Qty	Total
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Materials

Aggregate, Gravel, Graded	46	Gravel, includes materials, equipment and labor to transport and place. Includes washed and unwashed gravel.	Cubic Yard	\$31.47	2	\$62.94
Downspout, Aluminum, Small	1700	Aluminum downspout (3" to 5") in width with hangers. Materials only.	Foot	\$2.94	60	\$176.63
Gutter, Aluminum, Small	1689	Aluminum gutter (4" to 6") in width with hangers. Materials only.	Foot	\$2.99	200	\$597.40
Pipe, PVC, 4", SCH 40	978	Materials: - 4" - PVC - SCH 40 - ASTM D1785	Foot	\$4.31	110	\$474.05
Tank, Poly Enclosed Storage, >1,000	1075	Water storage tanks. Includes materials and shipping only.	Gallon	\$0.93	1500	\$1,387.50

Equipment Installation

Earthfill, Manually Compacted	50	Earthfill, manually compacted, includes equipment and labor	Cubic Yard	\$6.43	2	\$12.86
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Labor

General Labor	231	Labor performed using basic tools such as power tool, shovels, and other tools that do not require extensive training. Ex. pipe layer, herder, concrete placement, materials spreader, flagger, etc.	Hour	\$21.64	20	\$432.88
Skilled Labor	230	Labor requiring a high level skill set: Includes carpenters, welders, electricians, conservation professionals involved with data collection, monitoring, and or record keeping, etc.	Hour	\$37.24	1	\$37.24

Mobilization

Aggregate, Shipping, Cubic Yard-mile	2360	Mobilization of aggregate material beyond 20 miles of local delivery from quarry to construction site. Cubic Yard-mile (Cubic Yard * miles of haul).	Cubic Yard Mile	\$0.41	100	\$41.01
Mobilization, small equipment	1138	Equipment <70 HP but can't be transported by a pick-up truck or with typical weights between 3,500 to 14,000 pounds.	Each	\$202.55	1	\$202.55

Practice: 558 - Roof Runoff Structure

Scenario: #4 - Concrete Curb

Scenario Description: A roof runoff structure, consisting of a concrete curb or parabolic channel installed on existing impervious surface or the ground with appropriate outlet facilities. Environmental/design considerations, for example – snow loads, or a building without proper structural support needed for gutters dictate the use of an on-ground concrete curb. Used to keep roof clean water runoff uncontaminated and provide a stable outlet to ground surface. Facilitates waste management and protects the environment by minimizing clean water additions to waste systems and addresses water quality concerns. Associated practices include Waste Storage Facility (313), Roofs and Covers (367), Composting Facility (317), Heavy Use Area Protection (561), Underground Outlet (620), and Diversion (362).

Before Situation: Applicable where: (1) a roof runoff management facility is included in an overall plan for a waste management system; (2) roof runoff needs to be diverted away from structures or contaminated areas; (3) there is a need to collect, control, and transport runoff from roofs to a stable outlet.

After Situation: A concrete curb or parabolic channel and outlet system servicing the portion of the building roof that would otherwise drain into a waste management system or create erosion. Concrete curb (8" high) on a 2' wide slab extending the length of a 200' roof with additional length (5') for stable outlet.

Scenario Feature Measure: Linear Length of Curb

Scenario Unit: Foot

Scenario Typical Size: 205

Total Scenario Cost: \$3,693.35

Scenario Cost/Unit: \$18.02

Cost Details

Component Name	Id	Description	Unit	Cost	Qty	Total
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Equipment Installation

Concrete, CIP, formed reinforced	38	Steel reinforced concrete formed and cast-in-placed in formed structures such as walls or suspended slabs by chute placement. Typical strength is 3000 to 4000 psi. Includes materials, labor and equipment to transport, place and finish.	Cubic Yard	\$449.19	3	\$1,347.57
Concrete, CIP, formless, non reinforced	36	Non reinforced concrete cast-in-placed without forms by chute placement. Typical strength is 3000 to 4000 psi. Includes materials, labor and equipment to transport, place and finish.	Cubic Yard	\$142.33	8	\$1,138.68
Demolition, concrete	1498	Demolition and disposal of reinforced concrete structures including slabs and walls. Includes labor and equipment.	Cubic Yard	\$12.97	5	\$64.87
Excavation, Common Earth, side cast, small equipment	48	Bulk excavation and side casting of common earth with hydraulic excavator with less than 1 CY capacity. Includes equipment and labor.	Cubic Yard	\$2.58	8	\$20.63
Hauling, bulk, highway truck	1615	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	\$0.39	130	\$50.97

Materials

Aggregate, Gravel, Graded	46	Gravel, includes materials, equipment and labor to transport and place. Includes washed and unwashed gravel.	Cubic Yard	\$31.47	8	\$251.78
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Labor

General Labor	231	Labor performed using basic tools such as power tool, shovels, and other tools that do not require extensive training. Ex. pipe layer, herder, concrete placement, materials spreader, flagger, etc.	Hour	\$21.64	8	\$173.15
Supervisor or Manager	234	Labor involving supervision or management activities. Includes crew supervisors, foremen and farm/ranch managers time required for adopting new technology, etc.	Hour	\$43.40	1	\$43.40

Mobilization

Mobilization, medium equipment	1139	Equipment with 70-150 HP or typical weights between 14,000 and 30,000 pounds.	Each	\$301.16	2	\$602.32
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Practice: 558 - Roof Runoff Structure

Scenario: #5 - Trench Drain

Scenario Description: A roof runoff structure, consisting of a trench filled with rock, with a polyethylene, corrugated, perforated drain tile installed in trench bottom. Used to keep roof clean water runoff uncontaminated and provide a stable outlet to ground surface. Environmental/design considerations, for example – snow loads, or a building without proper structural support needed for gutters dictate the use of a trench drain. Facilitates waste management and protects the environment by minimizing clean water additions to waste systems and addresses water quality concerns. Associated practices include Waste Storage Facility (313), Composting Facility (317), Roofs and Covers (367), Heavy Use Area Protection (561), Underground Outlet (620), and Diversion (362).

Before Situation: Applicable where: (1) a roof runoff management facility is included in an overall plan for an overall plan for a waste management system; (2) roof runoff needs to be diverted away from structures or contaminated areas; (3) there is a need to collect, control, and transport runoff from roofs to a stable outlet.

After Situation: A 2' deep by 3' wide by 200 long deep rock filled, tile drained trench. Trench system servicing the portion of the building roof that would otherwise drain into a waste management system or create erosion. If discharge point needs to be elsewhere use additional applicable practice.

Scenario Feature Measure: Linear Length Drain

Scenario Unit: Foot

Scenario Typical Size: 200

Total Scenario Cost: \$2,730.91

Scenario Cost/Unit: \$13.65

Cost Details

Component Name	Id	Description	Unit	Cost	Qty	Total
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Equipment Installation

Excavation, Common Earth, side cast, small equipment	48	Bulk excavation and side casting of common earth with hydraulic excavator with less than 1 CY capacity. Includes equipment and labor.	Cubic Yard	\$2.58	44	\$113.46
Geotextile, woven	42	Woven Geotextile Fabric. Includes materials, equipment and labor	Square Yard	\$2.66	222	\$591.31

Materials

Aggregate, Gravel, Graded	46	Gravel, includes materials, equipment and labor to transport and place. Includes washed and unwashed gravel.	Cubic Yard	\$31.47	44	\$1,384.78
Pipe, HDPE, 4", PCPT, Single Wall	1270	Pipe, Corrugated Plastic Tubing, Single Wall, Perforated, 4" diameter - ASTM F405. Material cost only.	Foot	\$0.48	220	\$106.38

Labor

General Labor	231	Labor performed using basic tools such as power tool, shovels, and other tools that do not require extensive training. Ex. pipe layer, herder, concrete placement, materials spreader, flagger, etc.	Hour	\$21.64	6	\$129.86
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Mobilization

Mobilization, small equipment	1138	Equipment <70 HP but can't be transported by a pick-up truck or with typical weights between 3,500 to 14,000 pounds.	Each	\$202.55	2	\$405.11
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Practice: 558 - Roof Runoff Structure

Scenario: #6 - Stone Infiltration Sump

Scenario Description: A roof runoff structure, consisting of a square hole lined with geotextile and filled with rock and covered with soil. Used to redirect roof runoff for ground water recharge and reduce surface flow into streams. Reduces erosion and helps improve water quality. Associated practices include Waste Storage Facility (313), Agrichemical Handling Facility (309), Composting Facility (317), Roofs and Covers (367), Heavy Use Area Protection (561), Underground Outlet (620), and Diversion (362) Critical Area Seeding (342)

Before Situation: Applicable where: (1) a roof runoff management facility is included in an overall plan for a waste management system; (2) roof runoff needs to be diverted away from structures or contaminated areas; (3) there is a need to collect, control, and transport runoff from roofs to a stable outlet.

After Situation: Two, 6' x6' x 8' deep holes were dug and lined with geotextile and filled to within 1.5' of surface. The remaining surface filled with soil. Each has a 10' of 4" pipe coming from a downspout or underground outlet into this sump and 10' of 4" overflow pipe is also included. Payment includes all work and piping. Seeding will be done by others when site work done. Sumps located away from downspouts and good outlets will require additional piping under Underground Outlet (620)

Scenario Feature Measure: Each stone infiltration sump

Scenario Unit: Each

Scenario Typical Size: 2

Total Scenario Cost: \$2,228.32

Scenario Cost/Unit: \$1,114.16

Cost Details

Component Name	Id	Description	Unit	Cost	Qty	Total
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Equipment Installation

Backhoe, 80 HP	926	Wheel mounted backhoe excavator with horsepower range of 60 to 90. Equipment and power unit costs. Labor not included.	Hour	\$65.99	8	\$527.88
Geotextile, woven	42	Woven Geotextile Fabric. Includes materials, equipment and labor	Square Yard	\$2.66	30	\$79.91

Materials

Aggregate, Gravel, Graded	46	Gravel, includes materials, equipment and labor to transport and place. Includes washed and unwashed gravel.	Cubic Yard	\$31.47	16	\$503.56
Pipe, PVC, 4", SCH 40	978	Materials: - 4" - PVC - SCH 40 - ASTM D1785	Foot	\$4.31	40	\$172.38

Labor

Equipment Operators, Heavy	233	Includes: Cranes, Hydraulic Excavators >=50 HP, Dozers, Paving Machines, Rock Trenchers, Trenchers >=12", Dump Trucks, Ag Equipment >=150 HP, Scrapers, Water Wagons.	Hour	\$32.34	8	\$258.74
Skilled Labor	230	Labor requiring a high level skill set: Includes carpenters, welders, electricians, conservation professionals involved with data collection, monitoring, and or record keeping, etc.	Hour	\$37.24	8	\$297.91
Supervisor or Manager	234	Labor involving supervision or management activities. Includes crew supervisors, foremen and farm/ranch managers time required for adopting new technology, etc.	Hour	\$43.40	2	\$86.79

Mobilization

Mobilization, medium equipment	1139	Equipment with 70-150 HP or typical weights between 14,000 and 30,000 pounds.	Each	\$301.16	1	\$301.16
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Practice: 367 - Roofs and Covers

Scenario: #1 - Flexible Roof

Scenario Description: A flexible membrane or fabric-like roof placed on a steel truss hoop-like supports attached to an existing wall or with its own simple support 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. Associated Practices: Animal Mortality Facility (316), Composting Facility (317), Heavy Use Area Protection (561), Roof Runoff Structure (558), Waste Storage Facility (313), and Waste Treatment (629).

Before 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 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 40'x40 '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: Footprint of the building

Scenario Unit: Square Foot

Scenario Typical Size: 1600

Total Scenario Cost: \$10,889.30

Scenario Cost/Unit: \$6.81

Cost Details

Component Name	Id	Description	Unit	Cost	Qty	Total
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Mobilization

Mobilization, very small equipment	1137	Equipment that is small enough to be transported by a pick-up truck with typical weights less than 3,500 pounds. Can be multiple pieces of equipment if all hauled simultaneously.	Each	\$83.16	1	\$83.16
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Materials

Roof, Hoop Truss Arch Structure, 30-60' wide	1668	Hoop Truss Arch Structure with fabric cover - 30' to 60' width, includes materials, equipment, and installation. Does not include foundation preparation.	Square Foot	\$6.75	1600	\$10,806.14
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Practice: 367 - Roofs and Covers

Scenario: #2 - Flexible Roof, complex foundation

Scenario Description: A flexible membrane or fabric-like roof placed on a steel truss hoop-like supports and complex support system. Requires construction of anchor holes with concrete. 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: Animal Mortality Facility (316), Composting Facility (317), Heavy Use Area Protection (561), Roof Runoff Structure (558), Waste Storage Facility (313), and Waste Treatment (629).

Before 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 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 40'x40 'square feet and support by 2 rows of treated posts. 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: 1600

Total Scenario Cost: \$13,794.87

Scenario Cost/Unit: \$8.62

Cost Details

Component Name	Id	Description	Unit	Cost	Qty	Total
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Equipment Installation

Auger, Truck Mounted	2049	Truck mounted auger for large diameter excavation. Includes equipment and labor.	Hour	\$418.91	4	\$1,675.63
Concrete, CIP, formless, non reinforced	36	Non reinforced concrete cast-in-placed without forms by chute placement. Typical strength is 3000 to 4000 psi. Includes materials, labor and equipment to transport, place and finish.	Cubic Yard	\$142.33	3	\$427.00
Earthfill, Manually Compacted	50	Earthfill, manually compacted, includes equipment and labor	Cubic Yard	\$6.43	12	\$77.16
Skidsteer, 80 HP	933	Skidsteer loader with horsepower range of 60 to 90. Equipment and power unit costs. Labor not included.	Hour	\$52.50	8	\$420.02

Labor

Equipment Operators, Light	232	Includes: Skid Steer Loaders, Hydraulic Excavators <50 HP, Trenchers <12", Ag Equipment <150 HP, Pickup Trucks, Forklifts, Mulchers	Hour	\$23.29	8	\$186.35
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Mobilization

Mobilization, small equipment	1138	Equipment <70 HP but can't be transported by a pick-up truck or with typical weights between 3,500 to 14,000 pounds.	Each	\$202.55	1	\$202.55
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Materials

Roof, Hoop Truss Arch Structure, 30-60' wide	1668	Hoop Truss Arch Structure with fabric cover - 30' to 60' width, includes materials, equipment, and installation. Does not include foundation preparation.	Square Foot	\$6.75	1600	\$10,806.14
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Practice: 367 - Roofs and Covers

Scenario: #3 - Timber Frame Roof, over small bins

Scenario Description: A timber framed roof, non-truss, a combination of purlins and rafters covered with steel "sheet" roof used only over small multi-bin composting facilities. Anchor to existing facility located under roof. No foundation preparation. Limit maximum area to 1,500 SF. (All others use Timber Frame Roof scenario no. 4.) 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: Animal Mortality Facility (316), Composting Facility (317), Heavy Use Area Protection (561), Roof Runoff Structure (558), Waste Storage Facility (313), and Waste Treatment (629).

Before 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 Situation: A timber framed stick building with no truss, all supports by individual members with steel "sheet" roof and supporting foundation. Typically a roof over a multi-bin mortality facility sized at 16' x40'. Limit maximum area to 1,500 SF. Engineered and installed in accordance with appropriate building codes and permits. 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: Foot print of building

Scenario Unit: Square Foot

Scenario Typical Size: 640

Total Scenario Cost: \$8,436.13

Scenario Cost/Unit: \$13.18

Cost Details

Component Name	Id	Description	Unit	Cost	Qty	Total
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Materials

Corrugated Steel, 22 gauge	224	Corrugated or ribbed, galvanized, 22 gauge, includes fasteners, materials only.	Square Foot	\$2.35	720	\$1,690.19
Dimension Lumber, Treated	1044	Treated dimension lumber with nominal thickness equal or less than 2". Includes lumber and fasteners	Board Foot	\$0.93	1091	\$1,011.47
Lumber, planks, posts and timbers, treated	1609	Treated dimension lumber with nominal thickness greater than 2". Includes lumber and fasteners. Does not include labor.	Board Foot	\$1.69	540	\$911.65

Labor

Equipment Operators, Light	232	Includes: Skid Steer Loaders, Hydraulic Excavators <50 HP, Trenchers <12", Ag Equipment <150 HP, Pickup Trucks, Forklifts, Mulchers	Hour	\$23.29	16	\$372.71
General Labor	231	Labor performed using basic tools such as power tool, shovels, and other tools that do not require extensive training. Ex. pipe layer, herder, concrete placement, materials spreader, flagger, etc.	Hour	\$21.64	120	\$2,597.29

Equipment Installation

Skidsteer, 80 HP	933	Skidsteer loader with horsepower range of 60 to 90. Equipment and power unit costs. Labor not included.	Hour	\$52.50	16	\$840.05
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Mobilization

Mobilization, small equipment	1138	Equipment <70 HP but can't be transported by a pick-up truck or with typical weights between 3,500 to 14,000 pounds.	Each	\$202.55	5	\$1,012.77
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Practice: 367 - Roofs and Covers

Scenario: #4 - Timber Frame Roof

Scenario Description: A timber framed building with a timber or steel "sheet" roof. Anchor to existing facility located under roof or simple supports in ground. 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. Specified snowload and deadload on truss is less than 40 PSF. Associated Practices: Animal Mortality Facility (316), Composting Facility (317), Heavy Use Area Protection (561), Roof Runoff Structure (558), Waste Storage Facility (313), and Waste Treatment (629).

Before Situation: Applicable where the exclusion of precipitation from an animal waste storage and/or treatment facility will improve 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 Situation: A timber framed building with a timber or steel "sheet" roof and supporting foundation by associated practice. 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. Specified snowload and deadload on truss is 30 PSF. 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 building

Scenario Unit: Square Foot

Scenario Typical Size: 5000

Total Scenario Cost: \$42,767.48

Scenario Cost/Unit: \$8.55

Cost Details

Component Name	Id	Description	Unit	Cost	Qty	Total
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Mobilization

Mobilization, medium equipment	1139	Equipment with 70-150 HP or typical weights between 14,000 and 30,000 pounds.	Each	\$301.16	1	\$301.16
Mobilization, very small equipment	1137	Equipment that is small enough to be transported by a pick-up truck with typical weights less than 3,500 pounds. Can be multiple pieces of equipment if all hauled simultaneously.	Each	\$83.16	2	\$166.32

Materials

Roof, Post Frame Building, 30' to 60' wide	1676	Post Frame Building, no sides, - 30' to 60' width. Building sites with expected snow loads up to 30 lbs per square foot and wind exposure in semi protected areas (wooded or terrain with numerous closely spaced obstructions). Includes materials, shipping, equipment, and installation. Does not include foundation preparation.	Square Foot	\$8.46	5000	\$42,300.00
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Practice: 367 - Roofs and Covers

Scenario: #5 - Timber Frame Roof, Hvy Snow/High Wind

Scenario Description: A timber framed building with a timber or steel "sheet" roof. Anchor to existing facility located under roof or simple supports in ground. 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 storagges or cause nutrients to leach from solid manure piles leading to uncontrolled runoff as well as odor issues. Specified snowload and deadload on truss is equal to or greater than 40 PSF or wind loads exceeding 90 mph. These are typically used in high snowfall areas of a county or state or coastal states. Associated Practices: Animal Mortality Facility (316), Composting Facility (317), Heavy Use Area Protection (561), Roof Runoff Structure (558), Waste Storage Facility (313), and Waste Treatment (629).

Before Situation: Applicable where the exclusion of precipitation from an animal waste storage and/or treatment facility will improve 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 Situation: A timber framed building with a timber or steel "sheet" roof and supporting foundation by associated practice. Engineered and installed in accordance with appropriate building codes and permits. Truss specified must handle a total combined snow and deadload of 50 PSF or roof system will handle high wind loads. 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: Footprint of building

Scenario Unit: Square Foot

Scenario Typical Size: 5000

Total Scenario Cost: \$55,442.48

Scenario Cost/Unit: \$11.09

Cost Details

Component Name	Id	Description	Unit	Cost	Qty	Total
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Mobilization

Mobilization, medium equipment	1139	Equipment with 70-150 HP or typical weights between 14,000 and 30,000 pounds.	Each	\$301.16	1	\$301.16
Mobilization, very small equipment	1137	Equipment that is small enough to be transported by a pick-up truck with typical weights less than 3,500 pounds. Can be multiple pieces of equipment if all hauled simultaneously.	Each	\$83.16	2	\$166.32

Materials

Roof, Post Frame Building, 30' to 60' Wide, Hazardous Condtions	2512	Post Frame Building, no sides, - between 30' and 60' width. Hazardous building sites with snow loads exceeding 30 lbs per square foot and extreme wind exposure in areas of open terrain (flat open areas, grassland, shoreline, etc.). Includes materials, shipping, equipment, and installation. Does not include foundation preparation.	Square Foot	\$11.00	5000	\$54,975.00
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Practice: 367 - Roofs and Covers

Scenario: #6 - Timber Frame Roof, complex foundation

Scenario Description: A timber framed building with a timber or steel "sheet" roof and complex supporting foundation. Requires construction of anchor holes with concrete. 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. Specified snowload and deadload on truss is less than 40 PSF. Associated Practices: Animal Mortality Facility (316), Composting Facility (317), Heavy Use Area Protection (561), Roof Runoff Structure (558), Waste Storage Facility (313), and Waste Treatment (629).

Before 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 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. Truss specified must handle a total combined snow and deadload of 30 PSF. 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 building

Scenario Unit: Square Foot

Scenario Typical Size: 5000

Total Scenario Cost: \$48,448.33

Scenario Cost/Unit: \$9.69

Cost Details

Component Name	Id	Description	Unit	Cost	Qty	Total
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Equipment Installation

Auger, Truck Mounted	2049	Truck mounted auger for large diameter excavation. Includes equipment and labor.	Hour	\$418.91	8	\$3,351.26
Concrete, CIP, formless, non reinforced	36	Non reinforced concrete cast-in-placed without forms by chute placement. Typical strength is 3000 to 4000 psi. Includes materials, labor and equipment to transport, place and finish.	Cubic Yard	\$142.33	3	\$427.00
Earthfill, Manually Compacted	50	Earthfill, manually compacted, includes equipment and labor	Cubic Yard	\$6.43	9	\$57.87
Skidsteer, 80 HP	933	Skidsteer loader with horsepower range of 60 to 90. Equipment and power unit costs. Labor not included.	Hour	\$52.50	16	\$840.05

Labor

Equipment Operators, Light	232	Includes: Skid Steer Loaders, Hydraulic Excavators <50 HP, Trenchers <12", Ag Equipment <150 HP, Pickup Trucks, Forklifts, Mulchers	Hour	\$23.29	16	\$372.71
Supervisor or Manager	234	Labor involving supervision or management activities. Includes crew supervisors, foremen and farm/ranch managers time required for adopting new technology, etc.	Hour	\$43.40	16	\$694.34

Mobilization

Mobilization, small equipment	1138	Equipment <70 HP but can't be transported by a pick-up truck or with typical weights between 3,500 to 14,000 pounds.	Each	\$202.55	2	\$405.11
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Materials

Roof, Post Frame Building, 30' to 60' wide	1676	Post Frame Building, no sides, - 30' to 60' width. Building sites with expected snow loads up to 30 lbs per square foot and wind exposure in semi protected areas (wooded or terrain with numerous closely spaced obstructions). Includes materials, shipping, equipment, and installation. Does not include foundation preparation.	Square Foot	\$8.46	5000	\$42,300.00
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Practice: 367 - Roofs and Covers

Scenario: #7 - Timber Frame Roof, Complex found, Hvy Snow/High wind

Scenario Description: A timber framed building with a timber or steel "sheet" roof and complex supporting foundation. Requires construction of anchor holes with concrete. 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. Specified snowload and deadload on truss is equal to or greater than 40 PSF or wind loads exceed 90 mph. Typically found in areas with high snowloads or coastal states. Associated Practices: Animal Mortality Facility (316), Composting Facility (317), Heavy Use Area Protection (561), Roof Runoff Structure (558), Waste Storage Facility (313), and Waste Treatment (629).

Before 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 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. Truss specified must handle a total combined snow and deadload of 50 PSF or roof system will handle high wind loads. 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 building

Scenario Unit: Square Foot

Scenario Typical Size: 5000

Total Scenario Cost: \$61,123.33

Scenario Cost/Unit: \$12.22

Cost Details

Component Name	Id	Description	Unit	Cost	Qty	Total
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Equipment Installation

Auger, Truck Mounted	2049	Truck mounted auger for large diameter excavation. Includes equipment and labor.	Hour	\$418.91	8	\$3,351.26
Concrete, CIP, formless, non reinforced	36	Non reinforced concrete cast-in-placed without forms by chute placement. Typical strength is 3000 to 4000 psi. Includes materials, labor and equipment to transport, place and finish.	Cubic Yard	\$142.33	3	\$427.00
Earthfill, Manually Compacted	50	Earthfill, manually compacted, includes equipment and labor	Cubic Yard	\$6.43	9	\$57.87
Skidsteer, 80 HP	933	Skidsteer loader with horsepower range of 60 to 90. Equipment and power unit costs. Labor not included.	Hour	\$52.50	16	\$840.05

Labor

Equipment Operators, Light	232	Includes: Skid Steer Loaders, Hydraulic Excavators <50 HP, Trenchers <12", Ag Equipment <150 HP, Pickup Trucks, Forklifts, Mulchers	Hour	\$23.29	16	\$372.71
Supervisor or Manager	234	Labor involving supervision or management activities. Includes crew supervisors, foremen and farm/ranch managers time required for adopting new technology, etc.	Hour	\$43.40	16	\$694.34

Mobilization

Mobilization, small equipment	1138	Equipment <70 HP but can't be transported by a pick-up truck or with typical weights between 3,500 to 14,000 pounds.	Each	\$202.55	2	\$405.11
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Materials

Roof, Post Frame Building, 30' to 60' Wide, Hazardous Conditions	2512	Post Frame Building, no sides, - between 30' and 60' width. Hazardous building sites with snow loads exceeding 30 lbs per square foot and extreme wind exposure in areas of open terrain (flat open areas, grassland, shoreline, etc.). Includes materials, shipping, equipment, and installation. Does not include foundation preparation.	Square Foot	\$11.00	5000	\$54,975.00
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Practice: 367 - Roofs and Covers

Scenario: #8 - Steel Frame with Roof

Scenario Description: A steel framed building with steel "sheet" roof and simple supporting foundation or provided by associated practice 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: Animal Mortality Facility (316), Composting Facility (317), Heavy Use Area Protection (561), Roof Runoff Structure (558), Waste Storage Facility (313), and Waste Treatment (629).

Before 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 Situation: A steel framed building with steel "sheet" roof and supporting foundation provided by an associated practice. Engineered and installed in accordance with appropriate building codes and permits. Typical size is 10,000 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: Footprint of building

Scenario Unit: Square Foot

Scenario Typical Size: 10000

Total Scenario Cost: \$81,036.24

Scenario Cost/Unit: \$8.10

Cost Details

Component Name	Id	Description	Unit	Cost	Qty	Total
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Mobilization

Mobilization, medium equipment	1139	Equipment with 70-150 HP or typical weights between 14,000 and 30,000 pounds.	Each	\$301.16	2	\$602.32
Mobilization, very small equipment	1137	Equipment that is small enough to be transported by a pick-up truck with typical weights less than 3,500 pounds. Can be multiple pieces of equipment if all hauled simultaneously.	Each	\$83.16	2	\$166.32

Materials

Roof, Steel Frame Monoslope Building, greater than 60' wide	1677	Steel Frame Monoslope Building, greater than 60' width, includes materials, equipment, and installation. Does not include foundation preparation.	Square Foot	\$8.03	10000	\$80,267.60
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Practice: 367 - Roofs and Covers

Scenario: #9 - Permeable Composite or Inorganic Cover

Scenario Description: Permeable organic or inorganic cover applied to the liquid surface of a waste storage or treatment facility. Permeable organic or inorganic cover to reduce radiation and wind velocity over the surface of a manure storage to reduce transmission of odors and act as a medium for growth of microorganisms that utilize carbon, nitrogen, and sulfur to decompose odorous compounds. Associated Practices: Waste Storage Facility (313).

Before Situation: Applicable where the bio-treatment of emissions from an existing or planned waste storage or treatment facility will improve air quality.

After Situation: Permeable composite or inorganic cover applied to the liquid surface of a waste storage or treatment facility.

Scenario Feature Measure: Storage Surface Area at Normal Full Level

Scenario Unit: Square Foot

Scenario Typical Size: 10000

Total Scenario Cost: \$78,022.86

Scenario Cost/Unit: \$7.80

Cost Details

Component Name	Id	Description	Unit	Cost	Qty	Total
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Mobilization

Mobilization, small equipment	1138	Equipment <70 HP but can't be transported by a pick-up truck or with typical weights between 3,500 to 14,000 pounds.	Each	\$202.55	2	\$405.11
Mobilization, very small equipment	1137	Equipment that is small enough to be transported by a pick-up truck with typical weights less than 3,500 pounds. Can be multiple pieces of equipment if all hauled simultaneously.	Each	\$83.16	2	\$166.32

Materials

Composite Cover, floating cover, > 5,000 square feet	1860	Composite material that is used to cover open storages with an area greater than 5,000 sf. Example, Hexa-Cover. Materials only.	Square Foot	\$7.75	10000	\$77,451.43
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Practice: 367 - Roofs and Covers

Scenario: #10 - Flexible Membrane Cover, 20000 or less SF pond surface area

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. Includes gas collection and flaring system. Associated Practices: Animal Mortality Facility (316), Composting Facility (317), Heavy Use Area Protection (561), Roof Runoff Structure (558), Waste Storage Facility (313), Pumping Plant (533), and Waste Treatment (629).

Before 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 Situation: A 15,000 SF 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). Included will be a collection pipe for methane, a system of weighted tubes to create channels for rainwater collection and also keep membrane tight to surface. Methane collection pipe connected to flare with gas meter, flame arrestor and moisture control. Rainwater removal will be made under Pumping Plant (533). Payment based on surface area at top inside slope.

Scenario Feature Measure: Surface of Area of Storage Facility

Scenario Unit: Square Foot

Scenario Typical Size: 15000

Total Scenario Cost: \$58,515.36

Scenario Cost/Unit: \$3.90

Cost Details

Component Name	Id	Description	Unit	Cost	Qty	Total
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Equipment Installation

Earthfill, Manually Compacted	50	Earthfill, manually compacted, includes equipment and labor	Cubic Yard	\$6.43	48	\$308.63
Skidsteer, 80 HP	933	Skidsteer loader with horsepower range of 60 to 90. Equipment and power unit costs. Labor not included.	Hour	\$52.50	32	\$1,680.09
Track Loader, 95HP	935	Equipment and power unit costs. Labor not included.	Hour	\$103.78	24	\$2,490.80
Trencher, 8"	936	Equipment and power unit costs. Labor not included.	Hour	\$105.76	8	\$846.09

Labor

Equipment Operators, Light	232	Includes: Skid Steer Loaders, Hydraulic Excavators <50 HP, Trenchers <12", Ag Equipment <150 HP, Pickup Trucks, Forklifts, Mulchers	Hour	\$23.29	24	\$559.06
General Labor	231	Labor performed using basic tools such as power tool, shovels, and other tools that do not require extensive training. Ex. pipe layer, herder, concrete placement, materials spreader, flagger, etc.	Hour	\$21.64	48	\$1,038.92
Skilled Labor	230	Labor requiring a high level skill set: Includes carpenters, welders, electricians, conservation professionals involved with data collection, monitoring, and or record keeping, etc.	Hour	\$37.24	24	\$893.72

Mobilization

Mobilization, medium equipment	1139	Equipment with 70-150 HP or typical weights between 14,000 and 30,000 pounds.	Each	\$301.16	1	\$301.16
Mobilization, very small equipment	1137	Equipment that is small enough to be transported by a pick-up truck with typical weights less than 3,500 pounds. Can be multiple pieces of equipment if all hauled simultaneously.	Each	\$83.16	2	\$166.32

Materials

Covered Lagoon Flare	1666	Flare excess gas to convert from methane to carbon dioxide. Includes labor and equipment.	Each	\$12,910.72	1	\$12,910.72
Covered Lagoon Gas Collection System	1664	Piping and collection system for biogas. Includes labor and equipment.	Each	\$40,076.39	0.6	\$24,045.83

Synthetic Liner, 40 mil	1387	Synthetic 40 mil HDPE, LLDPE, EPDM, etc membrane liner material. Includes materials and shipping only.	Square Yard	\$6.12	2170	\$13,274.04
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Practice: 367 - Roofs and Covers

Scenario: #11 - Flexible Membrane Cover, 20,001 to 80,000 SF pond surface area

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. Includes gas collection and flaring system. Associated Practices: Animal Mortality Facility (316), Composting Facility (317), Heavy Use Area Protection (561), Roof Runoff Structure (558), Waste Storage Facility (313), and Waste Treatment (629).

Before 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 Situation: A 50,000 SF 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). Included will be a collection pipe for methane, a system of weighted tubes to create channels for rainwater collection and also keep membrane tight to surface. Methane collection pipe connected to flare with gas meter, flame arrestor and moisture control. Rainwater removal will be made under Pumping Plant (533). Payment based on surface area at top inside slope.

Scenario Feature Measure: Surface of Area of Storage Facility

Scenario Unit: Square Foot

Scenario Typical Size: 50000

Total Scenario Cost: \$124,340.02

Scenario Cost/Unit: \$2.49

Cost Details

Component Name	Id	Description	Unit	Cost	Qty	Total
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Equipment Installation

Earthfill, Manually Compacted	50	Earthfill, manually compacted, includes equipment and labor	Cubic Yard	\$6.43	90	\$578.68
Skidsteer, 80 HP	933	Skidsteer loader with horsepower range of 60 to 90. Equipment and power unit costs. Labor not included.	Hour	\$52.50	56	\$2,940.16
Track Loader, 95HP	935	Equipment and power unit costs. Labor not included.	Hour	\$103.78	40	\$4,151.33
Trencher, 8"	936	Equipment and power unit costs. Labor not included.	Hour	\$105.76	16	\$1,692.17

Labor

Equipment Operators, Light	232	Includes: Skid Steer Loaders, Hydraulic Excavators <50 HP, Trenchers <12", Ag Equipment <150 HP, Pickup Trucks, Forklifts, Mulchers	Hour	\$23.29	96	\$2,236.24
General Labor	231	Labor performed using basic tools such as power tool, shovels, and other tools that do not require extensive training. Ex. pipe layer, herder, concrete placement, materials spreader, flagger, etc.	Hour	\$21.64	80	\$1,731.53
Skilled Labor	230	Labor requiring a high level skill set: Includes carpenters, welders, electricians, conservation professionals involved with data collection, monitoring, and or record keeping, etc.	Hour	\$37.24	40	\$1,489.53

Mobilization

Mobilization, medium equipment	1139	Equipment with 70-150 HP or typical weights between 14,000 and 30,000 pounds.	Each	\$301.16	1	\$301.16
Mobilization, very small equipment	1137	Equipment that is small enough to be transported by a pick-up truck with typical weights less than 3,500 pounds. Can be multiple pieces of equipment if all hauled simultaneously.	Each	\$83.16	2	\$166.32

Materials

Covered Lagoon Flare	1666	Flare excess gas to convert from methane to carbon dioxide. Includes labor and equipment.	Each	\$12,910.72	1	\$12,910.72
Covered Lagoon Gas Collection System	1664	Piping and collection system for biogas. Includes labor and equipment.	Each	\$40,076.39	1.3	\$52,099.30

Synthetic Liner, 40 mil	1387	Synthetic 40 mil HDPE, LLDPE, EPDM, etc membrane liner material. Includes materials and shipping only.	Square Yard	\$6.12	7200	\$44,042.88
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Practice: 367 - Roofs and Covers

Scenario: #12 - Flexible Membrane Cover, 80001 or greater pond surface area

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. Includes gas collection and flaring system. Associated Practices: Animal Mortality Facility (316), Composting Facility (317), Heavy Use Area Protection (561), Roof Runoff Structure (558), Waste Storage Facility (313), and Waste Treatment (629).

Before 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 Situation: A 100,000 SF 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). Included will be a collection pipe for methane, a system of weighted tubes to create channels for rainwater collection and also keep membrane tight to surface. Methane collection pipe connected to flare with gas meter, flame arrestor and moisture control. Rainwater removal will be made under Pumping Plant (533). Payment based on surface area at top inside slope.

Scenario Feature Measure: Surface of Area of Storage Facility

Scenario Unit: Square Foot

Scenario Typical Size: 100000

Total Scenario Cost: \$222,401.08

Scenario Cost/Unit: \$2.22

Cost Details

Component Name	Id	Description	Unit	Cost	Qty	Total
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Equipment Installation

Earthfill, Manually Compacted	50	Earthfill, manually compacted, includes equipment and labor	Cubic Yard	\$6.43	126	\$810.15
Skidsteer, 80 HP	933	Skidsteer loader with horsepower range of 60 to 90. Equipment and power unit costs. Labor not included.	Hour	\$52.50	94	\$4,935.27
Track Loader, 95HP	935	Equipment and power unit costs. Labor not included.	Hour	\$103.78	80	\$8,302.66
Trencher, 8"	936	Equipment and power unit costs. Labor not included.	Hour	\$105.76	24	\$2,538.26

Labor

Equipment Operators, Light	232	Includes: Skid Steer Loaders, Hydraulic Excavators <50 HP, Trenchers <12", Ag Equipment <150 HP, Pickup Trucks, Forklifts, Mulchers	Hour	\$23.29	208	\$4,845.18
General Labor	231	Labor performed using basic tools such as power tool, shovels, and other tools that do not require extensive training. Ex. pipe layer, herder, concrete placement, materials spreader, flagger, etc.	Hour	\$21.64	160	\$3,463.06
Skilled Labor	230	Labor requiring a high level skill set: Includes carpenters, welders, electricians, conservation professionals involved with data collection, monitoring, and or record keeping, etc.	Hour	\$37.24	80	\$2,979.06

Mobilization

Mobilization, medium equipment	1139	Equipment with 70-150 HP or typical weights between 14,000 and 30,000 pounds.	Each	\$301.16	1	\$301.16
Mobilization, very small equipment	1137	Equipment that is small enough to be transported by a pick-up truck with typical weights less than 3,500 pounds. Can be multiple pieces of equipment if all hauled simultaneously.	Each	\$83.16	2	\$166.32

Materials

Covered Lagoon Flare	1666	Flare excess gas to convert from methane to carbon dioxide. Includes labor and equipment.	Each	\$12,910.72	2	\$25,821.44
Covered Lagoon Gas Collection System	1664	Piping and collection system for biogas. Includes labor and equipment.	Each	\$40,076.39	2	\$80,152.78

Synthetic Liner, 40 mil	1387	Synthetic 40 mil HDPE, LLDPE, EPDM, etc membrane liner material. Includes materials and shipping only.	Square Yard	\$6.12	14400	\$88,085.76
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Practice: 350 - Sediment Basin

Scenario: #1 - Excavated volume

Scenario Description: An excavated sediment basin in an existing drainage way on a farm for purpose of trapping sediment and preserving the capacity of reservoirs, ditches, canals, diversions, waterways and streams and to prevent undesirable deposition on bottom lands and other developed lands. The sediment basin 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. Resource concerns addressed include excessive suspended sediment and turbidity in surface water, damage from sediment deposition, and reduced capacity of conveyances by sediment deposition. Surface water causes the sediment (and potentially pesticides and nutrients) to be transported into the riparian areas and water bodies downstream.

Before Situation: Disturbed areas on all land uses that have excessive erosion lead to deterioration of receiving waters due to excessive sedimentation.

After Situation: The typical sediment basin is constructed by excavating 1500 cubic yards and spreading the spoil outside the pool area using a dozer or similar excavation equipment. The sediment storage capacity should be a minimum of 900 cubic feet per acre of disturbed area. The detention storage should be a minimum of 3600 cubic feet per acre of drainage area. Associated practice(s): Other practices that may need to be implemented along with sediment basin to address all of the site specific resource concerns include: Critical Area Planting (342) and Mulching (484) where necessary to prevent erosion following construction activities, Structure for Water Control (587) if using a dewatering device, Pond Sealing or Lining (521A,521B,521C,521D).

Scenario Feature Measure: Excavated volume

Scenario Unit: Cubic Yard

Scenario Typical Size: 1500

Total Scenario Cost: \$4,403.11

Scenario Cost/Unit: \$2.94

Cost Details

Component Name	Id	Description	Unit	Cost	Qty	Total
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Labor

Equipment Operators, Heavy	233	Includes: Cranes, Hydraulic Excavators >=50 HP, Dozers, Paving Machines, Rock Trenchers, Trenchers >=12", Dump Trucks, Ag Equipment >=150 HP, Scrapers, Water Wagons.	Hour	\$32.34	23	\$743.87
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Equipment Installation

Dozer, 140 HP	927	Track mounted Dozer with horsepower range of 125 to 160. Equipment and power unit costs. Labor not included.	Hour	\$146.00	23	\$3,358.08
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Mobilization

Mobilization, medium equipment	1139	Equipment with 70-150 HP or typical weights between 14,000 and 30,000 pounds.	Each	\$301.16	1	\$301.16
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Practice: 350 - Sediment Basin

Scenario: #2 - Embankment earthen basin with no pipe

Scenario Description: An low hazard class embankment earthen sediment basin in an existing drainage way on a farm for purpose of trapping sediment and preserving the capacity of reservoirs, ditches, canals, diversions, waterways and streams and to prevent undesirable deposition on bottom lands and other developed lands. An earthen embankment will be constructed with an earthen auxiliary spillway, as designed. Resource concerns addressed include excessive suspended sediment and turbidity in surface water, damage from sediment deposition, and reduced capacity of conveyances by sediment deposition. Surface water causes the sediment (and potentially pesticides and nutrients) to be transported into the riparian areas and water bodies downstream.

Before Situation: Disturbed areas on all land uses that have excessive erosion lead to deterioration of receiving waters due to excessive sedimentation.

After Situation: The typical sediment basin is constructed by excavating the pool area, constructing the auxiliary spillway, preparing the foundation as designed, and using 1500 cubic yards to create an embankment. The embankment will be designed and constructed according the pond standard (378). 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 sediment storage capacity should be a minimum of 900 cubic feet per acre of disturbed area. The detention storage should be a minimum of 3600 cubic feet per acre of drainage area. The earthen auxiliary spillway will be constructed as designed based on Pond standard (378). No principal spillway will be used. Associated practice(s): Other practices that may need to be implemented along with sediment basin to address all of the site specific resource concerns include: Critical Area Planting (342) and Mulching (484) where necessary to prevent erosion following construction activities, Structure for Water Control (587) if using a dewatering device, Pond Sealing or Lining (521A,521B,521C,521D).

Scenario Feature Measure: Embankment volume

Scenario Unit: Cubic Yard

Scenario Typical Size: 1500

Total Scenario Cost: \$4,403.11

Scenario Cost/Unit: \$2.94

Cost Details

Component Name	Id	Description	Unit	Cost	Qty	Total
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Labor

Equipment Operators, Heavy	233	Includes: Cranes, Hydraulic Excavators >=50 HP, Dozers, Paving Machines, Rock Trenchers, Trenchers >=12", Dump Trucks, Ag Equipment >=150 HP, Scrapers, Water Wagons.	Hour	\$32.34	23	\$743.87
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Equipment Installation

Dozer, 140 HP	927	Track mounted Dozer with horsepower range of 125 to 160. Equipment and power unit costs. Labor not included.	Hour	\$146.00	23	\$3,358.08
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Mobilization

Mobilization, medium equipment	1139	Equipment with 70-150 HP or typical weights between 14,000 and 30,000 pounds.	Each	\$301.16	1	\$301.16
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Practice: 350 - Sediment Basin

Scenario: #3 - Embankment earthen basin with pipe

Scenario Description: An low hazard class embankment earthen sediment basin in an existing drainage way on a farm for purpose of trapping sediment and preserving the capacity of reservoirs, ditches, canals, diversions, waterways and streams and to prevent undesirable deposition on bottom lands and other developed lands. An earthen embankment will be constructed with a principal spillway conduit and earthen auxiliary spillway, as designed. Resource concerns addressed include excessive suspended sediment and turbidity in surface water, damage from sediment deposition, and reduced capacity of conveyances by sediment deposition. Surface water causes the sediment (and potentially pesticides and nutrients) to be transported into the riparian areas and water bodies downstream.

Before Situation: Disturbed areas on all land uses that have excessive erosion lead to deterioration of receiving waters due to excessive sedimentation.

After Situation: The typical sediment basin is constructed by excavating the pool area, constructing the auxiliary spillway, preparing the foundation as designed, and using 1500 cubic yards to create an embankment. The embankment will be designed and constructed according the Pond standard (378). 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 sediment storage capacity should be a minimum of 900 cubic feet per acre of disturbed area. The detention storage should be a minimum of 3600 cubic feet per acre of drainage area. The principal spillway is created using an approved conduit material and filter diaphragm. The earthen auxiliary spillway will be constructed as designed based on Pond standard (378). Associated practice(s): Other practices that may need to be implemented along with sediment basin to address all of the site specific resource concerns include: Critical Area Planting (342) and Mulching (484) where necessary to prevent erosion following construction activities, Structure for Water Control (587) if using a dewatering device, Pond Sealing or Lining (521A,521B,521C,521D).

Scenario Feature Measure: Embankment volume

Scenario Unit: Cubic Yard

Scenario Typical Size: 1500

Total Scenario Cost: \$8,955.21

Scenario Cost/Unit: \$5.97

Cost Details

Component Name	Id	Description	Unit	Cost	Qty	Total
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Equipment Installation

Concrete, CIP, formed reinforced	38	Steel reinforced concrete formed and cast-in-placed in formed structures such as walls or suspended slabs by chute placement. Typical strength is 3000 to 4000 psi. Includes materials, labor and equipment to transport, place and finish.	Cubic Yard	\$449.19	3	\$1,347.57
Dozer, 140 HP	927	Track mounted Dozer with horsepower range of 125 to 160. Equipment and power unit costs. Labor not included.	Hour	\$146.00	23	\$3,358.08

Materials

Aggregate, Gravel, Graded	46	Gravel, includes materials, equipment and labor to transport and place. Includes washed and unwashed gravel.	Cubic Yard	\$31.47	1.6	\$50.36
Aggregate, Sand, Graded, Washed	45	Sand, typical ASTM C33 gradation, includes materials, equipment and labor to transport and place	Cubic Yard	\$31.05	19.6	\$608.59
Pipe, CMP, 18-16 gauge, weight priced	1322	18 & 16 gauge galvanized helical corrugated metal pipe priced by the weight of the pipe materials. Materials only.	Pound	\$1.18	1662	\$1,957.69
Trash Guard, metal	1608	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	\$2.46	118	\$289.99

Labor

Equipment Operators, Heavy	233	Includes: Cranes, Hydraulic Excavators >=50 HP, Dozers, Paving Machines, Rock Trenchers, Trenchers >=12", Dump Trucks, Ag Equipment >=150 HP, Scrapers, Water Wagons.	Hour	\$32.34	23	\$743.87
Skilled Labor	230	Labor requiring a high level skill set: Includes carpenters, welders, electricians, conservation professionals involved with data collection, monitoring, and or record keeping, etc.	Hour	\$37.24	8	\$297.91

Mobilization

Mobilization, medium equipment	1139	Equipment with 70-150 HP or typical weights between 14,000 and 30,000 pounds.	Each	\$301.16	1	\$301.16
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Practice: 646 - Shallow Water Development and Management

Scenario: #1 - Shallow Water Management

Scenario Description: This scenario addresses inadequate habitat for fish and wildlife on cropland. The resource concern is addressed by providing shallow water habitat for wildlife such as shorebirds, waterfowl, wading birds, mammals, fish, reptiles, amphibians, and other species that require shallow water for at least part of their life cycle. Sites are flooded up to a depth of 18" with an average depth of 9". Water is provided by natural flooding and/or precipitation.

Before Situation: There is inadequate habitat to provide optimum resting, nesting, and feeding habitat for waterfowl, shorebirds, and other wildlife (amphibians, reptiles, mammals, invertebrates, etc.).

After Situation: A single or series of shallow water areas that are managed per standard and specification. Water levels are regulated to maintain temporary wildlife habitat. Timing and duration of flooding and de-watering is dependent on specific species requirements. Water is pumped into area to be flooded. Flooded sites vary from mudflats to water depths of 18" with an average depth of 9". The hydrologic conditions of ponding and saturation (frequency, depth, duration, timing) provides optimum seasonal habitat for waterfowl, shorebirds, and other wildlife (amphibians, reptiles, mammals, invertebrates, etc.). If needed and dikes or water control structures are not currently present on the fields planned to be flooded, these practices may be planned for the same fields and cost shared under Structure for Water Control (587) and Dike (356). If a natural water source (i.e. precipitation or flooding) is not available, Pumping Plant (533) may be cost shared to provide a water source. Depending on local conditions, other Conservation Practices may also be required.

Scenario Feature Measure: Acre of shallow water

Scenario Unit: Acre

Scenario Typical Size: 1

Total Scenario Cost: \$21.64

Scenario Cost/Unit: \$21.64

Cost Details

Component Name	Id	Description	Unit	Cost	Qty	Total
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Labor

General Labor	231	Labor performed using basic tools such as power tool, shovels, and other tools that do not require extensive training. Ex. pipe layer, herder, concrete placement, materials spreader, flagger, etc.	Hour	\$21.64	1	\$21.64
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Practice: 646 - Shallow Water Development and Management

Scenario: #2 - Shallow Water Management, High Level

Scenario Description: This scenario addresses inadequate habitat for fish and wildlife on cropland. To facilitate practice code 643, 644, 645, or 395, seasonal shallow water is provided annually for target species by purchasing of water, lifting of such water, monitoring of the water quality, response by target plant community, use by target flora or fauna. Sites are flooded up to a depth of 18" with an average depth of 9". Monitoring and adaptive management accomplished of existing water control structures is accomplished to meet very specific conditions needed to address previously identified degraded plant conditions or inadequate habitat for fish and/or wildlife. This high-level management is applied to lands used for crop, pasture, hay, forests or wildlife lands where target flora and fauna have been identified as a primary concern. Loss of some level of crop, forage, hay or forest products may occur depending on site specific conditions.

Before Situation: The site has existing infrastructure (reliable water source, dikes, water control structures, pumps, gates) to provide a reliable seasonal water source. The site is not subject to frequent natural flooding. The potential benefits to target fauna and flora is not being captured. The purchase of water, supply of water and intensive management of season water, coupled with monitoring, adaptive management from highly trained individuals will fully address the identified degraded plant conditions and/or inadequate habitat for fish and/or wildlife.

After Situation: A single or series of shallow water areas that are managed per standard and specification. Water levels are regulated to maintain temporary wildlife habitat. Timing and duration of flooding and de-watering is dependent on specific species requirements. Water is pumped into area to be flooded. Flooded sites vary from mudflats to water depths of 18" with an average depth of 9". The hydrologic conditions of ponding and saturation (frequency, depth, duration, timing) provides optimum seasonal habitat for waterfowl, shorebirds, and other wildlife (amphibians, reptiles, mammals, invertebrates, etc.). If Dikes or Water Control Structures are not currently present on the fields planned to be flooded, these practices may be planned for the same fields and cost shared under Structure for Water Control (587) and Dike (356). If a natural water source (i.e. precipitation or flooding) is not available, Pumping Plant (533) may be cost shared to provide a water source. Depending on local conditions, other Conservation Practices may also be required.

Scenario Feature Measure: Acre of shallow water

Scenario Unit: Acre

Scenario Typical Size: 1

Total Scenario Cost: \$257.35

Scenario Cost/Unit: \$257.35

Cost Details

Component Name	Id	Description	Unit	Cost	Qty	Total
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Labor

General Labor	231	Labor performed using basic tools such as power tool, shovels, and other tools that do not require extensive training. Ex. pipe layer, herder, concrete placement, materials spreader, flagger, etc.	Hour	\$21.64	1	\$21.64
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Acquisition of Technical Knowledge

Training, Workshops	294	Educational seminar or series of meetings emphasizing interaction and exchange of information among a usually small number of participants.	Each	\$45.80	1	\$45.80
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Equipment Installation

Water management, Flooding & dewatering	969	Includes equipment and power unit. Labor not included.	Acre Foot	\$253.20	0.75	\$189.90
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Practice: 574 - Spring Development

Scenario: #1 - Spring Development laterals

Scenario Description: Develop a water source from a low yielding, diffuse flow 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 two 75 ft long, 4 inch diameter HDPE perforated pipe laterals enclosed in a sand/gravel envelope overlaid by 2 ft wide filter fabric (150 ft long) and behind compacted soil and plastic to retain water. Water is directed (via 20 ft long, 4 inch PVC) to a spring box (3' diameter well casing x 8 ft long) 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 outflow pipe from the spring box can be directed to buried large storage (not included), and 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 Situation: Livestock operation with inadequate fresh water for livestock and an on-site undeveloped spring/seep.

After 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

Total Scenario Cost: \$5,168.25

Scenario Cost/Unit: \$5,168.25

Cost Details

Component Name	Id	Description	Unit	Cost	Qty	Total
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Equipment Installation

Backhoe, 80 HP	926	Wheel mounted backhoe excavator with horsepower range of 60 to 90. Equipment and power unit costs. Labor not included.	Hour	\$65.99	16	\$1,055.76
Geotextile, woven	42	Woven Geotextile Fabric. Includes materials, equipment and labor	Square Yard	\$2.66	33	\$87.90

Materials

Aggregate, Gravel, Graded	46	Gravel, includes materials, equipment and labor to transport and place. Includes washed and unwashed gravel.	Cubic Yard	\$31.47	20	\$629.44
Aggregate, Sand, Graded, Washed	45	Sand, typical ASTM C33 gradation, includes materials, equipment and labor to transport and place	Cubic Yard	\$31.05	10	\$310.51
Pipe, HDPE, 4", PCPT, Single Wall	1270	Pipe, Corrugated Plastic Tubing, Single Wall, Perforated, 4" diameter - ASTM F405. Material cost only.	Foot	\$0.48	150	\$72.53
Pipe, PVC, 1 1/2", SCH 40	975	Materials: - 1 1/2" - PVC - SCH 40 - ASTM D1785	Foot	\$1.12	20	\$22.33
Pipe, PVC, 4", SCH 40	978	Materials: - 4" - PVC - SCH 40 - ASTM D1785	Foot	\$4.31	50	\$215.48
Poly film, 6 mil.	245	6 mil, polyethylene, black	Square Foot	\$0.08	1500	\$118.54
Spring Collection Box Cover, steel, 4' diameter	1281	4' diameter x 1/4" thick Steel lid with handle for spring collection box. Materials and fabrication.	Each	\$186.47	1	\$186.47
Well Casing, Concrete	2173	Concrete tile 3' diameter x 8' long. Materials only.	Foot	\$56.92	8	\$455.35

Labor

Equipment Operators, Light	232	Includes: Skid Steer Loaders, Hydraulic Excavators <50 HP, Trenchers <12", Ag Equipment <150 HP, Pickup Trucks, Forklifts, Mulchers	Hour	\$23.29	16	\$372.71
General Labor	231	Labor performed using basic tools such as power tool, shovels, and other tools that do not require extensive training. Ex. pipe layer, herder, concrete placement, materials spreader, flagger, etc.	Hour	\$21.64	48	\$1,038.92

Mobilization

Mobilization, medium equipment	1139	Equipment with 70-150 HP or typical weights between 14,000 and 30,000 pounds.	Each	\$301.16	2	\$602.32
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Practice: 574 - Spring Development

Scenario: #2 - Spring Development no lateral

Scenario Description: Develop a water source from a high yielding point source 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) at a point source natural spring or adjacent to a pond. Water seeps through back filled gravel to a perforated spring box (3' diameter well casing, 8 ft long) equipped with a watertight lid and two outlets. Compacted soil and plastic is placed below the spring box to cut off water flow. One outlet serves as overflow pipe to account for occasions where inflow exceeds outflow. The outflow pipe from the spring box can be directed to buried large storage (not included), and to a watering facility (not included) for use Resource Concern: Livestock production limitation - Inadequate livestock water. Associated Practices: Livestock Pipeline (516), Watering Facility (614), Fence (382), Critical Area Planting (342); Pumping Plant (533).

Before Situation: Livestock operation with inadequate fresh water for livestock and an on-site undeveloped spring/seep.

After 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

Total Scenario Cost: \$3,014.58

Scenario Cost/Unit: \$3,014.58

Cost Details

Component Name	Id	Description	Unit	Cost	Qty	Total
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Equipment Installation

Backhoe, 80 HP	926	Wheel mounted backhoe excavator with horsepower range of 60 to 90. Equipment and power unit costs. Labor not included.	Hour	\$65.99	8	\$527.88
Geotextile, woven	42	Woven Geotextile Fabric. Includes materials, equipment and labor	Square Yard	\$2.66	7	\$18.64

Materials

Aggregate, Gravel, Graded	46	Gravel, includes materials, equipment and labor to transport and place. Includes washed and unwashed gravel.	Cubic Yard	\$31.47	10	\$314.72
Pipe, PVC, 1 1/2", SCH 40	975	Materials: - 1 1/2" - PVC - SCH 40 - ASTM D1785	Foot	\$1.12	20	\$22.33
Poly film, 6 mil.	245	6 mil, polyethylene, black	Square Foot	\$0.08	100	\$7.90
Spring Collection Box Cover, steel, 4' diameter	1281	4' diameter x 1/4" thick Steel lid with handle for spring collection box. Materials and fabrication.	Each	\$186.47	1	\$186.47
Well Casing, Concrete	2173	Concrete tile 3' diameter x 8' long. Materials only.	Foot	\$56.92	8	\$455.35

Labor

Equipment Operators, Light	232	Includes: Skid Steer Loaders, Hydraulic Excavators <50 HP, Trenchers <12", Ag Equipment <150 HP, Pickup Trucks, Forklifts, Mulchers	Hour	\$23.29	8	\$186.35
General Labor	231	Labor performed using basic tools such as power tool, shovels, and other tools that do not require extensive training. Ex. pipe layer, herder, concrete placement, materials spreader, flagger, etc.	Hour	\$21.64	32	\$692.61

Mobilization

Mobilization, medium equipment	1139	Equipment with 70-150 HP or typical weights between 14,000 and 30,000 pounds.	Each	\$301.16	2	\$602.32
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Practice: 574 - Spring Development

Scenario: #3 - Spring Box with laterals

Scenario Description: Develop a water source from a low yielding, diffuse flow 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 two 100 ft long, 4 inch diameter HDPE perforated pipe laterals enclosed in a sand/gravel envelope overlaid by 2 ft wide filter fabric (200 ft long) and behind compacted soil and plastic to retain water. Water is directed (via 20 ft long, 4 inch PVC) to a concrete CIP or precast spring box with 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 outflow pipe from the spring box can be directed 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 Situation: Livestock operation with inadequate fresh water for livestock and an on-site undeveloped spring/seep.

After 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

Total Scenario Cost: \$7,347.79

Scenario Cost/Unit: \$7,347.79

Cost Details

Component Name	Id	Description	Unit	Cost	Qty	Total
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Equipment Installation

Backhoe, 80 HP	926	Wheel mounted backhoe excavator with horsepower range of 60 to 90. Equipment and power unit costs. Labor not included.	Hour	\$65.99	20	\$1,319.70
Concrete, CIP, formed reinforced	38	Steel reinforced concrete formed and cast-in-placed in formed structures such as walls or suspended slabs by chute placement. Typical strength is 3000 to 4000 psi. Includes materials, labor and equipment to transport, place and finish.	Cubic Yard	\$449.19	4	\$1,796.76
Geotextile, woven	42	Woven Geotextile Fabric. Includes materials, equipment and labor	Square Yard	\$2.66	44	\$117.20

Materials

Aggregate, Gravel, Graded	46	Gravel, includes materials, equipment and labor to transport and place. Includes washed and unwashed gravel.	Cubic Yard	\$31.47	25	\$786.81
Aggregate, Sand, Graded, Washed	45	Sand, typical ASTM C33 gradation, includes materials, equipment and labor to transport and place	Cubic Yard	\$31.05	13	\$403.66
Pipe, HDPE, 4", PCPT, Single Wall	1270	Pipe, Corrugated Plastic Tubing, Single Wall, Perforated, 4" diameter - ASTM F405. Material cost only.	Foot	\$0.48	200	\$96.71
Pipe, PVC, 4", SCH 40	978	Materials: - 4" - PVC - SCH 40 - ASTM D1785	Foot	\$4.31	50	\$215.48
Poly film, 6 mil.	245	6 mil, polyethylene, black	Square Foot	\$0.08	2000	\$158.06

Labor

Equipment Operators, Light	232	Includes: Skid Steer Loaders, Hydraulic Excavators <50 HP, Trenchers <12", Ag Equipment <150 HP, Pickup Trucks, Forklifts, Mulchers	Hour	\$23.29	20	\$465.88
General Labor	231	Labor performed using basic tools such as power tool, shovels, and other tools that do not require extensive training. Ex. pipe layer, herder, concrete placement, materials spreader, flagger, etc.	Hour	\$21.64	64	\$1,385.22

Mobilization

Mobilization, medium equipment	1139	Equipment with 70-150 HP or typical weights between 14,000 and 30,000 pounds.	Each	\$301.16	2	\$602.32
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Practice: 574 - Spring Development

Scenario: #4 - Plastic Tank With Laterals

Scenario Description: Develop a water source from a low yielding, diffuse flow 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 two 100 ft long, 4 inch diameter HDPE perforated pipe laterals enclosed in a sand/gravel envelope overlaid by 2 ft wide filter fabric (200 ft long) and behind compacted soil and plastic to retain water. Water is directed (via 20 ft long, 4 inch PVC) to a plastic 1000 gal tank with 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 outflow pipe from the spring box can be directed 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 Situation: Livestock operation with inadequate fresh water for livestock and an on-site undeveloped spring/seep.

After 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

Total Scenario Cost: \$5,772.61

Scenario Cost/Unit: \$5,772.61

Cost Details

Component Name	Id	Description	Unit	Cost	Qty	Total
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Equipment Installation

Backhoe, 80 HP	926	Wheel mounted backhoe excavator with horsepower range of 60 to 90. Equipment and power unit costs. Labor not included.	Hour	\$65.99	16	\$1,055.76
Geotextile, woven	42	Woven Geotextile Fabric. Includes materials, equipment and labor	Square Yard	\$2.66	44	\$117.20

Materials

Aggregate, Gravel, Graded	46	Gravel, includes materials, equipment and labor to transport and place. Includes washed and unwashed gravel.	Cubic Yard	\$31.47	25	\$786.81
Aggregate, Sand, Graded, Washed	45	Sand, typical ASTM C33 gradation, includes materials, equipment and labor to transport and place	Cubic Yard	\$31.05	13	\$403.66
Pipe, HDPE, 4", PCPT, Single Wall	1270	Pipe, Corrugated Plastic Tubing, Single Wall, Perforated, 4" diameter - ASTM F405. Material cost only.	Foot	\$0.48	200	\$96.71
Pipe, PVC, 4", SCH 40	978	Materials: - 4" - PVC - SCH 40 - ASTM D1785	Foot	\$4.31	50	\$215.48
Poly film, 6 mil.	245	6 mil, polyethylene, black	Square Foot	\$0.08	2000	\$158.06
Tank, Poly Enclosed Storage, >1,000	1075	Water storage tanks. Includes materials and shipping only.	Gallon	\$0.93	1000	\$925.00

Labor

Equipment Operators, Light	232	Includes: Skid Steer Loaders, Hydraulic Excavators <50 HP, Trenchers <12", Ag Equipment <150 HP, Pickup Trucks, Forklifts, Mulchers	Hour	\$23.29	16	\$372.71
General Labor	231	Labor performed using basic tools such as power tool, shovels, and other tools that do not require extensive training. Ex. pipe layer, herder, concrete placement, materials spreader, flagger, etc.	Hour	\$21.64	48	\$1,038.92

Mobilization

Mobilization, medium equipment	1139	Equipment with 70-150 HP or typical weights between 14,000 and 30,000 pounds.	Each	\$301.16	2	\$602.32
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Practice: 442 - Sprinkler System

Scenario: #1 - Center Pivot System

Scenario Description: Installation of a low to medium 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 Situation: A 57 acre field is irrigated with traveling guns. 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 Situation: The existing traveling gun irrigation system is converted to a low pressure center pivot. Corners are converted to non-irrigated cropland. The pivot is 885 feet in length with pressure regulators and low to medium pressure sprinklers on drops. The new irrigation system has a coefficient of uniformity above 85%. Irrigation water is efficiently and uniformly applied 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: Foot

Scenario Typical Size: 885

Total Scenario Cost: \$72,930.78

Scenario Cost/Unit: \$82.41

Cost Details

Component Name	Id	Description	Unit	Cost	Qty	Total
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Labor

General Labor	231	Labor performed using basic tools such as power tool, shovels, and other tools that do not require extensive training. Ex. pipe layer, herder, concrete placement, materials spreader, flagger, etc.	Hour	\$21.64	1	\$21.64
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Materials

Flow Meter, with Electronic Index	1452	10 inch Turbine Irrigation flow meter, with Electronic Index, Rate and Volume, permanently installed. Materials only.	Each	\$3,652.10	1	\$3,652.10
Irrigation, Center pivot system with appurtenances, fixed cost portion	317	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	\$6,441.55	1	\$6,441.55
Irrigation, Center pivot system with appurtenances, variable cost portion	318	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	\$70.54	885	\$62,431.17

Mobilization

Mobilization, medium equipment	1139	Equipment with 70-150 HP or typical weights between 14,000 and 30,000 pounds.	Each	\$301.16	1	\$301.16
Mobilization, very small equipment	1137	Equipment that is small enough to be transported by a pick-up truck with typical weights less than 3,500 pounds. Can be multiple pieces of equipment if all hauled simultaneously.	Each	\$83.16	1	\$83.16

Practice: 442 - Sprinkler System

Scenario: #2 - Linear Move System

Scenario Description: Installation of a fixed linear or lateral move sprinkler system with sprinklers on drops with or without drag hoses to improve irrigation efficiency and reduce soil erosion. 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 Situation: A 76 acre field is irrigated with a traveling gun. 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 Situation: A typical unit is approximately 76 acres in size with the sprinkler system up to 1280 feet in length with drop tubes that have a minimum of 30" spacing. The new irrigation system has a coefficient of uniformity above 85%. Irrigation water is efficiently and uniformly applied 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.

Scenario Feature Measure: Length of Linear Move Lateral

Scenario Unit: Foot

Scenario Typical Size: 1280

Total Scenario Cost: \$130,272.16

Scenario Cost/Unit: \$101.78

Cost Details

Component Name	Id	Description	Unit	Cost	Qty	Total
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Labor

General Labor	231	Labor performed using basic tools such as power tool, shovels, and other tools that do not require extensive training. Ex. pipe layer, herder, concrete placement, materials spreader, flagger, etc.	Hour	\$21.64	1	\$21.64
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Materials

Flow Meter, with Electronic Index	1452	10 inch Turbine Irrigation flow meter, with Electronic Index, Rate and Volume, permanently installed. Materials only.	Each	\$3,652.10	1	\$3,652.10
Linear Move System with appurtenances	322	Linear/lateral move system including: central tower, lateral towers, pipes, sprinklers, controllers, installation.	Acre	\$1,660.71	76	\$126,214.10

Mobilization

Mobilization, medium equipment	1139	Equipment with 70-150 HP or typical weights between 14,000 and 30,000 pounds.	Each	\$301.16	1	\$301.16
Mobilization, very small equipment	1137	Equipment that is small enough to be transported by a pick-up truck with typical weights less than 3,500 pounds. Can be multiple pieces of equipment if all hauled simultaneously.	Each	\$83.16	1	\$83.16

Practice: 442 - Sprinkler System

Scenario: #3 - Renovation of Existing Sprinkler System

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 conservation. A typical scenario assumes a 885 LF span, including end booms 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 Situation: A center pivot or lateral move system has high pressure sprinklers. 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 Situation: A Center Pivot or Linear Move sprinkler system with a span of 885 linear feet is re-nozzled with low-pressure nozzles. 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 requirements of the sprinklers reduces the energy used by the pump.

Scenario Feature Measure: Length of Lateral Retrofitted

Scenario Unit: Foot

Scenario Typical Size: 885

Total Scenario Cost: \$16,515.47

Scenario Cost/Unit: \$18.66

Cost Details

Component Name	Id	Description	Unit	Cost	Qty	Total
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Labor

Equipment Operators, Light	232	Includes: Skid Steer Loaders, Hydraulic Excavators <50 HP, Trenchers <12", Ag Equipment <150 HP, Pickup Trucks, Forklifts, Mulchers	Hour	\$23.29	6	\$139.76
General Labor	231	Labor performed using basic tools such as power tool, shovels, and other tools that do not require extensive training. Ex. pipe layer, herder, concrete placement, materials spreader, flagger, etc.	Hour	\$21.64	7	\$151.51

Mobilization

Mobilization, medium equipment	1139	Equipment with 70-150 HP or typical weights between 14,000 and 30,000 pounds.	Each	\$301.16	1	\$301.16
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Materials

Flow Meter, with Electronic Index	1452	10 inch Turbine Irrigation flow meter, with Electronic Index, Rate and Volume, permanently installed. Materials only.	Each	\$3,652.10	1	\$3,652.10
Irrigation, Sprinkler Package, Renozzle or Retrofit, with drops and pressure regulators	1480	Sprinkler Package - Renovation including sprinkler nozzle addition, and/or replacement, including new pressure regulators and drops.	Foot	\$13.53	885	\$11,972.96

Equipment Installation

Aerial lift, telescoping bucket	1893	Aerial lift, bucket truck or cherry picker, typical 40' boom. Equipment only.	Hour	\$49.66	6	\$297.98
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Practice: 442 - Sprinkler System

Scenario: #4 - Pivoting Linear Move

Scenario Description: Installation of a pivoting linear or lateral move sprinkler system with sprinklers on drops with or without drag hoses to improve irrigation efficiency and reduce soil erosion. It will turn to irrigate adjacent field. 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 Situation: A 76 acre field is irrigated with a traveling gun. 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 Situation: A typical unit is approximately 76 acres in size with the sprinkler system up to 1280 feet in length with drop tubes that have a minimum of 30" spacing. The unit turns to be able to irrigate an adjacent field. The new irrigation system has a coefficient of uniformity above 85%. Irrigation water is efficiently and uniformly applied 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.

Scenario Feature Measure: Length of main system

Scenario Unit: Foot

Scenario Typical Size: 1280

Total Scenario Cost: \$150,489.05

Scenario Cost/Unit: \$117.57

Cost Details

Component Name	Id	Description	Unit	Cost	Qty	Total
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Labor

General Labor	231	Labor performed using basic tools such as power tool, shovels, and other tools that do not require extensive training. Ex. pipe layer, herder, concrete placement, materials spreader, flagger, etc.	Hour	\$21.64	1	\$21.64
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Mobilization

Mobilization, medium equipment	1139	Equipment with 70-150 HP or typical weights between 14,000 and 30,000 pounds.	Each	\$301.16	1	\$301.16
Mobilization, very small equipment	1137	Equipment that is small enough to be transported by a pick-up truck with typical weights less than 3,500 pounds. Can be multiple pieces of equipment if all hauled simultaneously.	Each	\$83.16	1	\$83.16

Materials

Flow Meter, with Electronic Index	1452	10 inch Turbine Irrigation flow meter, with Electronic Index, Rate and Volume, permanently installed. Materials only.	Each	\$3,652.10	1	\$3,652.10
Irrigation, Lateral Move Pivot, Fixed Cost Portion	2448	Fixed cost portion of a lateral move pivot system with appurtenances. This portion includes all sprinklers, installation, pipe, tower.	Each	\$1.06	1	\$1.06
Irrigation, Lateral Move Pivot, Variable Cost Portion	2449	Variable cost portion of lateral move pivot system with appurtenances. This portion includes all sprinklers, installation, pipe, tower.	Foot	\$114.40	1280	\$146,429.93

Practice: 442 - Sprinkler System

Scenario: #5 - Traveling gun <2"

Scenario Description: A portable small gun system used to apply liquid waste on small fields. A small traveling gun system is installed to apply waste water uniformly and at an acceptable application rate operated under pressure to effectively irrigate less than 3 acres. The system is installed with all necessary appurtenances. Associated Practices: Irrigation Pipeline (430), Pumping Plant (533), Irrigation Water Management (449), Conservation Crop Rotation (328), Cover Crop (340), Nutrient Management (590), Waste Utilization (633), Manure Transfer (634)

Before Situation: An existing traveling gun on a 5 acre field is inefficient and is not applying water uniformly or not at an acceptable application rate. Excess applied water causes irrigation induced erosion, runoff and deep percolation. The runoff and deep percolation degrade the receiving waters.

After Situation: An existing waste application system on a 5 acre field is inefficient and is not applying waste uniformly or not at an acceptable application rate. Excess applied waste causes vegetative treatment strip, runoff and deep percolation of nutrients. The runoff and deep percolation degrade the receiving waters. Associated Practices: Waste Transfer, CNMP (102),

Scenario Feature Measure: Number of Traveling Gun Systems

Scenario Unit: Each

Scenario Typical Size: 1

Total Scenario Cost: \$8,692.17

Scenario Cost/Unit: \$8,692.17

Cost Details

Component Name	Id	Description	Unit	Cost	Qty	Total
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Materials

Irrigation, Traveling Gun System with <= 2" Nominal size hose, and appurtenances light duty	1478	Irrigation, Traveling Gun System with <= 2" Nominal size hose with appurtenances. This includes the sprinkler gun, traveler cart, hard hose, reel, connections, controls, and installation. Normal hose length 500'	Inch Diameter	\$8,692.17	1	\$8,692.17
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Practice: 442 - Sprinkler System

Scenario: #6 - Traveling Gun, 2" or >

Scenario Description: A portable big gun system used to apply waste water from animal feeding operations. This traveling big gun unit includes a sprinkler, towable cart, 1000' or more of PE hard hose, a self propelled reel that moves the sprinkler toward the reel during operation. The reel attaches to a mainline with appropriately designed towpath width. The scenario describes an irrigation system that is typical to confined animal feeding operations. Resource concerns: Soil Erosion (Concentrated flow erosion, e.g. overflowing waste storage) and Water Quality Degradation (Excess nutrients in surface and ground waters, Excessive salts in surface and ground waters, Excess pathogens and chemicals from liquid manure) Associated Practices: Irrigation Pipeline (430), Pumping Plant (533), Irrigation Water Management (449), Conservation Crop Rotation (328), Cover Crop (340), Nutrient Management (590), Waste Utilization (633), Manure Transfer (634)

Before Situation: A confined, animal operation has a waste management system that exceeds its capacity, or a operation that does not have a waste management system in place. The inefficiency of the existing system or the lack of a waste management system has an impact on the soil and water quality. Animal waste runs off and degrades the receiving waters.

After Situation: The big gun applies animal manure in an appropriate quantity and location that eliminates both runoff of the manure and deep percolation of excess nutrients, salts, and pathogens. The big gun system is typically located on 50 acres or less of hay/pasture land, or 100 acres or less of cropland. The system includes a large irrigation gun with 1" to 1½" orifice mounted onto a movable cart. 1000' or more flexible 2.5 - 3" PE pipe is attached to the cart on one end and a large reel on the other end. The reel serves as storage for the pipe as the cart moves back to the reel. The reel is turned by a small engine which gradually pulls the flexible pipe and cart back to the reel/base.

Scenario Feature Measure: No. of systems

Scenario Unit: Each

Scenario Typical Size: 1

Total Scenario Cost: \$23,425.92

Scenario Cost/Unit: \$23,425.92

Cost Details

Component Name	Id	Description	Unit	Cost	Qty	Total
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Materials

Irrigation, Traveling Gun System, > 2" to 3 " Nominal size hose	1479	Irrigation, Traveling Gun System with 2.3 to 3 " Nominal size hose with appurtenances. This includes the sprinkler gun, traveler cart, hard hose, reel, connections, controls, and installation. Normal hose length 1000'.	Inch Diameter	\$7,808.64	3	\$23,425.92
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Practice: 580 - Streambank and Shoreline Protection

Scenario: #1 - Vegetative

Scenario Description: Protection of streambanks consisting of conventional plantings of vegetation to stabilize and protect 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, critical area vegetation and erosion control fabric; a 6-foot high bank at 3(H):1(V) slope for 1000 linear feet (0.46 acres) is used for estimation purposes. 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; 484 - Mulching

Before 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 marginally 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 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: Square Feet of Streambank/Shoreline Protected

Scenario Unit: Square Foot

Scenario Typical Size: 20000

Total Scenario Cost: \$17,791.64

Scenario Cost/Unit: \$0.89

Cost Details

Component Name	Id	Description	Unit	Cost	Qty	Total
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Equipment Installation

Dozer, 80 HP	929	Track mounted Dozer with horsepower range of 60 to 90. Equipment and power unit costs. Labor not included.	Hour	\$77.85	32	\$2,491.18
Excavation, Common Earth, side cast, small equipment	48	Bulk excavation and side casting of common earth with hydraulic excavator with less than 1 CY capacity. Includes equipment and labor.	Cubic Yard	\$2.58	2500	\$6,446.80
Seeding Operation, Broadcast, Ground	959	Broadcast seed via ground operation. May require post tillage operation to incorporate seed. Includes equipment, power unit and labor costs.	Acre	\$14.86	0.46	\$6.84

Labor

Equipment Operators, Light	232	Includes: Skid Steer Loaders, Hydraulic Excavators <50 HP, Trenchers <12", Ag Equipment <150 HP, Pickup Trucks, Forklifts, Mulchers	Hour	\$23.29	32	\$745.41
General Labor	231	Labor performed using basic tools such as power tool, shovels, and other tools that do not require extensive training. Ex. pipe layer, herder, concrete placement, materials spreader, flagger, etc.	Hour	\$21.64	224	\$4,848.28
Supervisor or Manager	234	Labor involving supervision or management activities. Includes crew supervisors, foremen and farm/ranch managers time required for adopting new technology, etc.	Hour	\$43.40	56	\$2,430.18

Mobilization

Mobilization, medium equipment	1139	Equipment with 70-150 HP or typical weights between 14,000 and 30,000 pounds.	Each	\$301.16	2	\$602.32
Mobilization, small equipment	1138	Equipment <70 HP but can't be transported by a pick-up truck or with typical weights between 3,500 to 14,000 pounds.	Each	\$202.55	1	\$202.55

Materials

One Species, Cool Season, Annual Grass or Legume	2311	Cool season annual grass or legume. Includes material and shipping only.	Acre	\$39.29	0.46	\$18.08
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Practice: 580 - Streambank and Shoreline Protection

Scenario: #2 - 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, critical area vegetation, livestock, 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. 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; 484 - Mulching; 570 - Stormwater runoff control

Before 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 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: Square Feet of Streambank/Shoreline Protected

Scenario Unit: Square Foot

Scenario Typical Size: 20000

Total Scenario Cost: \$28,467.87

Scenario Cost/Unit: \$1.42

Cost Details

Component Name	Id	Description	Unit	Cost	Qty	Total
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Equipment Installation

Dozer, 80 HP	929	Track mounted Dozer with horsepower range of 60 to 90. Equipment and power unit costs. Labor not included.	Hour	\$77.85	16	\$1,245.59
Excavation, Common Earth, side cast, small equipment	48	Bulk excavation and side casting of common earth with hydraulic excavator with less than 1 CY capacity. Includes equipment and labor.	Cubic Yard	\$2.58	2500	\$6,446.80
Hydraulic Excavator, .5 CY	930	Track mounted hydraulic excavator with bucket capacity range of 0.3 to 0.8 CY. Equipment and power unit costs. Labor not included.	Hour	\$73.86	32	\$2,363.48
Seeding Operation, Broadcast, Ground	959	Broadcast seed via ground operation. May require post tillage operation to incorporate seed. Includes equipment, power unit and labor costs.	Acre	\$14.86	0.46	\$6.84

Labor

Equipment Operators, Heavy	233	Includes: Cranes, Hydraulic Excavators >=50 HP, Dozers, Paving Machines, Rock Trenchers, Trenchers >=12", Dump Trucks, Ag Equipment >=150 HP, Scrapers, Water Wagons.	Hour	\$32.34	32	\$1,034.95
Equipment Operators, Light	232	Includes: Skid Steer Loaders, Hydraulic Excavators <50 HP, Trenchers <12", Ag Equipment <150 HP, Pickup Trucks, Forklifts, Mulchers	Hour	\$23.29	48	\$1,118.12
General Labor	231	Labor performed using basic tools such as power tool, shovels, and other tools that do not require extensive training. Ex. pipe layer, herder, concrete placement, materials spreader, flagger, etc.	Hour	\$21.64	384	\$8,311.34

Supervisor or Manager	234	Labor involving supervision or management activities. Includes crew supervisors, foremen and farm/ranch managers time required for adopting new technology, etc.	Hour	\$43.40	80	\$3,471.69
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Mobilization

Mobilization, medium equipment	1139	Equipment with 70-150 HP or typical weights between 14,000 and 30,000 pounds.	Each	\$301.16	3	\$903.47
Mobilization, small equipment	1138	Equipment <70 HP but can't be transported by a pick-up truck or with typical weights between 3,500 to 14,000 pounds.	Each	\$202.55	1	\$202.55

Materials

One Species, Cool Season, Annual Grass or Legume	2311	Cool season annual grass or legume. Includes material and shipping only.	Acre	\$39.29	0.46	\$18.08
Tree, willow	1426	Willow tree for planting, 18" to 36" seedling. Includes materials and shipping only.	Each	\$0.67	5000	\$3,344.97

Practice: 580 - Streambank and Shoreline Protection

Scenario: #3 - Structural, >5 ft bank

Scenario Description: Protection of streambanks using structural measures such as riprap, concrete block, gabions, etc. to stabilize and protect banks of streams or excavated channels against scour and erosion. Additional structural measures may also include tree revetments; log, rootwad and boulder revetments; dormant post plantings; piling revetments with wire or geotextile fencing; piling revetments with slotted fencing; jacks or jack fields; rock riprap; stream jetties; stream barbs; and gabions. 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, critical area vegetation, 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. 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; 484 - Mulching; 570 - Stormwater runoff control

Before 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 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: Cubic Yards of Material

Scenario Unit: Cubic Yard

Scenario Typical Size: 1667

Total Scenario Cost: \$225,586.84

Scenario Cost/Unit: \$135.33

Cost Details

Component Name	Id	Description	Unit	Cost	Qty	Total
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Materials

One Species, Cool Season, Annual Grass or Legume	2311	Cool season annual grass or legume. Includes material and shipping only.	Acre	\$39.29	0.46	\$18.08
Rock Riprap, Placed with geotextile	44	Rock Riprap, placed with geotextile, includes materials, equipment and labor to transport and place	Cubic Yard	\$83.15	1667	\$138,616.84
Steel, rebar	1832	Steel rebar, grade 60. Materials only.	Pound	\$0.55	5280	\$2,901.10

Equipment Installation

Dozer, 80 HP	929	Track mounted Dozer with horsepower range of 60 to 90. Equipment and power unit costs. Labor not included.	Hour	\$77.85	48	\$3,736.77
Earthfill, Roller Compacted	49	Earthfill, roller or machine compacted, includes equipment and labor	Cubic Yard	\$4.87	2500	\$12,183.60
Excavation, common earth, wet, side cast, large equipment	1228	Bulk excavation and side casting of wet common earth with hydraulic excavator or dragline with greater than 1 CY capacity. Includes equipment and labor.	Cubic Yard	\$5.08	3500	\$17,796.24
Hydraulic Excavator, 1 CY	931	Track mounted hydraulic excavator with bucket capacity range of 0.8 to 1.5 CY. Equipment and power unit costs. Labor not included.	Hour	\$133.90	33	\$4,418.69
Seeding Operation, Broadcast, Ground	959	Broadcast seed via ground operation. May require post tillage operation to incorporate seed. Includes equipment, power unit and labor costs.	Acre	\$14.86	0.12	\$1.78
Water management, Flooding & dewatering	969	Includes equipment and power unit. Labor not included.	Acre Foot	\$253.20	60	\$15,192.20

Labor

Equipment Operators, Heavy	233	Includes: Cranes, Hydraulic Excavators >=50 HP, Dozers, Paving Machines, Rock Trenchers, Trenchers >=12", Dump Trucks, Ag Equipment >=150 HP, Scrapers, Water Wagons.	Hour	\$32.34	48	\$1,552.42
General Labor	231	Labor performed using basic tools such as power tool, shovels, and other tools that do not require extensive training. Ex. pipe layer, herder, concrete placement, materials spreader, flagger, etc.	Hour	\$21.64	352	\$7,618.73
Supervisor or Manager	234	Labor involving supervision or management activities. Includes crew supervisors, foremen and farm/ranch managers time required for adopting new technology, etc.	Hour	\$43.40	80	\$3,471.69

Mobilization

Mobilization, large equipment	1140	Equipment >150HP or typical weights greater than 30,000 pounds or loads requiring over width or over length permits.	Each	\$574.99	1	\$574.99
Mobilization, Material, distance > 50 miles	1043	Mobilization cost of materials for special cases where the distance from the supplier delivery point to the job site exceeds 50 miles. The costs for shipping by UPS or bulk freight shipping to a location within 50 miles of the job site have already been included in the component price.	Dollar	\$1.00	17000	\$17,000.00
Mobilization, medium equipment	1139	Equipment with 70-150 HP or typical weights between 14,000 and 30,000 pounds.	Each	\$301.16	1	\$301.16
Mobilization, small equipment	1138	Equipment <70 HP but can't be transported by a pick-up truck or with typical weights between 3,500 to 14,000 pounds.	Each	\$202.55	1	\$202.55

Practice: 580 - Streambank and Shoreline Protection

Scenario: #4 - Structural small, banks less than 4 ft

Scenario Description: Protection of streambanks using structural measures such as riprap, concrete block, gabions, etc. to stabilize and protect banks of streams or excavated channels against scour and erosion. Additional structural measures may also include tree revetments; log, rootwad and boulder revetments; dormant post plantings; piling revetments with wire or geotextile fencing; piling revetments with slotted fencing; jacks or jack fields; rock riprap; stream jetties; stream barbs; and gabions. 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, critical area vegetation, geotextile, and rock rip rap; a 4-foot high bank at 3(H):1(V) slope for 1000 linear feet (0.21 acres) is used for estimation purposes. The rock toe will be 2' thick and 3' high. The bank above the riprap will be graded to a stable slope and revegetated. 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; 484 - Mulching; 570 - Stormwater runoff control

Before 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 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: Cubic Yards of Material

Scenario Unit: Cubic Yard

Scenario Typical Size: 800

Total Scenario Cost: \$110,317.25

Scenario Cost/Unit: \$137.90

Cost Details

Component Name	Id	Description	Unit	Cost	Qty	Total
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Materials

One Species, Cool Season, Annual Grass or Legume	2311	Cool season annual grass or legume. Includes material and shipping only.	Acre	\$39.29	0.21	\$8.25
Rock Riprap, Placed with geotextile	44	Rock Riprap, placed with geotextile, includes materials, equipment and labor to transport and place	Cubic Yard	\$83.15	800	\$66,522.78

Equipment Installation

Dozer, 80 HP	929	Track mounted Dozer with horsepower range of 60 to 90. Equipment and power unit costs. Labor not included.	Hour	\$77.85	24	\$1,868.39
Earthfill, Roller Compacted	49	Earthfill, roller or machine compacted, includes equipment and labor	Cubic Yard	\$4.87	1750	\$8,528.52
Excavation, common earth, wet, side cast, large equipment	1228	Bulk excavation and side casting of wet common earth with hydraulic excavator or dragline with greater than 1 CY capacity. Includes equipment and labor.	Cubic Yard	\$5.08	1750	\$8,898.12
Seeding Operation, Broadcast, Ground	959	Broadcast seed via ground operation. May require post tillage operation to incorporate seed. Includes equipment, power unit and labor costs.	Acre	\$14.86	0.21	\$3.12
Water management, Flooding & dewatering	969	Includes equipment and power unit. Labor not included.	Acre Foot	\$253.20	30	\$7,596.10

Labor

Equipment Operators, Heavy	233	Includes: Cranes, Hydraulic Excavators >=50 HP, Dozers, Paving Machines, Rock Trenchers, Trenchers >=12", Dump Trucks, Ag Equipment >=150 HP, Scrapers, Water Wagons.	Hour	\$32.34	24	\$776.21
General Labor	231	Labor performed using basic tools such as power tool, shovels, and	Hour	\$21.64	224	\$4,848.28

		other tools that do not require extensive training. Ex. pipe layer, herder, concrete placement, materials spreader, flagger, etc.				
Supervisor or Manager	234	Labor involving supervision or management activities. Includes crew supervisors, foremen and farm/ranch managers time required for adopting new technology, etc.	Hour	\$43.40	60	\$2,603.76

Mobilization

Mobilization, Material, distance > 50 miles	1043	Mobilization cost of materials for special cases where the distance from the supplier delivery point to the job site exceeds 50 miles. The costs for shipping by UPS or bulk freight shipping to a location within 50 miles of the job site have already been included in the component price.	Dollar	\$1.00	8160	\$8,160.00
Mobilization, medium equipment	1139	Equipment with 70-150 HP or typical weights between 14,000 and 30,000 pounds.	Each	\$301.16	1	\$301.16
Mobilization, small equipment	1138	Equipment <70 HP but can't be transported by a pick-up truck or with typical weights between 3,500 to 14,000 pounds.	Each	\$202.55	1	\$202.55

Practice: 580 - Streambank and Shoreline Protection

Scenario: #5 - Geotextile Wrapped

Scenario Description: Protection of streambanks using geotextile wrapped soil lifts and native vegetation. Coir fabric and coir logs are placed on the constructed bench to form the bankline. The coir logs are then tied into the existing bankline at either end. The soil lifts include a woven inner fabric that helps prevent fine sediments from washing out and a heavier outer fabric that provides structural support. The structure is filled with soil to the height of the coir log. Coir fabric is then pulled over the coir log and soil and wooden wedge stakes are placed to secure the fabric along the back edge. Soil and willow cuttings are placed between the lift layers and the process is repeated. Willow cuttings are placed on the top lift and a final layer of soil is placed to the height of the bank. The top layer is then seeded with a mix of native grasses and forbs. 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. 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; 484 - Mulching; 570 - Stormwater runoff control

Before 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 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: Square Foot of Streambank

Scenario Unit: Square Foot

Scenario Typical Size: 1500

Total Scenario Cost: \$53,849.69

Scenario Cost/Unit: \$35.90

Cost Details

Component Name	Id	Description	Unit	Cost	Qty	Total
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Materials

Aggregate, Gravel, Graded	46	Gravel, includes materials, equipment and labor to transport and place. Includes washed and unwashed gravel.	Cubic Yard	\$31.47	30	\$944.17
Cuttings, woody, medium size	1308	Woody cuttings, live stakes or whips typically 1/4" to 1" diameter and 24" to 48" long. Includes materials and shipping only.	Each	\$0.49	6300	\$3,102.49
Geotextile, non-woven, light weight	1209	Non-woven less than 8 ounce/square yard geotextile with staple anchoring. Materials and shipping only.	Square Yard	\$1.17	2350	\$2,756.66
Mulching, straw or hay	1214	Use of straw or hay for temporary ground cover. Includes application and methods necessary to keep in place such as tacking or crimping. Includes materials, equipment and labor.	Acre	\$3,585.06	0.25	\$896.27
One Species, Cool Season, Annual Grass or Legume	2311	Cool season annual grass or legume. Includes material and shipping only.	Acre	\$39.29	0.25	\$9.82
Rock Riprap, graded, angular, material and shipping	1200	Graded Rock Riprap for all gradation ranges. Includes materials and delivery only.	Ton	\$33.78	462	\$15,607.86

Equipment Installation

Earthfill, Dumped and Spread	51	Earthfill, dumped and spread without compaction effort, includes equipment and labor	Cubic Yard	\$4.00	193	\$771.75
Earthfill, Roller Compacted	49	Earthfill, roller or machine compacted, includes equipment and labor	Cubic Yard	\$4.87	2923	\$14,245.07
Excavation, Common Earth, side cast, small equipment	48	Bulk excavation and side casting of common earth with hydraulic excavator with less than 1 CY capacity. Includes equipment and labor.	Cubic Yard	\$2.58	2923	\$7,537.60
Hydraulic Excavator, 1 CY	931	Track mounted hydraulic excavator with bucket capacity range of	Hour	\$133.90	32	\$4,284.79

		0.8 to 1.5 CY. Equipment and power unit costs. Labor not included.				
Seeding Operation, Broadcast, Ground	959	Broadcast seed via ground operation. May require post tillage operation to incorporate seed. Includes equipment, power unit and labor costs.	Acre	\$14.86	0.25	\$3.72

Labor

Equipment Operators, Heavy	233	Includes: Cranes, Hydraulic Excavators >=50 HP, Dozers, Paving Machines, Rock Trenchers, Trenchers >=12", Dump Trucks, Ag Equipment >=150 HP, Scrapers, Water Wagons.	Hour	\$32.34	32	\$1,034.95
General Labor	231	Labor performed using basic tools such as power tool, shovels, and other tools that do not require extensive training. Ex. pipe layer, herder, concrete placement, materials spreader, flagger, etc.	Hour	\$21.64	64	\$1,385.22
Supervisor or Manager	234	Labor involving supervision or management activities. Includes crew supervisors, foremen and farm/ranch managers time required for adopting new technology, etc.	Hour	\$43.40	16	\$694.34

Mobilization

Mobilization, large equipment	1140	Equipment >150HP or typical weights greater than 30,000 pounds or loads requiring over width or over length permits.	Each	\$574.99	1	\$574.99
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Practice: 578 - Stream Crossing

Scenario: #1 - Bridge

Scenario Description: Install a bridge to allow stream flows to cross under access road or animal trail. Bridge opening determined by sizing for storm event dictated in standard. Scenario includes dewatering, abutments, girders, decking. Work consists of site preparation, dewatering, acquiring and installing abutments, girders, decking with necessary hardware, backfilling abutments, and armoring with geotextile and riprap. Riprap and geotextile are used to stabilize and protect abutments as needed. Scenario based on cast in place concrete abutments, steel girders, and timber deck. Travel surface shall be wooden deck surface. If a different travel surface is needed, refer to another appropriate standard for the surfacing. Span is 30 feet. Load is H-20. Width is 12 feet including curbs. Abutments are <= 6 feet. Use this option assumes permits require extensive stream diversion or pumping bypass during construction. Use (396) Aquatic Organism Passage instead, when the primary intent is biological concerns, not hydrologic. 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, (561) Heavy Use Area, (382) Fence.

Before Situation: Water flow could not cross access road or trail without erosion; or access road or trail could not cross channel.

After Situation: Access and waterflow are able to cross each other in a stable manner. Stream flow is not impeded and a stable base exists for equipment, people and/or animals to cross.

Scenario Feature Measure: square footage of bridge deck

Scenario Unit: Square Foot

Scenario Typical Size: 360

Total Scenario Cost: \$17,568.37

Scenario Cost/Unit: \$48.80

Cost Details

Component Name	Id	Description	Unit	Cost	Qty	Total
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Materials

Aggregate, Gravel, Graded	46	Gravel, includes materials, equipment and labor to transport and place. Includes washed and unwashed gravel.	Cubic Yard	\$31.47	20	\$629.44
Block, pre-cast concrete, modular	1496	Pre-cast concrete blocks, typically 2ft x 2ft x 6ft , includes installation and delivery.	Cubic Yard	\$99.59	18	\$1,792.64
Dimension Lumber, untreated	1045	Untreated dimension lumber with nominal thickness equal or less than 2". Includes lumber and fasteners.	Board Foot	\$0.82	2000	\$1,640.27
Rock Riprap, Placed with geotextile	44	Rock Riprap, placed with geotextile, includes materials, equipment and labor to transport and place	Cubic Yard	\$83.15	20	\$1,663.07
Steel, structural steel members	1779	Structural steel, includes materials and fabrication.	Pound	\$1.06	4500	\$4,765.23

Labor

Equipment Operators, Heavy	233	Includes: Cranes, Hydraulic Excavators >=50 HP, Dozers, Paving Machines, Rock Trenchers, Trenchers >=12", Dump Trucks, Ag Equipment >=150 HP, Scrapers, Water Wagons.	Hour	\$32.34	20	\$646.84
General Labor	231	Labor performed using basic tools such as power tool, shovels, and other tools that do not require extensive training. Ex. pipe layer, herder, concrete placement, materials spreader, flagger, etc.	Hour	\$21.64	20	\$432.88
Skilled Labor	230	Labor requiring a high level skill set: Includes carpenters, welders, electricians, conservation professionals involved with data collection, monitoring, and or record keeping, etc.	Hour	\$37.24	80	\$2,979.06

Equipment Installation

Backhoe, 80 HP	926	Wheel mounted backhoe excavator with horsepower range of 60 to 90. Equipment and power unit costs. Labor not included.	Hour	\$65.99	16	\$1,055.76
Excavation, common earth, side cast, large equipment	1227	Bulk excavation and side casting of common earth with hydraulic excavator with less greater than 1 CY capacity. Includes equipment and labor.	Cubic Yard	\$1.98	75	\$148.80
Truck, dump, 12 CY	1215	Dump truck for moving bulk material. Typically capacity is 16 ton or 12 cubic yards. Includes equipment only.	Hour	\$113.86	8	\$910.90

Mobilization

Mobilization, medium equipment	1139	Equipment with 70-150 HP or typical weights between 14,000 and 30,000 pounds.	Each	\$301.16	3	\$903.47
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Practice: 578 - Stream Crossing

Scenario: #2 - Culvert installation

Scenario Description: Install a new culvert. Work includes dewatering, site preparation and removing any old crossing, acquiring and installing culvert pipe with gravel bedding and fill (compacted), and building headwalls. If a different travel surface is needed, refer to another appropriate standard for the surfacing. 36 inch Culvert installation with <75 cy of fill needed and < 2 yds rock riprap for headwalls. Pipe is 40 feet long. Use of this option assumes permits require extensive stream diversion or pumping bypass during construction. Use (396) Aquatic Organism Passage instead, when the primary intent is biological concerns, not hydrologic. Use (587) Structure for Water Control instead, for ditch cross culverts and other intermittent flows. 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. (561) Heavy Use Area, (382) Fence

Before Situation: Water flow could not cross access road or trail without erosion; or access road or trail could not cross channel.

After Situation: Access road and waterflow are able to cross each other in a stable manner. Stream flow is not impeded and a stable base exists for equipment, people and/or animals to cross. Typical crossing is 36" diameter pipe by 40 foot long. Practice payment based on diameter in inches times the length of pipe in feet.

Scenario Feature Measure: Culvert, inches diameter x length of pipe

Scenario Unit: Inch-Foot

Scenario Typical Size: 1440

Total Scenario Cost: \$13,834.64

Scenario Cost/Unit: \$9.61

Cost Details

Component Name	Id	Description	Unit	Cost	Qty	Total
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Materials

Aggregate, Gravel, Graded	46	Gravel, includes materials, equipment and labor to transport and place. Includes washed and unwashed gravel.	Cubic Yard	\$31.47	50	\$1,573.61
Pipe, HDPE, CPT, Double Wall, Soil Tight, 36"	1248	Pipe, Corrugated HDPE Double Wall, 36" diameter with soil tight joints - AASHTO M294. Material cost only.	Foot	\$37.85	40	\$1,513.89
Rock Riprap, Placed with geotextile	44	Rock Riprap, placed with geotextile, includes materials, equipment and labor to transport and place	Cubic Yard	\$83.15	27	\$2,245.14

Equipment Installation

Earthfill, Manually Compacted	50	Earthfill, manually compacted, includes equipment and labor	Cubic Yard	\$6.43	18	\$115.74
Hydraulic Excavator, 1 CY	931	Track mounted hydraulic excavator with bucket capacity range of 0.8 to 1.5 CY. Equipment and power unit costs. Labor not included.	Hour	\$133.90	10	\$1,339.00
Water management, Flooding & dewatering	969	Includes equipment and power unit. Labor not included.	Acre Foot	\$253.20	20	\$5,064.07

Labor

Equipment Operators, Heavy	233	Includes: Cranes, Hydraulic Excavators >=50 HP, Dozers, Paving Machines, Rock Trenchers, Trenchers >=12", Dump Trucks, Ag Equipment >=150 HP, Scrapers, Water Wagons.	Hour	\$32.34	20	\$646.84
General Labor	231	Labor performed using basic tools such as power tool, shovels, and other tools that do not require extensive training. Ex. pipe layer, herder, concrete placement, materials spreader, flagger, etc.	Hour	\$21.64	20	\$432.88

Mobilization

Mobilization, medium equipment	1139	Equipment with 70-150 HP or typical weights between 14,000 and 30,000 pounds.	Each	\$301.16	3	\$903.47
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Practice: 578 - Stream Crossing

Scenario: #3 - Ford with Water Management

Scenario Description: To install a stable crossing medium on channel bottom and approaches. Medium includes but not limited to precast concrete blocks, geocells, pavers, and gabions. If a different travel surface is needed, refer to another appropriate standard for the surfacing. Typical stream has 30 foot bottom width and approaches. Width is 12 feet for a total area as 420sf with total at 600sf. Use this option if permits require extensive stream diversion or pumping bypass during construction. Use (396) Aquatic Organism Passage instead, when the primary intent is biological concerns, not hydrologic. Scenario does not include cattle slats. 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, (561) Heavy Use Area, (382) Fence,

Before Situation: Water flow could not cross access road or trail without erosion; or access road or trail could not cross channel.

After Situation: Access road and waterflow are able to cross each other in a stable manner. Stream flow is not impeded and a stable base exists for equipment, people and/or animals to cross.

Scenario Feature Measure: low water crossing

Scenario Unit: Square Foot

Scenario Typical Size: 600

Total Scenario Cost: \$12,166.23

Scenario Cost/Unit: \$20.28

Cost Details

Component Name	Id	Description	Unit	Cost	Qty	Total
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Materials

Aggregate, Gravel, Graded	46	Gravel, includes materials, equipment and labor to transport and place. Includes washed and unwashed gravel.	Cubic Yard	\$31.47	18	\$566.50
Aggregate, Sand, Graded, Washed	45	Sand, typical ASTM C33 gradation, includes materials, equipment and labor to transport and place	Cubic Yard	\$31.05	6	\$186.30
Block, pre-cast concrete, modular	1496	Pre-cast concrete blocks, typically 2ft x 2ft x 6ft , includes installation and delivery.	Cubic Yard	\$99.59	1.2	\$119.51
GeoCell, 4"	1054	4-inch thick cellular confinement system, three-dimensional, expandable panels made from high-density polyethylene (HDPE), polyester or another polymer material. Includes materials, labor and equipment for the geocell only, does not include backfill	Square Yard	\$30.50	50	\$1,524.99
Rock Riprap, Placed with geotextile	44	Rock Riprap, placed with geotextile, includes materials, equipment and labor to transport and place	Cubic Yard	\$83.15	20	\$1,663.07

Labor

Equipment Operators, Heavy	233	Includes: Cranes, Hydraulic Excavators >=50 HP, Dozers, Paving Machines, Rock Trenchers, Trenchers >=12", Dump Trucks, Ag Equipment >=150 HP, Scrapers, Water Wagons.	Hour	\$32.34	2	\$64.68
General Labor	231	Labor performed using basic tools such as power tool, shovels, and other tools that do not require extensive training. Ex. pipe layer, herder, concrete placement, materials spreader, flagger, etc.	Hour	\$21.64	40	\$865.76

Equipment Installation

Dozer, 80 HP	929	Track mounted Dozer with horsepower range of 60 to 90. Equipment and power unit costs. Labor not included.	Hour	\$77.85	16	\$1,245.59
Excavation, common earth, side cast, large equipment	1227	Bulk excavation and side casting of common earth with hydraulic excavator with less greater than 1 CY capacity. Includes equipment and labor.	Cubic Yard	\$1.98	18	\$35.71
Truck, dump, 12 CY	1215	Dump truck for moving bulk material. Typically capacity is 16 ton or 12 cubic yards. Includes equipment only.	Hour	\$113.86	2	\$227.72
Water management, Flooding & dewatering	969	Includes equipment and power unit. Labor not included.	Acre Foot	\$253.20	20	\$5,064.07

Mobilization

Mobilization, medium equipment	1139	Equipment with 70-150 HP or typical weights between 14,000 and 30,000 pounds.	Each	\$301.16	2	\$602.32
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Practice: 578 - Stream Crossing

Scenario: #4 - Ramp only

Scenario Description: Install a stable ramp for a channel crossing with a stable bottom. Medium includes but not limited to precast concrete blocks, geocells, pavers, and rip rap. Cattle slats are found under a separate scenario. If a different travel surface is needed, refer to another appropriate standard for the surfacing. Use (396) Aquatic Organism Passage instead, when the primary intent is biological concerns, not hydrologic. Approach stabilization paid by associated practices. 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, (561) Heavy Use Area, (382) Fence,

Before Situation: Water flow could not cross access road or trail without erosion; or access road or trail could not cross channel.

After Situation: A 12' Wide ramp is installed at a 5:1 slope on a 4' bank height for a total area of 240 SF per approach or 480 SF total. Access road, animal trails and walkway, heavy use area and waterflow are able to cross each other in a stable manner. Stream flow is not impeded and a stable base exists for equipment, people and/or animals to cross. Payment measured from top of ramp to toe of slope times design width using low bank to set top of ramp. Areas above this that need stabilization paid under associated practices.

Scenario Feature Measure: Square foot of approach

Scenario Unit: Square Foot

Scenario Typical Size: 480

Total Scenario Cost: \$3,570.57

Scenario Cost/Unit: \$7.44

Cost Details

Component Name	Id	Description	Unit	Cost	Qty	Total
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Materials

Aggregate, Sand, Graded, Washed	45	Sand, typical ASTM C33 gradation, includes materials, equipment and labor to transport and place	Cubic Yard	\$31.05	6	\$186.30
Rock Riprap, Placed with geotextile	44	Rock Riprap, placed with geotextile, includes materials, equipment and labor to transport and place	Cubic Yard	\$83.15	23	\$1,912.53

Labor

Equipment Operators, Heavy	233	Includes: Cranes, Hydraulic Excavators >=50 HP, Dozers, Paving Machines, Rock Trenchers, Trenchers >=12", Dump Trucks, Ag Equipment >=150 HP, Scrapers, Water Wagons.	Hour	\$32.34	4	\$129.37
Supervisor or Manager	234	Labor involving supervision or management activities. Includes crew supervisors, foremen and farm/ranch managers time required for adopting new technology, etc.	Hour	\$43.40	4	\$173.58

Equipment Installation

Hydraulic Excavator, .5 CY	930	Track mounted hydraulic excavator with bucket capacity range of 0.3 to 0.8 CY. Equipment and power unit costs. Labor not included.	Hour	\$73.86	4	\$295.43
Truck, dump, 8 CY	1401	Dump truck for moving bulk material. Typically capacity is 12 ton or 8 cubic yards. Includes equipment only.	Hour	\$67.76	4	\$271.03

Mobilization

Mobilization, medium equipment	1139	Equipment with 70-150 HP or typical weights between 14,000 and 30,000 pounds.	Each	\$301.16	2	\$602.32
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Practice: 578 - Stream Crossing

Scenario: #5 - Ramps and channel

Scenario Description: Install a stable ramp and stabilize bottom for a channel crossing with an unstable bottom. Medium includes but not limited to precast concrete blocks, geocells, pavers, and rip rap. Cattle slats are found under a separate scenario. If a different travel surface is needed, refer to another appropriate standard for the surfacing. State permits have minimal requirements for water management during installation. Use (396) Aquatic Organism Passage instead, when the primary intent is biological concerns, not hydrologic. Approach stabilization paid by associated practices. 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, (561) Heavy Use Area, (382) Fence,

Before Situation: Water flow could not cross access road or trail without erosion; or access road or trail could not cross channel.

After Situation: A 12' Wide ramp is installed at a 5:1 slope on a 4' bank height for a total area of 240 SF per approach or 480 SF total for ramps. In addition, a 30' long bottom is also stabilized for an additional 360 SF or a total of 600 SF. Access road, animal trails and walkway, heavy use area and waterflow are able to cross each other in a stable manner. Stream flow is not impeded and a stable base exists for equipment, people and/or animals to cross. Payment measured from top of ramp to toe of slope times design width using low bank to set top of ramp plus the width of the channel bottom times the width. Areas above this that need stabilization paid under associated practices.

Scenario Feature Measure: SF of total crossing

Scenario Unit: Square Foot

Scenario Typical Size: 600

Total Scenario Cost: \$3,782.27

Scenario Cost/Unit: \$6.30

Cost Details

Component Name	Id	Description	Unit	Cost	Qty	Total
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Materials

Aggregate, Sand, Graded, Washed	45	Sand, typical ASTM C33 gradation, includes materials, equipment and labor to transport and place	Cubic Yard	\$31.05	8	\$248.41
Rock Riprap, Placed with geotextile	44	Rock Riprap, placed with geotextile, includes materials, equipment and labor to transport and place	Cubic Yard	\$83.15	23	\$1,912.53

Labor

Equipment Operators, Heavy	233	Includes: Cranes, Hydraulic Excavators >=50 HP, Dozers, Paving Machines, Rock Trenchers, Trenchers >=12", Dump Trucks, Ag Equipment >=150 HP, Scrapers, Water Wagons.	Hour	\$32.34	5	\$161.71
Supervisor or Manager	234	Labor involving supervision or management activities. Includes crew supervisors, foremen and farm/ranch managers time required for adopting new technology, etc.	Hour	\$43.40	5	\$216.98

Equipment Installation

Hydraulic Excavator, .5 CY	930	Track mounted hydraulic excavator with bucket capacity range of 0.3 to 0.8 CY. Equipment and power unit costs. Labor not included.	Hour	\$73.86	5	\$369.29
Truck, dump, 8 CY	1401	Dump truck for moving bulk material. Typically capacity is 12 ton or 8 cubic yards. Includes equipment only.	Hour	\$67.76	4	\$271.03

Mobilization

Mobilization, medium equipment	1139	Equipment with 70-150 HP or typical weights between 14,000 and 30,000 pounds.	Each	\$301.16	2	\$602.32
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Practice: 578 - Stream Crossing

Scenario: #6 - Ramp only with Cattle Slats

Scenario Description: Install a stable ramp for a channel crossing with a stable bottom. Medium limited to precast concrete cattle or hog slats laid over a subbase with stone to protect the side slopes. If a different travel surface is needed, use Ramp only option for the surfacing. Use (396) Aquatic Organism Passage instead, when the primary intent is biological concerns, not hydrologic. Approach stabilization paid by associated practices. 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, (561) Heavy Use Area, (382) Fence,

Before Situation: Water flow could not cross access road or trail without erosion; or access road or trail could not cross channel.

After Situation: A 12' Wide ramp is installed at a 5:1 slope on a 4' bank height for a total area of 240 SF per approach or 480 SF total. Access road, animal trails and walkway, heavy use area and waterflow are able to cross each other in a stable manner. Stream flow is not impeded and a stable base exists for equipment, people and/or animals to cross. Payment measured from top of ramp to toe of slope times design width using low bank to set top of ramp. Areas above this that need stabilization paid under associated practices.

Scenario Feature Measure: Square foot of approach

Scenario Unit: Square Foot

Scenario Typical Size: 480

Total Scenario Cost: \$5,084.70

Scenario Cost/Unit: \$10.59

Cost Details

Component Name	Id	Description	Unit	Cost	Qty	Total
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Materials

Aggregate, Gravel, Graded	46	Gravel, includes materials, equipment and labor to transport and place. Includes washed and unwashed gravel.	Cubic Yard	\$31.47	6	\$188.83
Cattle Slats	2553	Cattle/Hog slats (new, used or seconds) or Stream Crossing Slats palced in streams needed to prevent injury to cattle by creating stable footing. Includes materials only.	Square Foot	\$3.15	480	\$1,511.60
Rock Riprap, Placed with geotextile	44	Rock Riprap, placed with geotextile, includes materials, equipment and labor to transport and place	Cubic Yard	\$83.15	23	\$1,912.53

Labor

Equipment Operators, Heavy	233	Includes: Cranes, Hydraulic Excavators >=50 HP, Dozers, Paving Machines, Rock Trenchers, Trenchers >=12", Dump Trucks, Ag Equipment >=150 HP, Scrapers, Water Wagons.	Hour	\$32.34	4	\$129.37
Supervisor or Manager	234	Labor involving supervision or management activities. Includes crew supervisors, foremen and farm/ranch managers time required for adopting new technology, etc.	Hour	\$43.40	4	\$173.58

Equipment Installation

Hydraulic Excavator, .5 CY	930	Track mounted hydraulic excavator with bucket capacity range of 0.3 to 0.8 CY. Equipment and power unit costs. Labor not included.	Hour	\$73.86	4	\$295.43
Truck, dump, 8 CY	1401	Dump truck for moving bulk material. Typically capacity is 12 ton or 8 cubic yards. Includes equipment only.	Hour	\$67.76	4	\$271.03

Mobilization

Mobilization, medium equipment	1139	Equipment with 70-150 HP or typical weights between 14,000 and 30,000 pounds.	Each	\$301.16	2	\$602.32
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Practice: 578 - Stream Crossing

Scenario: #7 - Ramps and channel with Cattle Slats

Scenario Description: Install a stable ramp and stabilize bottom for a channel crossing with an unstable bottom. Medium limited to precast concrete cattle or hog slats laid over a stone subbase with riprap to protect the side slopes. If a different travel surface is needed, use Ramp and channel option for the surfacing. State permits have minimal requirements for water management during installation. Use (396) Aquatic Organism Passage instead, when the primary intent is biological concerns, not hydrologic. Approach stabilization paid by associated practices. 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, (561) Heavy Use Area, (382) Fence,

Before Situation: Water flow could not cross access road or trail without erosion; or access road or trail could not cross channel.

After Situation: A 12' Wide ramp is installed at a 5:1 slope on a 4' bank height for a total area of 240 SF per approach or 480 SF total for ramps. In addition, a 30' long bottom is also stabilized for an additional 360 SF or a total of 600 SF. Access road, animal trails and walkway, heavy use area and waterflow are able to cross each other in a stable manner. Stream flow is not impeded and a stable base exists for equipment, people and/or animals to cross. Payment measured from top of ramp to toe of slope times design width using low bank to set top of ramp plus the width of the channel bottom times the width. Areas above this that need stabilization paid under associated practices.

Scenario Feature Measure: SF of total crossing

Scenario Unit: Square Foot

Scenario Typical Size: 600

Total Scenario Cost: \$9,166.58

Scenario Cost/Unit: \$15.28

Cost Details

Component Name	Id	Description	Unit	Cost	Qty	Total
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Materials

Aggregate, Gravel, Graded	46	Gravel, includes materials, equipment and labor to transport and place. Includes washed and unwashed gravel.	Cubic Yard	\$31.47	39	\$1,227.42
Aggregate, Sand, Graded, Washed	45	Sand, typical ASTM C33 gradation, includes materials, equipment and labor to transport and place	Cubic Yard	\$31.05	8	\$248.41
Cattle Slats	2553	Cattle/Hog slats (new, used or seconds) or Stream Crossing Slats palced in streams needed to prevent injury to cattle by creating stable footing. Includes materials only.	Square Foot	\$3.15	1320	\$4,156.89
Rock Riprap, Placed with geotextile	44	Rock Riprap, placed with geotextile, includes materials, equipment and labor to transport and place	Cubic Yard	\$83.15	23	\$1,912.53

Labor

Equipment Operators, Heavy	233	Includes: Cranes, Hydraulic Excavators >=50 HP, Dozers, Paving Machines, Rock Trenchers, Trenchers >=12", Dump Trucks, Ag Equipment >=150 HP, Scrapers, Water Wagons.	Hour	\$32.34	5	\$161.71
Supervisor or Manager	234	Labor involving supervision or management activities. Includes crew supervisors, foremen and farm/ranch managers time required for adopting new technology, etc.	Hour	\$43.40	5	\$216.98

Equipment Installation

Hydraulic Excavator, .5 CY	930	Track mounted hydraulic excavator with bucket capacity range of 0.3 to 0.8 CY. Equipment and power unit costs. Labor not included.	Hour	\$73.86	5	\$369.29
Truck, dump, 8 CY	1401	Dump truck for moving bulk material. Typically capacity is 12 ton or 8 cubic yards. Includes equipment only.	Hour	\$67.76	4	\$271.03

Mobilization

Mobilization, medium equipment	1139	Equipment with 70-150 HP or typical weights between 14,000 and 30,000 pounds.	Each	\$301.16	2	\$602.32
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Practice: 395 - Stream Habitat Improvement and Management

Scenario: #1 - Stream Habitat Enhancement

Scenario Description: This scenario describes the implementation of a stream habitat improvement and management project where restoration is necessary to increase habitat and functionality of the stream. A combination of structures, excavation, channel shaping, and woody materials are considered based on natural channel design concepts. A local stream assessment with technical specialists (such as the Stream Visual Assessment Protocol) should be conducted in order to document habitat components (such as large wood, pools) are not currently present in the stream or are limited for aquatic species. A project design for restoration of the stream channel (channel shaping, boulder placement, wood, wood structures, etc) will be based on assessment of (a) the target stream reach characteristics and (b) those of a suitable reference reach. These characteristics include channel geometry, channel slope, stream bottom substrate size and composition, and the geomorphic setting influencing the channel form, pattern and profile. Large rocks/boulders placed in the stream channel will mimic geologic material sizes typically present in the watershed or observed in intact, reference stream reaches in the MLRA where the project is located. Rock boulder sizes should also reflect the geomorphic setting of the stream reach. Large wood placed into the stream under this scenario should be similar in species, age, and size (diameter) as trees found in the surrounding riparian area, to the extent possible. Stream restoration components including wood, boulders and/or boulder clusters will be placed in the stream to create pool habitat and hydraulic complexity with close review & approval of a fish habitat biologist onsite during the planning and implementation of the project. This scenario involves restoring a 300 foot stretch of the stream. The planned activity will meet the current 395 standard, and facilitating practice standards utilized. Implementation will result in the improvement of instream habitat complexity, hiding and resting cover, and/or increased food availability for fish and other stream species.

Before Situation: In this stream reach, habitat for fish, aquatic insects and/or other stream species is sub-optimal as determined by the NRCS Stream Visual Assessment Protocol or onsite technical specialist assessment. The site does not have adequate food, cover, and perhaps habitat connectivity for desired species. Riparian vegetation quality and/or quantity may also be compromised to the extent that the riparian area and floodplain are not functioning to provide necessary stream habitat components, such as large wood and off-channel refuge habitat. Bank and floodplain instability are present due to altered stream hydraulics due to degradation of the stream channel.

After Situation: Stream habitat within the project reach is improving as a result of completing a stream restoration based on natural channel design in the channel and/or along the stream bank. Pool habitat in the reach is improved, and hiding cover, food availability and refuge habitat for all stream species is improving.

Scenario Feature Measure: The entire reach of the impacted stream

Scenario Unit: Foot

Scenario Typical Size: 300

Total Scenario Cost: \$10,473.24

Scenario Cost/Unit: \$34.91

Cost Details

Component Name	Id	Description	Unit	Cost	Qty	Total
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Labor

Equipment Operators, Heavy	233	Includes: Cranes, Hydraulic Excavators >=50 HP, Dozers, Paving Machines, Rock Trenchers, Trenchers >=12", Dump Trucks, Ag Equipment >=150 HP, Scrapers, Water Wagons.	Hour	\$32.34	8	\$258.74
General Labor	231	Labor performed using basic tools such as power tool, shovels, and other tools that do not require extensive training. Ex. pipe layer, herder, concrete placement, materials spreader, flagger, etc.	Hour	\$21.64	16	\$346.31
Specialist Labor	235	Labor requiring a specialized skill set: Includes Agronomists, Foresters, Biologists, etc. to provide additional technical information during the planning and implementation of the practice. Does not include NRCS or TSP services.	Hour	\$96.48	8	\$771.81
Supervisor or Manager	234	Labor involving supervision or management activities. Includes crew supervisors, foremen and farm/ranch managers time required for adopting new technology, etc.	Hour	\$43.40	8	\$347.17

Equipment Installation

Hydraulic Excavator, 1 CY	931	Track mounted hydraulic excavator with bucket capacity range of 0.8 to 1.5 CY. Equipment and power unit costs. Labor not included.	Hour	\$133.90	8	\$1,071.20
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Mobilization

Mobilization, large equipment	1140	Equipment >150HP or typical weights greater than 30,000 pounds or loads requiring over width or over length permits.	Each	\$574.99	2	\$1,149.98
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Materials

Boulder	1761	Rock boulders (approximately 5 ft dia. 6.67 Tons) Includes materials and delivery (up to 100 miles) only.	Ton	\$34.32	25	\$857.94
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Cuttings, woody, large size	1309	Woody pole cuttings or posts 2" to 6" in diameter and 6' long. Includes materials and shipping only.	Each	\$18.38	300	\$5,515.14
One Species, Native Forb, Moderate/High Cost	2331	Native forb. Includes material and shipping only.	Acre	\$658.33	0.1	\$65.83
Root Wad	2045	Tree stump buried into the streambank with the roots left exposed. Includes material only.	Ton	\$8.91	10	\$89.13

Practice: 395 - Stream Habitat Improvement and Management

Scenario: #2 - Riparian Zone Improvement-Forested

Scenario Description: This scenario describes fish and wildlife habitat improvement and/or management actions focused on the community structure and function of forested riparian zone plant communities. The planned activity meets the 395 standard, and facilitating practice standards, especially Codes 390 and 391, utilized in combination to satisfy all requirements specific to habitats needed for the stream and riparian species for which the practice is being implemented. Implementation will improve instream and riparian habitat complexity, water quality, hiding and resting cover, and/or increased food availability for desired riparian and stream species. Because species and habitats differ dramatically within and across regions and/or MLRAs, up to 12 riparian plant community-specific scenarios may be required across the US. Associated Practices: Critical Area Planting (342) and Streambank and Shoreline Protection (580)

Before Situation: Riparian quality and quantity are at risk as determined by the NRCS Stream Visual Assessment Protocol score of less than 5 for those elements. The site does not have adequate food, cover, and/or connectivity for riparian wildlife, and contributes insufficient amounts of organic matter and/or large woody material for stream species food and cover. The site's riparian vegetation is compromised by human activities and/or access of vehicles, people, and/or livestock is not controlled adequately to protect riparian functions and stream habitat quality. 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 reduced due to compaction. Riparian vegetation quality and/or quantity is compromised to the extent that the riparian area and floodplain are not functioning to provide necessary stream and riparian habitat components.

After Situation: Revegetation/reforestation of the riparian zone is completed and the vegetation community is under close management to insure long-term survival and ecological succession of the plant community. The quality and quantity of the riparian zone components of the site are managed to support a diverse vegetation community suitable for the site, the species that depend on it for habitat, and the functions it performs or will eventually perform as the vegetation matures. These functions include: stream temperature moderation thru shading, recruitment of instream large wood and/or non-woody organic matter, riparian 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

Scenario Unit: Acre

Scenario Typical Size: 2

Total Scenario Cost: \$21,120.27

Scenario Cost/Unit: \$10,560.14

Cost Details

Component Name	Id	Description	Unit	Cost	Qty	Total
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Labor

Equipment Operators, Heavy	233	Includes: Cranes, Hydraulic Excavators >=50 HP, Dozers, Paving Machines, Rock Trenchers, Trenchers >=12", Dump Trucks, Ag Equipment >=150 HP, Scrapers, Water Wagons.	Hour	\$32.34	24	\$776.21
General Labor	231	Labor performed using basic tools such as power tool, shovels, and other tools that do not require extensive training. Ex. pipe layer, herder, concrete placement, materials spreader, flagger, etc.	Hour	\$21.64	40	\$865.76
Skilled Labor	230	Labor requiring a high level skill set: Includes carpenters, welders, electricians, conservation professionals involved with data collection, monitoring, and or record keeping, etc.	Hour	\$37.24	160	\$5,958.12
Specialist Labor	235	Labor requiring a specialized skill set: Includes Agronomists, Foresters, Biologists, etc. to provide additional technical information during the planning and implementation of the practice. Does not include NRCS or TSP services.	Hour	\$96.48	40	\$3,859.06
Supervisor or Manager	234	Labor involving supervision or management activities. Includes crew supervisors, foremen and farm/ranch managers time required for adopting new technology, etc.	Hour	\$43.40	40	\$1,735.84

Materials

Compost	265	A mixture of decaying organic matter, as from leaves and manure, used to improve soil structure and provide nutrients.	Ton	\$53.63	1	\$53.63
Cuttings, woody, large size	1309	Woody pole cuttings or posts 2" to 6" in diameter and 6' long. Includes materials and shipping only.	Each	\$18.38	200	\$3,676.76
One Species, Native Forb, Moderate/High Cost	2331	Native forb. Includes material and shipping only.	Acre	\$658.33	2	\$1,316.67
Tree shelter, wire mesh	1557	5 feet tall, Woven Wire mesh, 6"x 6" opening or smaller, 10 gauge wire (minimum) , cage placed around seedling for animal protection. Materials only.	Each	\$2.32	200	\$463.54

Tree, willow	1426	Willow tree for planting, 18" to 36" seedling. Includes materials and shipping only.	Each	\$0.67	200	\$133.80
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Equipment Installation

Backhoe, 80 HP	926	Wheel mounted backhoe excavator with horsepower range of 60 to 90. Equipment and power unit costs. Labor not included.	Hour	\$65.99	16	\$1,055.76
Dozer, 80 HP	929	Track mounted Dozer with horsepower range of 60 to 90. Equipment and power unit costs. Labor not included.	Hour	\$77.85	8	\$622.80

Mobilization

Mobilization, medium equipment	1139	Equipment with 70-150 HP or typical weights between 14,000 and 30,000 pounds.	Each	\$301.16	2	\$602.32
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Practice: 395 - Stream Habitat Improvement and Management

Scenario: #3 - Instream wood placement

Scenario Description: This scenario involves placement of large wood (logs, root wads, log structures) into a stream channel in order to improve aquatic habitat that currently does not meet quality criteria for stream species habitat. A stream assessment (i.e. Stream Visual Assessment Protocol) should be conducted in order to document habitat components lacking for aquatic species (i.e. large wood, pools). A project design for wood placement will be based on assessment of the target stream reach characteristics and those of a suitable reference reach. These characteristics include channel geometry, channel slope, stream bottom substrate size and composition, and the geomorphic setting influencing the channel form, pattern and profile. Large wood and root wads placed into the stream will mimic genus, age, and size of mature trees found in intact, reference riparian areas in the MLRA where the project is located. Large wood/trees with rootwads intact should be placed in streams to create pool habitat according to NRCS engineering specifications and with close review & approval of a fish habitat biologist. Boulders placed to provide ballast shall only be used if the geomorphic setting and project design demand this component. The planned activity will meet the current 395 standard, and facilitating practice standards utilized, including timing of work windows required for protected aquatic and riparian species, and protecting/restoring vegetation and substrates of/to areas impacted by heavy equipment. Implementation will result in the improvement of instream habitat complexity, hiding and resting cover, and/or increased food availability for fish and other stream species. Payment for implementation is to defray the costs of project implementation. Monitoring records demonstrating implementation of this scenario will address resource concerns for stream species of concern are required. Associated Practices: Critical Area Planting (342) and Streambank and Shoreline Protection (580)

Before Situation: In this stream reach, habitat for fish, aquatic insects and/or other stream species is sub-optimal as determined by the NRCS Stream Visual Assessment Protocol score of less than 5 overall. The site does not have adequate food, cover, and perhaps habitat connectivity for desired species. Riparian vegetation quality and/or quantity may also be compromised to the extent that the riparian area and floodplain are not functioning to provide necessary stream and riparian habitat components, such as large wood.

After Situation: Stream habitat within the project reach is improving as a result of placing logs, root wads, and/or wood structures in the channel and/or along the stream bank. Pool habitat in the reach is improved, and hiding cover, food availability and refuge habitat for all stream species is improving.

Scenario Feature Measure: Bankfull width x reach length

Scenario Unit: Acre

Scenario Typical Size: 1

Total Scenario Cost: \$16,725.21

Scenario Cost/Unit: \$16,725.21

Cost Details

Component Name	Id	Description	Unit	Cost	Qty	Total
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Materials

Aggregate, Gravel, Graded	46	Gravel, includes materials, equipment and labor to transport and place. Includes washed and unwashed gravel.	Cubic Yard	\$31.47	30	\$944.17
Aggregate, river rock	1834	Well graded, rounded mineral substrates derived from local riverine settings. Includes materials and local delivery	Ton	\$26.40	15	\$395.97
Aggregate, Sand, Graded, Washed	45	Sand, typical ASTM C33 gradation, includes materials, equipment and labor to transport and place	Cubic Yard	\$31.05	20	\$621.01
Boulder	1761	Rock boulders (approximately 5 ft dia. 6.67 Tons) Includes materials and delivery (up to 100 miles) only.	Ton	\$34.32	40	\$1,372.71
Compost	265	A mixture of decaying organic matter, as from leaves and manure, used to improve soil structure and provide nutrients.	Ton	\$53.63	1	\$53.63
Cuttings, woody, large size	1309	Woody pole cuttings or posts 2" to 6" in diameter and 6' long. Includes materials and shipping only.	Each	\$18.38	300	\$5,515.14
Log, un-anchored	2035	Price of log picked up at the Mill. Includes material only.	Ton	\$40.58	30	\$1,217.49
Root Wad	2045	Tree stump buried into the streambank with the roots left exposed. Includes material only.	Ton	\$8.91	20	\$178.25
Steel, rebar	1832	Steel rebar, grade 60. Materials only.	Pound	\$0.55	50	\$27.47

Labor

Equipment Operators, Heavy	233	Includes: Cranes, Hydraulic Excavators >=50 HP, Dozers, Paving Machines, Rock Trenchers, Trenchers >=12", Dump Trucks, Ag Equipment >=150 HP, Scrapers, Water Wagons.	Hour	\$32.34	24	\$776.21
General Labor	231	Labor performed using basic tools such as power tool, shovels, and other tools that do not require extensive training. Ex. pipe layer, herder, concrete placement, materials spreader, flagger, etc.	Hour	\$21.64	32	\$692.61

Supervisor or Manager	234	Labor involving supervision or management activities. Includes crew supervisors, foremen and farm/ranch managers time required for adopting new technology, etc.	Hour	\$43.40	8	\$347.17
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Equipment Installation

Hydraulic Excavator, 2 CY	932	Track mounted hydraulic excavator with bucket capacity range of 1.5 to 2.5 CY. Equipment and power unit costs. Labor not included.	Hour	\$193.59	16	\$3,097.49
Truck, dump, 12 CY	1215	Dump truck for moving bulk material. Typically capacity is 16 ton or 12 cubic yards. Includes equipment only.	Hour	\$113.86	8	\$910.90

Mobilization

Mobilization, large equipment	1140	Equipment >150HP or typical weights greater than 30,000 pounds or loads requiring over width or over length permits.	Each	\$574.99	1	\$574.99
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Practice: 395 - Stream Habitat Improvement and Management

Scenario: #4 - Instream rock placement

Scenario Description: This scenario describes the implementation of a stream habitat improvement and management project that places individual boulders or boulder clusters, or rock structures in or adjacent to the stream channel as habitat components. A project design for boulder placement will be based on assessment of the target stream reach characteristics and those of a suitable reference reach. These characteristics include channel geometry, channel slope, stream bottom substrate size and composition, and the geomorphic setting influencing the channel form, pattern and profile. Large rocks/boulders placed in the stream channel will mimic geologic material sizes typically present in the watershed or observed in intact, reference stream reaches in the MLRA where the project is located. Boulders should be placed in streams to create pool habitat and hydraulic complexity according to NRCS engineering specifications and with close review & approval of a fish habitat biologist onsite during implementation of the project design. Spawning gravel placement should be placed to restore spawning area substrates potentially disturbed by rock placement. The planned activity will meet the current 395 standard, and facilitating practice standards utilized. Implementation will result in the improvement of instream habitat complexity, hiding and resting cover, spawning habitat, and/or increased food availability for fish and other stream species. Payment for implementation is to defray the costs of stream habitat assessment, and project implementation. Records demonstrating implementation of this scenario will address resource concerns for stream species of concern will be required.

Before Situation: In this stream reach, habitat for fish, aquatic insects and other stream species is sub-optimal as determined by the NRCS Stream Visual Assessment Protocol score of less than 5 overall. The site does not have adequate food, cover, and perhaps habitat connectivity for desired species. Riparian vegetation quality and/or quantity may be also compromised to the extent that the riparian area and floodplain are not functioning to provide necessary stream and riparian habitat components, such as large wood, leaf matter, and shade. Associated Practices: Critical Area Planting (342) and Streambank and Shoreline Protection (580)

After Situation: Stream habitat within the project reach is improving as a result of placing boulders or constructing rock structures in the channel and/or along the stream bank. Hydraulic complexity of the habitat in the reach is increased, and hiding cover, food availability and refuge habitat for stream species is improving. Streambank vegetation is increasing and contributing to stability of the streambanks.

Scenario Feature Measure: Bankfull width x reach length

Scenario Unit: Acre

Scenario Typical Size: 1

Total Scenario Cost: \$14,839.48

Scenario Cost/Unit: \$14,839.48

Cost Details

Component Name	Id	Description	Unit	Cost	Qty	Total
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Materials

Aggregate, Gravel, Graded	46	Gravel, includes materials, equipment and labor to transport and place. Includes washed and unwashed gravel.	Cubic Yard	\$31.47	120	\$3,776.66
Aggregate, river rock	1834	Well graded, rounded mineral substrates derived from local riverine settings. Includes materials and local delivery	Ton	\$26.40	20	\$527.96
Aggregate, Sand, Graded, Washed	45	Sand, typical ASTM C33 gradation, includes materials, equipment and labor to transport and place	Cubic Yard	\$31.05	30	\$931.52
Boulder	1761	Rock boulders (approximately 5 ft dia. 6.67 Tons) Includes materials and delivery (up to 100 miles) only.	Ton	\$34.32	60	\$2,059.07
Cuttings, woody, large size	1309	Woody pole cuttings or posts 2" to 6" in diameter and 6' long. Includes materials and shipping only.	Each	\$18.38	100	\$1,838.38

Labor

Equipment Operators, Heavy	233	Includes: Cranes, Hydraulic Excavators >=50 HP, Dozers, Paving Machines, Rock Trenchers, Trenchers >=12", Dump Trucks, Ag Equipment >=150 HP, Scrapers, Water Wagons.	Hour	\$32.34	24	\$776.21
General Labor	231	Labor performed using basic tools such as power tool, shovels, and other tools that do not require extensive training. Ex. pipe layer, herder, concrete placement, materials spreader, flagger, etc.	Hour	\$21.64	16	\$346.31

Equipment Installation

Hydraulic Excavator, 2 CY	932	Track mounted hydraulic excavator with bucket capacity range of 1.5 to 2.5 CY. Equipment and power unit costs. Labor not included.	Hour	\$193.59	16	\$3,097.49
Truck, dump, 12 CY	1215	Dump truck for moving bulk material. Typically capacity is 16 ton or 12 cubic yards. Includes equipment only.	Hour	\$113.86	8	\$910.90

Mobilization

Mobilization, large equipment	1140	Equipment >150HP or typical weights greater than 30,000 pounds or loads requiring over width or over length permits.	Each	\$574.99	1	\$574.99
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Practice: 395 - Stream Habitat Improvement and Management

Scenario: #5 - Rock and wood structures

Scenario Description: This scenario describes the implementation of a stream habitat improvement and management project where practices are focused on instream habitat improvement with a combination of rock AND wood structures. This scenario involves placement of large wood and rock structures into a stream channel in order to improve aquatic habitat that currently does not meet quality criteria for stream species habitat. A stream assessment (i.e. Stream Visual Assessment Protocol) should be conducted in order to document habitat components (such as large wood, pools) are not currently present in the stream or are limited for aquatic species. A project design for placement of habitat structures (boulders, boulder clusters, wood, wood structures) will be based on assessment of (a) the target stream reach characteristics and (b) those of a suitable reference reach. These characteristics include channel geometry, channel slope, stream bottom substrate size and composition, and the geomorphic setting influencing the channel form, pattern and profile. Large rocks/boulders placed in the stream channel will mimic geologic material sizes typically present in the watershed or observed in intact, reference stream reaches in the MLRA where the project is located. Rock boulder sizes should also reflect the geomorphic setting of the stream reach. Large wood placed into the stream under this scenario should be similar in species, age, and size (diameter) as trees found in the surrounding riparian area, to the extent possible. Wood, boulders and/or boulder clusters will be placed in the stream to create pool habitat and hydraulic complexity according to NRCS engineering specifications and with close review & approval of a fish habitat biologist onsite during the planning and implementation of the project. This scenario involves restoring one acre of stream. The planned activity will meet the current 395 standard, and facilitating practice standards utilized. Implementation will result in the improvement of instream habitat complexity, hiding and resting cover, and/or increased food availability for fish and other stream species. Payment for implementation is to defray the costs of project implementation. Records demonstrating implementation of this scenario will address resource concerns for stream species of concern will be required.

Before Situation: In this stream reach, habitat for fish, aquatic insects and/or other stream species is sub-optimal as determined by the NRCS Stream Visual Assessment Protocol score of less than 5. The site does not have adequate food, cover, and perhaps habitat connectivity for desired species. Riparian vegetation quality and/or quantity may also be compromised to the extent that the riparian area and floodplain are not functioning to provide necessary stream habitat components, such as large wood and off-channel refuge habitat.

After Situation: Stream habitat within the project reach is improving as a result of placing logs, rocks, or constructing wood and rock structures in the channel and/or along the stream bank. Pool habitat in the reach is improved, and hiding cover, food availability and refuge habitat for all stream species is improving. Associated Practices: Critical Area Planting (342) and Streambank and Shoreline Protection (580)

Scenario Feature Measure: stream length X bankfull width

Scenario Unit: Acre

Scenario Typical Size: 1

Total Scenario Cost: \$29,865.35

Scenario Cost/Unit: \$29,865.35

Cost Details

Component Name	Id	Description	Unit	Cost	Qty	Total
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Materials

Aggregate, Gravel, Graded	46	Gravel, includes materials, equipment and labor to transport and place. Includes washed and unwashed gravel.	Cubic Yard	\$31.47	60	\$1,888.33
Aggregate, river rock	1834	Well graded, rounded mineral substrates derived from local riverine settings. Includes materials and local delivery	Ton	\$26.40	7	\$184.79
Aggregate, Sand, Graded, Washed	45	Sand, typical ASTM C33 gradation, includes materials, equipment and labor to transport and place	Cubic Yard	\$31.05	17	\$527.86
Boulder	1761	Rock boulders (approximately 5 ft dia. 6.67 Tons) Includes materials and delivery (up to 100 miles) only.	Ton	\$34.32	40	\$1,372.71
Compost	265	A mixture of decaying organic matter, as from leaves and manure, used to improve soil structure and provide nutrients.	Ton	\$53.63	1	\$53.63
Cuttings, woody, large size	1309	Woody pole cuttings or posts 2" to 6" in diameter and 6' long. Includes materials and shipping only.	Each	\$18.38	300	\$5,515.14
Log, un-anchored	2035	Price of log picked up at the Mill. Includes material only.	Ton	\$40.58	30	\$1,217.49
Root Wad	2045	Tree stump buried into the streambank with the roots left exposed. Includes material only.	Ton	\$8.91	10	\$89.13
Steel, rebar	1832	Steel rebar, grade 60. Materials only.	Pound	\$0.55	8	\$4.40

Labor

Equipment Operators, Heavy	233	Includes: Cranes, Hydraulic Excavators >=50 HP, Dozers, Paving Machines, Rock Trenchers, Trenchers >=12", Dump Trucks, Ag Equipment >=150 HP, Scrapers, Water Wagons.	Hour	\$32.34	24	\$776.21
General Labor	231	Labor performed using basic tools such as power tool, shovels, and	Hour	\$21.64	24	\$519.46

		other tools that do not require extensive training. Ex. pipe layer, herder, concrete placement, materials spreader, flagger, etc.				
Skilled Labor	230	Labor requiring a high level skill set: Includes carpenters, welders, electricians, conservation professionals involved with data collection, monitoring, and or record keeping, etc.	Hour	\$37.24	60	\$2,234.29
Specialist Labor	235	Labor requiring a specialized skill set: Includes Agronomists, Foresters, Biologists, etc. to provide additional technical information during the planning and implementation of the practice. Does not include NRCS or TSP services.	Hour	\$96.48	32	\$3,087.25
Supervisor or Manager	234	Labor involving supervision or management activities. Includes crew supervisors, foremen and farm/ranch managers time required for adopting new technology, etc.	Hour	\$43.40	180	\$7,811.29

Equipment Installation

Hydraulic Excavator, 2 CY	932	Track mounted hydraulic excavator with bucket capacity range of 1.5 to 2.5 CY. Equipment and power unit costs. Labor not included.	Hour	\$193.59	16	\$3,097.49
Truck, dump, 12 CY	1215	Dump truck for moving bulk material. Typically capacity is 16 ton or 12 cubic yards. Includes equipment only.	Hour	\$113.86	8	\$910.90

Mobilization

Mobilization, large equipment	1140	Equipment >150HP or typical weights greater than 30,000 pounds or loads requiring over width or over length permits.	Each	\$574.99	1	\$574.99
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Practice: 395 - Stream Habitat Improvement and Management

Scenario: #6 - Fish Barrier

Scenario Description: This scenario describes the implementation of a stream habitat improvement and management project where practices are focused on the stream channel. The planned activity will meet the current 395 standard, and facilitating practice standards utilized. Implementation will result in protecting native aquatic fauna in the reach from competition or harrassment from non-native fish. This action may also increase food availability for fish and other stream species located above the constructed barrier. Payment for implementation is to defray the costs of stream habitat assessment above the barrier, and project implementation. Records demonstrating implementation of this scenario will address resource concerns for aquatic and riparian species of concern will be required. Associated Practices: Critical Area Planting (342) and Streambank and Shoreline Protection (580)

Before Situation: In this stream corridor, native aquatic species are at risk as determined by the state fish and wildlife agency. NRCS Stream Visual Assessment Protocol for the reach being protected by a barrier meets quality criteria and provides habitat for native species of concern, as determined by a Stream Visual Assessment Protocol score of greater than 5 .

After Situation: Native fish inhabiting areas upstream of the newly constructed concrete barrier will not be adversely affected by interactions with non-native species/competitors.

Scenario Feature Measure: Each

Scenario Unit: Cubic Yard

Scenario Typical Size: 5

Total Scenario Cost: \$36,740.48

Scenario Cost/Unit: \$7,348.10

Cost Details

Component Name	Id	Description	Unit	Cost	Qty	Total
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Equipment Installation

Concrete, CIP, formed reinforced	38	Steel reinforced concrete formed and cast-in-placed in formed structures such as walls or suspended slabs by chute placement. Typical strength is 3000 to 4000 psi. Includes materials, labor and equipment to transport, place and finish.	Cubic Yard	\$449.19	60	\$26,951.40
Hydraulic Excavator, 2 CY	932	Track mounted hydraulic excavator with bucket capacity range of 1.5 to 2.5 CY. Equipment and power unit costs. Labor not included.	Hour	\$193.59	10	\$1,935.93
Truck, Concrete Pump	1211	Concrete pump, normally truck mounted. Use this item in association with other concrete components when job requires placement by other than normal chutes. Include drive and setup time in quantity; therefore, do not include mobilization. Includes equipment and operator.	Hour	\$149.05	36	\$5,365.95

Labor

Equipment Operators, Heavy	233	Includes: Cranes, Hydraulic Excavators >=50 HP, Dozers, Paving Machines, Rock Trenchers, Trenchers >=12", Dump Trucks, Ag Equipment >=150 HP, Scrapers, Water Wagons.	Hour	\$32.34	10	\$323.42
General Labor	231	Labor performed using basic tools such as power tool, shovels, and other tools that do not require extensive training. Ex. pipe layer, herder, concrete placement, materials spreader, flagger, etc.	Hour	\$21.64	10	\$216.44
Skilled Labor	230	Labor requiring a high level skill set: Includes carpenters, welders, electricians, conservation professionals involved with data collection, monitoring, and or record keeping, etc.	Hour	\$37.24	10	\$372.38

Mobilization

Mobilization, large equipment	1140	Equipment >150HP or typical weights greater than 30,000 pounds or loads requiring over width or over length permits.	Each	\$574.99	2	\$1,149.98
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Materials

Plywood, 3/4 inch, untreated	1833	Untreated 4' x 8' sheets of 3/4 inch exterior grade plywood. Includes materials only.	Each	\$26.87	15	\$402.99
Steel, rebar	1832	Steel rebar, grade 60. Materials only.	Pound	\$0.55	40	\$21.98

Practice: 395 - Stream Habitat Improvement and Management

Scenario: #7 - Cribbing Mudsill 10 section

Scenario Description: This scenario describes the implementation of a stream habitat improvement and management project where practices are focused on instream habitat improvement with a combination of rock AND wood structures to build a mudsill. A stream assessment (i.e. Stream Visual Assessment Protocol) should be conducted in order to document habitat components (such as large wood, pools) are not currently present in the stream or are limited for aquatic species. A project design for placement of habitat structures (boulders, boulder clusters, wood, wood structures) will be based on assessment of (a) the target stream reach characteristics and (b) those of a suitable reference reach. These characteristics include channel geometry, channel slope, stream bottom substrate size and composition, and the geomorphic setting influencing the channel form, pattern and profile. The bank is sloped back, logs set on rocks parallel to stream, boards set on top perpendicular to make shelter below pool level. Rock placed on top and then filled and sloped, protected with fabric .Rock boulder sizes should also reflect the geomorphic setting of the stream reach. Large wood placed into the stream under this scenario should be similar in species, age, and size (diameter) as trees found in the surrounding riparian area, to the extent possible. Wood, boulders and/or boulder clusters will be placed in the stream to create pool habitat and hydraulic complexity according to NRCS engineering specifications and with close review & approval of a fish habitat biologist onsite during the planning and implementation of the project. This scenario involves restoring one acre of stream. The planned activity will meet the current 395 standard, and facilitating practice standards utilized. Implementation will result in the improvement of instream habitat complexity, hiding and resting cover, and/or increased food availability for fish and other stream species. Payment for implementation is to defray the costs of project implementation. Records demonstrating implementation of this scenario will address resource concerns for stream species of concern will be required. Associated Practices: Critical Area Planting (342) and Streambank and Shoreline Protection (580)

Before Situation: In this stream reach, habitat for fish, aquatic insects and/or other stream species is sub-optimal as determined by the NRCS Stream Visual Assessment Protocol score of less than 5. The site does not have adequate food, cover, and perhaps habitat connectivity for desired species. Riparian vegetation quality and/or quantity may also be compromised to the extent that the riparian area and floodplain are not functioning to provide necessary stream habitat components, such as large wood and off-channel refuge habitat.

After Situation: Stream habitat within the project reach is improving as a result of placing a 10' section of mudsill along the stream bank. Pool habitat in the reach is improved, and hiding cover, food availability and refuge habitat for all stream species is improving.

Scenario Feature Measure: Each 10' Section

Scenario Unit: Each

Scenario Typical Size: 1

Total Scenario Cost: \$857.48

Scenario Cost/Unit: \$857.48

Cost Details

Component Name	Id	Description	Unit	Cost	Qty	Total
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Labor

Equipment Operators, Heavy	233	Includes: Cranes, Hydraulic Excavators >=50 HP, Dozers, Paving Machines, Rock Trenchers, Trenchers >=12", Dump Trucks, Ag Equipment >=150 HP, Scrapers, Water Wagons.	Hour	\$32.34	2	\$64.68
General Labor	231	Labor performed using basic tools such as power tool, shovels, and other tools that do not require extensive training. Ex. pipe layer, herder, concrete placement, materials spreader, flagger, etc.	Hour	\$21.64	2	\$43.29
Supervisor or Manager	234	Labor involving supervision or management activities. Includes crew supervisors, foremen and farm/ranch managers time required for adopting new technology, etc.	Hour	\$43.40	1	\$43.40

Equipment Installation

Chainsaw	937	Equipment and power unit costs. Labor not included.	Hour	\$5.14	1	\$5.14
Hydraulic Excavator, 1 CY	931	Track mounted hydraulic excavator with bucket capacity range of 0.8 to 1.5 CY. Equipment and power unit costs. Labor not included.	Hour	\$133.90	1	\$133.90
Truck, dump, 8 CY	1401	Dump truck for moving bulk material. Typically capacity is 12 ton or 8 cubic yards. Includes equipment only.	Hour	\$67.76	1	\$67.76

Materials

Boulder	1761	Rock boulders (approximately 5 ft dia. 6.67 Tons) Includes materials and delivery (up to 100 miles) only.	Ton	\$34.32	2	\$68.64
Dimension Lumber, untreated	1045	Untreated dimension lumber with nominal thickness equal or less than 2". Includes lumber and fasteners.	Board Foot	\$0.82	100	\$82.01
Erosion Control Blanket,	1213	Biodegradable erosion control blanket, typically a composite of	Square Yard	\$1.24	14	\$17.37

biodegradable		natural fibers with reinforcing polymer netting. Materials and shipping only.				
Log, un-anchored	2035	Price of log picked up at the Mill. Includes material only.	Ton	\$40.58	2	\$81.17
Rock Riprap, graded, angular, material and shipping	1200	Graded Rock Riprap for all gradation ranges. Includes materials and delivery only.	Ton	\$33.78	4	\$135.13

Mobilization

Mobilization, large equipment	1140	Equipment >150HP or typical weights greater than 30,000 pounds or loads requiring over width or over length permits.	Each	\$574.99	0.2	\$115.00
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Practice: 395 - Stream Habitat Improvement and Management

Scenario: #8 - Mdstream Structure - 10 Boulders or 3 mid str log structures

Scenario Description: This scenario describes the implementation of a stream habitat improvement and management project where practices are focused on instream habitat improvement with a combination of rock AND wood structures. This scenario involves placement of large wood and rock structures into a stream channel in order to improve aquatic habitat that currently does not meet quality criteria for stream species habitat. A stream assessment (i.e. Stream Visual Assessment Protocol) should be conducted in order to document habitat components (such as large wood, pools) are not currently present in the stream or are limited for aquatic species. A project design for placement of habitat structures (boulders, boulder clusters, wood, wood structures) will be based on assessment of (a) the target stream reach characteristics and (b) those of a suitable reference reach. These characteristics include channel geometry, channel slope, stream bottom substrate size and composition, and the geomorphic setting influencing the channel form, pattern and profile. Large rocks/boulders placed in the stream channel will mimic geologic material sizes typically present in the watershed or observed in intact, reference stream reaches in the MLRA where the project is located. Rock boulder sizes should also reflect the geomorphic setting of the stream reach. Large wood placed into the stream under this scenario should be similar in species, age, and size (diameter) as trees found in the surrounding riparian area, to the extent possible. Wood, boulders and/or boulder clusters will be placed in the stream to create pool habitat and hydraulic complexity according to NRCS engineering specifications and with close review & approval of a fish habitat biologist onsite during the planning and implementation of the project. The planned activity will meet the current 395 standard, and facilitating practice standards utilized. Implementation will result in the improvement of instream habitat complexity, hiding and resting cover, and/or increased food availability for fish and other stream species. Payment for implementation is to defray the costs of project implementation. Records demonstrating implementation of this scenario will address resource concerns for stream species of concern will be required. Associated Practices: Critical Area Planting (342) and Streambank and Shoreline Protection (580)

Before Situation: In this stream reach, habitat for fish, aquatic insects and/or other stream species is sub-optimal as determined by the NRCS Stream Visual Assessment Protocol score of less than 5. The site does not have adequate food, cover, and perhaps habitat connectivity for desired species. Riparian vegetation quality and/or quantity may also be compromised to the extent that the riparian area and floodplain are not functioning to provide necessary stream habitat components, such as large wood and off-channel refuge habitat.

After Situation: Stream habitat within the project reach is improving as a result of placing boulders in groups of 10 or constructing 3 log mid stream structures or some combination in the channel. Hydraulic complexity of the habitat in the reach is increased, and hiding cover, food availability and refuge habitat for stream species is improving. Streambank vegetation is increasing and contributing to stability of the streambanks.

Scenario Feature Measure: Each group

Scenario Unit: Each

Scenario Typical Size: 1

Total Scenario Cost: \$573.80

Scenario Cost/Unit: \$573.80

Cost Details

Component Name	Id	Description	Unit	Cost	Qty	Total
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Labor

Equipment Operators, Heavy	233	Includes: Cranes, Hydraulic Excavators >=50 HP, Dozers, Paving Machines, Rock Trenchers, Trenchers >=12", Dump Trucks, Ag Equipment >=150 HP, Scrapers, Water Wagons.	Hour	\$32.34	1.5	\$48.51
General Labor	231	Labor performed using basic tools such as power tool, shovels, and other tools that do not require extensive training. Ex. pipe layer, herder, concrete placement, materials spreader, flagger, etc.	Hour	\$21.64	2	\$43.29

Equipment Installation

Chainsaw	937	Equipment and power unit costs. Labor not included.	Hour	\$5.14	2	\$10.28
Hydraulic Excavator, 1 CY	931	Track mounted hydraulic excavator with bucket capacity range of 0.8 to 1.5 CY. Equipment and power unit costs. Labor not included.	Hour	\$133.90	1	\$133.90
Truck, dump, 8 CY	1401	Dump truck for moving bulk material. Typically capacity is 12 ton or 8 cubic yards. Includes equipment only.	Hour	\$67.76	0.5	\$33.88

Mobilization

Mobilization, large equipment	1140	Equipment >150HP or typical weights greater than 30,000 pounds or loads requiring over width or over length permits.	Each	\$574.99	0.2	\$115.00
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Materials

Boulder	1761	Rock boulders (approximately 5 ft dia. 6.67 Tons) Includes materials and delivery (up to 100 miles) only.	Ton	\$34.32	2.5	\$85.79
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Log, un-anchored	2035	Price of log picked up at the Mill. Includes material only.	Ton	\$40.58	2	\$81.17
Steel, rebar	1832	Steel rebar, grade 60. Materials only.	Pound	\$0.55	40	\$21.98

Practice: 395 - Stream Habitat Improvement and Management

Scenario: #9 - Deflector, Rock <= 80 ton

Scenario Description: This scenario describes the implementation of a stream habitat improvement and management project where practices are focused on instream habitat improvement with a combination of rock AND wood structures. This scenario involves placement of large rock deflector (<= 80tons) with or without log structures into a stream channel in order to improve aquatic habitat that currently does not meet quality criteria for stream species habitat. A stream assessment (i.e. Stream Visual Assessment Protocol) should be conducted in order to document habitat components (such as large wood, pools) are not currently present in the stream or are limited for aquatic species. These characteristics include channel geometry, channel slope, stream bottom substrate size and composition, and the geomorphic setting influencing the channel form, pattern and profile. Rock deflectors, generally more than one, will be placed in the stream to create pool habitat and hydraulic complexity according to NRCS engineering specifications and with close review & approval of a fish habitat biologist onsite during the planning and implementation of the project. The planned activity will meet the current 395 standard, and facilitating practice standards utilized. Implementation will result in the improvement of instream habitat complexity, hiding and resting cover, and/or increased food availability for fish and other stream species. Payment for implementation is to defray the costs of project implementation. Records demonstrating implementation of this scenario will address resource concerns for stream species of concern will be required. Associated Practices: Critical Area Planting (342) and Streambank and Shoreline Protection (580)

Before Situation: In this stream reach, habitat for fish, aquatic insects and/or other stream species is sub-optimal as determined by the NRCS Stream Visual Assessment Protocol score of less than 5. The site does not have adequate food, cover, and perhaps habitat connectivity for desired species. Riparian vegetation quality and/or quantity may also be compromised to the extent that the riparian area and floodplain are not functioning to provide necessary stream habitat components, such as large wood and off-channel refuge habitat.

After Situation: Stream habitat within the project reach is improving as a result of placing a 60 ton rock deflector with several logs into the channel from the stream bank. Stream habitat in the reach is improved, and hiding cover, food availability and refuge habitat for all stream species is improving.

Scenario Feature Measure: Each structure

Scenario Unit: Each

Scenario Typical Size: 1

Total Scenario Cost: \$3,248.89

Scenario Cost/Unit: \$3,248.89

Cost Details

Component Name	Id	Description	Unit	Cost	Qty	Total
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Labor

Equipment Operators, Heavy	233	Includes: Cranes, Hydraulic Excavators >=50 HP, Dozers, Paving Machines, Rock Trenchers, Trenchers >=12", Dump Trucks, Ag Equipment >=150 HP, Scrapers, Water Wagons.	Hour	\$32.34	2.5	\$80.86
Equipment Operators, Light	232	Includes: Skid Steer Loaders, Hydraulic Excavators <50 HP, Trenchers <12", Ag Equipment <150 HP, Pickup Trucks, Forklifts, Mulchers	Hour	\$23.29	1	\$23.29
General Labor	231	Labor performed using basic tools such as power tool, shovels, and other tools that do not require extensive training. Ex. pipe layer, herder, concrete placement, materials spreader, flagger, etc.	Hour	\$21.64	2	\$43.29
Supervisor or Manager	234	Labor involving supervision or management activities. Includes crew supervisors, foremen and farm/ranch managers time required for adopting new technology, etc.	Hour	\$43.40	1	\$43.40

Equipment Installation

Chainsaw	937	Equipment and power unit costs. Labor not included.	Hour	\$5.14	1	\$5.14
Hydraulic Excavator, 1 CY	931	Track mounted hydraulic excavator with bucket capacity range of 0.8 to 1.5 CY. Equipment and power unit costs. Labor not included.	Hour	\$133.90	2	\$267.80
Skidsteer, 80 HP	933	Skidsteer loader with horsepower range of 60 to 90. Equipment and power unit costs. Labor not included.	Hour	\$52.50	1	\$52.50
Truck, dump, 8 CY	1401	Dump truck for moving bulk material. Typically capacity is 12 ton or 8 cubic yards. Includes equipment only.	Hour	\$67.76	0.5	\$33.88

Mobilization

Mobilization, large equipment	1140	Equipment >150HP or typical weights greater than 30,000 pounds or loads requiring over width or over length permits.	Each	\$574.99	1	\$574.99
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Mobilization, medium equipment	1139	Equipment with 70-150 HP or typical weights between 14,000 and 30,000 pounds.	Each	\$301.16	1	\$301.16
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Materials

Aggregate, river rock	1834	Well graded, rounded mineral substrates derived from local riverine settings. Includes materials and local delivery	Ton	\$26.40	5	\$131.99
Boulder	1761	Rock boulders (approximately 5 ft dia. 6.67 Tons) Includes materials and delivery (up to 100 miles) only.	Ton	\$34.32	15	\$514.77
Log, un-anchored	2035	Price of log picked up at the Mill. Includes material only.	Ton	\$40.58	4	\$162.33
Rock Riprap, graded, angular, material and shipping	1200	Graded Rock Riprap for all gradation ranges. Includes materials and delivery only.	Ton	\$33.78	30	\$1,013.50

Practice: 395 - Stream Habitat Improvement and Management

Scenario: #10 - Deflector, Rock > 80 ton

Scenario Description: This scenario describes the implementation of a stream habitat improvement and management project where practices are focused on instream habitat improvement with a combination of rock AND wood structures. This scenario involves placement of large rock deflector (> 80tons) with or without log structures into a stream channel in order to improve aquatic habitat that currently does not meet quality criteria for stream species habitat. A stream assessment (i.e. Stream Visual Assessment Protocol) should be conducted in order to document habitat components (such as large wood, pools) are not currently present in the stream or are limited for aquatic species. These characteristics include channel geometry, channel slope, stream bottom substrate size and composition, and the geomorphic setting influencing the channel form, pattern and profile. Rock deflectors, generally more than one, will be placed in the stream to create pool habitat and hydraulic complexity according to NRCS engineering specifications and with close review & approval of a fish habitat biologist onsite during the planning and implementation of the project. The planned activity will meet the current 395 standard, and facilitating practice standards utilized. Implementation will result in the improvement of instream habitat complexity, hiding and resting cover, and/or increased food availability for fish and other stream species. Payment for implementation is to defray the costs of project implementation. Records demonstrating implementation of this scenario will address resource concerns for stream species of concern will be required. Associated Practices: Critical Area Planting (342) and Streambank and Shoreline Protection (580)

Before Situation: In this stream reach, habitat for fish, aquatic insects and/or other stream species is sub-optimal as determined by the NRCS Stream Visual Assessment Protocol score of less than 5. The site does not have adequate food, cover, and perhaps habitat connectivity for desired species. Riparian vegetation quality and/or quantity may also be compromised to the extent that the riparian area and floodplain are not functioning to provide necessary stream habitat components, such as large wood and off-channel refuge habitat.

After Situation: Stream habitat within the project reach is improving as a result of placing a rock deflector into the channel from the stream bank. Stream habitat in the reach is improved, and hiding cover, food availability and refuge habitat for all stream species is improving.

Scenario Feature Measure: Each Large Rock/Rocklog

Scenario Unit: Each

Scenario Typical Size: 1

Total Scenario Cost: \$5,185.26

Scenario Cost/Unit: \$5,185.26

Cost Details

Component Name	Id	Description	Unit	Cost	Qty	Total
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Labor

Equipment Operators, Heavy	233	Includes: Cranes, Hydraulic Excavators >=50 HP, Dozers, Paving Machines, Rock Trenchers, Trenchers >=12", Dump Trucks, Ag Equipment >=150 HP, Scrapers, Water Wagons.	Hour	\$32.34	3.5	\$113.20
Equipment Operators, Light	232	Includes: Skid Steer Loaders, Hydraulic Excavators <50 HP, Trenchers <12", Ag Equipment <150 HP, Pickup Trucks, Forklifts, Mulchers	Hour	\$23.29	3	\$69.88
General Labor	231	Labor performed using basic tools such as power tool, shovels, and other tools that do not require extensive training. Ex. pipe layer, herder, concrete placement, materials spreader, flagger, etc.	Hour	\$21.64	3	\$64.93
Supervisor or Manager	234	Labor involving supervision or management activities. Includes crew supervisors, foremen and farm/ranch managers time required for adopting new technology, etc.	Hour	\$43.40	1	\$43.40

Equipment Installation

Chainsaw	937	Equipment and power unit costs. Labor not included.	Hour	\$5.14	2	\$10.28
Hydraulic Excavator, 1 CY	931	Track mounted hydraulic excavator with bucket capacity range of 0.8 to 1.5 CY. Equipment and power unit costs. Labor not included.	Hour	\$133.90	3	\$401.70
Skidsteer, 80 HP	933	Skidsteer loader with horsepower range of 60 to 90. Equipment and power unit costs. Labor not included.	Hour	\$52.50	3	\$157.51
Truck, dump, 8 CY	1401	Dump truck for moving bulk material. Typically capacity is 12 ton or 8 cubic yards. Includes equipment only.	Hour	\$67.76	0.5	\$33.88

Mobilization

Mobilization, large equipment	1140	Equipment >150HP or typical weights greater than 30,000 pounds or loads requiring over width or over length permits.	Each	\$574.99	1	\$574.99
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Mobilization, medium equipment	1139	Equipment with 70-150 HP or typical weights between 14,000 and 30,000 pounds.	Each	\$301.16	1	\$301.16
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Materials

Aggregate, river rock	1834	Well graded, rounded mineral substrates derived from local riverine settings. Includes materials and local delivery	Ton	\$26.40	20	\$527.96
Boulder	1761	Rock boulders (approximately 5 ft dia. 6.67 Tons) Includes materials and delivery (up to 100 miles) only.	Ton	\$34.32	40	\$1,372.71
Log, un-anchored	2035	Price of log picked up at the Mill. Includes material only.	Ton	\$40.58	4	\$162.33
Rock Riprap, graded, angular, material and shipping	1200	Graded Rock Riprap for all gradation ranges. Includes materials and delivery only.	Ton	\$33.78	40	\$1,351.33

Practice: 395 - Stream Habitat Improvement and Management

Scenario: #11 - Defector Group of 3 Root Wads

Scenario Description: This scenario describes the implementation of a stream habitat improvement and management project where practices are focused on instream habitat improvement with a combination of rock AND wood structures. This scenario involves placement of large wood structures, called root wads, supported by boulders in order to improve aquatic habitat that currently does not meet quality criteria for stream species habitat. A stream assessment (i.e. Stream Visual Assessment Protocol) should be conducted in order to document habitat components (such as large wood, pools) are not currently present in the stream or are limited for aquatic species. A project design for placement of habitat structures (boulders, boulder clusters, wood, wood structures) will be based on assessment of (a) the target stream reach characteristics and (b) those of a suitable reference reach. These characteristics include channel geometry, channel slope, stream bottom substrate size and composition, and the geomorphic setting influencing the channel form, pattern and profile. Rock boulder sizes should also reflect the geomorphic setting of the stream reach. Large wood root wads placed into the stream under this scenario should be similar in species, age, and size (diameter) as trees found in the surrounding riparian area, to the extent possible. Wood, boulders and/or boulder clusters will be placed in the stream to create pool habitat and hydraulic complexity according to NRCS engineering specifications and with close review & approval of a fish habitat biologist onsite during the planning and implementation of the project. The planned activity will meet the current 395 standard, and facilitating practice standards utilized. Implementation will result in the improvement of instream habitat complexity, hiding and resting cover, and/or increased food availability for fish and other stream species. Payment for implementation is to defray the costs of project implementation. Records demonstrating implementation of this scenario will address resource concerns for stream species of concern will be required. Associated Practices: Critical Area Planting (342) and Streambank and Shoreline Protection (580)

Before Situation: In this stream reach, habitat for fish, aquatic insects and/or other stream species is sub-optimal as determined by the NRCS Stream Visual Assessment Protocol score of less than 5. The site does not have adequate food, cover, and perhaps habitat connectivity for desired species. Riparian vegetation quality and/or quantity may also be compromised to the extent that the riparian area and floodplain are not functioning to provide necessary stream habitat components, such as large wood and off-channel refuge habitat.

After Situation: Stream habitat within the project reach is improving as a result of placing a group of 3 root wads anchored with boulders protruding along the stream bank. Pool habitat in the reach is improved, and hiding cover, food availability and refuge habitat for all stream species is improving.

Scenario Feature Measure: Each group of 3

Scenario Unit: Each

Scenario Typical Size: 1

Total Scenario Cost: \$2,865.65

Scenario Cost/Unit: \$2,865.65

Cost Details

Component Name	Id	Description	Unit	Cost	Qty	Total
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Labor

Equipment Operators, Heavy	233	Includes: Cranes, Hydraulic Excavators >=50 HP, Dozers, Paving Machines, Rock Trenchers, Trenchers >=12", Dump Trucks, Ag Equipment >=150 HP, Scrapers, Water Wagons.	Hour	\$32.34	12	\$388.11
General Labor	231	Labor performed using basic tools such as power tool, shovels, and other tools that do not require extensive training. Ex. pipe layer, herder, concrete placement, materials spreader, flagger, etc.	Hour	\$21.64	6	\$129.86

Equipment Installation

Hydraulic Excavator, 1 CY	931	Track mounted hydraulic excavator with bucket capacity range of 0.8 to 1.5 CY. Equipment and power unit costs. Labor not included.	Hour	\$133.90	6	\$803.40
Truck, dump, 12 CY	1215	Dump truck for moving bulk material. Typically capacity is 16 ton or 12 cubic yards. Includes equipment only.	Hour	\$113.86	6	\$683.17

Mobilization

Mobilization, large equipment	1140	Equipment >150HP or typical weights greater than 30,000 pounds or loads requiring over width or over length permits.	Each	\$574.99	1	\$574.99
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Materials

Boulder	1761	Rock boulders (approximately 5 ft dia. 6.67 Tons) Includes materials and delivery (up to 100 miles) only.	Ton	\$34.32	6	\$205.91
Root Wad	2045	Tree stump buried into the streambank with the roots left exposed. Includes material only.	Ton	\$8.91	9	\$80.21

Practice: 395 - Stream Habitat Improvement and Management

Scenario: #12 - Cross Vane Rock or Rock/log

Scenario Description: This scenario describes the implementation of a stream habitat improvement and management project where practices are focused on instream habitat improvement with a combination of rock AND wood structures. This scenario involves placement of rocks or a combination of rocks and logs across the entire stream channel in order to improve aquatic habitat that currently does not meet quality criteria for stream species habitat. Shape typically forms a "V" shape pointing upstream called a cross vane. A stream assessment (i.e. Stream Visual Assessment Protocol) should be conducted in order to document habitat components (such as large wood, pools) are not currently present in the stream or are limited for aquatic species. A project design for placement of a cross vane will be based on assessment of (a) the target stream reach characteristics and (b) those of a suitable reference reach. These characteristics include channel geometry, channel slope, stream bottom substrate size and composition, and the geomorphic setting influencing the channel form, pattern and profile. Rock boulder sizes should also reflect the geomorphic setting of the stream reach. Large wood placed into the stream under this scenario should be similar in species, age, and size (diameter) as trees found in the surrounding riparian area, to the extent possible. The planned activity will meet the current 395 standard, and facilitating practice standards utilized. Implementation will result in the improvement of instream habitat complexity, hiding and resting cover, and/or increased food availability for fish and other stream species. Payment for implementation is to defray the costs of project implementation. Records demonstrating implementation of this scenario will address resource concerns for stream species of concern will be required. Associated Practices: Critical Area Planting (342) and Streambank and Shoreline Protection (580)

Before Situation: In this stream reach, habitat for fish, aquatic insects and/or other stream species is sub-optimal as determined by the NRCS Stream Visual Assessment Protocol score of less than 5. The site does not have adequate food, cover, and perhaps habitat connectivity for desired species. Riparian vegetation quality and/or quantity may also be compromised to the extent that the riparian area and floodplain are not functioning to provide necessary stream habitat components, such as large wood and off-channel refuge habitat.

After Situation: Stream habitat within the project reach is improving as a result of placing a 30' long rock or rock log cross vane across the entire channel. Pool habitat in the reach is improved, and hiding cover, food availability and refuge habitat for all stream species is improving.

Scenario Feature Measure: Each Cross vane

Scenario Unit: Each

Scenario Typical Size: 1

Total Scenario Cost: \$3,223.36

Scenario Cost/Unit: \$3,223.36

Cost Details

Component Name	Id	Description	Unit	Cost	Qty	Total
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Labor

Equipment Operators, Heavy	233	Includes: Cranes, Hydraulic Excavators >=50 HP, Dozers, Paving Machines, Rock Trenchers, Trenchers >=12", Dump Trucks, Ag Equipment >=150 HP, Scrapers, Water Wagons.	Hour	\$32.34	4	\$129.37
Equipment Operators, Light	232	Includes: Skid Steer Loaders, Hydraulic Excavators <50 HP, Trenchers <12", Ag Equipment <150 HP, Pickup Trucks, Forklifts, Mulchers	Hour	\$23.29	4	\$93.18
General Labor	231	Labor performed using basic tools such as power tool, shovels, and other tools that do not require extensive training. Ex. pipe layer, herder, concrete placement, materials spreader, flagger, etc.	Hour	\$21.64	4	\$86.58
Supervisor or Manager	234	Labor involving supervision or management activities. Includes crew supervisors, foremen and farm/ranch managers time required for adopting new technology, etc.	Hour	\$43.40	4	\$173.58

Equipment Installation

Hydraulic Excavator, 1 CY	931	Track mounted hydraulic excavator with bucket capacity range of 0.8 to 1.5 CY. Equipment and power unit costs. Labor not included.	Hour	\$133.90	4	\$535.60
Skidsteer, 80 HP	933	Skidsteer loader with horsepower range of 60 to 90. Equipment and power unit costs. Labor not included.	Hour	\$52.50	4	\$210.01

Mobilization

Mobilization, medium equipment	1139	Equipment with 70-150 HP or typical weights between 14,000 and 30,000 pounds.	Each	\$301.16	2	\$602.32
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Materials

Boulder	1761	Rock boulders (approximately 5 ft dia. 6.67 Tons) Includes	Ton	\$34.32	6	\$205.91
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		materials and delivery (up to 100 miles) only.				
Log, un-anchored	2035	Price of log picked up at the Mill. Includes material only.	Ton	\$40.58	4	\$162.33
Rock Riprap, graded, angular, material and shipping	1200	Graded Rock Riprap for all gradation ranges. Includes materials and delivery only.	Ton	\$33.78	30	\$1,013.50
Steel, rebar	1832	Steel rebar, grade 60. Materials only.	Pound	\$0.55	20	\$10.99

Practice: 649 - Structures for Wildlife

Scenario: #3 - Nesting Box, Large

Scenario Description: A structure is provided to support the nesting and rearing of larger targeted species such as waterfowl, bats and barn owls, and is directly mounted to a tree, building or other structure. These structures are designed to meet targeted species biology and life history needs. Addresses Resource Concern: Inadequate Cover/Shelter.

Before Situation: The area lacks sufficient overall habitat conditions to support viable populations of targeted species. A suitable location to mount the box is available. A predator guard is needed.

After Situation: The installation of nesting and rearing boxes support the life-cycle needs of targeted species, such as birds, bats and pollinators. Because of suitable location and conditions the nesting box can be directly mounted such as on a tree or building, thereby eliminating the need for mounting poles and predator guards. Species such as cavity dwelling birds and pollinators use this approach, but this treatment is not limited to those species. These structures/features enhance habitat, cover, and improve species survivability.

Scenario Feature Measure: Number of structures.

Scenario Unit: Each

Scenario Typical Size: 1

Total Scenario Cost: \$132.41

Scenario Cost/Unit: \$132.41

Cost Details

Component Name	Id	Description	Unit	Cost	Qty	Total
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Labor

General Labor	231	Labor performed using basic tools such as power tool, shovels, and other tools that do not require extensive training. Ex. pipe layer, herder, concrete placement, materials spreader, flagger, etc.	Hour	\$21.64	0.5	\$10.82
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Equipment Installation

All terrain vehicles, ATV	965	Includes equipment, power unit and labor costs.	Hour	\$38.47	0.5	\$19.24
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Materials

Habitat Box, waterfowl	1449	Wood Duck Box, typically 24" x 11" x 12" with 4" wide oval entrance, single. Includes material and shipping only.	Each	\$72.22	1	\$72.22
Predator Guard	1461	Predator guards (i.e. stove pipes, cone, hole guard, etc.) for habitat boxes. Materials only. Includes material and shipping only.	Each	\$30.14	1	\$30.14

Practice: 649 - Structures for Wildlife

Scenario: #4 - Nesting Box or Rapture Perch, Large, with Pole

Scenario Description: Constructing a nest box on a steel pole with a predator guard where needed. A structure is provided to support the nesting and rearing of larger targeted species such as woodducks, bats, barn owls. Addresses Resource Concern: Inadequate Cover/Shelter.

Before Situation: The area lacks sufficient overall nesting sites to support viable populations of targeted species. Predator guards provide needed protection of target species during nesting and rearing.

After Situation: The installation of pole mounted nesting and rearing boxes support the life-cycle needs of targeted species, such as bats and waterfowl.

Scenario Feature Measure: Number of structures

Scenario Unit: Each

Scenario Typical Size: 1

Total Scenario Cost: \$219.50

Scenario Cost/Unit: \$219.50

Cost Details

Component Name	Id	Description	Unit	Cost	Qty	Total
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Labor

General Labor	231	Labor performed using basic tools such as power tool, shovels, and other tools that do not require extensive training. Ex. pipe layer, herder, concrete placement, materials spreader, flagger, etc.	Hour	\$21.64	1	\$21.64
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Materials

Habitat Box, waterfowl	1449	Wood Duck Box, typically 24" x 11" x 12" with 4" wide oval entrance, single. Includes material and shipping only.	Each	\$72.22	1	\$72.22
Pipe, steel, galvanized, threaded, 1 1/4", schedule 40	256	Spec. A-53, includes coupling and clevis hanger assembly sized for covering, 10' OC	Foot	\$7.63	10	\$76.27
Predator Guard	1461	Predator guards (i.e. stove pipes, cone, hole guard, etc.) for habitat boxes. Materials only. Includes material and shipping only.	Each	\$30.14	1	\$30.14

Equipment Installation

All terrain vehicles, ATV	965	Includes equipment, power unit and labor costs.	Hour	\$38.47	0.5	\$19.24
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Practice: 649 - Structures for Wildlife

Scenario: #5 - Escape Ramp

Scenario Description: Retrofit an existing watering trough/tank with an appropriately designed and installed wildlife escape ramp to reduce wildlife mortality and maintain water quality within the watering facility.

Before Situation: Existing watering facilities lack escape potential for wildlife. This results in death of the small wildlife accessing the facility for water, and resulting poor water quality as the animal decays.

After Situation: Watering facilities provide wildlife safe access. Water quality is improved within the watering facility and wildlife mortality is reduced.

Scenario Feature Measure: Each Ramp

Scenario Unit: Each

Scenario Typical Size: 1

Total Scenario Cost: \$35.52

Scenario Cost/Unit: \$35.52

Cost Details

Component Name	Id	Description	Unit	Cost	Qty	Total
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Labor

General Labor	231	Labor performed using basic tools such as power tool, shovels, and other tools that do not require extensive training. Ex. pipe layer, herder, concrete placement, materials spreader, flagger, etc.	Hour	\$21.64	0.5	\$10.82
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Materials

Wildlife Escape Ramp	242	Pool size 15' x 30', for small mammals less than one pound	Each	\$24.70	1	\$24.70
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Practice: 649 - Structures for Wildlife

Scenario: #6 - Fence Markers, Vinyl Undersill

Scenario Description: Existing fences are retrofitted with vinyl markers that increase wire visibility and reduce mortality due to collision for wildlife species of concern. Markers are installed approximately every 3 feet along top wire. Scenario is typically implemented along fences in potential high risk areas (red areas in SGI Fence Collision Risk Model) or where a known problem exists.

Before Situation: Wire fences located in high risk areas pose a collision threat to wildlife of special concern.

After Situation: Fence related mortality of species of special concern is reduced.

Scenario Feature Measure: feet of fence marked

Scenario Unit: Foot

Scenario Typical Size: 1320

Total Scenario Cost: \$206.66

Scenario Cost/Unit: \$0.16

Cost Details

Component Name	Id	Description	Unit	Cost	Qty	Total
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Labor

General Labor	231	Labor performed using basic tools such as power tool, shovels, and other tools that do not require extensive training. Ex. pipe layer, herder, concrete placement, materials spreader, flagger, etc.	Hour	\$21.64	5	\$108.22
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Materials

Vinyl Undersill Strips	241	Marking material using the "undersill" strips of vinyl siding. Priced per foot of fence per each wire. Materials only.	Foot	\$0.06	1320	\$79.20
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Equipment Installation

All terrain vehicles, ATV	965	Includes equipment, power unit and labor costs.	Hour	\$38.47	0.5	\$19.24
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Practice: 649 - Structures for Wildlife

Scenario: #7 - Brush Pile - Small

Scenario Description: Small brush piles are created to provide shrubby/woody escape cover for wildlife. Pushing or cutting of select small trees and placement in selected locations to provide wildlife cover. Typical scenario of 10' x 20' area for structure covered by interlocking limbs of trees less than 12 inches in diameter.

Before Situation: The existing habitat lacks escape, ground nesting and safe loafing cover.

After Situation: Small brush piles provide needed escape, ground nesting and safe loafing cover for targeted wildlife species.

Scenario Feature Measure: brush piles

Scenario Unit: Each

Scenario Typical Size: 1

Total Scenario Cost: \$37.90

Scenario Cost/Unit: \$37.90

Cost Details

Component Name	Id	Description	Unit	Cost	Qty	Total
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Labor

Equipment Operators, Light	232	Includes: Skid Steer Loaders, Hydraulic Excavators <50 HP, Trenchers <12", Ag Equipment <150 HP, Pickup Trucks, Forklifts, Mulchers	Hour	\$23.29	0.5	\$11.65
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Equipment Installation

Skidsteer, 80 HP	933	Skidsteer loader with horsepower range of 60 to 90. Equipment and power unit costs. Labor not included.	Hour	\$52.50	0.5	\$26.25
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Practice: 649 - Structures for Wildlife

Scenario: #8 - Brush Pile - Large

Scenario Description: The typical scenario is hardwood and mixed wood forest stands and open areas where wildlife cover and ground nesting is limited. Brush piles will be created from trees and shrubs on site and will be constructed by piling brush and loose branches on top of a base frame comprised of large logs.

Before Situation: Forest edges, forest openings, pastures, and wildlife lands have limited escape cover, ground nesting habitat and safe loafing areas, resulting in unsuitable habitat and reduced survival. Wildlife such as cottontail will need other cover nearby for the success of the practice.

After Situation: Large brush piles provide needed escape, ground nesting and safe loafing cover for targeted wildlife species. An average 3 brush piles per acre have been constructed. Typical size is minimum 12-20 feet wide by 6 feet high. Escape cover, nesting habitat and safe loafing areas have been created and will increase wildlife survival.

Scenario Feature Measure: brush piles

Scenario Unit: Each

Scenario Typical Size: 1

Total Scenario Cost: \$186.34

Scenario Cost/Unit: \$186.34

Cost Details

Component Name	Id	Description	Unit	Cost	Qty	Total
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Labor

Equipment Operators, Light	232	Includes: Skid Steer Loaders, Hydraulic Excavators <50 HP, Trenchers <12", Ag Equipment <150 HP, Pickup Trucks, Forklifts, Mulchers	Hour	\$23.29	1.5	\$34.94
General Labor	231	Labor performed using basic tools such as power tool, shovels, and other tools that do not require extensive training. Ex. pipe layer, herder, concrete placement, materials spreader, flagger, etc.	Hour	\$21.64	3	\$64.93

Equipment Installation

Chainsaw	937	Equipment and power unit costs. Labor not included.	Hour	\$5.14	1.5	\$7.71
Skidsteer, 80 HP	933	Skidsteer loader with horsepower range of 60 to 90. Equipment and power unit costs. Labor not included.	Hour	\$52.50	1.5	\$78.75

Practice: 587 - Structure for Water Control

Scenario: #1 - 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. Associated Practices: Critical Area Seeding (342), 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.

Before 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 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).

Scenario Feature Measure: Flashboard Weir Length (in) x barrel Length (ft)

Scenario Unit: Inch-Foot

Scenario Typical Size: 1800

Total Scenario Cost: \$7,254.46

Scenario Cost/Unit: \$4.03

Cost Details

Component Name	Id	Description	Unit	Cost	Qty	Total
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Equipment Installation

Earthfill, Manually Compacted	50	Earthfill, manually compacted, includes equipment and labor	Cubic Yard	\$6.43	10	\$64.30
Earthfill, Roller Compacted	49	Earthfill, roller or machine compacted, includes equipment and labor	Cubic Yard	\$4.87	190	\$925.95
Hydraulic Excavator, .5 CY	930	Track mounted hydraulic excavator with bucket capacity range of 0.3 to 0.8 CY. Equipment and power unit costs. Labor not included.	Hour	\$73.86	2	\$147.72

Labor

Equipment Operators, Heavy	233	Includes: Cranes, Hydraulic Excavators >=50 HP, Dozers, Paving Machines, Rock Trenchers, Trenchers >=12", Dump Trucks, Ag Equipment >=150 HP, Scrapers, Water Wagons.	Hour	\$32.34	2	\$64.68
General Labor	231	Labor performed using basic tools such as power tool, shovels, and other tools that do not require extensive training. Ex. pipe layer, herder, concrete placement, materials spreader, flagger, etc.	Hour	\$21.64	6	\$129.86
Skilled Labor	230	Labor requiring a high level skill set: Includes carpenters, welders, electricians, conservation professionals involved with data collection, monitoring, and or record keeping, etc.	Hour	\$37.24	5	\$186.19

Mobilization

Mobilization, medium equipment	1139	Equipment with 70-150 HP or typical weights between 14,000 and 30,000 pounds.	Each	\$301.16	2	\$602.32
Mobilization, very small equipment	1137	Equipment that is small enough to be transported by a pick-up truck with typical weights less than 3,500 pounds. Can be multiple pieces of equipment if all hauled simultaneously.	Each	\$83.16	2	\$166.32

Materials

Lumber, planks, posts and timbers, treated	1609	Treated dimension lumber with nominal thickness greater than 2". Includes lumber and fasteners. Does not include labor.	Board Foot	\$1.69	32	\$54.02
Pipe, Steel, 30", Std Wt,	1361	Materials: - USED - 30" - Steel Std Wt	Foot	\$82.88	50	\$4,144.13

USED						
Pipe, Steel, 36", Std Wt, USED	1362	Materials: - USED - 36" - Steel Std Wt	Foot	\$105.82	6	\$634.94
Steel, Angle, 2 1/2" x 2 1/2" x 1/4"	1372	Materials: Angle, 2 1/2" x 2 1/2" x 1/4", Meets ASTM A36	Foot	\$3.59	24	\$86.07
Steel, Plate, 3/8"	1375	Flat steel plate, 3/8" thickness. Materials only.	Square Foot	\$11.99	4	\$47.95

Practice: 587 - Structure for Water Control

Scenario: #2 - 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 "Half-Round" flashboard riser shop fabricated using a longitudinal cut 36" smooth steel pipe, a 50' long - 30" outlet pipe passing through an embankment. Associated Practices: Critical Area Planting, 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.

Before 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 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).

Scenario Feature Measure: Flashboard Weir Length (in) x Barrel Length (ft)

Scenario Unit: Inch-Foot

Scenario Typical Size: 1800

Total Scenario Cost: \$7,684.72

Scenario Cost/Unit: \$4.27

Cost Details

Component Name	Id	Description	Unit	Cost	Qty	Total
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Equipment Installation

Earthfill, Manually Compacted	50	Earthfill, manually compacted, includes equipment and labor	Cubic Yard	\$6.43	15	\$96.45
Earthfill, Roller Compacted	49	Earthfill, roller or machine compacted, includes equipment and labor	Cubic Yard	\$4.87	190	\$925.95
Hydraulic Excavator, .5 CY	930	Track mounted hydraulic excavator with bucket capacity range of 0.3 to 0.8 CY. Equipment and power unit costs. Labor not included.	Hour	\$73.86	4	\$295.43

Labor

Equipment Operators, Heavy	233	Includes: Cranes, Hydraulic Excavators >=50 HP, Dozers, Paving Machines, Rock Trenchers, Trenchers >=12", Dump Trucks, Ag Equipment >=150 HP, Scrapers, Water Wagons.	Hour	\$32.34	4	\$129.37
General Labor	231	Labor performed using basic tools such as power tool, shovels, and other tools that do not require extensive training. Ex. pipe layer, herder, concrete placement, materials spreader, flagger, etc.	Hour	\$21.64	10	\$216.44
Skilled Labor	230	Labor requiring a high level skill set: Includes carpenters, welders, electricians, conservation professionals involved with data collection, monitoring, and or record keeping, etc.	Hour	\$37.24	7	\$260.67

Mobilization

Mobilization, medium equipment	1139	Equipment with 70-150 HP or typical weights between 14,000 and 30,000 pounds.	Each	\$301.16	2	\$602.32
Mobilization, very small equipment	1137	Equipment that is small enough to be transported by a pick-up truck with typical weights less than 3,500 pounds. Can be multiple pieces of equipment if all hauled simultaneously.	Each	\$83.16	2	\$166.32

Materials

Lumber, planks, posts and timbers, treated	1609	Treated dimension lumber with nominal thickness greater than 2". Includes lumber and fasteners. Does not include labor.	Board Foot	\$1.69	4	\$6.75
Pipe, Steel, 30", Std Wt,	1361	Materials: - USED - 30" - Steel Std Wt	Foot	\$82.88	50	\$4,144.13

USED						
Pipe, Steel, 36", Std Wt, USED	1362	Materials: - USED - 36" - Steel Std Wt	Foot	\$105.82	6	\$634.94
Steel, Angle, 2 1/2" x 2 1/2" x 1/4"	1372	Materials: Angle, 2 1/2" x 2 1/2" x 1/4", Meets ASTM A36	Foot	\$3.59	24	\$86.07
Steel, Plate, 3/8"	1375	Flat steel plate, 3/8" thickness. Materials only.	Square Foot	\$11.99	10	\$119.88

Practice: 587 - Structure for Water Control

Scenario: #3 - 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 a 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 15" SCH 40 PVC (inlet and outlet combined). Associated Practices: Critical Area Planting (342), 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.

Before 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 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).

Scenario Feature Measure: Flashboard Weir Length (in) x Barrel Length (ft)

Scenario Unit: Inch-Foot

Scenario Typical Size: 1000

Total Scenario Cost: \$4,781.47

Scenario Cost/Unit: \$4.78

Cost Details

Component Name	Id	Description	Unit	Cost	Qty	Total
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Equipment Installation

Earthfill, Manually Compacted	50	Earthfill, manually compacted, includes equipment and labor	Cubic Yard	\$6.43	15	\$96.45
Earthfill, Roller Compacted	49	Earthfill, roller or machine compacted, includes equipment and labor	Cubic Yard	\$4.87	190	\$925.95
Hydraulic Excavator, .5 CY	930	Track mounted hydraulic excavator with bucket capacity range of 0.3 to 0.8 CY. Equipment and power unit costs. Labor not included.	Hour	\$73.86	2	\$147.72

Labor

Equipment Operators, Heavy	233	Includes: Cranes, Hydraulic Excavators >=50 HP, Dozers, Paving Machines, Rock Trenchers, Trenchers >=12", Dump Trucks, Ag Equipment >=150 HP, Scrapers, Water Wagons.	Hour	\$32.34	2	\$64.68
General Labor	231	Labor performed using basic tools such as power tool, shovels, and other tools that do not require extensive training. Ex. pipe layer, herder, concrete placement, materials spreader, flagger, etc.	Hour	\$21.64	8	\$173.15
Skilled Labor	230	Labor requiring a high level skill set: Includes carpenters, welders, electricians, conservation professionals involved with data collection, monitoring, and or record keeping, etc.	Hour	\$37.24	3	\$111.71

Materials

Pipe, PVC, 16", SCH 80	1353	Materials: - 16" - PVC - SCH 80 - ASTM D1785	Foot	\$48.88	50	\$2,444.16
Water Control Structure, Stoplog, Inline, fixed costs portion	2145	Fixed cost portion of Water Level Control Structure, Inline stoplog type. Typically made of PVC or fiberglass materials. Fixed cost portion. Materials only.	Each	\$312.56	1	\$312.56
Water Control Structure, Stoplog, Inline, variable cost portion	2146	Variable cost portion of a Water Level Control Structure, Inline stoplog type. Typically made of PVC or fiberglass materials. Calculate total variable costs by multiplying by the structure height x pipe diameter. Materials only.	Height x Diameter	\$12.08	10	\$120.75

Mobilization

Mobilization, medium	1139	Equipment with 70-150 HP or typical weights between 14,000 and	Each	\$301.16	1	\$301.16
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equipment		30,000 pounds.				
Mobilization, very small equipment	1137	Equipment that is small enough to be transported by a pick-up truck with typical weights less than 3,500 pounds. Can be multiple pieces of equipment if all hauled simultaneously.	Each	\$83.16	1	\$83.16

Practice: 587 - Structure for Water Control

Scenario: #4 - 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. Associated practices: 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).

Before Situation: Water flow needs to be conveyed under an access road, ditch or other barrier. Water must be conveyed in a controlled fashion.

After Situation: Water is conveyed in a controlled manner.

Scenario Feature Measure: Pipe Diameter (In) x Pipe Length (Ft)

Scenario Unit: Inch-Foot

Scenario Typical Size: 960

Total Scenario Cost: \$2,844.71

Scenario Cost/Unit: \$2.96

Cost Details

Component Name	Id	Description	Unit	Cost	Qty	Total
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Materials

Aggregate, Gravel, Graded	46	Gravel, includes materials, equipment and labor to transport and place. Includes washed and unwashed gravel.	Cubic Yard	\$31.47	5	\$157.36
Pipe, HDPE, CPT, Double Wall, Soil Tight, 24"	1246	Pipe, Corrugated HDPE Double Wall, 24" diameter with soil tight joints - AASHTO M294. Material cost only.	Foot	\$19.94	40	\$797.73
Rock Riprap, Placed with geotextile	44	Rock Riprap, placed with geotextile, includes materials, equipment and labor to transport and place	Cubic Yard	\$83.15	2	\$166.31

Equipment Installation

Earthfill, Manually Compacted	50	Earthfill, manually compacted, includes equipment and labor	Cubic Yard	\$6.43	45	\$289.34
Excavation, Common Earth, side cast, small equipment	48	Bulk excavation and side casting of common earth with hydraulic excavator with less than 1 CY capacity. Includes equipment and labor.	Cubic Yard	\$2.58	5	\$12.89

Labor

General Labor	231	Labor performed using basic tools such as power tool, shovels, and other tools that do not require extensive training. Ex. pipe layer, herder, concrete placement, materials spreader, flagger, etc.	Hour	\$21.64	10	\$216.44
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Mobilization

Mobilization, medium equipment	1139	Equipment with 70-150 HP or typical weights between 14,000 and 30,000 pounds.	Each	\$301.16	4	\$1,204.63
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Practice: 587 - Structure for Water Control

Scenario: #5 - 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. Associated practices: 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).

Before Situation: Water flow needs to be conveyed under an access road, ditch or other barrier. Water must be conveyed in a controlled fashion.

After Situation: Water is conveyed in a controlled manner.

Scenario Feature Measure: Pipe Diameter (In) x Pipe Length (Ft)

Scenario Unit: Inch-Foot

Scenario Typical Size: 960

Total Scenario Cost: \$3,246.97

Scenario Cost/Unit: \$3.38

Cost Details

Component Name	Id	Description	Unit	Cost	Qty	Total
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Materials

Aggregate, Gravel, Graded	46	Gravel, includes materials, equipment and labor to transport and place. Includes washed and unwashed gravel.	Cubic Yard	\$31.47	5	\$157.36
Pipe, CMP, 24", 12 Gauge	1417	24" Corrugated Metal Pipe, Galvanized, Uncoated, 12 gage. Material cost only.	Foot	\$30.00	40	\$1,200.00
Rock Riprap, Placed with geotextile	44	Rock Riprap, placed with geotextile, includes materials, equipment and labor to transport and place	Cubic Yard	\$83.15	2	\$166.31

Equipment Installation

Earthfill, Manually Compacted	50	Earthfill, manually compacted, includes equipment and labor	Cubic Yard	\$6.43	45	\$289.34
Excavation, Common Earth, side cast, small equipment	48	Bulk excavation and side casting of common earth with hydraulic excavator with less than 1 CY capacity. Includes equipment and labor.	Cubic Yard	\$2.58	5	\$12.89

Labor

General Labor	231	Labor performed using basic tools such as power tool, shovels, and other tools that do not require extensive training. Ex. pipe layer, herder, concrete placement, materials spreader, flagger, etc.	Hour	\$21.64	10	\$216.44
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Mobilization

Mobilization, medium equipment	1139	Equipment with 70-150 HP or typical weights between 14,000 and 30,000 pounds.	Each	\$301.16	4	\$1,204.63
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Practice: 587 - Structure for Water Control

Scenario: #6 - Trench Drain with grate

Scenario Description: This involves installing a concrete cross drain with grate to collect and redirect surface away from another practice to reduce volume of nutrient materials to be collected. Typically used up gradient of a heavy use area and/or waste storage facility. Associated practices: Animal Mortality Facility (316), Composting Facility (317), Heavy Use Area (561), Roof Runoff Structure (558), Underground Outlet (620) Waste Storage Facility (313), Waste Transfer (634), Solid/Liquid Waste Separation Facility (632)

Before Situation: Upsite surface water adding additional volume to existing heavy use area or waste storage facility.

After Situation: Install a 12' long 1" wide by 18" deep concrete box to direct runoff away from existing HUA.

Scenario Feature Measure: Each

Scenario Unit: Each

Scenario Typical Size: 1

Total Scenario Cost: \$1,854.99

Scenario Cost/Unit: \$1,854.99

Cost Details

Component Name	Id	Description	Unit	Cost	Qty	Total
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Equipment Installation

Backhoe, 80 HP	926	Wheel mounted backhoe excavator with horsepower range of 60 to 90. Equipment and power unit costs. Labor not included.	Hour	\$65.99	4	\$263.94
Concrete, CIP, formed reinforced	38	Steel reinforced concrete formed and cast-in-place 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	\$449.19	1.2	\$539.03

Materials

Aggregate, Gravel, Graded	46	Gravel, includes materials, equipment and labor to transport and place. Includes washed and unwashed gravel.	Cubic Yard	\$31.47	0.5	\$15.74
Welded Bar Grate, metal	1980	Heavy duty vertical bar welded grating, typically 1-1/4"x 3/16" bars on 1" spacing with cross rod on 4" spacing. Materials only.	Square Foot	\$14.04	15	\$210.54

Labor

Skilled Labor	230	Labor requiring a high level skill set: Includes carpenters, welders, electricians, conservation professionals involved with data collection, monitoring, and or record keeping, etc.	Hour	\$37.24	6	\$223.43
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Mobilization

Mobilization, medium equipment	1139	Equipment with 70-150 HP or typical weights between 14,000 and 30,000 pounds.	Each	\$301.16	2	\$602.32
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Practice: 587 - Structure for Water Control

Scenario: #7 - Water Bar

Scenario Description: This scenario is the installation of a permanent water bar to direct water off an existing animal trail or access road. Installation of water bars on new animal trails or access roads is covered by that practice. This scenario assists in addressing the resource concerns: water management. Associated Practices: Animal Trails Walkways (575), Access road(560), Diversion (362), Grass Waterway (412)

Before Situation: Surface water flowing down associated practice causing scouring or installation avoids same situation.

After Situation: Three water bars are installed at intervals as per standard. Construction involved reshaping existing site, rolling sub-base, and placing compacted gravel surface at an angle across the associated practice. Other options include buried industrial belting on edge or two timber buried with spacer for water flow. Typical situation is a spacing of 300 per feet over 1000 feet of roadway.

Scenario Feature Measure: Each

Scenario Unit: Each

Scenario Typical Size: 3

Total Scenario Cost: \$2,542.50

Scenario Cost/Unit: \$847.50

Cost Details

Component Name	Id	Description	Unit	Cost	Qty	Total
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Materials

Aggregate, Gravel, Graded	46	Gravel, includes materials, equipment and labor to transport and place. Includes washed and unwashed gravel.	Cubic Yard	\$31.47	28	\$881.22
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Equipment Installation

Earthfill, Roller Compacted	49	Earthfill, roller or machine compacted, includes equipment and labor	Cubic Yard	\$4.87	1	\$4.87
Track Loader, 95HP	935	Equipment and power unit costs. Labor not included.	Hour	\$103.78	3	\$311.35

Labor

Equipment Operators, Heavy	233	Includes: Cranes, Hydraulic Excavators >=50 HP, Dozers, Paving Machines, Rock Trenchers, Trenchers >=12", Dump Trucks, Ag Equipment >=150 HP, Scrapers, Water Wagons.	Hour	\$32.34	3	\$97.03
Supervisor or Manager	234	Labor involving supervision or management activities. Includes crew supervisors, foremen and farm/ranch managers time required for adopting new technology, etc.	Hour	\$43.40	1	\$43.40

Mobilization

Mobilization, medium equipment	1139	Equipment with 70-150 HP or typical weights between 14,000 and 30,000 pounds.	Each	\$301.16	4	\$1,204.63
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Practice: 587 - Structure for Water Control

Scenario: #8 - Grated Dropbox

Scenario Description: This involves installing a concrete box with grate to collect and redirect surface water away from another practice to reduce volume of nutrient materials to be collected or to prevent surface erosion. Typically used up gradient of a heavy use area and/or waste storage facility. Associated practices: Animal Mortality Facility (316), Composting Facility (317), Heavy Use Area (561), Roof Runoff Structure (558), Underground Outlet (620) Waste Storage Facility (313), Waste Transfer (634), Solid/Liquid Waste Separation Facility (632)

Before Situation: Upsite surface water causing downslope erosion or adding cleanwater to nutrient rich areas.

After Situation: Install 2'x4'x4' deep concrete box with grate to collect surface water.

Scenario Feature Measure: Each

Scenario Unit: Each

Scenario Typical Size: 1

Total Scenario Cost: \$1,452.70

Scenario Cost/Unit: \$1,452.70

Cost Details

Component Name	Id	Description	Unit	Cost	Qty	Total
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Materials

Aggregate, Gravel, Graded	46	Gravel, includes materials, equipment and labor to transport and place. Includes washed and unwashed gravel.	Cubic Yard	\$31.47	0.4	\$12.59
Catch Basin, concrete, 2'x2'x6'	1257	Catch Basin, Precast Concrete, 2' square or round, cast grate, 6' deep. Includes materials, equipment and labor.	Each	\$711.28	1	\$711.28

Labor

Equipment Operators, Light	232	Includes: Skid Steer Loaders, Hydraulic Excavators <50 HP, Trenchers <12", Ag Equipment <150 HP, Pickup Trucks, Forklifts, Mulchers	Hour	\$23.29	1	\$23.29
Skilled Labor	230	Labor requiring a high level skill set: Includes carpenters, welders, electricians, conservation professionals involved with data collection, monitoring, and or record keeping, etc.	Hour	\$37.24	1	\$37.24

Equipment Installation

Backhoe, 80 HP	926	Wheel mounted backhoe excavator with horsepower range of 60 to 90. Equipment and power unit costs. Labor not included.	Hour	\$65.99	1	\$65.99
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Mobilization

Mobilization, medium equipment	1139	Equipment with 70-150 HP or typical weights between 14,000 and 30,000 pounds.	Each	\$301.16	2	\$602.32
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Practice: 587 - Structure for Water Control

Scenario: #9 - Slide Gate

Scenario Description: This scenario is the installation of a permanent slide gate structure to control the conveyance of water. The typical size is a 4' diameter opening. The slide gate may be installed on an open channel or pipeline. The slide gate is made of steel and has a hand operated mechanical lifting system, i.e. screw. This scenario assists in addressing the resource concerns: water management. Associated Practices: 533-Pumping Plant.

Before Situation: A channel or pipeline is in need of a head gate to control the flow of water.

After Situation: A 4' slide gate is installed and operated by hand is installed.

Scenario Feature Measure: diameter

Scenario Unit: Foot

Scenario Typical Size: 4

Total Scenario Cost: \$8,555.27

Scenario Cost/Unit: \$2,138.82

Cost Details

Component Name	Id	Description	Unit	Cost	Qty	Total
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Labor

Equipment Operators, Heavy	233	Includes: Cranes, Hydraulic Excavators >=50 HP, Dozers, Paving Machines, Rock Trenchers, Trenchers >=12", Dump Trucks, Ag Equipment >=150 HP, Scrapers, Water Wagons.	Hour	\$32.34	6	\$194.05
General Labor	231	Labor performed using basic tools such as power tool, shovels, and other tools that do not require extensive training. Ex. pipe layer, herder, concrete placement, materials spreader, flagger, etc.	Hour	\$21.64	12	\$259.73
Skilled Labor	230	Labor requiring a high level skill set: Includes carpenters, welders, electricians, conservation professionals involved with data collection, monitoring, and or record keeping, etc.	Hour	\$37.24	12	\$446.86

Equipment Installation

Backhoe, 80 HP	926	Wheel mounted backhoe excavator with horsepower range of 60 to 90. Equipment and power unit costs. Labor not included.	Hour	\$65.99	6	\$395.91
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Mobilization

Mobilization, medium equipment	1139	Equipment with 70-150 HP or typical weights between 14,000 and 30,000 pounds.	Each	\$301.16	2	\$602.32
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Materials

Screw gate, cast iron, 4' diameter, 10/0 head	1746	4' diameter cast iron screw (canal) gate rated at 10 seating head 0 feet unseating head. Includes materials only.	Each	\$6,656.40	1	\$6,656.40
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Practice: 587 - Structure for Water Control

Scenario: #10 - Flap Gate

Scenario Description: This scenario is the installation of a permanent flap (tide) gate structure to control the direction of flow resulting from tides or high water or back-flow from flooding. The typical size is a 4' diameter opening. The gate may be installed on an open channel or pipeline. It is made of steel and operates automatically. This scenario assists in addressing the resource concerns: water management. Associated practices: Shallow water development and management (646), Wetland Wildlife Habitat Management (644)

Before Situation: A wetland or other area is in need of a flap gate to control the direction of the water.

After Situation: A flap gate 4' wide is installed.

Scenario Feature Measure: Feet Diameter (of Gate)

Scenario Unit: Foot

Scenario Typical Size: 4

Total Scenario Cost: \$7,465.37

Scenario Cost/Unit: \$1,866.34

Cost Details

Component Name	Id	Description	Unit	Cost	Qty	Total
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Labor

Equipment Operators, Heavy	233	Includes: Cranes, Hydraulic Excavators >=50 HP, Dozers, Paving Machines, Rock Trenchers, Trenchers >=12", Dump Trucks, Ag Equipment >=150 HP, Scrapers, Water Wagons.	Hour	\$32.34	6	\$194.05
General Labor	231	Labor performed using basic tools such as power tool, shovels, and other tools that do not require extensive training. Ex. pipe layer, herder, concrete placement, materials spreader, flagger, etc.	Hour	\$21.64	12	\$259.73
Skilled Labor	230	Labor requiring a high level skill set: Includes carpenters, welders, electricians, conservation professionals involved with data collection, monitoring, and or record keeping, etc.	Hour	\$37.24	12	\$446.86

Equipment Installation

Backhoe, 80 HP	926	Wheel mounted backhoe excavator with horsepower range of 60 to 90. Equipment and power unit costs. Labor not included.	Hour	\$65.99	6	\$395.91
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Mobilization

Mobilization, medium equipment	1139	Equipment with 70-150 HP or typical weights between 14,000 and 30,000 pounds.	Each	\$301.16	2	\$602.32
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Materials

Flap Gate, cast iron, 4' diameter	1745	4' diameter cast iron flap gate. Materials only.	Each	\$5,566.50	1	\$5,566.50
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Practice: 587 - Structure for Water Control

Scenario: #11 - Flap Gate w/ Concrete Wall

Scenario Description: Install a concrete cut off wall with tide gate at the outlet of a channel. A typical scenario would be installed in a 25 foot channel, 6 foot deep, with 2:1 side slopes. A concrete wall will extend 10 feet on each side, and include a 4' flap gate structure to control flooding. Work includes site preparation, forming and pouring concrete, backfilling and acquiring and installing the tide gate.

Before Situation: Tides or flooding inundate and affect water quality of wetlands or other managed systems.

After Situation: Tide or flood inundation is controlled. Associated practices could be Aquaculture Ponds (397), Aquatic Organism Passage (396), Bivalve Aquaculture Gear and Biofouling Control (400), Constructed Wetland (656), Drainage Water Management (554), Irrigation Canal or Lateral (320), Irrigation Field Ditch (388), Irrigation System, Surface and Subsurface (443), Irrigation Water Management (449), Salinity and Sodic Soil Management (610), Subsurface Drain (606), Surface Drain, Field Ditch (607), Surface Drain, Main or Lateral (608), Wetland Creation (658), Wetland Enhancement (659), Wetland Restoration (657), and Wetland Wildlife Habitat Management (644).

Scenario Feature Measure: Cubic Yards of Concrete

Scenario Unit: Cubic Yard

Scenario Typical Size: 10

Total Scenario Cost: \$12,899.31

Scenario Cost/Unit: \$1,289.93

Cost Details

Component Name	Id	Description	Unit	Cost	Qty	Total
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Equipment Installation

Concrete, CIP, formed reinforced	38	Steel reinforced concrete formed and cast-in-placed in formed structures such as walls or suspended slabs by chute placement. Typical strength is 3000 to 4000 psi. Includes materials, labor and equipment to transport, place and finish.	Cubic Yard	\$449.19	10	\$4,491.90
Earthfill, Roller Compacted	49	Earthfill, roller or machine compacted, includes equipment and labor	Cubic Yard	\$4.87	200	\$974.69
Excavation, Common Earth, side cast, small equipment	48	Bulk excavation and side casting of common earth with hydraulic excavator with less than 1 CY capacity. Includes equipment and labor.	Cubic Yard	\$2.58	200	\$515.74

Materials

Aggregate, Sand, Graded, Washed	45	Sand, typical ASTM C33 gradation, includes materials, equipment and labor to transport and place	Cubic Yard	\$31.05	4	\$124.20
Flap Gate, cast iron, 4' diameter	1745	4' diameter cast iron flap gate. Materials only.	Each	\$5,566.50	1	\$5,566.50

Labor

General Labor	231	Labor performed using basic tools such as power tool, shovels, and other tools that do not require extensive training. Ex. pipe layer, herder, concrete placement, materials spreader, flagger, etc.	Hour	\$21.64	1	\$21.64
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Mobilization

Mobilization, medium equipment	1139	Equipment with 70-150 HP or typical weights between 14,000 and 30,000 pounds.	Each	\$301.16	4	\$1,204.63
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Practice: 587 - Structure for Water Control

Scenario: #12 - Rock Checks for Water Surface Profile

Scenario Description: Typical setting is in a stream that has become incised and is therefore disconnected from the floodplain. Typical installation consists of installing a "Vee" shaped rock structures with points facing upstream for the purpose of raising the water surface profile. Cost estimate is for three check dams with a top width of 3', max height of 6', min height of 3', and 28' length; containing an average of 58 cubic yards or 29 tons of rock for a total of 87 tons. The check dams are underlain with geotextile fabric. Disturbed areas are protected with permanent vegetative cover. Addresses resource concerns such as water quality degradation and soil erosion-concentrated flow erosion. Associated Practices: Critical Area Planting (342), Streambank and Shoreline Protection (580), Channel Bed Stabilization (584), Stream Habitat Improvement and Management (395), and Wetland Wildlife Habitat Management (644) will use the corresponding Standard(s) as appropriate.

Before Situation: The stream presently is incised with near vertical banks caused by bank toe erosion and sloughing. This condition has caused the floodplains to be disconnected from the stream, with only floods well above normal high-water escaping the high banks of the stream.

After Situation: Banks are stabilized, and pools are created raising the Water Surface Profile elevation and effectively reducing the slope. Riffle pool scheme is restored and banks are protected. Water quality is protected downstream due to erosion protection, and wetland features are restored in the floodplain. Any needed re-vegetation of disturbed areas use Critical Area Planting (342).

Scenario Feature Measure: Tons of rock installed

Scenario Unit: Ton

Scenario Typical Size: 87

Total Scenario Cost: \$6,220.56

Scenario Cost/Unit: \$71.50

Cost Details

Component Name	Id	Description	Unit	Cost	Qty	Total
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Materials

Rock Riprap, Placed with geotextile	44	Rock Riprap, placed with geotextile, includes materials, equipment and labor to transport and place	Cubic Yard	\$83.15	57	\$4,739.75
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Labor

General Labor	231	Labor performed using basic tools such as power tool, shovels, and other tools that do not require extensive training. Ex. pipe layer, herder, concrete placement, materials spreader, flagger, etc.	Hour	\$21.64	8	\$173.15
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Mobilization

Mobilization, large equipment	1140	Equipment >150HP or typical weights greater than 30,000 pounds or loads requiring over width or over length permits.	Each	\$574.99	2	\$1,149.98
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Equipment Installation

Excavation, common earth, large equipment, 50 ft	1222	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	\$1.88	84	\$157.67
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Practice: 587 - Structure for Water Control

Scenario: #13 - In-Stream Structure for Water Surface Profile

Scenario Description: Typical setting is in a stream that has become incised and is therefore disconnected from the floodplain. Typical installation consists of installing a "Vee" shaped concrete structure which points facing upstream for the purpose of raising the water surface profile. Cost estimate is for one cross vane with a effective length (Streambed width) of 36', and total length of 65', effective height of 3', max height of 6', and a 3' by 1.5' footer; containing 19 cubic yards of Concrete. Disturbed areas are protected with permanent vegetative cover. Addresses resource concerns such as water quality degradation and soil erosion-concentrated flow erosion. Associated Practices: Critical Area Planting (342), Streambank and Shoreline Protection (580) Channel Bed Stabilization (584), Stream Habitat Improvement and Management (395), and Wetland Wildlife Habitat Management (644) will use the corresponding Standard(s) as appropriate.

Before Situation: The stream presently is incised with near vertical banks caused by bank toe erosion and sloughing. This condition has caused the floodplains to be disconnected from the stream, with only floods well above normal high-water escaping the high banks of the stream.

After Situation: Banks are stabilized, and pools are created raising the water surface elevation and effectively reducing the slope. Riffle pool scheme is restored and banks are protected. Water quality is protected downstream due to erosion protection, and wetland features are restored in the floodplain. Any needed re-vegetation of disturbed areas use Critical Area Planting (342).

Scenario Feature Measure: Streambed Width

Scenario Unit: Foot

Scenario Typical Size: 36

Total Scenario Cost: \$10,670.75

Scenario Cost/Unit: \$296.41

Cost Details

Component Name	Id	Description	Unit	Cost	Qty	Total
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Equipment Installation

Concrete, CIP, formed reinforced	38	Steel reinforced concrete formed and cast-in-placed in formed structures such as walls or suspended slabs by chute placement. Typical strength is 3000 to 4000 psi. Includes materials, labor and equipment to transport, place and finish.	Cubic Yard	\$449.19	19	\$8,534.61
Excavation, Common Earth, side cast, small equipment	48	Bulk excavation and side casting of common earth with hydraulic excavator with less than 1 CY capacity. Includes equipment and labor.	Cubic Yard	\$2.58	18	\$46.42
Water management, Flooding &dewatering	969	Includes equipment and power unit. Labor not included.	Acre Foot	\$253.20	1	\$253.20

Labor

General Labor	231	Labor performed using basic tools such as power tool, shovels, and other tools that do not require extensive training. Ex. pipe layer, herder, concrete placement, materials spreader, flagger, etc.	Hour	\$21.64	10	\$216.44
Supervisor or Manager	234	Labor involving supervision or management activities. Includes crew supervisors, foremen and farm/ranch managers time required for adopting new technology, etc.	Hour	\$43.40	7	\$303.77

Mobilization

Mobilization, large equipment	1140	Equipment >150HP or typical weights greater than 30,000 pounds or loads requiring over width or over length permits.	Each	\$574.99	2	\$1,149.98
Mobilization, very small equipment	1137	Equipment that is small enough to be transported by a pick-up truck with typical weights less than 3,500 pounds. Can be multiple pieces of equipment if all hauled simultaneously.	Each	\$83.16	2	\$166.32

Practice: 587 - Structure for Water Control

Scenario: #14 - CMP Turnout

Scenario Description: A corrugated metal pipe (CMP) equipped with a slide gate diverts water from a ditch or canal into a field or field ditch. This scenario is for a 15 inch diameter gate and pipe that will transmit approximately 4 cfs of flow. Associated Practices: Irrigation Water Management (449)

Before Situation: A ditch or canal exists, but a means to move water from the ditch into a smaller ditch or field does not exist. A water supply of sufficient quantity and quality is available for irrigation.

After Situation: Water is diverted from a canal or ditch to meet irrigation requirements. A 15 inch diameter CMP is installed through the canal containment dike,. A 15 inch diameter slide gate is attached to the upstream end of the pipe. The top of the pipe inlet is below canal water surface elevation.

Scenario Feature Measure: Each

Scenario Unit: Each

Scenario Typical Size: 1

Total Scenario Cost: \$1,101.35

Scenario Cost/Unit: \$1,101.35

Cost Details

Component Name	Id	Description	Unit	Cost	Qty	Total
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Labor

Equipment Operators, Light	232	Includes: Skid Steer Loaders, Hydraulic Excavators <50 HP, Trenchers <12", Ag Equipment <150 HP, Pickup Trucks, Forklifts, Mulchers	Hour	\$23.29	2	\$46.59
General Labor	231	Labor performed using basic tools such as power tool, shovels, and other tools that do not require extensive training. Ex. pipe layer, herder, concrete placement, materials spreader, flagger, etc.	Hour	\$21.64	4	\$86.58

Equipment Installation

Backhoe, 80 HP	926	Wheel mounted backhoe excavator with horsepower range of 60 to 90. Equipment and power unit costs. Labor not included.	Hour	\$65.99	2	\$131.97
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Mobilization

Mobilization, medium equipment	1139	Equipment with 70-150 HP or typical weights between 14,000 and 30,000 pounds.	Each	\$301.16	2	\$602.32
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Materials

Pipe, CMP, 12", 16 Gauge	1269	12" Corrugated Metal Pipe, Galvanized, Uncoated, 16 gage. Material cost only.	Foot	\$11.46	10	\$114.59
Slide gate, steel, 1' diameter, low head	1830	1' diameter steel slide gate for low head installations	Each	\$119.31	1	\$119.31

Practice: 587 - Structure for Water Control

Scenario: #15 - Concrete Turnout Structure - Small

Scenario Description: A reinforced concrete turnout structure equipped with slide boards or panels diverts irrigation water from a ditch or canal into a field or field ditch. This scenario is for a four ft tall, two foot wide, and five foot long turnout structure. Associated Practices: Irrigation Water Management (449)

Before Situation: A ditch or canal exists, but a means to move water from the ditch into a smaller ditch or field does not exist. A water supply of sufficient quantity and quality is available for irrigation.

After Situation: Water is diverted from a canal or ditch to meet irrigation requirements. A two foot wide and four foot tall turnout structure equipped with slots for slide boards and panels conducts water through the canal berm into a field. The concrete structure is five feet long and has an end sill. All footings, floors, and walls have a minimum thickness of six inches. The structure delivers water to field elevation or ditch bottom elevation. The top of the pipe inlet is below canal water surface elevation.

Scenario Feature Measure: Each

Scenario Unit: Each

Scenario Typical Size: 1

Total Scenario Cost: \$1,589.98

Scenario Cost/Unit: \$1,589.98

Cost Details

Component Name	Id	Description	Unit	Cost	Qty	Total
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Equipment Installation

Backhoe, 80 HP	926	Wheel mounted backhoe excavator with horsepower range of 60 to 90. Equipment and power unit costs. Labor not included.	Hour	\$65.99	1	\$65.99
Concrete, CIP, formed reinforced	38	Steel reinforced concrete formed and cast-in-placed in formed structures such as walls or suspended slabs by chute placement. Typical strength is 3000 to 4000 psi. Includes materials, labor and equipment to transport, place and finish.	Cubic Yard	\$449.19	2	\$898.38

Labor

Equipment Operators, Light	232	Includes: Skid Steer Loaders, Hydraulic Excavators <50 HP, Trenchers <12", Ag Equipment <150 HP, Pickup Trucks, Forklifts, Mulchers	Hour	\$23.29	1	\$23.29
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Mobilization

Mobilization, medium equipment	1139	Equipment with 70-150 HP or typical weights between 14,000 and 30,000 pounds.	Each	\$301.16	2	\$602.32
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Practice: 587 - Structure for Water Control

Scenario: #16 - Concrete Turnout Structure

Scenario Description: A reinforced concrete turnout structure equipped with a 48 inch slide gate diverts irrigation water from a canal into a field or field ditch. This scenario is for a six ft tall, eight foot wide, and ten foot long turnout structure. A sloping trash rack fabricated from rebar is installed on the inlet. If needed fish screens may be installed at the inlet. Associated Practices: Irrigation Water Management (449)

Before Situation: A delivery canal exists, but a means to move water from the canal into a smaller ditch or field does not exist. A water supply of sufficient quantity and quality is available for irrigation.

After Situation: Water is diverted from a canal to meet irrigation requirements. A eight foot wide and six foot tall turnout structure equipped with a 48 inch slide gate conducts water through the canal berm. The concrete structure is ten feet long and has an end sill. All footings, floors, and walls have a minimum thickness of six inches. The structure delivers water to field or ditch bottom elevation.

Scenario Feature Measure: Each

Scenario Unit: Each

Scenario Typical Size: 1

Total Scenario Cost: \$4,095.55

Scenario Cost/Unit: \$4,095.55

Cost Details

Component Name	Id	Description	Unit	Cost	Qty	Total
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Equipment Installation

Backhoe, 80 HP	926	Wheel mounted backhoe excavator with horsepower range of 60 to 90. Equipment and power unit costs. Labor not included.	Hour	\$65.99	4	\$263.94
Concrete, CIP, formed reinforced	38	Steel reinforced concrete formed and cast-in-placed in formed structures such as walls or suspended slabs by chute placement. Typical strength is 3000 to 4000 psi. Includes materials, labor and equipment to transport, place and finish.	Cubic Yard	\$449.19	5	\$2,245.95

Labor

Equipment Operators, Light	232	Includes: Skid Steer Loaders, Hydraulic Excavators <50 HP, Trenchers <12", Ag Equipment <150 HP, Pickup Trucks, Forklifts, Mulchers	Hour	\$23.29	4	\$93.18
General Labor	231	Labor performed using basic tools such as power tool, shovels, and other tools that do not require extensive training. Ex. pipe layer, herder, concrete placement, materials spreader, flagger, etc.	Hour	\$21.64	10	\$216.44

Mobilization

Mobilization, medium equipment	1139	Equipment with 70-150 HP or typical weights between 14,000 and 30,000 pounds.	Each	\$301.16	2	\$602.32
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Materials

Welded Bar Grate, metal	1980	Heavy duty vertical bar welded grating, typically 1-1/4"x 3/16" bars on 1" spacing with cross rod on 4" spacing. Materials only.	Square Foot	\$14.04	48	\$673.73
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Practice: 587 - Structure for Water Control

Scenario: #17 - 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 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 Situation: Producer estimates seasonal and individual irrigation application flow rate and volumes based on energy costs, system operating pressure, or other means.

After 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

Total Scenario Cost: \$2,020.20

Scenario Cost/Unit: \$202.02

Cost Details

Component Name	Id	Description	Unit	Cost	Qty	Total
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Mobilization

Mobilization, very small equipment	1137	Equipment that is small enough to be transported by a pick-up truck with typical weights less than 3,500 pounds. Can be multiple pieces of equipment if all hauled simultaneously.	Each	\$83.16	2	\$166.32
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Materials

Flow Meter, with mechanical Index	1450	10 inch, Turbine Type Flow Meter with Mechanical Index, permanently installed. Includes material, labor and installation.	Each	\$1,853.88	1	\$1,853.88
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Practice: 587 - Structure for Water Control

Scenario: #18 - 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 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-Waster Transfer, and 590-Nutrient Management.

Before Situation: Producer estimates seasonal and individual irrigation application flow rate and volumes based on energy costs, system operating pressure, or other means.

After 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

Total Scenario Cost: \$3,818.42

Scenario Cost/Unit: \$381.84

Cost Details

Component Name	Id	Description	Unit	Cost	Qty	Total
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Mobilization

Mobilization, very small equipment	1137	Equipment that is small enough to be transported by a pick-up truck with typical weights less than 3,500 pounds. Can be multiple pieces of equipment if all hauled simultaneously.	Each	\$83.16	2	\$166.32
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Materials

Flow Meter, with Electronic Index	1452	10 inch Turbine Irrigation flow meter, with Electronic Index, Rate and Volume, permanently installed. Materials only.	Each	\$3,652.10	1	\$3,652.10
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Practice: 587 - Structure for Water Control

Scenario: #19 - 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 Situation: Producer estimates seasonal and individual irrigation application flow rate and volumes based on energy costs, system operating pressure, or other means.

After 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

Total Scenario Cost: \$4,904.74

Scenario Cost/Unit: \$490.47

Cost Details

Component Name	Id	Description	Unit	Cost	Qty	Total
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Mobilization

Mobilization, very small equipment	1137	Equipment that is small enough to be transported by a pick-up truck with typical weights less than 3,500 pounds. Can be multiple pieces of equipment if all hauled simultaneously.	Each	\$83.16	2	\$166.32
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Materials

Flow Meter, with electronic Index and telemetry	1451	10 inch Magnetic Irrigation Flow Meter, with electronic index and equipped for telemetry, permanently installed. Includes material, meter appurtenances, and installation.	Each	\$4,738.42	1	\$4,738.42
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Practice: 587 - Structure for Water Control

Scenario: #20 - Gated Pipe

Scenario Description: This involves spreading water to prevent surface erosion. Typically stormwater or water that may have extremely low levels of nutrients or small solids. Distribution above an existing grassed area. If the water has definable nutrients, use the Vegetated Treatment Area standard. Associated practices: Animal Mortality Facility (316), Composting Facility (317), Heavy Use Area (561), Roof Runoff Structure (558), Underground Outlet (620) Waste Storage Facility (313), Waste Transfer (634), Solid/Liquid Waste Separation Facility (632)

Before Situation: Surface water flowing down associated practice causing scouring or installation avoids same situation.

After Situation: Install 200 LF of 6" gated/perforated pipe to distribute water in an existing grassed area.

Scenario Feature Measure: Length of pipe

Scenario Unit: Foot

Scenario Typical Size: 200

Total Scenario Cost: \$3,040.44

Scenario Cost/Unit: \$15.20

Cost Details

Component Name	Id	Description	Unit	Cost	Qty	Total
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Materials

Block, concrete	253	Concrete block, hollow, normal weight, 3500 psi. Includes both full and partial sizes. Material only	Each	\$1.65	25	\$41.18
Pipe, PVC, 6", SDR 35	993	Materials: - 6" - PVC - SDR 35 - ASTM D3034	Foot	\$4.70	200	\$940.00
Post, Wood, CCA treated, 4" x 8'	10	Wood Post, Line 4" X 8', CCA Treated. Includes materials and shipping only.	Each	\$8.06	13	\$104.79

Labor

Equipment Operators, Light	232	Includes: Skid Steer Loaders, Hydraulic Excavators <50 HP, Trenchers <12", Ag Equipment <150 HP, Pickup Trucks, Forklifts, Mulchers	Hour	\$23.29	8	\$186.35
Skilled Labor	230	Labor requiring a high level skill set: Includes carpenters, welders, electricians, conservation professionals involved with data collection, monitoring, and or record keeping, etc.	Hour	\$37.24	16	\$595.81
Supervisor or Manager	234	Labor involving supervision or management activities. Includes crew supervisors, foremen and farm/ranch managers time required for adopting new technology, etc.	Hour	\$43.40	8	\$347.17

Equipment Installation

Skidsteer, 80 HP	933	Skidsteer loader with horsepower range of 60 to 90. Equipment and power unit costs. Labor not included.	Hour	\$52.50	8	\$420.02
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Mobilization

Mobilization, small equipment	1138	Equipment <70 HP but can't be transported by a pick-up truck or with typical weights between 3,500 to 14,000 pounds.	Each	\$202.55	2	\$405.11
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Practice: 587 - Structure for Water Control

Scenario: #21 - Sprinkler gun

Scenario Description: This involves spreading water to prevent surface erosion. Typically stormwater or water that may have extremely low levels of nutrients or small solids. Distribution is on a site that is not typically down hill from source or is not contoured for other methods of distribution on an existing grassed area. Method used are one or more large sprinkler guns. Cost per gun includes piping between guns. If the water has definable nutrients, use the Vegetated Treatment Area standard. Associated practices: Heavy Use Area (561), Roof Runoff Structure (558), Underground Outlet (620), Solid/Liquid Waste Separation Facility (632)

Before Situation: Surface water flowing down associated practice causing scouring or installation avoids same situation.

After Situation: Three sprinkler pods are installed and piped together to spray water over an existing grassed area.

Scenario Feature Measure: Number of guns

Scenario Unit: Each

Scenario Typical Size: 3

Total Scenario Cost: \$2,348.28

Scenario Cost/Unit: \$782.76

Cost Details

Component Name	Id	Description	Unit	Cost	Qty	Total
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Equipment Installation

Trenching, Earth, 12" x 48"	53	Trenching, earth, 12" wide x 48" depth, includes equipment and labor for trenching and backfilling	Foot	\$1.51	160	\$241.74
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Labor

Skilled Labor	230	Labor requiring a high level skill set: Includes carpenters, welders, electricians, conservation professionals involved with data collection, monitoring, and or record keeping, etc.	Hour	\$37.24	3	\$111.71
Supervisor or Manager	234	Labor involving supervision or management activities. Includes crew supervisors, foremen and farm/ranch managers time required for adopting new technology, etc.	Hour	\$43.40	1	\$43.40

Materials

Irrigation, Pod System, w/Appurtenances	323	Pod irrigation system that includes pod, pipe, sprinklers, connections, and appurtenances. Includes materials only.	Each	\$247.57	3	\$742.71
Pipe, PVC, 4", SDR 21	986	Materials: - 4" - PVC - SDR 21 200 psi - ASTM D2241	Foot	\$3.79	160	\$606.40

Mobilization

Mobilization, medium equipment	1139	Equipment with 70-150 HP or typical weights between 14,000 and 30,000 pounds.	Each	\$301.16	2	\$602.32
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Practice: 587 - Structure for Water Control

Scenario: #283 - Forestland Waterbar

Scenario Description: This scenario is utilized for the installation of permanent water bars to direct water off an existing forest trail or access road to correct an existing soil erosion problem. Installation of water bars on new forest trails (655) is not covered by this practice scenario. This scenario is installed into existing soils, using a small to medium sized dozer with an angle blade. All disturbed soils are seeded down with an acceptable shade tolerant grass (or Grass/Legume) seed mix using NRCS CPS 342, Critical Area Planting.

Before Situation: Sloping forest trail carries excessive runoff during rainfall events resulting in erosion of the trail and transport of soil and sediment to nearby water bodies.

After Situation: Properly seeded waterbars direct runoff away from trail.

Scenario Feature Measure: Waterbar

Scenario Unit: Each

Scenario Typical Size: 5

Total Scenario Cost: \$898.57

Scenario Cost/Unit: \$179.71

Cost Details

Component Name	Id	Description	Unit	Cost	Qty	Total
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Labor

Equipment Operators, Light	232	Includes: Skid Steer Loaders, Hydraulic Excavators <50 HP, Trenchers <12", Ag Equipment <150 HP, Pickup Trucks, Forklifts, Mulchers	Hour	\$23.29	2.5	\$58.24
Supervisor or Manager	234	Labor involving supervision or management activities. Includes crew supervisors, foremen and farm/ranch managers time required for adopting new technology, etc.	Hour	\$43.40	1	\$43.40

Equipment Installation

Dozer, 80 HP	929	Track mounted Dozer with horsepower range of 60 to 90. Equipment and power unit costs. Labor not included.	Hour	\$77.85	2.5	\$194.62
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Mobilization

Mobilization, medium equipment	1139	Equipment with 70-150 HP or typical weights between 14,000 and 30,000 pounds.	Each	\$301.16	2	\$602.32
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Practice: 587 - Structure for Water Control

Scenario: #284 - Basin, earthen

Scenario Description: An earth embankment constructed across the upper end of a water course to redirect flow into an inlet or riser connected to a existing or new underground outlet. Typical top width 4' with an inside slope of 2:1 and an outside slope of 5:1 or flatter. Typical depth from 2 to 6' with the length of fill from 20 to 60'. The purpose is to facilitate flow redirection and allow some collection of trash and sediment. Associated Practices: Critical Area Planting (342), Underground Outlet (620) lined waterway or outlet (468) Mulching (484)

Before 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 trash 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 Situation: A 35 foot long embankment is constructed with CY of excavation/earthfill to build an earthen basin. Rill and/or gully erosion is reduced. Water is redirected into underground piping system. Part of system to protect grassed waterway.

Scenario Feature Measure: Length of embankment

Scenario Unit: Linear Foot

Scenario Typical Size: 35

Total Scenario Cost: \$1,206.89

Scenario Cost/Unit: \$34.48

Cost Details

Component Name	Id	Description	Unit	Cost	Qty	Total
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Equipment Installation

Dozer, 140 HP	927	Track mounted Dozer with horsepower range of 125 to 160. Equipment and power unit costs. Labor not included.	Hour	\$146.00	4	\$584.01
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Mobilization

Mobilization, medium equipment	1139	Equipment with 70-150 HP or typical weights between 14,000 and 30,000 pounds.	Each	\$301.16	1	\$301.16
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Labor

Equipment Operators, Heavy	233	Includes: Cranes, Hydraulic Excavators >=50 HP, Dozers, Paving Machines, Rock Trenchers, Trenchers >=12", Dump Trucks, Ag Equipment >=150 HP, Scrapers, Water Wagons.	Hour	\$32.34	4	\$129.37
Skilled Labor	230	Labor requiring a high level skill set: Includes carpenters, welders, electricians, conservation professionals involved with data collection, monitoring, and or record keeping, etc.	Hour	\$37.24	4	\$148.95
Supervisor or Manager	234	Labor involving supervision or management activities. Includes crew supervisors, foremen and farm/ranch managers time required for adopting new technology, etc.	Hour	\$43.40	1	\$43.40

Practice: 606 - Subsurface Drain

Scenario: #1 - Corrugated Plastic Pipe, Single Wall, Less than or equal to 6 inches

Scenario Description: A perforated HDPE (Corrugated Plastic Pipe) pipeline less than or equal to 6 inches in diameter is installed below ground using a drainage plow to address excess water (seasonal high water table), degraded plant condition, and water quality degradation (nutrients). Associated Practices: 608 - Surface Drain, Main or Lateral; 587 - Structure for Water Control, 533 - Pumping Plant; and 554 - Drainage Water Management.

Before Situation: Soil conditions are excessively wet in the spring due to poor internal soil drainage. Excess soil water is causing crop stress and delay of field operations.

After Situation: A perforated HDPE (Corrugated Plastic Pipe) pipeline less than or equal to 6 inches in diameter is installed below ground using a drainage plow to address excess water (seasonal high water table), degraded plant condition, and water quality degradation (nutrients). A 5" single wall, perforated HDPE Corrugated Plastic Pipe (CPP) is installed below ground to a minimum depth of 5 feet. The typical number of mainline connections for 1,000 feet of subsurface drainline is 3. The drainage modifications result in reduced plant stress due to excess wetness or improved drainage water quality due to system retrofit enabling drainage water management.

Scenario Feature Measure: Feet of Pipe

Scenario Unit: Foot

Scenario Typical Size: 1000

Total Scenario Cost: \$5,557.72

Scenario Cost/Unit: \$5.56

Cost Details

Component Name	Id	Description	Unit	Cost	Qty	Total
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Mobilization

Mobilization, large equipment	1140	Equipment >150HP or typical weights greater than 30,000 pounds or loads requiring over width or over length permits.	Each	\$574.99	2	\$1,149.98
Mobilization, medium equipment	1139	Equipment with 70-150 HP or typical weights between 14,000 and 30,000 pounds.	Each	\$301.16	2	\$602.32

Materials

Drainage Lateral Connection	1458	Connect 3"-6" drainage lateral to main drain, includes excavation to 6' depth, install tee on main line, connect lateral, and backfill. Includes material cost for tee.	Each	\$34.69	3	\$104.07
Pipe, HDPE, corrugated single wall, <= 12" weight priced Compound	1380	High Density Polyethylene (HDPE) compound manufactured into single wall corrugated pipe or tubing. Materials only.	Pound	\$1.75	500	\$873.91

Equipment Installation

Trenching, tile line plowing, earth, 60"	1457	Plowing in 3"-15" CPP drain line into earth, 60" depth, includes equipment and labor for trenching, laying, and backfilling.	Foot	\$2.83	1000	\$2,827.44
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Practice: 606 - Subsurface Drain

Scenario: #2 - Enveloped Corrugated Plastic Pipe, Single Wall, Less than or equal to 6 inches

Scenario Description: A perforated HDPE (Corrugated Plastic Pipe) pipeline less than or equal to 6 inches in diameter is installed with a sand-gravel envelope below ground using a drainage plow to address excess water (seasonal high water table), degraded plant condition, and water quality degradation (nutrients). Associated Practices: 608 - Surface Drain, Main or Lateral; 587 - Structure for Water Control, 533 - Pumping Plant; and 554 - Drainage Water Management, Grass Waterway; 412, 620- Underground Outlet; 313-Waste Storage Structure

Before Situation: Soil conditions are excessively wet in the spring due to poor internal soil drainage. Excess soil water is causing crop stress and delay of field operations.

After Situation: A perforated HDPE (Corrugated Plastic Pipe) pipeline less than or equal to 6 inches in diameter is installed with a sand-gravel envelope below ground using a drainage plow to address excess water (seasonal high water table), degraded plant condition, and water quality degradation (nutrients). A 5" single wall, perforated HDPE Corrugated Plastic Pipe (CPP) is installed below ground to a minimum depth of 5 feet. The line is surrounded with a sand-gravel envelope. The typical volume sand-gravel for 1,000 feet of 12" wide x 12" high envelope is 32 cubic yards. The typical number of mainline connections for 1,000 feet of subsurface drainline is 3. The drainage modifications result in reduced plant stress due to excess wetness or improved drainage water quality due to system retrofit enabling drainage water management.

Scenario Feature Measure: Feet of Pipe

Scenario Unit: Foot

Scenario Typical Size: 1000

Total Scenario Cost: \$6,574.73

Scenario Cost/Unit: \$6.57

Cost Details

Component Name	Id	Description	Unit	Cost	Qty	Total
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Materials

Aggregate, Gravel, Graded	46	Gravel, includes materials, equipment and labor to transport and place. Includes washed and unwashed gravel.	Cubic Yard	\$31.47	32	\$1,007.11
Drainage Lateral Connection	1458	Connect 3"-6" drainage lateral to main drain, includes excavation to 6' depth, install tee on main line, connect lateral, and backfill. Includes material cost for tee.	Each	\$34.69	3	\$104.07
Pipe, HDPE, corrugated single wall, <= 12" weight priced Compound	1380	High Density Polyethylene (HDPE) compound manufactured into single wall corrugated pipe or tubing. Materials only.	Pound	\$1.75	500	\$873.91

Labor

Equipment Operators, Heavy	233	Includes: Cranes, Hydraulic Excavators >=50 HP, Dozers, Paving Machines, Rock Trenchers, Trenchers >=12", Dump Trucks, Ag Equipment >=150 HP, Scrapers, Water Wagons.	Hour	\$32.34	4	\$129.37
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Equipment Installation

Track Loader, 95HP	935	Equipment and power unit costs. Labor not included.	Hour	\$103.78	4	\$415.13
Trenching, Earth, 12" x 60"	1459	Trenching, earth, 12" wide x 60" depth, includes equipment and labor for trenching, laying 3"-6" CPP drain line with envelope, and backfilling.	Foot	\$2.29	1000	\$2,292.84

Mobilization

Mobilization, large equipment	1140	Equipment >150HP or typical weights greater than 30,000 pounds or loads requiring over width or over length permits.	Each	\$574.99	2	\$1,149.98
Mobilization, medium equipment	1139	Equipment with 70-150 HP or typical weights between 14,000 and 30,000 pounds.	Each	\$301.16	2	\$602.32

Practice: 606 - Subsurface Drain

Scenario: #3 - Corrugated Plastic Pipe , less than 8 inches, Buried 8 feet or more

Scenario Description: A perforated HDPE, Corrugated Plastic Pipe is installed with a stone drain using a hydraulic excavator. The depth of excavation can range from 8 to 15 feet deep. The drain is installed upslope of a proposed waste storage facility to intercept subsurface water flow. Failure to collect the flow could impair the integrity of proposed waste storage facility. Associated Practices: 313 - Waste Storage Facility, 608 - Surface Drain, Main or Lateral; 587 - Structure for Water Control, 533 - Pumping Plant; and 554 - Drainage Water Management, 620 Underground Outlet.

Before Situation: Soil conditions are excessively wet in the spring due to poor internal soil drainage. An earthen waste storage facility is planned, which will be vulnerable to failure from excess soil water upslope of the impoundment.

After Situation: A 4" perforated HDPE (Corrugated Plastic Pipe) pipeline is installed with a stone drain using a hydraulic excavator. A 12 feet deep trench is backfilled with a gravel drain. The drain is 2 feet wide by 8 feet high and runs the length of the project. The drainage modifications result in reduced risk of failure of the waste storage facility since the excessive moisture is now collected and carried around the structure to a safe outlet.

Scenario Feature Measure: Feet of Pipe

Scenario Unit: Foot

Scenario Typical Size: 500

Total Scenario Cost: \$13,612.30

Scenario Cost/Unit: \$27.22

Cost Details

Component Name	Id	Description	Unit	Cost	Qty	Total
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Materials

Aggregate, Gravel, Graded	46	Gravel, includes materials, equipment and labor to transport and place. Includes washed and unwashed gravel.	Cubic Yard	\$31.47	296	\$9,315.77
Pipe, HDPE, corrugated single wall, <= 12" weight priced Compound	1380	High Density Polyethylene (HDPE) compound manufactured into single wall corrugated pipe or tubing. Materials only.	Pound	\$1.75	150	\$262.17

Labor

Equipment Operators, Heavy	233	Includes: Cranes, Hydraulic Excavators >=50 HP, Dozers, Paving Machines, Rock Trenchers, Trenchers >=12", Dump Trucks, Ag Equipment >=150 HP, Scrapers, Water Wagons.	Hour	\$32.34	12	\$388.11
General Labor	231	Labor performed using basic tools such as power tool, shovels, and other tools that do not require extensive training. Ex. pipe layer, herder, concrete placement, materials spreader, flagger, etc.	Hour	\$21.64	8	\$173.15

Equipment Installation

Hydraulic Excavator, 2 CY	932	Track mounted hydraulic excavator with bucket capacity range of 1.5 to 2.5 CY. Equipment and power unit costs. Labor not included.	Hour	\$193.59	12	\$2,323.12
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Mobilization

Mobilization, large equipment	1140	Equipment >150HP or typical weights greater than 30,000 pounds or loads requiring over width or over length permits.	Each	\$574.99	2	\$1,149.98
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