Practice: 102 - Comprehensive Nutrient Management Plan - Written

Scenario: #66 - Non-Dairy Operation Less Than 300 AU with Land Application

Scenario Description:

A Comprehensive Nutrient Management Plan (CNMP) will be developed to address resource concerns on a small non-dairy Animal Feeding Operation (AFO) currently less than 300 animal units (AU)--primarily swine, poultry, and beef AFOs. The producer may export (material transferred to another owner with written documentation of the transfer) modest amounts of the manure or organic products from the farm. For operations where manure is both applied to land the AFO owner/operator controls and exported offsite, guidance to determine appropriate CNMP CAP scenario selection shall be provided by NRCS at the state level. The producer has an animal production area, farms cropland, and applies most nutrients. The CNMP is a conservation plan that addresses resource concerns on the AFO production area and land application areas. Production area components of the plan must include animal confinement facilities, feeding and lounging lots, animal mortality facilities, and manure containment and storage facilities. Land application components of the plan must include all lands under the control of the AFO owner or operator where waste materials are being applied. Planned practices on the production area and land application areas must result in meeting NRCS quality criteria for water quality and soil erosion. Any applicable air emission and negative air quality impacts occurring as a result of planned CNMP activities, or existing on-farm activities must be mitigated in the CNMP if feasible. The CNMP meets the AFO owner/operator's production objectives.

Before Situation:

The owner/operator of a small sized non-dairy AFO has not received a written Comprehensive Nutrient Management Plan (CNMP) that addresses all resource concerns present on the facility production area and land waste application areas. Various levels of management and conservation implementation have occurred on the farm. Little documentation of the systems used and practices installed exists. The producer may or may not have a conservation plan or a nutrient management plan. Partial implementation of CNMP-related practices for the AFO has potentially occurred. Resource concerns on the AFO production area and land waste application areas remain to be addressed through the development of a complete CNMP including management and conservation practices for proper manure/wastewater storage and handling, proper disposal of animal mortality, treatment of land application areas to reduce soil erosion to sustainable levels, and application of waste nutrients at an agronomic rate that meets application crop needs and does not exceed site risk analysis assessment condition. Negative air quality impacts and farmstead safety and security issues may remain on the AFO, and recordkeeping methods for crop yields, inspection and monitoring of the existing CNMP-related practices, and manure application and imports/exports may need further improvement.

After Situation:

A certified Technical Services Provider (TSP) has delivered, to the AFO owner/operator, a comprehensive nutrient management plan meeting CNMP CAP criteria (GM - Part 405 - Comprehensive Nutrient Management Plans), and to NRCS the CNMP Case File data that describes management and conservation practice solutions to all identified resource concerns on the small-sized non-dairy AFO production area and land application areas. Collection, transfer, and storage of manure and wastewater systems, mortality management facilities, as well as any rainfall or runoff diversion systems will be inventoried/evaluated and planned for adequacy according to applicable NRCS conservation practice standard technical criteria by a Professional Engineer. Management and conservation practices in the CNMP document delivered to the client ensure that, if implemented, the AFO will properly, within applicable NRCS standards and specifications, store, handle, and contain manure and wastewater materials generated by the AFO; dispose of AFO mortality; implement conservation practices to reduce soil erosion on land application areas to sustainable levels; land apply waste material nutrients in a manner than meets NRCS 590 Nutrient Management standard technical criteria. Decisions presented within the CNMP have been made to mitigate, if feasible, negative air quality impacts and improve farmland safety and security. Practices selected in the Record of Decision will provide estimated quantities to be installed in units of measure that align with the practice standards. Accurate recordkeeping documents for crop yields, operation and maintenance of existing and new CNMP-related practices, manure application, AFO manure imports and exports, and other information relevant to the management and compliance of the AFO with state and/or local rules and regulations are included in the CNMP. If the CNMP is not implemented all identified resource concerns will still exist.

Feature Measure: Number

Scenario Unit: Number

Scenario Typical Size: 1.0

Scenario Total Cost: $9,087.02

Scenario Cost/Unit: $9,087.02

Cost Details:

Component Name	ID	Description	Unit	Cost	QTY	Total
Labor						
CAP Labor, professional engineer	1297	Conservation Activity Plan labor to apply knowledge of engineering technology and biological science to agricultural problems concerned with power and machinery, electrification, structures, soil and water conservation, and processing of agricultural products. Cost associated with this component includes overhead and benefits (market price).	Hours	$103.58	55	$5,696.90
Cap Labor, conservation scientist	1300	Conservation Activity Plan labor to manage, improve, and protect natural resources to maximize their use without damaging the environment. Interprets resource information and assess resource conditions to provide conservation practice alternatives to producers to make decisions on the treatment of their soil, water, air, plant, animal, and energy resources. May instruct farmers, agricultural production managers, or ranchers in best ways to use crop rotation, contour plowing, or terracing to conserve soil and water; in the number and kind of livestock and forage plants best suited to particular ranges; and in range and farm improvements, such as fencing and reservoirs for stock watering.	Hours	$78.84	43	$3,390.12

Practice: 102 - Comprehensive Nutrient Management Plan - Written

Scenario: #67 - Dairy Operation Less Than 300 AU with Land Application

Scenario Description:

A Comprehensive Nutrient Management Plan (CNMP) and CNMP Case File will be developed to address resource concerns on a small Dairy Animal Feeding Operation (AFO) currently less than 300 animal units (AU). The producer may export (material transferred to another owner with written documentation of the transfer) modest amounts of the manure or organic products from the farm. For operations where manure is both applied to land the AFO owner/operator controls and exported offsite, guidance to determine appropriate CNMP CAP scenario selection shall be provided by NRCS at the state level. The producer has an animal production area, farms cropland, and applies most nutrients. The CNMP is a conservation plan that addresses resource concerns on the AFO production area and land application areas. Production area components of the plan must include animal confinement facilities, feeding and lounging lots, animal mortality facilities, and manure containment and storage facilities. Land application components of the plan must include all lands under the control of the AFO owner or operator where waste materials are being applied. Planned practices on the production area and land application areas must result in meeting NRCS quality criteria for water quality and soil erosion. Any applicable air emission and negative air quality impacts occurring as a result of planned CNMP activities, or existing on-farm activities must be mitigated in the CNMP if feasible. The CNMP meets the AFO owner/operator's production objectives.

Before Situation:

The owner/operator of a small sized dairy AFO has not received a written Comprehensive Nutrient Management Plan (CNMP) that addresses all resource concerns present on the facility production area and land waste application areas. Various levels of management and conservation implementation have occurred on the farm. Little documentation of the systems used and practices installed exists. The producer may or may not have a conservation plan or a nutrient management plan. Partial implementation of CNMP-related practices for the AFO has potentially occurred. Resource concerns on the AFO production area and land waste application areas remain to be addressed through the development of a complete CNMP including management and conservation practices for proper manure/wastewater storage and handling, proper disposal of animal mortality, treatment of land application areas to reduce soil erosion to sustainable levels, and application of waste nutrients at an agronomic rate that meets application crop needs and does not exceed site risk analysis assessment condition. Negative air quality impacts and farmstead safety and security issues may remain on the AFO, and recordkeeping methods for crop yields, inspection and monitoring of the existing CNMP-related practices, and manure application and imports/exports may need further improvement.

After Situation:

A certified Technical Services Provider (TSP) has delivered, to the AFO owner/operator, a comprehensive nutrient management plan meeting CNMP CAP criteria (GM - Part 405 - Comprehensive Nutrient Management Plans), and to NRCS the CNMP with Case File data that describes management and conservation practice solutions to all identified resource concerns on the small-sized dairy AFO production area and land application areas. Collection, transfer, and storage of manure and wastewater systems, mortality management facilities, as well as any rainfall or runoff diversion systems will be inventoried-evaluated and planned for adequacy according to applicable NRCS conservation practice standard technical criteria by a Professional Engineer. Management and conservation practices in the CNMP document delivered to the client ensure that, if implemented, the AFO will properly, within applicable NRCS standards and specifications, store, handle, and contain manure and wastewater materials generated by the AFO; dispose of AFO mortality; implement conservation practices to reduce soil erosion on land application areas to sustainable levels; land apply waste material nutrients in a manner than meets NRCS 590 Nutrient Management standard technical criteria. Decisions presented within the CNMP have been made to mitigate, if feasible, negative air quality impacts and improve farmland safety and security. Practices selected in the Record of Decision will provide estimated quantities to be installed in units of measure that align with the practice standards. Accurate recordkeeping documents for crop yields, operation and maintenance of existing and new CNMP-related practices, manure application, AFO manure imports and exports, and other information relevant to the management and compliance of the AFO with state and/or local rules and regulations are included in the CNMP. If the CNMP is not implemented all identified resource concerns will still exist.

Feature Measure: Number

Scenario Unit: Number

Scenario Typical Size: 1.0

Scenario Total Cost: $11,395.14

Scenario Cost/Unit: $11,395.14

Cost Details:

Component Name	ID	Description	Unit	Cost	QTY	Total
Labor						
CAP Labor, professional engineer	1297	Conservation Activity Plan labor to apply knowledge of engineering technology and biological science to agricultural problems concerned with power and machinery, electrification, structures, soil and water conservation, and processing of agricultural products. Cost associated with this component includes overhead and benefits (market price).	Hours	$103.58	75	$7,768.50
Cap Labor, conservation scientist	1300	Conservation Activity Plan labor to manage, improve, and protect natural resources to maximize their use without damaging the environment. Interprets resource information and assess resource conditions to provide conservation practice alternatives to producers to make decisions on the treatment of their soil, water, air, plant, animal, and energy resources. May instruct farmers, agricultural production managers, or ranchers in best ways to use crop rotation, contour plowing, or terracing to conserve soil and water; in the number and kind of livestock and forage plants best suited to particular ranges; and in range and farm improvements, such as fencing and reservoirs for stock watering.	Hours	$78.84	46	$3,626.64

Practice: 102 - Comprehensive Nutrient Management Plan - Written

Scenario: #68 - Non-Dairy Operation Greater Than or Equal to 300 AU and Less Than 700 AU with Land Application

Scenario Description:

A Comprehensive Nutrient Management Plan (CNMP) will be developed to address resource concerns on a medium non-dairy Animal Feeding Operation (AFO) currently greater than or equal to 300 and less than 700 animal units (AU).--primarily swine, poultry, and beef AFOs. The producer may export (material transferred to another owner with written documentation of the transfer) modest amounts of the manure or organic products from the farm. For operations where manure is both applied to land the AFO owner/operator controls and exported offsite, guidance to determine appropriate CNMP CAP scenario selection shall be provided by NRCS at the state level. The producer has an animal production area, farms cropland, and applies most nutrients. The CNMP is a conservation plan that addresses resource concerns on the AFO production area and land application areas. Production area components of the plan must include animal confinement facilities, feeding and lounging lots, animal mortality facilities, and manure containment and storage facilities. Land application components of the plan must include all lands under the control of the AFO owner or operator where waste materials are being applied. Planned practices on the production area and land application areas must result in meeting NRCS quality criteria for water quality and soil erosion. Any applicable air emission and negative air quality impacts occurring as a result of planned CNMP activities, or existing on-farm activities must be mitigated in the CNMP if feasible. The CNMP meets the AFO owner/operator's production objectives.

Before Situation:

The owner/operator of a medium sized non-dairy AFO has not received a written Comprehensive Nutrient Management Plan (CNMP) that addresses all resource concerns present on the facility production area and land waste application areas. Various levels of management and conservation implementation have occurred on the farm. Little documentation of the systems used and practices installed exists. The producer may or may not have a conservation plan or a nutrient management plan. Partial implementation of CNMP-related practices for the AFO has potentially occurred. Resource concerns on the AFO production area and land waste application areas remain to be addressed through the development of a complete CNMP including management and conservation practices for proper manure/wastewater storage and handling, proper disposal of animal mortality, treatment of land application areas to reduce soil erosion to sustainable levels, and application of waste nutrients at an agronomic rate that meets application crop needs and does not exceed site risk analysis assessment condition. Negative air quality impacts and farmstead safety and security issues may remain on the AFO, and recordkeeping methods for crop yields, inspection and monitoring of the existing CNMP-related practices, and manure application and imports/exports may need further improvement.

After Situation:

A certified Technical Services Provider (TSP) has delivered, to the AFO owner/operator, a comprehensive nutrient management plan meeting CNMP CAP criteria (GM - Part 405 - Comprehensive Nutrient Management Plans), and to NRCS with the CNMP Case File data that describes management and conservation practice solutions to all identified resource concerns on the non-dairy AFO production area and land application areas. Collection, transfer, and storage of manure and wastewater systems, mortality management facilities, as well as any rainfall or runoff diversion systems will be inventoried/evaluated and planned for adequacy according to applicable NRCS conservation practice standard technical criteria by a Professional Engineer. Management and conservation practices in the CNMP document delivered to the client ensure that, if implemented, the AFO will properly, within applicable NRCS standards and specifications, store, handle, and contain manure and wastewater materials generated by the AFO; dispose of AFO mortality; implement conservation practices to reduce soil erosion on land application areas to sustainable levels; land apply waste material nutrients in a manner than meets NRCS 590 Nutrient Management standard technical criteria. Decisions presented within the CNMP have been made to mitigate, if feasible, negative air quality impacts and improve farmland safety and security. Practices selected in the Record of Decision will provide estimated quantities to be installed in units of measure that align with the practice standards. Accurate recordkeeping documents for crop yields, operation and maintenance of existing and new CNMP-related practices, manure application, AFO manure imports and exports, and other information relevant to the management and compliance of the AFO with state and/or local rules and regulations are included in the CNMP. If the CNMP is not implemented all identified resource concerns will still exist.

Feature Measure: Number

Scenario Unit: Number

Scenario Typical Size: 1.0

Scenario Total Cost: $11,715.12

Scenario Cost/Unit: $11,715.12

Cost Details:

Component Name	ID	Description	Unit	Cost	QTY	Total
Labor						
CAP Labor, professional engineer	1297	Conservation Activity Plan labor to apply knowledge of engineering technology and biological science to agricultural problems concerned with power and machinery, electrification, structures, soil and water conservation, and processing of agricultural products. Cost associated with this component includes overhead and benefits (market price).	Hours	$103.58	72	$7,457.76
Cap Labor, conservation scientist	1300	Conservation Activity Plan labor to manage, improve, and protect natural resources to maximize their use without damaging the environment. Interprets resource information and assess resource conditions to provide conservation practice alternatives to producers to make decisions on the treatment of their soil, water, air, plant, animal, and energy resources. May instruct farmers, agricultural production managers, or ranchers in best ways to use crop rotation, contour plowing, or terracing to conserve soil and water; in the number and kind of livestock and forage plants best suited to particular ranges; and in range and farm improvements, such as fencing and reservoirs for stock watering.	Hours	$78.84	54	$4,257.36

Practice: 102 - Comprehensive Nutrient Management Plan - Written

Scenario: #69 - Dairy Operation Greater Than or Equal to 300 AU and Less Than 700 AU with Land Application

Scenario Description:

A Comprehensive Nutrient Management Plan (CNMP) will be developed to address resource concerns on a medium Dairy Animal Feeding Operation (AFO) currently greater than or equal to 300 and less than 700 animal units (AU). The producer may export (material transferred to another owner with written documentation of the transfer) modest amounts of the manure or organic products from the farm. For operations where manure is both applied to land the AFO owner/operator controls and exported offsite, guidance to determine appropriate CNMP CAP scenario selection shall be provided by NRCS at the state level. The producer has an animal production area, farms cropland, and applies most nutrients. The CNMP is a conservation plan that addresses resource concerns on the AFO production area and land application areas. Production area components of the plan must include animal confinement facilities, feeding and lounging lots, animal mortality facilities, and manure containment and storage facilities. Land application components of the plan must include all lands under the control of the AFO owner or operator where waste materials are being applied. Planned practices on the production area and land application areas must result in meeting NRCS quality criteria for water quality and soil erosion. Any applicable air emission and negative air quality impacts occurring as a result of planned CNMP activities, or existing on-farm activities must be mitigated in the CNMP if feasible. The CNMP meets the AFO owner/operator's production objectives.

Before Situation:

The owner/operator of a medium sized Dairy AFO has not received a written Comprehensive Nutrient Management Plan (CNMP) that addresses all resource concerns present on the facility production area and land waste application areas. Various levels of management and conservation implementation have occurred on the farm. Little documentation of the systems used and practices installed exists. The producer may or may not have a conservation plan or a nutrient management plan. Partial implementation of CNMP-related practices for the AFO has potentially occurred. Resource concerns on the AFO production area and land waste application areas remain to be addressed through the development of a complete CNMP including management and conservation practices for proper manure/wastewater storage and handling, proper disposal of animal mortality, treatment of land application areas to reduce soil erosion to sustainable levels, and application of waste nutrients at an agronomic rate that meets application crop needs and does not exceed site risk analysis assessment condition. Negative air quality impacts and farmstead safety and security issues may remain on the AFO, and recordkeeping methods for crop yields, inspection and monitoring of the existing CNMP-related practices, and manure application and imports/exports may need further improvement.

After Situation:

A certified Technical Services Provider (TSP) has delivered, to the AFO owner/operator, a comprehensive nutrient management plan meeting CNMP CAP criteria (GM - Part 405 - Comprehensive Nutrient Management Plans), and to NRCS the CNMP with Case File data that describes management and conservation practice solutions to all identified resource concerns on the dairy AFO production area and land application areas. Collection, transfer, and storage of manure and wastewater systems, mortality management facilities, as well as any rainfall or runoff diversion systems will be inventoried-evaluated and planned for adequacy according to applicable NRCS conservation practice standard technical criteria by a Professional Engineer. Management and conservation practices in the CNMP document delivered to the client ensure that, if implemented, the AFO will properly, within applicable NRCS standards and specifications, store, handle, and contain manure and wastewater materials generated by the AFO; dispose of AFO mortality; implement conservation practices to reduce soil erosion on land application areas to sustainable levels; land apply waste material nutrients in a manner than meets NRCS 590 Nutrient Management standard technical criteria. Decisions presented within the CNMP have been made to mitigate, if feasible, negative air quality impacts and improve farmland safety and security. Practices selected in the Record of Decision will provide estimated quantities to be installed in units of measure that align with the practice standards. Accurate recordkeeping documents for crop yields, operation and maintenance of existing and new CNMP-related practices, manure application, AFO manure imports and exports, and other information relevant to the management and compliance of the AFO with state and/or local rules and regulations are included in the CNMP. If the CNMP is not implemented all identified resource concerns will still exist.

Feature Measure: Number

Scenario Unit: Number

Scenario Typical Size: 1.0

Scenario Total Cost: $12,987.44

Scenario Cost/Unit: $12,987.44

Cost Details:

Component Name	ID	Description	Unit	Cost	QTY	Total
Labor						
CAP Labor, professional engineer	1297	Conservation Activity Plan labor to apply knowledge of engineering technology and biological science to agricultural problems concerned with power and machinery, electrification, structures, soil and water conservation, and processing of agricultural products. Cost associated with this component includes overhead and benefits (market price).	Hours	$103.58	82	$8,493.56
Cap Labor, conservation scientist	1300	Conservation Activity Plan labor to manage, improve, and protect natural resources to maximize their use without damaging the environment. Interprets resource information and assess resource conditions to provide conservation practice alternatives to producers to make decisions on the treatment of their soil, water, air, plant, animal, and energy resources. May instruct farmers, agricultural production managers, or ranchers in best ways to use crop rotation, contour plowing, or terracing to conserve soil and water; in the number and kind of livestock and forage plants best suited to particular ranges; and in range and farm improvements, such as fencing and reservoirs for stock watering.	Hours	$78.84	57	$4,493.88

Practice: 102 - Comprehensive Nutrient Management Plan - Written

Scenario: #70 - Non-Dairy Operation Greater Than or Equal to 700 AU with Land Application

Scenario Description:

A Comprehensive Nutrient Management Plan (CNMP) will be developed to address resource concerns on a large non-dairy Animal Feeding Operation ((AFO) currently greater than or equal to 700 animal units (AU)--primarily swine, poultry, and beef AFOs. The producer may export (material transferred to another owner with written documentation of the transfer) modest amounts of the manure or organic products from the farm. For operations where manure is both applied to land the AFO owner/operator controls and exported offsite, guidance to determine appropriate CNMP CAP scenario selection shall be provided by NRCS at the state level. The producer has an animal production area, farms cropland, and applies most nutrients. The CNMP is a conservation plan that addresses resource concerns on the AFO production area and land application areas. Production area components of the plan must include animal confinement facilities, feeding and lounging lots, animal mortality facilities, and manure containment and storage facilities. Land application components of the plan must include all lands under the control of the AFO owner or operator where waste materials are being applied. Planned practices on the production area and land application areas must result in meeting NRCS quality criteria for water quality and soil erosion. Any applicable air emission and negative air quality impacts occurring as a result of planned CNMP activities, or existing on-farm activities must be mitigated in the CNMP if feasible. The CNMP meets the AFO owner/operator's production objectives.

Before Situation:

The owner/operator of a large sized non-dairy AFO has not received a written Comprehensive Nutrient Management Plan (CNMP) that addresses all resource concerns present on the facility production area and land waste application areas. Various levels of management and conservation implementation have occurred on the farm. Little documentation of the systems used and practices installed exists. The producer may or may not have a conservation plan or a nutrient management plan. Partial implementation of CNMP-related practices for the AFO has potentially occurred. Resource concerns on the AFO production area and land waste application areas remain to be addressed through the development of a complete CNMP including management and conservation practices for proper manure/wastewater storage and handling, proper disposal of animal mortality, treatment of land application areas to reduce soil erosion to sustainable levels, and application of waste nutrients at an agronomic rate that meets application crop needs and does not exceed site risk analysis assessment condition. Negative air quality impacts and farmstead safety and security issues may remain on the AFO, and recordkeeping methods for crop yields, inspection and monitoring of the existing CNMP-related practices, and manure application and imports/exports may need further improvement.

After Situation:

A certified Technical Services Provider (TSP) has delivered, to the AFO owner/operator, a comprehensive nutrient management plan meeting CNMP CAP criteria (GM - Part 405 - Comprehensive Nutrient Management Plans), and to NRCS the CNMP Case File data that describes management and conservation practice solutions to all identified resource concerns on the non-dairy AFO production area and land application areas. Collection, transfer, and storage of manure and wastewater systems, mortality management facilities, as well as any rainfall or runoff diversion systems will be inventoried/evaluated and planned for adequacy according to applicable NRCS conservation practice standard technical criteria by a Professional Engineer. Management and conservation practices in the CNMP document delivered to the client ensure that, if implemented, the AFO will properly, within applicable NRCS standards and specifications, store, handle, and contain manure and wastewater materials generated by the AFO; dispose of AFO mortality; implement conservation practices to reduce soil erosion on land application areas to sustainable levels; land apply waste material nutrients in a manner than meets NRCS 590 Nutrient Management standard technical criteria. Decisions presented within the CNMP have been made to mitigate, if feasible, negative air quality impacts and improve farmland safety and security. Practices selected in the Record of Decision will provide estimated quantities to be installed in units of measure that align with the practice standards. Accurate recordkeeping documents for crop yields, operation and maintenance of existing and new CNMP-related practices, manure application, AFO manure imports and exports, and other information relevant to the management and compliance of the AFO with state and/or local rules and regulations are included in the CNMP. If the CNMP is not implemented all identified resource concerns will still exist.

Feature Measure: Number

Scenario Unit: Number

Scenario Typical Size: 1.0

Scenario Total Cost: $14,160.80

Scenario Cost/Unit: $14,160.80

Cost Details:

Component Name	ID	Description	Unit	Cost	QTY	Total
Labor						
CAP Labor, professional engineer	1297	Conservation Activity Plan labor to apply knowledge of engineering technology and biological science to agricultural problems concerned with power and machinery, electrification, structures, soil and water conservation, and processing of agricultural products. Cost associated with this component includes overhead and benefits (market price).	Hours	$103.58	88	$9,115.04
Cap Labor, conservation scientist	1300	Conservation Activity Plan labor to manage, improve, and protect natural resources to maximize their use without damaging the environment. Interprets resource information and assess resource conditions to provide conservation practice alternatives to producers to make decisions on the treatment of their soil, water, air, plant, animal, and energy resources. May instruct farmers, agricultural production managers, or ranchers in best ways to use crop rotation, contour plowing, or terracing to conserve soil and water; in the number and kind of livestock and forage plants best suited to particular ranges; and in range and farm improvements, such as fencing and reservoirs for stock watering.	Hours	$78.84	64	$5,045.76

Practice: 102 - Comprehensive Nutrient Management Plan - Written

Scenario: #71 - Dairy Operation Greater Than or Equal to 700 AU with Land Application

Scenario Description:

A Comprehensive Nutrient Management Plan (CNMP) will be developed to address resource concerns on a large Dairy Animal Feeding Operation (AFO) currently greater than or equal to 700 animal units (AU). The producer may export (material transferred to another owner with written documentation of the transfer) modest amounts of the manure or organic products from the farm. For operations where manure is both applied to land the AFO owner/operator controls and exported offsite, guidance to determine appropriate CNMP CAP scenario selection shall be provided by NRCS at the state level. The producer has an animal production area, farms cropland, and applies most nutrients. The CNMP is a conservation plan that addresses resource concerns on the AFO production area and land application areas. Production area components of the plan must include animal confinement facilities, feeding and lounging lots, animal mortality facilities, and manure containment and storage facilities. Land application components of the plan must include all lands under the control of the AFO owner or operator where waste materials are being applied. Planned practices on the production area and land application areas must result in meeting NRCS quality criteria for water quality and soil erosion. Any applicable air emission and negative air quality impacts occurring as a result of planned CNMP activities, or existing on-farm activities must be mitigated in the CNMP if feasible. The CNMP meets the AFO owner/operator's production objectives.

Before Situation:

The owner/operator of a large sized Dairy AFO has not received a written Comprehensive Nutrient Management Plan (CNMP) that addresses all resource concerns present on the facility production area and land waste application areas. Various levels of management and conservation implementation have occurred on the farm. Little documentation of the systems used and practices installed exists. The producer may or may not have a conservation plan or a nutrient management plan. Partial implementation of CNMP-related practices for the AFO has potentially occurred. Resource concerns on the AFO production area and land waste application areas remain to be addressed through the development of a complete CNMP including management and conservation practices for proper manure/wastewater storage and handling, proper disposal of animal mortality, treatment of land application areas to reduce soil erosion to sustainable levels, and application of waste nutrients at an agronomic rate that meets application crop needs and does not exceed site risk analysis assessment condition. Negative air quality impacts and farmstead safety and security issues may remain on the AFO, and recordkeeping methods for crop yields, inspection and monitoring of the existing CNMP-related practices, and manure application and imports/exports may need further improvement.

After Situation:

A certified Technical Services Provider (TSP) has delivered, to the AFO owner/operator, a comprehensive nutrient management plan meeting CNMP CAP criteria (GM - Part 405 - Comprehensive Nutrient Management Plans), and to NRCS the CNMP with Case File data that describes management and conservation practice solutions to all identified resource concerns on the dairy AFO production area and land application areas. Collection, transfer, and storage of manure and wastewater systems, mortality management facilities, as well as any rainfall or runoff diversion systems will be inventoried-evaluated and planned for adequacy according to applicable NRCS conservation practice standard technical criteria by a Professional Engineer. Management and conservation practices in the CNMP document delivered to the client ensure that, if implemented, the AFO will properly, within applicable NRCS standards and specifications, store, handle, and contain manure and wastewater materials generated by the AFO; dispose of AFO mortality; implement conservation practices to reduce soil erosion on land application areas to sustainable levels; land apply waste material nutrients in a manner than meets NRCS 590 Nutrient Management standard technical criteria. Decisions presented within the CNMP have been made to mitigate, if feasible, negative air quality impacts and improve farmland safety and security. Practices selected in the Record of Decision will provide estimated quantities to be installed in units of measure that align with the practice standards. Accurate recordkeeping documents for crop yields, operation and maintenance of existing and new CNMP-related practices, manure application, AFO manure imports and exports, and other information relevant to the management and compliance of the AFO with state and/or local rules and regulations are included in the CNMP. If the CNMP is not implemented all identified resource concerns will still exist.

Feature Measure: Number

Scenario Unit: Number

Scenario Typical Size: 1.0

Scenario Total Cost: $14,422.06

Scenario Cost/Unit: $14,422.06

Cost Details:

Component Name	ID	Description	Unit	Cost	QTY	Total
Labor						
CAP Labor, professional engineer	1297	Conservation Activity Plan labor to apply knowledge of engineering technology and biological science to agricultural problems concerned with power and machinery, electrification, structures, soil and water conservation, and processing of agricultural products. Cost associated with this component includes overhead and benefits (market price).	Hours	$103.58	89	$9,218.62
Cap Labor, conservation scientist	1300	Conservation Activity Plan labor to manage, improve, and protect natural resources to maximize their use without damaging the environment. Interprets resource information and assess resource conditions to provide conservation practice alternatives to producers to make decisions on the treatment of their soil, water, air, plant, animal, and energy resources. May instruct farmers, agricultural production managers, or ranchers in best ways to use crop rotation, contour plowing, or terracing to conserve soil and water; in the number and kind of livestock and forage plants best suited to particular ranges; and in range and farm improvements, such as fencing and reservoirs for stock watering.	Hours	$78.84	66	$5,203.44

Practice: 102 - Comprehensive Nutrient Management Plan - Written

Scenario: #72 - Livestock Operation Less Than 300 AU without Land Application

Scenario Description:

A Comprehensive Nutrient Management Plan (CNMP) will be developed to address resource concerns on a small Animal Feeding Operation (AFO) currently less than 300 animal units (AU). The producer exports (material transferred to another owner with written documentation of the transfer) nearly all of the manure or organic products from the farm. For operations where manure is both applied to land the AFO owner/operator controls and exported offsite, guidance to determine appropriate CNMP CAP scenario selection shall be provided by NRCS at the state level. The CNMP is a conservation plan that addresses resource concerns on the AFO production area and land application areas owned or controlled by the AFO owner/operator. In this scenario, the primary focus will be addressing resource concerns present on the production area, including manure/wastewater handling and storage, and documentation of manure generation by the AFO, and its export. Production area components of the plan must include animal confinement facilities, feeding and lounging areas, animal mortality facilities, and manure containment and storage facilities. Planned practices on the production area must result in meeting NRCS quality criteria for water quality and soil erosion. Any applicable air emission and negative air quality impacts occurring as a result of planned CNMP activities, or existing on-farm activities must be mitigated in the CNMP if feasible. The CNMP meets the AFO owner/operator's production objectives.

Before Situation:

The owner/operator of a small AFO has not received a written comprehensive nutrient management plan (CNMP) that addresses all resource concerns present on the facility production areas and any applicable land application areas. Partial implementation of CNMP- related practices for the AFO has potentially occurred. Various levels of management and conservation implementation have occurred on the farm. Little documentation of the systems used and practices installed exists. The producer may or may not have a conservation plan or a nutrient management plan. Resource concerns on the AFO production area remain to be addressed through the development of a complete CNMP including management and conservation practices for proper manure/wastewater storage and handling, proper disposal of animal mortality, erosion and runoff issues from feeding and lounging areas, and recordkeeping documentation of manure generation and exports. Negative air quality impacts and farmstead safety and security issues may remain on the AFO, and recordkeeping methods for inspection and monitoring of the existing CNMP-related practices, manure imports/exports may need further improvement.

After Situation:

A certified Technical Services Provider (TSP) has delivered, to the AFO owner/operator, a comprehensive conservation plan meeting CNMP CAP criteria (GM - Part 405 - Comprehensive Nutrient Management Plans), and to NRCS the CNMP Case File that describes management and conservation practice solutions to all identified resource concerns on the small sized AFO production area and any applicable land application areas. Collection, transfer, and storage of manure and wastewater systems, mortality management facilities, as well as any rainfall or runoff diversion systems will be inventoried/evaluated and planned for adequacy according to applicable NRCS conservation practice standard technical criteria by a Professional Engineer. Conservation practices in the CNMP document delivered to the client ensure that, if implemented, the AFO will properly, within applicable NRCS standards and specifications, store, handle, and contain manure and wastewater materials generated by the AFO; dispose of AFO mortality; minimize erosion and runoff from feeding and lounging areas, keep accurate AFO animal inventory information, and document AFO manure generation and exports. Decisions presented within the CNMP have been made to mitigate, if feasible, negative air quality impacts and improve farmland safety and security. Decisions selected in the Record of Decision will provide estimated quantities to be installed in units of measure that align with those in the conservation practice. Accurate recordkeeping documents for operation and maintenance of existing and new CNMP-related practices, AFO manure imports and exports, and other information relevant to the management and compliance of the AFO with state and/or local rules and regulations are included in the CNMP. If the CNMP is not implemented all identified resource concerns will still exist..

Feature Measure: Number

Scenario Unit: Number

Scenario Typical Size: 1.0

Scenario Total Cost: $8,334.24

Scenario Cost/Unit: $8,334.24

Cost Details:

Component Name	ID	Description	Unit	Cost	QTY	Total
Labor						
CAP Labor, professional engineer	1297	Conservation Activity Plan labor to apply knowledge of engineering technology and biological science to agricultural problems concerned with power and machinery, electrification, structures, soil and water conservation, and processing of agricultural products. Cost associated with this component includes overhead and benefits (market price).	Hours	$103.58	66	$6,836.28
Cap Labor, conservation scientist	1300	Conservation Activity Plan labor to manage, improve, and protect natural resources to maximize their use without damaging the environment. Interprets resource information and assess resource conditions to provide conservation practice alternatives to producers to make decisions on the treatment of their soil, water, air, plant, animal, and energy resources. May instruct farmers, agricultural production managers, or ranchers in best ways to use crop rotation, contour plowing, or terracing to conserve soil and water; in the number and kind of livestock and forage plants best suited to particular ranges; and in range and farm improvements, such as fencing and reservoirs for stock watering.	Hours	$78.84	19	$1,497.96

Practice: 102 - Comprehensive Nutrient Management Plan - Written

Scenario: #73 - Livestock Operation Greater Than 300 AU without Land Application

Scenario Description:

A Comprehensive Nutrient Management Plan (CNMP) will be developed to address resource concerns on a medium-large Animal Feeding Operation (AFO) currently greater than or equal to 300 animal units (AU). The producer exports (material transferred to another owner with written documentation of the transfer) nearly all of the manure or organic products from the farm. For operations where manure is both applied to land the AFO owner/operator controls and exported offsite, guidance to determine appropriate CNMP CAP scenario selection shall be provided by NRCS at the state level. The CNMP is a conservation plan that addresses resource concerns on the AFO production area and land application areas owned or controlled by the AFO owner/operator. In this scenario, the primary focus will be addressing resource concerns present on the production area, including manure/wastewater handling and storage, and documentation of manure generation by the AFO, and its export. Production area components of the plan must include animal confinement facilities, feeding and lounging lots, animal mortality facilities, and manure containment and storage facilities. Planned practices on the production area must result in meeting NRCS quality criteria for water quality and soil erosion. Any applicable air emission and negative air quality impacts occurring as a result of planned CNMP activities, or existing on-farm activities must be mitigated in the CNMP if feasible. The CNMP meets the AFO owner/operator's production objectives.

Before Situation:

The owner/operator of a medium-large sized AFO has not received a written Comprehensive Nutrient Management Plan (CNMP) that addresses all resource concerns present on the facility production areas and any applicable land application areas. Partial implementation of CNMP-related practices for the AFO has potentially occurred. Various levels of management and conservation implementation have occurred on the farm. Little documentation of the systems used and practices installed exists. The producer may or may not have a conservation plan or a nutrient management plan. Resource concerns on the AFO production area remain to be addressed through the development of a complete CNMP including management and conservation practices for proper manure/wastewater storage and handling, proper disposal of animal mortality, erosion and runoff issues from feeding and lounging areas, and recordkeeping documentation of manure generation and exports. Negative air quality impacts and farmstead safety and security issues may remain on the AFO, and recordkeeping methods for inspection and monitoring of the existing CNMP-related practices, manure imports/exports may need further improvement.

After Situation:

A certified Technical Services Provider (TSP) has delivered, to the AFO owner/operator, a comprehensive conservation plan meeting CNMP CAP criteria (GM - Part 405 - Comprehensive Nutrient Management Plans), and to NRCS a the CNMP Case File that describes management and conservation practice solutions to all identified resource concerns on the small sized AFO production area and any applicable land application areas. Collection, transfer, and storage of manure and wastewater systems, mortality management facilities, as well as any rainfall or runoff diversion systems will be inventoried/evaluated and planned for adequacy according to applicable NRCS conservation practice standard technical criteria by a Professional Engineer. Conservation practices in the CNMP document delivered to the client ensure that, if implemented, the AFO will properly, within applicable NRCS standards and specifications, store, handle, and contain manure and wastewater materials generated by the AFO; dispose of AFO mortality; minimize erosion and runoff from feeding and lounging areas, keep accurate AFO animal inventory information, and document AFO manure generation and exports. Decisions presented within the CNMP have been made to mitigate, if feasible, negative air quality impacts and improve farmland safety and security. Practices selected in the Record of Decision will provide estimated quantities to be installed in units of measure that align with those in the conservation practice. Accurate recordkeeping documents for operation and maintenance of existing and new CNMP-related practices, AFO manure imports and exports, and other information relevant to the management and compliance of the AFO with state and/or local rules and regulations are included in the CNMP. If the CNMP is not implemented all identified resource concerns will still exist.

Feature Measure: Number

Scenario Unit: Number

Scenario Typical Size: 1.0

Scenario Total Cost: $10,381.10

Scenario Cost/Unit: $10,381.10

Cost Details:

Component Name	ID	Description	Unit	Cost	QTY	Total
Labor						
CAP Labor, professional engineer	1297	Conservation Activity Plan labor to apply knowledge of engineering technology and biological science to agricultural problems concerned with power and machinery, electrification, structures, soil and water conservation, and processing of agricultural products. Cost associated with this component includes overhead and benefits (market price).	Hours	$103.58	85	$8,804.30
Cap Labor, conservation scientist	1300	Conservation Activity Plan labor to manage, improve, and protect natural resources to maximize their use without damaging the environment. Interprets resource information and assess resource conditions to provide conservation practice alternatives to producers to make decisions on the treatment of their soil, water, air, plant, animal, and energy resources. May instruct farmers, agricultural production managers, or ranchers in best ways to use crop rotation, contour plowing, or terracing to conserve soil and water; in the number and kind of livestock and forage plants best suited to particular ranges; and in range and farm improvements, such as fencing and reservoirs for stock watering.	Hours	$78.84	20	$1,576.80

Practice: 102 - Comprehensive Nutrient Management Plan - Written

Scenario: #135 - CNMP Less Than or Equal to 300 AU with Land Application (Minimal Engineer Assistance)

Scenario Description:

A Comprehensive Nutrient Management Plan (CNMP) will be developed to address resource concerns on a small non-dairy Animal Feeding Operation (AFO) currently less than 300 animal units (AU)--primarily swine, poultry, and beef AFOs. This scenario is for sites or states where the services of a professional engineer are minimal. The producer may export modest amounts of the manure or organic products from the farm. For operations where manure is both applied to land the AFO owner/operator controls and exported offsite, guidance to determine appropriate CNMP CAP scenario selection shall be provided by NRCS at the state level. The producer has an animal production area, farms cropland, and applies most nutrients. The CNMP is a conservation plan that addresses resource concerns on the AFO production area and land application areas. Production area components of the plan must include animal confinement facilities, feeding and lounging lots, animal mortality facilities, and manure containment and storage facilities. Land application components of the plan includes all lands under the control of the AFO owner or operator where waste materials are being applied. Planned practices on the production area and land application areas result in meeting NRCS planning criteria for water quality, soil erosion, and air quality concerns. Any applicable air emission and negative air quality impacts occurring as a result of planned CNMP activities, or existing on-farm activities must be mitigated in the CNMP if feasible. The CNMP meets the AFO owner/operator's production objectives.

Before Situation:

The owner/operator of an AFO has not received a written Comprehensive Nutrient Management Plan (CNMP) that addresses all resource concerns present on the facility production area and land waste application areas. Various levels of management and conservation implementation have occurred on the farm. Little documentation of the systems used and practices installed exists. Partial implementation of conservation practices for the AFO has potentially occurred. Resource concerns on the AFO production area and land waste application areas remain to be addressed through the development of a complete CNMP including management and conservation practices for proper manure/wastewater storage and handling, proper disposal of animal mortality, treatment of land application areas to reduce soil erosion to sustainable levels, and application of waste nutrients at an agronomic rate that meets application crop needs and does not exceed site risk analysis assessment condition. Negative air quality impacts may remain on the AFO, and recordkeeping methods for crop yields, inspection and monitoring of the existing CNMP-related practices, and manure application and imports/exports may need further improvement.

After Situation:

A certified Technical Services Provider (TSP) has delivered, to the AFO owner/operator, a comprehensive nutrient management plan meeting CNMP CAP criteria (GM - Part 405 - Comprehensive Nutrient Management Plans), and to NRCS with the CNMP Case File data that describes management and conservation practice systems to address all identified resource concerns on the AFO production area and land application areas. Collection, transfer, and storage of manure and wastewater systems, mortality management facilities, as well as any rainfall or runoff diversion systems will be inventoried-evaluated and planned for adequacy according to applicable NRCS conservation practice standard technical criteria. Management and conservation practices in the CNMP document delivered to the client ensure that, if implemented, the AFO will properly, within applicable NRCS standards and specifications, store, handle, and contain manure and wastewater materials generated by the AFO; dispose of AFO mortality; implement conservation practices to address soil erosion, water quality, and air quality within the NRCS planning criteria. Accurate record keeping documents for crop yields, operation and maintenance of existing and new CNMP-related practices, manure application, AFO manure imports and exports, and other information relevant to the management and compliance of the AFO with state and/or local rules and regulations are included in the CNMP.

Feature Measure: Each

Scenario Unit: Number

Scenario Typical Size: 1.0

Scenario Total Cost: $4,977.80

Scenario Cost/Unit: $4,977.80

Cost Details:

Component Name	ID	Description	Unit	Cost	QTY	Total
Labor						
CAP Labor, professional engineer	1297	Conservation Activity Plan labor to apply knowledge of engineering technology and biological science to agricultural problems concerned with power and machinery, electrification, structures, soil and water conservation, and processing of agricultural products. Cost associated with this component includes overhead and benefits (market price).	Hours	$103.58	10	$1,035.80
Cap Labor, conservation scientist	1300	Conservation Activity Plan labor to manage, improve, and protect natural resources to maximize their use without damaging the environment. Interprets resource information and assess resource conditions to provide conservation practice alternatives to producers to make decisions on the treatment of their soil, water, air, plant, animal, and energy resources. May instruct farmers, agricultural production managers, or ranchers in best ways to use crop rotation, contour plowing, or terracing to conserve soil and water; in the number and kind of livestock and forage plants best suited to particular ranges; and in range and farm improvements, such as fencing and reservoirs for stock watering.	Hours	$78.84	50	$3,942.00

Practice: 102 - Comprehensive Nutrient Management Plan - Written

Scenario: #136 - CNMP Less Than or Equal to 300 AU without Land Application (Minimal Engineer Assistance)

Scenario Description:

A Comprehensive Nutrient Management Plan (CNMP) will be developed to address resource concerns on the Animal Feeding Operation (AFO) currently less than 300 or equal animal units (AU). This scenario is for sites or states where the services of a professional engineer are minimal. The producer exports nearly all of the manure or organic products from the farm. The CNMP is a conservation plan that addresses soil erosion, water quality, and air quality resource concerns on the AFO production area and land application areas owned or controlled by the AFO owner/operator. In this scenario, the primary focus will be addressing soil erosion, water quality, and air quality resource concerns present on the production area, including manure/wastewater handling and storage, and documentation of manure generation by the AFO, and its export. Production area components of the plan must include animal confinement facilities, feeding and lounging areas, animal mortality facilities, and manure containment and storage facilities. Planned practices on the production area must result in meeting NRCS planning criteria for water quality and soil erosion. Any applicable air emission and negative air quality impacts occurring as a result of planned CNMP activities, or existing on-farm activities must be mitigated in the CNMP if feasible. The CNMP meets the AFO owner/operator's production objectives.

Before Situation:

The owner/operator of the AFO has not received a written Comprehensive Nutrient Management Plan (CNMP) that addresses all resource concerns present on the facility production areas and any applicable land application areas. Various levels of management and conservation implementation have occurred on the farm. Little documentation of the systems used and practices installed exists. The producer may or may not have a conservation plan or a nutrient management plan. Resource concerns on the AFO production area remain to be addressed through the development of a complete CNMP including management and conservation practices for proper manure/wastewater storage and handling, proper disposal of animal mortality, erosion and runoff issues from feeding and lounging areas, and record keeping documentation of manure generation and exports. Negative air quality impacts and farmstead safety and security issues may remain on the AFO, and record keeping methods for inspection and monitoring of the existing CNMP-related practices, manure imports/exports may need further improvement.

After Situation:

A certified Technical Services Provider (TSP) has delivered, to the AFO owner/operator, a comprehensive conservation plan meeting CNMP CAP criteria (GM - Part 405 - Comprehensive Nutrient Management Plans), and to NRCS the CNMP Case File that describes management and conservation practice(s) to address all identified soil erosion, water quality, and air quality resource concerns on the AFO production area and any applicable land application areas. Collection, transfer, and storage of manure and wastewater systems, mortality management facilities, as well as any rainfall or runoff diversion systems will be inventoried/evaluated and planned for adequacy according to applicable NRCS conservation practice standard technical criteria. Conservation practices in the CNMP document delivered to the client ensure that, if implemented, the AFO will properly, within applicable NRCS standards and specifications, store, handle, and contain manure and wastewater materials generated by the AFO; dispose of AFO mortality; minimize erosion and runoff from feeding and lounging areas, keep accurate AFO animal inventory information, and document AFO manure generation and exports. Decisions presented within the CNMP have been made to mitigate, if feasible, negative air quality impacts and improve farmland safety and security. Practices selected in the Record of Decision will provide estimated quantities to be installed in units of measure that align with those in the conservation practice. Accurate record keeping documents for operation and maintenance of existing and new CNMP-related practices, AFO manure imports and exports, and other information relevant to the management and compliance of the AFO with state and/or local rules and regulations are included in the CNMP.

Feature Measure: Each

Scenario Unit: Number

Scenario Typical Size: 1.0

Scenario Total Cost: $3,006.80

Scenario Cost/Unit: $3,006.80

Cost Details:

Component Name	ID	Description	Unit	Cost	QTY	Total
Labor						
CAP Labor, professional engineer	1297	Conservation Activity Plan labor to apply knowledge of engineering technology and biological science to agricultural problems concerned with power and machinery, electrification, structures, soil and water conservation, and processing of agricultural products. Cost associated with this component includes overhead and benefits (market price).	Hours	$103.58	10	$1,035.80
Cap Labor, conservation scientist	1300	Conservation Activity Plan labor to manage, improve, and protect natural resources to maximize their use without damaging the environment. Interprets resource information and assess resource conditions to provide conservation practice alternatives to producers to make decisions on the treatment of their soil, water, air, plant, animal, and energy resources. May instruct farmers, agricultural production managers, or ranchers in best ways to use crop rotation, contour plowing, or terracing to conserve soil and water; in the number and kind of livestock and forage plants best suited to particular ranges; and in range and farm improvements, such as fencing and reservoirs for stock watering.	Hours	$78.84	25	$1,971.00

Practice: 102 - Comprehensive Nutrient Management Plan - Written

Scenario: #137 - CNMP Greater Than 300 AU with Land Application (Minimal Engineer Assistance)

Scenario Description:

A Comprehensive Nutrient Management Plan (CNMP) will be developed to address resource concerns on an Animal Feeding Operation (AFO) currently greater than or equal to 300 animal units (AU). This scenario is for sites or states where the services of a professional engineer are minimal. The producer may export modest amounts of the manure or organic products from the farm. For operations where manure is both applied to land the AFO owner/operator controls and exported offsite, guidance to determine appropriate CNMP CAP scenario selection shall be provided by NRCS at the state level. The producer has an animal production area, farms cropland, and applies most manure nutrients. The CNMP is a conservation plan that addresses resource concerns on the AFO production area and land application areas. Production area components of the plan must include animal confinement facilities, feeding and lounging lots, animal mortality facilities, and manure containment and storage facilities. Land application components of the plan must include all lands under the control of the AFO owner or operator where waste materials are being applied. Planned practices on the production area and land application areas must result in meeting NRCS planning criteria for water quality and soil erosion. Any applicable air emission and negative air quality impacts occurring as a result of planned CNMP activities, or existing on-farm activities must be mitigated in the CNMP if feasible. The CNMP meets the AFO owner/operator's production objectives.

Before Situation:

The owner/operator of an AFO has not received a written Comprehensive Nutrient Management Plan (CNMP) that addresses all resource concerns present on the facility production area and land waste application areas. Various levels of management and conservation implementation have occurred on the farm. Little documentation of the systems used and practices installed exists. Partial implementation of CNMP-related practices for the AFO has potentially occurred. Resource concerns on the AFO production area and land waste application areas remain to be addressed through the development of a complete CNMP including management and conservation practices for proper manure/wastewater storage and handling, proper disposal of animal mortality, treatment of land application areas to reduce soil erosion to sustainable levels, and application of waste nutrients at an agronomic rate that meets application crop needs and does not exceed site risk analysis assessment condition. Negative air quality impacts and farmstead safety and security issues may remain on the AFO, and record keeping methods for crop yields, inspection and monitoring of the existing CNMP-related practices, and manure application and imports/exports may need further improvement.

After Situation:

A certified Technical Services Provider (TSP) has delivered, to the AFO owner/operator, a comprehensive nutrient management plan meeting CNMP CAP criteria (GM - Part 405 - Comprehensive Nutrient Management Plans), and to NRCS the CNMP Case File data that describes management and conservation practices to address all identified soil erosion, water quality, and air quality resource concerns on the AFO production area and land application areas. Collection, transfer, and storage of manure and wastewater systems, mortality management facilities, as well as any rainfall or runoff diversion systems will be inventoried-evaluated and planned for adequacy according to applicable NRCS conservation practice standard technical criteria. Management and conservation practices in the CNMP document delivered to the client ensure that, if implemented, the AFO will properly, within applicable NRCS standards and specifications, store, handle, and contain manure and wastewater materials generated by the AFO; dispose of AFO mortality; implement conservation practices to reduce soil erosion on land application areas to sustainable levels; land apply waste material nutrients in a manner than meets NRCS 590 Nutrient Management standard technical criteria. Decisions presented within the CNMP have been made to mitigate, if feasible, negative air quality impacts. Practices selected in the Record of Decision will provide estimated quantities to be installed in units of measure that align with the practice standards. Accurate record keeping documents for crop yields, operation and maintenance of existing and new CNMP-related practices, manure application, AFO manure imports and exports, and other information relevant to the management and compliance of the AFO with state and/or local rules and regulations are included in the CNMP.

Feature Measure: Each

Scenario Unit: Number

Scenario Typical Size: 1.0

Scenario Total Cost: $6,678.30

Scenario Cost/Unit: $6,678.30

Cost Details:

Component Name	ID	Description	Unit	Cost	QTY	Total
Labor						
CAP Labor, professional engineer	1297	Conservation Activity Plan labor to apply knowledge of engineering technology and biological science to agricultural problems concerned with power and machinery, electrification, structures, soil and water conservation, and processing of agricultural products. Cost associated with this component includes overhead and benefits (market price).	Hours	$103.58	15	$1,553.70
Cap Labor, conservation scientist	1300	Conservation Activity Plan labor to manage, improve, and protect natural resources to maximize their use without damaging the environment. Interprets resource information and assess resource conditions to provide conservation practice alternatives to producers to make decisions on the treatment of their soil, water, air, plant, animal, and energy resources. May instruct farmers, agricultural production managers, or ranchers in best ways to use crop rotation, contour plowing, or terracing to conserve soil and water; in the number and kind of livestock and forage plants best suited to particular ranges; and in range and farm improvements, such as fencing and reservoirs for stock watering.	Hours	$78.84	65	$5,124.60

Practice: 102 - Comprehensive Nutrient Management Plan - Written

Scenario: #138 - CNMP Greater Than 300 AU without Land Application (Minimal Engineer Assistance)

Scenario Description:

A Comprehensive Nutrient Management Plan (CNMP) will be developed to address resource concerns on an Animal Feeding Operation (AFO) currently greater than 300 animal units (AU). This scenario is for sites or states where the services of a professional engineer are minimal. The producer exports nearly all of the manure or organic products from the farm. For operations where manure is both applied to land the AFO owner/operator controls and exported offsite, guidance to determine appropriate CNMP CAP scenario selection shall be provided by NRCS at the state level. The CNMP is a conservation plan that addresses the soil erosion, water quality, and air quality resource concerns on the AFO production area and land application areas owned or controlled by the AFO owner/operator. In this scenario, the primary focus will be addressing resource concerns present on the production area, including manure/wastewater handling and storage, and documentation of manure generation by the AFO, and its export. Production area components of the plan must include animal confinement facilities, feeding and lounging lots, animal mortality facilities, and manure containment and storage facilities. Planned practices on the production area must result in meeting NRCS planning criteria for water quality and soil erosion. Any applicable air emission and negative air quality impacts occurring as a result of planned CNMP activities, or existing on-farm activities must be mitigated in the CNMP if feasible. The CNMP meets the AFO owner/operator's production objectives.

Before Situation:

The owner/operator of an AFO has not received a written Comprehensive Nutrient Management Plan (CNMP) that addresses the soil erosion, water quality, and air quality resource concerns present on the facility production areas and any applicable land application areas. Various levels of management and conservation implementation have occurred on the farm. Little documentation of the systems used and practices installed exists. The producer may or may not have a conservation plan or a nutrient management plan. Resource concerns on the AFO production area remain to be addressed through the development of a complete CNMP including management and conservation practices for proper manure/wastewater storage and handling, proper disposal of animal mortality, soil erosion, water quality, and air quality concerns from feeding and lounging areas, and record keeping documentation of manure generation and exports. Negative air quality impacts may remain on the AFO, and record keeping methods for inspection and monitoring of the existing CNMP-related practices, manure imports/exports may need further improvement.

After Situation:

A certified Technical Services Provider (TSP) has delivered, to the AFO owner/operator, a comprehensive conservation plan meeting CNMP CAP criteria (GM - Part 405 - Comprehensive Nutrient Management Plans), and to NRCS the CNMP Case File that describes management and conservation practice solutions to all identified resource concerns on the small sized AFO production area and any applicable land application areas. Collection, transfer, and storage of manure and wastewater systems, mortality management facilities, as well as any rainfall or runoff diversion systems are inventoried/evaluated and planned for adequacy according to applicable NRCS conservation practice standard technical criteria. Conservation practices in the CNMP document delivered to the client ensure that, if implemented, the AFO will properly, within applicable NRCS standards and specifications, store, handle, and contain manure and wastewater materials generated by the AFO; dispose of AFO mortality; minimize soil erosion, water quality, and air quality concerns from feeding and lounging areas, keep accurate AFO animal inventory information, and document AFO manure generation and exports. Decisions presented within the CNMP have been made to mitigate, if feasible, negative air quality impacts. Practices selected in the Record of Decisions will provide estimated quantities to be installed in units of measure that align with those in the conservation practice. Accurate record keeping documents for operation and maintenance of existing and new CNMP-related practices, AFO manure imports and exports, and other information relevant to the management and compliance of the AFO with state and/or local rules and regulations are included in the CNMP.

Feature Measure: Each

Scenario Unit: Number

Scenario Typical Size: 1.0

Scenario Total Cost: $3,401.00

Scenario Cost/Unit: $3,401.00

Cost Details:

Component Name	ID	Description	Unit	Cost	QTY	Total
Labor						
CAP Labor, professional engineer	1297	Conservation Activity Plan labor to apply knowledge of engineering technology and biological science to agricultural problems concerned with power and machinery, electrification, structures, soil and water conservation, and processing of agricultural products. Cost associated with this component includes overhead and benefits (market price).	Hours	$103.58	10	$1,035.80
Cap Labor, conservation scientist	1300	Conservation Activity Plan labor to manage, improve, and protect natural resources to maximize their use without damaging the environment. Interprets resource information and assess resource conditions to provide conservation practice alternatives to producers to make decisions on the treatment of their soil, water, air, plant, animal, and energy resources. May instruct farmers, agricultural production managers, or ranchers in best ways to use crop rotation, contour plowing, or terracing to conserve soil and water; in the number and kind of livestock and forage plants best suited to particular ranges; and in range and farm improvements, such as fencing and reservoirs for stock watering.	Hours	$78.84	30	$2,365.20

Practice: 102 - Comprehensive Nutrient Management Plan - Written

Scenario: #145 - CNMP Revision

Scenario Description:

A Comprehensive Nutrient Management Plan (CNMP) will be revised to address changes in manure management, volume or analysis, plants and crops, or plant and crop management or to adjust the nutrient balance on an Animal Feeding Operation (AFO). No modifications are required to engineered practices in the farmstead/production area. This scenario is where the services of a professional engineer are typically not required. The producer may export manure or organic products from the farm. The producer has an animal production area and land applies nutrients. The CNMP is a conservation plan that addresses resource concerns on the AFO production area and land application areas. Production area components of the plan may include animal confinement facilities, feeding and lounging lots, animal mortality facilities, and manure containment and storage facilities. All production area components are considered adequate. Land application components of the plan includes all lands under the control of the AFO owner or operator where nutrients are being applied. Planned practices on the land application area result in meeting NRCS planning criteria for water quality, soil erosion, and air quality concerns. Any applicable air emission and negative air quality impacts occurring because of planned CNMP activities, or existing on-farm activities must be mitigated in the CNMP if feasible. The CNMP meets the AFO owner/operator's production objectives. CNMP Revision CAP may not be used more often that once every five years, although it is recognized the nutrient management plan may be updated more frequently based on soil test frequency or other factors.

Before Situation:

The owner/operator of an AFO has an existing written Comprehensive Nutrient Management Plan (CNMP) that addresses the current required resource concerns and client objectives present on the facility production area and land application areas. The CNMP is out of date or does not meet current needs or objectives. Various levels of management and conservation implementation have changed on the operation. Soil tests, manure analyses, or changes in cropping system require that the nutrient balance be adjusted to bring the CNMP up to date.

After Situation:

A certified Technical Services Provider (TSP) has developed a comprehensive nutrient management plan meeting CNMP CAP criteria (GM – Part 405 - Comprehensive Nutrient Management Plans) for the AFO owner/operator and has delivered to NRCS the CNMP with the CNMP Case File data that describes management and conservation practice systems to address all identified required resource concerns on the AFO production area and land application areas. Management and conservation practices in the CNMP document delivered to the client ensure that, if implemented, the AFO will operate properly, within applicable NRCS standards and specifications, to store, handle, and contain manure and wastewater materials generated by the AFO; dispose of AFO mortality; implement conservation practices to address soil erosion, water quality, and air quality within the NRCS planning criteria. Required record keeping for land treatment, nutrient management, and other information relevant to the management and compliance of the AFO with state and/or local rules and regulations are identified in the CNMP.

Feature Measure: Each

Scenario Unit: Number

Scenario Typical Size: 1.0

Scenario Total Cost: $3,671.50

Scenario Cost/Unit: $3,671.50

Cost Details:

Component Name	ID	Description	Unit	Cost	QTY	Total
Labor						
CAP Labor, professional engineer	1297	Conservation Activity Plan labor to apply knowledge of engineering technology and biological science to agricultural problems concerned with power and machinery, electrification, structures, soil and water conservation, and processing of agricultural products. Cost associated with this component includes overhead and benefits (market price).	Hours	$103.58	5	$517.90
Cap Labor, conservation scientist	1300	Conservation Activity Plan labor to manage, improve, and protect natural resources to maximize their use without damaging the environment. Interprets resource information and assess resource conditions to provide conservation practice alternatives to producers to make decisions on the treatment of their soil, water, air, plant, animal, and energy resources. May instruct farmers, agricultural production managers, or ranchers in best ways to use crop rotation, contour plowing, or terracing to conserve soil and water; in the number and kind of livestock and forage plants best suited to particular ranges; and in range and farm improvements, such as fencing and reservoirs for stock watering.	Hours	$78.84	40	$3,153.60

Practice: 104 - Nutrient Management Plan - Written

Scenario: #50 - Nutrient Management CAP Less Than or Equal to 100 Acres (Not part of a CNMP)

Scenario Description:

Various on-farm land uses where natural or artificial amendments are applied. Natural Resource Concern: Water Quality, Soil Erosion, Water Quantity, and other associated resource concerns.

Before Situation:

Agricultural producer has no plan or minimal knowledge for the application and management of nutrients. The producer currently manages nutrient application based upon personal knowledge, or other local criteria. Producer is interested in management of nutrients to maximize yields, improve profit margins, reduce costs, and for environmental benefit. Producer is willing to collaborate with a certified TSP to develop a plan.

After Situation:

After EQIP contract approval, participant has obtained services from a certified TSP for development of the Nutrient Management conservation activity plan consistent with the criteria in CAP 104 and 590 Nutrient Management. The CAP criteria requires the plan to meet quality criteria for the primary Water Quality resource concern and other applicable resource concerns and provides for opportunities to manage nutrients for plant production and address offsite movement of nutrients. The CAP plan may include recommendations for associated conservation practices which address other related resource concerns. CAP meets the basic quality criteria for the 104 plan as cited in the NRCS Field Office Technical Guide and CPS 590 Nutrient Management.

Feature Measure: Number

Scenario Unit: Number

Scenario Typical Size: 1.0

Scenario Total Cost: $2,408.70

Scenario Cost/Unit: $2,408.70

Cost Details:

Component Name	ID	Description	Unit	Cost	QTY	Total
Labor						
CAP Labor, agronomist	1295	Conservation Activity Plan labor to conduct research in breeding, physiology, production, yield, and management of crops and agricultural plants or trees, shrubs, and nursery stock, their growth in soils, and control of pests; or study the chemical, physical, biological, and mineralogical composition of soils as they relate to plant or crop growth. May classify and map soils and investigate effects of alternative practices on soil and crop productivity. May provide on-site consulting services to help growers troubleshoot nutrient and pest problems, establish appropriate agronomic sampling programs and implement management recommendations in a cost-effective and environmentally sound manner.	Hours	$80.29	30	$2,408.70

Practice: 104 - Nutrient Management Plan - Written

Scenario: #51 - Nutrient Management CAP 101-300 Acres (Not part of a CNMP)

Scenario Description:

Various on-farm land uses where organic or inorganic amendments are applied. Natural Resource Concern: Water Quality, Soil Erosion, Water Quantity, and other associated resource concerns.

Before Situation:

Agricultural producer has no plan or minimal knowledge for application and management of land applied nutrients. The producer currently manages nutrient application based upon label instructions, personal knowledge, or other local criteria. Producer is interested in management of nutrients to maximize yields, improve profit margins, reduce costs, increase nutrient use efficiency and for environmental benefits. Producer is willing to collaborate with a certified TSP to develop a plan.

After Situation:

After EQIP contract approval, participant has obtained services from a certified TSP for the development of the Nutrient Management Conservation Activity Plan (CAP). The CAP criteria requires the plan to meet Nutrient Management criteria for the primary Water Quality resource concern and other applicable resource concerns and provides for opportunities to manage nutrients for plant production and address offsite movement of nutrients. The CAP plan may include recommendations for associated conservation practices which address other related resource concerns. CAP meets the basic criteria for the 104 plan as cited in the NRCS Field Office Technical Guide.

Feature Measure: Number

Scenario Unit: Number

Scenario Typical Size: 1.0

Scenario Total Cost: $3,211.60

Scenario Cost/Unit: $3,211.60

Cost Details:

Component Name	ID	Description	Unit	Cost	QTY	Total
Labor						
CAP Labor, agronomist	1295	Conservation Activity Plan labor to conduct research in breeding, physiology, production, yield, and management of crops and agricultural plants or trees, shrubs, and nursery stock, their growth in soils, and control of pests; or study the chemical, physical, biological, and mineralogical composition of soils as they relate to plant or crop growth. May classify and map soils and investigate effects of alternative practices on soil and crop productivity. May provide on-site consulting services to help growers troubleshoot nutrient and pest problems, establish appropriate agronomic sampling programs and implement management recommendations in a cost-effective and environmentally sound manner.	Hours	$80.29	40	$3,211.60

Practice: 104 - Nutrient Management Plan - Written

Scenario: #52 - Nutrient Management CAP Greater Than 300 Acres (Not part of a CNMP)

Scenario Description:

Various on-farm land uses where organic or inorganic amendments are applied. Natural Resource Concern: Water Quality, Soil Erosion, Water Quantity, and other associated resource concerns.

Before Situation:

Agricultural producer has no plan or minimal knowledge for the application and management of land applied nutrients. The producer currently manages nutrient application based upon label instructions, personal knowledge, or other local criteria. Producer is interested in management of nutrients to maximize yields, increase profit margins, reduce costs, improve nutrient use efficiency, and for environmental benefits. Producer is willing to collaborate with a certified TSP to develop a plan.

After Situation:

After EQIP contract approval, participant has obtained services from a certified TSP for development of the Nutrient Management Conservation Activity Plan (CAP). The CAP criteria requires the plan to meet quality criteria for the primary Water Quality resource concern and other applicable resource concerns and provides for opportunities to manage nutrients for plant production and address offsite movement of nutrients. The CAP plan may include recommendations for associated conservation practices which address other related resource concerns. CAP meets the basic criteria for the 104 plan as cited in the NRCS Field Office Technical Guide.

Feature Measure: Number

Scenario Unit: Number

Scenario Typical Size: 1.0

Scenario Total Cost: $4,014.50

Scenario Cost/Unit: $4,014.50

Cost Details:

Component Name	ID	Description	Unit	Cost	QTY	Total
Labor						
CAP Labor, agronomist	1295	Conservation Activity Plan labor to conduct research in breeding, physiology, production, yield, and management of crops and agricultural plants or trees, shrubs, and nursery stock, their growth in soils, and control of pests; or study the chemical, physical, biological, and mineralogical composition of soils as they relate to plant or crop growth. May classify and map soils and investigate effects of alternative practices on soil and crop productivity. May provide on-site consulting services to help growers troubleshoot nutrient and pest problems, establish appropriate agronomic sampling programs and implement management recommendations in a cost-effective and environmentally sound manner.	Hours	$80.29	50	$4,014.50

Practice: 104 - Nutrient Management Plan - Written

Scenario: #53 - Nutrient Management CAP Less Than or Equal to 100 Acres (Element of a CNMP)

Scenario Description:

Various on-farm land uses where natural or artificial nutrient amendments are applied. Natural Resource Concern: Water Quality, Soil Erosion, Water Quantity, and other associated resource concerns.

Before Situation:

Agricultural producer has no plan or minimal knowledge for the application and management of nutrients applied to the land. The producer currently manages nutrient application based upon label instructions, personal knowledge, or other local criteria. Producer is interested in management of nutrients to maximize yields, improve profit margins, reduce costs, and for environmental benefits. Producer is willing to collaborate with a certified TSP to develop a plan.

After Situation:

After EQIP contract approval, participant has obtained services from a certified TSP for the development of the Nutrient Management Conservation Activity Plan (CAP). The CAP criteria requires the plan to meet nutrient criteria for the primary Water Quality resource concern in 590 and other applicable resource concerns and provides for opportunities to manage nutrients for plant production and address offsite movement of nutrients. The CAP plan may include recommendations for associated conservation practices which address other related resource concerns. CAP meets the basic criteria for the 104 plan as cited in the NRCS Field Office Technical Guide.

Feature Measure: Number

Scenario Unit: Number

Scenario Typical Size: 1.0

Scenario Total Cost: $4,014.50

Scenario Cost/Unit: $4,014.50

Cost Details:

Component Name	ID	Description	Unit	Cost	QTY	Total
Labor						
CAP Labor, agronomist	1295	Conservation Activity Plan labor to conduct research in breeding, physiology, production, yield, and management of crops and agricultural plants or trees, shrubs, and nursery stock, their growth in soils, and control of pests; or study the chemical, physical, biological, and mineralogical composition of soils as they relate to plant or crop growth. May classify and map soils and investigate effects of alternative practices on soil and crop productivity. May provide on-site consulting services to help growers troubleshoot nutrient and pest problems, establish appropriate agronomic sampling programs and implement management recommendations in a cost-effective and environmentally sound manner.	Hours	$80.29	50	$4,014.50

Practice: 104 - Nutrient Management Plan - Written

Scenario: #54 - Nutrient Management CAP 101-300 Acres (Element of a CNMP)

Scenario Description:

Various on-farm land uses where organic or inorganic amendments are applied. Natural Resource Concern: Water Quality, Soil Erosion, Water Quantity, and other associated resource concerns.

Before Situation:

Agricultural producer has no plan or minimal knowledge for application and management of applied nutrients to the land. The producer currently manages nutrient application based upon label instructions, personal knowledge, or other local criteria. Producer is interested in management of nutrients to maximize yields, profits margin, reduce costs, and for environmental benefit. Producer is willing to collaborate with a certified TSP to develop a plan.

After Situation:

After EQIP contract approval, participant has obtained services from a certified TSP for the development of the Nutrient Management Conservation Activity Plan (CAP). The CAP criteria requires the plan to meet 590 criteria for the primary Water Quality resource concern and other applicable resource concerns, and provides for opportunities to manage nutrients for plant production and address offsite movement of nutrients. The CAP plan may include recommendations for associated conservation practices which address other related resource concerns. The CAP meets the basic quality criteria for the 104 plan as cited in the NRCS Field Office Technical Guide.

Feature Measure: Number

Scenario Unit: Number

Scenario Typical Size: 1.0

Scenario Total Cost: $5,620.30

Scenario Cost/Unit: $5,620.30

Cost Details:

Component Name	ID	Description	Unit	Cost	QTY	Total
Labor						
CAP Labor, agronomist	1295	Conservation Activity Plan labor to conduct research in breeding, physiology, production, yield, and management of crops and agricultural plants or trees, shrubs, and nursery stock, their growth in soils, and control of pests; or study the chemical, physical, biological, and mineralogical composition of soils as they relate to plant or crop growth. May classify and map soils and investigate effects of alternative practices on soil and crop productivity. May provide on-site consulting services to help growers troubleshoot nutrient and pest problems, establish appropriate agronomic sampling programs and implement management recommendations in a cost-effective and environmentally sound manner.	Hours	$80.29	70	$5,620.30

Practice: 104 - Nutrient Management Plan - Written

Scenario: #55 - Nutrient Management CAP Greater Than 300 Acres (Element of a CNMP)

Scenario Description:

Various on-farm land uses where organic or inorganic amendments are applied. Natural Resource Concern: Water Quality, Soil Erosion, Water Quantity, and other associated resource concerns.

Before Situation:

Agricultural producer has no plan or minimal knowledge for the application and management of nutrients applied to the land. The producer currently manages nutrient application based upon label instructions, personal knowledge, or other local criteria. Producer is interested in management of nutrients to maximize yields, improve profit margins, reduce costs, and for environmental benefits. Producer is willing to collaborate with a certified TSP to develop a plan.

After Situation:

After EQIP contract approval, participant has obtained services from a certified TSP for development of the Nutrient Management Conservation Activity Plan (CAP). The CAP criteria requires the plan to meet 590 criteria for the primary Water Quality resource concern and other applicable resource concerns and provides for opportunities to manage nutrients for plant production and address offsite movement of nutrients. The CAP plan may include recommendations for associated conservation practices which address other related resource concerns. CAP meets the basic criteria for the 104 plan as cited in the NRCS Field Office Technical Guide.

Feature Measure: Number

Scenario Unit: Number

Scenario Typical Size: 1.0

Scenario Total Cost: $6,824.65

Scenario Cost/Unit: $6,824.65

Cost Details:

Component Name	ID	Description	Unit	Cost	QTY	Total
Labor						
CAP Labor, agronomist	1295	Conservation Activity Plan labor to conduct research in breeding, physiology, production, yield, and management of crops and agricultural plants or trees, shrubs, and nursery stock, their growth in soils, and control of pests; or study the chemical, physical, biological, and mineralogical composition of soils as they relate to plant or crop growth. May classify and map soils and investigate effects of alternative practices on soil and crop productivity. May provide on-site consulting services to help growers troubleshoot nutrient and pest problems, establish appropriate agronomic sampling programs and implement management recommendations in a cost-effective and environmentally sound manner.	Hours	$80.29	85	$6,824.65

Practice: 106 - Forest Management Plan - Written

Scenario: #56 - FMP Less Than or Equal to 20 acres

Scenario Description:

Non Industrial Private Forest Land typically unmanaged or limited management activities. Typical site is approximately 1 to 20 acres in size and consists of existing uneven-aged mixed species stands of harvestable trees. Natural Resource Concern: Fish and Wildlife; Soil Erosion; Soil Condition; Water Quality; Plant Condition; on Forest Land.

Before Situation:

The producer currently manages forested lands without an existing forest management plan, or with an outdated plan. Resource concern(s) exist which are not addressed by a management plan. A Forest Management Plan or Conservation Activity Plan, as defined by EQIP regulation is needed to allow the producer to apply for financial assistance through EQIP or other programs to help implement needed conservation practices. Associated Practices: 472, 666, 654, 655,384, 394, 383, 379, 338, 391, 791, 490, 612, 660, 311, 380.

After Situation:

After EQIP contract approval, participant has obtained services from a certified TSP for development of the Forest Management Conservation Activity Plan (CAP). The CAP criteria requires the plan to identify approved Field Office Technical Guide conservation practices where needed to address identified resource concerns. The Forest Management CAP is not considered a Forest Harvest Plan, but should complement the needs for harvest if desired by the land user. Additional CAP plan criteria is detailed in the Field Office Technical Guide.

Feature Measure: Number

Scenario Unit: Number

Scenario Typical Size: 1.0

Scenario Total Cost: $1,448.94

Scenario Cost/Unit: $1,448.94

Cost Details:

Component Name	ID	Description	Unit	Cost	QTY	Total
Labor						
CAP Labor, forester	1302	Conservation Activity Plan labor to manage nonindustrial private forest lands for conservation, economic, and recreational purposes. Will inventory the type, amount, and location of standing timber and appraise the timber's condition. Will determine how to conserve wildlife habitats, improve water quality and soil stability, and how best to comply with environmental regulations. May devise plans for planting and growing new trees, monitoring trees for healthy growth, determining optimal thinning schedules, and increasing carbon capture and storage.	Hours	$76.26	19	$1,448.94

Practice: 106 - Forest Management Plan - Written

Scenario: #57 - FMP 21 to 100 acres

Scenario Description:

Non Industrial Private Forest Land typically unmanaged or limited management activities. Typical site is approximately 21 to 100 acres in size and consists of existing uneven-aged mixed species stands of harvestable trees. Natural Resource Concern: Fish and Wildlife; Soil Erosion; Soil Condition; Water Quality; Plant Condition; on Forest Land.

Before Situation:

The producer currently manages forested lands without an existing forest management plan, or with an outdated plan. Resource concern(s) exist which are not addressed by a management plan. A Forest Management Plan or Conservation Activity Plan, as defined by EQIP regulation is needed to allow the producer to apply for financial assistance through EQIP or other programs to help implement needed conservation practices. Associated Practices: 472, 666, 654, 655,384, 394, 383, 379, 338, 391, 791, 490, 612, 660, 311, 380.

After Situation:

After EQIP contract approval, participant has obtained services from a certified TSP for development of the Forest Management Conservation Activity Plan (CAP). The CAP criteria requires the plan to identify approved Field Office Technical Guide conservation practices where needed to address identified resource concerns. The Forest Management CAP is not considered a Forest Harvest Plan, but should complement the needs for harvest if desired by the land user. Additional CAP plan criteria is detailed in the Field Office Technical Guide.

Feature Measure: Number

Scenario Unit: Number

Scenario Typical Size: 1.0

Scenario Total Cost: $1,830.24

Scenario Cost/Unit: $1,830.24

Cost Details:

Component Name	ID	Description	Unit	Cost	QTY	Total
Labor						
CAP Labor, forester	1302	Conservation Activity Plan labor to manage nonindustrial private forest lands for conservation, economic, and recreational purposes. Will inventory the type, amount, and location of standing timber and appraise the timber's condition. Will determine how to conserve wildlife habitats, improve water quality and soil stability, and how best to comply with environmental regulations. May devise plans for planting and growing new trees, monitoring trees for healthy growth, determining optimal thinning schedules, and increasing carbon capture and storage.	Hours	$76.26	24	$1,830.24

Practice: 106 - Forest Management Plan - Written

Scenario: #58 - FMP 101 to 250 acres

Scenario Description:

Non Industrial Private Forest Land typically unmanaged or limited management activities. Typical site is approximately 101 to 250 acres in size and consists of existing uneven-aged mixed species stands of harvestable trees. Natural Resource Concern: Fish and Wildlife; Soil Erosion; Soil Condition; Water Quality; Plant Condition; on Forest Land.

Before Situation:

The producer currently manages forested lands without an existing forest management plan, or with an outdated plan. Resource concern(s) exist which are not addressed by a management plan. A Forest Management Plan or Conservation Activity Plan, as defined by EQIP regulation is needed to allow the producer to apply for financial assistance through EQIP or other programs to help implement needed conservation practices. Associated Practices: 472, 666, 654, 655,384, 394, 383, 379, 338, 391, 791, 490, 612, 660, 311, 380.

After Situation:

After EQIP contract approval, participant has obtained services from a certified TSP for development of the Forest Management Conservation Activity Plan (CAP). The CAP criteria requires the plan to identify approved Field Office Technical Guide conservation practices where needed to address identified resource concerns. The Forest Management CAP is not considered a Forest Harvest Plan, but should complement the needs for harvest if desired by the land user. Additional CAP plan criteria is detailed in the Field Office Technical Guide.

Feature Measure: Number

Scenario Unit: Number

Scenario Typical Size: 1.0

Scenario Total Cost: $3,279.18

Scenario Cost/Unit: $3,279.18

Cost Details:

Component Name	ID	Description	Unit	Cost	QTY	Total
Labor						
CAP Labor, forester	1302	Conservation Activity Plan labor to manage nonindustrial private forest lands for conservation, economic, and recreational purposes. Will inventory the type, amount, and location of standing timber and appraise the timber's condition. Will determine how to conserve wildlife habitats, improve water quality and soil stability, and how best to comply with environmental regulations. May devise plans for planting and growing new trees, monitoring trees for healthy growth, determining optimal thinning schedules, and increasing carbon capture and storage.	Hours	$76.26	43	$3,279.18

Practice: 106 - Forest Management Plan - Written

Scenario: #59 - FMP Greater Than 1000 acres

Scenario Description:

Non Industrial Private Forest Land typically unmanaged or limited management activities. Typical site is approximately 1001 acres or greater in size and consists of existing uneven-aged mixed species stands of harvestable trees. Natural Resource Concern: Fish and Wildlife; Soil Erosion; Soil Condition; Water Quality; Plant Condition; on Forest Land.

Before Situation:

The producer currently manages forested lands without an existing forest management plan, or with an outdated plan. Resource concern(s) exist which are not addressed by a management plan. A Forest Management Plan or Conservation Activity Plan, as defined by EQIP regulation is needed to allow the producer to apply for financial assistance through EQIP or other programs to help implement needed conservation practices. Associated Practices: 472, 666, 654, 655,384, 394, 383, 379, 338, 391, 791, 490, 612, 660, 311, 380.

After Situation:

After EQIP contract approval, participant has obtained services from a certified TSP for development of the Forest Management Conservation Activity Plan (CAP). The CAP criteria requires the plan to identify approved Field Office Technical Guide conservation practices where needed to address identified resource concerns. The Forest Management CAP is not considered a Forest Harvest Plan, but should complement the needs for harvest if desired by the land user. Additional CAP plan criteria is detailed in the Field Office Technical Guide.

Feature Measure: Number

Scenario Unit: Number

Scenario Typical Size: 1.0

Scenario Total Cost: $6,863.40

Scenario Cost/Unit: $6,863.40

Cost Details:

Component Name	ID	Description	Unit	Cost	QTY	Total
Labor						
CAP Labor, forester	1302	Conservation Activity Plan labor to manage nonindustrial private forest lands for conservation, economic, and recreational purposes. Will inventory the type, amount, and location of standing timber and appraise the timber's condition. Will determine how to conserve wildlife habitats, improve water quality and soil stability, and how best to comply with environmental regulations. May devise plans for planting and growing new trees, monitoring trees for healthy growth, determining optimal thinning schedules, and increasing carbon capture and storage.	Hours	$76.26	90	$6,863.40

Practice: 106 - Forest Management Plan - Written

Scenario: #60 - FMP 251 to 500 acres

Scenario Description:

Non Industrial Private Forest Land typically unmanaged or limited management activities. Typical site is approximately 251 to 500 acres in size and consists of existing uneven-aged mixed species stands of harvestable trees. Natural Resource Concern: Fish and Wildlife; Soil Erosion; Soil Condition; Water Quality; Plant Condition; on Forest Land.

Before Situation:

The producer currently manages forested lands without an existing forest management plan, or with an outdated plan. Resource concern(s) exist which are not addressed by a management plan. A Forest Management Plan or Conservation Activity Plan, as defined by EQIP regulation is needed to allow the producer to apply for financial assistance through EQIP or other programs to help implement needed conservation practices. Associated Practices: 472, 666, 654, 655,384, 394, 383, 379, 338, 391, 791, 490, 612, 660, 311, 380.

After Situation:

After EQIP contract approval, participant has obtained services from a certified TSP for development of the Forest Management Conservation Activity Plan (CAP). The CAP criteria requires the plan to identify approved Field Office Technical Guide conservation practices where needed to address identified resource concerns. The Forest Management CAP is not considered a Forest Harvest Plan, but should complement the needs for harvest if desired by the land user. Additional CAP plan criteria is detailed in the Field Office Technical Guide.

Feature Measure: Number

Scenario Unit: Number

Scenario Typical Size: 1.0

Scenario Total Cost: $4,728.12

Scenario Cost/Unit: $4,728.12

Cost Details:

Component Name	ID	Description	Unit	Cost	QTY	Total
Labor						
CAP Labor, forester	1302	Conservation Activity Plan labor to manage nonindustrial private forest lands for conservation, economic, and recreational purposes. Will inventory the type, amount, and location of standing timber and appraise the timber's condition. Will determine how to conserve wildlife habitats, improve water quality and soil stability, and how best to comply with environmental regulations. May devise plans for planting and growing new trees, monitoring trees for healthy growth, determining optimal thinning schedules, and increasing carbon capture and storage.	Hours	$76.26	62	$4,728.12

Practice: 106 - Forest Management Plan - Written

Scenario: #61 - FMP 501 to 1000 acres

Scenario Description:

Non Industrial Private Forest Land typically unmanaged or limited management activities. Typical site is approximately 501 to 1000 acres in size and consists of existing uneven-aged mixed species stands of harvestable trees. Natural Resource Concern: Fish and Wildlife; Soil Erosion; Soil Condition; Water Quality; Plant Condition; on Forest Land.

Before Situation:

The producer currently manages forested lands without an existing forest management plan, or with an outdated plan. Resource concern(s) exist which are not addressed by a management plan. A Forest Management Plan or Conservation Activity Plan, as defined by EQIP regulation is needed to allow the producer to apply for financial assistance through EQIP or other programs to help implement needed conservation practices. Associated Practices: 472, 666, 654, 655,384, 394, 383, 379, 338, 391, 791, 490, 612, 660, 311, 380.

After Situation:

After EQIP contract approval, participant has obtained services from a certified TSP for development of the Forest Management Conservation Activity Plan (CAP). The CAP criteria requires the plan to identify approved Field Office Technical Guide conservation practices where needed to address identified resource concerns. The Forest Management CAP is not considered a Forest Harvest Plan, but should complement the needs for harvest if desired by the land user. Additional CAP plan criteria is detailed in the Field Office Technical Guide.

Feature Measure: Number

Scenario Unit: Number

Scenario Typical Size: 1.0

Scenario Total Cost: $5,490.72

Scenario Cost/Unit: $5,490.72

Cost Details:

Component Name	ID	Description	Unit	Cost	QTY	Total
Labor						
CAP Labor, forester	1302	Conservation Activity Plan labor to manage nonindustrial private forest lands for conservation, economic, and recreational purposes. Will inventory the type, amount, and location of standing timber and appraise the timber's condition. Will determine how to conserve wildlife habitats, improve water quality and soil stability, and how best to comply with environmental regulations. May devise plans for planting and growing new trees, monitoring trees for healthy growth, determining optimal thinning schedules, and increasing carbon capture and storage.	Hours	$76.26	72	$5,490.72

Practice: 108 - Feed Management Plan - Written

Scenario: #54 - Feed Management Plan

Scenario Description:

The owner/operator of an Animal Feeding Operation (AFO) has not received a written Feed Management Plan (FeedMP) that addresses all resource concerns present on the facility. Various levels of management and conservation implementation has occurred in the operation. Little documentation of the methods of feed management used and practices installed exists, and the producer is not likely to developed a complete forage inventory or nutrient analysis. The producer may or may not have a conservation plan or a nutrient management plan. Nutrient management related resource concerns on the operation remain to be addressed through the development of a complete FeedMP including management and conservation practices for proper quantity and quality of available nutrients, feedstuffs, and/or additives fed to livestock or poultry that may be present on the operation. Present operation and feed methodology poses risk of feeding excessive amounts of nutrients in animal manure which result in negative impacts to water quality and odor resource concerns. Negative water and air quality impacts as well as farmstead safety and security issues may remain on the AFO, and inadequate recordkeeping nutrient, inspection and monitoring of the existing operation may need further improvement.

Before Situation:

Producer has no plan or limited knowledge of management of feed, nutrients, feedstuffs, or nutritional additives provided to domestic livestock and poultry. The producer currently manages feed without a plan which would address livestock production limitations and water and air quality resource concern impacts. Producer currently lacks plan to provide proper balance of forage, grains or other feeds and supplements to assure domestic animal nutritional needs are met without negatively impacting water and air quality. Producer is interested in management of feed for domestic animals to maximize profit margin, reduce costs, improve or address livestock production opportunities, and for other environmental benefits. Producer is willing to collaborate with a certified Technical Service Provider (TSP) to develop a plan, and to collect/coordinate data and records to determine current nutritional needs. Associated Practice(s): 590-Nutrient Management

After Situation:

After EQIP contract approval, participant has obtained services from a certified TSP for development of the Feed Management Conservation Activity Plan (CAP). The CAP criteria requires the plan to meet quality criteria for applicable natural resource concerns and provides for opportunities to identify and implement conservation practices related to management of feed, forages, or delivery of supplements to maximize efficient feeding operations and livestock growth. The CAP plan may serve as the basis for implementation of the primary conservation practice 592 - Feed Management. If applicable, the CAP may also be developed to complement Comprehensive Nutrient Management Plans (CNMP) or to help meet requirements of NRCS practice standard 590 - Nutrient Management. As addressed in the CAP planning criteria, the plan may include recommendations for addressing associated natural resource concerns with other conservation practices. The Feed Management CAP meets the basic quality criteria for the 108 plan as cited in the NRCS Field Office Technical Guide.

Feature Measure: Number

Scenario Unit: Each

Scenario Typical Size: 1.0

Scenario Total Cost: $3,153.60

Scenario Cost/Unit: $3,153.60

Cost Details:

Component Name	ID	Description	Unit	Cost	QTY	Total
Labor						
Cap Labor, conservation scientist	1300	Conservation Activity Plan labor to manage, improve, and protect natural resources to maximize their use without damaging the environment. Interprets resource information and assess resource conditions to provide conservation practice alternatives to producers to make decisions on the treatment of their soil, water, air, plant, animal, and energy resources. May instruct farmers, agricultural production managers, or ranchers in best ways to use crop rotation, contour plowing, or terracing to conserve soil and water; in the number and kind of livestock and forage plants best suited to particular ranges; and in range and farm improvements, such as fencing and reservoirs for stock watering.	Hours	$78.84	40	$3,153.60

Practice: 110 - Grazing Management Plan - Written

Scenario: #1 - Grazing Management Plan Less Than or Equal to 100 acres

Scenario Description:

Small agricultural operation with less than 100 acres grazed land. Natural Resource Concern: Soil erosion, water quality, fish and wildlife, plant condition, and all other appropriate resource concerns.

Before Situation:

Producer has no plan or limited knowledge of management of livestock or other animals on grazed land resources. The producer currently manages animals without a plan to address identified natural resource concerns. Producer is interested in management of animals to maximize profit margins, reduce costs, improve or address wildlife opportunities, and for other environmental benefit. Producer is willing to collaborate with a certified TSP to develop a plan and collect/coordinate data recording to monitor per requirements of plan. Associated Practices: In addition to the essential practices listed previously, addition practices to consider include: Channel Bank Vegetation, Prescribed Burning, Critical Area Planting, Pond, Windbreak/Shelterbelt Establishment, Silvopasture Establishment, Riparian Herbaceous Cover, Stream Habitat Improvement and Management, Pipeline, Heavy Use Area Protection, Spring Development, and Animal Trails and Walkways.

After Situation:

After EQIP contract approval, participant has obtained services from a certified TSP for development of the Grazing Management Conservation Activity Plan (CAP). The CAP criteria requires the plan to meet quality criteria for applicable resource concerns and provide for opportunities to implement essential conservation practices: Brush Management, Fencing, Firebreak, Forage Harvest Management, Grazing Land Mechanical Treatment, Herbaceous Weed Treatment, Nutrient Management, Forage and Biomass Planting, Prescribed Grazing, Range Planting, Access Control, and Watering Facilities. As addressed in the CAP criteria, the plan may include recommendations for associated conservation practices which address other related resource concerns. The CAP meets the basic quality criteria for the 110 plan as cited in the NRCS Field Office Technical Guide.

Feature Measure: Number

Scenario Unit: Number

Scenario Typical Size: 1.0

Scenario Total Cost: $2,350.80

Scenario Cost/Unit: $2,350.80

Cost Details:

Component Name	ID	Description	Unit	Cost	QTY	Total
Labor						
CAP Labor, range conservation	1299	Conservation Activity Plan labor to study, plan the use and management of rangelands to maximize their use in a sustainable manner. Range managers may inventory soils, plants, and animals; develop resource management plans; identify monitoring methods and collect data using those methods to determine if resource management objectives are being met or if adjustments to management activities are needed. For example, they may help ranchers attain optimum livestock production by determining the number and kind of animals to graze, the grazing system to use, and the best season for grazing. Cost associated with this component includes overhead and benefits (market price).	Hours	$78.36	30	$2,350.80

Practice: 110 - Grazing Management Plan - Written

Scenario: #2 - Grazing Management Plan 101 to 500 acres

Scenario Description:

Small agricultural operation with 101 to 500 acres grazed land. Natural Resource Concern: Soil erosion, water quality, fish and wildlife, plant condition, and all other appropriate resource concerns.

Before Situation:

Producer has no plan or limited knowledge of management of livestock or other animals on grazed land resources. The producer currently manages animals without a plan to address identified natural resource concerns. Producer is interested in management of animals to maximize profit margins, reduce costs, improve or address wildlife opportunities, and for other environmental benefit. Producer is willing to collaborate with a certified TSP to develop a plan and collect/coordinate data recording to monitor per requirements of plan. Associated Practices: In addition to the essential practices listed previously, addition practices to consider include: Channel Bank Vegetation, Prescribed Burning, Critical Area Planting, Pond, Windbreak/Shelterbelt Establishment, Silvopasture Establishment, Riparian Herbaceous Cover, Stream Habitat Improvement and Management, Pipeline, Heavy Use Area Protection, Spring Development, and Animal Trails and Walkways.

After Situation:

After EQIP contract approval, participant has obtained services from a certified TSP for development of the Grazing Management Conservation Activity Plan (CAP). The CAP criteria requires the plan to meet quality criteria for applicable resource concerns and provide for opportunities to implement essential conservation practices: Brush Management, Fencing, Firebreak, Forage Harvest Management, Grazing Land Mechanical Treatment, Herbaceous Weed Treatment, Nutrient Management, Forage and Biomass Planting, Prescribed Grazing, Range Planting, Access Control, and Watering Facilities. As addressed in the CAP criteria, the plan may include recommendations for associated conservation practices which address other related resource concerns. The CAP meets the basic quality criteria for the 110 plan as cited in the NRCS Field Office Technical Guide.

Feature Measure: Number

Scenario Unit: Number

Scenario Typical Size: 1.0

Scenario Total Cost: $3,134.40

Scenario Cost/Unit: $3,134.40

Cost Details:

Component Name	ID	Description	Unit	Cost	QTY	Total
Labor						
CAP Labor, range conservation	1299	Conservation Activity Plan labor to study, plan the use and management of rangelands to maximize their use in a sustainable manner. Range managers may inventory soils, plants, and animals; develop resource management plans; identify monitoring methods and collect data using those methods to determine if resource management objectives are being met or if adjustments to management activities are needed. For example, they may help ranchers attain optimum livestock production by determining the number and kind of animals to graze, the grazing system to use, and the best season for grazing. Cost associated with this component includes overhead and benefits (market price).	Hours	$78.36	40	$3,134.40

Practice: 110 - Grazing Management Plan - Written

Scenario: #3 - Grazing Management Plan 1501 to 5000 acres

Scenario Description:

Small agricultural operation with 1501 to 5000 acres grazed land. Natural Resource Concern: Soil erosion, water quality, fish and wildlife, plant condition, and all other appropriate resource concerns.

Before Situation:

Producer has no plan or limited knowledge of management of livestock or other animals on grazed land resources. The producer currently manages animals without a plan to address identified natural resource concerns. Producer is interested in management of animals to maximize profit margins, reduce costs, improve or address wildlife opportunities, and for other environmental benefit. Producer is willing to collaborate with a certified TSP to develop a plan and collect/coordinate data recording to monitor per requirements of plan. Associated Practices: In addition to the essential practices listed previously, addition practices to consider include: Channel Bank Vegetation, Prescribed Burning, Critical Area Planting, Pond, Windbreak/Shelterbelt Establishment, Silvopasture Establishment, Riparian Herbaceous Cover, Stream Habitat Improvement and Management, Pipeline, Heavy Use Area Protection, Spring Development, and Animal Trails and Walkways.

After Situation:

After EQIP contract approval, participant has obtained services from a certified TSP for development of the Grazing Management Conservation Activity Plan (CAP). The CAP criteria requires the plan to meet quality criteria for applicable resource concerns and provide for opportunities to implement essential conservation practices: Brush Management, Fencing, Firebreak, Forage Harvest Management, Grazing Land Mechanical Treatment, Herbaceous Weed Treatment, Nutrient Management, Forage and Biomass Planting, Prescribed Grazing, Range Planting, Access Control, and Watering Facilities. As addressed in the CAP criteria, the plan may include recommendations for associated conservation practices which address other related resource concerns. The CAP meets the basic quality criteria for the 110 plan as cited in the NRCS Field Office Technical Guide.

Feature Measure: Number

Scenario Unit: Number

Scenario Typical Size: 1.0

Scenario Total Cost: $4,701.60

Scenario Cost/Unit: $4,701.60

Cost Details:

Component Name	ID	Description	Unit	Cost	QTY	Total
Labor						
CAP Labor, range conservation	1299	Conservation Activity Plan labor to study, plan the use and management of rangelands to maximize their use in a sustainable manner. Range managers may inventory soils, plants, and animals; develop resource management plans; identify monitoring methods and collect data using those methods to determine if resource management objectives are being met or if adjustments to management activities are needed. For example, they may help ranchers attain optimum livestock production by determining the number and kind of animals to graze, the grazing system to use, and the best season for grazing. Cost associated with this component includes overhead and benefits (market price).	Hours	$78.36	60	$4,701.60

Practice: 110 - Grazing Management Plan - Written

Scenario: #5 - Grazing Management Plan Greater Than 5000 acres

Scenario Description:

Small agricultural operation with more than 5000 acres grazed land. Natural Resource Concern: Soil erosion, water quality, fish and wildlife, plant condition, and all other appropriate resource concerns.

Before Situation:

Producer has no plan or limited knowledge of management of livestock or other animals on grazed land resources. The producer currently manages animals without a plan to address identified natural resource concerns. Producer is interested in management of animals to maximize profit margins, reduce costs, improve or address wildlife opportunities, and for other environmental benefit. Producer is willing to collaborate with a certified TSP to develop a plan and collect/coordinate data recording to monitor per requirements of plan. Associated Practices: In addition to the essential practices listed previously, addition practices to consider include: Channel Bank Vegetation, Prescribed Burning, Critical Area Planting, Pond, Windbreak/Shelterbelt Establishment, Silvopasture Establishment, Riparian Herbaceous Cover, Stream Habitat Improvement and Management, Pipeline, Heavy Use Area Protection, Spring Development, and Animal Trails and Walkways.

After Situation:

After EQIP contract approval, participant has obtained services from a certified TSP for development of the Grazing Management Conservation Activity Plan (CAP). The CAP criteria requires the plan to meet quality criteria for applicable resource concerns and provide for opportunities to implement essential conservation practices: Brush Management, Fencing, Firebreak, Forage Harvest Management, Grazing Land Mechanical Treatment, Herbaceous Weed Treatment, Nutrient Management, Forage and Biomass Planting, Prescribed Grazing, Range Planting, Access Control, and Watering Facilities. As addressed in the CAP criteria, the plan may include recommendations for associated conservation practices which address other related resource concerns. The CAP meets the basic quality criteria for the 110 plan as cited in the NRCS Field Office Technical Guide.

Feature Measure: Number

Scenario Unit: Number

Scenario Typical Size: 1.0

Scenario Total Cost: $5,485.20

Scenario Cost/Unit: $5,485.20

Cost Details:

Component Name	ID	Description	Unit	Cost	QTY	Total
Labor						
CAP Labor, range conservation	1299	Conservation Activity Plan labor to study, plan the use and management of rangelands to maximize their use in a sustainable manner. Range managers may inventory soils, plants, and animals; develop resource management plans; identify monitoring methods and collect data using those methods to determine if resource management objectives are being met or if adjustments to management activities are needed. For example, they may help ranchers attain optimum livestock production by determining the number and kind of animals to graze, the grazing system to use, and the best season for grazing. Cost associated with this component includes overhead and benefits (market price).	Hours	$78.36	70	$5,485.20

Practice: 110 - Grazing Management Plan - Written

Scenario: #66 - Grazing Management Plan 501 to 1500 acres

Scenario Description:

Small agricultural operation with 501 to 1500 acres grazed land. Natural Resource Concern: Soil erosion, water quality, fish and wildlife, plant condition, and all other appropriate resource concerns.

Before Situation:

Producer has no plan or limited knowledge of management of livestock or other animals on grazed land resources. The producer currently manages animals without a plan to address identified natural resource concerns. Producer is interested in management of animals to maximize profit margins, reduce costs, improve or address wildlife opportunities, and for other environmental benefit. Producer is willing to collaborate with a certified TSP to develop a plan and collect/coordinate data recording to monitor per requirements of plan. Associated Practices: In addition to the essential practices listed previously, addition practices to consider include: Channel Bank Vegetation, Prescribed Burning, Critical Area Planting, Pond, Windbreak/Shelterbelt Establishment, Silvopasture Establishment, Riparian Herbaceous Cover, Stream Habitat Improvement and Management, Pipeline, Heavy Use Area Protection, Spring Development, and Animal Trails and Walkways.

After Situation:

After EQIP contract approval, participant has obtained services from a certified TSP for development of the Grazing Management Conservation Activity Plan (CAP). The CAP criteria requires the plan to meet quality criteria for applicable resource concerns and provide for opportunities to implement essential conservation practices: Brush Management, Fencing, Firebreak, Forage Harvest Management, Grazing Land Mechanical Treatment, Herbaceous Weed Treatment, Nutrient Management, Forage and Biomass Planting, Prescribed Grazing, Range Planting, Access Control, and Watering Facilities. As addressed in the CAP criteria, the plan may include recommendations for associated conservation practices which address other related resource concerns. The CAP meets the basic quality criteria for the 110 plan as cited in the NRCS Field Office Technical Guide.

Feature Measure: Number of plans

Scenario Unit: Number

Scenario Typical Size: 1.0

Scenario Total Cost: $3,918.00

Scenario Cost/Unit: $3,918.00

Cost Details:

Component Name	ID	Description	Unit	Cost	QTY	Total
Labor						
CAP Labor, range conservation	1299	Conservation Activity Plan labor to study, plan the use and management of rangelands to maximize their use in a sustainable manner. Range managers may inventory soils, plants, and animals; develop resource management plans; identify monitoring methods and collect data using those methods to determine if resource management objectives are being met or if adjustments to management activities are needed. For example, they may help ranchers attain optimum livestock production by determining the number and kind of animals to graze, the grazing system to use, and the best season for grazing. Cost associated with this component includes overhead and benefits (market price).	Hours	$78.36	50	$3,918.00

Practice: 112 - Prescribed Burning Plan - Written

Scenario: #27 - Prescribed Burning Plan Less Than or Equal to 20 Acres

Scenario Description:

Non Industrial Private Forest Land, Pasture or Range Land typically less than or equal to 20 acres in size and is dominated by fire tolerant species that are competing with undesirable vegetation and accumulating fuel load. Natural Resource Concern: Fish and Wildlife; Soil Erosion; Soil Condition; Water Quality; Plant Condition.

Before Situation:

Producer has no existing plan or an obsolete plan that is insufficient for current stand condition. Due to the size, landscape position, low to moderate fuel loads and presence of both natural firebreaks (i.e., streams, lakes, etc.) and man-made firebreaks (i.e., roads, farm paths, agricultural fields, etc.), few newly constructed firebreaks are needed to implement the prescribed burn. A Prescribed Burning Plan or Conservation Activity Plan is needed to enable the producer to apply for financial assistance through EQIP or other financial assistance programs in order to implement needed conservation practices. Associated Practices: 394, 383, 384, 528, 314, 315, 550, 644, 645, 659, 342, 647, 460, 643, 666, 595

After Situation:

After EQIP contract approval, participant has obtained services from a certified Technical Service Provider (TSP) for development of the Prescribed Burning Conservation Activity Plan (CAP). The CAP criteria require the plan to identify approved Field Office Technical Guide conservation practices where needed to address identified resource concerns. The Prescribed Burning Plan CAP is not considered a Forest Management Plan, a Reforestation Plan, a Forest Harvest Plan, or a Prescribed Grazing Plan, but should complement the needs of those plans if they exist and if desired by the decision maker. The CAP plan will fully describe all aspects of the prescribed burn including, but not limited to objectives of the burn (i.e., site preparation, wildlife habitat, etc.), site conditions (i.e., fuel load, fuel type, etc.), implementation strategies (i.e., method of ignition, number of persons required, equipment needs, etc.), tolerable weather parameters (i.e., wind direction, relative humidity, mixing height, etc.) and identification of Smoke Sensitive Areas. Additional CAP plan criteria are detailed in the Field Office Technical Guide and potentially state developed technical criteria.

Feature Measure: Number

Scenario Unit: Number

Scenario Typical Size: 1.0

Scenario Total Cost: $381.30

Scenario Cost/Unit: $381.30

Cost Details:

Component Name	ID	Description	Unit	Cost	QTY	Total
Labor						
CAP Labor, forester	1302	Conservation Activity Plan labor to manage nonindustrial private forest lands for conservation, economic, and recreational purposes. Will inventory the type, amount, and location of standing timber and appraise the timber's condition. Will determine how to conserve wildlife habitats, improve water quality and soil stability, and how best to comply with environmental regulations. May devise plans for planting and growing new trees, monitoring trees for healthy growth, determining optimal thinning schedules, and increasing carbon capture and storage.	Hours	$76.26	5	$381.30

Practice: 112 - Prescribed Burning Plan - Written

Scenario: #28 - Prescribed Burning Plan 21-100 Acres

Scenario Description:

Non Industrial Private Forest Land, Pasture or Range Land typically 21 to 100 acres in size and is dominated by fire tolerant species that are competing with undesirable vegetation and accumulating fuel load. Natural Resource Concern: Fish and Wildlife; Soil Erosion; Soil Condition; Water Quality; Plant Condition.

Before Situation:

Producer has no existing plan or an obsolete plan that is insufficient for current stand condition. Due to the size, landscape position, low to moderate fuel loads and presence of both natural firebreaks (i.e., streams, lakes, etc.) and man-made firebreaks (i.e., roads, farm paths, agricultural fields, etc.), few newly constructed firebreaks are needed to implement the prescribed burn. A Prescribed Burning Plan or Conservation Activity Plan is needed to enable the producer to apply for financial assistance through EQIP or other financial assistance programs in order to implement needed conservation practices. Associated Practices: 394, 383, 384, 528, 314, 315, 550, 644, 645, 659, 342, 647, 460, 643, 666, 595

After Situation:

After EQIP contract approval, participant has obtained services from a certified Technical Service Provider (TSP) for development of the Prescribed Burning Conservation Activity Plan (CAP). The CAP criteria require the plan to identify approved Field Office Technical Guide conservation practices where needed to address identified resource concerns. The Prescribed Burning Plan CAP is not considered a Forest Management Plan, a Reforestation Plan, a Forest Harvest Plan, or a Prescribed Grazing Plan, but should complement the needs of those plans if they exist and if desired by the decision maker. The CAP plan will fully describe all aspects of the prescribed burn including, but not limited to objectives of the burn (i.e., site preparation, wildlife habitat, etc.), site conditions (i.e., fuel load, fuel type, etc.), implementation strategies (i.e., method of ignition, number of persons required, equipment needs, etc.), tolerable weather parameters (i.e., wind direction, relative humidity, mixing height, etc.) and identification of Smoke Sensitive Areas. Additional CAP plan criteria are detailed in the Field Office Technical Guide and potentially state developed technical criteria.

Feature Measure: Number

Scenario Unit: Number

Scenario Typical Size: 1.0

Scenario Total Cost: $610.08

Scenario Cost/Unit: $610.08

Cost Details:

Component Name	ID	Description	Unit	Cost	QTY	Total
Labor						
CAP Labor, forester	1302	Conservation Activity Plan labor to manage nonindustrial private forest lands for conservation, economic, and recreational purposes. Will inventory the type, amount, and location of standing timber and appraise the timber's condition. Will determine how to conserve wildlife habitats, improve water quality and soil stability, and how best to comply with environmental regulations. May devise plans for planting and growing new trees, monitoring trees for healthy growth, determining optimal thinning schedules, and increasing carbon capture and storage.	Hours	$76.26	8	$610.08

Practice: 112 - Prescribed Burning Plan - Written

Scenario: #29 - Prescribed Burning Plan 101-250 Acres

Scenario Description:

Non Industrial Private Forest Land, Pasture or Range Land typically 101 to 250 acres in size and is dominated by fire tolerant species that are competing with undesirable vegetation and accumulating fuel load. Natural Resource Concern: Fish and Wildlife; Soil Erosion; Soil Condition; Water Quality; Plant Condition.

Before Situation:

Producer has no existing plan or an obsolete plan that is insufficient for current stand condition. Due to the size, landscape position, low to moderate fuel loads and presence of both natural firebreaks (i.e., streams, lakes, etc.) and man-made firebreaks (i.e., roads, farm paths, agricultural fields, etc.), few newly constructed firebreaks are needed to implement the prescribed burn. A Prescribed Burning Plan or Conservation Activity Plan is needed to enable the producer to apply for financial assistance through EQIP or other financial assistance programs in order to implement needed conservation practices. Associated Practices: 394, 383, 384, 528, 314, 315, 550, 644, 645, 659, 342, 647, 460, 643, 666, 595

After Situation:

After EQIP contract approval, participant has obtained services from a certified Technical Service Provider (TSP) for development of the Prescribed Burning Conservation Activity Plan (CAP). The CAP criteria require the plan to identify approved Field Office Technical Guide conservation practices where needed to address identified resource concerns. The Prescribed Burning Plan CAP is not considered a Forest Management Plan, a Reforestation Plan, a Forest Harvest Plan, or a Prescribed Grazing Plan, but should complement the needs of those plans if they exist and if desired by the decision maker. The CAP plan will fully describe all aspects of the prescribed burn including, but not limited to objectives of the burn (i.e., site preparation, wildlife habitat, etc.), site conditions (i.e., fuel load, fuel type, etc.), implementation strategies (i.e., method of ignition, number of persons required, equipment needs, etc.), tolerable weather parameters (i.e., wind direction, relative humidity, mixing height, etc.) and identification of Smoke Sensitive Areas. Additional CAP plan criteria are detailed in the Field Office Technical Guide and potentially state developed technical criteria.

Feature Measure: Number

Scenario Unit: Number

Scenario Typical Size: 1.0

Scenario Total Cost: $915.12

Scenario Cost/Unit: $915.12

Cost Details:

Component Name	ID	Description	Unit	Cost	QTY	Total
Labor						
CAP Labor, forester	1302	Conservation Activity Plan labor to manage nonindustrial private forest lands for conservation, economic, and recreational purposes. Will inventory the type, amount, and location of standing timber and appraise the timber's condition. Will determine how to conserve wildlife habitats, improve water quality and soil stability, and how best to comply with environmental regulations. May devise plans for planting and growing new trees, monitoring trees for healthy growth, determining optimal thinning schedules, and increasing carbon capture and storage.	Hours	$76.26	12	$915.12

Practice: 112 - Prescribed Burning Plan - Written

Scenario: #30 - Prescribed Burning Plan 251-500 Acres

Scenario Description:

Non Industrial Private Forest Land, Pasture or Range Land typically 251 to 500 acres in size and is dominated by fire tolerant species that are competing with undesirable vegetation and accumulating fuel load. Natural Resource Concern: Fish and Wildlife; Soil Erosion; Soil Condition; Water Quality; Plant Condition.

Before Situation:

Producer has no existing plan or an obsolete plan that is insufficient for current stand condition. Due to the size, landscape position, low to moderate fuel loads and presence of both natural firebreaks (i.e., streams, lakes, etc.) and man-made firebreaks (i.e., roads, farm paths, agricultural fields, etc.), few newly constructed firebreaks are needed to implement the prescribed burn. A Prescribed Burning Plan or Conservation Activity Plan is needed to enable the producer to apply for financial assistance through EQIP or other financial assistance programs in order to implement needed conservation practices. Associated Practices: 394, 383, 384, 528, 314, 315, 550, 644, 645, 659, 342, 647, 460, 643, 666, 595

After Situation:

After EQIP contract approval, participant has obtained services from a certified Technical Service Provider (TSP) for development of the Prescribed Burning Conservation Activity Plan (CAP). The CAP criteria require the plan to identify approved Field Office Technical Guide conservation practices where needed to address identified resource concerns. The Prescribed Burning Plan CAP is not considered a Forest Management Plan, a Reforestation Plan, a Forest Harvest Plan, or a Prescribed Grazing Plan, but should complement the needs of those plans if they exist and if desired by the decision maker. The CAP plan will fully describe all aspects of the prescribed burn including, but not limited to objectives of the burn (i.e., site preparation, wildlife habitat, etc.), site conditions (i.e., fuel load, fuel type, etc.), implementation strategies (i.e., method of ignition, number of persons required, equipment needs, etc.), tolerable weather parameters (i.e., wind direction, relative humidity, mixing height, etc.) and identification of Smoke Sensitive Areas. Additional CAP plan criteria are detailed in the Field Office Technical Guide and potentially state developed technical criteria.

Feature Measure: Number

Scenario Unit: Number

Scenario Typical Size: 1.0

Scenario Total Cost: $1,220.16

Scenario Cost/Unit: $1,220.16

Cost Details:

Component Name	ID	Description	Unit	Cost	QTY	Total
Labor						
CAP Labor, forester	1302	Conservation Activity Plan labor to manage nonindustrial private forest lands for conservation, economic, and recreational purposes. Will inventory the type, amount, and location of standing timber and appraise the timber's condition. Will determine how to conserve wildlife habitats, improve water quality and soil stability, and how best to comply with environmental regulations. May devise plans for planting and growing new trees, monitoring trees for healthy growth, determining optimal thinning schedules, and increasing carbon capture and storage.	Hours	$76.26	16	$1,220.16

Practice: 112 - Prescribed Burning Plan - Written

Scenario: #31 - Prescribed Burning Plan 501-1000 Acres

Scenario Description:

Non Industrial Private Forest Land, Pasture or Range Land typically 501 to 1000 acres in size and is dominated by fire tolerant species that are competing with undesirable vegetation and accumulating fuel load. Natural Resource Concern: Fish and Wildlife; Soil Erosion; Soil Condition; Water Quality; Plant Condition.

Before Situation:

Producer has no existing plan or an obsolete plan that is insufficient for current stand condition. Due to the size, landscape position, low to moderate fuel loads and presence of both natural firebreaks (i.e., streams, lakes, etc.) and man-made firebreaks (i.e., roads, farm paths, agricultural fields, etc.), few newly constructed firebreaks are needed to implement the prescribed burn. A Prescribed Burning Plan or Conservation Activity Plan is needed to enable the producer to apply for financial assistance through EQIP or other financial assistance programs in order to implement needed conservation practices. Associated Practices: 394, 383, 384, 528, 314, 315, 550, 644, 645, 659, 342, 647, 460, 643, 666, 595

After Situation:

After EQIP contract approval, participant has obtained services from a certified Technical Service Provider (TSP) for development of the Prescribed Burning Conservation Activity Plan (CAP). The CAP criteria require the plan to identify approved Field Office Technical Guide conservation practices where needed to address identified resource concerns. The Prescribed Burning Plan CAP is not considered a Forest Management Plan, a Reforestation Plan, a Forest Harvest Plan, or a Prescribed Grazing Plan, but should complement the needs of those plans if they exist and if desired by the decision maker. The CAP plan will fully describe all aspects of the prescribed burn including, but not limited to objectives of the burn (i.e., site preparation, wildlife habitat, etc.), site conditions (i.e., fuel load, fuel type, etc.), implementation strategies (i.e., method of ignition, number of persons required, equipment needs, etc.), tolerable weather parameters (i.e., wind direction, relative humidity, mixing height, etc.) and identification of Smoke Sensitive Areas. Additional CAP plan criteria are detailed in the Field Office Technical Guide and potentially state developed technical criteria.

Feature Measure: Number

Scenario Unit: Number

Scenario Typical Size: 1.0

Scenario Total Cost: $1,525.20

Scenario Cost/Unit: $1,525.20

Cost Details:

Component Name	ID	Description	Unit	Cost	QTY	Total
Labor						
CAP Labor, forester	1302	Conservation Activity Plan labor to manage nonindustrial private forest lands for conservation, economic, and recreational purposes. Will inventory the type, amount, and location of standing timber and appraise the timber's condition. Will determine how to conserve wildlife habitats, improve water quality and soil stability, and how best to comply with environmental regulations. May devise plans for planting and growing new trees, monitoring trees for healthy growth, determining optimal thinning schedules, and increasing carbon capture and storage.	Hours	$76.26	20	$1,525.20

Practice: 112 - Prescribed Burning Plan - Written

Scenario: #32 - Prescribed Burning Plan Greater Than 1000 Acres

Scenario Description:

Non Industrial Private Forest Land, Pasture or Range Land typically greater than 1000 acres in size and is dominated by fire tolerant species that are competing with undesirable vegetation and accumulating fuel load. Natural Resource Concern: Fish and Wildlife; Soil Erosion; Soil Condition; Water Quality; Plant Condition.

Before Situation:

Producer has no existing plan or an obsolete plan that is insufficient for current stand condition. Due to the size, landscape position, low to moderate fuel loads and presence of both natural firebreaks (i.e., streams, lakes, etc.) and man-made firebreaks (i.e., roads, farm paths, agricultural fields, etc.), few newly constructed firebreaks are needed to implement the prescribed burn. A Prescribed Burning Plan or Conservation Activity Plan is needed to enable the producer to apply for financial assistance through EQIP or other financial assistance programs in order to implement needed conservation practices. Associated Practices: 394, 383, 384, 528, 314, 315, 550, 644, 645, 659, 342, 647, 460, 643, 666, 595

After Situation:

After EQIP contract approval, participant has obtained services from a certified Technical Service Provider (TSP) for development of the Prescribed Burning Conservation Activity Plan (CAP). The CAP criteria require the plan to identify approved Field Office Technical Guide conservation practices where needed to address identified resource concerns. The Prescribed Burning Plan CAP is not considered a Forest Management Plan, a Reforestation Plan, a Forest Harvest Plan, or a Prescribed Grazing Plan, but should complement the needs of those plans if they exist and if desired by the decision maker. The CAP plan will fully describe all aspects of the prescribed burn including, but not limited to objectives of the burn (i.e., site preparation, wildlife habitat, etc.), site conditions (i.e., fuel load, fuel type, etc.), implementation strategies (i.e., method of ignition, number of persons required, equipment needs, etc.), tolerable weather parameters (i.e., wind direction, relative humidity, mixing height, etc.) and identification of Smoke Sensitive Areas. Additional CAP plan criteria are detailed in the Field Office Technical Guide and potentially state developed technical criteria.

Feature Measure: Number

Scenario Unit: Number

Scenario Typical Size: 1.0

Scenario Total Cost: $1,830.24

Scenario Cost/Unit: $1,830.24

Cost Details:

Component Name	ID	Description	Unit	Cost	QTY	Total
Labor						
CAP Labor, forester	1302	Conservation Activity Plan labor to manage nonindustrial private forest lands for conservation, economic, and recreational purposes. Will inventory the type, amount, and location of standing timber and appraise the timber's condition. Will determine how to conserve wildlife habitats, improve water quality and soil stability, and how best to comply with environmental regulations. May devise plans for planting and growing new trees, monitoring trees for healthy growth, determining optimal thinning schedules, and increasing carbon capture and storage.	Hours	$76.26	24	$1,830.24

Practice: 114 - Integrated Pest Management Plan - Written

Scenario: #23 - IPM Management CAP Small-Specialty Less Than 50 Acres

Scenario Description:

Various on-farm land uses where pests are managed on smaller operations, including organic and specialty crop operations, where more complicated pest management evaluations and solutions may be necessary. Current pest control activities cause environmental concerns with water quality and/or erosion. Natural Resource Concern: Water quality and all other appropriate resource concerns.

Before Situation:

Producer has no plan or limited knowledge of the control or management of agricultural pests. The producer currently manages pests based upon pesticide label instructions, personal knowledge, or other local criteria. Producer is interested in the management of pests and the reduction of environmental impacts for environmental benefit. Producer is willing to collaborate with a certified TSP to develop a plan and collect/coordinate data recording to monitor per requirements of the plan. Associated Practices: Integrated Pest Management, Crop Rotation, Cover Crop, Field Border, Filter Strip, Stripcropping, and Residue and Tillage management practices, or other applicable conservation practices cited in the NRCS Field Office Technical Guide.

After Situation:

After EQIP contract approval, participant has obtained services from a certified TSP for development of the Integrated Pest Management Conservation Activity Plan (CAP). The CAP criteria requires the plan to meet quality criteria for applicable resource concerns and provides for opportunities to utilize the following strategies: Prevention, Avoidance, Monitoring, and Suppression, which will be implemented through the use of Integrated Pest Management and may use one or more conservation practices and/or risk reduction strategies. The CAP plan may include recommendations for associated conservation practices which address other related resource concerns. The CAP meets the basic quality criteria for the 114 plan as cited in the NRCS Field Office Technical Guide.

Feature Measure: Number

Scenario Unit: Number

Scenario Typical Size: 1.0

Scenario Total Cost: $2,007.25

Scenario Cost/Unit: $2,007.25

Cost Details:

Component Name	ID	Description	Unit	Cost	QTY	Total
Labor						
CAP Labor, agronomist	1295	Conservation Activity Plan labor to conduct research in breeding, physiology, production, yield, and management of crops and agricultural plants or trees, shrubs, and nursery stock, their growth in soils, and control of pests; or study the chemical, physical, biological, and mineralogical composition of soils as they relate to plant or crop growth. May classify and map soils and investigate effects of alternative practices on soil and crop productivity. May provide on-site consulting services to help growers troubleshoot nutrient and pest problems, establish appropriate agronomic sampling programs and implement management recommendations in a cost-effective and environmentally sound manner.	Hours	$80.29	25	$2,007.25

Practice: 114 - Integrated Pest Management Plan - Written

Scenario: #24 - IPM Management CAP Medium 51 - 250 Acres

Scenario Description:

Various on-farm land uses where pests are managed on a moderately-sized farm where IPM is to be applied. Current pest control activities cause environmental concerns with water quality and/or erosion. Natural Resource Concern: Water quality and all other appropriate resource concerns.

Before Situation:

Producer has no plan or limited knowledge of the control or management of agricultural pests. The producer currently manages pests based upon pesticide label instructions, personal knowledge, or other local criteria. Producer is interested in the management of pests and the reduction of environmental impacts for environmental benefit. Producer is willing to collaborate with a certified TSP to develop a plan and collect/coordinate data recording to monitor per requirements of the plan. Associated Practices: Integrated Pest Management, Crop Rotation, Cover Crop, Field Border, Filter Strip, Stripcropping, and Residue and Tillage management practices, or other applicable conservation practices cited in the NRCS Field Office Technical Guide.

After Situation:

After EQIP contract approval, participant has obtained services from a certified TSP for development of the Integrated Pest Management Conservation Activity Plan (CAP). The CAP criteria requires the plan to meet quality criteria for applicable resource concerns and provides for opportunities to utilize the following strategies: Prevention, Avoidance, Monitoring, and Suppression, which will be implemented through the use of Integrated Pest Management and may use one or more conservation practices and/or risk reduction strategies. The CAP plan may include recommendations for associated conservation practices which address other related resource concerns. The CAP meets the basic quality criteria for the 114 plan as cited in the NRCS Field Office Technical Guide.

Feature Measure: Number

Scenario Unit: Number

Scenario Typical Size: 1.0

Scenario Total Cost: $2,569.28

Scenario Cost/Unit: $2,569.28

Cost Details:

Component Name	ID	Description	Unit	Cost	QTY	Total
Labor						
CAP Labor, agronomist	1295	Conservation Activity Plan labor to conduct research in breeding, physiology, production, yield, and management of crops and agricultural plants or trees, shrubs, and nursery stock, their growth in soils, and control of pests; or study the chemical, physical, biological, and mineralogical composition of soils as they relate to plant or crop growth. May classify and map soils and investigate effects of alternative practices on soil and crop productivity. May provide on-site consulting services to help growers troubleshoot nutrient and pest problems, establish appropriate agronomic sampling programs and implement management recommendations in a cost-effective and environmentally sound manner.	Hours	$80.29	32	$2,569.28

Practice: 114 - Integrated Pest Management Plan - Written

Scenario: #25 - IPM Management CAP Large - Greater Than 250 Acres

Scenario Description:

Various on-farm land uses where pests are managed on a larger farm where IPM strategies are to be applied. Current pest control activities cause environmental concerns with water quality and/or erosion. Natural Resource Concern: Water quality and all other appropriate resource concerns.

Before Situation:

Producer has no plan or limited knowledge of the control or management of agricultural pests. The producer currently manages pests based upon pesticide label instructions, personal knowledge, or other local criteria. Producer is interested in the management of pests and the reduction of environmental impacts for environmental benefit. Producer is willing to collaborate with a certified TSP to develop a plan and collect/coordinate data recording to monitor per requirements of the plan. Associated Practices: Integrated Pest Management, Crop Rotation, Cover Crop, Field Border, Filter Strip, Stripcropping, and Residue and Tillage management practices, or other applicable conservation practices cited in the NRCS Field Office Technical Guide.

After Situation:

After EQIP contract approval, participant has obtained services from a certified TSP for development of the Integrated Pest Management Conservation Activity Plan (CAP). The CAP criteria requires the plan to meet quality criteria for applicable resource concerns and provides for opportunities to utilize the following strategies: Prevention, Avoidance, Monitoring, and Suppression, which will be implemented through the use of Integrated Pest Management and may use one or more conservation practices and/or risk reduction strategies. The CAP plan may include recommendations for associated conservation practices which address other related resource concerns. The CAP meets the basic quality criteria for the 114 plan as cited in the NRCS Field Office Technical Guide.

Feature Measure: Number

Scenario Unit: Number

Scenario Typical Size: 1.0

Scenario Total Cost: $4,014.50

Scenario Cost/Unit: $4,014.50

Cost Details:

Component Name	ID	Description	Unit	Cost	QTY	Total
Labor						
CAP Labor, agronomist	1295	Conservation Activity Plan labor to conduct research in breeding, physiology, production, yield, and management of crops and agricultural plants or trees, shrubs, and nursery stock, their growth in soils, and control of pests; or study the chemical, physical, biological, and mineralogical composition of soils as they relate to plant or crop growth. May classify and map soils and investigate effects of alternative practices on soil and crop productivity. May provide on-site consulting services to help growers troubleshoot nutrient and pest problems, establish appropriate agronomic sampling programs and implement management recommendations in a cost-effective and environmentally sound manner.	Hours	$80.29	50	$4,014.50

Practice: 116 - Soil Health Management Plan - Written

Scenario: #7 - Small Farm

Scenario Description:

Evaluate soil health concerns and develop a transitional cropping management plan to improve overall soil health and address all 4 soil health principles. The plan includes management activities or land management practices associated with crop and forage production on smaller diversified farms (<10 acres).. The soil health management plan ensures that the purposes of crop and forage production and preservation of natural resources related to soil health are compatible.

Before Situation:

Agricultural producer has been farming a system that has not addressed all 4 of the soil health principles. Producer has noticed yield declines, soil degradation, or is simply interested in learning more about soil health management. Producer is willing to collaborate with a certified TSP to develop a plan.

After Situation:

After EQIP contract approval, participant has obtained services from a certified TSP to develop the Soil Health Management CAP. The CAP identifies resource concerns and practices that will address all 4 soil health principles. The CAP meets the criteria for the 116 plan as cited in the NRCS Field Office

Feature Measure: Number

Scenario Unit: Number

Scenario Typical Size: 1.0

Scenario Total Cost: $2,408.70

Scenario Cost/Unit: $2,408.70

Cost Details:

Component Name	ID	Description	Unit	Cost	QTY	Total
Labor						
CAP Labor, agronomist	1295	Conservation Activity Plan labor to conduct research in breeding, physiology, production, yield, and management of crops and agricultural plants or trees, shrubs, and nursery stock, their growth in soils, and control of pests; or study the chemical, physical, biological, and mineralogical composition of soils as they relate to plant or crop growth. May classify and map soils and investigate effects of alternative practices on soil and crop productivity. May provide on-site consulting services to help growers troubleshoot nutrient and pest problems, establish appropriate agronomic sampling programs and implement management recommendations in a cost-effective and environmentally sound manner.	Hours	$80.29	30	$2,408.70

Practice: 116 - Soil Health Management Plan - Written

Scenario: #23 - Crops and Livestock

Scenario Description:

Evaluate soil health concerns and develop a transitional cropping management plan to improve overall soil health and address all 4 soil health principles. The plan includes management activities or land management practices associated with crop, forage and livestock production. The soil health management plan ensures that the purposes of crop and forage production and preservation of natural resources related to soil health are compatible.

Before Situation:

Agricultural producer has been farming a system that has not addressed all 4 of the soil health principles. Producer has noticed yield declines, soil degradation, or is simply interested in learning more about soil health management. Producer is willing to collaborate with a certified TSP to develop a plan.

After Situation:

After EQIP contract approval, participant has obtained services from a certified TSP to develop the Soil Health Management CAP. The CAP identifies resource concerns and practices that will address all 4 soil health principles. The CAP meets the criteria for the 116 plan as cited in the NRCS Field Office

Feature Measure: Number

Scenario Unit: Number

Scenario Typical Size: 1.0

Scenario Total Cost: $4,014.50

Scenario Cost/Unit: $4,014.50

Cost Details:

Component Name	ID	Description	Unit	Cost	QTY	Total
Labor						
CAP Labor, agronomist	1295	Conservation Activity Plan labor to conduct research in breeding, physiology, production, yield, and management of crops and agricultural plants or trees, shrubs, and nursery stock, their growth in soils, and control of pests; or study the chemical, physical, biological, and mineralogical composition of soils as they relate to plant or crop growth. May classify and map soils and investigate effects of alternative practices on soil and crop productivity. May provide on-site consulting services to help growers troubleshoot nutrient and pest problems, establish appropriate agronomic sampling programs and implement management recommendations in a cost-effective and environmentally sound manner.	Hours	$80.29	50	$4,014.50

Practice: 116 - Soil Health Management Plan - Written

Scenario: #39 - Organic Crops and Livestock

Scenario Description:

Evaluate soil health concerns and develop a transitional cropping management plan to improve overall soil health and address all 4 soil health principles. The plan includes management activities or land management practices associated with crop, forage and livestock production on organic or transitioning to organic operations. The soil health management plan ensures that the purposes of crop and forage production and preservation of natural resources related to soil health are compatible.

Before Situation:

Agricultural producer has been farming a system that has not addressed all 4 of the soil health principles. Producer has noticed yield declines, soil degradation, or is simply interested in learning more about soil health management. Producer is willing to collaborate with a certified TSP to develop a plan.

After Situation:

After EQIP contract approval, participant has obtained services from a certified TSP to develop the Soil Health Management CAP. The CAP identifies resource concerns and practices that will address all 4 soil health principles. The CAP meets the criteria for the 116 plan as cited in the NRCS Field Office

Feature Measure: Number

Scenario Unit: Number

Scenario Typical Size: 1.0

Scenario Total Cost: $4,415.95

Scenario Cost/Unit: $4,415.95

Cost Details:

Component Name	ID	Description	Unit	Cost	QTY	Total
Labor						
CAP Labor, agronomist	1295	Conservation Activity Plan labor to conduct research in breeding, physiology, production, yield, and management of crops and agricultural plants or trees, shrubs, and nursery stock, their growth in soils, and control of pests; or study the chemical, physical, biological, and mineralogical composition of soils as they relate to plant or crop growth. May classify and map soils and investigate effects of alternative practices on soil and crop productivity. May provide on-site consulting services to help growers troubleshoot nutrient and pest problems, establish appropriate agronomic sampling programs and implement management recommendations in a cost-effective and environmentally sound manner.	Hours	$80.29	55	$4,415.95

Practice: 116 - Soil Health Management Plan - Written

Scenario: #55 - Organic Crops

Scenario Description:

Evaluate soil health concerns and develop a transitional cropping management plan to improve overall soil health and address all 4 soil health principles. The plan includes management activities or land management practices associated with crop and forage production on organic or transitioning to organic operations. The soil health management plan ensures that the purposes of crop and forage production and preservation of natural resources related to soil health are compatible.

Before Situation:

Agricultural producer has been farming a system that has not addressed all 4 of the soil health principles. Producer has noticed yield declines, soil degradation, or is simply interested in learning more about soil health management. Producer is willing to collaborate with a certified TSP to develop a plan.

After Situation:

After EQIP contract approval, participant has obtained services from a certified TSP to develop the Soil Health Management CAP. The CAP identifies resource concerns and practices that will address all 4 soil health principles. The CAP meets the criteria for the 116 plan as cited in the NRCS Field Office.

Feature Measure: Number

Scenario Unit: Number

Scenario Typical Size: 1.0

Scenario Total Cost: $3,613.05

Scenario Cost/Unit: $3,613.05

Cost Details:

Component Name	ID	Description	Unit	Cost	QTY	Total
Labor						
CAP Labor, agronomist	1295	Conservation Activity Plan labor to conduct research in breeding, physiology, production, yield, and management of crops and agricultural plants or trees, shrubs, and nursery stock, their growth in soils, and control of pests; or study the chemical, physical, biological, and mineralogical composition of soils as they relate to plant or crop growth. May classify and map soils and investigate effects of alternative practices on soil and crop productivity. May provide on-site consulting services to help growers troubleshoot nutrient and pest problems, establish appropriate agronomic sampling programs and implement management recommendations in a cost-effective and environmentally sound manner.	Hours	$80.29	45	$3,613.05

Practice: 116 - Soil Health Management Plan - Written

Scenario: #71 - Crops

Scenario Description:

Evaluate soil health concerns and develop a transitional cropping management plan to improve overall soil health and address all 4 soil health principles. The plan includes management activities or land management practices associated with crop and forage production. The soil health management plan ensures that the purposes of crop and forage production and preservation of natural resources related to soil health are compatible.

Before Situation:

Agricultural producer has been farming a system that has not addressed all 4 of the soil health principles. Producer has noticed yield declines, soil degradation, or is simply interested in learning more about soil health management. Producer is willing to collaborate with a certified TSP to develop a plan.

After Situation:

After EQIP contract approval, participant has obtained services from a certified TSP to develop the Soil Health Management CAP. The CAP identifies resource concerns and practices that will address all 4 soil health principles. The CAP meets the criteria for the 116 plan as cited in the NRCS Field Office

Feature Measure: Number

Scenario Unit: Number

Scenario Typical Size: 1.0

Scenario Total Cost: $3,211.60

Scenario Cost/Unit: $3,211.60

Cost Details:

Component Name	ID	Description	Unit	Cost	QTY	Total
Labor						
CAP Labor, agronomist	1295	Conservation Activity Plan labor to conduct research in breeding, physiology, production, yield, and management of crops and agricultural plants or trees, shrubs, and nursery stock, their growth in soils, and control of pests; or study the chemical, physical, biological, and mineralogical composition of soils as they relate to plant or crop growth. May classify and map soils and investigate effects of alternative practices on soil and crop productivity. May provide on-site consulting services to help growers troubleshoot nutrient and pest problems, establish appropriate agronomic sampling programs and implement management recommendations in a cost-effective and environmentally sound manner.	Hours	$80.29	40	$3,211.60

Practice: 118 - Irrigation Water Management Plan - Written

Scenario: #9 - Irrigation Water Management Conservation Activity Plan CAP

Scenario Description:

Agricultural operations supported with existing irrigation systems. Natural Resource Concern: Water quantity and all other appropriate resource concerns.

Before Situation:

Producer has no plan or limited knowledge for management of water application to meet crop needs and address identified resource concerns. The producer currently manages water application based upon personal knowledge, or other local criteria. Producer is interested in management of irrigation water to maximize yields, improve profit margins, reduce costs, and for environmental benefit. Producer is willing to collaborate with a certified TSP to develop a plan and collect/coordinate data recording to monitor per requirements of plan. Associated Practices: Irrigation Water Management (449); Irrigation System (442); Irrigation System, Surface & Subsurface (443); Irrigation Pipeline (430); Irrigation Ditch Lining (428); Irrigation Field Ditch (388); Irrigation Canal or Lateral (320); Structure for Water Control (587); Irrigation Reservoir (436); Irrigation System, Tailwater Recovery (447); Pumping Plant (533); Irrigation Land Leveling (464); Anionic Polyacrylamide (PM) Application (450); Salinity and Sodic Soil Management (590); Nutrient Management (590); Waste Utilization (633); or other applicable conservation practices in the NRCS Field Office Technical Guide.

After Situation:

After EQIP contract approval, participant has obtained services from a certified TSP for development of the Irrigation Water Management Conservation Activity Plan (CAP) to control the volume, frequency, and rate of water for efficient irrigation and to address other resource concerns. The CAP criteria requires the plan to meet quality criteria for applicable resource concerns. The CAP plan may include recommendations for associated conservation practices which address other related resource concerns. The CAP meets the basic quality criteria for the 118 plan as cited in the NRCS Field Office Technical Guide.

Feature Measure: Number

Scenario Unit: Number

Scenario Typical Size: 1.0

Scenario Total Cost: $3,625.30

Scenario Cost/Unit: $3,625.30

Cost Details:

Component Name	ID	Description	Unit	Cost	QTY	Total
Labor						
CAP Labor, professional engineer	1297	Conservation Activity Plan labor to apply knowledge of engineering technology and biological science to agricultural problems concerned with power and machinery, electrification, structures, soil and water conservation, and processing of agricultural products. Cost associated with this component includes overhead and benefits (market price).	Hours	$103.58	35	$3,625.30

Practice: 118 - Irrigation Water Management Plan - Written

Scenario: #17 - Irrigation Water Management CAP with Pump Test

Scenario Description:

Agricultural operations supported with existing irrigation systems. Natural Resource Concern: Water quantity and all other appropriate resource concerns.

Before Situation:

Producer has no plan or limited knowledge for management of water application to meet crop needs and address identified resource concerns. The producer currently manages water application based upon personal knowledge, or other local criteria. The pump for the irrigation system is of unknown performance and older than 3 years. Producer is interested in management of irrigation water to maximize yields, improve profit margins, reduce costs, and for environmental benefit. Producer is willing to collaborate with a certified TSP to develop a plan and collect/coordinate data recording to monitor per requirements of the plan. Associated Practices: Irrigation Water Management (449); Irrigation System (442); Irrigation System, Surface & Subsurface (443); Irrigation Pipeline (430); Irrigation Ditch Lining (428); Irrigation Field Ditch (388); Irrigation Canal or Lateral (320); Structure for Water Control (587); Irrigation Reservoir (436); Irrigation System, Tailwater Recovery (447); Pumping Plant (533); Irrigation Land Leveling (464); Anionic Polyacrylamide (PM) Application (450); Salinity and Sodic Soil Management (590); Nutrient Management (590); Waste Utilization (633); or other applicable conservation practices in the NRCS Field Office Technical Guide.

After Situation:

After EQIP contract approval, participant has obtained services from a certified TSP for the development of the Irrigation Water Management Conservation Activity Plan (CAP) to control the volume, frequency, and rate of water for efficient irrigation and to address other resource concerns. Because a pump test was performed, a new pump that operates more efficiently and matches the irrigation system has been analyzed and could possibly be installed such that less water and energy are consumed. The CAP criteria requires the plan to meet quality criteria for applicable resource concerns. The CAP plan may include recommendations for associated conservation practices which address other related resource concerns. CAP meets the basic quality criteria for the 118 plan as cited in the NRCS Field Office Technical Guide.

Feature Measure: Acre

Scenario Unit: Number

Scenario Typical Size: 1.0

Scenario Total Cost: $5,696.90

Scenario Cost/Unit: $5,696.90

Cost Details:

Component Name	ID	Description	Unit	Cost	QTY	Total
Labor						
CAP Labor, professional engineer	1297	Conservation Activity Plan labor to apply knowledge of engineering technology and biological science to agricultural problems concerned with power and machinery, electrification, structures, soil and water conservation, and processing of agricultural products. Cost associated with this component includes overhead and benefits (market price).	Hours	$103.58	55	$5,696.90

Practice: 128 - Agricultural Energy Management Plan - Written

Scenario: #113 - AgEMP Small, One Enterprise

Scenario Description:

Typical operation has either < 300 acres, < 300 AU, up to 2 irrigation pumps, < 20,000 sq. ft. of heater greenhouse, or a maple syrup enterprise. One enterprise as defined in the ASABE S612 Standard on-farm energy audit standard. A small operation is as described above. Agricultural producer currently has minimal knowledge of and no plan for energy conservation. The producer is willing to collaborate with a certified TSP to develop an AgEMP 128 CAP. The AgEMP is a grouping of conservation measures and management activities which, when implemented as part of a conservation system, will help to ensure that both production and natural resource protection goals are achieved. An AgEMP incorporates recommended measures to maximize energy conservation and efficiency. Natural Resource Concern: Energy Conservation

Before Situation:

Producer currently has minimal knowledge of and no plan for energy conservation. The producer currently manages a small operation as described above. Producer is willing to collaborate with a certified TSP to develop an AgEMP 128 CAP. The AgEMP is a grouping of conservation measures and management activities which, when implemented as part of a conservation system, will help to ensure that both production and natural resource protection goals are achieved. An AgEMP incorporates recommended measures to maximize energy conservation and efficiency. Associated Practices: 374 Farmstead Energy Improvement, 670 Lighting System Improvement, 672 Building Envelope Improvement, or other applicable practices approved in the NRCS Field Office Technical Guide.

After Situation:

After EQIP contract approval, participant has obtained services from a certified TSP for development of the Agricultural Energy Management Plan. The CAP criteria requires the plan to meet quality criteria for energy conservation and efficiency. The CAP plan may include recommendations for associated conservation practices which address energy conservation. The CAP meets the basic quality criteria for the 128 plan as cited in the NRCS Field Office Technical Guide.

Feature Measure: Number

Scenario Unit: Number

Scenario Typical Size: 1.0

Scenario Total Cost: $2,404.16

Scenario Cost/Unit: $2,404.16

Cost Details:

Component Name	ID	Description	Unit	Cost	QTY	Total
Labor						
CAP Labor, professional engineer	1297	Conservation Activity Plan labor to apply knowledge of engineering technology and biological science to agricultural problems concerned with power and machinery, electrification, structures, soil and water conservation, and processing of agricultural products. Cost associated with this component includes overhead and benefits (market price).	Hours	$103.58	9	$932.22
CAP Labor, Manager	1603	Conservation Activity Plan labor involving supervision or management activities. Includes crew supervisors, foremen and farm/ranch managers time required for adopting new technology, etc.	Hours	$45.12	17	$767.04
CAP Labor, Administrative Assistant	1739	Conservation Activity Plan labor involving routine clerical and administrative functions such as drafting correspondence, scheduling appointments, organizing and maintaining paper and electronic files, or providing information to callers.	Hours	$29.77	1.5	$44.66
CAP Labor, Energy Auditor	1740	Conservation Activity Plan labor involving analyzing energy efficient measures and conducting energy audits of industrial areas and facilities.	Hours	$55.02	12	$660.24

Practice: 128 - Agricultural Energy Management Plan - Written

Scenario: #114 - AgEMP Medium, One Enterprise

Scenario Description:

Typical operation has either 301 to 2500 acres, 301 to 1000 AU, 3 to 6 Irrigation Pumps, or 20,001 to 40,000 sq. ft. heated greenhouse. One enterprise as defined in the ASABE S612 Standard on-farm energy audit standard in combination with a medium operation, one of which is described above. Agricultural producer currently has minimal knowledge of and no plan for energy conservation. The producer is willing to collaborate with a certified TSP to develop an AgEMP 128 CAP. The AgEMP is a grouping of conservation measures and management activities which, when implemented as part of a conservation system, will help to ensure that both production and natural resource protection goals are achieved. An AgEMP incorporates recommended measures to maximize energy conservation and efficiency. Natural Resource concern: Energy Conservation

Before Situation:

Producer currently has minimal knowledge of and no plan for energy conservation. Producer currently manages a medium small operation with enterprise described above. The producer is willing to collaborate with a certified TSP to develop an AgEMP 128 CAP. The AgEMP is a grouping of conservation measures and management activities which, when implemented as part of a conservation system, will help to ensure that both production and natural resource protection goals are achieved. An AgEMP incorporates recommended measures to maximize energy conservation and efficiency. Associated Practices: 374 Farmstead Energy Improvement, 670 Lighting System Improvement, 672 Building Envelope Improvement or other applicable practices approved in the NRCS Field Office Technical Guide.

After Situation:

After EQIP contract approval, participant has obtained services from a certified TSP for development of the Agricultural Energy Management Plan. The CAP criteria requires the plan to meet quality criteria for energy conservation and efficiency. The CAP plan may include recommendations for associated conservation practices which address energy conservation. The CAP meets the basic quality criteria for the 128 plan as cited in the NRCS Field Office Technical Guide.

Feature Measure: Number

Scenario Unit: Number

Scenario Typical Size: 1.0

Scenario Total Cost: $2,994.98

Scenario Cost/Unit: $2,994.98

Cost Details:

Component Name	ID	Description	Unit	Cost	QTY	Total
Labor						
CAP Labor, professional engineer	1297	Conservation Activity Plan labor to apply knowledge of engineering technology and biological science to agricultural problems concerned with power and machinery, electrification, structures, soil and water conservation, and processing of agricultural products. Cost associated with this component includes overhead and benefits (market price).	Hours	$103.58	12	$1,242.96
CAP Labor, Manager	1603	Conservation Activity Plan labor involving supervision or management activities. Includes crew supervisors, foremen and farm/ranch managers time required for adopting new technology, etc.	Hours	$45.12	18	$812.16
CAP Labor, Administrative Assistant	1739	Conservation Activity Plan labor involving routine clerical and administrative functions such as drafting correspondence, scheduling appointments, organizing and maintaining paper and electronic files, or providing information to callers.	Hours	$29.77	2	$59.54
CAP Labor, Energy Auditor	1740	Conservation Activity Plan labor involving analyzing energy efficient measures and conducting energy audits of industrial areas and facilities.	Hours	$55.02	16	$880.32

Practice: 128 - Agricultural Energy Management Plan - Written

Scenario: #115 - AgEMP Large, One Enterprise

Scenario Description:

Typical operation has either > 2,500 acres, > 1000 AU, more than 7 irrigation pumps, or > 40,001 sq. ft. of heater greenhouse. One enterprise as defined in the ASABE S612 Standard on-farm energy audit standard in combination with a large operation with one enterprise, one of which is described above. Agricultural producer currently has minimal knowledge of and no plan for energy conservation. The producer is willing to collaborate with a certified TSP to develop an AgEMP 128 CAP. The AgEMP is a grouping of conservation measures and management activities which, when implemented as part of a conservation system, will help to ensure that both production and natural resource protection goals are achieved. An AgEMP incorporates recommended measures to maximize energy conservation and efficiency. Natural Resource Concern: Energy Conservation.

Before Situation:

Producer currently has minimal knowledge of and no plan for energy conservation. The producer currently manages a large operation with enterprises as described above. The producer is willing to collaborate with a certified TSP to develop an AgEMP 128 CAP. The AgEMP is a grouping of conservation measures and management activities which, when implemented as part of a conservation system, will help to ensure that both production and natural resource protection goals are achieved. An AgEMP incorporates recommended measures to maximize energy conservation and efficiency. Associated Practices: 374 Farmstead Energy Improvement, 670 Lighting System Improvement, 672 Building Envelope Improvement, or other applicable practices approved in the NRCS Field Office Technical Guide.

After Situation:

After EQIP contract approval, participant has obtained services from a certified TSP for development of the Agricultural Energy Management Plan. The CAP criteria requires the plan to meet quality criteria for energy conservation and efficiency. The CAP plan may include recommendations for associated conservation practices which address energy conservation. The CAP meets the basic quality criteria for the 128 plan as cited in the NRCS Field Office Technical Guide.

Feature Measure: Number

Scenario Unit: Number

Scenario Typical Size: 1.0

Scenario Total Cost: $3,935.21

Scenario Cost/Unit: $3,935.21

Cost Details:

Component Name	ID	Description	Unit	Cost	QTY	Total
Labor						
CAP Labor, professional engineer	1297	Conservation Activity Plan labor to apply knowledge of engineering technology and biological science to agricultural problems concerned with power and machinery, electrification, structures, soil and water conservation, and processing of agricultural products. Cost associated with this component includes overhead and benefits (market price).	Hours	$103.58	19	$1,968.02
CAP Labor, Manager	1603	Conservation Activity Plan labor involving supervision or management activities. Includes crew supervisors, foremen and farm/ranch managers time required for adopting new technology, etc.	Hours	$45.12	20	$902.40
CAP Labor, Administrative Assistant	1739	Conservation Activity Plan labor involving routine clerical and administrative functions such as drafting correspondence, scheduling appointments, organizing and maintaining paper and electronic files, or providing information to callers.	Hours	$29.77	2.5	$74.43
CAP Labor, Energy Auditor	1740	Conservation Activity Plan labor involving analyzing energy efficient measures and conducting energy audits of industrial areas and facilities.	Hours	$55.02	18	$990.36

Practice: 128 - Agricultural Energy Management Plan - Written

Scenario: #116 - AgEMP Small, Two Enterprise

Scenario Description:

Typical operation has either <300 acres, < 300 AU, up to 2 irrigation pumps, or < 20,000 sq. ft. heated greenhouse. Two enterprises as defined in the ASABE S612 Standard on-farm energy audit standard. A small operation as described above. Agricultural producer currently has minimal knowledge of and no plan for energy conservation. The producer is willing to collaborate with a certified TSP to develop an AgEMP 128 CAP. The AgEMP is a grouping of conservation measures and management activities which, when implemented as part of a conservation system, will help to ensure that both production and natural resource protection goals are achieved. An AgEMP incorporates recommended measures to maximize energy conservation and efficiency. Natural Resource Concern: Energy Conservation

Before Situation:

Producer currently has minimal knowledge of and no plan for energy conservation. An Agricultural Energy Management CAP for any type small sized operation with two enterprises will be planned according to the ASABE S612 Standard (e.g., broiler and greenhouse). The producer is willing to collaborate with a certified TSP to develop an AgEMP 128 CAP. The AgEMP is a grouping of conservation measures and management activities which, when implemented as part of a conservation system, will help to ensure that both production and natural resource protection goals are achieved. An AgEMP incorporates recommended measures to maximize energy conservation and efficiency. Associated Practices: 374 Farmstead Energy Improvement, 670 Lighting System Improvement, 672 Building Envelope Improvement, or other applicable practices approved in the NRCS Field Office Technical Guide.

After Situation:

After EQIP contract approval, participant has obtained services from a certified TSP for development of the Agricultural Energy Management Plan. The CAP criteria requires the plan to meet quality criteria for energy conservation and efficiency. The CAP plan may include recommendations for associated conservation practices which address energy conservation. The CAP meets the basic quality criteria for the 128 plan as cited in the NRCS Field Office Technical Guide.

Feature Measure: Number

Scenario Unit: Number

Scenario Typical Size: 1.0

Scenario Total Cost: $3,731.07

Scenario Cost/Unit: $3,731.07

Cost Details:

Component Name	ID	Description	Unit	Cost	QTY	Total
Labor						
CAP Labor, professional engineer	1297	Conservation Activity Plan labor to apply knowledge of engineering technology and biological science to agricultural problems concerned with power and machinery, electrification, structures, soil and water conservation, and processing of agricultural products. Cost associated with this component includes overhead and benefits (market price).	Hours	$103.58	15	$1,553.70
CAP Labor, Manager	1603	Conservation Activity Plan labor involving supervision or management activities. Includes crew supervisors, foremen and farm/ranch managers time required for adopting new technology, etc.	Hours	$45.12	21	$947.52
CAP Labor, Administrative Assistant	1739	Conservation Activity Plan labor involving routine clerical and administrative functions such as drafting correspondence, scheduling appointments, organizing and maintaining paper and electronic files, or providing information to callers.	Hours	$29.77	2.5	$74.43
CAP Labor, Energy Auditor	1740	Conservation Activity Plan labor involving analyzing energy efficient measures and conducting energy audits of industrial areas and facilities.	Hours	$55.02	21	$1,155.42

Practice: 128 - Agricultural Energy Management Plan - Written

Scenario: #117 - AgEMP Medium Two Enterprises

Scenario Description:

Typical operation has either 301 to 2500 acres, 301 to 1000 AU, 3 to 6 Irrigation Pumps, or 20,001 to 40,000 sq. ft. heated greenhouse. Two enterprises as defined in the ASABE S612 Standard on-farm energy audit standard in combination with a medium operation, one of which is described above. Agricultural producer currently has minimal knowledge of and no plan for energy conservation. Producer is willing to collaborate with a certified TSP to develop an AgEMP 128 CAP. The AgEMP is a grouping of conservation measures and management activities which, when implemented as part of a conservation system, will help to ensure that both production and natural resource protection goals are achieved. An AgEMP incorporates recommended measures to maximize energy conservation and efficiency. Natural Resource concern: Energy Conservation

Before Situation:

Producer currently has minimal knowledge of and no plan for energy conservation. An Agricultural Energy Management CAP for any operation with two enterprises will be planned according to the ASABE S612 Standard (e.g., broiler and greenhouse). Producer is willing to collaborate with a certified TSP to develop an AgEMP 128 CAP. The AgEMP is a grouping of conservation measures and management activities which, when implemented as part of a conservation system, will help to ensure that both production and natural resource protection goals are achieved. An AgEMP incorporates recommended measures to maximize energy conservation and efficiency. Associated Practices: 374 Farmstead Energy Improvement, 670 Lighting System Improvement, 672 Building Envelope Improvement, or other applicable practices approved in the NRCS Field Office Technical Guide.

After Situation:

After EQIP contract approval, participant has obtained services from a certified TSP for development of the Agricultural Energy Management Plan. The CAP criteria requires the plan to meet quality criteria for energy conservation and efficiency. The CAP plan may include recommendations for associated conservation practices which address energy conservation. The CAP meets the basic quality criteria for the 128 plan as cited in the NRCS Field Office Technical Guide.

Feature Measure: Number

Scenario Unit: Number

Scenario Typical Size: 1.0

Scenario Total Cost: $5,057.98

Scenario Cost/Unit: $5,057.98

Cost Details:

Component Name	ID	Description	Unit	Cost	QTY	Total
Labor						
CAP Labor, professional engineer	1297	Conservation Activity Plan labor to apply knowledge of engineering technology and biological science to agricultural problems concerned with power and machinery, electrification, structures, soil and water conservation, and processing of agricultural products. Cost associated with this component includes overhead and benefits (market price).	Hours	$103.58	21	$2,175.18
CAP Labor, Manager	1603	Conservation Activity Plan labor involving supervision or management activities. Includes crew supervisors, foremen and farm/ranch managers time required for adopting new technology, etc.	Hours	$45.12	25	$1,128.00
CAP Labor, Administrative Assistant	1739	Conservation Activity Plan labor involving routine clerical and administrative functions such as drafting correspondence, scheduling appointments, organizing and maintaining paper and electronic files, or providing information to callers.	Hours	$29.77	3.5	$104.20
CAP Labor, Energy Auditor	1740	Conservation Activity Plan labor involving analyzing energy efficient measures and conducting energy audits of industrial areas and facilities.	Hours	$55.02	30	$1,650.60

Practice: 128 - Agricultural Energy Management Plan - Written

Scenario: #118 - AgEMP Large, Two Enterprises

Scenario Description:

Typical operation has either > 2,500 acres, > 1000 AU, more than 7 irrigation pumps, or > 40,001 sq. ft. of heater greenhouse. Two enterprises as defined in the ASABE S612 Standard on-farm energy audit standard in combination with a large operation, one of which is described above. Multiple irrigation systems or a mixture of irrigation types may be counted as one of the extra enterprises. Agricultural producer currently has minimal knowledge of and no plan for energy conservation. the producer is willing to collaborate with a certified TSP to develop an AgEMP 128 CAP. The AgEMP is a grouping of conservation measures and management activities which, when implemented as part of a conservation system, will help to ensure that both production and natural resource protection goals are achieved. An AgEMP incorporates recommended measures to maximize energy conservation and efficiency. Natural Resource concern: Energy Conservation

Before Situation:

Producer currently has minimal knowledge of and no plan for energy conservation. An Agricultural Energy Management CAP for any operation with two enterprises (complex or multiple irrigation systems can count as one of the extra enterprises) will be planned according to the ASABE S612 Standard (e.g., broiler and greenhouse). The producer is willing to collaborate with a certified TSP to develop an AgEMP 128 CAP. The AgEMP is a grouping of conservation measures and management activities which, when implemented as part of a conservation system, will help to ensure that both production and natural resource protection goals are achieved. An AgEMP incorporates recommended measures to maximize energy conservation and efficiency. An EMP is developed to assist an owner/operator in meeting all applicable local, tribal, State, and Federal water quality goals or regulations. Associated Practices: 449 Irrigation Water Management, 374 Farmstead Energy Improvement, 670 Lighting System Improvement, 672 Building Envelope Improvement, or other applicable practices approved in the NRCS Field Office Technical Guide.

After Situation:

After EQIP contract approval, participant has obtained services from a certified TSP for development of the Agricultural Energy Management Plan. The CAP criteria requires the plan to meet quality criteria for energy conservation and efficiency. The CAP plan may include recommendations for associated conservation practices which address energy conservation. The CAP meets the basic quality criteria for the 128 plan as cited in the NRCS Field Office Technical Guide.

Feature Measure: Number

Scenario Unit: Number

Scenario Typical Size: 1.0

Scenario Total Cost: $6,902.79

Scenario Cost/Unit: $6,902.79

Cost Details:

Component Name	ID	Description	Unit	Cost	QTY	Total
Labor						
CAP Labor, professional engineer	1297	Conservation Activity Plan labor to apply knowledge of engineering technology and biological science to agricultural problems concerned with power and machinery, electrification, structures, soil and water conservation, and processing of agricultural products. Cost associated with this component includes overhead and benefits (market price).	Hours	$103.58	32	$3,314.56
CAP Labor, Manager	1603	Conservation Activity Plan labor involving supervision or management activities. Includes crew supervisors, foremen and farm/ranch managers time required for adopting new technology, etc.	Hours	$45.12	29	$1,308.48
CAP Labor, Administrative Assistant	1739	Conservation Activity Plan labor involving routine clerical and administrative functions such as drafting correspondence, scheduling appointments, organizing and maintaining paper and electronic files, or providing information to callers.	Hours	$29.77	4.5	$133.97
CAP Labor, Energy Auditor	1740	Conservation Activity Plan labor involving analyzing energy efficient measures and conducting energy audits of industrial areas and facilities.	Hours	$55.02	39	$2,145.78

Practice: 128 - Agricultural Energy Management Plan - Written

Scenario: #119 - AgEMP Small, Three Enterprise

Scenario Description:

Typical operation has either < 300 acres, < 300 AU, up to 2 irrigation pumps, or < 20,000 sq. ft. of heater greenhouse. Three enterprises as defined in the ASABE S612 Standard on-farm energy audit standard in combination with a small operation, one of which is described above. Agricultural producer currently has minimal knowledge of and no plan for energy conservation. The producer is willing to collaborate with a certified TSP to develop an AgEMP 128 CAP. The AgEMP is a grouping of conservation measures and management activities which, when implemented as part of a conservation system, will help to ensure that both production and natural resource protection goals are achieved. An AgEMP incorporates recommended measures to maximize energy conservation and efficiency. Natural Resource Concern: Energy Conservation

Before Situation:

Producer currently has minimal knowledge of and no plan for energy conservation. An Agricultural Energy Management CAP for any type of operation with three enterprises will be planned according to the ASABE S612 Standard (e.g., broiler and greenhouse). The producer is willing to collaborate with a certified TSP to develop an AgEMP 122 CAP. The AgEMP is a grouping of conservation measures and management activities which, when implemented as part of a conservation system, will help to ensure that both production and natural resource protection goals are achieved. An AgEMP incorporates recommended measures to maximize energy conservation and efficiency. Associated Practices: 374 Farmstead Energy Improvement, 670 Lighting System Improvement, 672 Building Envelope Improvement, or other applicable practices approved in the NRCS Field Office Technical Guide.

After Situation:

After EQIP contract approval, participant has obtained services from a certified TSP for development of the Agricultural Energy Management Plan. The CAP criteria requires the plan to meet quality criteria for energy conservation and efficiency. The CAP plan may include recommendations for associated conservation practices which address energy conservation. The CAP meets the basic quality criteria for the 128 plan as cited in the NRCS Field Office Technical Guide.

Feature Measure: Number

Scenario Unit: Number

Scenario Typical Size: 1.0

Scenario Total Cost: $4,321.89

Scenario Cost/Unit: $4,321.89

Cost Details:

Component Name	ID	Description	Unit	Cost	QTY	Total
Labor						
CAP Labor, professional engineer	1297	Conservation Activity Plan labor to apply knowledge of engineering technology and biological science to agricultural problems concerned with power and machinery, electrification, structures, soil and water conservation, and processing of agricultural products. Cost associated with this component includes overhead and benefits (market price).	Hours	$103.58	18	$1,864.44
CAP Labor, Manager	1603	Conservation Activity Plan labor involving supervision or management activities. Includes crew supervisors, foremen and farm/ranch managers time required for adopting new technology, etc.	Hours	$45.12	22	$992.64
CAP Labor, Administrative Assistant	1739	Conservation Activity Plan labor involving routine clerical and administrative functions such as drafting correspondence, scheduling appointments, organizing and maintaining paper and electronic files, or providing information to callers.	Hours	$29.77	3	$89.31
CAP Labor, Energy Auditor	1740	Conservation Activity Plan labor involving analyzing energy efficient measures and conducting energy audits of industrial areas and facilities.	Hours	$55.02	25	$1,375.50

Practice: 128 - Agricultural Energy Management Plan - Written

Scenario: #120 - AgEMP Medium, Three Enterprise

Scenario Description:

Typical operation has either 301 to 2500 acres, 301 to 1000 AU, 3 to 6 Irrigation Pumps, or 20,001 to 40,000 sq. ft. heated greenhouse. Three enterprises as defined in the ASABE S612 Standard on-farm energy audit standard in combination with a medium operation, one of which is described above. Agricultural producer currently has minimal knowledge of and no plan for energy conservation. The producer is willing to collaborate with a certified TSP to develop an AgEMP 128 CAP. The AgEMP is a grouping of conservation measures and management activities which, when implemented as part of a conservation system, will help to ensure that both production and natural resource protection goals are achieved. An AgEMP incorporates recommended measures to maximize energy conservation and efficiency. Natural Resource Concern: Energy Conservation.

Before Situation:

Producer currently has minimal knowledge of and no plan for energy conservation. An Agricultural Energy Management CAP for any type of operation with three enterprises will be planned according to the ASABE S612 Standard (e.g., broiler and greenhouse). The producer is willing to collaborate with a certified TSP to develop an AgEMP 128 CAP. The AgEMP is a grouping of conservation measures and management activities which, when implemented as part of a conservation system, will help to ensure that both production and natural resource protection goals are achieved. An AgEMP incorporates recommended measures to maximize energy conservation and efficiency. Associated Practices: 374 Farmstead Energy Improvement, 670 Lighting System Improvement, 672 Building Envelope Improvement, or other applicable practices approved in the NRCS Field Office Technical Guide.

After Situation:

After EQIP contract approval, participant has obtained services from a certified TSP for development of the Agricultural Energy Management Plan. The CAP criteria requires the plan to meet quality criteria for energy conservation and efficiency. The CAP plan may include recommendations for associated conservation practices which address energy conservation. The CAP meets the basic quality criteria for the 128 plan as cited in the NRCS Field Office Technical Guide.

Feature Measure: Number

Scenario Unit: Number

Scenario Typical Size: 1.0

Scenario Total Cost: $5,648.80

Scenario Cost/Unit: $5,648.80

Cost Details:

Component Name	ID	Description	Unit	Cost	QTY	Total
Labor						
CAP Labor, professional engineer	1297	Conservation Activity Plan labor to apply knowledge of engineering technology and biological science to agricultural problems concerned with power and machinery, electrification, structures, soil and water conservation, and processing of agricultural products. Cost associated with this component includes overhead and benefits (market price).	Hours	$103.58	24	$2,485.92
CAP Labor, Manager	1603	Conservation Activity Plan labor involving supervision or management activities. Includes crew supervisors, foremen and farm/ranch managers time required for adopting new technology, etc.	Hours	$45.12	26	$1,173.12
CAP Labor, Administrative Assistant	1739	Conservation Activity Plan labor involving routine clerical and administrative functions such as drafting correspondence, scheduling appointments, organizing and maintaining paper and electronic files, or providing information to callers.	Hours	$29.77	4	$119.08
CAP Labor, Energy Auditor	1740	Conservation Activity Plan labor involving analyzing energy efficient measures and conducting energy audits of industrial areas and facilities.	Hours	$55.02	34	$1,870.68

Practice: 128 - Agricultural Energy Management Plan - Written

Scenario: #121 - AgEMP Large, Three Enterprise

Scenario Description:

Typical operation has either > 2,500 acres, > 1000 AU, more than 7 irrigation pumps, or > 40,001 sq. ft. of heater greenhouse. Three enterprises as defined in the ASABE S612 Standard on-farm energy audit standard in combination with a large operation, one of which is described above. Multiple irrigation systems or a mixture of irrigation types may be counted as one of the extra enterprises. Agricultural producer currently has minimal knowledge of and no plan for energy conservation. The producer is willing to collaborate with a certified TSP to develop an AgEMP 128 CAP. The AgEMP is a grouping of conservation measures and management activities which, when implemented as part of a conservation system, will help to ensure that both production and natural resource protection goals are achieved. An AgEMP incorporates recommended measures to maximize energy conservation and efficiency. Natural Resource Concern: Energy Conservation.

Before Situation:

Producer currently has minimal knowledge of and no plan for energy conservation. An Agricultural Energy Management CAP for any type operation with three enterprises (complex or multiple irrigation systems can count as one of the extra enterprises) will be planned according to the ASABE S612 Standard (e.g., broiler and greenhouse). The producer is willing to collaborate with a certified TSP to develop an AgEMP 128 CAP. The AgEMP is a grouping of conservation measures and management activities which, when implemented as part of a conservation system, will help to ensure that both production and natural resource protection goals are achieved. An AgEMP incorporates recommended measures to maximize energy conservation and efficiency. Associated Practices: 449 Irrigation Water Management, 374 Farmstead Energy Improvement, 670 Lighting System Improvement, 672 Building Envelope Improvement, or other applicable practices approved in the NRCS Field Office Technical Guide.

After Situation:

After EQIP contract approval, participant has obtained services from a certified TSP for development of the Agricultural Energy Management Plan. The CAP criteria requires the plan to meet quality criteria for energy conservation and efficiency. The CAP plan may include recommendations for associated conservation practices which address energy conservation. The CAP meets the basic quality criteria for the 128 plan as cited in the NRCS Field Office Technical Guide.

Feature Measure: Number

Scenario Unit: Number

Scenario Typical Size: 1.0

Scenario Total Cost: $7,597.19

Scenario Cost/Unit: $7,597.19

Cost Details:

Component Name	ID	Description	Unit	Cost	QTY	Total
Labor						
CAP Labor, professional engineer	1297	Conservation Activity Plan labor to apply knowledge of engineering technology and biological science to agricultural problems concerned with power and machinery, electrification, structures, soil and water conservation, and processing of agricultural products. Cost associated with this component includes overhead and benefits (market price).	Hours	$103.58	36	$3,728.88
CAP Labor, Manager	1603	Conservation Activity Plan labor involving supervision or management activities. Includes crew supervisors, foremen and farm/ranch managers time required for adopting new technology, etc.	Hours	$45.12	30	$1,353.60
CAP Labor, Administrative Assistant	1739	Conservation Activity Plan labor involving routine clerical and administrative functions such as drafting correspondence, scheduling appointments, organizing and maintaining paper and electronic files, or providing information to callers.	Hours	$29.77	5	$148.85
CAP Labor, Energy Auditor	1740	Conservation Activity Plan labor involving analyzing energy efficient measures and conducting energy audits of industrial areas and facilities.	Hours	$55.02	43	$2,365.86

Practice: 128 - Agricultural Energy Management Plan - Written

Scenario: #122 - AgEMP Small, Four Enterprises

Scenario Description:

Typical operation has either < 300 acres, < 300 AU, up to 2 irrigation pumps, or < 20,000 sq. ft. of heater greenhouse. Four enterprises as defined in the ASABE S612 Standard on-farm energy audit standard in combination with a small operation, one of which is described above. Agricultural producer currently has minimal knowledge of and no plan for energy conservation. The producer is willing to collaborate with a certified TSP to develop an AgEMP 128 CAP. The AgEMP is a grouping of conservation measures and management activities which, when implemented as part of a conservation system, will help to ensure that both production and natural resource protection goals are achieved. An AgEMP incorporates recommended measures to maximize energy conservation and efficiency. Natural Resource Concern: Energy Conservation.

Before Situation:

Producer currently has minimal knowledge of and no plan for energy conservation. An Agricultural Energy Management CAP for any operation with four enterprises will be planned according to the ASABE S612 Standard (e.g., broiler and greenhouse). the producer is willing to collaborate with a certified TSP to develop an AgEMP 128 CAP. The AgEMP is a grouping of conservation measures and management activities which, when implemented as part of a conservation system, will help to ensure that both production and natural resource protection goals are achieved. An AgEMP incorporates recommended measures to maximize energy conservation and efficiency. Associated Practices: 374 Farmstead Energy Improvement, 670 Lighting System Improvement, 672 Building Envelope Improvement, or other applicable practices approved in the NRCS Field Office Technical Guide.

After Situation:

After EQIP contract approval, participant has obtained services from a certified TSP for development of the Agricultural Energy Management Plan. The CAP criteria requires the plan to meet quality criteria for energy conservation and efficiency. The CAP plan may include recommendations for associated conservation practices which address energy conservation. The CAP meets the basic quality criteria for the 128 plan as cited in the NRCS Field Office Technical Guide.

Feature Measure: Number

Scenario Unit: Number

Scenario Typical Size: 1.0

Scenario Total Cost: $5,262.12

Scenario Cost/Unit: $5,262.12

Cost Details:

Component Name	ID	Description	Unit	Cost	QTY	Total
Labor						
CAP Labor, professional engineer	1297	Conservation Activity Plan labor to apply knowledge of engineering technology and biological science to agricultural problems concerned with power and machinery, electrification, structures, soil and water conservation, and processing of agricultural products. Cost associated with this component includes overhead and benefits (market price).	Hours	$103.58	25	$2,589.50
CAP Labor, Manager	1603	Conservation Activity Plan labor involving supervision or management activities. Includes crew supervisors, foremen and farm/ranch managers time required for adopting new technology, etc.	Hours	$45.12	24	$1,082.88
CAP Labor, Administrative Assistant	1739	Conservation Activity Plan labor involving routine clerical and administrative functions such as drafting correspondence, scheduling appointments, organizing and maintaining paper and electronic files, or providing information to callers.	Hours	$29.77	3.5	$104.20
CAP Labor, Energy Auditor	1740	Conservation Activity Plan labor involving analyzing energy efficient measures and conducting energy audits of industrial areas and facilities.	Hours	$55.02	27	$1,485.54

Practice: 128 - Agricultural Energy Management Plan - Written

Scenario: #123 - AgEMP 128 Medium, Four Enterprise

Scenario Description:

Typical operation has either 301 to 2500 acres, 301 to 1000 AU, 3 to 6 Irrigation Pumps, or 20,001 to 40,000 sq. ft. heated greenhouse. Four enterprises as defined in the ASABE S612 Standard on-farm energy audit standard in combination with an medium operation, one of which is described above. Agricultural producer currently has minimal knowledge of and no plan for energy conservation. The producer is willing to collaborate with a certified TSP to develop an AgEMP 128 CAP. The AgEMP is a grouping of conservation measures and management activities which, when implemented as part of a conservation system, will help to ensure that both production and natural resource protection goals are achieved. An AgEMP incorporates recommended measures to maximize energy conservation and efficiency. Natural Resource Concern: Energy Conservation.

Before Situation:

Producer currently has minimal knowledge of and no plan for energy conservation. An Agricultural Energy Management CAP for any type of operation with four or more enterprises will be planned according to the ASABE S612 Standard (e.g., broiler and greenhouse). The producer is willing to collaborate with a certified TSP to develop an AgEMP 122 CAP. The AgEMP is a grouping of conservation measures and management activities which, when implemented as part of a conservation system, will help to ensure that both production and natural resource protection goals are achieved. An AgEMP incorporates recommended measures to maximize energy conservation and efficiency. Associated Practices: 374 Farmstead Energy Improvement, 670 Lighting System Improvement, 672 Building Envelope Improvement, or other applicable practices approved in the NRCS Field Office Technical Guide.

After Situation:

After EQIP contract approval, participant has obtained services from a certified TSP for development of the Agricultural Energy Management Plan. The CAP criteria requires the plan to meet quality criteria for energy conservation and efficiency. The CAP plan may include recommendations for associated conservation practices which address energy conservation. The CAP meets the basic quality criteria for the 128 plan as cited in the NRCS Field Office Technical Guide.

Feature Measure: Number

Scenario Unit: Number

Scenario Typical Size: 1.0

Scenario Total Cost: $6,589.03

Scenario Cost/Unit: $6,589.03

Cost Details:

Component Name	ID	Description	Unit	Cost	QTY	Total
Labor						
CAP Labor, professional engineer	1297	Conservation Activity Plan labor to apply knowledge of engineering technology and biological science to agricultural problems concerned with power and machinery, electrification, structures, soil and water conservation, and processing of agricultural products. Cost associated with this component includes overhead and benefits (market price).	Hours	$103.58	31	$3,210.98
CAP Labor, Manager	1603	Conservation Activity Plan labor involving supervision or management activities. Includes crew supervisors, foremen and farm/ranch managers time required for adopting new technology, etc.	Hours	$45.12	28	$1,263.36
CAP Labor, Administrative Assistant	1739	Conservation Activity Plan labor involving routine clerical and administrative functions such as drafting correspondence, scheduling appointments, organizing and maintaining paper and electronic files, or providing information to callers.	Hours	$29.77	4.5	$133.97
CAP Labor, Energy Auditor	1740	Conservation Activity Plan labor involving analyzing energy efficient measures and conducting energy audits of industrial areas and facilities.	Hours	$55.02	36	$1,980.72

Practice: 128 - Agricultural Energy Management Plan - Written

Scenario: #124 - AgEMP 128 Large, Four Enterprise

Scenario Description:

Typical operation has either > 2,500 acres, > 1000 AU, more than 7 irrigation pumps, or > 40,001 sq. ft. of heater greenhouse. Four enterprises as defined in the ASABE S612 Standard on-farm energy audit standard in combination with a large livestock operation, one of which is described above. Multiple irrigation systems or a mixture of irrigation types may be counted as one of the extra enterprises. Agricultural producer currently has minimal knowledge of and no plan for energy conservation. The producer is willing to collaborate with a certified TSP to develop an AgEMP 128 CAP. The AgEMP is a grouping of conservation measures and management activities which, when implemented as part of a conservation system, will help to ensure that both production and natural resource protection goals are achieved. An AgEMP incorporates recommended measures to maximize energy conservation and efficiency. Natural Resource Concern: Energy Conservation.

Before Situation:

Producer currently has minimal knowledge of and no plan for energy conservation. An Agricultural Energy Management CAP for any type of livestock operation with two non-livestock enterprises (complex or multiple irrigation systems can count as one of the extra enterprises) will be planned according to the ASABE S612 Standard (e.g., broiler and greenhouse). Producer is willing to collaborate with a certified TSP to develop an AgEMP 128 CAP. The AgEMP is a grouping of conservation measures and management activities which, when implemented as part of a conservation system, will help to ensure that both production and natural resource protection goals are achieved. An AgEMP incorporates recommended measures to maximize energy conservation and efficiency. Associated Practices: 449 Irrigation Water Management, 374 Farmstead Energy Improvement, 670 Lighting System Improvement, 672 Building Envelope Improvement, or other applicable practices approved in the NRCS Field Office Technical Guide.

After Situation:

After EQIP contract approval, participant has obtained services from a certified TSP for development of the Agricultural Energy Management Plan. The CAP criteria requires the plan to meet quality criteria for energy conservation and efficiency. The CAP plan may include recommendations for associated conservation practices which address energy conservation. The CAP meets the basic quality criteria for the 128 plan as cited in the NRCS Field Office Technical Guide.

Feature Measure: Number

Scenario Unit: Number

Scenario Typical Size: 1.0

Scenario Total Cost: $8,641.00

Scenario Cost/Unit: $8,641.00

Cost Details:

Component Name	ID	Description	Unit	Cost	QTY	Total
Labor						
CAP Labor, professional engineer	1297	Conservation Activity Plan labor to apply knowledge of engineering technology and biological science to agricultural problems concerned with power and machinery, electrification, structures, soil and water conservation, and processing of agricultural products. Cost associated with this component includes overhead and benefits (market price).	Hours	$103.58	44	$4,557.52
CAP Labor, Manager	1603	Conservation Activity Plan labor involving supervision or management activities. Includes crew supervisors, foremen and farm/ranch managers time required for adopting new technology, etc.	Hours	$45.12	32	$1,443.84
CAP Labor, Administrative Assistant	1739	Conservation Activity Plan labor involving routine clerical and administrative functions such as drafting correspondence, scheduling appointments, organizing and maintaining paper and electronic files, or providing information to callers.	Hours	$29.77	5.5	$163.74
CAP Labor, Energy Auditor	1740	Conservation Activity Plan labor involving analyzing energy efficient measures and conducting energy audits of industrial areas and facilities.	Hours	$55.02	45	$2,475.90

Practice: 130 - Drainage Water Management Plan - Written

Scenario: #15 - DWMP - Tile Map Available

Scenario Description:

A Drainage Water Management Plan (DWMP) will be developed on a relatively flat crop field with a patterned drainage system where a map of the tile system is available. The DWMP will document soil, topographic, and drainage system maps of the site, and identify the number and location of water control structures that are needed to implement drainage water management according to Field Office Technical Guide standards. The DWMP will also provide guidelines for management of the water control structures to achieve desired resource outcomes.

Before Situation:

Producer has no plan for or knowledge of managing drainage water. The producer does not manage the field for the purpose of controlling water retention during the crop season and therefore crop yields are reduced. Existing ditches and/or tile drains on the cropland field currently conduct flow off field to waterways resulting in potential water quality resource concerns related to excessive nitrogen.

After Situation:

A certified Technical Service Provider (TSP) develops the Drainage Water Management Conservation Activity Plan (CAP). The DWMP documents soil, topographic, and drainage system maps of the site, and identifies the number and location of water control structures that are needed to implement drainage water management according to Field Office Technical Guide standards. The DWMP also provides guidelines for management of the water control structures to achieve desired resource outcomes. The plan is ready for implementation with structural measures and management once the structures are installed. No actual benefits to resource concerns are achieved until the practices in the DWMP are implemented.

Feature Measure: Number

Scenario Unit: Number

Scenario Typical Size: 1.0

Scenario Total Cost: $2,827.56

Scenario Cost/Unit: $2,827.56

Cost Details:

Component Name	ID	Description	Unit	Cost	QTY	Total
Labor						
CAP Labor, small surveying crew	1296	Conservation Activity Plan labor to perform surveying and mapping duties, usually under the direction of an engineer, surveyor, cartographer, or photogrammetrist to obtain data used for construction, mapmaking, boundary location, mining, or other purposes. May calculate mapmaking information and create maps from source data, such as surveying notes, aerial photography, satellite data, or other maps to show topographical features, political boundaries, and other features. Cost associated with this component includes two man field crew, equipment, vehicle, overhead, and miscellaneous supplies.	Hours	$112.21	8	$897.68
Cap Labor, conservation scientist	1300	Conservation Activity Plan labor to manage, improve, and protect natural resources to maximize their use without damaging the environment. Interprets resource information and assess resource conditions to provide conservation practice alternatives to producers to make decisions on the treatment of their soil, water, air, plant, animal, and energy resources. May instruct farmers, agricultural production managers, or ranchers in best ways to use crop rotation, contour plowing, or terracing to conserve soil and water; in the number and kind of livestock and forage plants best suited to particular ranges; and in range and farm improvements, such as fencing and reservoirs for stock watering.	Hours	$78.84	13	$1,024.92
Cap Labor, Survey and Mapping Technician	1591	Conservation Activity Plan labor to perform surveying and mapping duties, usually under the direction of an engineer, surveyor, cartographer, or photogrammetrist to obtain data used for construction, mapmaking, boundary location, mining, or other purposes. May calculate mapmaking information and create maps from source data, such as surveying notes, aerial photography, satellite data, or other maps to show topographical features, political boundaries, and other features. May verify accuracy and completeness of maps.	Hours	$56.56	16	$904.96

Practice: 130 - Drainage Water Management Plan - Written

Scenario: #16 - DWMP - No Tile Map Available

Scenario Description:

A Drainage Water Management Plan (DWMP) will be developed on a relatively flat crop field with a patterned drainage system where no map of the tile system is available. The DWMP will document soil, topographic, and drainage system maps of the site, and identify the number and location of water control structures that are needed to implement drainage water management according to Field Office Technical Guide standards. The DWMP will also provide guidelines for management of the water control structures to achieve desired resource outcomes.

Before Situation:

Producer has no plan for or knowledge of managing drainage water. The producer does not manage the field for the purpose of controlling water retention during the crop season and therefore crop yields are reduced. Existing ditches and/or tile drains on the cropland field currently conduct flow off field to waterways resulting in potential water quality resource concerns related to excessive nitrogen.

After Situation:

A certified Technical Service Provider (TSP) develops the Drainage Water Management Conservation Activity Plan (CAP). The DWMP documents soil, topographic, and drainage system maps of the site, and identifies the number and location of water control structures that are needed to implement drainage water management according to Field Office Technical Guide standards. The DWMP also provides guidelines for management of the water control structures to achieve desired resource outcomes. The plan is ready for implementation with structural measures and management once the structures are installed. No actual benefits to resource concerns are achieved until the practices in the DWMP are implemented.

Feature Measure: Number

Scenario Unit: Number

Scenario Typical Size: 1.0

Scenario Total Cost: $3,930.60

Scenario Cost/Unit: $3,930.60

Cost Details:

Component Name	ID	Description	Unit	Cost	QTY	Total
Labor						
CAP Labor, small surveying crew	1296	Conservation Activity Plan labor to perform surveying and mapping duties, usually under the direction of an engineer, surveyor, cartographer, or photogrammetrist to obtain data used for construction, mapmaking, boundary location, mining, or other purposes. May calculate mapmaking information and create maps from source data, such as surveying notes, aerial photography, satellite data, or other maps to show topographical features, political boundaries, and other features. Cost associated with this component includes two man field crew, equipment, vehicle, overhead, and miscellaneous supplies.	Hours	$112.21	8	$897.68
Cap Labor, conservation scientist	1300	Conservation Activity Plan labor to manage, improve, and protect natural resources to maximize their use without damaging the environment. Interprets resource information and assess resource conditions to provide conservation practice alternatives to producers to make decisions on the treatment of their soil, water, air, plant, animal, and energy resources. May instruct farmers, agricultural production managers, or ranchers in best ways to use crop rotation, contour plowing, or terracing to conserve soil and water; in the number and kind of livestock and forage plants best suited to particular ranges; and in range and farm improvements, such as fencing and reservoirs for stock watering.	Hours	$78.84	13	$1,024.92
Cap Labor, Survey and Mapping Technician	1591	Conservation Activity Plan labor to perform surveying and mapping duties, usually under the direction of an engineer, surveyor, cartographer, or photogrammetrist to obtain data used for construction, mapmaking, boundary location, mining, or other purposes. May calculate mapmaking information and create maps from source data, such as surveying notes, aerial photography, satellite data, or other maps to show topographical features, political boundaries, and other features. May verify accuracy and completeness of maps.	Hours	$56.56	16	$904.96
CAP Labor, Skilled	1604	Conservation Activity Plan labor requiring a high level skill set: Includes carpenters, welders, electricians, conservation professionals involved with data collection, monitoring, and or record keeping, etc.	Hours	$34.47	32	$1,103.04

Practice: 136 - Agricultural Energy Design Plan - Written

Scenario: #7 - AgEDP Low Complexity, One Design

Scenario Description:

An agricultural producer wishes to conserve energy through an EQIP contract with at least one (1) energy practice scenario. Associated scenario(s) provide for one-to-one device retrofits. The scenario(s) may provide for a new component to modify the operation of an existing device (e.g., timer to reduce run-time). Three factors typically indicate a “Low Complexity” system, as follows. 1) New devices maintain output (hp, Btu/hr, lux, etc.) of the old devices within a roughly 10% range. 2) New devices are installed in the same location as the old devices. 3) The retrofit does not require substantive changes to electrical, mechanical, plumbing, or structural systems. “Low Complexity” practice scenarios include but are not limited to: lamp or fixture upgrades; attic insulation; fans; or washer-extractors. “One Design” indicates that each new device or component is closely related to other devices or components even if numerous scenarios are contracted. The AgEDP includes reviewing, and, when needed, revising alternatives to address energy concerns. The AgEDP documents: a) the client’s final decisions related to the associated energy practice scenarios, b) estimated energy and greenhouse gas benefits; and c) design deliverables described in the associated NRCS Conservation Practice Statements of Work. Natural Resource Concern: Energy Efficiency.

Before Situation:

Producer wants to transition their agricultural operation to become more energy efficient. Producer intends to work with a certified TSP to develop an AgEDP (CAP 136) to implement one or more practice scenarios to address the Energy Efficiency resource concerns. An AgEDP incorporates recommended measures to increase energy conservation and efficiency. Associated Practices: 374 Farmstead Energy Improvement, 670 Lighting System Improvement, 672 Building Envelope Improvement, 533 Pumping Plant, or other applicable practices in the NRCS Field Office Technical Guide.

After Situation:

The producer has obtained services from a certified TSP to develop the Agricultural Energy Design Plan. The CAP 136 criteria include tasks needed to document the client’s decision, energy savings and design of conservation practices which address energy efficiency. The AgEDP meets the quality criteria for the CAP 136 plan as cited in the NRCS Field Office Technical Guide.

Feature Measure: Number

Scenario Unit: Number

Scenario Typical Size: 1.0

Scenario Total Cost: $2,785.57

Scenario Cost/Unit: $2,785.57

Cost Details:

Component Name	ID	Description	Unit	Cost	QTY	Total
Labor						
CAP Labor, professional engineer	1297	Conservation Activity Plan labor to apply knowledge of engineering technology and biological science to agricultural problems concerned with power and machinery, electrification, structures, soil and water conservation, and processing of agricultural products. Cost associated with this component includes overhead and benefits (market price).	Hours	$103.58	18	$1,864.44
CAP Labor, Manager	1603	Conservation Activity Plan labor involving supervision or management activities. Includes crew supervisors, foremen and farm/ranch managers time required for adopting new technology, etc.	Hours	$45.12	10	$451.20
CAP Labor, Administrative Assistant	1739	Conservation Activity Plan labor involving routine clerical and administrative functions such as drafting correspondence, scheduling appointments, organizing and maintaining paper and electronic files, or providing information to callers.	Hours	$29.77	1	$29.77
CAP Labor, Energy Auditor	1740	Conservation Activity Plan labor involving analyzing energy efficient measures and conducting energy audits of industrial areas and facilities.	Hours	$55.02	8	$440.16

Practice: 136 - Agricultural Energy Design Plan - Written

Scenario: #23 - AgEDP Medium Complexity, One Design

Scenario Description:

An agricultural producer wishes to conserve energy through an EQIP contract with at least one (1) energy practice scenario. Associated scenario(s) provide for retrofits that impose some variables in the design process. The scenarios may involve a change in service levels that can be evaluated or designed through use of simple tools or manual calculations. Four factors typically indicate a “Medium Complexity” system, as follows. 1) Client objectives require a change of output (hp, Btu/hr, lux, etc.) that varies more than about 10% from old devices. 2) System constraints prevent new devices from being installed in the same location as the old devices. 3) The retrofit requires substantive changes to either electrical, mechanical, plumbing, or structural systems. 4) Analysis beyond the scope of NRCS methodology to evaluate alternatives is required to confirm level of service and appropriate device output, placement, etc. (For example, a simplified heat transfer model to determine heating, ventilation, and cooling loads may be required if existing device capacity cannot be estimated.) “Medium Complexity” practice scenarios include but are not limited to: change of lighting fixture counts or layout; wall insulation; grain dryers; add reverse osmosis to syrup production; or add evaporative cooling systems (cooling cells). “One Design” indicates that each new device or component is closely related to other devices or components even if numerous scenarios are contracted. The AgEDP includes reviewing, and, when needed, revising alternatives to address energy concerns. The AgEDP documents: a) the client’s final decisions related to the associated energy practice scenarios, b) estimated energy and greenhouse gas benefits; and c) design deliverables described in the associated NRCS Conservation Practice Statements of Work. Natural Resource Concern: Energy Efficiency.

Before Situation:

Producer wants to transition their agricultural operation to become more energy efficient. Producer intends to work with a certified TSP to develop an AgEDP (CAP 136) to implement one or more practice scenarios to address the Energy Efficiency resource concerns. An AgEDP incorporates recommended measures to increase energy conservation and efficiency. Associated Practices: 374 Farmstead Energy Improvement, 670 Lighting System Improvement, 672 Building Envelope Improvement, 533 Pumping Plant, or other applicable practices in the NRCS Field Office Technical Guide.

After Situation:

The producer has obtained services from a certified TSP to develop the Agricultural Energy Design Plan. The CAP 136 criteria include tasks needed to document the client’s decision, energy savings and design of conservation practices which address energy efficiency. The AgEDP meets the quality criteria for the CAP 136 plan as cited in the NRCS Field Office Technical Guide.

Feature Measure: Number

Scenario Unit: Number

Scenario Typical Size: 1.0

Scenario Total Cost: $4,213.46

Scenario Cost/Unit: $4,213.46

Cost Details:

Component Name	ID	Description	Unit	Cost	QTY	Total
Labor						
CAP Labor, professional engineer	1297	Conservation Activity Plan labor to apply knowledge of engineering technology and biological science to agricultural problems concerned with power and machinery, electrification, structures, soil and water conservation, and processing of agricultural products. Cost associated with this component includes overhead and benefits (market price).	Hours	$103.58	30	$3,107.40
CAP Labor, Manager	1603	Conservation Activity Plan labor involving supervision or management activities. Includes crew supervisors, foremen and farm/ranch managers time required for adopting new technology, etc.	Hours	$45.12	11	$496.32
CAP Labor, Administrative Assistant	1739	Conservation Activity Plan labor involving routine clerical and administrative functions such as drafting correspondence, scheduling appointments, organizing and maintaining paper and electronic files, or providing information to callers.	Hours	$29.77	2	$59.54
CAP Labor, Energy Auditor	1740	Conservation Activity Plan labor involving analyzing energy efficient measures and conducting energy audits of industrial areas and facilities.	Hours	$55.02	10	$550.20

Practice: 136 - Agricultural Energy Design Plan - Written

Scenario: #39 - AgEDP High Complexity, One Design

Scenario Description:

An agricultural producer wishes to conserve energy through an EQIP contract with at least one (1) energy practice scenario. Associated scenario(s) provide for retrofits that impose several variables in the design process. The scenarios may involve a change in service levels that cannot be evaluated or designed through use of simple tools or manual calculations. Four factors typically indicate a “High Complexity” system, as follows. 1) Client objectives require a change of output (hp, Btu/hr, lux, etc.) that varies more than about 30% from old devices. 2) System constraints prevent new devices from being installed in the same location as the old devices. 3) The retrofit requires substantive changes to two or more of the electrical, mechanical, plumbing, or structural systems. 4) Complex analysis to evaluate alternatives is required to confirm level of service and appropriate device output, placement, etc. (For example, a detailed simulation is required to determine systems sizing and layout.) “High Complexity” practice scenarios include but are not limited to: comprehensive lighting system redesign; radiant heating systems; convert to tunnel ventilation; or convert to bench heating. “One Design” indicates that each new device or component is closely related to other devices or components even if numerous scenarios are contracted. The AgEDP includes reviewing, and, when needed, revising alternatives to address energy concerns. The AgEDP documents: a) the client’s final decisions related to the associated energy practice scenarios, b) estimated energy and greenhouse gas benefits; and c) design deliverables described in the associated NRCS Conservation Practice Statements of Work. Natural Resource Concern: Energy Efficiency.

Before Situation:

Producer wants to transition their agricultural operation to become more energy efficient. Producer intends to work with a certified TSP to develop an AgEDP (CAP 136) to implement one or more practice scenarios to address the Energy Efficiency resource concerns. An AgEDP incorporates recommended measures to increase energy conservation and efficiency. Associated Practices: 374 Farmstead Energy Improvement, 670 Lighting System Improvement, 672 Building Envelope Improvement, 533 Pumping Plant, or other applicable practices in the NRCS Field Office Technical Guide.

After Situation:

The producer has obtained services from a certified TSP to develop the Agricultural Energy Design Plan. The CAP 136 criteria include tasks needed to document the client’s decision, energy savings and design of conservation practices which address energy efficiency. The AgEDP meets the quality criteria for the CAP 136 plan as cited in the NRCS Field Office Technical Guide.

Feature Measure: Number

Scenario Unit: Number

Scenario Typical Size: 1.0

Scenario Total Cost: $5,641.35

Scenario Cost/Unit: $5,641.35

Cost Details:

Component Name	ID	Description	Unit	Cost	QTY	Total
Labor						
CAP Labor, professional engineer	1297	Conservation Activity Plan labor to apply knowledge of engineering technology and biological science to agricultural problems concerned with power and machinery, electrification, structures, soil and water conservation, and processing of agricultural products. Cost associated with this component includes overhead and benefits (market price).	Hours	$103.58	42	$4,350.36
CAP Labor, Manager	1603	Conservation Activity Plan labor involving supervision or management activities. Includes crew supervisors, foremen and farm/ranch managers time required for adopting new technology, etc.	Hours	$45.12	12	$541.44
CAP Labor, Administrative Assistant	1739	Conservation Activity Plan labor involving routine clerical and administrative functions such as drafting correspondence, scheduling appointments, organizing and maintaining paper and electronic files, or providing information to callers.	Hours	$29.77	3	$89.31
CAP Labor, Energy Auditor	1740	Conservation Activity Plan labor involving analyzing energy efficient measures and conducting energy audits of industrial areas and facilities.	Hours	$55.02	12	$660.24

Practice: 136 - Agricultural Energy Design Plan - Written

Scenario: #55 - AgEDP Low Complexity, 2-3 Designs

Scenario Description:

An agricultural producer wishes to conserve energy through an EQIP contract with multiple energy practice scenarios. Associated scenario(s) provide for one-to-one device retrofits. The scenario(s) may provide for a new component to modify the operation of an existing device (e.g., timer to reduce run-time). Three factors typically indicate a "Low Complexity" system, as follows. 1) New devices maintain output (hp, Btu/hr, lux, etc.) of the old devices within a roughly 10% range. 2) New devices are installed in the same location as the old devices. 3) The retrofit does not require substantive changes to electrical, mechanical, plumbing, or structural systems. "Low Complexity" practice scenarios include but are not limited to: lamp or fixture upgrades; attic insulation; fans; or washer-extractors. Each "Design" indicates that new devices or components are closely related to other devices or components even if numerous scenarios are contracted. If more than one practice is contracted, then, at a minimum, "2-3 Designs" shall be contracted for the AgEDP. The AgEDP includes reviewing, and, when needed, revising alternatives to address energy concerns. The AgEDP documents: a) the client's final decisions related to the associated energy practice scenarios, b) estimated energy and greenhouse gas benefits; and c) design deliverables described in the associated NRCS Conservation Practice Statements of Work. Natural Resource Concern: Energy Efficiency.

Before Situation:

Producer wants to transition their agricultural operation to become more energy efficient. Producer intends to work with a certified TSP to develop an AgEDP (CAP 136) to implement one or more practice scenarios to address the Energy Efficiency resource concerns. An AgEDP incorporates recommended measures to increase energy conservation and efficiency. Associated Practices: 374 Farmstead Energy Improvement, 670 Lighting System Improvement, 672 Building Envelope Improvement, 533 Pumping Plant, or other applicable practices in the NRCS Field Office Technical Guide.

After Situation:

The producer has obtained services from a certified TSP to develop the Agricultural Energy Design Plan. The CAP 136 criteria include tasks needed to document the client's decision, energy savings and design of conservation practices which address energy efficiency. The AgEDP meets the quality criteria for the CAP 136 plan as cited in the NRCS Field Office Technical Guide.

Feature Measure: Number

Scenario Unit: Number

Scenario Typical Size: 1.0

Scenario Total Cost: $4,323.50

Scenario Cost/Unit: $4,323.50

Cost Details:

Component Name	ID	Description	Unit	Cost	QTY	Total
Labor						
CAP Labor, professional engineer	1297	Conservation Activity Plan labor to apply knowledge of engineering technology and biological science to agricultural problems concerned with power and machinery, electrification, structures, soil and water conservation, and processing of agricultural products. Cost associated with this component includes overhead and benefits (market price).	Hours	$103.58	30	$3,107.40
CAP Labor, Manager	1603	Conservation Activity Plan labor involving supervision or management activities. Includes crew supervisors, foremen and farm/ranch managers time required for adopting new technology, etc.	Hours	$45.12	11	$496.32
CAP Labor, Administrative Assistant	1739	Conservation Activity Plan labor involving routine clerical and administrative functions such as drafting correspondence, scheduling appointments, organizing and maintaining paper and electronic files, or providing information to callers.	Hours	$29.77	2	$59.54
CAP Labor, Energy Auditor	1740	Conservation Activity Plan labor involving analyzing energy efficient measures and conducting energy audits of industrial areas and facilities.	Hours	$55.02	12	$660.24

Practice: 136 - Agricultural Energy Design Plan - Written

Scenario: #71 - AgEDP Medium Complexity, 2-3 Designs

Scenario Description:

An agricultural producer wishes to conserve energy through an EQIP contract with multiple energy practice scenarios. Associated scenario(s) provide for retrofits that impose some variables in the design process. The scenarios may involve a change in service levels that can be evaluated or designed through use of simple tools or manual calculations. Four factors typically indicate a “Medium Complexity” system, as follows. 1) Client objectives require a change of output (hp, Btu/hr, lux, etc.) that varies more than about 10% from old devices. 2) System constraints prevent new devices from being installed in the same location as the old devices. 3) The retrofit requires substantive changes to either electrical, mechanical, plumbing, or structural systems. 4) Analysis beyond the scope of NRCS methodology to evaluate alternatives is required to confirm level of service and appropriate device output, placement, etc. (For example, a simplified heat transfer model to determine heating, ventilation, and cooling loads may be required if existing device capacity cannot be estimated.) “Medium Complexity” practice scenarios include but are not limited to: change of lighting fixture counts or layout; wall insulation; grain dryers; add reverse osmosis to syrup production; or add evaporative cooling systems (cooling cells). Each “Design” indicates that new devices or components are closely related to other devices or components even if numerous scenarios are contracted. If more than one practice is contracted, then, at a minimum, “2-3 Designs” shall be contracted for the AgEDP. The AgEDP includes reviewing, and, when needed, revising alternatives to address energy concerns. The AgEDP documents: a) the client’s final decisions related to the associated energy practice scenarios, b) estimated energy and greenhouse gas benefits; and c) design deliverables described in the associated NRCS Conservation Practice Statements of Work. Natural Resource Concern: Energy Efficiency.

Before Situation:

Producer wants to transition their agricultural operation to become more energy efficient. Producer intends to work with a certified TSP to develop an AgEDP (CAP 136) to implement one or more practice scenarios to address the Energy Efficiency resource concerns. An AgEDP incorporates recommended measures to increase energy conservation and efficiency. Associated Practices: 374 Farmstead Energy Improvement, 670 Lighting System Improvement, 672 Building Envelope Improvement, 533 Pumping Plant, or other applicable practices in the NRCS Field Office Technical Guide.

After Situation:

The producer has obtained services from a certified TSP to develop the Agricultural Energy Design Plan. The CAP 136 criteria include tasks needed to document the client’s decision, energy savings and design of conservation practices which address energy efficiency. The AgEDP meets the quality criteria for the CAP 136 plan as cited in the NRCS Field Office Technical Guide.

Feature Measure: Number

Scenario Unit: Number

Scenario Typical Size: 1.0

Scenario Total Cost: $5,751.39

Scenario Cost/Unit: $5,751.39

Cost Details:

Component Name	ID	Description	Unit	Cost	QTY	Total
Labor						
CAP Labor, professional engineer	1297	Conservation Activity Plan labor to apply knowledge of engineering technology and biological science to agricultural problems concerned with power and machinery, electrification, structures, soil and water conservation, and processing of agricultural products. Cost associated with this component includes overhead and benefits (market price).	Hours	$103.58	42	$4,350.36
CAP Labor, Manager	1603	Conservation Activity Plan labor involving supervision or management activities. Includes crew supervisors, foremen and farm/ranch managers time required for adopting new technology, etc.	Hours	$45.12	12	$541.44
CAP Labor, Administrative Assistant	1739	Conservation Activity Plan labor involving routine clerical and administrative functions such as drafting correspondence, scheduling appointments, organizing and maintaining paper and electronic files, or providing information to callers.	Hours	$29.77	3	$89.31
CAP Labor, Energy Auditor	1740	Conservation Activity Plan labor involving analyzing energy efficient measures and conducting energy audits of industrial areas and facilities.	Hours	$55.02	14	$770.28

Practice: 136 - Agricultural Energy Design Plan - Written

Scenario: #87 - AgEDP High Complexity, 2-3 Designs

Scenario Description:

An agricultural producer wishes to conserve energy through an EQIP contract with multiple energy practice scenarios. Associated scenario(s) provide for retrofits that impose several variables in the design process. The scenarios may involve a change in service levels that cannot be evaluated or designed through use of simple tools or manual calculations. Four factors typically indicate a “High Complexity” system, as follows. 1) Client objectives require a change of output (hp, Btu/hr, lux, etc.) that varies more than about 30% from old devices. 2) System constraints prevent new devices from being installed in the same location as the old devices. 3) The retrofit requires substantive changes to two or more of the electrical, mechanical, plumbing, or structural systems. 4) Complex analysis to evaluate alternatives is required to confirm level of service and appropriate device output, placement, etc. (For example, a detailed simulation is required to determine systems sizing and layout.) “High Complexity” practice scenarios include but are not limited to: comprehensive lighting system redesign; radiant heating systems; convert to tunnel ventilation; or convert to bench heating. Each “Design” indicates that new devices or components are closely related to other devices or components even if numerous scenarios are contracted. If more than one practice is contracted, then, at a minimum, “2-3 Designs” shall be contracted for the AgEDP The AgEDP includes reviewing, and, when needed, revising alternatives to address energy concerns. The AgEDP documents: a) the client’s final decisions related to the associated energy practice scenarios, b) estimated energy and greenhouse gas; and c) design deliverables described in the associated NRCS Conservation Practice Statements of Work. Natural Resource Concern: Energy Efficiency.

Before Situation:

Producer wants to transition their agricultural operation to become more energy efficient. Producer intends to work with a certified TSP to develop an AgEDP (CAP 136) to implement one or more practice scenarios to address the Energy Efficiency resource concerns. An AgEDP incorporates recommended measures to increase energy conservation and efficiency. Associated Practices: 374 Farmstead Energy Improvement, 670 Lighting System Improvement, 672 Building Envelope Improvement, 533 Pumping Plant, or other applicable practices in the NRCS Field Office Technical Guide.

After Situation:

The producer has obtained services from a certified TSP to develop the Agricultural Energy Design Plan. The CAP 136 criteria include tasks needed to document the client’s decision, energy savings and design of conservation practices which address energy efficiency. The AgEDP meets the quality criteria for the CAP 136 plan as cited in the NRCS Field Office Technical Guide.

Feature Measure: Number

Scenario Unit: Number

Scenario Typical Size: 1.0

Scenario Total Cost: $7,179.28

Scenario Cost/Unit: $7,179.28

Cost Details:

Component Name	ID	Description	Unit	Cost	QTY	Total
Labor						
CAP Labor, professional engineer	1297	Conservation Activity Plan labor to apply knowledge of engineering technology and biological science to agricultural problems concerned with power and machinery, electrification, structures, soil and water conservation, and processing of agricultural products. Cost associated with this component includes overhead and benefits (market price).	Hours	$103.58	54	$5,593.32
CAP Labor, Manager	1603	Conservation Activity Plan labor involving supervision or management activities. Includes crew supervisors, foremen and farm/ranch managers time required for adopting new technology, etc.	Hours	$45.12	13	$586.56
CAP Labor, Administrative Assistant	1739	Conservation Activity Plan labor involving routine clerical and administrative functions such as drafting correspondence, scheduling appointments, organizing and maintaining paper and electronic files, or providing information to callers.	Hours	$29.77	4	$119.08
CAP Labor, Energy Auditor	1740	Conservation Activity Plan labor involving analyzing energy efficient measures and conducting energy audits of industrial areas and facilities.	Hours	$55.02	16	$880.32

Practice: 136 - Agricultural Energy Design Plan - Written

Scenario: #103 - AgEDP Low Complexity, 4-5 Designs

Scenario Description:

An agricultural producer wishes to conserve energy through an EQIP contract with multiple energy practice scenarios. Associated scenario(s) provide for one-to-one device retrofits. The scenario(s) may provide for a new component to modify the operation of an existing device (e.g., timer to reduce run-time). Three factors typically indicate a "Low Complexity" system, as follows. 1) New devices maintain output (hp, Btu/hr, lux, etc.) of the old devices within a roughly 10% range. 2) New devices are installed in the same location as the old devices. 3) The retrofit does not require substantive changes to electrical, mechanical, plumbing, or structural systems. "Low Complexity" practice scenarios include but are not limited to: lamp or fixture upgrades; attic insulation; fans; or washer-extractors. Each "Design" indicates that new devices or components are closely related to other devices or components even if numerous scenarios are contracted. If more than three practices are contracted, then, at a minimum, "4-5 Designs" shall be contracted for the AgEDP. The AgEDP includes reviewing, and, when needed, revising alternatives to address energy concerns. The AgEDP documents: a) the client's final decisions related to the associated energy practice scenarios, b) estimated energy and greenhouse gas benefits; and c) design deliverables described in the associated NRCS Conservation Practice Statements of Work. Natural Resource Concern: Energy Efficiency.

Before Situation:

Producer wants to transition their agricultural operation to become more energy efficient. Producer intends to work with a certified TSP to develop an AgEDP (CAP 136) to implement one or more practice scenarios to address the Energy Efficiency resource concerns. An AgEDP incorporates recommended measures to increase energy conservation and efficiency. Associated Practices: 374 Farmstead Energy Improvement, 670 Lighting System Improvement, 672 Building Envelope Improvement, 533 Pumping Plant, or other applicable practices in the NRCS Field Office Technical Guide.

After Situation:

The producer has obtained services from a certified TSP to develop the Agricultural Energy Design Plan. The CAP 136 criteria include tasks needed to document the client's decision, energy savings and design of conservation practices which address energy efficiency. The AgEDP meets the quality criteria for the CAP 136 plan as cited in the NRCS Field Office Technical Guide.

Feature Measure: Number

Scenario Unit: Number

Scenario Typical Size: 1.0

Scenario Total Cost: $5,861.43

Scenario Cost/Unit: $5,861.43

Cost Details:

Component Name	ID	Description	Unit	Cost	QTY	Total
Labor						
CAP Labor, professional engineer	1297	Conservation Activity Plan labor to apply knowledge of engineering technology and biological science to agricultural problems concerned with power and machinery, electrification, structures, soil and water conservation, and processing of agricultural products. Cost associated with this component includes overhead and benefits (market price).	Hours	$103.58	42	$4,350.36
CAP Labor, Manager	1603	Conservation Activity Plan labor involving supervision or management activities. Includes crew supervisors, foremen and farm/ranch managers time required for adopting new technology, etc.	Hours	$45.12	12	$541.44
CAP Labor, Administrative Assistant	1739	Conservation Activity Plan labor involving routine clerical and administrative functions such as drafting correspondence, scheduling appointments, organizing and maintaining paper and electronic files, or providing information to callers.	Hours	$29.77	3	$89.31
CAP Labor, Energy Auditor	1740	Conservation Activity Plan labor involving analyzing energy efficient measures and conducting energy audits of industrial areas and facilities.	Hours	$55.02	16	$880.32

Practice: 136 - Agricultural Energy Design Plan - Written

Scenario: #119 - AgEDP Medium Complexity, 4-5 Designs

Scenario Description:

An agricultural producer wishes to conserve energy through an EQIP contract with multiple energy practice scenarios. Associated scenario(s) provide for retrofits that impose some variables in the design process. The scenarios may involve a change in service levels that can be evaluated or designed through use of simple tools or manual calculations. Four factors typically indicate a “Medium Complexity” system, as follows. 1) Client objectives require a change of output (hp, Btu/hr, lux, etc.) that varies more than about 10% from old devices. 2) System constraints prevent new devices from being installed in the same location as the old devices. 3) The retrofit requires substantive changes to either electrical, mechanical, plumbing, or structural systems. 4) Analysis beyond the scope of NRCS methodology to evaluate alternatives is required to confirm level of service and appropriate device output, placement, etc. (For example, a simplified heat transfer model to determine heating, ventilation, and cooling loads may be required if existing device capacity cannot be estimated.) “Medium Complexity” practice scenarios include but are not limited to: change of lighting fixture counts or layout; wall insulation; grain dryers; add reverse osmosis to syrup production; or add evaporative cooling systems (cooling cells). Each “Design” indicates that new devices or components are closely related to other devices or components even if numerous scenarios are contracted. If more than three practices are contracted, then, at a minimum, “4-5 Designs” shall be contracted for the AgEDP. The AgEDP includes reviewing, and, when needed, revising alternatives to address energy concerns. The AgEDP documents: a) the client’s final decisions related to the associated energy practice scenarios, b) estimated energy and greenhouse gas benefits; and c) design deliverables described in the associated NRCS Conservation Practice Statements of Work. Natural Resource Concern: Energy Efficiency.

Before Situation:

Producer wants to transition their agricultural operation to become more energy efficient. Producer intends to work with a certified TSP to develop an AgEDP (CAP 136) to implement one or more practice scenarios to address the Energy Efficiency resource concerns. An AgEDP incorporates recommended measures to increase energy conservation and efficiency. Associated Practices: 374 Farmstead Energy Improvement, 670 Lighting System Improvement, 672 Building Envelope Improvement, 533 Pumping Plant, or other applicable practices in the NRCS Field Office Technical Guide.

After Situation:

The producer has obtained services from a certified TSP to develop the Agricultural Energy Design Plan. The CAP 136 criteria include tasks needed to document the client’s decision, energy savings and design of conservation practices which address energy efficiency. The AgEDP meets the quality criteria for the CAP 136 plan as cited in the NRCS Field Office Technical Guide.

Feature Measure: Number

Scenario Unit: Number

Scenario Typical Size: 1.0

Scenario Total Cost: $7,289.32

Scenario Cost/Unit: $7,289.32

Cost Details:

Component Name	ID	Description	Unit	Cost	QTY	Total
Labor						
CAP Labor, professional engineer	1297	Conservation Activity Plan labor to apply knowledge of engineering technology and biological science to agricultural problems concerned with power and machinery, electrification, structures, soil and water conservation, and processing of agricultural products. Cost associated with this component includes overhead and benefits (market price).	Hours	$103.58	54	$5,593.32
CAP Labor, Manager	1603	Conservation Activity Plan labor involving supervision or management activities. Includes crew supervisors, foremen and farm/ranch managers time required for adopting new technology, etc.	Hours	$45.12	13	$586.56
CAP Labor, Administrative Assistant	1739	Conservation Activity Plan labor involving routine clerical and administrative functions such as drafting correspondence, scheduling appointments, organizing and maintaining paper and electronic files, or providing information to callers.	Hours	$29.77	4	$119.08
CAP Labor, Energy Auditor	1740	Conservation Activity Plan labor involving analyzing energy efficient measures and conducting energy audits of industrial areas and facilities.	Hours	$55.02	18	$990.36

Practice: 136 - Agricultural Energy Design Plan - Written

Scenario: #135 - AgEDP High Complexity, 4-5 Designs

Scenario Description:

An agricultural producer wishes to conserve energy through an EQIP contract with multiple energy practice scenarios. Associated scenario(s) provide for retrofits that impose several variables in the design process. The scenarios may involve a change in service levels that cannot be evaluated or designed through use of simple tools or manual calculations. Four factors typically indicate a “High Complexity” system, as follows. 1) Client objectives require a change of output (hp, Btu/hr, lux, etc.) that varies more than about 30% from old devices. 2) System constraints prevent new devices from being installed in the same location as the old devices. 3) The retrofit requires substantive changes to two or more of the electrical, mechanical, plumbing, or structural systems. 4) Complex analysis to evaluate alternatives is required to confirm level of service and appropriate device output, placement, etc. (For example, a detailed simulation is required to determine systems sizing and layout.) “High Complexity” practice scenarios include but are not limited to: comprehensive lighting system redesign; radiant heating systems; convert to tunnel ventilation; or convert to bench heating. Each “Design” indicates that new devices or components are closely related to other devices or components even if numerous scenarios are contracted. If more than three practices are contracted, then, at a minimum, “4-5 Designs” shall be contracted for the AgEDP. The AgEDP includes reviewing, and, when needed, revising alternatives to address energy concerns. The AgEDP documents: a) the client’s final decisions related to the associated energy practice scenarios, b) estimated energy and greenhouse gas benefits; and c) design deliverables described in the associated NRCS Conservation Practice Statements of Work. Natural Resource Concern: Energy Efficiency.

Before Situation:

Producer wants to transition their agricultural operation to become more energy efficient. Producer intends to work with a certified TSP to develop an AgEDP (CAP 136) to implement one or more practice scenarios to address the Energy Efficiency resource concerns. An AgEDP incorporates recommended measures to increase energy conservation and efficiency. Associated Practices: 374 Farmstead Energy Improvement, 670 Lighting System Improvement, 672 Building Envelope Improvement, 533 Pumping Plant, or other applicable practices in the NRCS Field Office Technical Guide.

After Situation:

The producer has obtained services from a certified TSP to develop the Agricultural Energy Design Plan. The CAP 136 criteria include tasks needed to document the client’s decision, energy savings and design of conservation practices which address energy efficiency. The AgEDP meets the quality criteria for the CAP 136 plan as cited in the NRCS Field Office Technical Guide.

Feature Measure: Number

Scenario Unit: Number

Scenario Typical Size: 1.0

Scenario Total Cost: $8,717.21

Scenario Cost/Unit: $8,717.21

Cost Details:

Component Name	ID	Description	Unit	Cost	QTY	Total
Labor						
CAP Labor, professional engineer	1297	Conservation Activity Plan labor to apply knowledge of engineering technology and biological science to agricultural problems concerned with power and machinery, electrification, structures, soil and water conservation, and processing of agricultural products. Cost associated with this component includes overhead and benefits (market price).	Hours	$103.58	66	$6,836.28
CAP Labor, Manager	1603	Conservation Activity Plan labor involving supervision or management activities. Includes crew supervisors, foremen and farm/ranch managers time required for adopting new technology, etc.	Hours	$45.12	14	$631.68
CAP Labor, Administrative Assistant	1739	Conservation Activity Plan labor involving routine clerical and administrative functions such as drafting correspondence, scheduling appointments, organizing and maintaining paper and electronic files, or providing information to callers.	Hours	$29.77	5	$148.85
CAP Labor, Energy Auditor	1740	Conservation Activity Plan labor involving analyzing energy efficient measures and conducting energy audits of industrial areas and facilities.	Hours	$55.02	20	$1,100.40

Practice: 136 - Agricultural Energy Design Plan - Written

Scenario: #151 - AgEDP Low Complexity, 6+ Designs

Scenario Description:

An agricultural producer wishes to conserve energy through an EQIP contract with multiple energy practice scenarios. Associated scenario(s) provide for one-to-one device retrofits. The scenario(s) may provide for a new component to modify the operation of an existing device (e.g., timer to reduce run-time). Three factors typically indicate a "Low Complexity" system, as follows. 1) New devices maintain output (hp, Btu/hr, lux, etc.) of the old devices within a roughly 10% range. 2) New devices are installed in the same location as the old devices. 3) The retrofit does not require substantive changes to electrical, mechanical, plumbing, or structural systems. "Low Complexity" practice scenarios include but are not limited to: lamp or fixture upgrades; attic insulation; fans; or washer-extractors. Each "Design" indicates that new devices or components are closely related to other devices or components even if numerous scenarios are contracted. If more than five practices are contracted, then, at a minimum, "6+ Designs" shall be contracted for the AgEDP. The AgEDP includes reviewing, and, when needed, revising alternatives to address energy concerns. The AgEDP documents: a) the client's final decisions related to the associated energy practice scenarios, b) estimated energy and greenhouse gas; and c) design deliverables described in the associated NRCS Conservation Practice Statements of Work. Natural Resource Concern: Energy Efficiency.

Before Situation:

Producer wants to transition their agricultural operation to become more energy efficient. Producer intends to work with a certified TSP to develop an AgEDP (CAP 136) to implement one or more practice scenarios to address the Energy Efficiency resource concerns. An AgEDP incorporates recommended measures to increase energy conservation and efficiency. Associated Practices: 374 Farmstead Energy Improvement, 670 Lighting System Improvement, 672 Building Envelope Improvement, 533 Pumping Plant, or other applicable practices in the NRCS Field Office Technical Guide.

After Situation:

The producer has obtained services from a certified TSP to develop the Agricultural Energy Design Plan. The CAP 136 criteria include tasks needed to document the client's decision, energy savings and design of conservation practices which address energy efficiency. The AgEDP meets the quality criteria for the CAP 136 plan as cited in the NRCS Field Office Technical Guide.

Feature Measure: Number

Scenario Unit: Number

Scenario Typical Size: 1.0

Scenario Total Cost: $7,399.36

Scenario Cost/Unit: $7,399.36

Cost Details:

Component Name	ID	Description	Unit	Cost	QTY	Total
Labor						
CAP Labor, professional engineer	1297	Conservation Activity Plan labor to apply knowledge of engineering technology and biological science to agricultural problems concerned with power and machinery, electrification, structures, soil and water conservation, and processing of agricultural products. Cost associated with this component includes overhead and benefits (market price).	Hours	$103.58	54	$5,593.32
CAP Labor, Manager	1603	Conservation Activity Plan labor involving supervision or management activities. Includes crew supervisors, foremen and farm/ranch managers time required for adopting new technology, etc.	Hours	$45.12	13	$586.56
CAP Labor, Administrative Assistant	1739	Conservation Activity Plan labor involving routine clerical and administrative functions such as drafting correspondence, scheduling appointments, organizing and maintaining paper and electronic files, or providing information to callers.	Hours	$29.77	4	$119.08
CAP Labor, Energy Auditor	1740	Conservation Activity Plan labor involving analyzing energy efficient measures and conducting energy audits of industrial areas and facilities.	Hours	$55.02	20	$1,100.40

Practice: 136 - Agricultural Energy Design Plan - Written

Scenario: #167 - AgEDP Medium Complexity, 6+ Designs

Scenario Description:

An agricultural producer wishes to conserve energy through an EQIP contract with multiple energy practice scenarios. Associated scenario(s) provide for retrofits that impose some variables in the design process. The scenarios may involve a change in service levels that can be evaluated or designed through use of simple tools or manual calculations. Four factors typically indicate a “Medium Complexity” system, as follows. 1) Client objectives require a change of output (hp, Btu/hr, lux, etc.) that varies more than about 10% from old devices. 2) System constraints prevent new devices from being installed in the same location as the old devices. 3) The retrofit requires substantive changes to either electrical, mechanical, plumbing, or structural systems. 4) Analysis beyond the scope of NRCS methodology to evaluate alternatives is required to confirm level of service and appropriate device output, placement, etc. (For example, a simplified heat transfer model to determine heating, ventilation, and cooling loads may be required if existing device capacity cannot be estimated.) “Medium Complexity” practice scenarios include but are not limited to: change of lighting fixture counts or layout; wall insulation; grain dryers; add reverse osmosis to syrup production; or add evaporative cooling systems (cooling cells). Each “Design” indicates that new devices or components are closely related to other devices or components even if numerous scenarios are contracted. If more than five practices are contracted, then, at a minimum, “6+ Designs” shall be contracted for the AgEDP. The AgEDP includes reviewing, and, when needed, revising alternatives to address energy concerns. The AgEDP documents: a) the client’s final decisions related to the associated energy practice scenarios, b) estimated energy and greenhouse gas benefits; and c) design deliverables described in the associated NRCS Conservation Practice Statements of Work. Natural Resource Concern: Energy Efficiency.

Before Situation:

Producer wants to transition their agricultural operation to become more energy efficient. Producer intends to work with a certified TSP to develop an AgEDP (CAP 136) to implement one or more practice scenarios to address the Energy Efficiency resource concerns. An AgEDP incorporates recommended measures to increase energy conservation and efficiency. Associated Practices: 374 Farmstead Energy Improvement, 670 Lighting System Improvement, 672 Building Envelope Improvement, 533 Pumping Plant, or other applicable practices in the NRCS Field Office Technical Guide.

After Situation:

The producer has obtained services from a certified TSP to develop the Agricultural Energy Design Plan. The CAP 136 criteria include tasks needed to document the client’s decision, energy savings and design of conservation practices which address energy efficiency. The AgEDP meets the quality criteria for the CAP 136 plan as cited in the NRCS Field Office Technical Guide.

Feature Measure: Number

Scenario Unit: Number

Scenario Typical Size: 1.0

Scenario Total Cost: $8,827.25

Scenario Cost/Unit: $8,827.25

Cost Details:

Component Name	ID	Description	Unit	Cost	QTY	Total
Labor						
CAP Labor, professional engineer	1297	Conservation Activity Plan labor to apply knowledge of engineering technology and biological science to agricultural problems concerned with power and machinery, electrification, structures, soil and water conservation, and processing of agricultural products. Cost associated with this component includes overhead and benefits (market price).	Hours	$103.58	66	$6,836.28
CAP Labor, Manager	1603	Conservation Activity Plan labor involving supervision or management activities. Includes crew supervisors, foremen and farm/ranch managers time required for adopting new technology, etc.	Hours	$45.12	14	$631.68
CAP Labor, Administrative Assistant	1739	Conservation Activity Plan labor involving routine clerical and administrative functions such as drafting correspondence, scheduling appointments, organizing and maintaining paper and electronic files, or providing information to callers.	Hours	$29.77	5	$148.85
CAP Labor, Energy Auditor	1740	Conservation Activity Plan labor involving analyzing energy efficient measures and conducting energy audits of industrial areas and facilities.	Hours	$55.02	22	$1,210.44

Practice: 136 - Agricultural Energy Design Plan - Written

Scenario: #183 - AgEDP High Complexity, 6+ Designs

Scenario Description:

An agricultural producer wishes to conserve energy through an EQIP contract with multiple energy practice scenarios. Associated scenario(s) provide for retrofits that impose several variables in the design process. The scenarios may involve a change in service levels that cannot be evaluated or designed through use of simple tools or manual calculations. Four factors typically indicate a “High Complexity” system, as follows. 1) Client objectives require a change of output (hp, Btu/hr, lux, etc.) that varies more than about 30% from old devices. 2) System constraints prevent new devices from being installed in the same location as the old devices. 3) The retrofit requires substantive changes to two or more of the electrical, mechanical, plumbing, or structural systems. 4) Complex analysis to evaluate alternatives is required to confirm level of service and appropriate device output, placement, etc. (For example, a detailed simulation is required to determine systems sizing and layout.) “High Complexity” practice scenarios include but are not limited to: comprehensive lighting system redesign; radiant heating systems; convert to tunnel ventilation; or convert to bench heating. Each “Design” indicates that new devices or components are closely related to other devices or components even if numerous scenarios are contracted. If more than five practices are contracted, then, at a minimum, “6+ Designs” shall be contracted for the AgEDP. The AgEDP includes reviewing, and, when needed, revising alternatives to address energy concerns. The AgEDP documents: a) the client’s final decisions related to the associated energy practice scenarios, b) estimated energy and greenhouse gas benefits; and c) design deliverables described in the associated NRCS Conservation Practice Statements of Work. Natural Resource Concern: Energy Efficiency.

Before Situation:

Producer wants to transition their agricultural operation to become more energy efficient. Producer intends to work with a certified TSP to develop an AgEDP (CAP 136) to implement one or more practice scenarios to address the Energy Efficiency resource concerns. An AgEDP incorporates recommended measures to increase energy conservation and efficiency. Associated Practices: 374 Farmstead Energy Improvement, 670 Lighting System Improvement, 672 Building Envelope Improvement, 533 Pumping Plant, or other applicable practices in the NRCS Field Office Technical Guide.

After Situation:

The producer has obtained services from a certified TSP to develop the Agricultural Energy Design Plan. The CAP 136 criteria include tasks needed to document the client’s decision, energy savings and design of conservation practices which address energy efficiency. The AgEDP meets the quality criteria for the CAP 136 plan as cited in the NRCS Field Office Technical Guide.

Feature Measure: Number

Scenario Unit: Number

Scenario Typical Size: 1.0

Scenario Total Cost: $10,255.14

Scenario Cost/Unit: $10,255.14

Cost Details:

Component Name	ID	Description	Unit	Cost	QTY	Total
Labor						
CAP Labor, professional engineer	1297	Conservation Activity Plan labor to apply knowledge of engineering technology and biological science to agricultural problems concerned with power and machinery, electrification, structures, soil and water conservation, and processing of agricultural products. Cost associated with this component includes overhead and benefits (market price).	Hours	$103.58	78	$8,079.24
CAP Labor, Manager	1603	Conservation Activity Plan labor involving supervision or management activities. Includes crew supervisors, foremen and farm/ranch managers time required for adopting new technology, etc.	Hours	$45.12	15	$676.80
CAP Labor, Administrative Assistant	1739	Conservation Activity Plan labor involving routine clerical and administrative functions such as drafting correspondence, scheduling appointments, organizing and maintaining paper and electronic files, or providing information to callers.	Hours	$29.77	6	$178.62
CAP Labor, Energy Auditor	1740	Conservation Activity Plan labor involving analyzing energy efficient measures and conducting energy audits of industrial areas and facilities.	Hours	$55.02	24	$1,320.48

Practice: 138 - Conservation Plan Supporting Organic Transition - Written

Scenario: #16 - Conservation Plan Supporting Organic Transition CAP Crops and Livestock

Scenario Description:

Agricultural operation where producer will transition from conventional to organic to meet USDA National Organic Program (NOP) requirements. Natural Resource Concern: Soil Erosion, Water Quality, Plant Condition, and other identified natural resource concerns.

Before Situation:

Agricultural operation currently managed using traditional and conventional methods for farming and/or ranching mixed operation of crops and livestock. The producer currently manages the operation based upon personal knowledge, or other local criteria. The producer is interested in transitioning part or all of the management unit to meet national USDA requirements for a certified operation. The producer is willing to collaborate with a certified TSP to develop a plan and collect/coordinate data recording to monitor per requirements of plan. Associated Practices: Refer to the NRCS Plan Criteria for conservation practices associated with operations transitioning to organic certification and typically needed to address identified natural resource concerns.

After Situation:

After EQIP contract approval, participant has obtained services from a certified TSP to develop the Conservation Plan Supporting Organic Transition Conservation Activity Plan (CAP) The CAP criteria requires the plan to meet quality criteria for applicable resource concerns and provides for opportunities to implement a system of conservation practices which assist the producer to transition from conventional farming or ranching to an organic production system with crops and livestock. The CAP plan will include conservation practices which address related resource concerns. The CAP meets the basic quality criteria for the 138 plan as cited in the NRCS Field Office Technical Guide.

Feature Measure: Number

Scenario Unit: Number

Scenario Typical Size: 1.0

Scenario Total Cost: $5,913.00

Scenario Cost/Unit: $5,913.00

Cost Details:

Component Name	ID	Description	Unit	Cost	QTY	Total
Labor						
Cap Labor, conservation scientist	1300	Conservation Activity Plan labor to manage, improve, and protect natural resources to maximize their use without damaging the environment. Interprets resource information and assess resource conditions to provide conservation practice alternatives to producers to make decisions on the treatment of their soil, water, air, plant, animal, and energy resources. May instruct farmers, agricultural production managers, or ranchers in best ways to use crop rotation, contour plowing, or terracing to conserve soil and water; in the number and kind of livestock and forage plants best suited to particular ranges; and in range and farm improvements, such as fencing and reservoirs for stock watering.	Hours	$78.84	75	$5,913.00

Practice: 138 - Conservation Plan Supporting Organic Transition - Written

Scenario: #17 - Conservation Plan Supporting Organic Transition CAP Crops or Livestock

Scenario Description:

Agricultural operation where producer will transition from conventional to organic to meet USDA National Organic Program (NOP) requirements. Natural Resource Concern: Soil Erosion, Water Quality, Plant Condition, and other identified natural resource concerns.

Before Situation:

Agricultural operation currently managed using traditional and conventional methods for farming with only crops. The producer currently manages the operation based upon personal knowledge, or other local criteria. The producer is interested in transitioning part or all of the management unit to meet national USDA requirements for certified operation. The producer is willing to collaborate with a certified TSP to develop a plan and collect/coordinate data recording to monitor per requirements of plan. Associated Practices: Refer to the NRCS Plan Criteria for conservation practices associated with operations transitioning to organic certification and typically needed to address identified natural resource concerns.

After Situation:

After EQIP contract approval, participant has obtained services from a certified TSP to develop the Conservation Plan Supporting Organic Transition Conservation Activity Plan (CAP) The CAP criteria requires the plan to meet quality criteria for applicable resource concerns and provides for opportunities to implement a system of conservation practices which assist the producer to transition from conventional farming or ranching to an organic production system with crops and livestock. The CAP plan will include conservation practices which address related resource concerns. The CAP meets the basic quality criteria for the 138 plan as cited in the NRCS Field Office Technical Guide.

Feature Measure: Number

Scenario Unit: Number

Scenario Typical Size: 1.0

Scenario Total Cost: $5,045.76

Scenario Cost/Unit: $5,045.76

Cost Details:

Component Name	ID	Description	Unit	Cost	QTY	Total
Labor						
Cap Labor, conservation scientist	1300	Conservation Activity Plan labor to manage, improve, and protect natural resources to maximize their use without damaging the environment. Interprets resource information and assess resource conditions to provide conservation practice alternatives to producers to make decisions on the treatment of their soil, water, air, plant, animal, and energy resources. May instruct farmers, agricultural production managers, or ranchers in best ways to use crop rotation, contour plowing, or terracing to conserve soil and water; in the number and kind of livestock and forage plants best suited to particular ranges; and in range and farm improvements, such as fencing and reservoirs for stock watering.	Hours	$78.84	64	$5,045.76

Practice: 142 - Fish and Wildlife Habitat Plan - Written

Scenario: #23 - Fish & Wildlife Habitat Management CAP (2 Land Uses)

Scenario Description:

Various on-farm land uses. Natural Resource Concern: Fish and Wildlife, and other applicable resource concerns on an agricultural operation. The CAP addresses fish and wildlife habitat management relative to two land uses on the agricultural operation of which each land use is at least 20 acres in size.

Before Situation:

Producer has no plan or knowledge of development or management of fish and/or wildlife habitat. The producer does not currently manage or enhance habitat to promote opportunities for fish and/or wildlife habitat. Within existing land uses, the producer is interested in management of land or for establishment of new habitat for benefit of appropriate fish or wildlife species. Associated Practices: Applicable conservation practices cited in the CAP criteria and NRCS Field Office Technical Guide.

After Situation:

After EQIP contract approval, the participant has obtained services from a certified TSP for development of the Fish and Wildlife Management Conservation Activity Plan (CAP). The CAP criteria requires the plan to meet quality criteria for the primary fish/wildlife habitat resource concern and other applicable resource concerns and provides for opportunities to improve, restore, or enhance habitat that supports native and/or managed species. The CAP plan may include recommendations for associated conservation practices which address other related resource concerns. The CAP meets the basic quality criteria for the 142 plan as cited in the NRCS Field Office Technical Guide.

Feature Measure: Number

Scenario Unit: Number

Scenario Typical Size: 1.0

Scenario Total Cost: $3,523.08

Scenario Cost/Unit: $3,523.08

Cost Details:

Component Name	ID	Description	Unit	Cost	QTY	Total
Labor						
CAP Labor, biologist	1298	Conservation Activity Plan labor to study the origins, behavior, diseases, genetics, and life processes of animals and wildlife. May specialize in wildlife research and management. May collect and analyze biological data to determine the environmental effects of present and potential use of land and water habitats. Cost associated with this component includes overhead and benefits (market price).	Hours	$80.07	44	$3,523.08

Practice: 142 - Fish and Wildlife Habitat Plan - Written

Scenario: #39 - Fish & Wildlife Habitat Management CAP (Three Land Uses)

Scenario Description:

Various on-farm land uses. Natural Resource Concern: Fish and Wildlife, and other applicable resource concerns on an agricultural operation. The CAP addresses fish and wildlife habitat management relative to two or more land uses on the agricultural operation of which at least three of the land uses are at least 20 acres in size

Before Situation:

Producer has no plan or knowledge of development or management of fish and/or wildlife habitat. The producer does not currently manage or enhance habitat to promote opportunities for fish and/or wildlife habitat. Within existing land uses, the producer is interested in management of land or for establishment of new habitat for benefit of appropriate fish or wildlife species. Associated Practices: Applicable conservation practices cited in the CAP criteria and NRCS Field Office Technical Guide.

After Situation:

After EQIP contract approval, the participant has obtained services from a certified TSP for development of the Fish and Wildlife Management Conservation Activity Plan (CAP). The CAP criteria requires the plan to meet quality criteria for the primary fish/wildlife habitat resource concern and other applicable resource concerns and provides for opportunities to improve, restore, or enhance habitat that supports native and/or managed species. The CAP plan may include recommendations for associated conservation practices which address other related resource concerns. The CAP meets the basic quality criteria for the 142 plan as cited in the NRCS Field Office Technical Guide.

Feature Measure: Number

Scenario Unit: Number

Scenario Typical Size: 1.0

Scenario Total Cost: $4,163.64

Scenario Cost/Unit: $4,163.64

Cost Details:

Component Name	ID	Description	Unit	Cost	QTY	Total
Labor						
CAP Labor, biologist	1298	Conservation Activity Plan labor to study the origins, behavior, diseases, genetics, and life processes of animals and wildlife. May specialize in wildlife research and management. May collect and analyze biological data to determine the environmental effects of present and potential use of land and water habitats. Cost associated with this component includes overhead and benefits (market price).	Hours	$80.07	52	$4,163.64

Practice: 142 - Fish and Wildlife Habitat Plan - Written

Scenario: #55 - Fish & Wildlife Habitat Management CAP (1 Land Use)

Scenario Description:

Various on-farm land uses. Natural Resource Concern: Fish and Wildlife, and other applicable resource concerns on an agricultural operation. The CAP addresses fish and wildlife habitat management relative to only one land use on the agricultural operation.

Before Situation:

Producer has no plan or knowledge of development or management of fish and/or wildlife habitat. The producer does not currently manage or enhance habitat to promote opportunities for fish and/or wildlife habitat. Within existing land uses, the producer is interested in management of land or for establishment of new habitat for benefit of appropriate fish or wildlife species. Associated Practices: Applicable conservation practices cited in the CAP criteria and NRCS Field Office Technical Guide.

After Situation:

After EQIP contract approval, the participant has obtained services from a certified TSP for development of the Fish and Wildlife Management Conservation Activity Plan (CAP). The CAP criteria requires the plan to meet quality criteria for the primary fish/wildlife habitat resource concern and other applicable resource concerns and provides for opportunities to improve, restore, or enhance habitat that supports native and/or managed species. The CAP plan may include recommendations for associated conservation practices which address other related resource concerns. The CAP meets the basic quality criteria for the 142 plan as cited in the NRCS Field Office Technical Guide.

Feature Measure: Number

Scenario Unit: Number

Scenario Typical Size: 1.0

Scenario Total Cost: $2,882.52

Scenario Cost/Unit: $2,882.52

Cost Details:

Component Name	ID	Description	Unit	Cost	QTY	Total
Labor						
CAP Labor, biologist	1298	Conservation Activity Plan labor to study the origins, behavior, diseases, genetics, and life processes of animals and wildlife. May specialize in wildlife research and management. May collect and analyze biological data to determine the environmental effects of present and potential use of land and water habitats. Cost associated with this component includes overhead and benefits (market price).	Hours	$80.07	36	$2,882.52

Practice: 146 - Pollinator Habitat Plan - Written

Scenario: #16 - Pollinator Habitat Enhancement Plan CAP

Scenario Description:

Various on-farm land uses. Natural Resource Concern: Fish and Wildlife, Plant Condition, Soil Erosion, Water Quality on an agricultural operation.

Before Situation:

Agricultural producer currently has no plan or knowledge of development or management of pollinator habitat. The producer does not currently manage or enhance habitat to promote opportunities for pollinator habitat. Within existing land uses, the producer may be interested in management of land or for establishment of new habitat for benefit of appropriate pollinator species. Associated Practices: 311, 322, 327, 328, 656, 332, 340, 342, 647, 386, 393, 412, 422, 603, 379, 512, 595, 338, 528, 550, 329, 643, 391, 390, 381, 395, 580, 585, 612, 645, 601, 659, 657, 644, 380, 650.

After Situation:

After EQIP contract approval, participant has obtained services from a certified TSP for development of the Pollinator Habitat Enhancement Conservation Activity Plan (CAP). The CAP criteria requires the plan to meet quality criteria for applicable resource concerns and provides for opportunities to improve, restore, or enhance flower-rich habitat that supports native and/or managed pollinator species. The CAP plan may include recommendations for associated conservation practices which address other related resource concerns. The CAP meets the basic quality criteria for the 146 plan as cited in the NRCS Field Office Technical Guide.

Feature Measure: Number

Scenario Unit: Number

Scenario Typical Size: 1.0

Scenario Total Cost: $3,362.94

Scenario Cost/Unit: $3,362.94

Cost Details:

Component Name	ID	Description	Unit	Cost	QTY	Total
Labor						
CAP Labor, biologist	1298	Conservation Activity Plan labor to study the origins, behavior, diseases, genetics, and life processes of animals and wildlife. May specialize in wildlife research and management. May collect and analyze biological data to determine the environmental effects of present and potential use of land and water habitats. Cost associated with this component includes overhead and benefits (market price).	Hours	$80.07	42	$3,362.94

Practice: 146 - Pollinator Habitat Plan - Written

Scenario: #17 - Pollinator Habitat Enhancement Plan CAP - No Local TSP

Scenario Description:

Various on-farm land uses, No qualified TSP within 300 miles. Natural Resource Concern: Fish and Wildlife, Plant Condition, Soil Erosion, Water Quality on an agricultural operation.

Before Situation:

Agricultural producer currently has no plan or knowledge of development or management of pollinator habitat. The producer does not currently manage or enhance habitat to promote opportunities for pollinator habitat. Within existing land uses, the producer may be interested in management of land or for establishment of new habitat for benefit of appropriate pollinator species. Associated Practices: 311, 322, 327, 328, 656, 332, 340, 342, 647, 386, 393, 412, 422, 603, 379, 512, 595, 338, 528, 550, 329, 643, 391, 390, 381, 395, 580, 585, 612, 645, 601, 659, 657, 644, 380, 650.

After Situation:

After EQIP contract approval, participant has obtained services from a certified TSP for development of the Pollinator Habitat Enhancement Conservation Activity Plan (CAP). The CAP criteria requires the plan to meet quality criteria for applicable resource concerns and provides for opportunities to improve, restore, or enhance flower-rich habitat that supports native and/or managed pollinator species. The CAP plan may include recommendations for associated conservation practices which address other related resource concerns. The CAP meets the basic quality criteria for the 146 plan as cited in the NRCS Field Office Technical Guide.

Feature Measure: Number

Scenario Unit: Number

Scenario Typical Size: 1.0

Scenario Total Cost: $4,884.27

Scenario Cost/Unit: $4,884.27

Cost Details:

Component Name	ID	Description	Unit	Cost	QTY	Total
Labor						
CAP Labor, biologist	1298	Conservation Activity Plan labor to study the origins, behavior, diseases, genetics, and life processes of animals and wildlife. May specialize in wildlife research and management. May collect and analyze biological data to determine the environmental effects of present and potential use of land and water habitats. Cost associated with this component includes overhead and benefits (market price).	Hours	$80.07	61	$4,884.27

Practice: 154 - IPM Herbicide Resistance Weed Conservation Plan - Written

Scenario: #17 - IPM Herbicide Resistance Weed Management CAP Small-Specialty Less Than or Equal to 50 Acres

Scenario Description:

On-farm cropland where weeds are resistant to herbicides, including organic and specialty crop operations. Natural Resource Concerns: Water quality, soil erosion, soil condition, and plant condition are the appropriate resource concerns.

Before Situation:

Agricultural producer currently has no plan or limited knowledge for management of cropland weeds or for adaptive techniques to address herbicide resistant weeds. The producer currently manages cropland weeds based upon herbicide label instructions, personal knowledge, or other local criteria, and has not implemented strategies to diversify crop rotations and rotate herbicide modes of action for purposes of managing resistant weed spread and protecting soil quality and plant condition. The producer is interested in management of weeds to maximize yields, improve profit margins, reduce costs, address challenges in herbicide resistant weeds, and for environmental benefit. The producer is willing to collaborate with a certified TSP to develop a plan and collect/coordinate data recording to monitor per requirements of the plan. Associated Practices: Integrated Pest Management, Crop Rotation, Cover Crop, Field Border, Filter Strip, Stripcropping, and Residue and Tillage management practices, or other applicable conservation practices cited in the NRCS Field Office Technical Guide.

After Situation:

After EQIP contract approval, participant has obtained services from a certified TSP for development of the Herbicide Resistance Weed Conservation Activity Plan (CAP). The CAP criteria requires the plan to meet quality criteria for applicable resource concerns and provides for opportunities to utilize the following strategies: Prevention, Avoidance, Monitoring, and Suppression, which will be implemented through the use of Integrated Pest Management and may use one or more of the following conservation practices: Crop Rotation, Cover Crop, and Residue Management. Recommendations on crop system diversification and integration of herbicide mode of action rotation for effective weed control on recommended crop rotation are integral to the CAP. The CAP plan may include recommendations for associated conservation practices which address other related resource concerns. The CAP meets the basic quality criteria for the 154 plan as cited in the NRCS Field Office Technical Guide.

Feature Measure: Number

Scenario Unit: Number

Scenario Typical Size: 1.0

Scenario Total Cost: $2,408.70

Scenario Cost/Unit: $2,408.70

Cost Details:

Component Name	ID	Description	Unit	Cost	QTY	Total
Labor						
CAP Labor, agronomist	1295	Conservation Activity Plan labor to conduct research in breeding, physiology, production, yield, and management of crops and agricultural plants or trees, shrubs, and nursery stock, their growth in soils, and control of pests; or study the chemical, physical, biological, and mineralogical composition of soils as they relate to plant or crop growth. May classify and map soils and investigate effects of alternative practices on soil and crop productivity. May provide on-site consulting services to help growers troubleshoot nutrient and pest problems, establish appropriate agronomic sampling programs and implement management recommendations in a cost-effective and environmentally sound manner.	Hours	$80.29	30	$2,408.70

Practice: 154 - IPM Herbicide Resistance Weed Conservation Plan - Written

Scenario: #18 - IPM Herbicide Resistance Weed Management CAP Medium 51 - 250 Acres

Scenario Description:

On-farm cropland where weeds are resistant to herbicides, including organic and specialty crop operations. Natural Resource Concerns: Water quality, soil erosion, soil condition, and plant condition are the appropriate resource concerns.

Before Situation:

Agricultural producer currently has no plan or limited knowledge for management of cropland weeds or for adaptive techniques to address herbicide resistant weeds. The producer currently manages cropland weeds based upon herbicide label instructions, personal knowledge, or other local criteria, and has not implemented strategies to diversify crop rotations and rotate herbicide modes of action for purposes of managing resistant weed spread and protecting soil quality and plant condition. The producer is interested in management of weeds to maximize yields, improve profit margins, reduce costs, address challenges in herbicide resistant weeds, and for environmental benefit. The producer is willing to collaborate with a certified TSP to develop a plan and collect/coordinate data recording to monitor per requirements of the plan. Associated Practices: Integrated Pest Management, Crop Rotation, Cover Crop, Field Border, Filter Strip, Stripcropping, and Residue and Tillage management practices, or other applicable conservation practices cited in the NRCS Field Office Technical Guide.

After Situation:

After EQIP contract approval, participant has obtained services from a certified TSP for development of the Herbicide Resistance Weed Conservation Activity Plan (CAP). The CAP criteria requires the plan to meet quality criteria for applicable resource concerns and provides for opportunities to utilize the following strategies: Prevention, Avoidance, Monitoring, and Suppression, which will be implemented through the use of Integrated Pest Management and may use one or more of the following conservation practices: Crop Rotation, Cover Crop, and Residue Management. Recommendations on crop system diversification and integration of herbicide mode of action rotation for effective weed control on recommended crop rotation are integral to the CAP. The CAP plan may include recommendations for associated conservation practices which address other related resource concerns. The CAP meets the basic quality criteria for the 154 plan as cited in the NRCS Field Office Technical Guide.

Feature Measure: Number

Scenario Unit: Number

Scenario Typical Size: 1.0

Scenario Total Cost: $3,131.31

Scenario Cost/Unit: $3,131.31

Cost Details:

Component Name	ID	Description	Unit	Cost	QTY	Total
Labor						
CAP Labor, agronomist	1295	Conservation Activity Plan labor to conduct research in breeding, physiology, production, yield, and management of crops and agricultural plants or trees, shrubs, and nursery stock, their growth in soils, and control of pests; or study the chemical, physical, biological, and mineralogical composition of soils as they relate to plant or crop growth. May classify and map soils and investigate effects of alternative practices on soil and crop productivity. May provide on-site consulting services to help growers troubleshoot nutrient and pest problems, establish appropriate agronomic sampling programs and implement management recommendations in a cost-effective and environmentally sound manner.	Hours	$80.29	39	$3,131.31

Practice: 154 - IPM Herbicide Resistance Weed Conservation Plan - Written

Scenario: #19 - IPM Herbicide Resistance Weed Management CAP Large - Greater Than 250 Acres

Scenario Description:

On-farm cropland where weeds are resistant to herbicides, including organic and specialty crop operations. Natural Resource Concerns: Water quality, soil erosion, soil condition, and plant condition are the appropriate resource concerns.

Before Situation:

Agricultural producer currently has no plan or limited knowledge for management of cropland weeds or for adaptive techniques to address herbicide resistant weeds. The producer currently manages cropland weeds based upon herbicide label instructions, personal knowledge, or other local criteria, and has not implemented strategies to diversify crop rotations and rotate herbicide modes of action for purposes of managing resistant weed spread and protecting soil quality and plant condition. The producer is interested in the management of weeds to maximize yields, improve profit margins, reduce costs, address challenges in herbicide resistant weeds, and for environmental benefit. The producer is willing to collaborate with a certified TSP to develop a plan and collect/coordinate data recording to monitor per requirements of plan. Associated Practices: Integrated Pest Management, Crop Rotation, Cover Crop, Field Border, Filter Strip, Stripcropping, and Residue and Tillage management practices, or other application conservation practices cited tin the NRCS Field Office Technical Guide.

After Situation:

After EQIP contract approval, participant has obtained services from a certified TSP for development of the Herbicide Resistance Weed Conservation Activity Plan (CAP). The CAP criteria requires the plan to meet quality criteria for applicable resource concerns and provides for opportunities to utilize the following strategies: Prevention, Avoidance, Monitoring, and Suppression, which will be implemented through the use of Integrated Pest Management and may use one or more of the following conservation practices: Crop Rotation, Cover Crop, and Residue Management. Recommendations on crop system diversification and integration of herbicide mode of action rotation for effective weed control on recommended crop rotation are integral to the CAP. The CAP plan may include recommendations for associated conservation practices which address other related resource concerns. The CAP meets the basic quality criteria for the 154 plan as cited in the NRCS Field Office Technical Guide.

Feature Measure: Number

Scenario Unit: Number

Scenario Typical Size: 1.0

Scenario Total Cost: $4,817.40

Scenario Cost/Unit: $4,817.40

Cost Details:

Component Name	ID	Description	Unit	Cost	QTY	Total
Labor						
CAP Labor, agronomist	1295	Conservation Activity Plan labor to conduct research in breeding, physiology, production, yield, and management of crops and agricultural plants or trees, shrubs, and nursery stock, their growth in soils, and control of pests; or study the chemical, physical, biological, and mineralogical composition of soils as they relate to plant or crop growth. May classify and map soils and investigate effects of alternative practices on soil and crop productivity. May provide on-site consulting services to help growers troubleshoot nutrient and pest problems, establish appropriate agronomic sampling programs and implement management recommendations in a cost-effective and environmentally sound manner.	Hours	$80.29	60	$4,817.40

Practice: 216 - Soil Testing

Scenario: #7 - Basic Soil Health Suite: TSP

Scenario Description:

A laboratory soil health assessment is conducted using recommended methods in technical note 450-03 to design the implementation requirements (IR) for a practice. Laboratory tests must be conducted according to technical note 450-03 and consist of all the following approved "basic package" indicators: soil organic carbon, aggregation, bioavailable nitrogen, respiration, and active carbon. This scenario assumes that a comprehensive chemical soil test (macronutrients + micronutrients) has been completed on the same management unit in the last 2 years. Sample collection and IR development is completed by a TSP and includes time for soil sampling and IR development. This scenario may be used after a CAP 116 has been completed or as a companion with CAP 116.

Before Situation:

Agricultural producer has been farming a system that has not addressed all 4 of the soil health principles. Producer has noticed yield declines, soil degradation, or is simply interested in learning more about soil health management. A CAP 116 has been completed or is being planned to identify core soil health practices needed to address the resource concerns.

After Situation:

A laboratory soil health test was completed and the results were interpreted (scored) and explained to the producer. Job sheets or implementation requirements for soil health practices were developed by a TSP.

Feature Measure: Number

Scenario Unit: Number

Scenario Typical Size: 5.0

Scenario Total Cost: $1,186.33

Scenario Cost/Unit: $237.27

Cost Details:

Component Name	ID	Description	Unit	Cost	QTY	Total
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.	Hours	$37.19	2.5	$92.98
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.	Hours	$102.76	5	$513.80
Materials						
Test, Soil Health, Basic Package	2734	Basic soil health laboratory assessment for soil organic carbon, aggregation, bioavailable nitrogen, respiration, and active carbon according to technical note 450-03. Includes shipping and handling.	Number	$115.91	5	$579.55

Practice: 309 - Agrichemical Handling Facility

Scenario: #1 - Enclosed Building for Storage and Handling

Scenario Description:

This practice scenario is an agrichemical handling facility for storage and mixing and loading operations. This practice addresses water quality degradation and due to mis-handling, storing and mixing of agrichemicals where nutrients and/or chemicals are running off into surface waters or leaching into ground water. Associated practices: Heavy Use Area Protection (561), Diversion (362), Access Road (560), Pipeline (516), Roof Runoff Management (558), Pumping Plant for Water Control (533), Nutrient Management (590), Pest Management (595)

Before Situation:

Agrichemicals are improperly stored on the ground or next to a well. Operator mixes the agrichemicals and fills the sprayer tank next to a hydrant. Spills or overflows of agrichemicals contaminate the soil, runoff to surface waters and leaching to ground water.

After Situation:

An agrichemical storage and handling facility is constructed inside an enclosed building. The average size of the agrichemical handling facility for storage and mixing and loading is 35' x 40' with an application equipment length of 36 ft. The handling pad for mixing and loading operations is sized to contain the length of the agrichemical spray tank and its volume. Install a curbed reinforced concrete handling pad for mixing and loading with proper storage of associated dry and/or liquid agrichemicals. The concrete is sealed and sloped to a collection sump, facility containment is surrounded by square and ramped curbs. This practice will contain agrichemicals and prevent contamination of surface and ground water resources.

Feature Measure: Total Containment Area

Scenario Unit: Square Feet

Scenario Typical Size: 1,400.0

Scenario Total Cost: $38,300.17

Scenario Cost/Unit: $27.36

Cost Details:

Component Name	ID	Description	Unit	Cost	QTY	Total
Equipment Installation						
Concrete, CIP, slab on grade, reinforced	37	Steel reinforced concrete formed and cast-in-placed as a slab on grade by chute placement. Typical strength is 3000 to 4000 psi. Includes materials, labor and equipment to transport, place and finish.	Cubic Yards	$362.36	18	$6,522.48
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 Yards	$481.12	10	$4,811.20
Dozer, 80 HP	929	Track mounted Dozer with horsepower range of 60 to 90. Equipment and power unit costs. Labor not included.	Hours	$55.20	4	$220.80
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.	Hours	$27.56	8	$220.48
Equipment Operators, Heavy	233	Includes: Cranes, Hydraulic Excavators >=50 HP, Dozers, Paving Machines, Rock Trenchers, Trenchers >=12 in., Dump Trucks, Ag Equipment >=150 HP, Scrapers, Water Wagons.	Hours	$38.00	8	$304.00
Materials						
Aggregate, Sand, Graded, Washed	45	Sand, typical ASTM C33 gradation, includes materials, equipment and labor to transport and place	Cubic Yards	$43.40	22	$954.80
Post Frame Building, enclosed 4 sides	1046	Enclosed post frame building, four walls. Building sites with expected snow loads up to 30 lbs per square foot and wind exposure in semi protected areas (wooded or terrain with numerous closely spaced obstructions). Includes materials, shipping, and labor only.	Square Feet	$13.02	1760	$22,915.20
Painting, porous surface, impermeable	1497	Painting of concrete, foam or other porous surfaces with an impermeable coating. Includes materials and application.	Square Feet	$0.88	1400	$1,232.00
Emergency shower and eye wash station	1499	Emergency shower and ewe wash station unit. Materials only.	Each	$691.62	1	$691.62
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	$171.94	1	$171.94
Mobilization, medium equipment	1139	Equipment with 70-150 HP or typical weights between 14,000 and 30,000 pounds.	Each	$255.65	1	$255.65

Practice: 309 - Agrichemical Handling Facility

Scenario: #5 - Concrete Pad for mixing and loading

Scenario Description:

This practice scenario is an agrichemical handling facility for mixing and loading operations. This practice addresses water quality degradation and due to mis-handling, and mixing of agrichemicals where nutrients and/or chemicals are running off into surface waters or leaching into ground water. Associated practices: Heavy Use Area Protection (561), Diversion (362), Access Road (560), Pipeline (516), Pumping Plant for Water Control (533), Nutrient Management (590), Pest Management (595), Roofs and Covers (367)

Before Situation:

Agrichemicals are improperly stored on the ground or next to a well. Operator mixes the agrichemicals and fills the sprayer tank next to a hydrant. Spills or overflows of agrichemicals contaminate the soil, runoff to surface waters and leaching to ground water.

After Situation:

This scenario is an agrichemical handling facility pad for mixing and loading operations. The average size of the agrichemical handling pad for mixing and loading is 16' x 40' with an application equipment length of 36 ft. The handling pad for mixing and loading operations is sized to contain the length of the agrichemical spray tank and its volume. Install a curbed reinforced concrete handling pad for mixing and loading. The concrete is sealed and sloped to a collection sump, containment of the pad is surrounded by sloped and ramped reinforced concrete. This practice will contain agrichemicals and prevent contamination of surface and ground water resources.

Feature Measure: Total Containment Area

Scenario Unit: Square Feet

Scenario Typical Size: 640.0

Scenario Total Cost: $8,878.77

Scenario Cost/Unit: $13.87

Cost Details:

Component Name	ID	Description	Unit	Cost	QTY	Total
Equipment Installation						
Concrete, CIP, slab on grade, reinforced	37	Steel reinforced concrete formed and cast-in-placed as a slab on grade by chute placement. Typical strength is 3000 to 4000 psi. Includes materials, labor and equipment to transport, place and finish.	Cubic Yards	$362.36	10	$3,623.60
Concrete, CIP, formed reinforced	38	Steel reinforced concrete formed and cast-in-placed in formed structures such as walls or suspended slabs by chute placement. Typical strength is 3000 to 4000 psi. Includes materials, labor and equipment to transport, place and finish.	Cubic Yards	$481.12	7	$3,367.84
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 Yards	$2.31	35	$80.85
Dozer, 80 HP	929	Track mounted Dozer with horsepower range of 60 to 90. Equipment and power unit costs. Labor not included.	Hours	$55.20	4	$220.80
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.	Hours	$27.56	4	$110.24
Equipment Operators, Heavy	233	Includes: Cranes, Hydraulic Excavators >=50 HP, Dozers, Paving Machines, Rock Trenchers, Trenchers >=12 in., Dump Trucks, Ag Equipment >=150 HP, Scrapers, Water Wagons.	Hours	$38.00	4	$152.00
Materials						
Aggregate, Sand, Graded, Washed	45	Sand, typical ASTM C33 gradation, includes materials, equipment and labor to transport and place	Cubic Yards	$43.40	10	$434.00
Painting, porous surface, impermeable	1497	Painting of concrete, foam or other porous surfaces with an impermeable coating. Includes materials and application.	Square Feet	$0.88	640	$563.20
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	$70.59	1	$70.59
Mobilization, medium equipment	1139	Equipment with 70-150 HP or typical weights between 14,000 and 30,000 pounds.	Each	$255.65	1	$255.65

Practice: 309 - Agrichemical Handling Facility

Scenario: #6 - Greenhouse, Pallet Drum Storage and Poly Pad for Handling

Scenario Description:

This practice scenario is an agrichemical storage and handling facility for mixing and loading operations within a greenhouse. This practice addresses water quality degradation and due to mis-handling, storing, and mixing of agrichemicals where nutrients and/or chemicals are running off into surface waters or leaching into ground water. Associated practices: Heavy Use Area Protection (561), Diversion (362), Pipeline (516), Pumping Plant for Water Control (533), Nutrient Management (590), Pest Management (595)

Before Situation:

Agrichemicals are improperly stored on the ground or next to a well. Operator mixes the agrichemicals and fills the sprayer tank next to a hydrant. Spills or overflows of agrichemicals contaminate the soil, runoff to surface waters and leaching to ground water.

After Situation:

This scenario is an agrichemical handling facility storage an impermeable barrier poly pad for mixing and loading operations. The average size of the agrichemical handling storage is for a pallet drum on a 5 ft x 5 ft contaiment pallet with sump capacity included. A poly pad is used for mixing and loading that is 8ft x 8ft with an application equipment length of 4 ft. The handling pad for mixing and loading operations is sized to contain the length of the agrichemical spray tank and its volume. This practice will contain agrichemicals and prevent contamination of surface and ground water resources.

Feature Measure: Storage Area + Mixing Area

Scenario Unit: Square Feet

Scenario Typical Size: 89.0

Scenario Total Cost: $1,714.52

Scenario Cost/Unit: $19.26

Cost Details:

Component Name	ID	Description	Unit	Cost	QTY	Total
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.	Hours	$27.56	8	$220.48
Materials						
2 Drum Spill Pallet, 66 Gallon	1610	Pre fabricated containment basin with a capacity of approximately 66 gal. Materials only.	Each	$265.24	1	$265.24
PVC Containment Basin, 6' x 6'	1611	Poly containment basin typically 8 in. to 12 in. deep with area dimensions in the range of 6' x 6' or larger.	Square Feet	$19.20	64	$1,228.80

Practice: 311 - Alley Cropping

Scenario: #246 - Alley Cropping-single row

Scenario Description:

The crop or grass land is planted with rows of trees to increase crop diversity. Final row width, and spacing of trees within the row, is based on farm equipment size, growth form of trees, light needs of annual crop or grass, and intent of the landowner. The resource concerns are plant condition - inadequate structure and composition.

Before Situation:

The landscape has been cropped or in perennial grass for many years. It is void of any perennial tree vegetation. On cropland site preparation needs may need deep ripping to eliminate any plow pan and on grass land competing vegetation control is accomplished prior to tree planting.

After Situation:

Trees have been established to diversify the crop production of the field. Typically the area planted is 10 acres on approximately 12 x 40 foot spacing.

Feature Measure: planted seedling

Scenario Unit: Each

Scenario Typical Size: 900.0

Scenario Total Cost: $32,156.87

Scenario Cost/Unit: $35.73

Cost Details:

Component Name	ID	Description	Unit	Cost	QTY	Total
Equipment Installation						
Auger, Post driver attachment	934	Auger or post driver attachment to a tractor or skidsteer. Does not include power unit. Labor not included.	Hours	$12.74	80	$1,019.20
Truck, Pickup	939	Equipment and power unit costs. Labor not included.	Hours	$24.18	4	$96.72
Tractor, agricultural, 120 HP	962	Agricultural tractor with horsepower range of 90 to 140. Equipment and power unit costs. Labor not included.	Hours	$50.84	90	$4,575.60
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.	Hours	$27.56	180	$4,960.80
Equipment Operators, Light	232	Includes: Skid Steer Loaders, Hydraulic Excavators <50 HP, Trenchers <12 in., Ag Equipment <150 HP, Pickup Trucks, Forklifts, Mulchers	Hours	$27.87	80	$2,229.60
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.	Hours	$46.88	20	$937.60
Materials						
Tree, Hardwood, Potted, Medium	1532	Potted hardwood seedling, 2 gallons or larger. Includes materials and shipping only.	Each	$14.60	910	$13,286.00
Tree shelter, solid tube type, 5 in. x 48 in.	1571	5 inch x 48 inch tree tube for protection from animal damage. Materials only.	Each	$3.71	910	$3,376.10
Cable ties, plastic	1575	Plastic cable ties (typ. 8-12 in.) to assist in securing items. Materials only.	Each	$0.06	910	$54.60
Stakes, wood, 3/4 in. x 3/4 in. x 60 in.	1583	3/4 in. x 3/4 in. x 60 in. wood stakes to fasten items in place. Includes materials only.	Each	$1.50	910	$1,365.00
Mobilization						
Mobilization, medium equipment	1139	Equipment with 70-150 HP or typical weights between 14,000 and 30,000 pounds.	Each	$255.65	1	$255.65

Practice: 311 - Alley Cropping

Scenario: #247 - 3-row alley cropping

Scenario Description:

Cropland is planted with trees in 3-row sets with 40 foot alleyways in between. The outside rows of trees are conifers and the center row a mast-producing high-value hardwood timber species. Between row spacing is 16 feet and between tree spacing is 10 feet. The resource concerns are Plant Condition - inadequate structure and composition; Soil Erosion (wind); Excess/ Insufficient Water (inefficient moisture management); Inadequate Habitat for Fish and Wildlife (food, cover/shelter, continuity).

Before Situation:

The landscape has been cropped for many years. It is void of any perennial tree vegetation. Wind erosion is evident, insufficient water for crops occurs due to excessive winds, wildlife habitat score is very low due to the lackof any perennial vegetation. Site preparation needs may include deep ripping to eliminate any plow pan prior to tree planting.

After Situation:

Trees have been established to diversify the crop production, reduce erosion by wind and water and improve growing conditions for crops in alleyways. Typically the area planted is 10 acres.

Feature Measure: Area of Treatment

Scenario Unit: Acres

Scenario Typical Size: 10.0

Scenario Total Cost: $6,802.76

Scenario Cost/Unit: $680.28

Cost Details:

Component Name	ID	Description	Unit	Cost	QTY	Total
Equipment Installation						
Truck, Pickup	939	Equipment and power unit costs. Labor not included.	Hours	$24.18	4	$96.72
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.	Hours	$5.96	2.5	$14.90
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.	Hours	$27.56	40	$1,102.40
Equipment Operators, Light	232	Includes: Skid Steer Loaders, Hydraulic Excavators <50 HP, Trenchers <12 in., Ag Equipment <150 HP, Pickup Trucks, Forklifts, Mulchers	Hours	$27.87	2.5	$69.68
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.	Hours	$46.88	12	$562.56
Materials						
Tree, Hardwood, Seedling, Small	1509	Bare root hardwood seedlings 6 to 18 inches tall; includes tropical containerized seedlings of 8 cubic inches or smaller. Includes materials and shipping only.	Each	$0.78	605	$471.90
Tree, Conifer, Seedling, Medium	1514	Containerized conifer seedlings, 8 or 10 cubic inches; or bare root conifer seedlings 1+1 (two-year old seedlings that grew one year in the original seedbed and another year in a transplant bed), or bare root seedlings 2+0 (two-year old seedlings grown in their original seedbed). Includes materials and shipping only.	Each	$0.86	1210	$1,040.60
Tree shelter, solid tube type, 5 in. x 48 in.	1571	5 inch x 48 inch tree tube for protection from animal damage. Materials only.	Each	$3.71	605	$2,244.55
Cable ties, plastic	1575	Plastic cable ties (typ. 8-12 in.) to assist in securing items. Materials only.	Each	$0.06	605	$36.30
Stakes, wood, 3/4 in. x 3/4 in. x 60 in.	1583	3/4 in. x 3/4 in. x 60 in. wood stakes to fasten items in place. Includes materials only.	Each	$1.50	605	$907.50
Mobilization						
Mobilization, medium equipment	1139	Equipment with 70-150 HP or typical weights between 14,000 and 30,000 pounds.	Each	$255.65	1	$255.65

Practice: 313 - Waste Storage Facility

Scenario: #1 - Earthen Storage Facility up to 50K ft3 Storage

Scenario Description:

An earthen waste impoundment constructed to store wastes such as manure, wastewater, and contaminated runoff as part of an agricultural waste management system. This scenario has a design storage volume of less than 50,000 ft3. This practice will address soil and water quality by reducing the pollution potential for surface water and groundwater quality degradation. Earthen storage liners are addressed with another standard. Vehicular and equipment access is addressed in Heavy Use Area Protection (561). Adequately protect liner at agitation and access points. Potential Associated Practices: Pond Sealing or Lining, Bentonite Sealant (521C), Pond Sealing or Lining, Compacted Clay Treatment (521D), Pond Sealing or Lining, Flexible Membrane (521A), Pond Sealing or Lining, Soil Dispersant (521B), Fence (382), Critical Area Planting (342), Nutrient Management (590), Waste Transfer (634), Heavy Use Area Protection (561), Roofs and Covers (367), and Solid/Liquid Waste Separation Facility (632), Waste Treatment (629) .

Before Situation:

Operator presently has a confined animal feeding operation without a waste management system adequate to handle the waste stream leaving the animal production facilities. Manure and other agricultural waste by-products are not being utilized or controlled in an environmentally safe manner. The wastes are either accumulating at the source, or are being transported but not properly utilized or disposed of. This situation poses an environmentally threat of excessive nutrients, organics, and pathogens being transported into surface and groundwater resources.

After Situation:

An earthen storage structure constructed from on-site material provides an environmentally safe facility for storing manure and other agricultural waste by-products. This facility provides the landowner a means of storing waste until it can be utilized in a proper manner in accordance with a nutrient management plan. Typical design size : Total volume = 24,864 ft3; 78'X78' (top); 3:1 inside and outside side slopes; top of berm = 10'; cut/fill ratio = 1.25; Total depth = 8.0', including freeboard. Total volume includes freeboard, preciptation, solids build up, etc.

Feature Measure: "Strike Full" Volume

Scenario Unit: Cubic Feet

Scenario Typical Size: 24,864.0

Scenario Total Cost: $9,639.65

Scenario Cost/Unit: $0.39

Cost Details:

Component Name	ID	Description	Unit	Cost	QTY	Total
Equipment Installation						
Earthfill, Roller Compacted	49	Earthfill, roller or machine compacted, includes equipment and labor	Cubic Yards	$4.66	599	$2,791.34
Earthfill, Dumped and Spread	51	Earthfill, dumped and spread without compaction effort, includes equipment and labor	Cubic Yards	$3.81	599	$2,282.19
Excavation, common earth, large equipment, 150 ft	1223	Bulk excavation of common earth including sand and gravel with dozer >100 HP with average push distance of 150 feet. Includes equipment and labor.	Cubic Yards	$4.06	599	$2,431.94
Labor						
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.	Hours	$46.88	20	$937.60
Materials						
Structural steel tubing, 2 in. diameter	1120	Structural steel tubing, 2 inch diameter, 1/8 inch wall thickness, materials only	Feet	$4.10	8	$32.80
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	$70.59	2	$141.18
Mobilization, medium equipment	1139	Equipment with 70-150 HP or typical weights between 14,000 and 30,000 pounds.	Each	$255.65	4	$1,022.60

Practice: 313 - Waste Storage Facility

Scenario: #2 - Earthen Storage Facility over 50K ft3 Storage

Scenario Description:

An earthen waste impoundment constructed to store wastes such as manure, wastewater, and contaminated runoff as part of an agricultural waste management system. This scenario has a design storage volume of more than 50,000 ft3. This practice will address soil and water quality by reducing the pollution potential for surface water and groundwater quality degradation. Earthen storage liners are addressed with another standard. Vehicular and equipment access is addressed in Heavy Use Area Protection (561). Adequately protect liner at agitation and access points. Potential Associated Practices: Pond Sealing or Lining, Bentonite Sealant (521C), Pond Sealing or Lining, Compacted Clay Treatment (521D), Pond Sealing or Lining, Flexible Membrane (521A), Pond Sealing or Lining, Soil Dispersant (521B), Fence (382), Critical Area Planting (342), Nutrient Management (590), Waste Transfer (634), Heavy Use Area Protection (561), Roofs and Covers (367), and Solid/Liquid Waste Separation Facility (632), Waste Treatment (629).

Before Situation:

Operator presently has a confined animal feeding operation without a waste management system adequate to handle the waste stream leaving the animal production facilities. Manure and other agricultural waste by-products are not being utilized or controlled in an environmentally safe manner. The wastes are either accumulating at the source, or are being transported but not properly utilized or disposed of. This situation poses an environmentally threat of excessive nutrients, organics, and pathogens being transported into surface and groundwater resources.

After Situation:

An earthen storage structure constructed from on-site material provides an environmentally safe facility for storing manure and other agricultural waste by-products. This facility provides the landowner a means of storing waste until it can be utilized in a proper manner in accordance with a nutrient management plan. Typical design size : Total volume = 199,878 ft3; 159'x159' (top); 3:1 inside and outside side slopes; top of berm = 10'; cut/fill ratio = 1.25; Total depth = 14.0', including freeboard. Total volume includes freeboard, preciptation, solids build up, etc.

Feature Measure: "Strike Full" Volume

Scenario Unit: Cubic Feet

Scenario Typical Size: 199,878.0

Scenario Total Cost: $64,320.54

Scenario Cost/Unit: $0.32

Cost Details:

Component Name	ID	Description	Unit	Cost	QTY	Total
Equipment Installation						
Earthfill, Roller Compacted	49	Earthfill, roller or machine compacted, includes equipment and labor	Cubic Yards	$4.66	4812	$22,423.92
Earthfill, Dumped and Spread	51	Earthfill, dumped and spread without compaction effort, includes equipment and labor	Cubic Yards	$3.81	4812	$18,333.72
Excavation, common earth, large equipment, 150 ft	1223	Bulk excavation of common earth including sand and gravel with dozer >100 HP with average push distance of 150 feet. Includes equipment and labor.	Cubic Yards	$4.06	4812	$19,536.72
Labor						
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.	Hours	$46.88	40	$1,875.20
Materials						
Structural steel tubing, 2 in. diameter	1120	Structural steel tubing, 2 inch diameter, 1/8 inch wall thickness, materials only	Feet	$4.10	14	$57.40
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	$70.59	2	$141.18
Mobilization, large equipment	1140	Equipment >150HP or typical weights greater than 30,000 pounds or loads requiring over width or over length permits.	Each	$488.10	4	$1,952.40

Practice: 313 - Waste Storage Facility

Scenario: #3 - Above Ground Steel/Concrete up to 25K ft3 Storage

Scenario Description:

An above ground circular glass lined steel or concrete structure constructed to store wastes such as manure, wastewater, and contaminated runoff as part of an agricultural waste management system. This scenario has a design storage volume of less than 25,000 ft3. This practice will address soil and water quality by reducing the pollution potential for surface water and groundwater quality degradation. Potential Associated Practices: Fence (382), Critical Area Planting (342), Nutrient Management (590), Waste Transfer (634), Heavy Use Area Protection (561), Solid/Liquid Waste Separation Facility (632), Waste Treatment (629), and Pumping Plant (533).

Before Situation:

Operator presently has a confined animal feeding operation without a waste management system adequate to handle the waste stream leaving the animal production facilities. Manure and other agricultural waste by-products are not being utilized or controlled in an environmentally safe manner. The wastes are either accumulating at the source, or are being transported but not properly utilized or disposed of. This situation poses an environmentally threat of excessive nutrients, organics, and pathogens being transported into surface and groundwater resources.

After Situation:

An above ground storage structure provides an environmentally safe facility for storing manure and other agricultural waste by-products. This facility provides the landowner a means of storing waste until it can be utilized in a proper manner in accordance with a nutrient management plan. Typical design size : Total volume 14,340 ft3, including freeboard; based on 31' X 19' glass lined steel tank. "Strike Full" = the total volume includes freeboard, precipitation, solids build up, etc.

Feature Measure: "Strike Full" Volume

Scenario Unit: Cubic Feet

Scenario Typical Size: 14,340.0

Scenario Total Cost: $113,992.40

Scenario Cost/Unit: $7.95

Cost Details:

Component Name	ID	Description	Unit	Cost	QTY	Total
Equipment Installation						
Concrete, CIP, slab on grade, reinforced	37	Steel reinforced concrete formed and cast-in-placed as a slab on grade by chute placement. Typical strength is 3000 to 4000 psi. Includes materials, labor and equipment to transport, place and finish.	Cubic Yards	$362.36	12	$4,348.32
Concrete, CIP, formed reinforced	38	Steel reinforced concrete formed and cast-in-placed in formed structures such as walls or suspended slabs by chute placement. Typical strength is 3000 to 4000 psi. Includes materials, labor and equipment to transport, place and finish.	Cubic Yards	$481.12	18	$8,660.16
Earthfill, Roller Compacted	49	Earthfill, roller or machine compacted, includes equipment and labor	Cubic Yards	$4.66	84	$391.44
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.	Hours	$72.23	5	$361.15
Excavation, common earth, large equipment, 150 ft	1223	Bulk excavation of common earth including sand and gravel with dozer >100 HP with average push distance of 150 feet. Includes equipment and labor.	Cubic Yards	$4.06	84	$341.04
Plate compactor	1915	Manually guided vibratroy plate compactor. Equipment only.	Hours	$4.33	2	$8.66
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.	Hours	$27.56	2	$55.12
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.	Hours	$46.88	30	$1,406.40
Materials						
Aggregate, Gravel, Graded	46	Gravel, includes materials, equipment and labor to transport and place. Includes washed and unwashed gravel.	Cubic Yards	$45.42	14	$635.88
Waste Storage, Glass lined steel structure (<25,000 ft3)	1616	Includes materials, equipment and labor to install 31' (diameter) X19' (height) steel lined structure. Includes materials, equipment and labor.	Cubic Feet	$6.72	14340	$96,364.80
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	$70.59	2	$141.18
Mobilization, medium equipment	1139	Equipment with 70-150 HP or typical weights between 14,000 and 30,000 pounds.	Each	$255.65	5	$1,278.25

Practice: 313 - Waste Storage Facility

Scenario: #4 - Above Ground Steel/Concrete 25 to 100K ft3 Storage

Scenario Description:

An above ground circular glass lined steel or concrete structure constructed to store wastes such as manure, wastewater, and contaminated runoff as part of an agricultural waste management system. This scenario has a design storage volume of between 25,000 and 100,000 ft3. This practice will address soil and water quality by reducing the pollution potential for surface water and groundwater quality degradation. Potential Associated Practices: Fence (382), Critical Area Planting (342), Nutrient Management (590), Waste Transfer (634), Heavy Use Area Protection (561), Solid/Liquid Waste Separation Facility (632), Waste Treatment (629), and Pumping Plant (533).

Before Situation:

Operator presently has a confined animal feeding operation without a waste management system adequate to handle the waste stream leaving the animal production facilities. Manure and other agricultural waste by-products are not being utilized or controlled in an environmentally safe manner. The wastes are either accumulating at the source, or are being transported but not properly utilized or disposed of. This situation poses an environmentally threat of excessive nutrients, organics, and pathogens being transported into surface and groundwater resources.

After Situation:

An above ground storage structure provides an environmentally safe facility for storing manure and other agricultural waste by-products. This facility provides the landowner a means of storing waste until it can be utilized in a proper manner in accordance with a nutrient management plan. Typical design size : Total volume 79,522 ft3, including freeboard; based on 73' X 19' glass lined steel tank. "Strike Full" = the total volume includes freeboard, preciptation, solids build up, etc.

Feature Measure: "Strike Full" Volume

Scenario Unit: Cubic Feet

Scenario Typical Size: 79,522.0

Scenario Total Cost: $267,177.79

Scenario Cost/Unit: $3.36

Cost Details:

Component Name	ID	Description	Unit	Cost	QTY	Total
Equipment Installation						
Concrete, CIP, slab on grade, reinforced	37	Steel reinforced concrete formed and cast-in-placed as a slab on grade by chute placement. Typical strength is 3000 to 4000 psi. Includes materials, labor and equipment to transport, place and finish.	Cubic Yards	$362.36	65	$23,553.40
Concrete, CIP, formed reinforced	38	Steel reinforced concrete formed and cast-in-placed in formed structures such as walls or suspended slabs by chute placement. Typical strength is 3000 to 4000 psi. Includes materials, labor and equipment to transport, place and finish.	Cubic Yards	$481.12	43	$20,688.16
Earthfill, Roller Compacted	49	Earthfill, roller or machine compacted, includes equipment and labor	Cubic Yards	$4.66	465	$2,166.90
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.	Hours	$72.23	6	$433.38
Excavation, common earth, large equipment, 150 ft	1223	Bulk excavation of common earth including sand and gravel with dozer >100 HP with average push distance of 150 feet. Includes equipment and labor.	Cubic Yards	$4.06	465	$1,887.90
Plate compactor	1915	Manually guided vibratroy plate compactor. Equipment only.	Hours	$4.33	4	$17.32
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.	Hours	$27.56	4	$110.24
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.	Hours	$46.88	40	$1,875.20
Materials						
Aggregate, Gravel, Graded	46	Gravel, includes materials, equipment and labor to transport and place. Includes washed and unwashed gravel.	Cubic Yards	$45.42	77	$3,497.34
Waste Storage, glass lined steel structure, 25,000 - 100,000 cubic foot	1620	Includes materials, equipment and labor to install a steel glass lined structure (based on typical 73' diameter X 19' height) . Includes materials, equipment and labor.	Cubic Feet	$2.66	79522	$211,528.52
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	$70.59	2	$141.18
Mobilization, medium equipment	1139	Equipment with 70-150 HP or typical weights between 14,000 and 30,000 pounds.	Each	$255.65	5	$1,278.25

Practice: 313 - Waste Storage Facility

Scenario: #5 - Above Ground Steel/Concrete 100 to 200K ft3 Storage

Scenario Description:

An above ground circular glass lined steel or concrete structure constructed to store wastes such as manure, wastewater, and contaminated runoff as part of an agricultural waste management system. This scenario has a design storage volume of between 100,000 and 200,000 ft3. This practice will address soil and water quality by reducing the pollution potential for surface water and groundwater quality degradation. Potential Associated Practices: Fence (382), Critical Area Planting (342), Nutrient Management (590), Waste Transfer (634), Heavy Use Area Protection (561), Solid/Liquid Waste Separation Facility (632), Waste Treatment (629), and Pumping Plant (533).

Before Situation:

Operator presently has a confined animal feeding operation without a waste management system adequate to handle the waste stream leaving the animal production facilities. Manure and other agricultural waste by-products are not being utilized or controlled in an environmentally safe manner. The wastes are either accumulating at the source, or are being transported but not properly utilized or disposed of. This situation poses an environmentally threat of excessive nutrients, organics, and pathogens being transported into surface and groundwater resources.

After Situation:

An above ground storage structure provides an environmentally safe facility for storing manure and other agricultural waste by-products. This facility provides the landowner a means of storing waste until it can be utilized in a proper manner in accordance with a nutrient management plan. Typical design size : Total volume 187,189 ft3, including freeboard; based on 112' X 19' glass lined steel tank. "Strike Full" = the total volume includes freeboard, precipitation, solids build up, etc.

Feature Measure: "Strike Full" Volume

Scenario Unit: Cubic Feet

Scenario Typical Size: 187,189.0

Scenario Total Cost: $479,689.15

Scenario Cost/Unit: $2.56

Cost Details:

Component Name	ID	Description	Unit	Cost	QTY	Total
Equipment Installation						
Concrete, CIP, slab on grade, reinforced	37	Steel reinforced concrete formed and cast-in-placed as a slab on grade by chute placement. Typical strength is 3000 to 4000 psi. Includes materials, labor and equipment to transport, place and finish.	Cubic Yards	$362.36	152	$55,078.72
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 Yards	$481.12	65	$31,272.80
Earthfill, Roller Compacted	49	Earthfill, roller or machine compacted, includes equipment and labor	Cubic Yards	$4.66	1094	$5,098.04
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.	Hours	$72.23	7	$505.61
Excavation, common earth, large equipment, 150 ft	1223	Bulk excavation of common earth including sand and gravel with dozer >100 HP with average push distance of 150 feet. Includes equipment and labor.	Cubic Yards	$4.06	1094	$4,441.64
Plate compactor	1915	Manually guided vibratroy plate compactor. Equipment only.	Hours	$4.33	5	$21.65
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.	Hours	$27.56	5	$137.80
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.	Hours	$46.88	60	$2,812.80
Materials						
Aggregate, Gravel, Graded	46	Gravel, includes materials, equipment and labor to transport and place. Includes washed and unwashed gravel.	Cubic Yards	$45.42	182	$8,266.44
Waste Storage, glass lined steel structure, 100,000-200,000 cubic foot	1621	Includes materials, equipment and labor to install a steel glass lined structure (based on typical 112' diameter X 19' height) . Includes materials, equipment and labor.	Cubic Feet	$1.98	187189	$370,634.22
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	$70.59	2	$141.18
Mobilization, medium equipment	1139	Equipment with 70-150 HP or typical weights between 14,000 and 30,000 pounds.	Each	$255.65	5	$1,278.25

Practice: 313 - Waste Storage Facility

Scenario: #6 - Above Ground Steel/Concrete over 200K ft3 Storage

Scenario Description:

An above ground circular glass lined steel or concrete structure constructed to store wastes such as manure, wastewater, and contaminated runoff as part of an agricultural waste management system. This scenario has a design storage volume of greater than 200,000 ft3. This practice will address soil and water quality by reducing the pollution potential for surface water and groundwater quality degradation. Potential Associated Practices: Fence (382), Critical Area Planting (342), Nutrient Management (590), Waste Transfer (634), Heavy Use Area Protection (561), Solid/Liquid Waste Separation Facility (632), Waste Treatment (629), and Pumping Plant (533).

Before Situation:

Operator presently has a confined animal feeding operation without a waste management system adequate to handle the waste stream leaving the animal production facilities. Manure and other agricultural waste by-products are not being utilized or controlled in an environmentally safe manner. The wastes are either accumulating at the source, or are being transported but not properly utilized or disposed of. This situation poses an environmentally threat of excessive nutrients, organics, and pathogens being transported into surface and groundwater resources.

After Situation:

An above ground storage structure provides an environmentally safe facility for storing manure and other agricultural waste by-products. This facility provides the landowner a means of storing waste until it can be utilized in a proper manner in accordance with a nutrient management plan. Typical design size : Total volume 248,326 ft3, including freeboard; based on 129' X 19' glass lined steel tank. "Strike Full" = the total volume includes freeboard, precipitation, solids build up, etc.

Feature Measure: "Strike Full" Volume

Scenario Unit: Cubic Feet

Scenario Typical Size: 248,326.0

Scenario Total Cost: $620,752.81

Scenario Cost/Unit: $2.50

Cost Details:

Component Name	ID	Description	Unit	Cost	QTY	Total
Equipment Installation						
Concrete, CIP, slab on grade, reinforced	37	Steel reinforced concrete formed and cast-in-placed as a slab on grade by chute placement. Typical strength is 3000 to 4000 psi. Includes materials, labor and equipment to transport, place and finish.	Cubic Yards	$362.36	202	$73,196.72
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 Yards	$481.12	75	$36,084.00
Earthfill, Roller Compacted	49	Earthfill, roller or machine compacted, includes equipment and labor	Cubic Yards	$4.66	1452	$6,766.32
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.	Hours	$72.23	8	$577.84
Excavation, common earth, large equipment, 150 ft	1223	Bulk excavation of common earth including sand and gravel with dozer >100 HP with average push distance of 150 feet. Includes equipment and labor.	Cubic Yards	$4.06	1452	$5,895.12
Plate compactor	1915	Manually guided vibratroy plate compactor. Equipment only.	Hours	$4.33	10	$43.30
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.	Hours	$27.56	10	$275.60
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.	Hours	$46.88	80	$3,750.40
Materials						
Aggregate, Gravel, Graded	46	Gravel, includes materials, equipment and labor to transport and place. Includes washed and unwashed gravel.	Cubic Yards	$45.42	242	$10,991.64
Waste Storage, glass lined steel structure >200,000 cubic foot	1622	Includes materials, equipment and labor to install a steel glass lined structure (based on typical 129' diameter X 19' height) . Includes materials, equipment and labor.	Cubic Feet	$1.94	248326	$481,752.44
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	$70.59	2	$141.18
Mobilization, medium equipment	1139	Equipment with 70-150 HP or typical weights between 14,000 and 30,000 pounds.	Each	$255.65	5	$1,278.25

Practice: 313 - Waste Storage Facility

Scenario: #7 - Concrete, Rectangular, With Concrete Top

Scenario Description:

This scenario consists of installing a small concrete tank with a design storage volume of less than 5,000 CF that is totally or partially buried and has solid concrete lid with several openings for direct loading from heavy use area, gutter cleaner or gravity pipe. Manure is held for 3 to 14 day on smaller operations or transferred to larger storage facility or direct land applied. This practice will address soil and water quality by reducing the pollution potential to soil, surface water and ground water. Potential Associated Practices: Fence (382), Critical Area Planting (342), Nutrient Management (590), Access Road (560), Waste Transfer (634), Heavy Use Area Protection (561), Roof and Covers (367), Solid/Liquid Waste Separation Facility (632), Diversion (362), Subsurface Drain (606), Pumping Plant (533),and Underground Outlet (620).

Before Situation:

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

After Situation:

Manure and other agricultural by-products are being controlled, by the collection at the source, and stored temporarily, at an environmentally suitable location, until such time that they are disposed of or utilized in a proper manner, typically in accordance with a nutrient management plan. Tank typically 8' deep x 12' wide x 40' long, with a total volume of 3,840 cubic feet including freeboard. Tank includes concrete top. Sizing based on manure, other wastes, rainfall, lot runoff, etc. Tanks associated with open lots sized to handle design storm in tank or in combination with lot as per state regulations. Total volume includes freeboard, precipitation, solids build up, etc.

Feature Measure: Total Volume including freeboard,

Scenario Unit: Cubic Feet

Scenario Typical Size: 3,840.0

Scenario Total Cost: $34,592.50

Scenario Cost/Unit: $9.01

Cost Details:

Component Name	ID	Description	Unit	Cost	QTY	Total
Equipment Installation						
Concrete, CIP, slab on grade, reinforced	37	Steel reinforced concrete formed and cast-in-placed as a slab on grade by chute placement. Typical strength is 3000 to 4000 psi. Includes materials, labor and equipment to transport, place and finish.	Cubic Yards	$362.36	8	$2,898.88
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 Yards	$481.12	48	$23,093.76
Earthfill, Dumped and Spread	51	Earthfill, dumped and spread without compaction effort, includes equipment and labor	Cubic Yards	$3.81	390	$1,485.90
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.	Hours	$72.23	8	$577.84
Excavation, common earth, small equipment, 50 ft	1220	Bulk excavation of common earth with dozer <100 HP with average push distance of 50 feet. Includes equipment and labor.	Cubic Yards	$2.37	390	$924.30
Plate compactor	1915	Manually guided vibratroy plate compactor. Equipment only.	Hours	$4.33	3	$12.99
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.	Hours	$27.56	11	$303.16
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.	Hours	$46.88	20	$937.60
Materials						
Aggregate, Gravel, Graded	46	Gravel, includes materials, equipment and labor to transport and place. Includes washed and unwashed gravel.	Cubic Yards	$45.42	11	$499.62
Cement, Type I or II	1336	Type I or II Portland Cement (94 lb. bag), Materials only.	Each	$14.34	56	$803.04
Waterstop, PVC, ribbed, 3/16 in x 6 in	1614	Waterstop, PVC, ribbed, 3/16 inch thick by 6 inches wide. Includes materials, equipment and labor.	Feet	$8.10	104	$842.40
Steel, rebar	1832	Steel rebar, grade 60. Materials only.	Pound	$0.69	575	$396.75
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	$70.59	4	$282.36
Mobilization, medium equipment	1139	Equipment with 70-150 HP or typical weights between 14,000 and 30,000 pounds.	Each	$255.65	6	$1,533.90

Practice: 313 - Waste Storage Facility

Scenario: #8 - Concrete, Rectangular, Without Roof up to 35K ft3 Storage

Scenario Description:

This scenario consists of a rectangular concrete facility with reinforced concrete floor and concrete walls. Walls are NOT designed to support a roof. This scenario is intended to store liquid or dry manure. The purpose of this practice is to properly store manure and other agricultural by-products until they can be hauled away from the site for proper disposal or utilization on land at agronomical rates. This practice will address soil and water quality by reducing the pollution potential to soil, surface water and groundwater. Potential Associated practices: 342-Critical Area Planting, 362-Diversion, 561-Heavy Use Area Protection, 367-Roofs and Covers, 558-Roof Runoff Structure, 317-Composting Facility, 633-Waste Recycling, 634-Waste Transfer, 635-Vegetated Treatment Area

Before Situation:

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

After Situation:

The typical size is 4,368 Sq.Ft. (42' x 104'). The facility floor is 5" reinforced concrete with 8' reinforced concrete walls. Wall is NOT designed to support a roof. Walls allow for greater storage volume. Backfill height required on walls is a minimum of 6 feet and a maximum of 8 feet, as per MA-WSF-06. Manure and other agricultural by-products are collected and stored near the source until such time that the manure can be disposed of or utilized in a proper manner, typically in accordance with a nutrient management plan.

Feature Measure: Total Volume including Freeboard,

Scenario Unit: Cubic Feet

Scenario Typical Size: 34,944.0

Scenario Total Cost: $129,672.54

Scenario Cost/Unit: $3.71

Cost Details:

Component Name	ID	Description	Unit	Cost	QTY	Total
Equipment Installation						
Concrete, CIP, slab on grade, reinforced	37	Steel reinforced concrete formed and cast-in-placed as a slab on grade by chute placement. Typical strength is 3000 to 4000 psi. Includes materials, labor and equipment to transport, place and finish.	Cubic Yards	$362.36	50	$18,118.00
Concrete, CIP, formed reinforced	38	Steel reinforced concrete formed and cast-in-placed in formed structures such as walls or suspended slabs by chute placement. Typical strength is 3000 to 4000 psi. Includes materials, labor and equipment to transport, place and finish.	Cubic Yards	$481.12	171	$82,271.52
Earthfill, Dumped and Spread	51	Earthfill, dumped and spread without compaction effort, includes equipment and labor	Cubic Yards	$3.81	1660	$6,324.60
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.	Hours	$72.23	8	$577.84
Excavation, common earth, large equipment, 150 ft	1223	Bulk excavation of common earth including sand and gravel with dozer >100 HP with average push distance of 150 feet. Includes equipment and labor.	Cubic Yards	$4.06	1660	$6,739.60
Plate compactor	1915	Manually guided vibratroy plate compactor. Equipment only.	Hours	$4.33	4	$17.32
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.	Hours	$27.56	54	$1,488.24
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.	Hours	$46.88	40	$1,875.20
Materials						
Aggregate, Gravel, Graded	46	Gravel, includes materials, equipment and labor to transport and place. Includes washed and unwashed gravel.	Cubic Yards	$45.42	104	$4,723.68
Cement, Type I or II	1336	Type I or II Portland Cement (94 lb. bag), Materials only.	Each	$14.34	221	$3,169.14
Steel, rebar	1832	Steel rebar, grade 60. Materials only.	Pound	$0.69	3595	$2,480.55
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	$70.59	5	$352.95

Mobilization, medium equipment	1139	Equipment with 70-150 HP or typical weights between 14,000 and 30,000 pounds.	Each	$255.65	6	$1,533.90

Practice: 313 - Waste Storage Facility

Scenario: #9 - Concrete, Rectangular, Without Roof over 35K ft3 Storage

Scenario Description:

This scenario consists of a rectangular concrete facility with reinforced concrete floor and concrete walls. Walls are NOT designed to support a roof. This scenario is intended to store liquid or dry manure. The purpose of this practice is to properly store manure and other agricultural by-products until they can be hauled away from the site for proper disposal or utilization on land at agronomical rates. This practice will address soil and water quality by reducing the pollution potential to soil, surface water and ground water. Potential Associated practices: 342-Critical Area Planting, 362-Diversion, 561-Heavy Use Area Protection, 367-Roofs and Covers, 558-Roof Runoff Structure, 382-Fence, 317-Composting Facility, 633-Waste Recycling, 634-Waste Transfer, 635-Vegetated Treatment Area

Before Situation:

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

After Situation:

Manure and other agricultural by-products are collected and stored near the source until such time that the manure can be disposed of or utilized in a proper manner, typically in accordance with a nutrient management plan. Scenario was developed using MA-WSF-06. Typical size is 69,192 CF (93' x 93' x 8' deep). Footing is 14" thick, 7'-10" wide with two mats of steel. Wall is 10" thick, 8' high with two mats of steel. Backfill on wall is between 6' min. to 8' max. WT concrete slab installed is 5" thick with #4 rebar at 8" o.c.

Feature Measure: Total Volume including freeboard,

Scenario Unit: Cubic Feet

Scenario Typical Size: 69,192.0

Scenario Total Cost: $197,673.35

Scenario Cost/Unit: $2.86

Cost Details:

Component Name	ID	Description	Unit	Cost	QTY	Total
Equipment Installation						
Concrete, CIP, slab on grade, reinforced	37	Steel reinforced concrete formed and cast-in-placed as a slab on grade by chute placement. Typical strength is 3000 to 4000 psi. Includes materials, labor and equipment to transport, place and finish.	Cubic Yards	$362.36	113	$40,946.68
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 Yards	$481.12	220	$105,846.40
Earthfill, Dumped and Spread	51	Earthfill, dumped and spread without compaction effort, includes equipment and labor	Cubic Yards	$3.81	3053	$11,631.93
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.	Hours	$72.23	12	$866.76
Excavation, common earth, large equipment, 150 ft	1223	Bulk excavation of common earth including sand and gravel with dozer >100 HP with average push distance of 150 feet. Includes equipment and labor.	Cubic Yards	$4.06	3053	$12,395.18
Plate compactor	1915	Manually guided vibratroy plate compactor. Equipment only.	Hours	$4.33	7	$30.31
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.	Hours	$27.56	120	$3,307.20
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.	Hours	$46.88	60	$2,812.80
Materials						
Aggregate, Gravel, Graded	46	Gravel, includes materials, equipment and labor to transport and place. Includes washed and unwashed gravel.	Cubic Yards	$45.42	191	$8,675.22
Cement, Type I or II	1336	Type I or II Portland Cement (94 lb. bag), Materials only.	Each	$14.34	333	$4,775.22
Steel, rebar	1832	Steel rebar, grade 60. Materials only.	Pound	$0.69	6520	$4,498.80
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	$70.59	5	$352.95

Mobilization, medium equipment	1139	Equipment with 70-150 HP or typical weights between 14,000 and 30,000 pounds.	Each	$255.65	6	$1,533.90

Practice: 313 - Waste Storage Facility

Scenario: #10 - Concrete, Rectangular, with Roof

Scenario Description:

This scenario consists of a rectangular concrete facility with reinforced concrete floor and concrete walls. This scenario shall be used in conjunction with 367 - Roofs and Covers. Walls are designed to support a roof. This scenario is intended to store liquid or dry manure (Ramp will be required to remove dry manure). The purpose of this practice is to properly store manure and other agricultural by-products until they can be hauled away from the site for proper disposal or utilization on land at agronomical rates. This practice will address soil and water quality by reducing the pollution potential to soil, surface water and ground water. Potential Associated practices: 342-Critical Area Planting, 362-Diversion, 561-Heavy Use Area Protection, 367-Roofs and Covers, 558-Roof Runoff Structure, 382-Fence, 317-Composting Facility, 633-Waste Recycling, 634-Waste Transfer, 635-Vegetated Treatment Area

Before Situation:

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

After Situation:

The typical size is 4,368 Sq.Ft. (42' x 104'). The facility floor is 5" reinforced concrete with 8' reinforced concrete walls. Wall is designed to support a roof. Walls allow for greater storage volume. Manure and other agricultural by-products are collected and stored near the source until such time that the manure can be disposed of or utilized in a proper manner, typically in accordance with a nutrient management plan.

Feature Measure: Total Volume including Freeboard,

Scenario Unit: Cubic Feet

Scenario Typical Size: 34,944.0

Scenario Total Cost: $147,683.80

Scenario Cost/Unit: $4.23

Cost Details:

Component Name	ID	Description	Unit	Cost	QTY	Total
Equipment Installation						
Concrete, CIP, slab on grade, reinforced	37	Steel reinforced concrete formed and cast-in-placed as a slab on grade by chute placement. Typical strength is 3000 to 4000 psi. Includes materials, labor and equipment to transport, place and finish.	Cubic Yards	$362.36	50	$18,118.00
Concrete, CIP, formed reinforced	38	Steel reinforced concrete formed and cast-in-placed in formed structures such as walls or suspended slabs by chute placement. Typical strength is 3000 to 4000 psi. Includes materials, labor and equipment to transport, place and finish.	Cubic Yards	$481.12	207	$99,591.84
Earthfill, Dumped and Spread	51	Earthfill, dumped and spread without compaction effort, includes equipment and labor	Cubic Yards	$3.81	1660	$6,324.60
Excavation, common earth, large equipment, 150 ft	1223	Bulk excavation of common earth including sand and gravel with dozer >100 HP with average push distance of 150 feet. Includes equipment and labor.	Cubic Yards	$4.06	1660	$6,739.60
Plate compactor	1915	Manually guided vibratroy plate compactor. Equipment only.	Hours	$4.33	4	$17.32
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.	Hours	$27.56	54	$1,488.24
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.	Hours	$46.88	60	$2,812.80
Materials						
Aggregate, Gravel, Graded	46	Gravel, includes materials, equipment and labor to transport and place. Includes washed and unwashed gravel.	Cubic Yards	$45.42	104	$4,723.68
Cement, Type I or II	1336	Type I or II Portland Cement (94 lb. bag), Materials only.	Each	$14.34	257	$3,685.38
Steel, rebar	1832	Steel rebar, grade 60. Materials only.	Pound	$0.69	3595	$2,480.55
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	$70.59	6	$423.54
Mobilization, medium equipment	1139	Equipment with 70-150 HP or typical weights between 14,000 and 30,000 pounds.	Each	$255.65	5	$1,278.25

Practice: 313 - Waste Storage Facility

Scenario: #11 - Concrete Block, Rectangular, Without Roof

Scenario Description:

This scenario consists of a "3 sided" rectangular concrete facility with reinforced concrete floor. Walls are constructed of large concrete blocks (2'x2'x6'). All vertical and horizontal cold joints are sealed with bentonite type waterstop. Walls are NOT designed to support a roof. This scenario is intended to store dry manure in tight locations. Also intended for small and limited resource producers who don't need a large facility or can afford one. The purpose of this practice is to properly store manure and other agricultural by-products until they can be hauled away from the site for proper disposal or utilization on land at agronomical rates. This practice will address soil and water quality by reducing the pollution potential to soil, surface water and ground water. Potential Associated practices: 342-Critical Area Planting, 362-Diversion, 561-Heavy Use Area Protection, 558-Roof Runoff Structure, 317-Composting Facility, 633-Waste Recycling, 634-Waste Transfer, 635-Vegetated Treatment Area

Before Situation:

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

After Situation:

The typical facility is 25' wide by 40' long by 6' deep (6000 cf). The facility floor is 5" concrete slab reinforced with #4 rebar at 18" o.c. Wall is NOT designed to support roof. Walls are constructed of 2'x2'x6' concrete block which will allow for greater storage volume. All cold joints in the wall will be sealed with bentonite type waterstop. Manure and other agricultural by-products are being controlled, by the collection at the source, and stored temporarily, at an environmentally suitable location, until such time that they are disposed of or utilized in a proper manner, typically in accordance with a nutrient management plan.

Feature Measure: "Strike Full" Volume

Scenario Unit: Cubic Feet

Scenario Typical Size: 6,000.0

Scenario Total Cost: $18,072.32

Scenario Cost/Unit: $3.01

Cost Details:

Component Name	ID	Description	Unit	Cost	QTY	Total
Equipment Installation						
Concrete, CIP, slab on grade, reinforced	37	Steel reinforced concrete formed and cast-in-placed as a slab on grade by chute placement. Typical strength is 3000 to 4000 psi. Includes materials, labor and equipment to transport, place and finish.	Cubic Yards	$362.36	18	$6,522.48
Earthfill, Dumped and Spread	51	Earthfill, dumped and spread without compaction effort, includes equipment and labor	Cubic Yards	$3.81	132	$502.92
Excavation, common earth, large equipment, 150 ft	1223	Bulk excavation of common earth including sand and gravel with dozer >100 HP with average push distance of 150 feet. Includes equipment and labor.	Cubic Yards	$4.06	132	$535.92
Plate compactor	1915	Manually guided vibratroy plate compactor. Equipment only.	Hours	$4.33	2	$8.66
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.	Hours	$27.56	2	$55.12
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.	Hours	$46.88	20	$937.60
Materials						
Aggregate, Gravel, Graded	46	Gravel, includes materials, equipment and labor to transport and place. Includes washed and unwashed gravel.	Cubic Yards	$45.42	22	$999.24
Block, pre-cast concrete, modular	1496	Pre-cast concrete blocks, typically 2ft x 2ft x 6ft , includes installation and delivery.	Cubic Yards	$109.95	42	$4,617.90
Waterstop, PVC, ribbed, 3/16 in x 6 in	1614	Waterstop, PVC, ribbed, 3/16 inch thick by 6 inches wide. Includes materials, equipment and labor.	Feet	$8.10	400	$3,240.00
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	$70.59	2	$141.18
Mobilization, medium equipment	1139	Equipment with 70-150 HP or typical weights between 14,000 and 30,000 pounds.	Each	$255.65	2	$511.30

Practice: 313 - Waste Storage Facility

Scenario: #12 - Concrete Tank, buried up to 15K ft3 Storage

Scenario Description:

This scenario consists of installing a concrete tank that has a design storage volume from 5,000 to 14,999 CF that is totally or partially buried and has an open top. The tank can also be under an animal facility with the top cover of either slats or solid concrete lid/floor. Potential Associated Practices: Fence (382), Critical Area Planting (342), Nutrient Management (590), Access Road (560), Waste Transfer (634), Heavy Use Area Protection (561), Roof and Covers (367), Solid/Liquid Waste Separation Facility (632), Diversion (362), Subsurface Drain (606), and Underground Outlet (620).

Before Situation:

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

After Situation:

Manure and other agricultural by-products are being controlled, by the collection at the source, and stored temporarily, at an environmentally suitable location, until such time that they are disposed of or utilized in a proper manner, typically in accordance with a nutrient management plan. Tank typically 39' diameter x 8' deep, with a total volume of 9,557 CF including freeboard. Sizing based on manure, other wastes, rainfall, lot runoff, etc. as appropriate. Total volume includes freeboard, preciptation, solids build up, etc.

Feature Measure: Total Volume including Freeboard,

Scenario Unit: Cubic Feet

Scenario Typical Size: 9,557.0

Scenario Total Cost: $37,528.73

Scenario Cost/Unit: $3.93

Cost Details:

Component Name	ID	Description	Unit	Cost	QTY	Total
Equipment Installation						
Concrete, CIP, slab on grade, reinforced	37	Steel reinforced concrete formed and cast-in-placed as a slab on grade by chute placement. Typical strength is 3000 to 4000 psi. Includes materials, labor and equipment to transport, place and finish.	Cubic Yards	$362.36	18	$6,522.48
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 Yards	$481.12	38	$18,282.56
Earthfill, Dumped and Spread	51	Earthfill, dumped and spread without compaction effort, includes equipment and labor	Cubic Yards	$3.81	670	$2,552.70
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.	Hours	$72.23	8	$577.84
Excavation, common earth, small equipment, 50 ft	1220	Bulk excavation of common earth with dozer <100 HP with average push distance of 50 feet. Includes equipment and labor.	Cubic Yards	$2.37	670	$1,587.90
Plate compactor	1915	Manually guided vibratroy plate compactor. Equipment only.	Hours	$4.33	2	$8.66
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.	Hours	$27.56	20	$551.20
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.	Hours	$46.88	40	$1,875.20
Materials						
Aggregate, Gravel, Graded	46	Gravel, includes materials, equipment and labor to transport and place. Includes washed and unwashed gravel.	Cubic Yards	$45.42	22	$999.24
Cement, Type I or II	1336	Type I or II Portland Cement (94 lb. bag), Materials only.	Each	$14.34	56	$803.04
Waterstop, PVC, ribbed, 3/16 in x 6 in	1614	Waterstop, PVC, ribbed, 3/16 inch thick by 6 inches wide. Includes materials, equipment and labor.	Feet	$8.10	122	$988.20
Steel, rebar	1832	Steel rebar, grade 60. Materials only.	Pound	$0.69	1294	$892.86
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	$70.59	5	$352.95

Mobilization, medium equipment	1139	Equipment with 70-150 HP or typical weights between 14,000 and 30,000 pounds.	Each	$255.65	6	$1,533.90

Practice: 313 - Waste Storage Facility

Scenario: #13 - Concrete Tank, Buried 15 to 25K ft3 Storage

Scenario Description:

This scenario consists of installing a concrete tank that has a design storage volume from 15,000 to 24,999 CF. The tank is totally or partially buried and has an open top. It can be under an animal facility with the top cover being slats or concrete lid/floor. This practice will address soil and water quality by reducing the pollution potential to soil, surface water and ground water. Potential Associated Practices: Fence (382), Critical Area Planting (342), Nutrient Management (590), Access Road (560), Waste Transfer (634), Heavy Use Area Protection (561), Roof and Covers (367), Solid/Liquid Waste Separation Facility (632), Diversion (362), Subsurface Drain (606), Pumping Plant (533) and Underground Outlet (620).

Before Situation:

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

After Situation:

Manure and other agricultural by-products are being controlled, by the collection at the source, and stored temporarily, at an environmentally suitable location, until such time that they are disposed of or utilized in a proper manner, typically in accordance with a nutrient management plan. Tank typically 56.5' diameter x 8' deep with a total storage volume of 20,057 CF including freeboard. Sizing based on manure, other wastes, rainfall, lot runoff, etc. as appropriate. Total volume includes freeboard, precipitation, solids build up, etc.

Feature Measure: Total Volume including freeboard,

Scenario Unit: Cubic Feet

Scenario Typical Size: 20,057.0

Scenario Total Cost: $62,620.99

Scenario Cost/Unit: $3.12

Cost Details:

Component Name	ID	Description	Unit	Cost	QTY	Total
Equipment Installation						
Concrete, CIP, slab on grade, reinforced	37	Steel reinforced concrete formed and cast-in-placed as a slab on grade by chute placement. Typical strength is 3000 to 4000 psi. Includes materials, labor and equipment to transport, place and finish.	Cubic Yards	$362.36	39	$14,132.04
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 Yards	$481.12	55	$26,461.60
Earthfill, Dumped and Spread	51	Earthfill, dumped and spread without compaction effort, includes equipment and labor	Cubic Yards	$3.81	1155	$4,400.55
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.	Hours	$72.23	10	$722.30
Excavation, common earth, large equipment, 150 ft	1223	Bulk excavation of common earth including sand and gravel with dozer >100 HP with average push distance of 150 feet. Includes equipment and labor.	Cubic Yards	$4.06	1155	$4,689.30
Plate compactor	1915	Manually guided vibratroy plate compactor. Equipment only.	Hours	$4.33	3	$12.99
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.	Hours	$27.56	42	$1,157.52
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.	Hours	$46.88	50	$2,344.00
Materials						
Aggregate, Gravel, Graded	46	Gravel, includes materials, equipment and labor to transport and place. Includes washed and unwashed gravel.	Cubic Yards	$45.42	46	$2,089.32
Cement, Type I or II	1336	Type I or II Portland Cement (94 lb. bag), Materials only.	Each	$14.34	94	$1,347.96
Waterstop, PVC, ribbed, 3/16 in x 6 in	1614	Waterstop, PVC, ribbed, 3/16 inch thick by 6 inches wide. Includes materials, equipment and labor.	Feet	$8.10	178	$1,441.80
Steel, rebar	1832	Steel rebar, grade 60. Materials only.	Pound	$0.69	2804	$1,934.76
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	$70.59	5	$352.95
Mobilization, medium equipment	1139	Equipment with 70-150 HP or typical weights between 14,000 and 30,000 pounds.	Each	$255.65	6	$1,533.90

Practice: 313 - Waste Storage Facility

Scenario: #14 - Concrete Tank, Buried 25 to 50K ft3 Storage

Scenario Description:

This scenario consists of installing a concrete tank that has a design storage volume from 25,000 to 49,999 CF. Tank is totally or partially buried and has an open top. Tank can be under a animal facility with the top cover being slats or concrete lid/floor. This practice will address soil and water quality by reducing the pollution potential to soil, surface water and ground water. Potential Associated Practices: Fence (382), Critical Area Planting (342), Nutrient Management (590), Access Road (560), Waste Transfer (634), Heavy Use Area Protection (561), Roof and Covers (367), Solid/Liquid Waste Separation Facility (632), Diversion (362), Subsurface Drain (606), and Underground Outlet (620).

Before Situation:

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

After Situation:

Manure and other agricultural by-products are being controlled, by the collection at the source, and stored temporarily, at an environmentally suitable location, until such time that they are disposed of or utilized in a proper manner, typically in accordance with a nutrient management plan. Tank typically 60' diameter x 10' deep with a total storage volume of 28,274 CF including freeboard. Sizing based on manure, other wastes, rainfall, lot runoff, etc. as appropriate. Total volume includes freeboard, precipitation, solids build up, etc.

Feature Measure: Total Volume including Freeboard,

Scenario Unit: Cubic Feet

Scenario Typical Size: 28,274.0

Scenario Total Cost: $82,132.51

Scenario Cost/Unit: $2.90

Cost Details:

Component Name	ID	Description	Unit	Cost	QTY	Total
Equipment Installation						
Concrete, CIP, slab on grade, reinforced	37	Steel reinforced concrete formed and cast-in-placed as a slab on grade by chute placement. Typical strength is 3000 to 4000 psi. Includes materials, labor and equipment to transport, place and finish.	Cubic Yards	$362.36	44	$15,943.84
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 Yards	$481.12	79	$38,008.48
Earthfill, Dumped and Spread	51	Earthfill, dumped and spread without compaction effort, includes equipment and labor	Cubic Yards	$3.81	1708	$6,507.48
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.	Hours	$72.23	12	$866.76
Excavation, common earth, large equipment, 150 ft	1223	Bulk excavation of common earth including sand and gravel with dozer >100 HP with average push distance of 150 feet. Includes equipment and labor.	Cubic Yards	$4.06	1708	$6,934.48
Plate compactor	1915	Manually guided vibratroy plate compactor. Equipment only.	Hours	$4.33	4	$17.32
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.	Hours	$27.56	48	$1,322.88
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.	Hours	$46.88	60	$2,812.80
Materials						
Aggregate, Gravel, Graded	46	Gravel, includes materials, equipment and labor to transport and place. Includes washed and unwashed gravel.	Cubic Yards	$45.42	52	$2,361.84
Cement, Type I or II	1336	Type I or II Portland Cement (94 lb. bag), Materials only.	Each	$14.34	123	$1,763.82
Waterstop, PVC, ribbed, 3/16 in x 6 in	1614	Waterstop, PVC, ribbed, 3/16 inch thick by 6 inches wide. Includes materials, equipment and labor.	Feet	$8.10	188	$1,522.80
Steel, rebar	1832	Steel rebar, grade 60. Materials only.	Pound	$0.69	3164	$2,183.16
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	$70.59	5	$352.95
Mobilization, medium equipment	1139	Equipment with 70-150 HP or typical weights between 14,000 and 30,000 pounds.	Each	$255.65	6	$1,533.90

Practice: 313 - Waste Storage Facility

Scenario: #15 - Concrete Tank, Buried 50 to 75K ft3 Storage

Scenario Description:

This scenario consists of installing a concrete tank that has a design storage volume from 50,000 to 74,999 CF. Tank is totally or partially buried and has an open top, however it can be under a animal facility with the top cover with slats or concrete lid/floor. This practice will address soil and water quality by reducing the pollution potential to soil, surface water and ground water. Potential Associated Practices: Fence (382), Critical Area Planting (342), Nutrient Management (590), Access Road (560), Waste Transfer (634), Heavy Use Area Protection (561), Roof and Covers (367), Solid/Liquid Waste Separation Facility (632), Diversion (362), Subsurface Drain (606), and Underground Outlet (620).

Before Situation:

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

After Situation:

Manure and other agricultural by-products are being controlled, by the collection at the source, and stored temporarily, at an environmentally suitable location, until such time that they are disposed of or utilized in a proper manner, typically in accordance with a nutrient management plan. Tank typically 81' diameter x 12' deep with a total storage volume of 61,836 CF including freeboard. Sizing based on manure, other wastes, rainfall, lot runoff, etc. as appropriate. Total volume includes freeboard, precipitation, solids build up, etc.

Feature Measure: Total Volume including free board,

Scenario Unit: Cubic Feet

Scenario Typical Size: 61,836.0

Scenario Total Cost: $136,744.23

Scenario Cost/Unit: $2.21

Cost Details:

Component Name	ID	Description	Unit	Cost	QTY	Total
Equipment Installation						
Concrete, CIP, slab on grade, reinforced	37	Steel reinforced concrete formed and cast-in-placed as a slab on grade by chute placement. Typical strength is 3000 to 4000 psi. Includes materials, labor and equipment to transport, place and finish.	Cubic Yards	$362.36	80	$28,988.80
Concrete, CIP, formed reinforced	38	Steel reinforced concrete formed and cast-in-placed in formed structures such as walls or suspended slabs by chute placement. Typical strength is 3000 to 4000 psi. Includes materials, labor and equipment to transport, place and finish.	Cubic Yards	$481.12	122	$58,696.64
Earthfill, Dumped and Spread	51	Earthfill, dumped and spread without compaction effort, includes equipment and labor	Cubic Yards	$3.81	3470	$13,220.70
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.	Hours	$72.23	14	$1,011.22
Excavation, common earth, large equipment, 150 ft	1223	Bulk excavation of common earth including sand and gravel with dozer >100 HP with average push distance of 150 feet. Includes equipment and labor.	Cubic Yards	$4.06	3470	$14,088.20
Plate compactor	1915	Manually guided vibratroy plate compactor. Equipment only.	Hours	$4.33	4	$17.32
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.	Hours	$27.56	84	$2,315.04
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.	Hours	$46.88	70	$3,281.60
Materials						
Aggregate, Gravel, Graded	46	Gravel, includes materials, equipment and labor to transport and place. Includes washed and unwashed gravel.	Cubic Yards	$45.42	95	$4,314.90
Cement, Type I or II	1336	Type I or II Portland Cement (94 lb. bag), Materials only.	Each	$14.34	202	$2,896.68
Waterstop, PVC, ribbed, 3/16 in x 6 in	1614	Waterstop, PVC, ribbed, 3/16 inch thick by 6 inches wide. Includes materials, equipment and labor.	Feet	$8.10	254	$2,057.40
Steel, rebar	1832	Steel rebar, grade 60. Materials only.	Pound	$0.69	5752	$3,968.88
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	$70.59	5	$352.95
Mobilization, medium equipment	1139	Equipment with 70-150 HP or typical weights between 14,000 and 30,000 pounds.	Each	$255.65	6	$1,533.90

Practice: 313 - Waste Storage Facility

Scenario: #16 - Concrete Tank, Buried 75 to 110K ft3 Storage

Scenario Description:

This scenario consists of installing a concrete tank that has a design storage volume from 75,000 to 109,999 CF. Tank is totally or partially buried and has an open top. Tank can also be under an animal facility with the top cover using slats or concrete lid/floor. This practice will address soil and water quality by reducing the pollution potential to soil, surface water and ground water. Potential Associated Practices: Fence (382), Critical Area Planting (342), Nutrient Management (590), Access Road (560), Waste Transfer (634), Heavy Use Area Protection (561), Roof and Covers (367), Solid/Liquid Waste Separation Facility (632), Diversion (362), Pipeline (516), Subsurface Drain (606), and Underground Outlet (620).

Before Situation:

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

After Situation:

Manure and other agricultural by-products are being controlled, by the collection at the source, and stored temporarily, at an environmentally suitable location, until such time that they are disposed of or utilized in a proper manner, typically in accordance with a nutrient management plan. This practice will address soil and water quality by reducing the pollution potential to soil, surface water and ground water. Tank typically 101' diameter x 12' deep with a total storage volume of 96,142 CF including freeboard. Sizing based on manure, other wastes, rainfall, lot runoff, etc. as appropriate. Total volume includes freeboard, preciptation, solids build up, etc.

Feature Measure: Total Volume including Freeboard,

Scenario Unit: Cubic Feet

Scenario Typical Size: 96,142.0

Scenario Total Cost: $187,103.46

Scenario Cost/Unit: $1.95

Cost Details:

Component Name	ID	Description	Unit	Cost	QTY	Total
Equipment Installation						
Concrete, CIP, slab on grade, reinforced	37	Steel reinforced concrete formed and cast-in-placed as a slab on grade by chute placement. Typical strength is 3000 to 4000 psi. Includes materials, labor and equipment to transport, place and finish.	Cubic Yards	$362.36	123	$44,570.28
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 Yards	$481.12	153	$73,611.36
Earthfill, Dumped and Spread	51	Earthfill, dumped and spread without compaction effort, includes equipment and labor	Cubic Yards	$3.81	4993	$19,023.33
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.	Hours	$72.23	16	$1,155.68
Excavation, common earth, large equipment, 150 ft	1223	Bulk excavation of common earth including sand and gravel with dozer >100 HP with average push distance of 150 feet. Includes equipment and labor.	Cubic Yards	$4.06	4993	$20,271.58
Plate compactor	1915	Manually guided vibratroy plate compactor. Equipment only.	Hours	$4.33	6	$25.98
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.	Hours	$27.56	129	$3,555.24
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.	Hours	$46.88	80	$3,750.40
Materials						
Aggregate, Gravel, Graded	46	Gravel, includes materials, equipment and labor to transport and place. Includes washed and unwashed gravel.	Cubic Yards	$45.42	148	$6,722.16
Cement, Type I or II	1336	Type I or II Portland Cement (94 lb. bag), Materials only.	Each	$14.34	276	$3,957.84
Waterstop, PVC, ribbed, 3/16 in x 6 in	1614	Waterstop, PVC, ribbed, 3/16 inch thick by 6 inches wide. Includes materials, equipment and labor.	Feet	$8.10	317	$2,567.70
Steel, rebar	1832	Steel rebar, grade 60. Materials only.	Pound	$0.69	8844	$6,102.36
Mobilization						

Mobilization, medium equipment	1139	Equipment with 70-150 HP or typical weights between 14,000 and 30,000 pounds.	Each	$255.65	7	$1,789.55

Practice: 313 - Waste Storage Facility

Scenario: #17 - Concrete Tank, Buried over 110K ft3 Storage

Scenario Description:

This scenario consists of installing a concrete tank that has a design storage volume of 110, 000 or more CF. Tank is totally or partially buried and has an open top. Tank can also be under a animal facility with the top cover using slats or concrete lid/floor. This practice will address soil and water quality by reducing the pollution potential to soil, surface water and ground water. Potential Associated Practices: Fence (382), Critical Area Planting (342), Nutrient Management (590), Access Road (560), Waste Transfer (634), Heavy Use Area Protection (561), Roof and Covers (367), Solid/Liquid Waste Separation Facility (632), Diversion (362), Pipeline (516), Subsurface Drain (606), and Underground Outlet (620).

Before Situation:

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

After Situation:

Manure and other agricultural by-products are being controlled, by the collection at the source, and stored temporarily, at an environmentally suitable location, until such time that they are disposed of or utilized in a proper manner, typically in accordance with a nutrient management plan. Tank typically 120' diameter x 14' deep with a total storage volume of 158,336 CF including freeboard. Sizing based on manure, other wastes, rainfall, lot runoff, etc. as appropriate. Total volume includes freeboard, precipitation, solids build up, etc.

Feature Measure: Total Volume including Freeboard,

Scenario Unit: Cubic Feet

Scenario Typical Size: 158,336.0

Scenario Total Cost: $275,659.55

Scenario Cost/Unit: $1.74

Cost Details:

Component Name	ID	Description	Unit	Cost	QTY	Total
Equipment Installation						
Concrete, CIP, slab on grade, reinforced	37	Steel reinforced concrete formed and cast-in-placed as a slab on grade by chute placement. Typical strength is 3000 to 4000 psi. Includes materials, labor and equipment to transport, place and finish.	Cubic Yards	$362.36	165	$59,789.40
Concrete, CIP, formed reinforced	38	Steel reinforced concrete formed and cast-in-placed in formed structures such as walls or suspended slabs by chute placement. Typical strength is 3000 to 4000 psi. Includes materials, labor and equipment to transport, place and finish.	Cubic Yards	$481.12	245	$117,874.40
Earthfill, Dumped and Spread	51	Earthfill, dumped and spread without compaction effort, includes equipment and labor	Cubic Yards	$3.81	7612	$29,001.72
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.	Hours	$72.23	18	$1,300.14
Excavation, common earth, large equipment, 150 ft	1223	Bulk excavation of common earth including sand and gravel with dozer >100 HP with average push distance of 150 feet. Includes equipment and labor.	Cubic Yards	$4.06	7612	$30,904.72
Plate compactor	1915	Manually guided vibratroy plate compactor. Equipment only.	Hours	$4.33	8	$34.64
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.	Hours	$27.56	173	$4,767.88
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.	Hours	$46.88	90	$4,219.20
Materials						
Aggregate, Gravel, Graded	46	Gravel, includes materials, equipment and labor to transport and place. Includes washed and unwashed gravel.	Cubic Yards	$45.42	197	$8,947.74
Cement, Type I or II	1336	Type I or II Portland Cement (94 lb. bag), Materials only.	Each	$14.34	410	$5,879.40
Waterstop, PVC, ribbed, 3/16 in x 6 in	1614	Waterstop, PVC, ribbed, 3/16 inch thick by 6 inches wide. Includes materials, equipment and labor.	Feet	$8.10	366	$2,964.60
Steel, rebar	1832	Steel rebar, grade 60. Materials only.	Pound	$0.69	11864	$8,186.16
Mobilization						

Mobilization, medium equipment	1139	Equipment with 70-150 HP or typical weights between 14,000 and 30,000 pounds.	Each	$255.65	7	$1,789.55

Practice: 313 - Waste Storage Facility

Scenario: #18 - Bedded Pack, Concrete Wall, Earth Floor

Scenario Description:

Install a composted bedded pack facility with concrete walls and earth floor. This scenario shall be used in conjunction with 367 - Roofs and Covers (Fabric Roof with No Foundation or Timber Framed Roofed with No Foundation). Walls are designed to support a roof. Concrete walls will generally be used on sites wear shallow bedrock conditions exist or where the overall spans and dead weight cannot be practically supported by timber posts/wall. Facility is constructed to store wastes as part of an agricultural waste management system. This scenario is applicable where geological, soil, and climate conditions are appropriate for earth floors and are allowed by state and local regulations. A gravel pad is installed over the earthen floor to act as a wear surface to protect the earthen floor below. This practice will address soil and water quality by reducing the pollution potential for surface water and groundwater quality degradation. Potential Associated Practices: Critical Area Planting (342), Diversion (362), Fence (382), Roofs and Covers (367), Nutrient Management (590), Waste Transfer (634), Heavy Use Area Protection (561), and Roof Runoff Structure (558).

Before Situation:

Operator presently has a confined animal feeding operation without a waste management system adequate to handle the waste stream leaving the animal production facilities. Manure and other agricultural waste by-products are not being utilized or controlled in an environmentally safe manner. The wastes are either accumulating at the source, or are being transported but not properly utilized or disposed of. This situation poses an environmentally threat of excessive nutrients, organics, and pathogens being transported into surface and groundwater resources.

After Situation:

Using a bedded pack provides an environmentally safe facility for storing manure and other agricultural waste by-products. This facility provides the landowner a means of storing waste until it can be utilized in a proper manner in accordance with a nutrient management plan. Based on MA Design #MA-WSF-12. Projected area is measured from outside wall to outside wall. Total area = 3200 SF, (40' X 80'); Concrete wall - 10" thick x 8' tall, Footer - 8' wide x 14" thick, earthen floor with a gravel wear surface. Concrete wall/foundation is designed to support roof (367- Roofs & Covers). An additional concrete wall will be installed at each end of the facility to contain the manure, except at ingress and egress locations.

Feature Measure: Area of Facility from Outside Wall t

Scenario Unit: Square Feet

Scenario Typical Size: 3,200.0

Scenario Total Cost: $83,292.89

Scenario Cost/Unit: $26.03

Cost Details:

Component Name	ID	Description	Unit	Cost	QTY	Total
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 Yards	$481.12	127	$61,102.24
Geotextile, woven	42	Woven Geotextile Fabric. Includes materials, equipment and labor	Square Yard	$1.33	330	$438.90
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 Yards	$2.31	430	$993.30
Earthfill, Manually Compacted	50	Earthfill, manually compacted, includes equipment and labor	Cubic Yards	$6.02	77	$463.54
Stripping and stockpiling, topsoil	1199	Stripping and stockpiling of topsoil adjacent to stripping area. Includes equipment and labor.	Cubic Yards	$0.97	200	$194.00
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.	Hours	$72.23	12	$866.76
Excavation, common earth, small equipment, 50 ft	1220	Bulk excavation of common earth with dozer <100 HP with average push distance of 50 feet. Includes equipment and labor.	Cubic Yards	$2.37	200	$474.00
Excavation, common earth, large equipment, 150 ft	1223	Bulk excavation of common earth including sand and gravel with dozer >100 HP with average push distance of 150 feet. Includes equipment and labor.	Cubic Yards	$4.06	200	$812.00
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.	Hours	$27.56	40	$1,102.40
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.	Hours	$46.88	30	$1,406.40
Materials						
Aggregate, Sand, Graded, Washed	45	Sand, typical ASTM C33 gradation, includes materials, equipment and labor to transport and place	Cubic Yards	$43.40	77	$3,341.80
Aggregate, Gravel, Graded	46	Gravel, includes materials, equipment and labor to transport and place. Includes washed and unwashed gravel.	Cubic Yards	$45.42	200	$9,084.00

Aggregate, Gravel, Ungraded, Quarry Run	1099	Includes materials, equipment and labor	Cubic Yards	$34.43	55	$1,893.65
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	$70.59	5	$352.95
Mobilization, medium equipment	1139	Equipment with 70-150 HP or typical weights between 14,000 and 30,000 pounds.	Each	$255.65	3	$766.95

Practice: 313 - Waste Storage Facility

Scenario: #19 - Bedded Pack, Concrete Wall, Concrete Floor

Scenario Description:

Install a composted bedded pack facility with concrete walls and concrete floor. This scenario shall be used in conjunction with 367 - Roofs and Covers (Fabric Roof with No Foundation or Timber Framed Roofed with No Foundation). Walls are designed to support a roof. Concrete walls will generally be used on sites wear shallow bedrock conditions exist or where the overall spans and dead weight cannot be practically supported by timber posts/wall. Facility is constructed to store wastes as part of an agricultural waste management system. A concrete floor is generally installed in locations that are shallow to ground water or bedrock or where other environmental conditions warrants a concrete floor. This practice will address soil and water quality by reducing the pollution potential for surface water and groundwater quality degradation. Potential Associated Practices: Critical Area Planting (342), Diversion (362), Fence (382), Roofs and Covers (367), Nutrient Management (590), Waste Transfer (634), Heavy Use Area Protection (561), and Roof Runoff Structure (558).

Before Situation:

Operator presently has a confined animal feeding operation without a waste management system adequate to handle the waste stream leaving the animal production facilities. Manure and other agricultural waste by-products are not being utilized or controlled in an environmentally safe manner. The wastes are either accumulating at the source, or are being transported but not properly utilized or disposed of. This situation poses an environmentally threat of excessive nutrients, organics, and pathogens being transported into surface and groundwater resources.

After Situation:

Using a bedded pack provides an environmentally safe facility for storing manure and other agricultural waste by-products. This facility provides the landowner a means of storing waste until it can be utilized in a proper manner in accordance with a nutrient management plan. Based on MA Design #MA-WSF-12. Projected area is measured from outside wall to outside wall. Total area = 3200 SF, (40' X 80'); Concrete wall - 10" thick x 8' tall, Footer - 8' wide x 14" thick, Concrete slab with #4 rebar @ 8" o.c. Concrete wall/foundation is designed to support roof (367- Roofs & Covers). An additional concrete wall will be installed at each end of the facility to contain the manure, except at ingress and egress locations.

Feature Measure: Square Foot Floor Area

Scenario Unit: Square Feet

Scenario Typical Size: 3,200.0

Scenario Total Cost: $91,742.78

Scenario Cost/Unit: $28.67

Cost Details:

Component Name	ID	Description	Unit	Cost	QTY	Total
Equipment Installation						
Concrete, CIP, slab on grade, reinforced	37	Steel reinforced concrete formed and cast-in-placed as a slab on grade by chute placement. Typical strength is 3000 to 4000 psi. Includes materials, labor and equipment to transport, place and finish.	Cubic Yards	$362.36	46	$16,668.56
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 Yards	$481.12	127	$61,102.24
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 Yards	$2.31	430	$993.30
Earthfill, Roller Compacted	49	Earthfill, roller or machine compacted, includes equipment and labor	Cubic Yards	$4.66	200	$932.00
Earthfill, Manually Compacted	50	Earthfill, manually compacted, includes equipment and labor	Cubic Yards	$6.02	77	$463.54
Stripping and stockpiling, topsoil	1199	Stripping and stockpiling of topsoil adjacent to stripping area. Includes equipment and labor.	Cubic Yards	$0.97	200	$194.00
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.	Hours	$72.23	15	$1,083.45
Excavation, common earth, small equipment, 50 ft	1220	Bulk excavation of common earth with dozer <100 HP with average push distance of 50 feet. Includes equipment and labor.	Cubic Yards	$2.37	200	$474.00
Excavation, common earth, large equipment, 150 ft	1223	Bulk excavation of common earth including sand and gravel with dozer >100 HP with average push distance of 150 feet. Includes equipment and labor.	Cubic Yards	$4.06	200	$812.00
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.	Hours	$27.56	40	$1,102.40
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.	Hours	$46.88	30	$1,406.40
Materials						

Aggregate, Gravel, Graded	46	Gravel, includes materials, equipment and labor to transport and place. Includes washed and unwashed gravel.	Cubic Yards	$45.42	77	$3,497.34
Aggregate, Gravel, Ungraded, Quarry Run	1099	Includes materials, equipment and labor	Cubic Yards	$34.43	55	$1,893.65
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	$70.59	5	$352.95
Mobilization, medium equipment	1139	Equipment with 70-150 HP or typical weights between 14,000 and 30,000 pounds.	Each	$255.65	3	$766.95

Practice: 313 - Waste Storage Facility

Scenario: #20 - Bedded Pack, Timber Wall, Earth Floor

Scenario Description:

Install a composted bedded pack facility with timber posts and plank walls and earthen floor. This scenario shall be used in conjunction with 367 - Roofs and Covers (Fabric Roof with No Foundation or Timber Framed Roofed with No Foundation). Walls are designed to support a roof. Facility is constructed to store wastes as part of an agricultural waste management system. This scenario is applicable where geological, soil, and climate conditions are appropriate for earth floors and are allowed by state and local regulations. A gravel pad is installed over the earthen floor to act as a wear surface to protect the earthen floor below. This practice will address soil and water quality by reducing the pollution potential for surface water and groundwater quality degradation. Potential Associated Practices: Critical Area Planting (342), Diversion (362), Fence (382), Roofs and Covers (367), Nutrient Management (590), Waste Transfer (634), Heavy Use Area Protection (561), and Roof Runoff Structure (558).

Before Situation:

Operator presently has a confined animal feeding operation without a waste management system adequate to handle the waste stream leaving the animal production facilities. Manure and other agricultural waste by-products are not being utilized or controlled in an environmentally safe manner. The wastes are either accumulating at the source, or are being transported but not properly utilized or disposed of. This situation poses an environmentally threat of excessive nutrients, organics, and pathogens being transported into surface and groundwater resources.

After Situation:

Using a bedded pack provides an environmentally safe facility for storing manure and other agricultural waste by-products. This facility provides the landowner a means of storing waste until it can be utilized in a proper manner in accordance with a nutrient management plan. Based on VT Design #VT08072015LAM. Projected area is measured from outside post to outside post. Total area = 4307 SF, (53.5' X 80.5'); 8' timber wall height (only 4' of wall which contains the manure is considered on scenario), posts are 9-5/8” x 6-3/4” laminated, embedded 6' in the ground, earthen floor with a gravel wear surface, open at each end of structure. Timber Wall/foundation is designed d to support roof (367- Roofs & Covers). An additional timber plank wall will be installed at each end of the facility to contain the manure, except at ingress and egress locations.

Feature Measure: Area of Building (Outside Post to O

Scenario Unit: Square Feet

Scenario Typical Size: 4,307.0

Scenario Total Cost: $34,804.56

Scenario Cost/Unit: $8.08

Cost Details:

Component Name	ID	Description	Unit	Cost	QTY	Total
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 Yards	$481.12	34	$16,358.08
Geotextile, woven	42	Woven Geotextile Fabric. Includes materials, equipment and labor	Square Yard	$1.33	480	$638.40
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 Yards	$2.31	155	$358.05
Earthfill, Roller Compacted	49	Earthfill, roller or machine compacted, includes equipment and labor	Cubic Yards	$4.66	160	$745.60
Earthfill, Manually Compacted	50	Earthfill, manually compacted, includes equipment and labor	Cubic Yards	$6.02	155	$933.10
Stripping and stockpiling, topsoil	1199	Stripping and stockpiling of topsoil adjacent to stripping area. Includes equipment and labor.	Cubic Yards	$0.97	160	$155.20
Excavation, common earth, small equipment, 50 ft	1220	Bulk excavation of common earth with dozer <100 HP with average push distance of 50 feet. Includes equipment and labor.	Cubic Yards	$2.37	315	$746.55
Excavation, common earth, large equipment, 150 ft	1223	Bulk excavation of common earth including sand and gravel with dozer >100 HP with average push distance of 150 feet. Includes equipment and labor.	Cubic Yards	$4.06	160	$649.60
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.	Hours	$27.56	80	$2,204.80
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.	Hours	$46.88	30	$1,406.40
Materials						
Aggregate, Gravel, Ungraded, Quarry Run	1099	Includes materials, equipment and labor	Cubic Yards	$34.43	80	$2,754.40
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 Feet	$1.89	3540	$6,690.60
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	$70.59	2	$141.18
Mobilization, medium equipment	1139	Equipment with 70-150 HP or typical weights between 14,000 and 30,000 pounds.	Each	$255.65	4	$1,022.60

Practice: 313 - Waste Storage Facility

Scenario: #21 - Bedded Pack, Timber Wall, Concrete Floor

Scenario Description:

Install a composted bedded pack facility with timber posts and plank walls and concrete floor. This scenario shall be used in conjunction with 367 - Roofs and Covers (Fabric Roof with No Foundation or Timber Framed Roofed with No Foundation). Walls are designed to support a roof. Facility is constructed to store wastes as part of an agricultural waste management system. Concrete floor is generally used on sites that are shallow to ground water or bed rock or other environmental conditions warrants a concrete floor. This practice will address soil and water quality by reducing the pollution potential for surface water and groundwater quality degradation. Potential Associated Practices: Critical Area Planting (342), Diversion (362), Fence (382), Roofs and Covers (367), Nutrient Management (590), Waste Transfer (634), Heavy Use Area Protection (561), and Roof Runoff Structure (558).

Before Situation:

Operator presently has a confined animal feeding operation without a waste management system adequate to handle the waste stream leaving the animal production facilities. Manure and other agricultural waste by-products are not being utilized or controlled in an environmentally safe manner. The wastes are either accumulating at the source, or are being transported but not properly utilized or disposed of. This situation poses an environmentally threat of excessive nutrients, organics, and pathogens being transported into surface and groundwater resources.

After Situation:

Using a bedded pack provides an environmentally safe facility for storing manure and other agricultural waste by-products. This facility provides the landowner a means of storing waste until it can be utilized in a proper manner in accordance with a nutrient management plan. Based on VT Design #VT08072015LAM. Projected area is measured from outside post to outside post. Total area = 4307 SF, (53.5' X 80.5'); 8' timber wall height (only 4' of wall which contains the manure is considered on scenario), posts are 9-5/8” x 6-3/4” laminated, embedded 6' in the ground, concrete floor, open at each end of structure. Timber Wall/foundation is designed d to support roof (367- Roofs & Covers). An additional timber plank wall will be installed at each end of the facility to contain the manure, except at ingress and egress locations.

Feature Measure: Square Foot Floor Area

Scenario Unit: Square Feet

Scenario Typical Size: 4,307.0

Scenario Total Cost: $59,689.40

Scenario Cost/Unit: $13.86

Cost Details:

Component Name	ID	Description	Unit	Cost	QTY	Total
Equipment Installation						
Concrete, CIP, slab on grade, reinforced	37	Steel reinforced concrete formed and cast-in-placed as a slab on grade by chute placement. Typical strength is 3000 to 4000 psi. Includes materials, labor and equipment to transport, place and finish.	Cubic Yards	$362.36	66	$23,915.76
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 Yards	$481.12	34	$16,358.08
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 Yards	$2.31	155	$358.05
Earthfill, Roller Compacted	49	Earthfill, roller or machine compacted, includes equipment and labor	Cubic Yards	$4.66	160	$745.60
Earthfill, Manually Compacted	50	Earthfill, manually compacted, includes equipment and labor	Cubic Yards	$6.02	235	$1,414.70
Stripping and stockpiling, topsoil	1199	Stripping and stockpiling of topsoil adjacent to stripping area. Includes equipment and labor.	Cubic Yards	$0.97	160	$155.20
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.	Hours	$72.23	5	$361.15
Excavation, common earth, small equipment, 50 ft	1220	Bulk excavation of common earth with dozer <100 HP with average push distance of 50 feet. Includes equipment and labor.	Cubic Yards	$2.37	315	$746.55
Excavation, common earth, large equipment, 150 ft	1223	Bulk excavation of common earth including sand and gravel with dozer >100 HP with average push distance of 150 feet. Includes equipment and labor.	Cubic Yards	$4.06	160	$649.60
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.	Hours	$27.56	80	$2,204.80
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.	Hours	$46.88	30	$1,406.40
Materials						
Aggregate, Gravel, Graded	46	Gravel, includes materials, equipment and labor to transport and place. Includes washed and unwashed gravel.	Cubic Yards	$45.42	80	$3,633.60

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 Feet	$1.89	3540	$6,690.60
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	$70.59	4	$282.36
Mobilization, medium equipment	1139	Equipment with 70-150 HP or typical weights between 14,000 and 30,000 pounds.	Each	$255.65	3	$766.95

Practice: 313 - Waste Storage Facility

Scenario: #22 - Concrete Stacking Slab without Curb

Scenario Description:

This scenario consists of a reinforce concrete slab to stack dry or semi-solid manure on. Walls or curbing not included. This scenario is intended to store dry or semi-solid manure. The purpose of this practice is to properly store manure and other agricultural by-products until they can be hauled away from the site for proper disposal or utilization on land at agronomical rates. This practice will address soil and water quality by reducing the pollution potential to soil, surface water and ground water. Potential Associated practices: 342-Critical Area Planting, 362-Diversion, 561-Heavy Use Area Protection, 558-Roof Runoff Structure, 317-Composting Facility, 633-Waste Recycling, 634-Waste Transfer, 635-Vegetated Treatment Area

Before Situation:

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

After Situation:

The typical stacking facility is 40' wide by 50' long (2000 SF). The facility floor is 5" concrete slab reinforced with #4 rebar at 18" o.c. Slab is constructed on 18" of fill to keep manure above seasonal high water table. Manure and other agricultural by-products are being controlled, by the collection at the source, and stored temporarily, at an environmentally suitable location, until such time that they are disposed of or utilized in a proper manner, typically in accordance with a nutrient management plan.

Feature Measure: Area of Concrete Slab

Scenario Unit: Square Feet

Scenario Typical Size: 2,000.0

Scenario Total Cost: $17,332.51

Scenario Cost/Unit: $8.67

Cost Details:

Component Name	ID	Description	Unit	Cost	QTY	Total
Equipment Installation						
Concrete, CIP, slab on grade, reinforced	37	Steel reinforced concrete formed and cast-in-placed as a slab on grade by chute placement. Typical strength is 3000 to 4000 psi. Includes materials, labor and equipment to transport, place and finish.	Cubic Yards	$362.36	31	$11,233.16
Earthfill, Dumped and Spread	51	Earthfill, dumped and spread without compaction effort, includes equipment and labor	Cubic Yards	$3.81	111	$422.91
Excavation, common earth, large equipment, 150 ft	1223	Bulk excavation of common earth including sand and gravel with dozer >100 HP with average push distance of 150 feet. Includes equipment and labor.	Cubic Yards	$4.06	111	$450.66
Plate compactor	1915	Manually guided vibratroy plate compactor. Equipment only.	Hours	$4.33	2	$8.66
Plate compactor	1915	Manually guided vibratroy plate compactor. Equipment only.	Hours	$4.33	2	$8.66
Labor						
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.	Hours	$46.88	10	$468.80
Materials						
Aggregate, Gravel, Graded	46	Gravel, includes materials, equipment and labor to transport and place. Includes washed and unwashed gravel.	Cubic Yards	$45.42	37	$1,680.54
Aggregate, Gravel, Ungraded, Quarry Run	1099	Includes materials, equipment and labor	Cubic Yards	$34.43	74	$2,547.82
Mobilization						
Mobilization, medium equipment	1139	Equipment with 70-150 HP or typical weights between 14,000 and 30,000 pounds.	Each	$255.65	2	$511.30

Practice: 313 - Waste Storage Facility

Scenario: #23 - Concrete Stacking Slab with Curb

Scenario Description:

This scenario consists of a reinforce concrete slab to stack dry or semi-solid manure on. 2' wall or curb included. This scenario is intended to store dry or semi-solid manure. Curbing is necessary to help contain manure is sometimes wetter than normal. It also aids in the collection of manure when it is field applied. The purpose of this practice is to properly store manure and other agricultural by-products until they can be hauled away from the site for proper disposal or utilization on land at agronomical rates. This practice will address soil and water quality by reducing the pollution potential to soil, surface water and ground water. Potential Associated practices: 342-Critical Area Planting, 362-Diversion, 561-Heavy Use Area Protection, 558-Roof Runoff Structure, 317-Composting Facility, 633-Waste Recycling, 634-Waste Transfer, 635-Vegetated Treatment Area

Before Situation:

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

After Situation:

The typical stacking facility is 40' wide by 50' long (2000 SF). The facility floor is 5" concrete slab reinforced with #4 rebar at 18" o.c. 2' high concrete curb or wall along three sides is included. Slab is constructed on 18" of fill to keep manure above seasonal high water table. Manure and other agricultural by-products are being controlled, by the collection at the source, and stored temporarily, at an environmentally suitable location, until such time that they are disposed of or utilized in a proper manner, typically in accordance with a nutrient management plan.

Feature Measure: Area of Concrete Slab

Scenario Unit: Square Feet

Scenario Typical Size: 2,000.0

Scenario Total Cost: $23,392.97

Scenario Cost/Unit: $11.70

Cost Details:

Component Name	ID	Description	Unit	Cost	QTY	Total
Equipment Installation						
Concrete, CIP, slab on grade, reinforced	37	Steel reinforced concrete formed and cast-in-placed as a slab on grade by chute placement. Typical strength is 3000 to 4000 psi. Includes materials, labor and equipment to transport, place and finish.	Cubic Yards	$362.36	31	$11,233.16
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 Yards	$481.12	12.5	$6,014.00
Earthfill, Dumped and Spread	51	Earthfill, dumped and spread without compaction effort, includes equipment and labor	Cubic Yards	$3.81	111	$422.91
Excavation, common earth, large equipment, 150 ft	1223	Bulk excavation of common earth including sand and gravel with dozer >100 HP with average push distance of 150 feet. Includes equipment and labor.	Cubic Yards	$4.06	111	$450.66
Plate compactor	1915	Manually guided vibratroy plate compactor. Equipment only.	Hours	$4.33	2	$8.66
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.	Hours	$27.56	2	$55.12
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.	Hours	$46.88	10	$468.80
Materials						
Aggregate, Gravel, Graded	46	Gravel, includes materials, equipment and labor to transport and place. Includes washed and unwashed gravel.	Cubic Yards	$45.42	37	$1,680.54
Aggregate, Gravel, Ungraded, Quarry Run	1099	Includes materials, equipment and labor	Cubic Yards	$34.43	74	$2,547.82
Mobilization						
Mobilization, medium equipment	1139	Equipment with 70-150 HP or typical weights between 14,000 and 30,000 pounds.	Each	$255.65	2	$511.30

Practice: 313 - Waste Storage Facility

Scenario: #24 - Plastic Tank

Scenario Description:

This scenario consists of installing a buried plastic tank that has a design storage volume of 10,000 gallons (1340 cubic feet). The tank is buried with 2' of cover. The tank can be used to store silage leachate as part of a silage leachate collection system. This practice will address soil and water quality by reducing the pollution potential to soil, surface water and ground water. Potential Associated Practices: Fence (382), Critical Area Planting (342), Nutrient Management (590), Access Road (560), Waste Transfer (634), Heavy Use Area Protection (561), Roof and Covers (367), Solid/Liquid Waste Separation Facility (632), Diversion (362), Subsurface Drain (606), Pumping Plant (533) and Underground Outlet (620).

Before Situation:

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

After Situation:

Manure and other agricultural by-products are being controlled, by the collection at the source, and stored temporarily, at an environmentally suitable location, until such time that they are disposed of or utilized in a proper manner, typically in accordance with a nutrient management plan. Tank typically 141" diameter x 160" deep, with a total volume of 10,000 gallons (1340 CF). Sizing based on manure, other wastes, rainfall, lot runoff, etc. as appropriate. Large concrete base is required to counter act buoyant forces.

Feature Measure: "Strike Full" Volume

Scenario Unit: Cubic Feet

Scenario Typical Size: 1,340.0

Scenario Total Cost: $21,298.48

Scenario Cost/Unit: $15.89

Cost Details:

Component Name	ID	Description	Unit	Cost	QTY	Total
Equipment Installation						
Concrete, CIP, slab on grade, reinforced	37	Steel reinforced concrete formed and cast-in-placed as a slab on grade by chute placement. Typical strength is 3000 to 4000 psi. Includes materials, labor and equipment to transport, place and finish.	Cubic Yards	$362.36	8	$2,898.88
Geotextile, woven	42	Woven Geotextile Fabric. Includes materials, equipment and labor	Square Yard	$1.33	30	$39.90
Earthfill, Manually Compacted	50	Earthfill, manually compacted, includes equipment and labor	Cubic Yards	$6.02	773	$4,653.46
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 Yards	$1.72	875	$1,505.00
Plate compactor	1915	Manually guided vibratroy plate compactor. Equipment only.	Hours	$4.33	2	$8.66
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.	Hours	$27.56	2	$55.12
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.	Hours	$46.88	4	$187.52
Materials						
Aggregate, Gravel, Graded	46	Gravel, includes materials, equipment and labor to transport and place. Includes washed and unwashed gravel.	Cubic Yards	$45.42	52	$2,361.84
Tank, rinsate or chemical storage, > 1,000 gal	2397	Poly tank reservoir for storing rinsate or other liquid agrichemicals. Greater than 1,000 gallon capacity. Materials only.	Gallons	$0.91	10000	$9,100.00
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	$488.10	1	$488.10

Practice: 313 - Waste Storage Facility

Scenario: #25 - Timber Sided with Concrete Floor

Scenario Description:

Install a three sided timber posts and plank walls with concrete floor. No roof! Scenarios is intended for small operations with relatively dry manure such as poultry or horses. Facility is constructed to store wastes as part of an agricultural waste management system. This practice will address soil and water quality by reducing the pollution potential for surface water and groundwater quality degradation. Potential Associated Practices: Nutrient Management (590), Heavy Use Area Protection (561), 342-Critical Area Planting, 362-Diversion, 558-Roof Runoff Structure, and 317-Composting Facility

Before Situation:

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

After Situation:

Manure and other agricultural by-products are collected and stored near the source until such time that the manure can be disposed of or utilized in a proper manner, typically in accordance with a nutrient management plan. Typical design: Scenario is based upon "NH WSF Post and Plank Details". Facility is typically constructed above ground. Typical size is 30' long by 20' wide (inside curb to inside curb wall) with 6' high walls. "Strike Full" capacity = 3600 CF. Concrete slab extends beyond the inside dimension of the timber wall by ~2 feet. The concrete slab extends 12' beyond the open end of the facility. Walls are typically constructed of 6" x 10" PT, 10' long, timber post spaced 4 feet o.c. PT 2" planking is installed on the inside of the posts with the bottom 2 feet consisting of a 6" concrete curb. Concrete floor is typically 5" thick with rebar reinforcement. Floor is underlain by 6" of drainfill material.

Feature Measure: "Strike Full" Volume

Scenario Unit: Cubic Feet

Scenario Typical Size: 3,600.0

Scenario Total Cost: $14,934.20

Scenario Cost/Unit: $4.15

Cost Details:

Component Name	ID	Description	Unit	Cost	QTY	Total
Equipment Installation						
Concrete, CIP, slab on grade, reinforced	37	Steel reinforced concrete formed and cast-in-placed as a slab on grade by chute placement. Typical strength is 3000 to 4000 psi. Includes materials, labor and equipment to transport, place and finish.	Cubic Yards	$362.36	17	$6,160.12
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 Yards	$481.12	3	$1,443.36
Earthfill, Manually Compacted	50	Earthfill, manually compacted, includes equipment and labor	Cubic Yards	$6.02	36	$216.72
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.	Hours	$62.17	20	$1,243.40
Plate compactor	1915	Manually guided vibratroy plate compactor. Equipment only.	Hours	$4.33	4	$17.32
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.	Hours	$37.19	30	$1,115.70
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.	Hours	$27.56	4	$110.24
Equipment Operators, Light	232	Includes: Skid Steer Loaders, Hydraulic Excavators <50 HP, Trenchers <12 in., Ag Equipment <150 HP, Pickup Trucks, Forklifts, Mulchers	Hours	$27.87	20	$557.40
Materials						
Aggregate, Gravel, Graded	46	Gravel, includes materials, equipment and labor to transport and place. Includes washed and unwashed gravel.	Cubic Yards	$45.42	20	$908.40
Dimension Lumber, Treated	1044	Treated dimension lumber with nominal thickness equal or less than 2". Includes lumber and fasteners	Board Feet	$1.10	656	$721.60
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 Feet	$1.89	1200	$2,268.00
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	$171.94	1	$171.94

Practice: 314 - Brush Management

Scenario: #1 - Brush Hog

Scenario Description:

Pastures or wildlife land that are of various sizes in New England often have woody plants encroaching on the edges and throughout the field due to under utilization of the pasture or field. This reduces the amount of forage available for implementing a grazing management plan and/or negatively affects early successional habitat and forest health. The scenario is usually applied to a portion of a field. Fields are mowed with a brush hog or rotary mower to manage undesirable woody plants. This will create the desired plant community consistent with the ecological site and/or improve forage accessibility, quality and quantity for livestock and cover for wildlife.

Before Situation:

The resource concerns addressed in this scenario include plant productivity, health and vigor, inadequate feed and forage, inadequate cover and shelter for wildlife. Woody species are encroaching and shading out desirable forage species resulting in a degraded pasture and inadequate forage. Forest succession is limiting desirable shrub species and reducing the amount of stems per acre. The species targeted for management are often native woody species including pine, dogwood, birch, poplar, though some invasive species such as multi-flora rose may be present. The goal is to manage the brush to increase desired vegetation rather than eradicate. The encroachment of the target species is at a stage where a rotary mower or brush hog will be able to cut the species, they are usually 1" or less in diameter.

After Situation:

Minimum treatment area is 0.1 ac. or more of woody plants. Below this amount should be controlled through manual clipping. After treatment, livestock grazing should keep the woody vegetation under control and undesirable plants are controlled or eradicated and desirable forage species have become the dominant condition. Increased forage production results. Early successional habitat may be improved through various treatments to retain or manage for thick woody cover areas within the field.

Feature Measure: Acres planned

Scenario Unit: Acres

Scenario Typical Size: 5.0

Scenario Total Cost: $720.04

Scenario Cost/Unit: $144.01

Cost Details:

Component Name	ID	Description	Unit	Cost	QTY	Total
Equipment Installation						
Mower, Bush Hog	940	Equipment and power unit costs. Labor not included.	Hours	$50.43	7	$353.01
Labor						
Equipment Operators, Light	232	Includes: Skid Steer Loaders, Hydraulic Excavators <50 HP, Trenchers <12 in., Ag Equipment <150 HP, Pickup Trucks, Forklifts, Mulchers	Hours	$27.87	7	$195.09
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	$171.94	1	$171.94

Practice: 314 - Brush Management

Scenario: #2 - Light Mechanical

Scenario Description:

Pastures, wildlife land, forests and early successional habitats that are of various sizes in New England often have woody plants encroaching throughout. This reduces the amount of forage needed for implementing a grazing management plan or negatively affects early successional habitat and forest health. The scenario is usually applied to a portion of a field or forest. Encroaching brush and/or invasive plant species in this setting is heavy enough (<2" DBH) that it requires cutting with chain or brush saws and mechanical cutter/choppers/ In riparian or sensitive areas low ground pressure equipment may be used. This will create the desired plant community consistent with the ecological site and or improve forage accessibility, quality and quantity for livestock and cover for wildlife. This scenario is also used in riparian areas in a stream corridor. Management is recommended to be done on the bank and floodplain for a conservation purpose. All required permits are to be obtained prior to start of work.

Before Situation:

The resource concerns addressed in this scenario include plant productivity, health and vigor, inadequate feed and forage, and inadequate cover and shelter for wildlife in pastures, wildlife land and in riparian areas. Undesirable plants and invasive woody species are encroaching and forcing out desirable forage species resulting in a degraded pasture, inadequate forage and wildlife habitat. The species targeted for management include, but are not limited to, native woody species including pine, dogwood, birch, poplar, though some invasive species such as multi-flora rose and others may be present. The infestation of the target species is at a stage where a rotary mower or brush hog will not be able to cut the species, requiring a larger implement to accomplish the goals. Stems are usually less than 2" in diameter.

After Situation:

Minimum treatment area is 0.1 acre or more of woody plants for field situations and 30' X 400' for riparian settings. Below this amount should be controlled through manual clipping. Since the goal is to control brush, treatment is effective on very low density, as well as high. Undesirable plants are controlled or eradicated and desirable forage species and native woody species have become the dominant cover, improving forage production and wildlife habitat.

Feature Measure: Acres planned

Scenario Unit: Acres

Scenario Typical Size: 3.0

Scenario Total Cost: $1,238.44

Scenario Cost/Unit: $412.81

Cost Details:

Component Name	ID	Description	Unit	Cost	QTY	Total
Equipment Installation						
Mechanical cutter, chopper	943	Forestry mulcher, flail shredder, hydro axe, brush cutter, etc. Equipment and power unit costs. Labor not included.	Hours	$90.63	9	$815.67
Labor						
Equipment Operators, Light	232	Includes: Skid Steer Loaders, Hydraulic Excavators <50 HP, Trenchers <12 in., Ag Equipment <150 HP, Pickup Trucks, Forklifts, Mulchers	Hours	$27.87	9	$250.83
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	$171.94	1	$171.94

Practice: 314 - Brush Management

Scenario: #3 - Medium Mechanical

Scenario Description:

Pastures, wildlife land, forests and early successional habitats that are of various sizes in New England often have woody plants encroaching throughout. This reduces the amount of forage needed for implementing a grazing management plan or negatively affects early successional habitat and forest health. The scenario is usually applied to a portion of a field or forest. Encroaching brush and/or invasive plant species in this setting is heavy enough (2-4" DBH) that it requires cutting with chain or brush saws and mechanical cutter/choppers/ In riparian or sensitive areas low ground pressure equipment may be used. This will create the desired plant community consistent with the ecological site and or improve forage accessibility, quality and quantity for livestock and cover for wildlife. This scenario is also used in riparian areas in a stream corridor. Management is recommended to be done on the bank and floodplain for a conservation purpose. All required permits are to be obtained prior to start of work.

Before Situation:

The resource concerns addressed in this scenario include plant productivity, health and vigor, inadequate feed and forage, and inadequate cover and shelter for wildlife in pastures, wildlife land and in riparian areas. Undesirable plants and invasive woody species are encroaching and forcing out desirable forage species resulting in a degraded pasture, inadequate forage and wildlife habitat. The species targeted for management include, but are not limited to, native woody species including pine, dogwood, birch, poplar, though some invasive species such as multi-flora rose and others may be present. The infestation of the target species is at a stage where a rotary mower or brush hog will not be able to cut the species, requiring a larger implement to accomplish the goals. Stems are usually 2-4" in diameter.

After Situation:

Minimum treatment area is 0.1 acre or more of woody plants for field situations and 30' X 400' for riparian settings. Below this amount should be controlled through manual clipping. Since the goal is to control brush, treatment is effective on very low density, as well as high. Undesirable plants are controlled or eradicated and desirable forage species and native woody species have become the dominant cover, improving forage production and wildlife habitat.

Feature Measure: Acres planned

Scenario Unit: Acres

Scenario Typical Size: 3.0

Scenario Total Cost: $2,082.46

Scenario Cost/Unit: $694.15

Cost Details:

Component Name	ID	Description	Unit	Cost	QTY	Total
Equipment Installation						
Chainsaw	937	Equipment and power unit costs. Labor not included.	Hours	$7.15	3	$21.45
Mechanical cutter, chopper	943	Forestry mulcher, flail shredder, hydro axe, brush cutter, etc. Equipment and power unit costs. Labor not included.	Hours	$90.63	15	$1,359.45
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.	Hours	$37.19	3	$111.57
Equipment Operators, Light	232	Includes: Skid Steer Loaders, Hydraulic Excavators <50 HP, Trenchers <12 in., Ag Equipment <150 HP, Pickup Trucks, Forklifts, Mulchers	Hours	$27.87	15	$418.05
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	$171.94	1	$171.94

Practice: 314 - Brush Management

Scenario: #4 - Heavy Mechanical

Scenario Description:

Pastures, wildlife land, forests and early successional habitats that are of various sizes in New England often have woody plants encroaching throughout. This reduces the amount of forage needed for implementing a grazing management plan or negatively affects early successional habitat and forest health. The scenario is usually applied to a portion of a field or forest. Encroaching brush and/or invasive plant species in this setting is heavy enough (4-6" DBH) that it requires cutting with chain or brush saws and mechanical cutter/choppers/ In riparian or sensitive areas low ground pressure equipment may be used. This will create the desired plant community consistent with the ecological site and or improve forage accessibility, quality and quantity for livestock and cover for wildlife. This scenario is also used in riparian areas in a stream corridor. Management is recommended to be done on the bank and floodplain for a conservation purpose. All required permits are to be obtained prior to start of work.

Before Situation:

The resource concerns addressed in this scenario include plant productivity, health and vigor, inadequate feed and forage, and inadequate cover and shelter for wildlife in pastures, wildlife land and in riparian areas. Undesirable plants and invasive woody species are encroaching and forcing out desirable forage species resulting in a degraded pasture, inadequate forage and wildlife habitat. The species targeted for management include, but are not limited to, native woody species including pine, dogwood, birch, poplar, though some invasive species such as multi-flora rose and others may be present. The infestation of the target species is at a stage where a rotary mower or brush hog will not be able to cut the species, requiring a larger implement to accomplish the goals. Stems are usually 4-6" in diameter.

After Situation:

Minimum treatment area is 0.1 acre or more of woody plants for field situations and 30' X 400' for riparian settings. Below this amount should be controlled through manual clipping. Since the goal is to control brush, treatment is effective on very low density, as well as high. Undesirable plants are controlled or eradicated and desirable forage species and native woody species have become the dominant cover, improving forage production and wildlife habitat.

Feature Measure: Acres planned

Scenario Unit: Acres

Scenario Typical Size: 2.0

Scenario Total Cost: $1,771.30

Scenario Cost/Unit: $885.65

Cost Details:

Component Name	ID	Description	Unit	Cost	QTY	Total
Equipment Installation						
Chainsaw	937	Equipment and power unit costs. Labor not included.	Hours	$7.15	4	$28.60
Mechanical cutter, chopper	943	Forestry mulcher, flail shredder, hydro axe, brush cutter, etc. Equipment and power unit costs. Labor not included.	Hours	$90.63	12	$1,087.56
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.	Hours	$37.19	4	$148.76
Equipment Operators, Light	232	Includes: Skid Steer Loaders, Hydraulic Excavators <50 HP, Trenchers <12 in., Ag Equipment <150 HP, Pickup Trucks, Forklifts, Mulchers	Hours	$27.87	12	$334.44
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	$171.94	1	$171.94

Practice: 314 - Brush Management

Scenario: #5 - Mechanical Chemical

Scenario Description:

Pastures, wildlife land, forests and early successional habitats that are of various sizes in New England often have woody plants encroaching throughout. This reduces the amount of forage available for implementing a grazing management plan and/or negatively affects early successional habitat and forest health. The scenario is usually applied to a portion of a field or forest. This treatment will consist of both herbicide and mechanical treatment. The treatment will create the desired plant community consistent with the ecological site.

Before Situation:

The resource concerns addressed in this scenario include plant productivity, health and vigor, invasive species infestation, inadequate feed and forage, and inadequate cover and shelter for wildlife. Undesirable plants and invasive woody species are encroaching and forcing out desirable forage species resulting in a degraded pasture, inadequate forage and degraded wildlife habitat. The species targeted for eradication include, but are not limited to, are multi-flora rose, autumn olive. Asiatic bittersweet, glossy and common buckthorn, exotic honeysuckle, and Japanese barberry. The infestation of the target species is at a stage where a rotary mower or brush hog will be able to cut the species, they are usually 1-3" in diameter. A follow-up treatment with a chemical application is necessary to ensure that re-sprouting is controlled.

After Situation:

At least 1 mechanical and 1 herbicide treatment is needed to control the target species, and annual monitoring is necessary. Minimum treatment area is 0.1 acre or more of woody plants. Undesirable plants are controlled or eradicated and desirable forage species and native woody species have become the dominant cover type, improving forage production and wildlife habitat and forest health. Payment includes cost of one cutting treatment and one herbicide treatment for the area. Follow up with landowner after first year to evaluate success and repeat if necessary.

Feature Measure: Acres planned

Scenario Unit: Acres

Scenario Typical Size: 3.0

Scenario Total Cost: $3,088.86

Scenario Cost/Unit: $1,029.62

Cost Details:

Component Name	ID	Description	Unit	Cost	QTY	Total
Equipment Installation						
Chainsaw	937	Equipment and power unit costs. Labor not included.	Hours	$7.15	5	$35.75
Mechanical cutter, chopper	943	Forestry mulcher, flail shredder, hydro axe, brush cutter, etc. Equipment and power unit costs. Labor not included.	Hours	$90.63	15	$1,359.45
Chemical, ground application	948	Chemical application performed by ground equipment. Includes equipment, power unit and labor costs.	Acres	$5.80	3	$17.40
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.	Hours	$37.19	15	$557.85
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.	Hours	$27.56	5	$137.80
Equipment Operators, Light	232	Includes: Skid Steer Loaders, Hydraulic Excavators <50 HP, Trenchers <12 in., Ag Equipment <150 HP, Pickup Trucks, Forklifts, Mulchers	Hours	$27.87	15	$418.05
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.	Hours	$102.76	1	$102.76
Materials						
Herbicide, Glyphosate	334	A broad-spectrum, non-selective systemic herbicide. Refer to WIN-PST for product names and active ingredients. Includes materials and shipping only.	Acres	$9.21	3	$27.63
Herbicide, Triclopyor	338	Refer to WIN-PST for product names and active ingredients. Materials and shipping	Acres	$27.92	3	$83.76
Herbicide, Surfactant	1095	Surfactants reduce the surface tension of water to produce more uniform coverage and penetration of herbicides, and weed killers. Paraffin Based Petroleum Surfactant. Refer to WIN-PST for product names and active ingredients. Includes materials and shipping only.	Acres	$1.51	3	$4.53
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	$171.94	2	$343.88

Practice: 314 - Brush Management

Scenario: #6 - Chemical Moderate

Scenario Description:

This scenario will be used on sites where chemical control of invasive exotics with backpack sprayer (foliar), cut-stump treatments or basal bark treatments are required. Access is good and the general coverage of the invasive plants is less than 75% cover (aerial view estimate). This would be used for moderate infestations. Species to be controlled include but are not limited to barberry, buckthorn, honeysuckle, autumn olive and multiflora rose. Restricted use chemicals and contractor work is necessary in wetland settings.

Before Situation:

Typical setting is forestland, pasture, riparian or wildlife lands where invasive plants are established and are negatively affecting wildlife food and cover, plant community diversity and regeneration of native plant species. Invasive plants are common in many parts of New England and are a multi-resource problem that is being addressed. This scenario represents the most common scenario where invasive plants are established but access and potential for control is very good. Skilled labor for applicators and consultant time for forester or applicator supervisor. General labor for landowner or other cutting stems and or moving brush.

After Situation:

Typical size of this scenario is variable ranging from an acre to many acres. This scenario may also be paired with another scenario for heavy infestations but only for very dense stands. Typical application of herbicides is from a commercial applicator using a backpack foliar sprayer, cut stump treatments or basal bark treatment. Future maintenance will be required. After treatment, invasive plants have been controlled to a level that meets client objectives to improve wildlife habitat, improve plant community diversity and forest health and to improve plant producitivity, health and vigor.

Feature Measure: Acres planned

Scenario Unit: Acres

Scenario Typical Size: 1.0

Scenario Total Cost: $435.97

Scenario Cost/Unit: $435.97

Cost Details:

Component Name	ID	Description	Unit	Cost	QTY	Total
Equipment Installation						
Chainsaw	937	Equipment and power unit costs. Labor not included.	Hours	$7.15	2	$14.30
Chemical, ground application	948	Chemical application performed by ground equipment. Includes equipment, power unit and labor costs.	Acres	$5.80	1	$5.80
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.	Hours	$37.19	4	$148.76
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.	Hours	$27.56	2	$55.12
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.	Hours	$102.76	1	$102.76
Materials						
Herbicide, Glyphosate	334	A broad-spectrum, non-selective systemic herbicide. Refer to WIN-PST for product names and active ingredients. Includes materials and shipping only.	Acres	$9.21	1	$9.21
Herbicide, Triclopyor	338	Refer to WIN-PST for product names and active ingredients. Materials and shipping	Acres	$27.92	1	$27.92
Herbicide, Surfactant	1095	Surfactants reduce the surface tension of water to produce more uniform coverage and penetration of herbicides, and weed killers. Paraffin Based Petroleum Surfactant. Refer to WIN-PST for product names and active ingredients. Includes materials and shipping only.	Acres	$1.51	1	$1.51
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	$70.59	1	$70.59

Practice: 314 - Brush Management

Scenario: #7 - Chemical Moderate & Follow-up

Scenario Description:

This scenario includes an initial and a follow up treatment to control re-sprout of the weeds on sites where chemical control of invasive exotics with backpack sprayer (foliar), cut-stump treatments or basal bark treatments are required. Access is good and the general coverage of the invasive plants is less than 75% cover (aerial view estimate). This would be used for light to moderate infestations. Species to be controlled include but are not limited to barberry, buckthorn, honeysuckle, autumn olive and multiflora rose. Restricted use chemicals and contractor work is necessary in wetland settings.

Before Situation:

Typical setting is forestland, pasture, riparian or wildlife lands where invasive plants are established and are negatively affecting wildlife food and cover, plant community diversity and regeneration of native plant species. Invasive plants are common in many parts of New England and are a multi-resource problem that is being addressed. This scenario represents the most common scenario where invasive plants are established but access and potential for control is very good. Skilled labor for applicators and consultant time for forester or applicator supervisor. General labor for landowner or other cutting stems and or moving brush.

After Situation:

Typical size of this scenario is variable ranging from an acre to many acres. This scenario may also be paired with another scenario for heavy infestations but only for very dense stands. Typical application of herbicides is from a commercial applicator using a backpack foliar sprayer, cut stump treatments or basal bark treatment. After treatment, invasive plants have been controlled to a level that meets client objectives to improve wildlife habitat, improve plant community diversity and forest health and to improve plant producitivity, health and vigor.

Feature Measure: Acres planned

Scenario Unit: Acres

Scenario Typical Size: 1.0

Scenario Total Cost: $819.45

Scenario Cost/Unit: $819.45

Cost Details:

Component Name	ID	Description	Unit	Cost	QTY	Total
Equipment Installation						
Chainsaw	937	Equipment and power unit costs. Labor not included.	Hours	$7.15	3	$21.45
Chemical, ground application	948	Chemical application performed by ground equipment. Includes equipment, power unit and labor costs.	Acres	$5.80	1.6	$9.28
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.	Hours	$37.19	8	$297.52
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.	Hours	$27.56	3	$82.68
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.	Hours	$102.76	2	$205.52
Materials						
Herbicide, Glyphosate	334	A broad-spectrum, non-selective systemic herbicide. Refer to WIN-PST for product names and active ingredients. Includes materials and shipping only.	Acres	$9.21	1.6	$14.74
Herbicide, Triclopyor	338	Refer to WIN-PST for product names and active ingredients. Materials and shipping	Acres	$27.92	1.6	$44.67
Herbicide, Surfactant	1095	Surfactants reduce the surface tension of water to produce more uniform coverage and penetration of herbicides, and weed killers. Paraffin Based Petroleum Surfactant. Refer to WIN-PST for product names and active ingredients. Includes materials and shipping only.	Acres	$1.51	1.6	$2.42
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	$70.59	2	$141.18

Practice: 314 - Brush Management

Scenario: #8 - Chemical Difficult Control

Scenario Description:

This scenario will be used on sites where chemical control of invasive exotics with backpack sprayer (foliar) or for dense areas where cut-stump treatments or basal bark treatments are required. Access is very poor due to distance or heavy slash and/or high number of invasive stems/acre (~11,000 per acre, <2x2ft spacing) or invasive cover is 75 % (aerial view estimate) or greater. This would be used for moderate to heavy infestations of Oriental bittersweet and Japanese knotweed. Restricted use chemicals and contractor work is necessary in wetland settings or landowners with heavy infestations. Species to be controlled include but are not limited to barberry, buckthorn, honeysuckle, autumn olive and multiflora rose. Mobilization of equipment is for all terrain vehicles (ATV) or Utility vehicles (UTV) such a an Argo used to transport personnel, supplies, and hand tools to work site..

Before Situation:

Typical setting is forestland, pasture, riparian or wildlife lands where invasive plants are established and are negatively affecting wildlife food and cover, plant community diversity and regeneration of native plant species. Invasive plants are common in many parts of New England and are a multi-resource problem that is being addressed. This scenario represents the most problematic site conditions. Skilled labor for applicators and consultant time for forester or applicator supervisor. General labor for landowner or other cutting stems and or moving brush.

After Situation:

Typical size of this scenario ranges from 1 ac to a large stand of dense invasive plants. This scenario would often be paired with another scenario for moderate infestations on a portion of the acreage. Typical application of herbicides is from a commercial applicator using a backpack foliar sprayer, cut stump treatments or basal bark treatment. Future maintenance will be required. After treatment, invasive plants have been controlled to a level that meets client objectives to improve wildlife habitat, improve plant community diversity and forest health and/or to improve plant productivity, health and vigor.

Feature Measure: Acres treated

Scenario Unit: Acres

Scenario Typical Size: 1.0

Scenario Total Cost: $926.18

Scenario Cost/Unit: $926.18

Cost Details:

Component Name	ID	Description	Unit	Cost	QTY	Total
Equipment Installation						
Chainsaw	937	Equipment and power unit costs. Labor not included.	Hours	$7.15	6	$42.90
Chemical, ground application	948	Chemical application performed by ground equipment. Includes equipment, power unit and labor costs.	Acres	$5.80	1	$5.80
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.	Hours	$37.19	14	$520.66
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.	Hours	$102.76	2	$205.52
Materials						
Herbicide, Glyphosate	334	A broad-spectrum, non-selective systemic herbicide. Refer to WIN-PST for product names and active ingredients. Includes materials and shipping only.	Acres	$9.21	1	$9.21
Herbicide, Imazapyr	336	Pre and post-emergent, non-selective herbicide for control of undesirable vegetation in non-crop areas. Refer to WIN-PST for product names and active ingredients. Includes materials and shipping only.	Acres	$42.07	1	$42.07
Herbicide, Triclopyor	338	Refer to WIN-PST for product names and active ingredients. Materials and shipping	Acres	$27.92	1	$27.92
Herbicide, Surfactant	1095	Surfactants reduce the surface tension of water to produce more uniform coverage and penetration of herbicides, and weed killers. Paraffin Based Petroleum Surfactant. Refer to WIN-PST for product names and active ingredients. Includes materials and shipping only.	Acres	$1.51	1	$1.51
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	$70.59	1	$70.59

Practice: 314 - Brush Management

Scenario: #9 - Chemical, Difficult & Follow-up

Scenario Description:

This scenario includes an initial and follow up treatment to control re-sprout of the weeds on sites where chemical control of invasive exotics with backpack sprayer (foliar) or for dense areas where cut-stump treatments or basal bark treatments are required. Access is very poor due to distance or heavy slash and/or high number of invasive stems/acre (~11,000 per acre, <2x2ft spacing) or invasive cover is 75 % (aerial view estimate) or greater. This would be used for moderate to heavy infestations of Oriental bittersweet and Japanese knotweed. Restricted use chemicals and contractor work is necessary in wetland settings or landowners with heavy infestations. Species to be controlled include but are not limited to barberry, buckthorn, honeysuckle, autumn olive and multiflora rose.

Before Situation:

Typical setting is forestland, pasture, riparian or wildlife lands where invasive plants are established and are negatively affecting wildlife food and cover, plant community diversity and regeneration of native plant species. Invasive plants are common in many parts of New England and are a multi-resource problem that is being addressed. This scenario represents the most problematic site conditions. Skilled labor for applicators and consultant time for forester or applicator supervisor. General labor for landowner or other cutting stems and or moving brush.

After Situation:

Typical size of this scenario ranges from 1 ac to a large stand of dense invasive plants. This scenario would often be paired with another scenario for moderate infestations on a portion of the acreage. Typical application of herbicides is from a commercial applicator using a backpack foliar sprayer, cut stump treatments or basal bark treatment. After treatment, invasive plants have been controlled to a level that meets client objectives to improve wildlife habitat, improve plant community diversity and forest health and/or to improve plant productivity, health and vigor.

Feature Measure: Acres planned

Scenario Unit: Acres

Scenario Typical Size: 1.0

Scenario Total Cost: $1,361.84

Scenario Cost/Unit: $1,361.84

Cost Details:

Component Name	ID	Description	Unit	Cost	QTY	Total
Equipment Installation						
Chainsaw	937	Equipment and power unit costs. Labor not included.	Hours	$7.15	7	$50.05
Chemical, ground application	948	Chemical application performed by ground equipment. Includes equipment, power unit and labor costs.	Acres	$5.80	1.8	$10.44
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.	Hours	$37.19	19	$706.61
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.	Hours	$102.76	3	$308.28
Materials						
Herbicide, Glyphosate	334	A broad-spectrum, non-selective systemic herbicide. Refer to WIN-PST for product names and active ingredients. Includes materials and shipping only.	Acres	$9.21	1.8	$16.58
Herbicide, Imazapyr	336	Pre and post-emergent, non-selective herbicide for control of undesirable vegetation in non-crop areas. Refer to WIN-PST for product names and active ingredients. Includes materials and shipping only.	Acres	$42.07	1.8	$75.73
Herbicide, Triclopyor	338	Refer to WIN-PST for product names and active ingredients. Materials and shipping	Acres	$27.92	1.8	$50.26
Herbicide, Surfactant	1095	Surfactants reduce the surface tension of water to produce more uniform coverage and penetration of herbicides, and weed killers. Paraffin Based Petroleum Surfactant. Refer to WIN-PST for product names and active ingredients. Includes materials and shipping only.	Acres	$1.51	1.8	$2.72
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	$70.59	2	$141.18

Practice: 314 - Brush Management

Scenario: #10 - Manual, Hand tools

Scenario Description:

This scenario will be used on sites where manual control of invasive exotics is possible due to few young stems per acre. Access is good and the general coverage of the invasive plants is very low. This would be used for initial and light infestations. Species to be controlled include but are not limited to barberry, buckthorn, honeysuckle, autumn olive and multiflora rose. Hand pulling and hand tools such as shovels and weed wrenches will be used to remove plants and roots from the ground. Plants will be hung in nearby trees to be sure roots dessicate.

Before Situation:

Typical setting is forestland, pasture, riparian or wildlife lands where invasive plants are just starting to become established and are beginning to negatively affecting wildlife food and cover, plant community diversity and regeneration of native plant species. Invasive plants are common in many parts of New England and are a multi-resource problem that is being addressed. This scenario represents conditions where invasive plants are just starting to get established and can be readily controlled by hand pulling. General labor for consultant or landowner time pulling plants.

After Situation:

Typical size of this scenario is variable ranging from 1-2 acres. A minimum of two treatments and future maintenance will be required. After treatment, invasive plants have been controlled to a level that meets client objectives to improve wildlife habitat, improve plant community diversity and forest health and to improve plant producitivity, health and vigor.

Feature Measure: Acres treated

Scenario Unit: Acres

Scenario Typical Size: 1.0

Scenario Total Cost: $83.56

Scenario Cost/Unit: $83.56

Cost Details:

Component Name	ID	Description	Unit	Cost	QTY	Total
Equipment Installation						
Truck, Pickup	939	Equipment and power unit costs. Labor not included.	Hours	$24.18	1	$24.18
Pruning tools, hand tools	1318	Pruning tools, hand tools, shears, loppers, pole saw, handsaw. Material costs only. Labor not included.	Hours	$2.13	2	$4.26
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.	Hours	$27.56	2	$55.12

Practice: 314 - Brush Management

Scenario: #11 - Manual, Hand tools & Follow-up

Scenario Description:

This scenario includes a follow up treatment to control re-sprout of the weeds on sites where manual control of invasive exotics is possible due to few young stems per acre. Access is good and the general coverage of the invasive plants is very low. This would be used for initial and light infestations. Species to be controlled include but are not limited to barberry, buckthorn, honeysuckle, autumn olive and multiflora rose. Hand pulling and hand tools such as shovels and weed wrenches will be used to remove plants and roots from the ground. Plants will be hung in nearby trees to be sure roots dessicate.

Before Situation:

Typical setting is forestland, pasture, riparian or wildlife lands where invasive plants are just starting to become established and are beginning to negatively affecting wildlife food and cover, plant community diversity and regeneration of native plant species. A previous hand pulling had been completed. Invasive plants are common in many parts of New England and are a multi-resource problem that is being addressed. This scenario represents conditions where invasive plants are just starting to get established and can be readily controlled by hand pulling. General labor for consultant or landowner time pulling plants.

After Situation:

Typical size of this scenario is variable ranging from 1-2 acres. Future maintenance by the landowner will be required. After treatment, invasive plants have been controlled to a level that meets client objectives to improve wildlife habitat, improve plant community diversity and forest health and to improve plant producitivity, health and vigor.

Feature Measure: Acres planned

Scenario Unit: Acres

Scenario Typical Size: 1.0

Scenario Total Cost: $113.25

Scenario Cost/Unit: $113.25

Cost Details:

Component Name	ID	Description	Unit	Cost	QTY	Total
Equipment Installation						
Truck, Pickup	939	Equipment and power unit costs. Labor not included.	Hours	$24.18	1	$24.18
Pruning tools, hand tools	1318	Pruning tools, hand tools, shears, loppers, pole saw, handsaw. Material costs only. Labor not included.	Hours	$2.13	3	$6.39
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.	Hours	$27.56	3	$82.68

Practice: 314 - Brush Management

Scenario: #302 - Chemical, Individual Plant Treatment

Scenario Description:

This Practice is for the implementation of brush management on range, pasture or native pasture using Individual Plant Treatment (IPT). The typical method of control is application of herbicides (basal or foliar location) on selected individual plants.

Before Situation:

Brush species exceed desired levels resulting in degraded plant condition, loss of forage production, or degraded wildlife habitat. Densities of brush exceed levels indicated in the ecological site descriptions.

After Situation:

Brush has been treated to a level which results in improved plant condition, forage production, or wildlife habitat. The typical method of control is application of herbicides (basal or foliar location) on selected individual plants.

Feature Measure: Acres treated

Scenario Unit: Acres

Scenario Typical Size: 40.0

Scenario Total Cost: $1,528.35

Scenario Cost/Unit: $38.21

Cost Details:

Component Name	ID	Description	Unit	Cost	QTY	Total
Equipment Installation						
Truck, Pickup	939	Equipment and power unit costs. Labor not included.	Hours	$24.18	3	$72.54
Chemical, spot treatment, single stem application	964	Ground applied chemical to individual plants or group of plants, e.g., backpack sprayer treatment. Equipment and labor cost included.	Hours	$71.67	10	$716.70
All terrain vehicles, ATV	965	Includes equipment, power unit and labor costs.	Hours	$21.14	10	$211.40
Materials						
Herbicide, Surfactant	1095	Surfactants reduce the surface tension of water to produce more uniform coverage and penetration of herbicides, and weed killers. Paraffin Based Petroleum Surfactant. Refer to WIN-PST for product names and active ingredients. Includes materials and shipping only.	Acres	$1.51	8	$12.08
Herbicide, Triazine	1321	Broad spectrum herbicide. Refer to WIN-PST for product names and active ingredients. Includes materials and shipping only.	Acres	$55.63	8	$445.04
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	$70.59	1	$70.59

Practice: 314 - Brush Management

Scenario: #327 - Chemical Light

Scenario Description:

This scenario will be used on sites where chemical control of invasive exotics with foliar treatments are required. Limited basal bark or cut stump treatments may also be used. Access is good and the general coverage is at ~10% or less (aerial cover estimate). This would be used for light infestations or for follow-up after using the chemical difficult or chemical moderate scenarios. Species to be controlled include but are not limited to barberry, buckthorn, honeysuckle, autumn olive and multiflora rose. Restricted use chemicals and contractor work is necessary in wetland settings.

Before Situation:

Typical setting is forestland, pasture, riparian or wildlife lands where invasive plants are established and are negatively affecting wildlife food and cover, plant community diversity and regeneration of native plant species. Invasive plants are common in many parts of New England and are a multi-resource problem that is being addressed. This scenario represents the most common scenario where invasive plants are established but access and potential for control is very good. Skilled labor for applicators and consultant time for forester or applicator supervisor.

After Situation:

Typical size of this scenario is variable ranging from an acre to many acres. Typical application of herbicides is from a commercial applicator using a backpack foliar sprayer with potential for limited cut stump or basal bark treatment. Future maintenance will be required. After treatment, invasive plants have been controlled to a level that meets client objectives to improve wildlife habitat, improve plant community diversity and forest health and to improve plant productivity, health and vigor.

Feature Measure: Acres planned

Scenario Unit: Acres

Scenario Typical Size: 1.0

Scenario Total Cost: $254.98

Scenario Cost/Unit: $254.98

Cost Details:

Component Name	ID	Description	Unit	Cost	QTY	Total
Equipment Installation						
Chemical, ground application	948	Chemical application performed by ground equipment. Includes equipment, power unit and labor costs.	Acres	$5.80	1	$5.80
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.	Hours	$37.19	1	$37.19
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.	Hours	$102.76	1	$102.76
Materials						
Herbicide, Glyphosate	334	A broad-spectrum, non-selective systemic herbicide. Refer to WIN-PST for product names and active ingredients. Includes materials and shipping only.	Acres	$9.21	1	$9.21
Herbicide, Triclopyor	338	Refer to WIN-PST for product names and active ingredients. Materials and shipping	Acres	$27.92	1	$27.92
Herbicide, Surfactant	1095	Surfactants reduce the surface tension of water to produce more uniform coverage and penetration of herbicides, and weed killers. Paraffin Based Petroleum Surfactant. Refer to WIN-PST for product names and active ingredients. Includes materials and shipping only.	Acres	$1.51	1	$1.51
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	$70.59	1	$70.59

Practice: 315 - Herbaceous Weed Treatment

Scenario: #1 - Low Density

Scenario Description:
Remove light infestations of herbaceous weeds using a mower, herbicide, or other state approved methods. Often used on land where weed management is accomplished by treating the field uniformly, such as with a rotary mower or boom sprayer.

Before Situation:
Pasture or hayland contains herbaceous weeds such as bedstraw or yellow rattle. Forage quality, desirable species composition, and plant productivity is often low.

After Situation:
Herbaceous weeds are managed to achieve the desirable plant community based on species composition, structure, density, and canopy cover or height.

Feature Measure: Acres treated

Scenario Unit: Acres

Scenario Typical Size: 5.0

Scenario Total Cost: $367.69

Scenario Cost/Unit: $73.54

Cost Details:

Component Name	ID	Description	Unit	Cost	QTY	Total
Equipment Installation						
Mower, Bush Hog	940	Equipment and power unit costs. Labor not included.	Hours	$50.43	2.5	$126.08
Labor						
Equipment Operators, Light	232	Includes: Skid Steer Loaders, Hydraulic Excavators <50 HP, Trenchers <12 in., Ag Equipment <150 HP, Pickup Trucks, Forklifts, Mulchers	Hours	$27.87	2.5	$69.68
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	$171.94	1	$171.94

Practice: 315 - Herbaceous Weed Treatment

Scenario: #2 - Low Density with Follow Up

Scenario Description:

Remove light infestations of herbaceous weeds using a mower, herbicide, or other state approved methods. Often used on land where weed management is accomplished by treating the field uniformly, such as with a rotary mower or boom sprayer. This scenario includes a follow up treatment to control re-sprout of the weeds after practice certification.

Before Situation:

Pasture or hayland contains herbaceous weeds such as bedstraw or yellow rattle. Forage quality, desirable species composition, and plant productivity is often low.

After Situation:

Herbaceous weeds are managed to achieve the desirable plant community based on species composition, structure, density, and canopy cover or height.

Feature Measure: Acres treated

Scenario Unit: Acres

Scenario Typical Size: 5.0

Scenario Total Cost: $657.08

Scenario Cost/Unit: $131.42

Cost Details:

Component Name	ID	Description	Unit	Cost	QTY	Total
Equipment Installation						
Mower, Bush Hog	940	Equipment and power unit costs. Labor not included.	Hours	$50.43	4	$201.72
Labor						
Equipment Operators, Light	232	Includes: Skid Steer Loaders, Hydraulic Excavators <50 HP, Trenchers <12 in., Ag Equipment <150 HP, Pickup Trucks, Forklifts, Mulchers	Hours	$27.87	4	$111.48
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	$171.94	2	$343.88

Practice: 315 - Herbaceous Weed Treatment

Scenario: #3 - Moderate Density

Scenario Description:

Remove moderate infestations of herbaceous weeds using state approved chemical/mechanical methods. Often used on smaller areas of land where weed management is accomplished using chemical application (with backpack or other types of sprayers) in combination with manual cutting. Invasive plant coverage is less than 75%.

Before Situation:

Area consists of moderate stands of invasive weeds degrading health and vigor of native herbaceous species and degrading wildlife habitat.

After Situation:

Herbaceous weeds are removed to achieve the desirable plant community based on species composition, structure, density, and canopy cover or height. Ecological site condition is progressing in an upward trend, hydrology and plant health and vigor is returning to near normal levels, and improved wildlife habitat.

Feature Measure: Acres treated

Scenario Unit: Acres

Scenario Typical Size: 1.0

Scenario Total Cost: $315.03

Scenario Cost/Unit: $315.03

Cost Details:

Component Name	ID	Description	Unit	Cost	QTY	Total
Equipment Installation						
Chemical, spot treatment, single stem application	964	Ground applied chemical to individual plants or group of plants, e.g., backpack sprayer treatment. Equipment and labor cost included.	Hours	$71.67	3	$215.01
Materials						
Herbicide, Triclopyor	338	Refer to WIN-PST for product names and active ingredients. Materials and shipping	Acres	$27.92	1	$27.92
Herbicide, Surfactant	1095	Surfactants reduce the surface tension of water to produce more uniform coverage and penetration of herbicides, and weed killers. Paraffin Based Petroleum Surfactant. Refer to WIN-PST for product names and active ingredients. Includes materials and shipping only.	Acres	$1.51	1	$1.51
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	$70.59	1	$70.59

Practice: 315 - Herbaceous Weed Treatment

Scenario: #4 - Moderate Density with Follow Up

Scenario Description:

Remove moderate infestations of herbaceous weeds using state approved chemical/mechanical methods. Often used on smaller areas of landwhere weed management is accomplished using chemical application (with backpack or other types of sprayers) in combination with manual cutting. This scenario includes a follow up "spot treatment" to control re-sprout of the weeds after practice certification.

Before Situation:

Area consists of moderate stands of invasive weeds degrading health and vigor of native herbaceous species and degrading wildlife habitat.

After Situation:

Herbaceous weeds are removed to achieve the desirable plant community based on species composition, structure, density, and canopy cover or height. Ecological site condition is progressing in an upward trend, hydrology and plant health and vigor is returning to near normal levels, and improved wildlife habitat.

Feature Measure: Acres treated

Scenario Unit: Acres

Scenario Typical Size: 1.0

Scenario Total Cost: $507.84

Scenario Cost/Unit: $507.84

Cost Details:

Component Name	ID	Description	Unit	Cost	QTY	Total
Equipment Installation						
Chemical, spot treatment, single stem application	964	Ground applied chemical to individual plants or group of plants, e.g., backpack sprayer treatment. Equipment and labor cost included.	Hours	$71.67	4.5	$322.52
Materials						
Herbicide, Triclopyor	338	Refer to WIN-PST for product names and active ingredients. Materials and shipping	Acres	$27.92	1.5	$41.88
Herbicide, Surfactant	1095	Surfactants reduce the surface tension of water to produce more uniform coverage and penetration of herbicides, and weed killers. Paraffin Based Petroleum Surfactant. Refer to WIN-PST for product names and active ingredients. Includes materials and shipping only.	Acres	$1.51	1.5	$2.27
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	$70.59	2	$141.18

Practice: 315 - Herbaceous Weed Treatment

Scenario: #5 - Intensive

Scenario Description:

Remove dense infestations of herbaceous weeds, such as phragmites and knotweed, using state approved chemical/mechanical methods. Often used on small areas of land where weed management is accomplished using intensive management techniques, such as chemical application (with backpack or other types of sprayers) in combination with manual/machine cutting.

Before Situation:

Area consist of excessive stands of herbaceous weeds degrading health and vigor of native herbaceous species promoting noxious and invasive species and degrading wildlife habitat.

After Situation:

Herbaceous weeds are removed to achieve the desirable plant community based on species composition, structure, density, and canopy cover or height. Ecological site condition is progressing in an upward trend, hydrology and plant health and vigor is returning to near normal levels, and improved wildlife habitat.

Feature Measure: Acres treated

Scenario Unit: Acres

Scenario Typical Size: 1.0

Scenario Total Cost: $842.55

Scenario Cost/Unit: $842.55

Cost Details:

Component Name	ID	Description	Unit	Cost	QTY	Total
Equipment Installation						
Mechanical cutter, chopper	943	Forestry mulcher, flail shredder, hydro axe, brush cutter, etc. Equipment and power unit costs. Labor not included.	Hours	$90.63	3	$271.89
Chemical, ground application	948	Chemical application performed by ground equipment. Includes equipment, power unit and labor costs.	Acres	$5.80	1	$5.80
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.	Hours	$37.19	4	$148.76
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.	Hours	$102.76	2	$205.52
Materials						
Herbicide, Glyphosate	334	A broad-spectrum, non-selective systemic herbicide. Refer to WIN-PST for product names and active ingredients. Includes materials and shipping only.	Acres	$9.21	1	$9.21
Herbicide, Triclopyor	338	Refer to WIN-PST for product names and active ingredients. Materials and shipping	Acres	$27.92	1	$27.92
Herbicide, Surfactant	1095	Surfactants reduce the surface tension of water to produce more uniform coverage and penetration of herbicides, and weed killers. Paraffin Based Petroleum Surfactant. Refer to WIN-PST for product names and active ingredients. Includes materials and shipping only.	Acres	$1.51	1	$1.51
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	$171.94	1	$171.94

Practice: 315 - Herbaceous Weed Treatment

Scenario: #6 - High Density with Follow Up

Scenario Description:

Remove dense infestations of herbaceous weeds, such as phragmites and knotweed, using state approved chemical/mechanical methods. Often used on small areas of land where weed management is accomplished using intensive management techniques, such as chemical application (with backpack or other types of sprayers) in combination with manual/machine cutting. This scenario includes a follow up "spot treatment" to control re-sprout of the weeds after practice certification.

Before Situation:

Area consist of excessive stands of herbaceous weeds degrading health and vigor of native herbaceous species promoting noxious and invasive species and degrading wildlife habitat.

After Situation:

Herbaceous weeds are removed to achieve the desirable plant community based on species composition, structure, density, and canopy cover or height. Ecological site condition is progressing in an upward trend, hydrology and plant health and vigor is returning to near normal levels, and improved wildlife habitat.

Feature Measure: Acres treated

Scenario Unit: Acres

Scenario Typical Size: 1.0

Scenario Total Cost: $881.08

Scenario Cost/Unit: $881.08

Cost Details:

Component Name	ID	Description	Unit	Cost	QTY	Total
Equipment Installation						
Mechanical cutter, chopper	943	Forestry mulcher, flail shredder, hydro axe, brush cutter, etc. Equipment and power unit costs. Labor not included.	Hours	$90.63	3	$271.89
Chemical, spot treatment, single stem application	964	Ground applied chemical to individual plants or group of plants, e.g., backpack sprayer treatment. Equipment and labor cost included.	Hours	$71.67	4.5	$322.52
Materials						
Herbicide, Triclopyor	338	Refer to WIN-PST for product names and active ingredients. Materials and shipping	Acres	$27.92	1.5	$41.88
Herbicide, Surfactant	1095	Surfactants reduce the surface tension of water to produce more uniform coverage and penetration of herbicides, and weed killers. Paraffin Based Petroleum Surfactant. Refer to WIN-PST for product names and active ingredients. Includes materials and shipping only.	Acres	$1.51	1.5	$2.27
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	$70.59	1	$70.59
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	$171.94	1	$171.94

Practice: 315 - Herbaceous Weed Treatment

Scenario: #40 - Phragmites - Intensive

Scenario Description:

Remove dense infestations of herbaceous weeds, such as phragmites, using state approved chemical methods. Often used on small areas of land where weed management is accomplished using intensive management techniques, such as chemical application (with hydraulic or backpack sprayers). This scenario is a well-established, dense stand of phragmites with significant thatch build-up, creating slow working conditions. An all-terrain vehicle, such as an Argo or Swampmaster is often used to create paths, carry the operator, and to power the hydraulic sprayer. Possible supporting practices include Brush Management (314), Drainage Water Management (554), Restoration and Management of Declining Habitats (643), Stream Habitat Improvement (395), Wetland Wildlife Habitat Management (644), Conservation Cover (327) or Critical Area Planting (342).

Before Situation:

Area consist of excessive stands of herbaceous weeds degrading health and vigor of native herbaceous species promoting noxious and invasive species and degrading wildlife habitat. Resource Concerns include Degraded Plant Condition and Fish and Wildlife - Inadequate Habitat.

After Situation:

Herbaceous weeds are removed to achieve the desirable plant community based on species composition, structure, density, and canopy cover or height. Ecological site condition is progressing in an upward trend, hydrology and plant health and vigor is returning to near normal levels, and improved wildlife habitat

Feature Measure: Acre treated

Scenario Unit: Acres

Scenario Typical Size: 1.0

Scenario Total Cost: $1,955.01

Scenario Cost/Unit: $1,955.01

Cost Details:

Component Name	ID	Description	Unit	Cost	QTY	Total
Equipment Installation						
Chemical, spot treatment, single stem application	964	Ground applied chemical to individual plants or group of plants, e.g., backpack sprayer treatment. Equipment and labor cost included.	Hours	$71.67	12	$860.04
All terrain vehicles, ATV	965	Includes equipment, power unit and labor costs.	Hours	$21.14	12	$253.68
Labor						
Specialist Labor	235	Labor requiring a specialized skill set: Includes Agronomists, Foresters, Biologists, etc. to provide additional technical information during the planning and implementation of the practice. Does not include NRCS or TSP services.	Hours	$102.76	6	$616.56
Materials						
Herbicide, Glyphosate	334	A broad-spectrum, non-selective systemic herbicide. Refer to WIN-PST for product names and active ingredients. Includes materials and shipping only.	Acres	$9.21	1	$9.21
Herbicide, Imazapyr	336	Pre and post-emergent, non-selective herbicide for control of undesirable vegetation in non-crop areas. Refer to WIN-PST for product names and active ingredients. Includes materials and shipping only.	Acres	$42.07	1	$42.07
Herbicide, Surfactant	1095	Surfactants reduce the surface tension of water to produce more uniform coverage and penetration of herbicides, and weed killers. Paraffin Based Petroleum Surfactant. Refer to WIN-PST for product names and active ingredients. Includes materials and shipping only.	Acres	$1.51	1	$1.51
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	$171.94	1	$171.94

Practice: 315 - Herbaceous Weed Treatment

Scenario: #41 - Moderate Control for Phragmites

Scenario Description:

Moderate control with chemicals for Phragmites and other dense weeds. Remove dense infestations of herbaceous weeds, such as phragmites, using state approved chemical methods. Often used on small areas of land where weed management is accomplished using intensive management techniques, such as chemical application (with hydraulic or backpack sprayers). This scenario is a well-established, dense stand of phragmites with significant thatch build-up, creating slow working conditions. An all-terrain vehicle, such as an Argo or Swampmaster is often used to create paths, carry the operator, and to power the hydraulic sprayer. Herbaceous weeds are removed to achieve the desirable plant community based on species composition, structure, density, and canopy cover or height. Possible supporting practices include Brush Management (314), Drainage Water Management (554), Restoration and Management of Declining Habitats (643), Stream Habitat Improvement (395), Wetland Wildlife Habitat Management (644), Conservation Cover (327) or Critical Area Planting (342).

Before Situation:

Phragmites or other dense weeds have taken over a site. They are crowding out the native species and eliminating the habitat for the wildlife. Resource Concerns include Fish and Wildlife - Inadequate Habitat and Degraded Plant Condition.

After Situation:

Phragmites and other weeds have been controlled. The native species are returning and the wildlife habitat is restored

Feature Measure: Acre

Scenario Unit: Acres

Scenario Typical Size: 1.0

Scenario Total Cost: $1,192.63

Scenario Cost/Unit: $1,192.63

Cost Details:

Component Name	ID	Description	Unit	Cost	QTY	Total
Equipment Installation						
Chemical, spot treatment, single stem application	964	Ground applied chemical to individual plants or group of plants, e.g., backpack sprayer treatment. Equipment and labor cost included.	Hours	$71.67	6	$430.02
All terrain vehicles, ATV	965	Includes equipment, power unit and labor costs.	Hours	$21.14	6	$126.84
Labor						
Specialist Labor	235	Labor requiring a specialized skill set: Includes Agronomists, Foresters, Biologists, etc. to provide additional technical information during the planning and implementation of the practice. Does not include NRCS or TSP services.	Hours	$102.76	4	$411.04
Materials						
Herbicide, Glyphosate	334	A broad-spectrum, non-selective systemic herbicide. Refer to WIN-PST for product names and active ingredients. Includes materials and shipping only.	Acres	$9.21	1	$9.21
Herbicide, Imazapyr	336	Pre and post-emergent, non-selective herbicide for control of undesirable vegetation in non-crop areas. Refer to WIN-PST for product names and active ingredients. Includes materials and shipping only.	Acres	$42.07	1	$42.07
Herbicide, Surfactant	1095	Surfactants reduce the surface tension of water to produce more uniform coverage and penetration of herbicides, and weed killers. Paraffin Based Petroleum Surfactant. Refer to WIN-PST for product names and active ingredients. Includes materials and shipping only.	Acres	$1.51	1	$1.51
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	$171.94	1	$171.94

Practice: 315 - Herbaceous Weed Treatment

Scenario: #42 - Chemical Light

Scenario Description:

This scenario will be used on sites where chemical control of invasive exotics with foliar treatments are required. Access is good and the general coverage is 10% or less. This would be used for light infestations or for follow-up after using the chemical difficult or chemical moderate scenarios. Species to be controlled include but are not limited to Japanese knotweed, yellow iris, swallowwort, garlic mustard, Phragmites, etc. Restricted use chemicals and contractor work is necessary in wetland settings.

Before Situation:

Area consists of light stands of invasive weeds degrading health and vigor of native and favorable introduced herbaceous species and degrading wildlife habitat.

After Situation:

Herbaceous weeds are removed to achieve the desirable plant community based on species composition, structure, density, and canopy cover or height. Ecological site condition is progressing in an upward trend, hydrology and plant health and vigor is returning to near normal levels, and improved wildlife habitat.

Feature Measure: Acres treated

Scenario Unit: Acres

Scenario Typical Size: 1.0

Scenario Total Cost: $270.32

Scenario Cost/Unit: $270.32

Cost Details:

Component Name	ID	Description	Unit	Cost	QTY	Total
Equipment Installation						
All terrain vehicles, ATV	965	Includes equipment, power unit and labor costs.	Hours	$21.14	1	$21.14
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.	Hours	$37.19	1	$37.19
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.	Hours	$102.76	1	$102.76
Materials						
Herbicide, Glyphosate	334	A broad-spectrum, non-selective systemic herbicide. Refer to WIN-PST for product names and active ingredients. Includes materials and shipping only.	Acres	$9.21	1	$9.21
Herbicide, Triclopyor	338	Refer to WIN-PST for product names and active ingredients. Materials and shipping	Acres	$27.92	1	$27.92
Herbicide, Surfactant	1095	Surfactants reduce the surface tension of water to produce more uniform coverage and penetration of herbicides, and weed killers. Paraffin Based Petroleum Surfactant. Refer to WIN-PST for product names and active ingredients. Includes materials and shipping only.	Acres	$1.51	1	$1.51
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	$70.59	1	$70.59

Practice: 316 - Animal Mortality Facility

Scenario: #5 - Static pile, Gravel pad

Scenario Description:

This scenario consists of installing a gravel pad to compost large animal mortalities, typically dairy cow mortality, in a static windrow or single pile. Additional carbon based bulking material is added to facilitate aeration and provide a proper C:N ratio. Piles turned at least once to go into another heat cycle prior to land application. Access is infrequent so concrete surface is not needed. This option requires at least 2 more times the area in vegetation for runoff treatment. This may not be an option for sites will limited areas, karst topography, and not isolated from of public view. The purpose of the practice is to address resource concerns related to water quality degradation due to excessive nutrients, organics, and pathogens being transported into surface and groundwater resources. Air quality impacts due to odors will also be addressed. Potential Associated Practices: Fence (382), Critical Area Planting (342), Nutrient Management (590), Access Road (560), Structure for Water Control (378), Diversion (362), Subsurface Drain (606), and Underground Outlet (620)). Vegetative Treatment Area (635), Composting (317), Roofs and Covers (367), Heavy Use Area Protection (561)

Before Situation:

Animal mortality is done in a manner that results in non-point source pollution of excessive nutrients, organics, and pathogens being transported into surface and groundwater resources. Improper operation results in odors and spread of pathogens from incomplete composting, incineration, or interaction with predators. No plan was formulated for both normal and catastrophic mortality events.

After Situation:

Animal mortality is being done in a manner that prevents non-point source pollution of excessive nutrients, organics, and pathogens being transported into surface and groundwater resources. Proper operation results in little to no odors, complete composting, and protection from predators to minimize pathogen survival or spreading. An overall plan covers normal and catastrophic mortality events. Construct a 50' x 50' compacted gravel pad with geotextile underlainment. Site can handle mortality for a 100 cow dairy with associated heifers and calves. Adequate cover needs to be provided over bedrock and ground water and shall be relively impervious. Include sufficient area for processing equipment access. Single piles or windrows to minimize runoff. Site to be located out of drainage areas, off-site water diverted and any runoff to spread out into a grassed area or vegetated treatment area as per regulations. Site preparation includes excavation and grading of the site.

Feature Measure: Pad Area

Scenario Unit: Square Feet

Scenario Typical Size: 2,500.0

Scenario Total Cost: $6,865.76

Scenario Cost/Unit: $2.75

Cost Details:

Component Name	ID	Description	Unit	Cost	QTY	Total
Equipment Installation						
Geotextile, woven	42	Woven Geotextile Fabric. Includes materials, equipment and labor	Square Yard	$1.33	280	$372.40
Earthfill, Roller Compacted	49	Earthfill, roller or machine compacted, includes equipment and labor	Cubic Yards	$4.66	93	$433.38
Dozer, 80 HP	929	Track mounted Dozer with horsepower range of 60 to 90. Equipment and power unit costs. Labor not included.	Hours	$55.20	8	$441.60
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.	Hours	$37.19	4	$148.76
Equipment Operators, Light	232	Includes: Skid Steer Loaders, Hydraulic Excavators <50 HP, Trenchers <12 in., Ag Equipment <150 HP, Pickup Trucks, Forklifts, Mulchers	Hours	$27.87	8	$222.96
Materials						
Aggregate, Gravel, Graded	46	Gravel, includes materials, equipment and labor to transport and place. Includes washed and unwashed gravel.	Cubic Yards	$45.42	93	$4,224.06
Mobilization						
Mobilization, medium equipment	1139	Equipment with 70-150 HP or typical weights between 14,000 and 30,000 pounds.	Each	$255.65	4	$1,022.60

Practice: 316 - Animal Mortality Facility

Scenario: #6 - Static pile, Concrete Pad

Scenario Description:

This scenario consists of installing a concrete pad over permeable soils, karst topography, frequently accessed sites or sites with regulatory requirements. Typically associated with large dairy (1,000 cows plus heifers) or beef animal mortality with an average daily mortality of 175 lbs/day. Area sized to compost animal mortality as a static pile or windrow with equipment around materials. Sufficient carbon based bulking material added to allow natural aeration and a proper C:N ratio. Piles typically turned at least once to go into another heat cycle prior to final disposal, typically land application. Site to be located out of drainage areas, off-site water diverted and any runoff to spread out into a grassed area or vegetated treatment area as per regulations. Potential Associated Practices: Fence (382), Critical Area Planting (342), Nutrient Management (590), Access Road (560), Structure for Water Control (587), Diversion (362), Subsurface Drain (606), and Underground Outlet (620).

Before Situation:

Animal mortality is done in a manner that results in non-point source pollution of excessive nutrients, organics, and pathogens being transported into surface and groundwater resources. Improper operation results in odors and spread of pathogens from incomplete composting, incineration, or interaction with predators. No plan was formulated for both normal and catastrophic mortality events.

After Situation:

Animal mortality is being done in a manner that prevents non-point source pollution of excessive nutrients, organics, and pathogens being transported into surface and groundwater resources. Proper operation results in little to no odors, complete composting, and protection from predators to minimize pathogen survival or spreading. An overall plan covers normal and catastrophic mortality events. Construct a 50'x50' concrete surface to process mortality. Concrete 5" thick with light reinforcement. Typical layout is 18' wide piles with 8' wide access area is around each pile or windrow. Site preparation includes topsoil removal, minimal regrading and compaction, installing gravel or sand subbase and then concrete.

Feature Measure: Pad Area

Scenario Unit: Square Feet

Scenario Typical Size: 2,500.0

Scenario Total Cost: $18,510.66

Scenario Cost/Unit: $7.40

Cost Details:

Component Name	ID	Description	Unit	Cost	QTY	Total
Equipment Installation						
Concrete, CIP, slab on grade, reinforced	37	Steel reinforced concrete formed and cast-in-placed as a slab on grade by chute placement. Typical strength is 3000 to 4000 psi. Includes materials, labor and equipment to transport, place and finish.	Cubic Yards	$362.36	39	$14,132.04
Earthfill, Manually Compacted	50	Earthfill, manually compacted, includes equipment and labor	Cubic Yards	$6.02	46	$276.92
Dozer, 80 HP	929	Track mounted Dozer with horsepower range of 60 to 90. Equipment and power unit costs. Labor not included.	Hours	$55.20	8	$441.60
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.	Hours	$37.19	4	$148.76
Equipment Operators, Light	232	Includes: Skid Steer Loaders, Hydraulic Excavators <50 HP, Trenchers <12 in., Ag Equipment <150 HP, Pickup Trucks, Forklifts, Mulchers	Hours	$27.87	8	$222.96
Materials						
Aggregate, Gravel, Graded	46	Gravel, includes materials, equipment and labor to transport and place. Includes washed and unwashed gravel.	Cubic Yards	$45.42	46	$2,089.32
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	$171.94	4	$687.76
Mobilization, medium equipment	1139	Equipment with 70-150 HP or typical weights between 14,000 and 30,000 pounds.	Each	$255.65	2	$511.30

Practice: 317 - Composting Facility

Scenario: #1 - Composting Pad, Windrow, Concrete/Asphalt

Scenario Description:

The composting facility is installed to address water quality concerns and disease vectors resulting from improper waste disposal by providing a dedicated facility for storage and treatment, and by creating a compost product that can be used in multiple ways including land application for enrichment of soil. This scenario is applicable when geological, soil, climate conditions or state and local regulations prohibit the use of an earthen surface. Curbing may need to be installed around the perimeter of the pad to help contain runoff from flowing away. Animal mortality composting pads shall be done using Practice Standard 316 - Animal Mortality Facility. Potential Associated Practices: Fence (382), Critical Area Planting (342), Nutrient Management (590), Access Road (560), Structure for water control (587), Diversion (362), Pipeline (516), Subsurface Drain (606), Heavy Use Area Protection (561), Roofs and Covers (367), Roof Runoff Structure (558), Waste Storage Facility (313), Waste Recycling (633), Waste Transfer (634), Underground Outlet (620) and Vegetative Treatment Area (635).

Before Situation:

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

After Situation:

Manure and other agricultural by-products are being controlled, by the collection at the source, and stored properly, at an environmentally suitable location, until such time that they are disposed of or utilized in a proper manner, typically in accordance with a nutrient management plan. This is incorporated as part of the overall waste management system meeting the National Engineering Handbook (NEH), Part 651, Agricultural Waste Management Field Handbook (AWMFH) that has been developed to also account for end use of the product from the composting facility. This scenario consists of installing a concrete or asphalt pad over compacted gravel to act as a working area to compost organic material in windrows. Sufficient carbon based bulking material will be added to the waste to maximize the composting process. Windrows are typically turned at least once to go into another heat cycle prior to final disposal, typically land application. Typical pad size is 100' x 100' (10,000 square feet) on a concrete or asphalt surface. Sub base material sufficiently compacted. Include sufficient area for processing equipment access. Single piles or windrows to minimize runoff. Site to be located out of drainage areas and off-site water diverted away from the pad. Divert runoff from the pad to a vegetated treatment area or a waste storage facility as per regulations. Site preparation includes topsoil removal, compaction of subsoil, and installing 6" of compacted gravel prior to installing concrete or asphalt pad.

Feature Measure: Area of Concrete/Asphalt Pad

Scenario Unit: Square Feet

Scenario Typical Size: 10,000.0

Scenario Total Cost: $79,586.20

Scenario Cost/Unit: $7.96

Cost Details:

Component Name	ID	Description	Unit	Cost	QTY	Total
Equipment Installation						
Concrete, CIP, slab on grade, reinforced	37	Steel reinforced concrete formed and cast-in-placed as a slab on grade by chute placement. Typical strength is 3000 to 4000 psi. Includes materials, labor and equipment to transport, place and finish.	Cubic Yards	$362.36	165	$59,789.40
Earthfill, Roller Compacted	49	Earthfill, roller or machine compacted, includes equipment and labor	Cubic Yards	$4.66	740	$3,448.40
Earthfill, Manually Compacted	50	Earthfill, manually compacted, includes equipment and labor	Cubic Yards	$6.02	185	$1,113.70
Excavation, common earth, large equipment, 150 ft	1223	Bulk excavation of common earth including sand and gravel with dozer >100 HP with average push distance of 150 feet. Includes equipment and labor.	Cubic Yards	$4.06	740	$3,004.40
Labor						
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.	Hours	$46.88	40	$1,875.20
Materials						
Aggregate, Gravel, Graded	46	Gravel, includes materials, equipment and labor to transport and place. Includes washed and unwashed gravel.	Cubic Yards	$45.42	185	$8,402.70
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	$488.10	4	$1,952.40

Practice: 317 - Composting Facility

Scenario: #3 - Composter, timber bins

Scenario Description:

The composting facility, with complete concrete floor and under bins, is installed to address water quality concerns and disease vectors resulting from improper waste disposal by providing a dedicated facility for storage and treatment, and by creating a compost product that can be used in multiple ways including land application for enrichment of crop ground. This scenario consists of a 3 bin composter made from timber walls placed over a cast in place concrete floor. Bins are 11' 3" by 10' 8" in size. Posts are imbedded in ground. Concrete pad is 498 square feet in area (37.3' by 13.3'). A 1' by 1.33' concrete curb is also included. Timber bins are often used with smaller operations where only smaller machinery is available, often for sheep, goat, or chickens or where local regulations require use of this material.. For operations with larger machinery where larger bin sizes are needed, consider using concrete block bins. All animal mortality composting shall be done using Practice Standard 316 - Animal Mortality Facility. Potential Associated Practices: Fence (382), Critical Area Planting (342), Nutrient Management (590), Access Road (560), Structure for water control (587), Diversion (362), Pipeline (516), Subsurface Drain (606), Heavy Use Area Protection (561), Roofs and Covers (367), Roof Runoff Structure (558), Waste Storage Facility (313), Waste Recycling (633), Waste Transfer (634), Underground Outlet (620) and Vegetative Treatment Area (635).

Before Situation:

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

After Situation:

Manure and other agricultural by-products are being controlled, by the collection at the source, and stored properly, at an environmentally suitable location, until such time that they are disposed of or utilized in a proper manner, typically in accordance with a nutrient management plan. The typical composter is designed to handle organic material from a typical New England farming operation. The typical composter is 37.3' x 13.3' with 5' high bins, 3 bin system. Strip top 1' of soil and roll compact same back into sub-floor. The entire structure is constructed on a 5" concrete slab used to store and stabilize organic material from a typical New England farm.

Feature Measure: Square Foot Floor Area

Scenario Unit: Square Feet

Scenario Typical Size: 498.0

Scenario Total Cost: $11,564.90

Scenario Cost/Unit: $23.22

Cost Details:

Component Name	ID	Description	Unit	Cost	QTY	Total
Equipment Installation						
Concrete, CIP, slab on grade, reinforced	37	Steel reinforced concrete formed and cast-in-placed as a slab on grade by chute placement. Typical strength is 3000 to 4000 psi. Includes materials, labor and equipment to transport, place and finish.	Cubic Yards	$362.36	8	$2,898.88
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 Yards	$481.12	3.5	$1,683.92
Geotextile, woven	42	Woven Geotextile Fabric. Includes materials, equipment and labor	Square Yard	$1.33	56	$74.48
Earthfill, Roller Compacted	49	Earthfill, roller or machine compacted, includes equipment and labor	Cubic Yards	$4.66	9.5	$44.27
Skidsteer, 80 HP	933	Skidsteer loader with horsepower range of 60 to 90. Equipment and power unit costs. Labor not included.	Hours	$55.01	4	$220.04
Auger, Post driver attachment	934	Auger or post driver attachment to a tractor or skidsteer. Does not include power unit. Labor not included.	Hours	$12.74	4	$50.96
Excavation, common earth, large equipment, 150 ft	1223	Bulk excavation of common earth including sand and gravel with dozer >100 HP with average push distance of 150 feet. Includes equipment and labor.	Cubic Yards	$4.06	23	$93.38
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.	Hours	$27.56	90	$2,480.40
Equipment Operators, Light	232	Includes: Skid Steer Loaders, Hydraulic Excavators <50 HP, Trenchers <12 in., Ag Equipment <150 HP, Pickup Trucks, Forklifts, Mulchers	Hours	$27.87	4	$111.48
Materials						
Aggregate, Gravel, Graded	46	Gravel, includes materials, equipment and labor to transport and place. Includes washed and unwashed gravel.	Cubic Yards	$45.42	9.5	$431.49
Dimension Lumber, Treated	1044	Treated dimension lumber with nominal thickness equal or less than 2". Includes lumber and fasteners	Board Feet	$1.10	560	$616.00
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 Feet	$1.89	480	$907.20
Mobilization						

Mobilization, large equipment	1140	Equipment >150HP or typical weights greater than 30,000 pounds or loads requiring over width or over length permits.	Each	$488.10	4	$1,952.40

Practice: 317 - Composting Facility

Scenario: #4 - Composter, concrete block bins

Scenario Description:

The composting facility, with complete concrete floor and under bins, is installed to address water quality concerns and disease vectors resulting from improper waste disposal by providing a dedicated facility for storage and treatment, and by creating a compost product that can be used in multiple ways including land application for enrichment of crop ground. This scenario consists of a 3 bin composter made from stacked concrete blocks placed on a cast in place concrete floor. Bins are 2 blocks wide by 2 blocks long creating bins 12' by 12' in size. A 1' by 1.33' buckwall to support concrete block walls is also included. Concrete pad is 780 square feet in area (46.7' by 16.7'). Concrete block bins are often used with larger operations where larger machinery is available, often for cattle. Use concrete block bins where larger bin sizes are needed and larger equipment is available or where local regulations require use of this material. All animal mortality composting shall be done using Practice Standard 316 - Animal Mortality Facility. Potential Associated Practices: Fence (382), Critical Area Planting (342), Nutrient Management (590), Access Road (560), Structure for water control (587), Diversion (362), Pipeline (516), Subsurface Drain (606), Heavy Use Area Protection (561), Roofs and Covers (367), Roof Runoff Structure (558), Waste Storage Facility (313), Waste Recycling (633), Waste Transfer (634), Underground Outlet (620) and Vegetative Treatment Area (635).

Before Situation:

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

After Situation:

Manure and other agricultural by-products are being controlled, by the collection at the source, and stored properly, at an environmentally suitable location, until such time that they are disposed of or utilized in a proper manner, typically in accordance with a nutrient management plan. The typical composter is designed to handle organic material from a typical New England farming operation. The typical composter is 46.7' x 16.7' with 6' high concrete block bins, 3 bin system. Strip top 1' of soil and roll compact same back into sub-floor. The entire structure is constructed on a 5" concrete slab used to store and stabilize organic material from a typical New England farm.

Feature Measure: Square Foot Floor Area

Scenario Unit: Square Feet

Scenario Typical Size: 780.0

Scenario Total Cost: $14,647.39

Scenario Cost/Unit: $18.78

Cost Details:

Component Name	ID	Description	Unit	Cost	QTY	Total
Equipment Installation						
Concrete, CIP, slab on grade, reinforced	37	Steel reinforced concrete formed and cast-in-placed as a slab on grade by chute placement. Typical strength is 3000 to 4000 psi. Includes materials, labor and equipment to transport, place and finish.	Cubic Yards	$362.36	12	$4,348.32
Concrete, CIP, formed reinforced	38	Steel reinforced concrete formed and cast-in-placed in formed structures such as walls or suspended slabs by chute placement. Typical strength is 3000 to 4000 psi. Includes materials, labor and equipment to transport, place and finish.	Cubic Yards	$481.12	3.5	$1,683.92
Geotextile, woven	42	Woven Geotextile Fabric. Includes materials, equipment and labor	Square Yard	$1.33	87	$115.71
Earthfill, Roller Compacted	49	Earthfill, roller or machine compacted, includes equipment and labor	Cubic Yards	$4.66	148	$689.68
Excavation, common earth, large equipment, 150 ft	1223	Bulk excavation of common earth including sand and gravel with dozer >100 HP with average push distance of 150 feet. Includes equipment and labor.	Cubic Yards	$4.06	34	$138.04
Labor						
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.	Hours	$46.88	20	$937.60
Materials						
Aggregate, Gravel, Graded	46	Gravel, includes materials, equipment and labor to transport and place. Includes washed and unwashed gravel.	Cubic Yards	$45.42	14.5	$658.59
Block, pre-cast concrete, modular	1496	Pre-cast concrete blocks, typically 2ft x 2ft x 6ft , includes installation and delivery.	Cubic Yards	$109.95	37.5	$4,123.13
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	$488.10	4	$1,952.40

Practice: 317 - Composting Facility

Scenario: #5 - Composter, concrete bins

Scenario Description:

The composting facility, with complete concrete floor and under bins, is installed to address water quality concerns and disease vectors resulting from improper waste disposal by providing a dedicated facility for storage and treatment, and by creating a compost product that can be used in multiple ways including land application for enrichment of crop ground. This scenario consists of a 3 bin composter made from cast in place concrete placed on a cast in place concrete floor with footer for walls. Bins are 12' by 12' in size. Walls are 10" thick and 6' tall. A footer for the walls extends 4' past the concrete walls on the outside of the walls on three sides and 2' past the end of the walls on the front side. Concrete pad is 846 square feet in area (47' by 18'). This scenario should be considered when timber bins or concrete block bins are deemed not feasible at the site and cast in place concrete is required. All animal mortality composting shall be done using Practice Standard 316 - Animal Mortality Facility. Potential Associated Practices: Fence (382), Critical Area Planting (342), Nutrient Management (590), Access Road (560), Structure for water control (587), Diversion (362), Pipeline (516), Subsurface Drain (606), Heavy Use Area Protection (561), Roofs and Covers (367), Roof Runoff Structure (558), Waste Storage Facility (313), Waste Recycling (633), Waste Transfer (634), Underground Outlet (620) and Vegetative Treatment Area (635).

Before Situation:

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

After Situation:

Manure and other agricultural by-products are being controlled, by the collection at the source, and stored properly, at an environmentally suitable location, until such time that they are disposed of or utilized in a proper manner, typically in accordance with a nutrient management plan. The typical composter is designed to handle organic material from a typical New England farming operation. The typical composter is 47' x 18' with 6' high concrete walls, 3 bin system. Strip top 1' of soil and roll compact same back into sub-floor. The entire structure is constructed on a 12" concrete slab with footer used to store and stabilize organic material from a typical New England farm.

Feature Measure: Square Foot Floor Area

Scenario Unit: Square Feet

Scenario Typical Size: 846.0

Scenario Total Cost: $24,323.67

Scenario Cost/Unit: $28.75

Cost Details:

Component Name	ID	Description	Unit	Cost	QTY	Total
Equipment Installation						
Concrete, CIP, slab on grade, reinforced	37	Steel reinforced concrete formed and cast-in-placed as a slab on grade by chute placement. Typical strength is 3000 to 4000 psi. Includes materials, labor and equipment to transport, place and finish.	Cubic Yards	$362.36	31.5	$11,414.34
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 Yards	$481.12	15.5	$7,457.36
Geotextile, woven	42	Woven Geotextile Fabric. Includes materials, equipment and labor	Square Yard	$1.33	94	$125.02
Earthfill, Roller Compacted	49	Earthfill, roller or machine compacted, includes equipment and labor	Cubic Yards	$4.66	134	$624.44
Excavation, common earth, large equipment, 150 ft	1223	Bulk excavation of common earth including sand and gravel with dozer >100 HP with average push distance of 150 feet. Includes equipment and labor.	Cubic Yards	$4.06	36.5	$148.19
Labor						
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.	Hours	$46.88	40	$1,875.20
Materials						
Aggregate, Gravel, Graded	46	Gravel, includes materials, equipment and labor to transport and place. Includes washed and unwashed gravel.	Cubic Yards	$45.42	16	$726.72
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	$488.10	4	$1,952.40

Practice: 317 - Composting Facility

Scenario: #6 - Composter, gravel pad

Scenario Description:

The composting facility is installed to address water quality concerns and disease vectors resulting from improper waste disposal by providing a dedicated facility for storage and treatment, and by creating a compost product that can be used in multiple ways including land application for enrichment of crop ground. This scenario is applicable when geological, soil, climate conditions or state and local regulations prohibit the use of an earthen surface but does not require a hard working surface such as concrete or asphalt. Local laws and regulations may require the use of a liner (see potential associated practices) for a gravel pad. All animal mortality composting shall be done using Practice Standard 316 - Animal Mortality Facility. Potential Associated Practices: Pond Sealing or Lining, Bentonite Sealant (521C), Pond Sealing or Lining, Compacted Clay Treatment (521D), Pond Sealing or Lining, Flexible Membrane (521A), Pond Sealing or Lining, Soil Dispersant (521B), Fence (382), Critical Area Planting (342), Nutrient Management (590), Access Road (560), Structure for water control (587), Diversion (362), Pipeline (516), Subsurface Drain (606), Heavy Use Area Protection (561), Roofs and Covers (367), Roof Runoff Structure (558), Waste Storage Facility (313), Waste Recycling (633), Waste Transfer (634), Underground Outlet (620) and Vegetative Treatment Area (635).

Before Situation:

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

After Situation:

Manure and other agricultural by-products are being controlled, by the collection at the source, and stored properly, at an environmentally suitable location, until such time that they are disposed of or utilized in a proper manner, typically in accordance with a nutrient management plan. This is incorporated as part of the overall waste management system meeting the National Engineering Handbook (NEH), Part 651, Agricultural Waste Management Field Handbook (AWMFH) that has been developed to also account for end use of the product from the composting facility. This scenario consists of installing a gravel pad over compacted earth and geotextile to act as a working area to compost organic material in a static pile, windrow, that has sufficient carbon based bulking material to allow natural aeration. Piles typically turned at least once to go into another heat cycle prior to final deposal, typically land application. Typical pad is 100' x 100' (10,000 square feet) of gravel on a compacted earth surface. Gravel material sufficiently compacted. Include sufficient area for processing equipment access. Single piles or windrows to minimize runoff. Site to be located out of drainage areas, off-site water diverted and any runoff to spread out into a grassed area or vegetated treatment area as per regulations. Site preparation includes topsoil removal, compaction of subsoil, and installing a geotextile plus compacted gravel.

Feature Measure: Square Foot Floor Area

Scenario Unit: Square Feet

Scenario Typical Size: 10,000.0

Scenario Total Cost: $27,094.80

Scenario Cost/Unit: $2.71

Cost Details:

Component Name	ID	Description	Unit	Cost	QTY	Total
Equipment Installation						
Geotextile, woven	42	Woven Geotextile Fabric. Includes materials, equipment and labor	Square Yard	$1.33	1120	$1,489.60
Earthfill, Roller Compacted	49	Earthfill, roller or machine compacted, includes equipment and labor	Cubic Yards	$4.66	370	$1,724.20
Excavation, common earth, large equipment, 150 ft	1223	Bulk excavation of common earth including sand and gravel with dozer >100 HP with average push distance of 150 feet. Includes equipment and labor.	Cubic Yards	$4.06	800	$3,248.00
Labor						
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.	Hours	$46.88	40	$1,875.20
Materials						
Aggregate, Gravel, Graded	46	Gravel, includes materials, equipment and labor to transport and place. Includes washed and unwashed gravel.	Cubic Yards	$45.42	370	$16,805.40
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	$488.10	4	$1,952.40

Practice: 317 - Composting Facility

Scenario: #8 - Urban/Peri-Urban Composter

Scenario Description:

The composting facility is installed on a small, urban or organic farm to address water quality concerns, pest/rodent concerns, and disease vectors resulting from improper vegetative waste disposal by providing a dedicated facility for storage and treatment, and by creating a compost product that can be used in multiple ways including land application for enrichment of crop ground. The typical facility size is 6 feet by 9 feet and is comprised of a two bin system. Screening is provided to limit access by vermon. Cost may be higher per unit that traditional compost facilities due to construction access limitations. Potential Associated Practices: Pond Sealing or Lining, Bentonite Sealant (521C), Pond Sealing or Lining, Compacted Clay Treatment (521D), Pond Sealing or Lining, Flexible Membrane (521A), Pond Sealing or Lining, Soil Dispersant (521B), Fence (382), Critical Area Planting (342), Nutrient Management (590), Access Road (560), Structure for water control (587), Diversion (362), Pipeline (516), Subsurface Drain (606), Heavy Use Area Protection (561), Roofs and Covers (367), Roof Runoff Structure (558), Waste Storage Facility (313), Waste Recycling (633), Waste Transfer (634), Underground Outlet (620) and Vegetative Treatment Area (635), Stormwater Runoff Control (570).

Before Situation:

Manure and other vegetative waste are not being utilized or controlled in an environmentally safe manner. The wastes are either accumulating at the source, or other location, or are being transported but not properly utilized or disposed. This situation poses an environmentally threat of excessive nutrients, organics, and pathogens being transported into surface and groundwaters.

After Situation:

Manure and other agricultural by-products are being controlled, by the collection at the source, and stored properly, at an environmentally suitable location, until such time that they are utilized in a proper manner, typically in accordance with a nutrient management plan. This is incorporated as part of the overall waste management system meeting the National Engineering Handbook (NEH), Part 651, Agricultural Waste Management Field Handbook (AWMFH) that has been developed to also account for end use of the product from the composting facility. This scenario consists of installing a composting structure on a concrete pad. Concrete pad is 6'x9' on a compacted gravel earth surface. Gravel material sufficiently compacted. Include sufficient area for accessing compost structure. Site to be located out of drainage areas, off-site water diverted and any runoff to spread out into a grassed area or vegetated treatment area as per regulations. Site preparation includes topsoil removal, compaction of subsoil, and installing a geotextile plus compacted gravel, concrete pad, and composting structure.

Feature Measure: Square Foot Floor Area

Scenario Unit: Square Feet

Scenario Typical Size: 54.0

Scenario Total Cost: $2,442.64

Scenario Cost/Unit: $45.23

Cost Details:

Component Name	ID	Description	Unit	Cost	QTY	Total
Equipment Installation						
Geotextile, woven	42	Woven Geotextile Fabric. Includes materials, equipment and labor	Square Yard	$1.33	14	$18.62
Earthfill, Manually Compacted	50	Earthfill, manually compacted, includes equipment and labor	Cubic Yards	$6.02	2	$12.04
Truck, Pickup	939	Equipment and power unit costs. Labor not included.	Hours	$24.18	5	$120.90
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.	Hours	$37.19	20	$743.80
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.	Hours	$27.56	16	$440.96
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.	Hours	$46.88	10	$468.80
Materials						
Aggregate, Gravel, Graded	46	Gravel, includes materials, equipment and labor to transport and place. Includes washed and unwashed gravel.	Cubic Yards	$45.42	2	$90.84
Lumber, planks, posts and timbers, untreated, rot resistant	1612	Untreated dimension lumber with nominal thickness greater than 2" milled from rot resistant species such as cedar. Includes lumber and fasteners. Does not include labor.	Board Feet	$3.16	173	$546.68

Practice: 317 - Composting Facility

Scenario: #15 - Rotary Composting Drum greater than 85 c.y.

Scenario Description:

Manure, litter, and other agricultural by-products are collected, stored, and treated in a compost drum until such time that they are disposed of or utilized in a proper manner, typically in accordance with a nutrient management plan. An equal or higher volume of carbonaceous amendments are added to the drum based on compost tests used to develop a compost recipe. The drum is to be filled according to manufacturer's specifications to accommodate adequate mixing space and to maintain an aerobic environment for optimal composting conditions. Compost is incorporated as part of an overall waste management system meeting the National Engineering Handbook (NEH), Part 651, Agricultural Waste Management Field Handbook (AWMFH) that has been developed to account for end use of the product from the composting facility. The composting facility consists of a composting drum installed on a concrete slab. Water quality concerns and disease vectors resulting from improper waste disposal are addressed by providing a dedicated facility for storage and treatment. The system produces a composted product that can be used in several ways, including land application for enrichment of crop ground. This scenario is applicable when there is limited land availability, geological, soil or climatic conditions prohibiting the use of only partial concrete surfaces, and for optimum moisture control. The drum system may be part of a waste separation system where composted solids are reused as bedding, as soil amendment, or sold off-farm. Operations including animal mortality composting must also adhere to Practice Standard 316 - Animal Mortality Facility. List of Potential Associated Practices: Critical Area Planting (342), Nutrient Management (590), Access Road (560), Pipeline (516), Subsurface Drain (606), Heavy Use Area Protection (561), Roofs and Covers (367), Roof Runoff Structure (558), Waste Storage Facility (313), Waste Recycling (633), Waste Transfer (634), Underground Outlet (620) and Vegetative Treatment Area (635), Waste Separation (632).

Before Situation:

Manure and other agricultural by-products are not being utilized or controlled in an environmentally safe manner. The wastes are either accumulating at the source, another location, or are being transported but improperly disposed and/or utilized. This situation poses an environmental threat of excessive nutrients, organics, and pathogens being transported into surface water and/or groundwater, in addition to excessive fertilization.

After Situation:

This scenario typically consists of a 112 cubic yard (3,024 cu ft) capacity composting drum that is loaded at less than 80% capacity. The drum is loaded with organic and bulking materials from a livestock operation and is turned periodically prior to final deposal, which typically consists of land application. Benefits include improvements in water quality, air quality, biosecurity, compost moisture management, expedited year-round composting, and pest reduction. Additional manure handling and storage components (i.e. pipelines, pumps, waste storage facilities, etc.) completed using (634), Manure Transfer, and required site work and accompanying pad to be completed under Heavy Use Area Protection, (561).

Feature Measure: Drum Size

Scenario Unit: Cubic Feet

Scenario Typical Size: 3,024.0

Scenario Total Cost: $193,444.66

Scenario Cost/Unit: $63.97

Cost Details:

Component Name	ID	Description	Unit	Cost	QTY	Total
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.	Hours	$37.19	32	$1,190.08
Equipment Operators, Heavy	233	Includes: Cranes, Hydraulic Excavators >=50 HP, Dozers, Paving Machines, Rock Trenchers, Trenchers >=12 in., Dump Trucks, Ag Equipment >=150 HP, Scrapers, Water Wagons.	Hours	$38.00	8	$304.00
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.	Hours	$102.76	48	$4,932.48
Materials						
110 CY Drum Composter Unit	2766	110 CY drum composter unit. Total capacity range is 85-135 CY. Includes loading hopper and discharge sleeve, hydraulic system, single phase electric motors, fan with snorkel, control panel, 2 monitoring ports, industrial strength interior coating, insulation installed on site after setting, and delivery. Does not include labor or unloading or associated HUA/Roof structures.	Each	$186,530.00	1	$186,530.00
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	$488.10	1	$488.10

Practice: 318 - Short Term Storage of Animal Waste and By-Products

Scenario: #1 - Poly Cover, Earthen Pad

Scenario Description:

A compacted earthen pad is constructed to store wastes on a short-term basis between collection and utilization as part of an agricultural waste management system. This practice will address soil and water quality by reducing the pollution potential for surface water and groundwater quality degradation. Potential Associated Practices: Nutrient Management (590), Waste Recycling (633)

Before Situation:

Operator presently has a confined animal feeding operation and daily manure spreading operations are not possible due to weather. Manure and other agricultural waste by-products are not being managed in an environmentally safe manner. The wastes are either accumulating at the source, or are being stockpiled in environmentally vulnerable areas and not properly managed. This situation poses an environmental threat of excessive nutrients, organics, and pathogens being transported into surface and groundwater resources.

After Situation:

Using a compacted earthen pad with a cover provides an environmentally safe meaure for temporarily managing manure and other agricultural waste by-products. This facility provides the landowner a means of storing waste until it can be utilized in a proper manner in accordance with a nutrient management plan. This practice will address soil and water quality by reducing the pollution potential to soil, surface water and ground water. Typical design: volume of material temporarily stored 12,576 ft3, pad area 6,000 ft2 (60' X 100'); 4' width around edge of manure stack to properly anchor and cover the manure; footprint of manure pile: 52' X 92", 6' manure stack height on 4:1 slopes; cover is a 6 mil poly film; 15" x 1/2" dia auger anchors on 2' centers.

Feature Measure: Volume of stored manure solids

Scenario Unit: Cubic Feet

Scenario Typical Size: 12,576.0

Scenario Total Cost: $5,968.57

Scenario Cost/Unit: $0.47

Cost Details:

Component Name	ID	Description	Unit	Cost	QTY	Total
Equipment Installation						
Earthfill, Roller Compacted	49	Earthfill, roller or machine compacted, includes equipment and labor	Cubic Yards	$4.66	222	$1,034.52
Materials						
Poly film, 6 mil.	245	6 mil, polyethylene, black	Square Feet	$0.08	6324	$505.92
Earthfill Material, purchased, common	2060	Purchased earthfill materials includes both silt or clay. Material only.	Cubic Yards	$13.97	222	$3,101.34
Anchor, earthen, auger, 15 in.	2571	Very Low disturbance, galvanized or aluminum alloy earthen anchors (set of 6) with holding power of 500 pounds or less in normal soil. Includes materials and shipping only.	Each	$6.66	160	$1,065.60
Introduced Perennial Grasses, Legumes and/or Forbs, Low Density	2747	Introduced perennial grasses, legumes, and/or forbs, may include a small percentage of annual species for establishment purposes and/or if allowed by the CPS. Planted at lower to medium density (40 pure live seeds/sq ft and less). Includes material and shipping.	Acres	$30.75	0.18	$5.54
Mobilization						
Mobilization, medium equipment	1139	Equipment with 70-150 HP or typical weights between 14,000 and 30,000 pounds.	Each	$255.65	1	$255.65

Practice: 319 - On-Farm Secondary Containment Facility

Scenario: #1 - Double Wall Tank

Scenario Description:

This practice scenario includes the replacement of an existing single wall fuel storage tank with a new double wall tank. The purpose of the practice is to address resource concerns related to water quality degradation due to the excessive release of organics into ground and surface waters or excessive sediment and turbidity in surface waters. Associated practices: Heavy Use Area Protection (561).

Before Situation:

The agricultural operation has an existing single wall fuel/oil storage tank(s) without any spill prevention protection. The producer has developed an SPCC plan in accordance with EPA requirements, which requires an above ground secondary containment facility for on-farm oil products.

After Situation:

This scenario is based on the replacement of an existing single wall tank(s) with a new double wall tank(s). Installation of "used" double wall tank(s) will not be allowed. A 3000 gallon horizontal or vertical antiroll tank (U/L 142-23 Secondary Containment Vessel) double walled which meets EPA regulations will be installed. Payment Schedule is based on the cost difference between a new single wall tank and new double wall tank of the same size. The double wall tank will provide an environmentally safe facility for handling and storage of oil products stored on the farm. Any accidental spills will be contained.

Feature Measure: Tank volume

Scenario Unit: Gallons

Scenario Typical Size: 3,000.0

Scenario Total Cost: $6,389.76

Scenario Cost/Unit: $2.13

Cost Details:

Component Name	ID	Description	Unit	Cost	QTY	Total
Equipment Installation						
Crane, truck mounted, hydraulic, 12 ton	1734	12 ton capacity truck mounted hydraulic crane. Equipment cost only.	Hours	$64.76	2	$129.52
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.	Hours	$37.19	8	$297.52
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.	Hours	$27.56	8	$220.48
Equipment Operators, Heavy	233	Includes: Cranes, Hydraulic Excavators >=50 HP, Dozers, Paving Machines, Rock Trenchers, Trenchers >=12 in., Dump Trucks, Ag Equipment >=150 HP, Scrapers, Water Wagons.	Hours	$38.00	2	$76.00
Materials						
Tank, storage tank, upgrade to a double wall from a single wall, horizontal, steel, above ground, variable cost portion	2260	Variable cost portion of the difference between a single wall and double wall horizontal steel storage tank. Includes cradles, coating, fittings, labor, equipment. Excludes foundations, pumps or piping.	Gallons	$1.78	3000	$5,340.00
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	$70.59	1	$70.59
Mobilization, medium equipment	1139	Equipment with 70-150 HP or typical weights between 14,000 and 30,000 pounds.	Each	$255.65	1	$255.65

Practice: 319 - On-Farm Secondary Containment Facility

Scenario: #4 - Concrete Containment with Roof up to 150 SF

Scenario Description:

This practice scenario includes the installation of a reinforced concrete wall containment with a concrete slab around an existing storage tank. This scenario also includes a mono-sloped roof to cover the facility. The purpose of the practice is to address resource concerns related to water quality degradation due to the excessive release of organics into ground and surface waters or excessive sediment and turbidity in surface waters. Due to topography, limited site space and/or geological conditions a fabricated structure is needed. Structure will provide an environmentally safe facility for handling and storage of these products. Associated practices may include: Heavy Use Area Protection (561)

Before Situation:

Existing agricultural operation that has single walled fuel/oil storage tank(s) not protected. The producer has developed an SPCC plan in accordance with EPA requirements, that requires an above ground secondary containment facility for on-farm oil products, in order to control the excessive release of organics into ground and surface waters, or to control the excessive sediment and turbidity in surface water.

After Situation:

Containment facility is typically installed for 250 to 500 gallon tank. The containment volume is designed for 125% of the largest tank. Structure will provide an environmentally safe facility for handling and storage of these products. Scenario is based upon VT Secondary Containment Facility Design which is 12.5' x 9.5' in size. Reinforced concrete slab is 6" thick slab with 2' tall formed sidewalls. Existing tank will be placed inside containment facility after facility is constructed. Facility will be covered with a mono-slope timber framed roof. The secondary containment system will prevent accidental release diseil, gasoline, kerosine, oil and other petroleum products that will release of organics, suspended sediments, and turbidity. Structure will provide an environmentally safe facility for handling and storage of these products.

Feature Measure: Area of Containmnet Facility (Foot

Scenario Unit: Square Feet

Scenario Typical Size: 119.0

Scenario Total Cost: $6,781.71

Scenario Cost/Unit: $56.99

Cost Details:

Component Name	ID	Description	Unit	Cost	QTY	Total
Equipment Installation						
Concrete, CIP, slab on grade, reinforced	37	Steel reinforced concrete formed and cast-in-placed as a slab on grade by chute placement. Typical strength is 3000 to 4000 psi. Includes materials, labor and equipment to transport, place and finish.	Cubic Yards	$362.36	3.5	$1,268.26
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 Yards	$481.12	3	$1,443.36
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.	Hours	$109.36	2	$218.72
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.	Hours	$37.19	24	$892.56
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.	Hours	$27.56	24	$661.44
Equipment Operators, Heavy	233	Includes: Cranes, Hydraulic Excavators >=50 HP, Dozers, Paving Machines, Rock Trenchers, Trenchers >=12 in., Dump Trucks, Ag Equipment >=150 HP, Scrapers, Water Wagons.	Hours	$38.00	2	$76.00
Materials						
Aggregate, Gravel, Graded	46	Gravel, includes materials, equipment and labor to transport and place. Includes washed and unwashed gravel.	Cubic Yards	$45.42	2.5	$113.55
Corrugated Steel, 22 gauge	224	Corrugated or ribbed, galvanized, 22 gauge, includes fasteners, materials only.	Square Feet	$2.70	167	$450.90
Dimension Lumber, Treated	1044	Treated dimension lumber with nominal thickness equal or less than 2". Includes lumber and fasteners	Board Feet	$1.10	88	$96.80
Dimension Lumber, untreated	1045	Untreated dimension lumber with nominal thickness equal or less than 2". Includes lumber and fasteners.	Board Feet	$0.91	278	$252.98
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 Feet	$1.89	84	$158.76
Fuel Containment Facility, Gate valve 2 inch diameter	1735	Metal 2 inch diameter gate valve. Materials only.	Each	$417.75	1	$417.75
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	$70.59	1	$70.59
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	$171.94	1	$171.94
Mobilization, large equipment	1140	Equipment >150HP or typical weights greater than 30,000 pounds or loads requiring over width or over length permits.	Each	$488.10	1	$488.10

Practice: 319 - On-Farm Secondary Containment Facility

Scenario: #5 - Concrete Containment with Roof over 150 SF

Scenario Description:

This practice scenario includes the installation of a reinforced concrete wall containment with a concrete slab around an existing storage tank. This scenario also includes a mono-sloped roof to cover the facility. The purpose of the practice is to address resource concerns related to water quality degradation due to the excessive release of organics into ground and surface waters or excessive sediment and turbidity in surface waters. Due to topography, limited site space and/or geological conditions a fabricated structure is needed. Structure will provide an environmentally safe facility for handling and storage of these products. Associated practices may include: Heavy Use Area Protection (561)

Before Situation:

Existing agricultural operation that has single walled fuel/oil storage tank(s) not protected. The producer has developed an SPCC plan in accordance with EPA requirements, that requires an above ground secondary containment facility for on-farm oil products, in order to control the excessive release of organics into ground and surface waters, or to control the excessive sediment and turbidity in surface water.

After Situation:

Containment facility is typically installed for 500 to 1000 gallon tank. The containment volume is designed for 125% of the largest tank. Structure will provide an environmentally safe facility for handling and storage of these products. Scenario is based upon VT Secondary Containment Facility Design which is 24.5' x 10.0' in size. Reinforced concrete slab is 6" thick slab with 2' tall formed sidewalls. Existing tank will be placed inside containment facility after facility is constructed. Facility will be covered with a mono-slope timber framed roof. The secondary containment system will prevent accidental release diseil, gasoline, kerosine, oil and other petroleum products that will release of organics, suspended sediments, and turbidity. Structure will provide an environmentally safe facility for handling and storage of these products.

Feature Measure: Area of Containmnet Facility (Foot

Scenario Unit: Square Feet

Scenario Typical Size: 245.0

Scenario Total Cost: $10,575.21

Scenario Cost/Unit: $43.16

Cost Details:

Component Name	ID	Description	Unit	Cost	QTY	Total
Equipment Installation						
Concrete, CIP, slab on grade, reinforced	37	Steel reinforced concrete formed and cast-in-placed as a slab on grade by chute placement. Typical strength is 3000 to 4000 psi. Includes materials, labor and equipment to transport, place and finish.	Cubic Yards	$362.36	6.5	$2,355.34
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 Yards	$481.12	4.5	$2,165.04
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.	Hours	$109.36	4	$437.44
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.	Hours	$37.19	32	$1,190.08
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.	Hours	$27.56	32	$881.92
Equipment Operators, Heavy	233	Includes: Cranes, Hydraulic Excavators >=50 HP, Dozers, Paving Machines, Rock Trenchers, Trenchers >=12 in., Dump Trucks, Ag Equipment >=150 HP, Scrapers, Water Wagons.	Hours	$38.00	4	$152.00
Materials						
Aggregate, Gravel, Graded	46	Gravel, includes materials, equipment and labor to transport and place. Includes washed and unwashed gravel.	Cubic Yards	$45.42	5	$227.10
Corrugated Steel, 22 gauge	224	Corrugated or ribbed, galvanized, 22 gauge, includes fasteners, materials only.	Square Feet	$2.70	318	$858.60
Dimension Lumber, Treated	1044	Treated dimension lumber with nominal thickness equal or less than 2". Includes lumber and fasteners	Board Feet	$1.10	237	$260.70
Dimension Lumber, untreated	1045	Untreated dimension lumber with nominal thickness equal or less than 2". Includes lumber and fasteners.	Board Feet	$0.91	518	$471.38
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 Feet	$1.89	114	$215.46
Fuel Containment Facility, Gate valve 2 inch diameter	1735	Metal 2 inch diameter gate valve. Materials only.	Each	$417.75	1	$417.75
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	$70.59	4	$282.36
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	$171.94	1	$171.94
Mobilization, large equipment	1140	Equipment >150HP or typical weights greater than 30,000 pounds or loads requiring over width or over length permits.	Each	$488.10	1	$488.10

Practice: 319 - On-Farm Secondary Containment Facility

Scenario: #18 - Spill Pallet

Scenario Description:

This practice scenario provides spill pallets where drums storing petroleum products will be stored. The spill pallets are specially made to collect and contain any oil that may leak or spill from the drum. Spill pallets are intended for inside use only. The purpose of the practice is to address resource concerns related to water quality degradation due to the excessive release of organics into ground and surface waters or excessive sediment and turbidity in surface waters.

Before Situation:

Typical petroleum storage drums in the machine shop of a farm constantly leak or material is spilled onto the shop floor where it leaks into the floor drain or seeps in to the soil. High potential for ground and surface water contamination with petroleum products.

After Situation:

All petroleum leakage and spillage from storage drums is fully contained thus protecting surface and ground water resources. Spill pallets are part of an overall SPCC plan in accordance with EPA requirements.

Feature Measure: Volume of Drum

Scenario Unit: Gallons

Scenario Typical Size: 66.0

Scenario Total Cost: $423.84

Scenario Cost/Unit: $6.42

Cost Details:

Component Name	ID	Description	Unit	Cost	QTY	Total
Equipment Installation						
Truck, Pickup	939	Equipment and power unit costs. Labor not included.	Hours	$24.18	2	$48.36
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.	Hours	$27.56	4	$110.24
Materials						
2 Drum Spill Pallet, 66 Gallon	1610	Pre fabricated containment basin with a capacity of approximately 66 gal. Materials only.	Each	$265.24	1	$265.24

Practice: 324 - Deep Tillage

Scenario: #8 - Deep Tillage less than 20 inches

Scenario Description:

Fields (80 acres) with adverse soils conditions that restrict plant growth such as compacted layers caused by tillage operations or restrictive layers such as hardpans (duripans) in the root zone. This practice does not apply to normal tillage practices to prepare a seedbed but is meant to fracture the restrictive soil layer.

Before Situation:

In this geographic area, crop plants are observed as having reduced yield, water is not infiltrating into the soil. Soil layers have been compacted by shallow tillage operations, or soils have a hardpan (duripan) layer that is restricting root growth. Typical field size is 80 acres with crop rotations consisting of annual row crops or small grains with conventional tillage or when the harvesting of row crops (onions, sugar beets, potato, and corn silage) use heavy trucks to assist with the harvest. Compaction has been caused when soil moisture is too wet for normal field operations or by excessive shallow tillage or field harvest haul traffic throughout the entire field. Soil structure has been reduced, aggregate strength is weak and soil biological activity is low. Soil organic matter is not adequate and the water holding capacity of the soil is limited for the desired root zone.

After Situation:

Soil compaction is measured with a penetrometer and visual observation of limiting root growth. Deep tillage operations such as subsoiling, paratilling or ripping are performed not as a part of the normal tillage operation for seedbed preparation, but used to relieve compaction at depths less than 20 inches. Soil moisture is less than 30 percent when deep tillage is used. The fractured zone will be sufficient to permit root penetration below the restrictive soil layer. Penetrometers are used to identify the severity (psi) of the compaction and the depth of the restrictive layer. Deep tillage is generally performed in the fall after crop harvest when soil conditions are dry. After deep tillage, harvest operations should be avoided when soil moisture is greater than 50% of field capacity. Field harvest haul traffic should be limited to end rows or haul roads. Using dual tires or tracks beneath tractors or grain wagons can help spread the weight load.

Feature Measure: <Unknown>

Scenario Unit: Acres

Scenario Typical Size: 80.0

Scenario Total Cost: $1,941.62

Scenario Cost/Unit: $24.27

Cost Details:

Component Name	ID	Description	Unit	Cost	QTY	Total
Equipment Installation						
Truck, Pickup	939	Equipment and power unit costs. Labor not included.	Hours	$24.18	1	$24.18
Ripper or subsoiler, 16 to 36 inch depth	1235	Deep ripper or subsoiler, (16-36 inches depth) includes tillage implement, power unit and labor.	Acres	$20.71	80	$1,656.80
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.	Hours	$27.56	2	$55.12
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.	Hours	$102.76	2	$205.52

Practice: 324 - Deep Tillage

Scenario: #9 - Deep Tillage more than 20 inches

Scenario Description:

Fields (80 acres) with adverse soils conditions that restrict plant growth such as compacted layers caused by tillage operations or restrictive layers such as hardpans (duripans) in the root zone. This practice does not apply to normal tillage practices to prepare a seedbed but is meant to fracture the restrictive soil layer.

Before Situation:

In this geographic area, crop plants are observed as having reduced yield, water is not infiltrating into the soil. Soil layers have been compacted by shallow tillage operations, or soils have a hardpan (duripan) layer that is restricting root growth. Typical field size is 80 acres with crop rotations consisting of annual row crops, orchard /vineyards or small grains with conventional tillage or when the harvesting of row crops (onions, sugar beets, potato, and corn silage) use heavy trucks to assist with the harvest. Orchards and vineyards may be deep ripped prior to establishment of perennial crop. Compaction has been caused when soil moisture is too wet for normal field operations or by excessive shallow tillage or field harvest haul traffic throughout the entire field. Soil structure has been reduced, aggregate strength is weak and soil biological activity is low. Soil organic matter is not adequate and the water holding capacity of the soil is limited for the desired root zone.

After Situation:

Soil compaction is measured with a penetrometer and visual observation of limiting root growth. Deep tillage operations such as subsoiling, paratilling or ripping are performed not as a part of the normal tillage operation for seedbed preparation, but used to relieve compaction at depths more than 20 inches. Soil moisture is less than 30 percent when deep tillage is used. The fractured zone will be sufficient to permit root penetration below the restrictive soil layer. Penetrometers are used to identify the severity (psi) of the compaction and the depth of the restrictive layer. Deep tillage is generally performed in the fall after crop harvest when soil conditions are dry. When possible, harvest operations should be avoided when soil moisture is greater than 50% of field capacity. Field harvest haul traffic should be limited to end rows or haul roads. Using dual tires or tracks beneath tractors or grain wagons can help spread the weight load.

Feature Measure: <Unknown>

Scenario Unit: Acres

Scenario Typical Size: 80.0

Scenario Total Cost: $4,904.02

Scenario Cost/Unit: $61.30

Cost Details:

Component Name	ID	Description	Unit	Cost	QTY	Total
Equipment Installation						
Truck, Pickup	939	Equipment and power unit costs. Labor not included.	Hours	$24.18	1	$24.18
Ripper or subsoiler, > 36 inch depth	1236	Deep ripper or subsoiler, (>36 inches depth) includes tillage implement, power unit and labor.	Acres	$57.74	80	$4,619.20
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.	Hours	$27.56	2	$55.12
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.	Hours	$102.76	2	$205.52

Practice: 324 - Deep Tillage

Scenario: #16 - Deep Tillage, Off Site Equipment

Scenario Description:

Fields (10 acres) with adverse soils conditions that restrict plant growth such as compacted layers caused by tillage operations or restrictive layers such as hardpans (duripans) in the root zone. This practice does not apply to normal tillage practices to prepare a seedbed but is meant to fracture the compacted zone below the restrictive soil layer.

Before Situation:

In this geographic area, crop plants are observed as having reduced yield, water is not infiltrating into the soil. Soil layers have been compacted by shallow tillage operations, or soils have a hardpan (duripan) layer that is restricting root growth. Typical field size is 10 acres with crop rotations consisting of annual row crops or small grains with conventional tillage or when the harvesting of row crops (onions, sugar beets, potato, corn silage) use heavy trucks to assist with the harvest. Compaction has been caused when soil moisture is to wet for normal field operations or by excessive shallow tillage or field harvest haul traffic throughout the entire field. Soil structure has been reduced, aggregate strength is week and soil biological activity is low. Soil organic matter is not adequate and the water holding capacity of the soil is limited for the desired root zone.

After Situation:

Soil compaction is measured with a penetrometer and visual observation of limiting root growth. Deep tillage operations such as subsoiling, paratilling or ripping are performed not as a part of the normal tillage operation for seedbed preparation. Equipment is rented and moved from off site. Soil moisture is less than 30 percent when deep tillage is used. The fractured zone will be sufficient to permit root penetration below the restrictive soil layer. Penetrometers are used to identify the severity (psi) of the compaction and the depth of the restrictive layer. Deep tillage is generally preformed in the fall after crop harvest when soil conditions are dry. When possible, harvest operations should be avoided when soil moisture is greater than 50% of field capacity. Field harvest haul traffic should be limited to end rows or haul roads. Using dual tires or tracts beneath tractors or grain wagons can help spread the weight load.

Feature Measure: Unknown

Scenario Unit: Acres

Scenario Typical Size: 10.0

Scenario Total Cost: $747.57

Scenario Cost/Unit: $74.76

Cost Details:

Component Name	ID	Description	Unit	Cost	QTY	Total
Equipment Installation						
Truck, Pickup	939	Equipment and power unit costs. Labor not included.	Hours	$24.18	1	$24.18
Ripper or subsoiler, 16 to 36 inch depth	1235	Deep ripper or subsoiler, (16-36 inches depth) includes tillage implement, power unit and labor.	Acres	$20.71	10	$207.10
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.	Hours	$27.56	2	$55.12
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.	Hours	$102.76	2	$205.52
Mobilization						
Mobilization, medium equipment	1139	Equipment with 70-150 HP or typical weights between 14,000 and 30,000 pounds.	Each	$255.65	1	$255.65

Practice: 325 - High Tunnel System

Scenario: #30 - Contiguous US Snow

Scenario Description:

Used for contiguous US states in areas with high snowfall. A gothic style (peaked) manufactured frame of tubular steel (30 x 70 ft.) covered with 4-year 6 mil plastic. Costs are based on purchase of manufactured kit and landowner installing the structure. Structure must be installed to manufacturer's specifications.

Before Situation:

Cropland where extension of the growing season is needed. Additional resource concerns that may need to be addressed include soil erosion, soil condition, water quality, water quantity, and plant condition.

After Situation:

A high tunnel structure has been installed and he growing season has been extended for 1-4 months on average. Plant health and vigor has been improved.

Feature Measure: Area of Tunnel Installed

Scenario Unit: Square Feet

Scenario Typical Size: 2,160.0

Scenario Total Cost: $10,319.16

Scenario Cost/Unit: $4.78

Cost Details:

Component Name	ID	Description	Unit	Cost	QTY	Total
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.	Hours	$27.56	71	$1,956.76
Materials						
Hoop House, gothic style, base package	1278	Includes heavy-duty, gothic framework complete with all predrilled steel, hardware and instructions. Includes 6 mil 4-year polyethylene film to cover tunnel, roll-up sides, lumber, and polylock for sides and ends for a gothic style (peaked top) hoop house. Materials only, does not include labor.	Square Feet	$3.64	2160	$7,862.40
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.	Dollars	$1.00	500	$500.00

Practice: 326 - Clearing and Snagging

Scenario: #13 - Clearing and Snagging - Light

Scenario Description:

Removal of vegetation, logs, or other material that impedes the proper functioning on up to 200 linear feet of a stream channel or water course to restore flow capacity; prevent bank erosion by eddies; reduce the formation of sediment bars; and/or minimize blockages by debris. Addresses resource concerns such as water quantity and soil erosion-streambanks.

Before Situation:

Vegetation, logs, or other material provide a flow restriction or divert flowing water against the streambank causing excess erosion. Approximately one-third of the channel flow capacity is obstructed. The flow blockage may encourage depostion in the main channel and may alter the established flow channel.

After Situation:

Vegetation, logs, or other material have been removed to allow unrestricted flow in the channel and appurtenant structures. Material that poses no blockage threat is left in place to enhance aquatic habitat. Channel bed and banks are in equillibrium with the flow.

Feature Measure: Linear Feet

Scenario Unit: Feet

Scenario Typical Size: 200.0

Scenario Total Cost: $3,540.22

Scenario Cost/Unit: $17.70

Cost Details:

Component Name	ID	Description	Unit	Cost	QTY	Total
Equipment Installation						
Dozer, 80 HP	929	Track mounted Dozer with horsepower range of 60 to 90. Equipment and power unit costs. Labor not included.	Hours	$55.20	6	$331.20
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.	Hours	$109.36	6	$656.16
Chainsaw	937	Equipment and power unit costs. Labor not included.	Hours	$7.15	12	$85.80
Truck, dump, 8 CY	1401	Dump truck for moving bulk material. Typically capacity is 12 ton or 8 cubic yards. Includes equipment only.	Hours	$58.86	8	$470.88
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.	Hours	$27.56	16	$440.96
Equipment Operators, Light	232	Includes: Skid Steer Loaders, Hydraulic Excavators <50 HP, Trenchers <12 in., Ag Equipment <150 HP, Pickup Trucks, Forklifts, Mulchers	Hours	$27.87	24	$668.88
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.	Hours	$46.88	8	$375.04
Mobilization						
Mobilization, medium equipment	1139	Equipment with 70-150 HP or typical weights between 14,000 and 30,000 pounds.	Each	$255.65	2	$511.30

Practice: 326 - Clearing and Snagging

Scenario: #14 - Clearing and Snagging - Medium

Scenario Description:

Removal of vegetation, logs, or other material that impedes the proper functioning on 200 to 400 linear feet of a stream channel or water course to restore flow capacity; prevent bank erosion by eddies; reduce the formation of sediment bars; and/or minimize blockages by debris. Addresses resource concerns such as water quantity and soil erosion-streambanks.

Before Situation:

Vegetation, logs, or other material provide a flow restriction or divert flowing water against the streambank causing excess erosion. Approximately one-half of the channel flow capacity is obstructed. The flow blockage may encourage depostion in the main channel and may alter the established flow channel.

After Situation:

Vegetation, logs, or other material have been removed to allow unrestricted flow in the channel and appurtenant structures. Material that poses no blockage threat is left in place to enhance aquatic habitat. Channel bed and banks are in equillibrium with the flow.

Feature Measure: Linear Feet

Scenario Unit: Feet

Scenario Typical Size: 300.0

Scenario Total Cost: $5,186.40

Scenario Cost/Unit: $17.29

Cost Details:

Component Name	ID	Description	Unit	Cost	QTY	Total
Equipment Installation						
Dozer, 140 HP	927	Track mounted Dozer with horsepower range of 125 to 160. Equipment and power unit costs. Labor not included.	Hours	$104.83	10	$1,048.30
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.	Hours	$109.36	10	$1,093.60
Chainsaw	937	Equipment and power unit costs. Labor not included.	Hours	$7.15	20	$143.00
Truck, dump, 8 CY	1401	Dump truck for moving bulk material. Typically capacity is 12 ton or 8 cubic yards. Includes equipment only.	Hours	$58.86	10	$588.60
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.	Hours	$27.56	16	$440.96
Equipment Operators, Light	232	Includes: Skid Steer Loaders, Hydraulic Excavators <50 HP, Trenchers <12 in., Ag Equipment <150 HP, Pickup Trucks, Forklifts, Mulchers	Hours	$27.87	32	$891.84
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.	Hours	$46.88	10	$468.80
Mobilization						
Mobilization, medium equipment	1139	Equipment with 70-150 HP or typical weights between 14,000 and 30,000 pounds.	Each	$255.65	2	$511.30

Practice: 326 - Clearing and Snagging

Scenario: #15 - Clearing and Snagging - Heavy

Scenario Description:

Removal of vegetation, logs, or other material that impedes the proper functioning on over 400 linear feet of a stream channel or water course to restore flow capacity; prevent bank erosion by eddies; reduce the formation of sediment bars; and/or minimize blockages by debris. Addresses resource concerns such as water quantity and soil erosion-streambanks.

Before Situation:

Vegetation, logs, or other material provide a flow restriction or divert flowing water against the streambank causing excess erosion. Approximately two-thirds of the channel flow capacity is obstructed. The flow blockage may encourage depostion in the main channel and may alter the established flow channel.

After Situation:

Vegetation, logs, or other material have been removed to allow unrestricted flow in the channel and appurtenant structures. Material that poses no blockage threat is left in place to enhance aquatic habitat. Channel bed and banks are in equillibrium with the flow.

Feature Measure: Linear Feet

Scenario Unit: Feet

Scenario Typical Size: 400.0

Scenario Total Cost: $7,786.28

Scenario Cost/Unit: $19.47

Cost Details:

Component Name	ID	Description	Unit	Cost	QTY	Total
Equipment Installation						
Dozer, 140 HP	927	Track mounted Dozer with horsepower range of 125 to 160. Equipment and power unit costs. Labor not included.	Hours	$104.83	16	$1,677.28
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.	Hours	$109.36	16	$1,749.76
Chainsaw	937	Equipment and power unit costs. Labor not included.	Hours	$7.15	30	$214.50
Truck, dump, 8 CY	1401	Dump truck for moving bulk material. Typically capacity is 12 ton or 8 cubic yards. Includes equipment only.	Hours	$58.86	16	$941.76
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.	Hours	$27.56	30	$826.80
Equipment Operators, Light	232	Includes: Skid Steer Loaders, Hydraulic Excavators <50 HP, Trenchers <12 in., Ag Equipment <150 HP, Pickup Trucks, Forklifts, Mulchers	Hours	$27.87	40	$1,114.80
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.	Hours	$46.88	16	$750.08
Mobilization						
Mobilization, medium equipment	1139	Equipment with 70-150 HP or typical weights between 14,000 and 30,000 pounds.	Each	$255.65	2	$511.30

Practice: 327 - Conservation Cover

Scenario: #1 - Introduced Species

Scenario Description:

The land is covered with permanent non-native grass vegetation resulting in reduced soil erosion and water/sediment runoff, and the elimination of dust emissions which improves air quality significantly. Plants sown for conservation cover may provide cover for beneficial insects and wildlife. This scenario does not apply to plantings for forage production or to critical area plantings. Applies to conventional or organic systems.

Before Situation:

Crops such as corn, soybeans, or cotton may be conventionally or organically grown and harvested. Full width tillage is utilized, weeds controlled by cultivation and/or chemical application. Soil surface residue amounts average 10% or less. Soil erosion exceed allowable tolerance, sediment may be moving offsite into surface water degrading water quality. Soil quality (soil organic matter) declines over time as a result of tillage practices, low residue, and long periods of bare soil. Air quality may be impacted during field operations by the creation of particulates. The system provides little to no wildlife habitat.

After Situation:

The 327 Implementation Requirements have been developed for the site and applied. The land is covered with permanent non-native grass vegetation resulting in reduced soil erosion and water/sediment runoff, and the elimination of significant dust emissions which improves air quality. Plants sown for conservation cover may provide cover for beneficial insects and wildlife. This scenario does not apply to plantings for forage production or to critical area plantings.

Feature Measure: Area planted

Scenario Unit: Acres

Scenario Typical Size: 50.0

Scenario Total Cost: $8,385.00

Scenario Cost/Unit: $167.70

Cost Details:

Component Name	ID	Description	Unit	Cost	QTY	Total
Equipment Installation						
Tillage, Light	945	Includes light disking (tandem) or field cultivator. Includes equipment, power unit and labor costs.	Acres	$10.68	150	$1,602.00
Fertilizer, ground application, dry bulk	950	Dry bulk fertilizer application performed by ground equipment. Includes equipment, power unit and labor costs.	Acres	$6.63	50	$331.50
Mechanical weed control, Vegetation termination	957	Mechanical operations, Includes: Roller/crimper, mower, shredder, etc. Includes equipment, power unit and labor costs.	Acres	$20.46	50	$1,023.00
Seeding Operation, No Till/Grass Drill	960	No Till drill or grass drill for seeding. Includes equipment, power unit and labor costs.	Acres	$21.92	50	$1,096.00
Materials						
Nitrogen (N), Ammonium Nitrate	69	Price per pound of N supplied by Ammonium Nitrate. Price is not per pound of total product applied, no conversion is needed.	Pound	$0.63	2500	$1,575.00
Phosphorus, P2O5	73	Price per pound of P2O5 supplied by Superphosphate. Price is not per pound of total product applied, no conversion is needed.	Pound	$0.61	2000	$1,220.00
Introduced Perennial Grasses, Legumes and/or Forbs, Low Density	2747	Introduced perennial grasses, legumes, and/or forbs, may include a small percentage of annual species for establishment purposes and/or if allowed by the CPS. Planted at lower to medium density (40 pure live seeds/sq ft and less). Includes material and shipping.	Acres	$30.75	50	$1,537.50

Practice: 327 - Conservation Cover

Scenario: #2 - Native Species

Scenario Description:

This practice applies on land to be retired from agricultural production and on other lands needing permanent protective cover. This practice typically involves conversion from a clean-tilled (conventional tilled) intensive cropping system to permanent native vegetation (scenario includes native grass). The typical size of the practice is 50 acres. This practice scenario is typically used to reduce soil erosion, reduce soil quality degradation, improve water quality, develop wildlife habitat, and reduce air quality impacts. Applies to conventional or organic systems

Before Situation:

Crops such as corn, soybeans, or cotton may be conventionally or organically grown and harvested. Full width tillage is utilized, weeds controlled by cultivation and/or chemical application. Soil surface residue amounts average 10% or less. Soil erosion exceeds allowable tolerance, and sediment may be moving offsite into surface water degrading water quality. Soil quality (soil organic matter) declines over time as a result of tillage practices, low residue, and long periods of bare soil. Air quality may be impacted during field operations by the creation of particulates. The system provides little to no wildlife habitat.

After Situation:

The 327 Implementation Requirements have been developed for the site and applied. The land is covered with permanent native grass vegetation which reduces soil erosion and water/sediment runoff, and eliminates dust emissions which improves air quality. Plants sown for conservation cover may provide cover for beneficial insects and wildlife. This scenario does not apply to plantings for forage production or to critical area plantings.

Feature Measure: Area planted

Scenario Unit: Acres

Scenario Typical Size: 50.0

Scenario Total Cost: $10,310.50

Scenario Cost/Unit: $206.21

Cost Details:

Component Name	ID	Description	Unit	Cost	QTY	Total
Equipment Installation						
Tillage, Light	945	Includes light disking (tandem) or field cultivator. Includes equipment, power unit and labor costs.	Acres	$10.68	150	$1,602.00
Mechanical weed control, Vegetation termination	957	Mechanical operations, Includes: Roller/crimper, mower, shredder, etc. Includes equipment, power unit and labor costs.	Acres	$20.46	100	$2,046.00
Seeding Operation, No Till/Grass Drill	960	No Till drill or grass drill for seeding. Includes equipment, power unit and labor costs.	Acres	$21.92	50	$1,096.00
Materials						
Native Perennial Grasses, Low Density	2750	Native perennial grasses, may include a small percentage of annual species for establishment purposes and/or if allowed by the CPS. Planted at lower to medium density (40 pure live seeds/sq ft and less). Includes material and shipping.	Acres	$111.33	50	$5,566.50

Practice: 327 - Conservation Cover

Scenario: #3 - Orchard or Vineyard Alleyways

Scenario Description:

This practice applies on orchards and vineyards needing permanent protective cover in the alleyways between tree and vine rows. The typical size of this practice is 20 acres. This practice typically involves conversion from a clean-tilled (conventional tilled) intensive cropping system to permanent vegetation (scenario includes non-native grass and legume mix). This practice scenario is typically used to reduce soil erosion, reduce soil quality degradation, improve water quality, enhance wildlife and/or pollinator habitat, manage plant pests, and reduce air quality impacts. Typically 60% of the surface area is conservation cover per acre.

Before Situation:

Orchard or vineyard with bare soil between vine/tree rows. Bare soil is exposed to wind erosion and/or intense rainfall during the fall, winter, and early spring. Over the winter sediment/nutrient runoff from orchards/vineyards increases. Soil erosion exceeds tolerable levels. 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 long periods of bare soil. Little to no wildlife/pollinator habitat is present.

After Situation:

The 327 Implementation Requirements have been developed for the site and has been applied. Orchard or Vineyard area between vine/tree rows are planted with permanent introduced grass/legume mix. Area covered has reduced soil erosion, reduced water/sediment runoff, and improved air quality as a result of the elimination of significant amounts of dust emissions.. Plants sown for conservation cover may provide cover for beneficial insects, pollinators, and wildlife.

Feature Measure: Area planted

Scenario Unit: Acres

Scenario Typical Size: 20.0

Scenario Total Cost: $2,297.76

Scenario Cost/Unit: $114.89

Cost Details:

Component Name	ID	Description	Unit	Cost	QTY	Total
Equipment Installation						
Tillage, Light	945	Includes light disking (tandem) or field cultivator. Includes equipment, power unit and labor costs.	Acres	$10.68	24	$256.32
Fertilizer, ground application, dry bulk	950	Dry bulk fertilizer application performed by ground equipment. Includes equipment, power unit and labor costs.	Acres	$6.63	12	$79.56
Mechanical weed control, Vegetation termination	957	Mechanical operations, Includes: Roller/crimper, mower, shredder, etc. Includes equipment, power unit and labor costs.	Acres	$20.46	24	$491.04
Seeding Operation, No Till/Grass Drill	960	No Till drill or grass drill for seeding. Includes equipment, power unit and labor costs.	Acres	$21.92	12	$263.04
Materials						
Nitrogen (N), Ammonium Nitrate	69	Price per pound of N supplied by Ammonium Nitrate. Price is not per pound of total product applied, no conversion is needed.	Pound	$0.63	600	$378.00
Phosphorus, P2O5	73	Price per pound of P2O5 supplied by Superphosphate. Price is not per pound of total product applied, no conversion is needed.	Pound	$0.61	480	$292.80
Potassium, K2O	74	K2O supplied by Muriate Of Potash. Price is not per pound of total product applied, no conversion is needed.	Pound	$0.35	480	$168.00
Introduced Perennial Grasses, Legumes and/or Forbs, Low Density	2747	Introduced perennial grasses, legumes, and/or forbs, may include a small percentage of annual species for establishment purposes and/or if allowed by the CPS. Planted at lower to medium density (40 pure live seeds/sq ft and less). Includes material and shipping.	Acres	$30.75	12	$369.00

Practice: 327 - Conservation Cover

Scenario: #4 - Pollinator Species

Scenario Description:

Permanent vegetation, including a mix of native grasses, legumes, and forbs (mix may also include non-native species), established on any land needing permanent vegetative cover that provides habitat for pollinators. Typical practice size is variable depending on site; this scenario uses 1 ac as the typical size. In addition to providing pollinator habitat, this practice scenario may also reduce sheet, rill, and wind erosion, improve soil quality, improve water quality, and improve air quality. The practice may also provide wildlife habitat. Practice applicable on cropland, odd areas, corners, etc. Applies to conventional or organic systems.

Before Situation:

Crops such as corn, soybeans, or cotton may be conventionally or organically grown and harvested. Full width tillage is utilized, weeds controlled by cultivation and/or chemical application. Soil surface residue amounts average 10% or less. Erosion exceeds tolerable rates and sediment may be moving offsite into surface water degrading water quality. Soil quality (soil organic matter) declines over time as a result of tillage practices, low residue, and long periods of bare soil. Air quality may be impacted during field operations by the creation of particulates. The system provides little to no wildlife or pollinator habitat.

After Situation:

The 327 Implementation Requirements have been developed for the site and applied. Land is covered with permanent pollinator habitat including a mix of native grasses, legumes, forbs (mix may also include non-native species). This practice may also have reduced soil erosion, reduced water/sediment runoff, and improved air quality as a result of the elimination of dust emissions. Plants sown for pollinator habitat may also provide cover for beneficial insects and wildlife. This scenario does not apply to critical area plantings.

Feature Measure: Area planted

Scenario Unit: Acres

Scenario Typical Size: 1.0

Scenario Total Cost: $726.60

Scenario Cost/Unit: $726.60

Cost Details:

Component Name	ID	Description	Unit	Cost	QTY	Total
Equipment Installation						
Truck, Pickup	939	Equipment and power unit costs. Labor not included.	Hours	$24.18	1	$24.18
Tillage, Light	945	Includes light disking (tandem) or field cultivator. Includes equipment, power unit and labor costs.	Acres	$10.68	3	$32.04
Mechanical weed control, Vegetation termination	957	Mechanical operations, Includes: Roller/crimper, mower, shredder, etc. Includes equipment, power unit and labor costs.	Acres	$20.46	2	$40.92
Seeding Operation, No Till/Grass Drill	960	No Till drill or grass drill for seeding. Includes equipment, power unit and labor costs.	Acres	$21.92	1	$21.92
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.	Hours	$37.19	4	$148.76
Materials						
Native Perennial Grasses, Legumes and/or Forb Mix for Targeted Wildlife/Pollinator Habitat or Ecological Restoration, moderate commercial availability	2619	Diverse mix of native perennial grasses, legumes and forbs, less than 50% grasses, may include biennials and a small percentage of annual species for establishment purposes and/or if allowed by the CPS. This is a mix composed of species required to meet specific wildlife/pollinator habitat or ecological requirements. Seed is moderately easy to purchase commercially. Includes materials and shipping.	Acres	$458.78	1	$458.78

Practice: 327 - Conservation Cover

Scenario: #22 - Monarch Species Mix

Scenario Description:

Establish permanent vegetative cover for pollinator habitat according to state specifications. Typically used for high quality nectar and pollen species. Assumes seed/plugs, equipment and labor for seed bed prep/planting, and weed management during establishment. Used for conventional or organic land on small, intensive areas that are central to specialty crop production. Not typically used for large-scale plantings. This is applicable to both organic and non-organic conditions.

Before Situation:

Old hayfields that are mowed typically in the fall lack milkweed needed for monarchs. Other crops such as corn, soybeans, or cotton are conventionally grown and harvested. The system provides little to no wildlife or pollinator habitat.

After Situation:

The 327 Implementation Requirements have been developed and applied for the site. Land covered with permanent monarch habitat including a mix of milkweed species, native grasses, legumes, and forbs. Plants sown for monarch habitat may also provide cover for beneficial insects and wildlife.

Feature Measure: area planted

Scenario Unit: Acres

Scenario Typical Size: 1.0

Scenario Total Cost: $910.11

Scenario Cost/Unit: $910.11

Cost Details:

Component Name	ID	Description	Unit	Cost	QTY	Total
Equipment Installation						
Truck, Pickup	939	Equipment and power unit costs. Labor not included.	Hours	$24.18	1	$24.18
Tillage, Light	945	Includes light disking (tandem) or field cultivator. Includes equipment, power unit and labor costs.	Acres	$10.68	3	$32.04
Mechanical weed control, Vegetation termination	957	Mechanical operations, Includes: Roller/crimper, mower, shredder, etc. Includes equipment, power unit and labor costs.	Acres	$20.46	2	$40.92
Seeding Operation, No Till/Grass Drill	960	No Till drill or grass drill for seeding. Includes equipment, power unit and labor costs.	Acres	$21.92	1	$21.92
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.	Hours	$37.19	4	$148.76
Materials						
Native Perennial Grasses, Legumes and/or Forb Mix for Targeted Wildlife/Pollinator Habitat or Ecological Restoration, moderate commercial availability	2619	Diverse mix of native perennial grasses, legumes and forbs, less than 50% grasses, may include biennials and a small percentage of annual species for establishment purposes and/or if allowed by the CPS. This is a mix composed of species required to meet specific wildlife/pollinator habitat or ecological requirements. Seed is moderately easy to purchase commercially. Includes materials and shipping.	Acres	$458.78	1.4	$642.29

Practice: 327 - Conservation Cover

Scenario: #35 - Introduced with Forgone Income

Scenario Description:

This practice applies on organically managed land needing permanent protective cover. This practice typically involves conversion from an intensive organic cropping system to permanent non-native vegetation (scenario includes non-native grass/legume mix). The typical size of the practice is 20 acres. This practice scenario is typically used to reduce soil erosion, reduce soil quality degradation, improve water quality, develop wildlife habitat, and reduce air quality impacts.

Before Situation:

Crops such as vegetables and small fruit crops are organically grown and harvested. Full width tillage is utilized, weeds controlled mainly by cultivation. Soil surface residue amounts average 10% or less. Erosion exceeds tolerable rates and sediment may be moving offsite into surface water degrading water quality. Soil quality (soil organic matter) declines over time as a result of tillage practices, low residue, and long periods of bare soil. Air quality may be impacted during field operations by the creation of particulates. The system provides little to no wildlife habitat.

After Situation:

The 327 Implementation Requirements have been developed for the site and has been applied. Organically managed land covered with permanent non- native grass/legume mix vegetation has reduced soil erosion, reduced water/sediment runoff, and improved air quality due to the elimination of dust emissions. . Plants sown for conservation cover may provide cover for beneficial insects and wildlife. This scenario does not apply to plantings for forage production or to critical area plantings.

Feature Measure: Area planted

Scenario Unit: Acres

Scenario Typical Size: 50.0

Scenario Total Cost: $20,512.00

Scenario Cost/Unit: $410.24

Cost Details:

Component Name	ID	Description	Unit	Cost	QTY	Total
Equipment Installation						
Tillage, Light	945	Includes light disking (tandem) or field cultivator. Includes equipment, power unit and labor costs.	Acres	$10.68	150	$1,602.00
Fertilizer, ground application, dry bulk	950	Dry bulk fertilizer application performed by ground equipment. Includes equipment, power unit and labor costs.	Acres	$6.63	50	$331.50
Mechanical weed control, Vegetation termination	957	Mechanical operations, Includes: Roller/crimper, mower, shredder, etc. Includes equipment, power unit and labor costs.	Acres	$20.46	50	$1,023.00
Seeding Operation, No Till/Grass Drill	960	No Till drill or grass drill for seeding. Includes equipment, power unit and labor costs.	Acres	$21.92	50	$1,096.00
Foregone Income						
FI, Corn Dryland	1959	Dryland Corn is Primary Crop	Acres	$270.47	50	$13,523.50
Materials						
Nitrogen, Organic	266	ORGANIC Nitrogen	Pound	$0.24	2500	$600.00
Phosphorus, Organic	267	ORGANIC Phosphorus	Pound	$0.07	2000	$140.00
Introduced Perennial Grasses, Legumes and/or Forbs, Medium Density	2748	Introduced perennial grasses, legumes, and/or forbs, may include a small percentage of annual species for establishment purposes and/or if allowed by the CPS. Planted at medium to higher density (41-60 pure live seeds/sq ft). Includes material and shipping.	Acres	$43.92	50	$2,196.00

Practice: 327 - Conservation Cover

Scenario: #36 - Native Species with Forgone Income

Scenario Description:

This practice applies on conventional or organically managed land needing permanent protective cover. This practice typically involves conversion from an intensive cropping system to permanent native vegetation (scenario includes native grass/legume mix). The typical size of the practice is 50 acres. This practice scenario is typically used to reduce soil erosion, reduce soil quality degradation, improve water quality, develop wildlife habitat, and reduce air quality impacts. Applies to conventional or organic systems.

Before Situation:

Crops such as vegetables and small fruit crops may be conventionally or organically grown and harvested. Full width tillage is utilized, weeds controlled mainly by cultivation. Soil surface residue amounts average 10% or less. Soil erosion exceeds tolerable rates and sediment may be moving offsite into surface water degrading water quality. Soil quality (soil organic matter) declines over time as a result of tillage practices, low residue, and long periods of bare soil. Air quality may be impacted during field operations by the creation of particulates. The system provides little to no wildlife habitat.

After Situation:

The 327 Implementation Requirements have been developed for the site and applied. Managed land covered with permanent native grass/legume mix vegetation has reduced soil erosion, reduced water/sediment runoff, and improved air quality due to the elimination of dust emissions. Plants sown for conservation cover may provide cover for beneficial insects and wildlife. This scenario does not apply to plantings for forage production or to critical area plantings.

Feature Measure: Area planted

Scenario Unit: Acres

Scenario Typical Size: 50.0

Scenario Total Cost: $23,834.00

Scenario Cost/Unit: $476.68

Cost Details:

Component Name	ID	Description	Unit	Cost	QTY	Total
Equipment Installation						
Tillage, Light	945	Includes light disking (tandem) or field cultivator. Includes equipment, power unit and labor costs.	Acres	$10.68	150	$1,602.00
Mechanical weed control, Vegetation termination	957	Mechanical operations, Includes: Roller/crimper, mower, shredder, etc. Includes equipment, power unit and labor costs.	Acres	$20.46	100	$2,046.00
Seeding Operation, No Till/Grass Drill	960	No Till drill or grass drill for seeding. Includes equipment, power unit and labor costs.	Acres	$21.92	50	$1,096.00
Foregone Income						
FI, Corn Dryland	1959	Dryland Corn is Primary Crop	Acres	$270.47	50	$13,523.50
Materials						
Native Perennial Grasses, Low Density	2750	Native perennial grasses, may include a small percentage of annual species for establishment purposes and/or if allowed by the CPS. Planted at lower to medium density (40 pure live seeds/sq ft and less). Includes material and shipping.	Acres	$111.33	50	$5,566.50

Practice: 327 - Conservation Cover

Scenario: #37 - Pollinator Species with Forgone Income

Scenario Description:

Permanent vegetation, including a mix of native grasses, legumes, and forbs (mix may also include non-native species), established on land needing permanent vegetative cover that provides habitat for pollinators. Typical practice size is variable depending on site; this scenario uses 1 ac as the typical size. In addition to providing pollinator habitat, this practice scenario may also reduce sheet and rill erosion, improve soil quality, improve water quality, and improve air quality. The practice may also provide wildlife habitat. Practice applicable on cropland, odd areas, corners, etc. Applies to conventional or organic systems.

Before Situation:

Crops such as vegetables and small fruit crops may be conventionally or organically grown and harvested. Full width tillage is utilized, weeds controlled mainly by cultivation. Soil surface residue amounts average 10% or less. Soil erosion exceeds tolerable rates and sediment may be moving offsite into surface water degrading water quality. Soil quality (soil organic matter) declines over time as a result of tillage practices, low residue, and long periods of bare soil. Air quality may be impacted during field operations by the creation of particulates. The system provides little to no wildlife or pollinator habitat.

After Situation:

The 327 Implementation Requirements have been developed for the site and applied. Managed land covered with permanent pollinator habitat including a mix of native grasses, legumes, and forbs (mix may also include non-native species). This practice may also reduce soil erosion, reduce water/sediment runoff, and improve air quality due to the elimination of dust emissions. Plants sown for pollinator habitat may also provide cover for beneficial insects and wildlife. This scenario does not apply to critical area plantings.

Feature Measure: Area planted

Scenario Unit: Acres

Scenario Typical Size: 1.0

Scenario Total Cost: $1,053.52

Scenario Cost/Unit: $1,053.52

Cost Details:

Component Name	ID	Description	Unit	Cost	QTY	Total
Equipment Installation						
Tillage, Light	945	Includes light disking (tandem) or field cultivator. Includes equipment, power unit and labor costs.	Acres	$10.68	3	$32.04
Mechanical weed control, Vegetation termination	957	Mechanical operations, Includes: Roller/crimper, mower, shredder, etc. Includes equipment, power unit and labor costs.	Acres	$20.46	2	$40.92
Seeding Operation, No Till/Grass Drill	960	No Till drill or grass drill for seeding. Includes equipment, power unit and labor costs.	Acres	$21.92	1	$21.92
Foregone Income						
FI, Corn Dryland	1959	Dryland Corn is Primary Crop	Acres	$270.47	1	$270.47
Materials						
Native Perennial Grasses, Legumes and/or Forb Mix for Targeted Wildlife/Pollinator Habitat or Ecological Restoration, moderate commercial availability	2619	Diverse mix of native perennial grasses, legumes and forbs, less than 50% grasses, may include biennials and a small percentage of annual species for establishment purposes and/or if allowed by the CPS. This is a mix composed of species required to meet specific wildlife/pollinator habitat or ecological requirements. Seed is moderately easy to purchase commercially. Includes materials and shipping.	Acres	$458.78	1.5	$688.17

Practice: 328 - Conservation Crop Rotation

Scenario: #1 - Basic Rotation Organic and Non-Organic

Scenario Description:

In this region this practice may be part of a conservation management system on both organic and non-organic operations to: 1) Reduce sheet, rill and wind erosion, 2) Maintain or increase soil health and organic matter content, 3) Reduce water quality degradation due to excess nutrients, 4) Improve soil moisture efficiency, 5) Reduce the concentration of salts and other chemicals from saline seeps, 6) Reduce plant pest pressures, 7) Provide feed and forage for domestic livestock, and 8) Provide food and cover habitat for wildlife, including pollinator forage, and nesting. This practice payment is provided to the producer for the time needed to plan and implement the logistics of changing the rotation to effectively implement a conservation crop rotation on a typical 200 acre cropland farm. No foregone income. Cost represents typical situations for conventional and organic producers.

Before Situation:

The rotation consists primarily of low residue producing row crops. Fields range from nearly flat to C and D slopes. Erosion, soil quality, and pest management are the primary concerns.

After Situation:

A rotation is established that provides additional high residue and/or perennial crops that may treat one or more of the following purposes: reduce sheet, rill and wind erosion, maintain or increase soil health and organic matter content, reduce water quality degradation due to excess nutrients, improve soil moisture efficiency, reduce the concentration of salts and other chemicals from saline seeps, reduce plant pest pressures, provide feed and forage for domestic livestock, or provide food and cover habitat for wildlife, including pollinator forage, and nesting.

Feature Measure: Area planted

Scenario Unit: Acres

Scenario Typical Size: 100.0

Scenario Total Cost: $1,406.40

Scenario Cost/Unit: $14.06

Cost Details:

Component Name	ID	Description	Unit	Cost	QTY	Total
Labor						
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.	Hours	$46.88	30	$1,406.40

Practice: 328 - Conservation Crop Rotation

Scenario: #5 - Specialty Crops Organic and Non-Organic

Scenario Description:

In this region a rotation of organic or non-organic specialty crops (fruits and vegetable) are produced as part of a conservation management system to treat one or more of the following resource concerns: 1) Reduce sheet, rill and wind erosion, 2) Maintain or increase soil health and organic matter content, 3) Reduce water quality degradation due to excess nutrients, 4) Improve soil moisture efficiency, 5) Reduce the concentration of salts and other chemicals from saline seeps, 6) Reduce plant pest pressures, 7) Provide feed and forage for domestic livestock, and 8) Provide food and cover habitat for wildlife, including pollinator forage, and nesting. This practice payment is provided to acquire the technical knowledge and skills necessary to effectively implement a conservation crop rotation on a typical 50 acre specialty crop farm. No foregone income. Cost represents typical situations for organic and non-organic producers.

Before Situation:

This rotation consisted of growing specialty crops. Fields range from nearly flat to B and C slopes. Erosion, soil quality, and pest management are the primary concerns.

After Situation:

The rotation established adds higher residue crop(s) to the rotation that will treat one or more of the following resource concerns on organic and non- organic farms: 1) Reduce sheet, rill and wind erosion, 2) Maintain or increase soil health and organic matter content, 3) Reduce water quality degradation due to excess nutrients, 4) Improve soil moisture efficiency, 5) Reduce the concentration of salts and other chemicals from saline seeps, 6) Reduce plant pest pressures, 7) Provide feed and forage for domestic livestock, and 8) Provide food and cover habitat for wildlife, including pollinator forage, and nesting.

Feature Measure: Area planted

Scenario Unit: Acres

Scenario Typical Size: 50.0

Scenario Total Cost: $1,875.20

Scenario Cost/Unit: $37.50

Cost Details:

Component Name	ID	Description	Unit	Cost	QTY	Total
Labor						
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.	Hours	$46.88	40	$1,875.20

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 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 establish and harvest crops. 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 non-tillage types of weed control and may also include a period of no till fallow. System is applicable in both irrigated and non-irrigated fields of organic and non-organic operations.

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, seedbed preparation 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. 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:

The Implementation Requirements for 329 Residue Management, No Till is prepared and installed. 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.

Feature Measure: Area planted

Scenario Unit: Acres

Scenario Typical Size: 100.0

Scenario Total Cost: $2,192.00

Scenario Cost/Unit: $21.92

Cost Details:

Component Name	ID	Description	Unit	Cost	QTY	Total
Equipment Installation						
Seeding Operation, No Till/Grass Drill	960	No Till drill or grass drill for seeding. Includes equipment, power unit and labor costs.	Acres	$21.92	100	$2,192.00

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 by following the Agronomy Technical Note 10 - Adaptive Management.

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. Any crop residue that is present degrades and sediment/nutrient runoff from fields increases during rainfall events. Sheet and rill erosion exceeds soil loss tolerances. 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:

Implementation Requirements are prepared and an Adaptive Management Plan for the plots is developed and implemented. 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 10 - Adaptive Management Process. 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 10 - Adaptive Management. The yields for each plot will be adjusted to the appropriate moisture content. This would be repeated for 3 years.

Feature Measure: Based on 15 acre plots

Scenario Unit: Each

Scenario Typical Size: 1.0

Scenario Total Cost: $3,468.10

Scenario Cost/Unit: $3,468.10

Cost Details:

Component Name	ID	Description	Unit	Cost	QTY	Total
Equipment Installation						
Seeding Operation, No Till/Grass Drill	960	No Till drill or grass drill for seeding. Includes equipment, power unit and labor costs.	Acres	$21.92	7.5	$164.40
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.	Acres	$19.48	7.5	$146.10
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.	Hours	$27.56	40	$1,102.40
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.	Hours	$102.76	20	$2,055.20

Practice: 330 - Contour Farming

Scenario: #1 - Contour Farming

Scenario Description:

This scenario meets the specifications of the NRCS Contour Farming Standard. This scenario applies to fields greater than 5 acres. Payment reflects the extra labor and initial supervision costs in laying out and implementing contour farming. Annual erosion rates for the rotation exceeds tolerance levels. Excessive runoff leads to sedimentation of waterways

Before Situation:

The typical field size in this geographical region for this scenario is 30 acres. The field slope averages 6% while the slope length averages 160 feet. All farming operations on this cropland field including disking, bedding, planting, and cultivation are performed generally up and down the slope. Annual erosion rates for the rotation exceeds tolerance levels. Excessive runoff leads to sedimentation of waterways.

After Situation:

Implementation Requirements are prepared and implemented according to 330 Contour Farming. This practice is installed on the entire field. A survey is completed by trained and certified Federal, State, local personnel or consultant to determine and "stake" contour row arrangement. Permanent row markers are established to ensure that this practice is maintained for the life of this practice. All field operations including disking, bedding, planting, and cultivation are performed on the contour which is near perpendicular to the field slope. The farm manager is initially on site to ensure that equipment operators are properly following contour methods. Soil erosion rates are reduced by nearly half and may be below tolerance depending on the rotation. Likewise, sedimentation has been significantly reduced.

Feature Measure: acre

Scenario Unit: Acres

Scenario Typical Size: 30.0

Scenario Total Cost: $304.17

Scenario Cost/Unit: $10.14

Cost Details:

Component Name	ID	Description	Unit	Cost	QTY	Total
Equipment Installation						
Truck, Pickup	939	Equipment and power unit costs. Labor not included.	Hours	$24.18	1	$24.18
Labor						
Equipment Operators, Light	232	Includes: Skid Steer Loaders, Hydraulic Excavators <50 HP, Trenchers <12 in., Ag Equipment <150 HP, Pickup Trucks, Forklifts, Mulchers	Hours	$27.87	5	$139.35
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.	Hours	$46.88	3	$140.64

Practice: 331 - Contour Orchard and Other Perennial Crops

Scenario: #1 - Contour Orchards/Vineyards

Scenario Description:

This scenario meets the specifications of the NRCS 331 Contour Orchards and Perennial Crops Standard. This scenario applies to fields greater than 5 acres. Payment reflects the extra labor and initial supervision costs in implementing and following contour operations compared to other methods. More time is usually needed when following contour operations due to more equipment time in shorter rows and more equipment turning. Annual erosion rates for the rotation exceeds tolerance levels. Excessive runoff leads to sedimentation of waterways.

Before Situation:

The typical field size in this geographical region for this scenario is 10 acres. The field slope averages 6% while the slope length averages 160 feet. All farming operations are performed up and down the slope. Annual erosion rates for the rotation exceeds tolerance levels. Excessive runoff leads to sedimentation of waterways.

After Situation:

Implementation Requirements are prepared and implemented according to the Contour Orchards and Perennial Crops Standard (331). This practice is installed on the entire field. All field operations including: harvesting, disking, bedding, and planting are performed on the contour which is near perpendicular to the field slope. The farm manager is initially on site to ensure that equipment operators are properly following contour methods. Soil erosion rates are reduced to tolerable soil loss levels. Likewise, sedimentation has be significantly reduced.

Feature Measure: acre

Scenario Unit: Acres

Scenario Typical Size: 10.0

Scenario Total Cost: $304.17

Scenario Cost/Unit: $30.42

Cost Details:

Component Name	ID	Description	Unit	Cost	QTY	Total
Equipment Installation						
Truck, Pickup	939	Equipment and power unit costs. Labor not included.	Hours	$24.18	1	$24.18
Labor						
Equipment Operators, Light	232	Includes: Skid Steer Loaders, Hydraulic Excavators <50 HP, Trenchers <12 in., Ag Equipment <150 HP, Pickup Trucks, Forklifts, Mulchers	Hours	$27.87	5	$139.35
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.	Hours	$46.88	3	$140.64

Practice: 332 - Contour Buffer Strips

Scenario: #21 - Native Species, Foregone Income (Organic and Non-organic)

Scenario Description:

Narrow strips of permanent, herbaceous vegetative cover established around the hill slope and alternated down the slope with wider cropped strips in between that are organically or non-organically farmed on the contour. This practice applies to all cropland. Practice includes seedbed prep and planting of native species. The area of the contour grass strip is taken out of production.

Before Situation:

The NRCS water erosion prediction software indicates that there is a significant amount of sheet and rill erosion and/or a significant amount of sediment potentially delivered to the downslope edge of the field. A secondary concern is that there may not be enough wildlife/pollinator habitat, food source or refugia in the field or farm.

After Situation:

Native grasses, legumes and forbs will be established in strips in the field to meet the Contour buffer Strips (332) criteria, resource needs, and producer objectives. Minimum widths shall be based on NRCS local design criteria specific to the purpose for installing the practice. Native species shall be selected that do not function as a host for diseases of a field crop and have physical characteristics necessary to control water erosion to tolerable levels in the cropped area of the field.

Feature Measure: number of acres

Scenario Unit: Acres

Scenario Typical Size: 1.0

Scenario Total Cost: $418.73

Scenario Cost/Unit: $418.73

Cost Details:

Component Name	ID	Description	Unit	Cost	QTY	Total
Equipment Installation						
Chemical, ground application	948	Chemical application performed by ground equipment. Includes equipment, power unit and labor costs.	Acres	$5.80	1	$5.80
Seeding Operation, No Till/Grass Drill	960	No Till drill or grass drill for seeding. Includes equipment, power unit and labor costs.	Acres	$21.92	1	$21.92
Foregone Income						
FI, Corn Dryland	1959	Dryland Corn is Primary Crop	Acres	$270.47	1	$270.47
Materials						
Herbicide, Glyphosate	334	A broad-spectrum, non-selective systemic herbicide. Refer to WIN-PST for product names and active ingredients. Includes materials and shipping only.	Acres	$9.21	1	$9.21
Native Perennial Grasses, Low Density	2750	Native perennial grasses, may include a small percentage of annual species for establishment purposes and/or if allowed by the CPS. Planted at lower to medium density (40 pure live seeds/sq ft and less). Includes material and shipping.	Acres	$111.33	1	$111.33

Practice: 332 - Contour Buffer Strips

Scenario: #22 - Introduced Species, Foregone Income (Organic and Non-Organic)

Scenario Description:

Narrow strips of permanent, herbaceous vegetative cover established around the hill slope and alternated down the slope with wider cropped strips in between that are farmed on the contour. This practice applies to all cropland. Practice includes seedbed prep and planting of native species. The area of the contour grass strip is taken out of production. This applies to both organic and non-organic.

Before Situation:

The NRCS water erosion prediction software indicates that there is a significant amount of sheet and rill erosion and/or a significant amount of sediment potentially delivered to the downslope edge of the field. A secondary concern is that there may not be enough wildlife/pollinator habitat, food source or refugia in the field or farm.

After Situation:

Introduced grasses and legumes will be established in strips in the field to meet the Contour buffer Strips (332) criteria, resource needs, and producer objectives. Minimum widths shall be based on NRCS local design criteria specific to the purpose for installing the practice. Introduced species shall be selected that do not function as a host for diseases of a field crop and have physical characteristics necessary to control water erosion to tolerable levels in the cropped area of the field.

Feature Measure: Number of acres

Scenario Unit: Acres

Scenario Typical Size: 1.0

Scenario Total Cost: $390.62

Scenario Cost/Unit: $390.62

Cost Details:

Component Name	ID	Description	Unit	Cost	QTY	Total
Equipment Installation						
Chemical, ground application	948	Chemical application performed by ground equipment. Includes equipment, power unit and labor costs.	Acres	$5.80	1	$5.80
Seeding Operation, No Till/Grass Drill	960	No Till drill or grass drill for seeding. Includes equipment, power unit and labor costs.	Acres	$21.92	1	$21.92
Foregone Income						
FI, Corn Dryland	1959	Dryland Corn is Primary Crop	Acres	$270.47	1	$270.47
Materials						
Nitrogen (N), Urea	71	Price per pound of N supplied by Urea. Price is not per pound of total product applied, no conversion is needed.	Pound	$0.47	30	$14.10
Phosphorus, P2O5	73	Price per pound of P2O5 supplied by Superphosphate. Price is not per pound of total product applied, no conversion is needed.	Pound	$0.61	20	$12.20
Sulfate of Potash	263	Approved for Organic Systems - Muriate of Potash	Pound	$0.65	20	$13.00
Herbicide, Glyphosate	334	A broad-spectrum, non-selective systemic herbicide. Refer to WIN-PST for product names and active ingredients. Includes materials and shipping only.	Acres	$9.21	1	$9.21
Introduced Perennial Grasses, Legumes and/or Forbs, Medium Density	2748	Introduced perennial grasses, legumes, and/or forbs, may include a small percentage of annual species for establishment purposes and/or if allowed by the CPS. Planted at medium to higher density (41-60 pure live seeds/sq ft). Includes material and shipping.	Acres	$43.92	1	$43.92

Practice: 332 - Contour Buffer Strips

Scenario: #23 - Wildlife/Pollinator, Foregone Income (Organic and Non-Organic)

Scenario Description:

Narrow strips of permanent, herbaceous vegetative cover established around the hill slope and alternated down the slope with wider cropped strips in between that are farmed on the contour. This practice applies to all cropland. Practice includes seedbed prep and planting of mainly pollinator friendly species. The area of the field border is taken out of production. This applies to organic and no-organic.

Before Situation:

Water Erosion Calculator (e.g. RUSLE2) indicates that there is a significant amount of sheet and rill erosion and/or a significant amount of sediment potentially delivered to the downslope edge of the field. A secondary concern is that there may not be enough wildlife/pollinator habitat, food source or refugia in the field or farm.

After Situation:

Plant species will be established in strips in the field to meet the Contour buffer Strips (332) criteria, resource needs, producer objectives, and the targeted wildlife/pollinators necessary food and/or cover. Minimum widths shall be based on NRCS local design criteria specific to the purpose for installing the practice. Species selected shall meet the wildlife/pollinator habitat requirements of the state and be adapted to site; not function as a host for diseases of a field crop and; have physical characteristics necessary to control sheet and rill erosion to tolerable levels on the cropped area of the field.

Feature Measure: Number of acres

Scenario Unit: Acres

Scenario Typical Size: 1.0

Scenario Total Cost: $418.73

Scenario Cost/Unit: $418.73

Cost Details:

Component Name	ID	Description	Unit	Cost	QTY	Total
Equipment Installation						
Chemical, ground application	948	Chemical application performed by ground equipment. Includes equipment, power unit and labor costs.	Acres	$5.80	1	$5.80
Seeding Operation, No Till/Grass Drill	960	No Till drill or grass drill for seeding. Includes equipment, power unit and labor costs.	Acres	$21.92	1	$21.92
Foregone Income						
FI, Corn Dryland	1959	Dryland Corn is Primary Crop	Acres	$270.47	1	$270.47
Materials						
Herbicide, Glyphosate	334	A broad-spectrum, non-selective systemic herbicide. Refer to WIN-PST for product names and active ingredients. Includes materials and shipping only.	Acres	$9.21	1	$9.21
Native Perennial Grasses, Low Density	2750	Native perennial grasses, may include a small percentage of annual species for establishment purposes and/or if allowed by the CPS. Planted at lower to medium density (40 pure live seeds/sq ft and less). Includes material and shipping.	Acres	$111.33	1	$111.33

Practice: 332 - Contour Buffer Strips

Scenario: #24 - Native, Foregone Income-High Value Cropland

Scenario Description:

Narrow strips of permanent, herbaceous vegetative cover established around the hill slope and alternated down the slope with wider cropped strips in between that are farmed on the contour. This practice applies to all cropland. Practice includes seedbed prep and planting of native species. The area of the contour buffer strips is taken out of production.

Before Situation:

The NRCS water erosion prediction software indicates that there is a significant amount of sheet and rill erosion and/or a significant amount of sediment potentially delivered to the downslope edge of the field. Specialty crops for market are produced on this acreage. A secondary concern is that there may not be enough wildlife/pollinator habitat, food source or refugia in the field or farm.

After Situation:

Native grasses, legumes and forbs will be established in strips in the field to meet the Contour buffer Strips (332) criteria, resource needs, and producer objectives. Minimum widths shall be based on NRCS local design criteria specific to the purpose for installing the practice. Native species shall be selected that do not function as a host for diseases of a field crop and have physical characteristics necessary to control water erosion to tolerable levels in the cropped area of the field.

Feature Measure: number of acres

Scenario Unit: Acres

Scenario Typical Size: 1.0

Scenario Total Cost: $1,372.57

Scenario Cost/Unit: $1,372.57

Cost Details:

Component Name	ID	Description	Unit	Cost	QTY	Total
Equipment Installation						
Chemical, ground application	948	Chemical application performed by ground equipment. Includes equipment, power unit and labor costs.	Acres	$5.80	1	$5.80
Seeding Operation, No Till/Grass Drill	960	No Till drill or grass drill for seeding. Includes equipment, power unit and labor costs.	Acres	$21.92	1	$21.92
Foregone Income						
FI, Vegetables	2033	Vegetables is Primary Crop	Acres	$1,224.31	1	$1,224.31
Materials						
Herbicide, Glyphosate	334	A broad-spectrum, non-selective systemic herbicide. Refer to WIN-PST for product names and active ingredients. Includes materials and shipping only.	Acres	$9.21	1	$9.21
Native Perennial Grasses, Low Density	2750	Native perennial grasses, may include a small percentage of annual species for establishment purposes and/or if allowed by the CPS. Planted at lower to medium density (40 pure live seeds/sq ft and less). Includes material and shipping.	Acres	$111.33	1	$111.33

Practice: 332 - Contour Buffer Strips

Scenario: #25 - Introduced-High Value Cropland

Scenario Description:

Narrow strips of permanent, herbaceous vegetative cover established around the hill slope and alternated down the slope with wider cropped strips in between that are farmed on the contour. This practice applies to all cropland. Practice includes seedbed prep and planting of mainly introduced species. The area of the field border is taken out of production.

Before Situation:

The NRCS water erosion prediction software indicates that there is a significant amount of sheet and rill erosion and/or a significant amount of sediment potentially delivered to the downslope edge of the field. Specialty crops for market are grown in this field. A secondary concern is that there may not be enough wildlife/pollinator habitat, food source or refugia in the field or farm.

After Situation:

Introduced grasses and legumes will be established in strips in the field to meet the Contour buffer Strips (332) criteria, resource needs, and producer objectives. Minimum widths shall be based on NRCS local design criteria specific to the purpose for installing the practice. Introduced species shall be selected that do not function as a host for diseases of a field crop and have physical characteristics necessary to control water erosion to tolerable levels in the cropped area of the field.

Feature Measure: Number of acres

Scenario Unit: Acres

Scenario Typical Size: 1.0

Scenario Total Cost: $1,344.46

Scenario Cost/Unit: $1,344.46

Cost Details:

Component Name	ID	Description	Unit	Cost	QTY	Total
Equipment Installation						
Chemical, ground application	948	Chemical application performed by ground equipment. Includes equipment, power unit and labor costs.	Acres	$5.80	1	$5.80
Seeding Operation, No Till/Grass Drill	960	No Till drill or grass drill for seeding. Includes equipment, power unit and labor costs.	Acres	$21.92	1	$21.92
Foregone Income						
FI, Vegetables	2033	Vegetables is Primary Crop	Acres	$1,224.31	1	$1,224.31
Materials						
Nitrogen (N), Urea	71	Price per pound of N supplied by Urea. Price is not per pound of total product applied, no conversion is needed.	Pound	$0.47	30	$14.10
Phosphorus, P2O5	73	Price per pound of P2O5 supplied by Superphosphate. Price is not per pound of total product applied, no conversion is needed.	Pound	$0.61	20	$12.20
Sulfate of Potash	263	Approved for Organic Systems - Muriate of Potash	Pound	$0.65	20	$13.00
Herbicide, Glyphosate	334	A broad-spectrum, non-selective systemic herbicide. Refer to WIN-PST for product names and active ingredients. Includes materials and shipping only.	Acres	$9.21	1	$9.21
Introduced Perennial Grasses, Legumes and/or Forbs, Medium Density	2748	Introduced perennial grasses, legumes, and/or forbs, may include a small percentage of annual species for establishment purposes and/or if allowed by the CPS. Planted at medium to higher density (41-60 pure live seeds/sq ft). Includes material and shipping.	Acres	$43.92	1	$43.92

Practice: 332 - Contour Buffer Strips

Scenario: #26 - Wildlife/Pollinator-High Value Cropland

Scenario Description:

Narrow strips of permanent, herbaceous vegetative cover established around the hill slope and alternated down the slope with wider cropped strips in between that are farmed on the contour. This practice applies to all cropland. Practice includes seedbed prep and planting of mainly pollinator friendly species. The area of the field border is taken out of production.

Before Situation:

The NRCS water erosion prediction software indicates that there is a significant amount of sheet and rill erosion and/or a significant amount of sediment potentially delivered to the downslope edge of the field. Specialty crops for market are grown in this field. A secondary concern is that there may not be enough wildlife/pollinator habitat, food source or refugia in the field or farm.

After Situation:

Introduced grasses and legumes will be established in strips in the field to meet the Contour buffer Strips (332) criteria, resource needs, and producer objectives. Minimum widths shall be based on NRCS local design criteria specific to the purpose for installing the practice. Species selected shall meet the wildlife/pollinator habitat requirements of the state and be adapted to the site; not function as a host for diseases of a field crop and; have physical characteristics necessary to control sheet and rill erosion to tolerable levels on the cropped area of the field.

Feature Measure: Number of acres

Scenario Unit: Acres

Scenario Typical Size: 1.0

Scenario Total Cost: $1,372.57

Scenario Cost/Unit: $1,372.57

Cost Details:

Component Name	ID	Description	Unit	Cost	QTY	Total
Equipment Installation						
Chemical, ground application	948	Chemical application performed by ground equipment. Includes equipment, power unit and labor costs.	Acres	$5.80	1	$5.80
Seeding Operation, No Till/Grass Drill	960	No Till drill or grass drill for seeding. Includes equipment, power unit and labor costs.	Acres	$21.92	1	$21.92
Foregone Income						
FI, Vegetables	2033	Vegetables is Primary Crop	Acres	$1,224.31	1	$1,224.31
Materials						
Herbicide, Glyphosate	334	A broad-spectrum, non-selective systemic herbicide. Refer to WIN-PST for product names and active ingredients. Includes materials and shipping only.	Acres	$9.21	1	$9.21
Native Perennial Grasses, Low Density	2750	Native perennial grasses, may include a small percentage of annual species for establishment purposes and/or if allowed by the CPS. Planted at lower to medium density (40 pure live seeds/sq ft and less). Includes material and shipping.	Acres	$111.33	1	$111.33

Practice: 333 - Amending Soil Properties with Gypsum Products

Scenario: #13 - Gypsum greater than 1 ton rate

Scenario Description:

Gypsum application of more than one ton/acre rate (typical average 1.5 tons/acre) to improve surface water quality due to phosphorus, pathogens, and soil health (Ca/Mg ratio). Scenario to be used in combination with an implemented nutrient management plan. The producer will use gypsum to improve soil surface structure and reduce concentration of dissolved reactive phosphorus (DRP) in runoff. Scenario includes the cost of material, application, and supervisor/management time to establish and manage new application methodology, including rates, timing, and sequence of application with other nutrient materials (i.e., manures, bio-solids, and fertilizers). The addressed resource concern is water quality and soil health. Associated practices are Nutrient Management (590), Conservation Crop Rotation (328), Cover Crop (340), Residue and Tillage Management, No-till (329) and Residue and Tillage Management, Reduced Till (345).

Before Situation:

Cropland in continuous production having relatively low soil organic matter and moderately high clay content with application of manure with a risk of pathogens. Soil in these fields has poor soil structure and a high risk of phosphorus and pathogen runoff. The soils are susceptible to soil crusting and as a result of long term tillage systems have a high concentration of phosphorous near the soil surface. The combination of poor soil structure and high nutrient levels at the soil surface results in runoff events with high concentrations of DRP that may contribute to degraded water quality.

After Situation:

A determination based on existing soil samples used in normal nutrient management has been made. The Implementation Requirements for Amending Soil Properties with Gypsum (333) has been developed for the site. The application of gypsum to the field based on the existing soil samples will result in reduced runoff and improved runoff water quality. This condition over time in combination with an implemented nutrient management plan and supporting practices to improve soil health will improve surface water quality.

Feature Measure: Acres with a gypsum product applic

Scenario Unit: Acres

Scenario Typical Size: 40.0

Scenario Total Cost: $2,316.28

Scenario Cost/Unit: $57.91

Cost Details:

Component Name	ID	Description	Unit	Cost	QTY	Total
Equipment Installation						
Lime application	953	Lime application performed by ground equipment. Includes equipment, power unit and labor costs.	Acres	$8.21	40	$328.40
Labor						
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.	Hours	$46.88	1	$46.88
Materials						
Gypsum, Ground Ag Grade, Bulk	1224	Agricultural grade quarry ground gypsum (CaCO4) for dispersive soil treatment. Materials and delivery only.	Ton	$32.35	60	$1,941.00

Practice: 333 - Amending Soil Properties with Gypsum Products

Scenario: #14 - Gypsum less than 1 ton per acre

Scenario Description:

Gypsum application of less than or equal to one ton/acre rate (typical average 1 tons/acre) to improve surface water quality due to phosphorus, pathogens, and soil health (Ca/Mg ratio). Scenario to be used in combination with an implemented nutrient management plan. The producer will use gypsum to improve soil surface structure and reduce concentration of dissolved reactive phosphorus (DRP) in runoff. Scenario includes the cost of material, application, and management time to establish and manage new application methodology, including rates, timing, and sequence of application with other nutrient materials (i.e., manures, bio-solids, and fertilizers). . The addressed resource concern is water quality and soil health. Associated practices are Nutrient Management (590), Conservation Crop Rotation (328), Cover Crop (340), Residue and Tillage Management, No-till (329) and Residue and Tillage Management, Reduced Till (345).

Before Situation:

Cropland in continuous production having relatively low soil organic matter and moderately high clay content. Soil in these fields have poor soil structure and a high risk of phosphorus and pathogen runoff. The soils are susceptible to soil crusting and as a result of long term tillage systems have high concentration of phosphorous near the soil surface. The combination of poor soil structure and high nutrient levels at the soil surface results in runoff events with high concentrations of DRP that may contribute to degraded water quality.

After Situation:

A determination based on existing soil samples used in normal nutrient management has been made. The Implementation Requirements for Amending Soil Properties with Gypsum (333) has been developed for the site. The application of gypsum to the field is based on the existing soil samples and will result in reduce runoff and improve runoff water quality. This condition over time in combination with the implemented nutrient management plan and supporting practices to improve soil health will improve surface water quality.

Feature Measure: Acres with a gypsum product applic

Scenario Unit: Acres

Scenario Typical Size: 40.0

Scenario Total Cost: $1,345.78

Scenario Cost/Unit: $33.64

Cost Details:

Component Name	ID	Description	Unit	Cost	QTY	Total
Equipment Installation						
Lime application	953	Lime application performed by ground equipment. Includes equipment, power unit and labor costs.	Acres	$8.21	40	$328.40
Labor						
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.	Hours	$46.88	1	$46.88
Materials						
Gypsum, Ground Ag Grade, Bulk	1224	Agricultural grade quarry ground gypsum (CaCO4) for dispersive soil treatment. Materials and delivery only.	Ton	$32.35	30	$970.50

Practice: 334 - Controlled Traffic Farming

Scenario: #1 - Controlled Traffic

Scenario Description:

This practice must be part of a conservation management system to reduce soil compaction. This scenario considers the time needed to modify equipment, develop the technical skills necessary to effectively implement a controlled traffic farming system on a typical 200 acre cropland farm. The controlled traffic generally utilizes RTK automatic steering technology to locate and maintain high load field traffic. This scenario represents the costs associated with reducing the amount of surface area tracked/compacted to 33% or less. Cost represents typical situations for conventional, organic, and transitioning to organic producers.

Before Situation:

The typical scenario for this practice is a 200 acre row crop operation on high clay, poorly drained soils. Studies show that when high wheel load traffic is not controlled, up to 85% of the field is tracked causing some degree of soil compaction. Before the practice is installed traffic is uncontrolled tracking and 85% of the field has compacted soil which limits soil health.

After Situation:

An Implementation Requirement for Controlled Traffic (334) is developed and the controlled traffic lanes installed per the implementation requirements. After the practice is installed wheel/track traffic is confined to designated traffic lanes/tramlines. Wheel/track soil compaction is confined to the traffic lanes to protect the remaining surface area and subsoil from wheel/track compaction. The wheel/track traffic follows the installed traffic lanes/tramlines each year.

Feature Measure: Acre

Scenario Unit: Acres

Scenario Typical Size: 200.0

Scenario Total Cost: $11,196.00

Scenario Cost/Unit: $55.98

Cost Details:

Component Name	ID	Description	Unit	Cost	QTY	Total
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.	Hours	$37.19	80	$2,975.20
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.	Hours	$102.76	80	$8,220.80

Practice: 338 - Prescribed Burning

Scenario: #1 - Understory Burn

Scenario Description:

Applying a prescribed burn according to designed burn plan and NRCS Prescribed Burning (338) standard and specifications in order to control undesirable species, improve wildlife habitat, improve plant productivity and/or quality, facilitate grazing distribution, to encourage natural seeding or to permit reforestation by planting or direct seeding and maintain ecological processes. An Understory burn can consume debris or leaf litter under controlled conditions that otherwise could burn uncontrollably and devastatingly. Prior to burning unit may need to be treated to reduce slash height and quantities. Burn should be cool enough to not cause mortality to residual stand but also must reduce litter and debris. Burned firebreaks used to achieve total firebreak width are part of these burns. (Constructed firebreak cost is not included in cost of burn. Refer to Firebreak (394) standard and cost scenarios)

Before Situation:

Moderate slash accumulation in a open forest stand. Leaf litter and debris throughout stand. Small seedlings of various quantities may be present. Desirable plant composition is lacking due to reduced plant vigor, invasive species or improper livestock distribution.

After Situation:

Litter, debris and slash are consumed, small seedlings may be killed during active burning. Residual larger trees have little to no scorching. Post treatment fire danger is significantly reduced. Desirable plant composition is restored, plant vigor improved and invasive species reduced. Forage production and quality for livestock and /or wildlife is improved.

Feature Measure: Acres planned

Scenario Unit: Acres

Scenario Typical Size: 10.0

Scenario Total Cost: $7,596.70

Scenario Cost/Unit: $759.67

Cost Details:

Component Name	ID	Description	Unit	Cost	QTY	Total
Equipment Installation						
Truck, Pickup	939	Equipment and power unit costs. Labor not included.	Hours	$24.18	10	$241.80
Trailer, water tank	1598	Mobile 5,000 gal water tank mounted on a trailer. Equipment only. Does not include towing equipment.	Hours	$20.94	10	$209.40
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.	Hours	$27.56	20	$551.20
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.	Hours	$46.88	20	$937.60
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.	Hours	$102.76	50	$5,138.00
Materials						
Fuel, ignition fuel mixture	1596	Mixture of gasoline and diesel for ignition of prescribed burns. Materials only.	Gallons	$2.55	12	$30.60
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	$488.10	1	$488.10

Practice: 338 - Prescribed Burning

Scenario: #3 - Steep Terrain, Volatile fuels >4 ft tall, <10% Canopy Cover

Scenario Description:

Applying a prescribed burn according to designed burn plan and NRCS Prescribed Burning (338) standard and specifications in order to control undesirable species, improve wildlife habitat, improve plant productivity and/or quality, and maintain ecological processes. This scenario is based on a burn area of 15 acres and applies under the following conditions: where the terrain of the majority of the area to be burned >15% slopes with herbaceous and low volatile woody fuel with high volatile woody fuels greater than 4ft tall, but fire is still a ground fire carried by fine fuel. Burned firebreaks used to achieve total firebreak width are part of these burns. (Constructed firebreak cost is not included in cost of burn. Refer to Firebreak (394) standard and cost scenarios)

Before Situation:

Desirable plant composition is lacking due to reduced plant vigor, invasive species or improper livestock distribution.

After Situation:

Desirable plant composition is restored, plant vigor improved and invasive species reduced. Forage production and quality for livestock and /or wildlife is improved.

Feature Measure: Acres Planned

Scenario Unit: Acres

Scenario Typical Size: 15.0

Scenario Total Cost: $8,255.74

Scenario Cost/Unit: $550.38

Cost Details:

Component Name	ID	Description	Unit	Cost	QTY	Total
Equipment Installation						
Truck, Pickup	939	Equipment and power unit costs. Labor not included.	Hours	$24.18	8	$193.44
All terrain vehicles, ATV	965	Includes equipment, power unit and labor costs.	Hours	$21.14	16	$338.24
Trailer, water tank	1598	Mobile 5,000 gal water tank mounted on a trailer. Equipment only. Does not include towing equipment.	Hours	$20.94	8	$167.52
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.	Hours	$14.01	8	$112.08
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.	Hours	$37.19	16	$595.04
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.	Hours	$27.56	56	$1,543.36
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.	Hours	$46.88	8	$375.04
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.	Hours	$102.76	44	$4,521.44
Materials						
Fuel, ignition fuel mixture	1596	Mixture of gasoline and diesel for ignition of prescribed burns. Materials only.	Gallons	$2.55	5	$12.75
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	$70.59	2	$141.18
Mobilization, medium equipment	1139	Equipment with 70-150 HP or typical weights between 14,000 and 30,000 pounds.	Each	$255.65	1	$255.65

Practice: 338 - Prescribed Burning

Scenario: #4 - Volatile Fuel Burn

Scenario Description:

Applying a prescribed burn according to designed burn plan and NRCS Prescribed Burning (338) standard and specifications in order to control undesirable species, improve wildlife habitat, improve plant productivity and/or quality, facilitate grazing distribution, to encourage natural seeding or to permit reforestation by planting or direct seeding and maintain ecological processes. An Understory burn can consume debris or leaf litter under controlled conditions that otherwise could burn uncontrollably and devastatingly. Prior to burning unit may need to be treated to reduce slash height and quantities. Burn should be cool enough to not cause mortality to residual stand but also must reduce litter and debris. Burned firebreaks used to achieve total firebreak width are part of these burns. (Constructed firebreak cost is not included in cost of burn. Refer to Firebreak (394) standard and cost scenarios)

Before Situation:

Heavy shrub accumulation with a a high volatility. Leaf litter and debris throughout stand. Small seedlings of various quantities may be present. Desirable plant composition is lacking due to reduced plant vigor or invasive species.

After Situation:

Shrubs, litter, and debris are consumed, small seedlings may be killed during active burning. Residual larger trees have little to no scorching. Post treatment fire danger is significantly reduced. Desirable plant composition is restored, plant vigor improved and invasive species reduced.

Feature Measure: Acres Planned

Scenario Unit: Acres

Scenario Typical Size: 10.0

Scenario Total Cost: $11,151.00

Scenario Cost/Unit: $1,115.10

Cost Details:

Component Name	ID	Description	Unit	Cost	QTY	Total
Equipment Installation						
Truck, Pickup	939	Equipment and power unit costs. Labor not included.	Hours	$24.18	15	$362.70
Trailer, water tank	1598	Mobile 5,000 gal water tank mounted on a trailer. Equipment only. Does not include towing equipment.	Hours	$20.94	15	$314.10
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.	Hours	$27.56	30	$826.80
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.	Hours	$46.88	30	$1,406.40
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.	Hours	$102.76	75	$7,707.00
Materials						
Fuel, ignition fuel mixture	1596	Mixture of gasoline and diesel for ignition of prescribed burns. Materials only.	Gallons	$2.55	18	$45.90
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	$488.10	1	$488.10

Practice: 340 - Cover Crop

Scenario: #1 - Cover Crop - Basic (Organic and Non-organic)

Scenario Description:

Typically a small grain or legume (may also use forage sorghum, radishes, turnips, buckwheat, etc.) will be planted as a cover crop immediately after harvest of a row crop, and will be followed by a row crop that will utilize the residue as a mulch. This scenario assumes that seed will be planted with a drill. The cover crop should be allowed to generate as much biomass as possible, without delaying planting of the following crop. The cover crop will be terminated using an approved herbicide prior to planting the subsequent crop.

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. Erosion exceeds soil loss tolerances. Runoff from the fields flows into streams, water courses or other water bodies causing degradation to the receiving waters. Soil health (soil organic matter) declines over time as a result of tillage practices, low residue crops, and long periods of bare soil.

After Situation:

Implementation Requirements according to Cover Crop (340) are prepared and implemented. Within 30 days after harvest of the row crop, fields are planted with a small grain or legume cover crop (may also use forage sorghum, radishes, turnips, buckwheat, etc.), typically rye or clover. The average field size is 40 acres. The cover crop is seeded with a drill. No additional fertilizer is applied with the cover crop. The cover crop provides soil cover by late fall, throughout the winter, and into the early spring. Runoff and erosion are reduced. Wind erosion is reduced by standing residues. The cover crop is terminated with an approved herbicide prior to spring planting as late as feasible to maximize plant biomass production. Over time, soil health is improved due to the additional biomass, ground cover, soil infiltration, and plant diversity introduced to the cropping system. Cover crop residues left on the surface may maximize weed control by increasing allelopathic and mulching effect.

Feature Measure: Area planted

Scenario Unit: Acres

Scenario Typical Size: 40.0

Scenario Total Cost: $2,780.40

Scenario Cost/Unit: $69.51

Cost Details:

Component Name	ID	Description	Unit	Cost	QTY	Total
Equipment Installation						
Chemical, ground application	948	Chemical application performed by ground equipment. Includes equipment, power unit and labor costs.	Acres	$5.80	40	$232.00
Seeding Operation, No Till/Grass Drill	960	No Till drill or grass drill for seeding. Includes equipment, power unit and labor costs.	Acres	$21.92	40	$876.80
Materials						
Herbicide, Glyphosate	334	A broad-spectrum, non-selective systemic herbicide. Refer to WIN-PST for product names and active ingredients. Includes materials and shipping only.	Acres	$9.21	40	$368.40
Annual Grasses	2730	Annual grasses, one or more species, mostly introduced but may be native. Used for temporary cover or cover crops. Includes material and shipping.	Acres	$32.58	40	$1,303.20

Practice: 340 - Cover Crop

Scenario: #6 - Cover Crop - Adaptive Management

Scenario Description:

The practice scenario is for the implementation of cover crops in small replicated plots to allow the producer to learn how to manage cover crops on their operation. Scenario includes implementing replicated strip trials on a field plot to evaluate, identify and implement a particular cover crop management strategy (e.g., cover crop vs no cover crop, multiple species vs, single species, evaluate different termination methods or timings, using a legume vs no legume for nitrogen credits). This will be done following the guidance in the NRCS Technical Note 10 - Adaptive Management.

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. Over the winter residue degrades and sediment/nutrient runoff from fields increases. Sheet and rill erosion occurs with visible rills by spring. Runoff from the fields flows into streams, water courses or other water bodies causing degradation to the receiving waters. Soil health (soil organic matter) declines over time as a result of tillage practices, low residue crops, and long periods of bare soil. The producer is considering the use of cover crops but is unsure how to manage on their unique operation or is seeking a way to better manage cover crops in the operation.

After Situation:

Implementation Requirements for Cover Crop (340) will be prepared along with the Adaptive Management plan for the replicated cover crop plots and implemented. Installation of this scenario will result in establishment of a cover crop replicated plots to compare to different management strategies for cover crop management following the guidance in the Agronomy Technical Note 10 - Adaptive Management. Implementation involves establishing the replicated plots to evaluate one or more cover crop 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 cover crop management. Results are used to make cover crop management decisions to address erosion and water quality issues. Yields will be measured and statistically summarized following the procedures in Agronomy Technical Note 10 - Adaptive Management. The yields for each plot will be adjusted to the appropriate moisture content. This would be repeated for 3 years.

Feature Measure: Based on 10 acres

Scenario Unit: Each

Scenario Typical Size: 1.0

Scenario Total Cost: $2,695.00

Scenario Cost/Unit: $2,695.00

Cost Details:

Component Name	ID	Description	Unit	Cost	QTY	Total
Equipment Installation						
Chemical, ground application	948	Chemical application performed by ground equipment. Includes equipment, power unit and labor costs.	Acres	$5.80	10	$58.00
Seeding Operation, No Till/Grass Drill	960	No Till drill or grass drill for seeding. Includes equipment, power unit and labor costs.	Acres	$21.92	10	$219.20
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.	Hours	$37.19	20	$743.80
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.	Hours	$27.56	40	$1,102.40
Materials						
Herbicide, Glyphosate	334	A broad-spectrum, non-selective systemic herbicide. Refer to WIN-PST for product names and active ingredients. Includes materials and shipping only.	Acres	$9.21	10	$92.10
Annual Grasses, Legumes or Forbs	2732	A mix of annual grasses, legumes and/or forbs, mostly introduced but may be native. Used for temporary cover or cover crops. Includes material and shipping.	Acres	$47.95	10	$479.50

Practice: 340 - Cover Crop

Scenario: #11 - Cover Crop - Multiple Species (Organic and Non-organic)

Scenario Description:

Typically the multi-species cover crop (two or more species) mix includes a small grain, a legume, and may include other species such as forage sorghum, radishes, turnips, buckwheat, etc.). This mix will address all the purposes of the Cover Crop (340) standard. Typically the cover crop is seeded immediately after harvest of a row crop, but may be inter-seeded into a row crop using a broadcast seeder, drill, or similar device. The cover crop will be followed by another row crop and will utilize the residue as a mulch. The cover crop should be allowed to generate as much biomass as possible without delaying planting of the following crop. The cover crop will be terminated using an approved herbicide or tillage prior to planting the subsequent crop and terminated per the NRCS Cover Crop Termination Guidelines.

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. Erosion exceeds soil loss tolerances. Runoff from the fields flows into streams, water courses or other water bodies causing degradation to the receiving waters. Soil health (soil organic matter) declines over time as a result of tillage practices, low residue crops, and long periods of bare soil.

After Situation:

Implementation Requirements according to Cover Crop (340) are prepared and implemented. Within 30 days after the harvest of row crop, fields are planted with a multi-species (2 or more species) cover crop mix that generally includes a small grain, a legume, and may include other species such as forage sorghum, radishes, turnips, buckwheat, etc. The average field size is 40 acres. The cover crop is seeded with a drill, broadcast seeder, aerial broadcast, or other method. No additional fertilizer is applied with the cover crop. The cover crop provides soil cover by late fall, throughout the winter, and into the early spring. Runoff and erosion are reduced. Wind erosion is reduced by standing residues. The cover crop is terminated with an approved herbicide prior to spring planting as late as feasible to maximize plant biomass production. Over time, soil health is improved due to the additional biomass, ground cover, soil infiltration, and plant diversity introduced to the cropping system. Cover crop residues left on the surface may maximize weed control by increasing allelopathic and mulching effect.

Feature Measure: Area planted

Scenario Unit: Acres

Scenario Typical Size: 40.0

Scenario Total Cost: $3,395.20

Scenario Cost/Unit: $84.88

Cost Details:

Component Name	ID	Description	Unit	Cost	QTY	Total
Equipment Installation						
Chemical, ground application	948	Chemical application performed by ground equipment. Includes equipment, power unit and labor costs.	Acres	$5.80	40	$232.00
Seeding Operation, No Till/Grass Drill	960	No Till drill or grass drill for seeding. Includes equipment, power unit and labor costs.	Acres	$21.92	40	$876.80
Materials						
Herbicide, Glyphosate	334	A broad-spectrum, non-selective systemic herbicide. Refer to WIN-PST for product names and active ingredients. Includes materials and shipping only.	Acres	$9.21	40	$368.40
Annual Grasses, Legumes or Forbs	2732	A mix of annual grasses, legumes and/or forbs, mostly introduced but may be native. Used for temporary cover or cover crops. Includes material and shipping.	Acres	$47.95	40	$1,918.00

Practice: 340 - Cover Crop

Scenario: #33 - Cover Crop - Basic Organic

Scenario Description:

"Typically a small grain or small grain-legume mix (may also use forage sorghum, radishes, turnips, buckwheat, etc) will be planted as a cover crop immediately after harvest of an organically grown crop, and will be followed by an organically grown crop that will utilize the residue as a mulch. This scenario assumes that seed will be planted with a no-till drill. The cover crop should be allowed to generate as much biomass as possible, without delaying planting of the following crop. The cover crop will be terminated using a mechnical kill method (mowing, rolling, undercutting, etc.), within weeks prior to planting the subsequent crop. This scenario REQUIRES use of Certified Organic Seed. Associated practices: Conservation Cover (327), Conservation Crop Rotation (328), Residue and Tillage Management, No-Till/Strip Till/Direct Seed (329), Critical Area Planting (342), Residue Management, Seasonal (344), Residue and Tillage Management, Mulch Till (345), Residue and Tillage Management, Ridge Till (346), Nutrient Management (590), Integrated Pest Management (595)."

Before Situation:

Organically grown crops such as various vegetable and fruit crops (along with organically produced row crops) are grown and harvested in mid-late fall. Fields are disked immediately following harvest. Residue amounts after harvest average 30% or less, resulting in bare soil being exposed to wind erosion and/or intense rainfall during the fall, winter, and early spring. Over the winter residue degrades and sediment/nutrient runoff from fields increases. Sheet and rill erosion occurs with visible rills by spring. Runoff from the fields flows into streams, water courses or other water bodies causing degradation to the receiving waters. Soil health (soil organic matter) declines over time as a result of tillage practices, low residue crops, and long periods of bare soil.

After Situation:

Within 30 days after harvest of organic crop, fields are planted with a small grain-legume mix cover crop, typically rye and clover. The average field size is 25 acres. The cover crop is seeded with a no-till drill. No additional fertilizer is applied with the cover crop. The cover crop provides soil cover by late fall, throughout the winter, and into the early spring. Runoff and erosion are reduced and no rills are visible on the soil surface in the spring. The cover crop is terminated with using a mechnical kill method (mowing, rolling, undercutting, etc.), prior to spring planting as late as feasible to maximize plant biomass production. Over time, soil health is improved due to the additional biomass, ground cover, and plant diversity introduced to the cropping system. Wind erosion is reduced by standing resides. Cover crop residues left on the surface may maximize weed control by increasing allelopathic and mulching effect.

Feature Measure: Area Planted

Scenario Unit: Acres

Scenario Typical Size: 30.0

Scenario Total Cost: $3,328.80

Scenario Cost/Unit: $110.96

Cost Details:

Component Name	ID	Description	Unit	Cost	QTY	Total
Equipment Installation						
Mechanical weed control, Vegetation termination	957	Mechanical operations, Includes: Roller/crimper, mower, shredder, etc. Includes equipment, power unit and labor costs.	Acres	$20.46	30	$613.80
Seeding Operation, No Till/Grass Drill	960	No Till drill or grass drill for seeding. Includes equipment, power unit and labor costs.	Acres	$21.92	30	$657.60
Materials						
Certified Organic, Annual Grasses, Legumes and/or Forbs	2343	Annual grasses, mostly introduced but may be native. Used for temporary cover or cover crops. Certified organic. Includes material and shipping only.	Acres	$68.58	30	$2,057.40

Practice: 340 - Cover Crop

Scenario: #57 - Cover Crop - 1 acre or less

Scenario Description:

Typically a small grain or legume will be planted as a cover crop immediately after harvest of a crop, and will be followed by a crop. This scenario assumes that seed will be planted by hand. The cover crop should be allowed to generate as much biomass as possible, without delaying planting of the following crop. The cover crop will typically be terminated by mowing or tilling prior to planting the subsequent crop.

Before Situation:

Crops such as sweet corn, vegetables, or root crops 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. Erosion exceeds soil loss tolerances. Runoff from the fields flows into streams, water courses or other water bodies causing degradation to the receiving waters. Soil health (soil organic matter) declines over time as a result of tillage practices, low residue crops, and long periods of bare soil.

After Situation:

Implementation Requirements according to Cover Crop (340) are prepared and implemented. Within 10 days after harvest of the crop, fields are planted with a small grain or legume cover crop, typically rye or clover. The average field size is 0.25 acres. The cover crop is seeded by hand. No additional fertilizer is applied with the cover crop. The cover crop provides soil cover by late fall, throughout the winter, and into the early spring. Runoff and erosion are reduced. Wind erosion is reduced by standing residues. The cover crop is terminated with an approved herbicide prior to spring planting as late as feasible to maximize plant biomass production. Over time, soil health is improved due to the additional biomass, ground cover, soil infiltration, and plant diversity introduced to the cropping system. Cover crop residues left on the surface may maximize weed control by increasing allelopathic and mulching effect.

Feature Measure: area planted

Scenario Unit: Acres

Scenario Typical Size: 0.3

Scenario Total Cost: $82.01

Scenario Cost/Unit: $328.03

Cost Details:

Component Name	ID	Description	Unit	Cost	QTY	Total
Equipment Installation						
Walk-behind Rototiller	2723	8 hp walk-behind rototiller, one-day rental	Day	$169.84	0.25	$42.46
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.	Hours	$27.56	1	$27.56
Materials						
Annual Grasses, Legumes or Forbs	2732	A mix of annual grasses, legumes and/or forbs, mostly introduced but may be native. Used for temporary cover or cover crops. Includes material and shipping.	Acres	$47.95	0.25	$11.99

Practice: 342 - Critical Area Planting

Scenario: #1 - Native or Introduced Vegetation - Normal Tillage (Organic and Non-Organic)

Scenario Description:

Establishment of permanent vegetation (Native and Introduced) on a site (both organic and non-organic) that is void or nearly void of vegetation due to a natural occurrence or a newly constructed conservation practice. Costs include seedbed preparation with typical tillage implements, grass/legume seed, companion crop, and fertilizer and lime with application.

Before Situation:

Areas that are void or nearly void of vegetation, resulting in bare soil being exposed to erosive processes. The exposed areas may be caused from recent natural occurrences (fire, flood, wind, etc.) or due to newly constructed conservation practices such as waterways, terraces, water and sediment basins or dams. The exposed areas will be subject to wind and water erosion that exceed soil loss tolerances. Runoff from the area flows into streams, water courses or other water bodies causing degradation to the receiving waters. The soil typically has a pH imbalance and low fertility.

After Situation:

Implementation Requirements are prepared and implemented according to the Critical Area Planting (342) standard. This typical 1.0 acre critical area is stabilized by applying fertilizer, lime and seed. Soil amendments will be incorporated at a depth of four to six inches to improve fertility and ensure establishment of permanent vegetative cover. The site will be stabilized, erosion reduced, and offsite damages reduced/eliminated.

Feature Measure: area seeded

Scenario Unit: Acres

Scenario Typical Size: 1.0

Scenario Total Cost: $317.13

Scenario Cost/Unit: $317.13

Cost Details:

Component Name	ID	Description	Unit	Cost	QTY	Total
Equipment Installation						
Tillage, Light	945	Includes light disking (tandem) or field cultivator. Includes equipment, power unit and labor costs.	Acres	$10.68	2	$21.36
Fertilizer, ground application, dry bulk	950	Dry bulk fertilizer application performed by ground equipment. Includes equipment, power unit and labor costs.	Acres	$6.63	1	$6.63
Seeding Operation, No Till/Grass Drill	960	No Till drill or grass drill for seeding. Includes equipment, power unit and labor costs.	Acres	$21.92	1	$21.92
Cultipacking	1100	Includes equipment, power unit and labor costs.	Acres	$8.68	1	$8.68
Materials						
Nitrogen (N), Urea	71	Price per pound of N supplied by Urea. Price is not per pound of total product applied, no conversion is needed.	Pound	$0.47	30	$14.10
Phosphorus, P2O5	73	Price per pound of P2O5 supplied by Superphosphate. Price is not per pound of total product applied, no conversion is needed.	Pound	$0.61	60	$36.60
Potassium, K2O	74	K2O supplied by Muriate Of Potash. Price is not per pound of total product applied, no conversion is needed.	Pound	$0.35	60	$21.00
Lime, ENM	75	Fertilizer: Limestone Spread on field.	Ton	$64.87	2	$129.74
Introduced Perennial Grasses, Legumes and/or Forbs, High Density	2749	Introduced perennial grasses, legumes, and/or forbs, may include a small percentage of annual species for establishment purposes and/or if allowed by the CPS. Planted at high density (greater than 60 pure live seeds/sq ft). Includes material and shipping.	Acres	$57.10	1	$57.10

Practice: 342 - Critical Area Planting

Scenario: #4 - Native or Introduced Vegetation - Moderate Grading (Organic and Non-Organic)

Scenario Description:

Establishment of permanent vegetation (native and introduced) on a site that is void or nearly void of vegetation due to a natural or human disturbance. Costs include a dozer for grading and shaping of small gullies, seedbed preparation with typical tillage implements, grass/legume seed, companion crop, and fertilizer and lime with application.

Before Situation:

Areas that are void or nearly void of vegetation, resulting in bare soil being exposed to erosive processes. The exposed areas may be caused from natural occurrences (fire, flood, etc.) or human disturbance. The exposed areas have visible rills and small gullies averaging 1 foot in depth and 1 foot in width that requires some moderate grading to prepare a seedbed. Runoff from the area flows into streams, water courses or other water bodies causing degradation to the receiving waters. The soil typically has a pH imbalance and low fertility.

After Situation:

Implementation Requirements are prepared and implemented according to the Critical Area Planting (342) standard.. This typical 1.0 acre critical area is stabilized by grading and shaping the small gullies with a dozer and then applying fertilizer, lime and seed. The site will be stabilized, erosion reduced, and offsite damages reduced/eliminated.

Feature Measure: area seeded

Scenario Unit: Acres

Scenario Typical Size: 1.0

Scenario Total Cost: $665.41

Scenario Cost/Unit: $665.41

Cost Details:

Component Name	ID	Description	Unit	Cost	QTY	Total
Equipment Installation						
Dozer, 80 HP	929	Track mounted Dozer with horsepower range of 60 to 90. Equipment and power unit costs. Labor not included.	Hours	$55.20	4	$220.80
Tillage, Light	945	Includes light disking (tandem) or field cultivator. Includes equipment, power unit and labor costs.	Acres	$10.68	2	$21.36
Fertilizer, ground application, dry bulk	950	Dry bulk fertilizer application performed by ground equipment. Includes equipment, power unit and labor costs.	Acres	$6.63	1	$6.63
Seeding Operation, No Till/Grass Drill	960	No Till drill or grass drill for seeding. Includes equipment, power unit and labor costs.	Acres	$21.92	1	$21.92
Cultipacking	1100	Includes equipment, power unit and labor costs.	Acres	$8.68	1	$8.68
Labor						
Equipment Operators, Heavy	233	Includes: Cranes, Hydraulic Excavators >=50 HP, Dozers, Paving Machines, Rock Trenchers, Trenchers >=12 in., Dump Trucks, Ag Equipment >=150 HP, Scrapers, Water Wagons.	Hours	$38.00	4	$152.00
Materials						
Nitrogen (N), Urea	71	Price per pound of N supplied by Urea. Price is not per pound of total product applied, no conversion is needed.	Pound	$0.47	30	$14.10
Phosphorus, P2O5	73	Price per pound of P2O5 supplied by Superphosphate. Price is not per pound of total product applied, no conversion is needed.	Pound	$0.61	60	$36.60
Potassium, K2O	74	K2O supplied by Muriate Of Potash. Price is not per pound of total product applied, no conversion is needed.	Pound	$0.35	60	$21.00
Lime, ENM	75	Fertilizer: Limestone Spread on field.	Ton	$64.87	2	$129.74
Annual Grasses	2730	Annual grasses, one or more species, mostly introduced but may be native. Used for temporary cover or cover crops. Includes material and shipping.	Acres	$32.58	1	$32.58

Practice: 342 - Critical Area Planting

Scenario: #6 - Native or Introduced Vegetation - Heavy Grading (Organic and Non-Organic)

Scenario Description:

Establishment of permanent vegetation on a site that is void or nearly void of vegetation due to a natural or human disturbance. Costs include a dozer for grading and shaping of moderate to severe gullies, seedbed preparation with typical tillage implements, grass/legume seed, companion crop, and fertilizer and lime with application.

Before Situation:

Areas that are void or nearly void of vegetation, resulting in bare soil being exposed to erosive processes. The exposed areas may be caused from natural occurrences (fire, flood, etc.) or human disturbance. The exposed areas have visible rills and moderate to severe gullies averaging 3 feet in depth and 3 feet in width. Runoff from the area flows into streams, water courses or other water bodies causing degradation to the receiving waters. The soil typically has a pH imbalance and low fertility.

After Situation:

Implementation Requirements are prepared and implemented according to the Critical Area Planting (342) standard. This typical 1.0 acre critical area is stabilized by grading and shaping the moderate to severe gullies with a dozer and then applying fertilizer, lime and seed. The site will be stabilized, erosion reduced, and offsite damages reduced/eliminated.

Feature Measure: area seeded

Scenario Unit: Acres

Scenario Typical Size: 1.0

Scenario Total Cost: $1,053.58

Scenario Cost/Unit: $1,053.58

Cost Details:

Component Name	ID	Description	Unit	Cost	QTY	Total
Equipment Installation						
Dozer, 80 HP	929	Track mounted Dozer with horsepower range of 60 to 90. Equipment and power unit costs. Labor not included.	Hours	$55.20	8	$441.60
Tillage, Light	945	Includes light disking (tandem) or field cultivator. Includes equipment, power unit and labor costs.	Acres	$10.68	2	$21.36
Fertilizer, ground application, dry bulk	950	Dry bulk fertilizer application performed by ground equipment. Includes equipment, power unit and labor costs.	Acres	$6.63	1	$6.63
Seeding Operation, No Till/Grass Drill	960	No Till drill or grass drill for seeding. Includes equipment, power unit and labor costs.	Acres	$21.92	1	$21.92
Cultipacking	1100	Includes equipment, power unit and labor costs.	Acres	$8.68	1	$8.68
Labor						
Equipment Operators, Heavy	233	Includes: Cranes, Hydraulic Excavators >=50 HP, Dozers, Paving Machines, Rock Trenchers, Trenchers >=12 in., Dump Trucks, Ag Equipment >=150 HP, Scrapers, Water Wagons.	Hours	$38.00	8	$304.00
Materials						
Nitrogen (N), Urea	71	Price per pound of N supplied by Urea. Price is not per pound of total product applied, no conversion is needed.	Pound	$0.47	30	$14.10
Phosphorus, P2O5	73	Price per pound of P2O5 supplied by Superphosphate. Price is not per pound of total product applied, no conversion is needed.	Pound	$0.61	60	$36.60
Potassium, K2O	74	K2O supplied by Muriate Of Potash. Price is not per pound of total product applied, no conversion is needed.	Pound	$0.35	60	$21.00
Lime, ENM	75	Fertilizer: Limestone Spread on field.	Ton	$64.87	2	$129.74
Annual Grasses, Legumes or Forbs	2732	A mix of annual grasses, legumes and/or forbs, mostly introduced but may be native. Used for temporary cover or cover crops. Includes material and shipping.	Acres	$47.95	1	$47.95

Practice: 342 - Critical Area Planting

Scenario: #29 - Hydroseed

Scenario Description:

Establishment of permanent vegetation (Native and Introduced) on a site (both organic and non-organic) that is void or nearly void of vegetation due to a natural occurrence or a newly constructed conservation practice. Costs include a specialized hydroseed truck, grass/legume seed, companion crop, and fertilizer and lime with application.

Before Situation:

Areas that are void or nearly void of vegetation, resulting in bare soil being exposed to erosive processes. The exposed areas may be caused from recent natural occurrences (fire, flood, wind, etc.) or due to newly constructed conservation practices such as waterways, terraces, water and sediment basins or dams. The exposed areas will be subject to wind and water erosion that exceed soil loss tolerances. Runoff from the area flows into streams, water courses or other water bodies causing degradation to the receiving waters. The soil typically has a pH imbalance and low fertility. The site has poor access, is excessively steep, wet or is a newly shaped earthen engineering application which will not tolerate seeding by hand or machine.

After Situation:

Implementation Requirements are prepared and implemented according to the Critical Area Planting (342) standard. This typical 1.0 acre critical area is stabilized by applying fertilizer, lime and seed. Soil amendments are not incorporated, but are in liquid form and readily adsorbed into the soil to improve fertility and ensure establishment of permanent vegetative cover. The site will be stabilized, erosion reduced, and offsite damages reduced/eliminated.

Feature Measure: Area Seeded and Planted

Scenario Unit: Acres

Scenario Typical Size: 1.0

Scenario Total Cost: $1,301.36

Scenario Cost/Unit: $1,301.36

Cost Details:

Component Name	ID	Description	Unit	Cost	QTY	Total
Equipment Installation						
Lime application	953	Lime application performed by ground equipment. Includes equipment, power unit and labor costs.	Acres	$8.21	1	$8.21
Seeding Operation, hydroseeder	1291	Hydroseeding with typical 1500 to 3600 gallon seeder. Includes all costs for equipment, power unit, and labor.	Acres	$823.28	1	$823.28
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.	Hours	$27.56	8	$220.48
Materials						
Nitrogen (N), Urea	71	Price per pound of N supplied by Urea. Price is not per pound of total product applied, no conversion is needed.	Pound	$0.47	30	$14.10
Phosphorus, P2O5	73	Price per pound of P2O5 supplied by Superphosphate. Price is not per pound of total product applied, no conversion is needed.	Pound	$0.61	60	$36.60
Potassium, K2O	74	K2O supplied by Muriate Of Potash. Price is not per pound of total product applied, no conversion is needed.	Pound	$0.35	60	$21.00
Lime, ENM	75	Fertilizer: Limestone Spread on field.	Ton	$64.87	2	$129.74
Annual Grasses, Legumes or Forbs	2732	A mix of annual grasses, legumes and/or forbs, mostly introduced but may be native. Used for temporary cover or cover crops. Includes material and shipping.	Acres	$47.95	1	$47.95

Practice: 342 - Critical Area Planting

Scenario: #31 - Hydroseed, extra site preparation

Scenario Description:

Establishment of permanent vegetation (Native and Introduced) on a site (both organic and non-organic) that is relatively steep with concentrated flow resulting in rills and channel erosion which is void or nearly void of vegetation due to a natural occurrence or a newly constructed conservation practice. Costs include a dozer, specialized hydroseed truck, grass/legume seed, companion crop, and fertilizer and lime with application.

Before Situation:

Steep side slopes such as those on road banks and travel ways that are void or nearly void of vegetation, resulting in bare soil being exposed to erosive processes. The exposed areas may be caused from recent natural occurrences (fire, flood, wind, etc.) or due to newly constructed conservation practices such as waterways, terraces, water and sediment basins or dams. The exposed areas will be subject to wind and water erosion that exceed soil loss tolerances. Runoff from the area flows into streams, water courses or other water bodies causing degradation to the receiving waters. The soil typically has a pH imbalance and low fertility. The site has poor access, is excessively steep, wet or is a newly shaped earthen engineering application which will not tolerate seeding by hand or machine.

After Situation:

Implementation Requirements are prepared and implemented according to the Critical Area Planting (342) standard. This typical 1.0 acre critical area is shaped and graded then stabilized by applying fertilizer, lime and seed. Soil amendments are not incorporated, but are in liquid form and readily adsorbed into the soil to improve fertility and ensure establishment of permanent vegetative cover. The site will be stabilized, erosion reduced, and offsite damages reduced/eliminated.

Feature Measure: Area Seeded and Planted

Scenario Unit: Acres

Scenario Typical Size: 1.0

Scenario Total Cost: $1,929.81

Scenario Cost/Unit: $1,929.81

Cost Details:

Component Name	ID	Description	Unit	Cost	QTY	Total
Equipment Installation						
Dozer, 80 HP	929	Track mounted Dozer with horsepower range of 60 to 90. Equipment and power unit costs. Labor not included.	Hours	$55.20	4	$220.80
Lime application	953	Lime application performed by ground equipment. Includes equipment, power unit and labor costs.	Acres	$8.21	1	$8.21
Seeding Operation, hydroseeder	1291	Hydroseeding with typical 1500 to 3600 gallon seeder. Includes all costs for equipment, power unit, and labor.	Acres	$823.28	1	$823.28
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.	Hours	$27.56	8	$220.48
Equipment Operators, Heavy	233	Includes: Cranes, Hydraulic Excavators >=50 HP, Dozers, Paving Machines, Rock Trenchers, Trenchers >=12 in., Dump Trucks, Ag Equipment >=150 HP, Scrapers, Water Wagons.	Hours	$38.00	4	$152.00
Materials						
Nitrogen (N), Urea	71	Price per pound of N supplied by Urea. Price is not per pound of total product applied, no conversion is needed.	Pound	$0.47	30	$14.10
Phosphorus, P2O5	73	Price per pound of P2O5 supplied by Superphosphate. Price is not per pound of total product applied, no conversion is needed.	Pound	$0.61	60	$36.60
Potassium, K2O	74	K2O supplied by Muriate Of Potash. Price is not per pound of total product applied, no conversion is needed.	Pound	$0.35	60	$21.00
Lime, ENM	75	Fertilizer: Limestone Spread on field.	Ton	$64.87	2	$129.74
Annual Grasses, Legumes or Forbs	2732	A mix of annual grasses, legumes and/or forbs, mostly introduced but may be native. Used for temporary cover or cover crops. Includes material and shipping.	Acres	$47.95	1	$47.95
Mobilization						
Mobilization, medium equipment	1139	Equipment with 70-150 HP or typical weights between 14,000 and 30,000 pounds.	Each	$255.65	1	$255.65

Practice: 345 - Residue and Tillage Management, Reduced Till

Scenario: #2 - Residue and Tillage Management, Reduced Till

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, vertical tillage, chiseling and disking, or the use of high disturbance drills without additional tillage. It applies to stubble mulching on summer-fallowed land, to tillage for annually planted crops, to tillage for planted crops and to tillage for planting perennial crops. All residue shall be uniformly spread or managed over the surface throughout the critical erosion period(s). 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 crop residue on the soil surface. The NRCS erosion prediction model(s) will be used to review the farming operations and determine the amount of surface residue to manage throughout the rotation to keep soil loss below T. The producer will adopt a reduced till system to meet one or more of the practice purposes.

Before Situation:

Crops such as corn, soybeans, small grains, or cotton are grown and harvested. Fields are tilled 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 increase. Sheet, rill and wind erosion occurs. Spring tillage and seedbed preparation activities occur as early as possible in the late winter and early spring. Runoff from the fields flows into streams, water courses or other water bodies causing water quality degradation. 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:

The Implementation Requirements are prepared following the criteria in the 345 Residue and Tillage Management, Reduced Till conservation practice standard. Reduced till applies to all cropland and other lands where crops are planted. This scenario includes the use of a reduce till systems and high disturbance drills, such as a hoe drill, air seeder, or no-till drill that disturbs a large percentage of soil surface during the planting operation. The residue that remains on the soil surface provides soil cover during late fall, throughout the winter, and into the early spring. Runoff and water/wind erosion are reduced and water quality improves. Over time, soil health is improved due to less tillage, the additional biomass, ground cover, soil infiltration, and plant diversity in the cropping system.

Feature Measure: Area planted

Scenario Unit: Acres

Scenario Typical Size: 100.0

Scenario Total Cost: $1,948.00

Scenario Cost/Unit: $19.48

Cost Details:

Component Name	ID	Description	Unit	Cost	QTY	Total
Equipment Installation						
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.	Acres	$19.48	100	$1,948.00

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 guidelines outlined in Agronomy Technical Note 10 - Adaptive Management.

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. Over the winter residue degrades and sediment/nutrient runoff from fields increases. Erosion exceeds soil loss tolerances. Spring tillage and seedbed preparation activities occur as early as possible in the late winter and early spring prior to planting. 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:

Implementation Requirements and the Adaptive Management Plan is prepared for the plots and implemented. 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 guidelines outlined in Agronomy Technical Note 10 - Adaptive Management and the Adaptive Management Guidance 345 for Mulch Till. Implementation involves establishing the replicated plots to evaluate one or more reduced till management strategies. The plot will consist of at least four replicated plots designed, laid out, managed and evaluated with the assistance of a consultant knowledgeable in reduced till management. Results are used to make reduced 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 10 - Adaptive Management. The yields for each plot will be adjusted to the appropriate moisture content and residue levels measured as needed. This practice will be repeated for three years.

Feature Measure: Based on 20 acres

Scenario Unit: Each

Scenario Typical Size: 1.0

Scenario Total Cost: $4,111.20

Scenario Cost/Unit: $4,111.20

Cost Details:

Component Name	ID	Description	Unit	Cost	QTY	Total
Equipment Installation						
Tillage, Light	945	Includes light disking (tandem) or field cultivator. Includes equipment, power unit and labor costs.	Acres	$10.68	20	$213.60
Tillage, Primary	946	Includes heavy disking (offset) or chisel plow. Includes equipment, power unit and labor costs.	Acres	$16.30	20	$326.00
Seeding Operation, No Till/Grass Drill	960	No Till drill or grass drill for seeding. Includes equipment, power unit and labor costs.	Acres	$21.92	10	$219.20
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.	Acres	$19.48	10	$194.80
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.	Hours	$27.56	40	$1,102.40
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.	Hours	$102.76	20	$2,055.20

Practice: 345 - Residue and Tillage Management, Reduced Till

Scenario: #45 - Reduced Till Sweep for No Burn/Sweep Beds - Sugarcane Production in Louisiana

Scenario Description:

In this scenario, sugarcane producers will be migrating from a system of burning residue immediately after harvest in the fall and winter to a system that discontinues burning and allows residue to be swept into furrows. No burning will take place during the management period. Adopting this system will improve soil quality, reduce erosion, and improve air quality in sensitive areas.

Before Situation:

Sugarcane residue is typically burned immediately after harvest in the fall and early winter. After burning, beds may be reshaped with tillage. Any crop residue that is present degrades and sediment/nutrient runoff from fields increases during rainfall events. Sheet and rill erosion occurs with visible signs of soil erosion by spring. Sensitive receptors near sugarcane fields will be exposed to increased particulate matter and degraded air quality during burning events.

After Situation:

After harvest in the fall or winter, residue will be swept from the sugarcane row tops into the furrows. Residue will not be burned. In the early spring, row reshaping (off-bar and lay-by tillage) will occur as necessary. Over time, soil health is improved due to the additional crop residues, ground cover, and soil infiltration.

Feature Measure: Acres

Scenario Unit: Acres

Scenario Typical Size: 200.0

Scenario Total Cost: $3,260.00

Scenario Cost/Unit: $16.30

Cost Details:

Component Name	ID	Description	Unit	Cost	QTY	Total
Equipment Installation						
Tillage, Primary	946	Includes heavy disking (offset) or chisel plow. Includes equipment, power unit and labor costs.	Acres	$16.30	200	$3,260.00

Practice: 350 - Sediment Basin

Scenario: #1 - Excavated basin

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 800 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), Stormwater Runoff Control (570) and Mulching (484) where necessary to prevent erosion following construction activities, Structure for Water Control (587) if using a dewatering device, and Pond Sealing or Lining (521A,521B,521C,521D).

Feature Measure: Excavated volume

Scenario Unit: Cubic Yards

Scenario Typical Size: 800.0

Scenario Total Cost: $1,969.61

Scenario Cost/Unit: $2.46

Cost Details:

Component Name	ID	Description	Unit	Cost	QTY	Total
Equipment Installation						
Dozer, 140 HP	927	Track mounted Dozer with horsepower range of 125 to 160. Equipment and power unit costs. Labor not included.	Hours	$104.83	12	$1,257.96
Labor						
Equipment Operators, Heavy	233	Includes: Cranes, Hydraulic Excavators >=50 HP, Dozers, Paving Machines, Rock Trenchers, Trenchers >=12 in., Dump Trucks, Ag Equipment >=150 HP, Scrapers, Water Wagons.	Hours	$38.00	12	$456.00
Mobilization						
Mobilization, medium equipment	1139	Equipment with 70-150 HP or typical weights between 14,000 and 30,000 pounds.	Each	$255.65	1	$255.65

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), Stormwater Runoff Control (570) and Mulching (484) where necessary to prevent erosion following construction activities, Structure for Water Control (587) if using a dewatering device, and Pond Sealing or Lining (521A,521B,521C,521D).

Feature Measure: Embankment volume

Scenario Unit: Cubic Yards

Scenario Typical Size: 1,500.0

Scenario Total Cost: $8,427.75

Scenario Cost/Unit: $5.62

Cost Details:

Component Name	ID	Description	Unit	Cost	QTY	Total
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 Yards	$481.12	3	$1,443.36
Dozer, 140 HP	927	Track mounted Dozer with horsepower range of 125 to 160. Equipment and power unit costs. Labor not included.	Hours	$104.83	23	$2,411.09
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.	Hours	$37.19	8	$297.52
Equipment Operators, Heavy	233	Includes: Cranes, Hydraulic Excavators >=50 HP, Dozers, Paving Machines, Rock Trenchers, Trenchers >=12 in., Dump Trucks, Ag Equipment >=150 HP, Scrapers, Water Wagons.	Hours	$38.00	23	$874.00
Materials						
Aggregate, Sand, Graded, Washed	45	Sand, typical ASTM C33 gradation, includes materials, equipment and labor to transport and place	Cubic Yards	$43.40	19.6	$850.64
Aggregate, Gravel, Graded	46	Gravel, includes materials, equipment and labor to transport and place. Includes washed and unwashed gravel.	Cubic Yards	$45.42	1.6	$72.67
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	$1.15	1662	$1,911.30
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	$2.64	118	$311.52
Mobilization						
Mobilization, medium equipment	1139	Equipment with 70-150 HP or typical weights between 14,000 and 30,000 pounds.	Each	$255.65	1	$255.65

Practice: 351 - Well Decommissioning

Scenario: #1 - Dug Well

Scenario Description:

A licensed well driller will seal and permanently close an inactive, abandoned, or unusable water well to prevent excess nutrients in surface and groundwater and to eliminate pesticides transported to surface and ground water. Well will be cleared of all equipment and materials. Residual water column must be treated with chlorine concentration of >50 ppm or according to local, State, Tribal, or Federal regulations.

Before Situation:

Shallow well or hand dug well 36 inches in diameter and 20 feet deep that is not being used.

After Situation:

Procedures and sealing materials shall conform to ASTM D5299 and be compatible with all local, State, Tribal, and Federal requirements. Place compacted earthfill in the well up to five feet from the surface. The top five feet of the well is filled with cement grout or bentonite. Associated practices: 342 Critical Area Seeding

Feature Measure: Each Well to be Decommissioned

Scenario Unit: Each

Scenario Typical Size: 1.0

Scenario Total Cost: $2,187.08

Scenario Cost/Unit: $2,187.08

Cost Details:

Component Name	ID	Description	Unit	Cost	QTY	Total
Equipment Installation						
Earthfill, Manually Compacted	50	Earthfill, manually compacted, includes equipment and labor	Cubic Yards	$6.02	5.3	$31.91
Grout pump	1334	Grout pump with tremie pipe. Equipment and power unit costs. Labor not included.	Hours	$22.82	3	$68.46
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.	Hours	$27.56	3	$82.68
Materials						
Grout, cement	1333	Cement grout meeting ASTM specifications for well sealing. Includes both neat-cement grout and bentonite gout mixtures. Includes materials, equipment and labor to place.	Cubic Yards	$567.19	1.8	$1,020.94
Chlorine	1335	Liquid chlorine bleach. Includes materials only.	Gallons	$4.37	1	$4.37
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	$70.59	3	$211.77
Mobilization, medium equipment	1139	Equipment with 70-150 HP or typical weights between 14,000 and 30,000 pounds.	Each	$255.65	3	$766.95

Practice: 351 - Well Decommissioning

Scenario: #2 - Dug Well Sealed with Grout

Scenario Description:

A licensed well driller will seal and permanently close an inactive, abandoned, or unusable water well to prevent excess nutrients in surface and groundwater and to eliminate pesticides transported to surface and ground water. Well will be cleared of all equipment and materials. Residual water column must be treated with chlorine concentration of >50 ppm or according to local, State, Tribal, or Federal regulations.

Before Situation:

A drilled or driven well with a 6" diameter casing and a depth of 150 feet that is not being used

After Situation:

Procedures and sealing materials shall conform to ASTM D5299 and be compatible with all local, State, Tribal, and Federal requirements. Grout shall be pumped into the well starting at the bottom and working toward the top. Associated practices: 342 Critical Area Seeding

Feature Measure: Each Well to be Decommissioned

Scenario Unit: Each

Scenario Typical Size: 1.0

Scenario Total Cost: $1,198.51

Scenario Cost/Unit: $1,198.51

Cost Details:

Component Name	ID	Description	Unit	Cost	QTY	Total
Equipment Installation						
Grout pump	1334	Grout pump with tremie pipe. Equipment and power unit costs. Labor not included.	Hours	$22.82	6	$136.92
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.	Hours	$27.56	6	$165.36
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.	Hours	$46.88	3	$140.64
Materials						
Grout, cement	1333	Cement grout meeting ASTM specifications for well sealing. Includes both neat-cement grout and bentonite gout mixtures. Includes materials, equipment and labor to place.	Cubic Yards	$567.19	1.2	$680.63
Chlorine	1335	Liquid chlorine bleach. Includes materials only.	Gallons	$4.37	1	$4.37
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	$70.59	1	$70.59

Practice: 351 - Well Decommissioning

Scenario: #11 - Drilled well less than 300' deep

Scenario Description:
A licensed well driller will seal and permanently close an inactive, abandoned, or unusable water well to prevent excess nutrients in surface and groundwater and to eliminate pesticides transported to surface and ground water.

Before Situation:
Drilled well that is less than 300 feet deep. Assume 6" diameter casing.

After Situation:
Procedures and sealing materials shall conform to ASTM D5299 and be compatible with all local, State, Tribal, and Federal requirements. Backfill shall be placed and compacted in a manner that minimizes segregation and bulking to prevent surface subsidense. Associated practices: 342 Critical Area Seeding

Feature Measure: Length of well casing

Scenario Unit: Feet

Scenario Typical Size: 200.0

Scenario Total Cost: $1,277.97

Scenario Cost/Unit: $6.39

Cost Details:

Component Name	ID	Description	Unit	Cost	QTY	Total
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.	Hours	$31.96	1	$31.96
Grout pump	1334	Grout pump with tremie pipe. Equipment and power unit costs. Labor not included.	Hours	$22.82	1	$22.82
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.	Hours	$37.19	2	$74.38
Equipment Operators, Heavy	233	Includes: Cranes, Hydraulic Excavators >=50 HP, Dozers, Paving Machines, Rock Trenchers, Trenchers >=12 in., Dump Trucks, Ag Equipment >=150 HP, Scrapers, Water Wagons.	Hours	$38.00	1	$38.00
Materials						
Grout, cement	1333	Cement grout meeting ASTM specifications for well sealing. Includes both neat-cement grout and bentonite gout mixtures. Includes materials, equipment and labor to place.	Cubic Yards	$567.19	1.5	$850.79
Chlorine	1335	Liquid chlorine bleach. Includes materials only.	Gallons	$4.37	1	$4.37
Mobilization						
Mobilization, medium equipment	1139	Equipment with 70-150 HP or typical weights between 14,000 and 30,000 pounds.	Each	$255.65	1	$255.65

Practice: 351 - Well Decommissioning

Scenario: #12 - Drilled well greater than 300' deep

Scenario Description:
A licensed well driller will seal and permanently close an inactive, abandoned, or unusable water well to prevent excess nutrients in surface and groundwater and to eliminate pesticides transported to surface and ground water.

Before Situation:
Drilled well that is greater than 300 feet deep. Assume 6" diameter casing.

After Situation:
Procedures and sealing materials shall conform to ASTM D5299 and be compatible with all local, State, Tribal, and Federal requirements. Backfill shall be placed and compacted in a manner that minimizes segregation and bulking to prevent surface subsidense. Associated practices: 342 Critical Area Seeding

Feature Measure: Length of well casing

Scenario Unit: Feet

Scenario Typical Size: 500.0

Scenario Total Cost: $2,562.97

Scenario Cost/Unit: $5.13

Cost Details:

Component Name	ID	Description	Unit	Cost	QTY	Total
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.	Hours	$31.96	1	$31.96
Grout pump	1334	Grout pump with tremie pipe. Equipment and power unit costs. Labor not included.	Hours	$22.82	1	$22.82
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.	Hours	$37.19	3	$111.57
Equipment Operators, Heavy	233	Includes: Cranes, Hydraulic Excavators >=50 HP, Dozers, Paving Machines, Rock Trenchers, Trenchers >=12 in., Dump Trucks, Ag Equipment >=150 HP, Scrapers, Water Wagons.	Hours	$38.00	1	$38.00
Materials						
Grout, cement	1333	Cement grout meeting ASTM specifications for well sealing. Includes both neat-cement grout and bentonite gout mixtures. Includes materials, equipment and labor to place.	Cubic Yards	$567.19	3.7	$2,098.60
Chlorine	1335	Liquid chlorine bleach. Includes materials only.	Gallons	$4.37	1	$4.37
Mobilization						
Mobilization, medium equipment	1139	Equipment with 70-150 HP or typical weights between 14,000 and 30,000 pounds.	Each	$255.65	1	$255.65

Practice: 355 - Groundwater Testing

Scenario: #1 - Basic Water Test

Scenario Description:

Typical scenario includes the professional testing for nitrates, nitrites, and coliform to confirm well water meets basic water quality standards for consumption by livestock or use in irrigation. Water samples are sent to an EPA or state certified laboratory for testing. This scenario is recommended when water quality is suspected to be acceptable.

Before Situation:

There are no known contaminants of the well, however, neighboring wells have known issues with nitrates, or coliform, and confirmation of acceptable water quality is desired. Manure is spread near to the well, following a nutrient management plan; well contamination is unlikely but possible.

After Situation:

Water quality results are known.

Feature Measure: No.

Scenario Unit: Each

Scenario Typical Size: 1.0

Scenario Total Cost: $63.94

Scenario Cost/Unit: $63.94

Cost Details:

Component Name	ID	Description	Unit	Cost	QTY	Total
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.	Hours	$27.56	0.5	$13.78
Materials						
Test, Standard Water Test, Irrigation Suitability	310	Irrigation water suitability lab analysis. Includes pH, alkalinity, carbonates/bicarbonates, EC, dissolved solids, B, Cl, Ca, Mg, Na, SAR, and hardness.	Each	$50.16	1	$50.16

Practice: 355 - Groundwater Testing

Scenario: #2 - Specialty Water Test

Scenario Description:

Typical scenario includes the professional testing for pesticides, heavy metals, VOC's or other less common substances, in addition to the basic water test items. Tests are intended to confirm well water meets water quality standards for consumption by livestock or use in irrigation. Water samples are sent to an EPA or state certified laboratory for testing. This scenario is recommended when water quality is suspected to be degraded due to a specialized substance.

Before Situation:

There are no known contaminants of the well, however, neighboring wells have known issues with water quality, and confirmation of acceptable water quality is desired. Manure, pesticides, or other potential contaminants have been spread near to the well, in an unmanaged manner; well contamination is possible.

After Situation:

Water quality results are known.

Feature Measure: No.

Scenario Unit: Each

Scenario Typical Size: 1.0

Scenario Total Cost: $246.77

Scenario Cost/Unit: $246.77

Cost Details:

Component Name	ID	Description	Unit	Cost	QTY	Total
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.	Hours	$27.56	0.5	$13.78
Materials						
Test, Standard Water Test, Irrigation Suitability	310	Irrigation water suitability lab analysis. Includes pH, alkalinity, carbonates/bicarbonates, EC, dissolved solids, B, Cl, Ca, Mg, Na, SAR, and hardness.	Each	$50.16	1	$50.16
Test, singular specialized water test, well water	2003	Testing for specific pesticide, inorganic chemical or volatile organic not included in a basic well suitability test.. Includes materials and shipping only.	Each	$182.83	1	$182.83

Practice: 355 - Groundwater Testing

Scenario: #3 - Full Spectrum Test

Scenario Description:

Typical scenario includes the professional comprehensive testing for all less common substances, to include: pesticides, heavy metals, VOC's or other less common substances, in addition to the basic water test items. Tests are intended to confirm well water meets water quality standards for consumption by livestock or use in irrigation. Water samples are sent to an EPA or state certified laboratory for testing. This scenario is recommended when water quality is known to be degraded due to a specialized substance but thorough analysis is warranted.

Before Situation:

There are no known contaminants of the well, however, neighboring wells have known issues with water quality, and confirmation of acceptable water quality is desired. Manure, pesticides, sewage sludge, or other potential contaminants have been spread near to the well, in an unmanaged manner; well contamination is likely.

After Situation:

Water quality results are known.

Feature Measure: No.

Scenario Unit: Each

Scenario Typical Size: 1.0

Scenario Total Cost: $294.60

Scenario Cost/Unit: $294.60

Cost Details:

Component Name	ID	Description	Unit	Cost	QTY	Total
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.	Hours	$27.56	0.5	$13.78
Materials						
Test, Standard Water Test, Irrigation Suitability	310	Irrigation water suitability lab analysis. Includes pH, alkalinity, carbonates/bicarbonates, EC, dissolved solids, B, Cl, Ca, Mg, Na, SAR, and hardness.	Each	$50.16	1	$50.16
Test, comprehensive specialized water test, well water	2002	Comprehensive testing for a broad spectrum of pesticides, inorganic chemicals or volatile organics not included in a basic well suitability test. Includes materials and shipping only.	Each	$230.66	1	$230.66

Practice: 356 - Dike

Scenario: #1 - Material haul 1 mile or less

Scenario Description:

Construction of a barrier, constructed of an earthen embankment, to control water level. Embankment structure to provide adequate freeboard, allowance for settlement, and foundation and embankment stability. Material haul < 1 mile. Associated practices include, but are not limited to: PS327 Conservation Cover, PS656 Constructed Wetland, PS342 Critical Area Planting, PS378 Ponds, PS382 Fence, PS464 Irrigation Land Levelling, PS500 Obstruction Removal, PS528 Prescribed Grazing, PS587 Structure for Water Control, PS620 Underground Outlet, PS645 Upland Wildlife Management, PS658 Wetland Creation, PS659 Wetland Enhancement, PS657 Wetland Restoration, PS644 Wetland Wildlife Habitat Management.

Before Situation:

Site is subject to flooding or indundation which poses a potential hazard to public safety, damage to land or property. Site may also require control of water level for purposes connected with crop production; fish and wildlife managment; or wetland maintenance, improvement, restoration, or construction. An adequate quantity of soil suitable for constructing an earthen dike is available at an economical haul distance. Material haul < 1 mile.

After Situation:

Water level controlled by a stable earthen structure. Potential hazard to public safety, land or property mitigated; environmental benefit provided.

Feature Measure: Volume of Earthfill (including volu

Scenario Unit: Cubic Yards

Scenario Typical Size: 4,500.0

Scenario Total Cost: $33,701.51

Scenario Cost/Unit: $7.49

Cost Details:

Component Name	ID	Description	Unit	Cost	QTY	Total
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 Yards	$2.31	4500	$10,395.00
Earthfill, Roller Compacted	49	Earthfill, roller or machine compacted, includes equipment and labor	Cubic Yards	$4.66	4500	$20,970.00
Labor						
Specialist Labor	235	Labor requiring a specialized skill set: Includes Agronomists, Foresters, Biologists, etc. to provide additional technical information during the planning and implementation of the practice. Does not include NRCS or TSP services.	Hours	$102.76	6	$616.56
Mobilization						
Mobilization, medium equipment	1139	Equipment with 70-150 HP or typical weights between 14,000 and 30,000 pounds.	Each	$255.65	1	$255.65
Mobilization, large equipment	1140	Equipment >150HP or typical weights greater than 30,000 pounds or loads requiring over width or over length permits.	Each	$488.10	3	$1,464.30

Practice: 356 - Dike

Scenario: #2 - Material haul over 1 mile

Scenario Description:

Construction of a barrier, constructed of an earthen embankment, to control water level. Embankment structure to provide adequate freeboard, allowance for settlement, and foundation and embankment stability. Material haul > 1 mile. Associated practices include, but are not limited to: PS327 Conservation Cover, PS656 Constructed Wetland, PS342 Critical Area Planting, PS378 Ponds, PS382 Fence, PS464 Irrigation Land Levelling, PS500 Obstruction Removal, PS528 Prescribed Grazing, PS587 Structure for Water Control, PS620 Underground Outlet, PS645 Upland Wildlife Management, PS658 Wetland Creation, PS659 Wetland Enhancement, PS657 Wetland Restoration, PS644 Wetland Wildlife Habitat Management.

Before Situation:

Site is subject to flooding or indundation which poses a potential hazard to public safety, damage to land or property. Site may also require control of water level for purposes connected with crop production; fish and wildlife managment; or wetland maintenance, improvement, restoration, or construction. An adequate quantity of soil suitable for constructing an earthen dike is available at an economical haul distance. Material haul > 1 mile.

After Situation:

Water level controlled by a stable earthen structure. Potential hazard to public safety, land or property mitigated; environmental benefit provided.

Feature Measure: Volume of Earthfill (including volu

Scenario Unit: Cubic Yards

Scenario Typical Size: 4,500.0

Scenario Total Cost: $36,491.51

Scenario Cost/Unit: $8.11

Cost Details:

Component Name	ID	Description	Unit	Cost	QTY	Total
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 Yards	$2.31	4500	$10,395.00
Earthfill, Roller Compacted	49	Earthfill, roller or machine compacted, includes equipment and labor	Cubic Yards	$4.66	4500	$20,970.00
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	$0.31	9000	$2,790.00
Labor						
Specialist Labor	235	Labor requiring a specialized skill set: Includes Agronomists, Foresters, Biologists, etc. to provide additional technical information during the planning and implementation of the practice. Does not include NRCS or TSP services.	Hours	$102.76	6	$616.56
Mobilization						
Mobilization, medium equipment	1139	Equipment with 70-150 HP or typical weights between 14,000 and 30,000 pounds.	Each	$255.65	1	$255.65
Mobilization, large equipment	1140	Equipment >150HP or typical weights greater than 30,000 pounds or loads requiring over width or over length permits.	Each	$488.10	3	$1,464.30

Practice: 356 - Dike

Scenario: #3 - Cranberry Mineral Soils

Scenario Description:

Construction of a barrier, constructed of an earthen embankment, to control water level. Embankment structure to provide adequate freeboard, allowance for settlement, and foundation and embankment stability. Typical earthen dike assumed 500 lineal feet, Class IV (5 ft. in height, 6 ft. top width, 1.5H:1V side slopes) for 2.5CY/LF of dike. Material haul > 1 mile. Associated practices include, but are not limited to: PS342 Critical Area Planting, PS466 Land Smoothing, PS587 Structure for Water Control.

Before Situation:

Site requires control of water level for purposes connected with crop production; fish and wildlife managment; or wetland maintenance, improvement, restoration, or construction. An adequate quantity of soil suitable for constructing an earthen dike is available at an economical haul distance. Material haul < 1 mile.

After Situation:

Water level controlled by a stable earthen structure. Water can be impounded temporarily for harvesting, trash removal, pest control, and winter flooding.

Feature Measure: Volume of Earthfill (including volu

Scenario Unit: Cubic Yards

Scenario Typical Size: 1,250.0

Scenario Total Cost: $8,968.15

Scenario Cost/Unit: $7.17

Cost Details:

Component Name	ID	Description	Unit	Cost	QTY	Total
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 Yards	$2.31	1250	$2,887.50
Earthfill, Roller Compacted	49	Earthfill, roller or machine compacted, includes equipment and labor	Cubic Yards	$4.66	1250	$5,825.00
Mobilization						
Mobilization, medium equipment	1139	Equipment with 70-150 HP or typical weights between 14,000 and 30,000 pounds.	Each	$255.65	1	$255.65

Practice: 356 - Dike

Scenario: #4 - Cranberry Organic Soils

Scenario Description:

Construction of a barrier, constructed of an earthen embankment, to control water level. Embankment structure to provide adequate freeboard, allowance for settlement, and foundation and embankment stability. Successive application of fill required for stability on organic soils. Typical earthen dike assumed 500 lineal feet, Class IV (5 ft. in height, 6 ft. top width, 1.5H:1V side slopes) including 2ft overexavation and fill of organic material for about 4.3CY/LF. Material haul > 1 mile. Associated practices include, but are not limited to: PS342 Critical Area Planting, PS466 Land Smoothing, PS587 Structure for Water Control.

Before Situation:

Site requires control of water level for purposes connected with crop production; fish and wildlife managment; or wetland maintenance, improvement, restoration, or construction. An adequate quantity of soil suitable for constructing an earthen dike is available at an economical haul distance. Material haul > 1 mile.

After Situation:

Water level controlled by a stable earthen structure. Water can be impounded temporarily for harvesting, trash removal, pest control, and winter flooding.

Feature Measure: Volume of Earthfill (including volu

Scenario Unit: Cubic Yards

Scenario Typical Size: 2,150.0

Scenario Total Cost: $17,751.95

Scenario Cost/Unit: $8.26

Cost Details:

Component Name	ID	Description	Unit	Cost	QTY	Total
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 Yards	$2.31	2150	$4,966.50
Earthfill, Roller Compacted	49	Earthfill, roller or machine compacted, includes equipment and labor	Cubic Yards	$4.66	2150	$10,019.00
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	$0.31	6450	$1,999.50
Mobilization						
Mobilization, medium equipment	1139	Equipment with 70-150 HP or typical weights between 14,000 and 30,000 pounds.	Each	$255.65	3	$766.95

Practice: 360 - Waste Facility Closure

Scenario: #3 - Demolition of Concrete Waste Storage Structure

Scenario Description:

This practice scenario includes the demolition of an existing concrete waste storage structure. The purpose of the practice is to address resource concerns related to water quality degradation due to excess nutrient and pathogens in ground and/or surface waters and air quality impacts from greenhouse gases, particulate matter and associated precursors, and objectionable odors. Associated practices: Nutrient Management (590), Critical Area Planting (342)

Before Situation:

An existing concrete waste storage structure is no longer functioning correctly or is not being used for its intended purpose. It poses a safety hazard for humans and livestock and is a threat to environmentally sustainability by the potential for impacts to water and air quality.

After Situation:

This scenario assumes a concrete waste storage structure, with dimensions of 60 ft x 60 ft with 10 ft vertical walls. The walls are 8 inches thick, the concrete floor is 5 inches thick and the footing for the wall is 24 inches wide by 12 inches deep. The "strike full" capacity of the structure equals 36,000 cubic feet. The total volume of concrete to be demolished is: Walls = 60' x 4 sides x 10' x 8"/12 / 27 = 59 CY Footer = 60' x 4 sides x 2' x 1' / 27 = 18 CY Slab = 60'x60'x5"/12 / 27 = 56 CY Total = 133 CY The volume of waste to be removed approximately equals 50% of the structural volume (50% x 36,000 x 7.48 Gal/CF = 134,640 Gal). The volume of earthwork (earthfill and/or excavation, final grading) required is approximately 50% of the structural volume(50% x 36,000 / 27 = 670 CY. The concrete will be demolished and hauled off-site for recycling or disposal. Structural removal, as necessary, may include the sealing or removal and disposal of waste transfer components and other appurtenances associated with closure of the facility. Demolition of a concrete waste storage structure includes agitating, removing, and spreading the waste remaining in the structure. All waste material shall be land applied in accordance with Nutrient Management (590). Excavated areas will be filled in. The disturbed areas shall be vegetated in accordance with Critical Area Planting (342). Demolition of the concrete waste structure will address water quality degradation, air quality impacts and safety hazards by removing and properly utilizing the waste from the impoundment. The site will also become available for another use.

Feature Measure: "Strike Full" Capacity of Structure

Scenario Unit: Cubic Feet

Scenario Typical Size: 36,000.0

Scenario Total Cost: $9,775.37

Scenario Cost/Unit: $0.27

Cost Details:

Component Name	ID	Description	Unit	Cost	QTY	Total
Equipment Installation						
Earthfill, Roller Compacted	49	Earthfill, roller or machine compacted, includes equipment and labor	Cubic Yards	$4.66	670	$3,122.20
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.	Hours	$109.36	10	$1,093.60
Manure, compost, injection	956	Loading, hauling and injecting manure/compost by ground equipment. Includes equipment, power unit and labor costs.	Gallons	$0.01	134640	$1,346.40
Demolition, concrete	1498	Demolition and disposal of reinforced concrete structures including slabs and walls. Includes labor and equipment.	Cubic Yards	$12.29	133	$1,634.57
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	$0.31	1330	$412.30
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.	Hours	$27.56	10	$275.60
Equipment Operators, Heavy	233	Includes: Cranes, Hydraulic Excavators >=50 HP, Dozers, Paving Machines, Rock Trenchers, Trenchers >=12 in., Dump Trucks, Ag Equipment >=150 HP, Scrapers, Water Wagons.	Hours	$38.00	10	$380.00
Mobilization						
Mobilization, medium equipment	1139	Equipment with 70-150 HP or typical weights between 14,000 and 30,000 pounds.	Each	$255.65	4	$1,022.60
Mobilization, large equipment	1140	Equipment >150HP or typical weights greater than 30,000 pounds or loads requiring over width or over length permits.	Each	$488.10	1	$488.10

Practice: 360 - Waste Facility Closure

Scenario: #4 - Liquid Waste Impoundment Closure with 75% Liquids and 25% Solids

Scenario Description:

This practice scenario includes the decommissioning of an earthen liquid waste impoundment (embankment or excavated type) where the estimated volume of waste to be removed is approximately 75% liquid/slurry waste and 25% sludge/solid waste of the structural storage capacity of the structure. The purpose of the practice is to address resource concerns related to water quality degradation due to excess nutrient and pathogens in ground and/or surface waters and air quality impacts from greenhouse gases, particulate matter and associated precursors, and objectionable odors. Associated practices: Nutrient Management (590), Critical Area Planting (342)

Before Situation:

An existing lagoon or waste storage pond is no longer functioning correctly or is not being used for its intended purpose. It poses a safety hazard for humans and livestock and is a threat to environmental sustainability by the potential for impacts to water and air quality.

After Situation:

This scenario assumes a waste storage pond, with top dimensions of 110 ft x 110 ft, 8 ft total depth with 2:1 side slopes. The total structural storage volume equals 63,851 cubic feet. The volume of liquid waste to be pumped approximately equals 75% if the structural volume (75% X 63,851 CF = 47,888 CF). The volume of solid waste to be removed approximately equals 25% of the structural volume (25% X 63,851 = 15,963 CF). The volume of earthwork (earthfill and excavation) required to breach the embankment and/or fill in the impoundment and perform final grading of the site is approximately 50% of the structural volume. The volume of earthwork will include 60% as excavation and 40% as compacted earthfill. Structural removal, as necessary, may include the removal and disposal of the synthetic liner, sealing or removal and disposal of waste transfer components and other appurtenances associated with closure of the facility. Decommissioning of a liquid waste storage impoundment includes agitating, removing, and spreading liquid/slurry waste material, removing solid/sludge waste remaining in the bottom. All waste material shall be land applied in accordance with Nutrient Management (590). If present, the synthetic liner will be removed and properly disposed of. All inflow devices and associated appurtenances will be removed and properly disposed of. The embankment will be breached and the excavation filled in with the embankment material or hauled in earthfill. The disturbed areas shall be vegetated in accordance with Critical Area Planting (342). Closure of the waste impoundment will address water quality degradation, air quality impacts and safety hazards by removing and properly utilizing the waste from the impoundment. The site will also become available for another use.

Feature Measure: Cubic feet of structural storage

Scenario Unit: Cubic Feet

Scenario Typical Size: 63,851.0

Scenario Total Cost: $13,233.29

Scenario Cost/Unit: $0.21

Cost Details:

Component Name	ID	Description	Unit	Cost	QTY	Total
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 Yards	$2.31	709	$1,637.79
Earthfill, Roller Compacted	49	Earthfill, roller or machine compacted, includes equipment and labor	Cubic Yards	$4.66	473	$2,204.18
Manure, compost, injection	956	Loading, hauling and injecting manure/compost by ground equipment. Includes equipment, power unit and labor costs.	Gallons	$0.01	358204	$3,582.04
Spreading, manure sludge	1633	Loading, hauling and spreading manure solids/sludge by ground equipment on nearby fields. Includes equipment, power unit and labor costs.	Cubic Feet	$0.22	15963	$3,511.86
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.	Hours	$27.56	12	$330.72
Equipment Operators, Heavy	233	Includes: Cranes, Hydraulic Excavators >=50 HP, Dozers, Paving Machines, Rock Trenchers, Trenchers >=12 in., Dump Trucks, Ag Equipment >=150 HP, Scrapers, Water Wagons.	Hours	$38.00	12	$456.00
Mobilization						
Mobilization, medium equipment	1139	Equipment with 70-150 HP or typical weights between 14,000 and 30,000 pounds.	Each	$255.65	4	$1,022.60
Mobilization, large equipment	1140	Equipment >150HP or typical weights greater than 30,000 pounds or loads requiring over width or over length permits.	Each	$488.10	1	$488.10

Practice: 360 - Waste Facility Closure

Scenario: #10 - Liquid Waste Impoundment Conversion to Fresh Water Storage with 25% Liquids and 75% Solids

Scenario Description:

This practice scenario includes the conversion of an earthen liquid waste impoundment (embankment or excavated type) to fresh water storage where the estimated volume of waste to be removed is approximately 25% liquid/slurry waste and 75% sludge/solid waste of the structural storage capacity of the structure. The purpose of the practice is to address resource concerns related to water quality degradation due to excess nutrient and pathogens in ground and/or surface waters and air quality impacts from greenhouse gases, particulate matter and associated precursors, and objectionable odors. Associated practices: Nutrient Management (590), Critical Area Planting (342)

Before Situation:

An existing lagoon or waste storage pond is no longer functioning correctly or is not being used for its intended purpose. It poses a safety hazard for humans and livestock and is a threat to environmental sustainability by the potential for impacts to water and air quality.

After Situation:

This scenario assumes a waste storage pond, with top dimensions of 110 ft x 110 ft, 8 ft total depth with 2:1 side slopes. The total structural storage volume equals 63,851 cubic feet. The volume of liquid waste to be pumped approximately equals 25% of the structural volume (25% X 63,851 CF = 15,963 CF). The volume of solid waste to be removed approximately equals 75% of the structural volume (75% X 63,851 = 47,888 CF). The volume of earthwork (earthfill and/or excavation) required to meet current NRCS standards and perform final grading and shaping of the site is approximately 5% of the structural volume. Structural removal, as necessary, may include the sealing or removal and disposal of waste transfer components and other appurtenances associated with closure of the facility. Conversion of a liquid waste storage impoundment for fresh water storage includes agitating, removing, and spreading liquid/slurry waste material, removing solid/sludge waste remaining in the bottom. All waste material shall be land applied in accordance with Nutrient Management (590). All inflow devices and associated appurtenances will be removed and properly disposed of. The embankment will be brought up to current NRCS standards for its intended purpose. The disturbed areas shall be vegetated in accordance with Critical Area Planting (342). Conversion to fresh water storage will address water quality degradation, air quality impacts and safety hazards by removing and properly utilizing the waste from the impoundment.

Feature Measure: Cubic feet of structural storage

Scenario Unit: Cubic Feet

Scenario Typical Size: 63,851.0

Scenario Total Cost: $14,314.43

Scenario Cost/Unit: $0.22

Cost Details:

Component Name	ID	Description	Unit	Cost	QTY	Total
Equipment Installation						
Earthfill, Roller Compacted	49	Earthfill, roller or machine compacted, includes equipment and labor	Cubic Yards	$4.66	118	$549.88
Manure, compost, injection	956	Loading, hauling and injecting manure/compost by ground equipment. Includes equipment, power unit and labor costs.	Gallons	$0.01	119401	$1,194.01
Spreading, manure sludge	1633	Loading, hauling and spreading manure solids/sludge by ground equipment on nearby fields. Includes equipment, power unit and labor costs.	Cubic Feet	$0.22	47888	$10,535.36
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.	Hours	$27.56	8	$220.48
Equipment Operators, Heavy	233	Includes: Cranes, Hydraulic Excavators >=50 HP, Dozers, Paving Machines, Rock Trenchers, Trenchers >=12 in., Dump Trucks, Ag Equipment >=150 HP, Scrapers, Water Wagons.	Hours	$38.00	8	$304.00
Mobilization						
Mobilization, medium equipment	1139	Equipment with 70-150 HP or typical weights between 14,000 and 30,000 pounds.	Each	$255.65	4	$1,022.60
Mobilization, large equipment	1140	Equipment >150HP or typical weights greater than 30,000 pounds or loads requiring over width or over length permits.	Each	$488.10	1	$488.10

Practice: 360 - Waste Facility Closure

Scenario: #11 - Liquid Waste Impoundment Conversion to Fresh Water Storage with 0% Liquids and 100% Solids

Scenario Description:

This practice scenario includes the conversion of an earthen liquid waste impoundment (embankment or excavated type) to fresh water storage where the estimated volume of waste to be removed is approximately 0% liquid/slurry waste and 100% sludge/solid waste of the structural storage capacity of the structure. The purpose of the practice is to address resource concerns related to water quality degradation due to excess nutrient and pathogens in ground and/or surface waters and air quality impacts from greenhouse gases, particulate matter and associated precursors, and objectionable odors. Associated practices: Nutrient Management (590), Critical Area Planting (342)

Before Situation:

An existing lagoon or waste storage pond is no longer functioning correctly or is not being used for its intended purpose. It poses a safety hazard for humans and livestock and is a threat to environmental sustainability by the potential for impacts to water and air quality.

After Situation:

This scenario assumes a waste storage pond, with top dimensions of 110 ft x 110 ft, 8 ft total depth with 2:1 side slopes. The total structural storage volume equals 63,851 cubic feet. The volume of liquid waste to be pumped approximately equals 0% of the structural volume. The volume of solid waste to be removed approximately equals 100% of the structural volume (47,888 CF). The volume of earthwork (earthfill and/or excavation) required to meet current NRCS standards and perform final grading and shaping of the site is approximately 5% of the structural volume. Structural removal, as necessary, may include the sealing or removal and disposal of waste transfer components and other appurtenances associated with closure of the facility. Conversion of a liquid waste storage impoundment for fresh water storage includes agitating, removing, and spreading liquid/slurry waste material, removing solid/sludge waste remaining in the bottom. All waste material shall be land applied in accordance with Nutrient Management (590). All inflow devices and associated appurtenances will be removed and properly disposed of. The embankment will be brought up to current NRCS standards for its intended purpose. The disturbed areas shall be vegetated in accordance with Critical Area Planting (342). Conversion to fresh water storage will address water quality degradation, air quality impacts and safety hazards by removing and properly utilizing the waste from the impoundment.

Feature Measure: Cubic feet of structural storage

Scenario Unit: Cubic Feet

Scenario Typical Size: 63,851.0

Scenario Total Cost: $16,376.63

Scenario Cost/Unit: $0.26

Cost Details:

Component Name	ID	Description	Unit	Cost	QTY	Total
Equipment Installation						
Earthfill, Roller Compacted	49	Earthfill, roller or machine compacted, includes equipment and labor	Cubic Yards	$4.66	118	$549.88
Spreading, manure sludge	1633	Loading, hauling and spreading manure solids/sludge by ground equipment on nearby fields. Includes equipment, power unit and labor costs.	Cubic Feet	$0.22	63851	$14,047.22
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.	Hours	$27.56	8	$220.48
Equipment Operators, Heavy	233	Includes: Cranes, Hydraulic Excavators >=50 HP, Dozers, Paving Machines, Rock Trenchers, Trenchers >=12 in., Dump Trucks, Ag Equipment >=150 HP, Scrapers, Water Wagons.	Hours	$38.00	8	$304.00
Mobilization						
Mobilization, medium equipment	1139	Equipment with 70-150 HP or typical weights between 14,000 and 30,000 pounds.	Each	$255.65	3	$766.95
Mobilization, large equipment	1140	Equipment >150HP or typical weights greater than 30,000 pounds or loads requiring over width or over length permits.	Each	$488.10	1	$488.10

Practice: 362 - Diversion

Scenario: #1 - Diversion with seed and mulch

Scenario Description:

An earthen channel constructed across long slopes with supporting ridge on lower side, to divert runoff away from farmsteads, agricultural waste systems, gullies, critical erosion areas, construction areas or other sensitive areas. Outlet may be waterway, underground outlet. or other suitable outlet. Typical diversion is 400 feet long, 15' wide with 10-15' wide berm, installed on a field slope of 1 percent and requires ~1 CY excavation & compaction per LF. Topsoil is stripped, stockpiled and respread. Channel my be level or gradient and ridge is vegetated. The quantity of excavation and fill is balanced. Seed, mulch, and lime applied to establish grass cover.

Before Situation:

Excessive sedimentation and soil erosion as a result of gully, rill or sheet erosion which exceeds "T" from farm fields and other locations. Also, roof runoff or surface runoff that becomes contaminated with agricultral wastes that significantly contributes to the amount of runoff that has to be stored or treated.

After Situation:

Diversion is 400 feet long installed using a dozer. Field system meets "T" or "clean" storm water runoff is diverted away from an agricultural waste management system to minimize the volume of runoff that is contaminated by agricultral waste. Associated practices are Critical Area Planting (342), Grassed Waterway (412), Underground Outlet (620), Mulching (484), and Subsurface Drainage (606).

Feature Measure: Length of Diversion

Scenario Unit: Feet

Scenario Typical Size: 400.0

Scenario Total Cost: $3,423.63

Scenario Cost/Unit: $8.56

Cost Details:

Component Name	ID	Description	Unit	Cost	QTY	Total
Equipment Installation						
Dozer, 80 HP	929	Track mounted Dozer with horsepower range of 60 to 90. Equipment and power unit costs. Labor not included.	Hours	$55.20	15	$828.00
Fertilizer, ground application, dry bulk	950	Dry bulk fertilizer application performed by ground equipment. Includes equipment, power unit and labor costs.	Acres	$6.63	0.3	$1.99
Lime application	953	Lime application performed by ground equipment. Includes equipment, power unit and labor costs.	Acres	$8.21	0.3	$2.46
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.	Acres	$12.00	0.3	$3.60
Stripping and stockpiling, topsoil	1199	Stripping and stockpiling of topsoil adjacent to stripping area. Includes equipment and labor.	Cubic Yards	$0.97	222	$215.34
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.	Hours	$27.56	2	$55.12
Equipment Operators, Heavy	233	Includes: Cranes, Hydraulic Excavators >=50 HP, Dozers, Paving Machines, Rock Trenchers, Trenchers >=12 in., Dump Trucks, Ag Equipment >=150 HP, Scrapers, Water Wagons.	Hours	$38.00	15	$570.00
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.	Hours	$46.88	2	$93.76
Materials						
Nitrogen (N), Urea	71	Price per pound of N supplied by Urea. Price is not per pound of total product applied, no conversion is needed.	Pound	$0.47	15	$7.05
Phosphorus, P2O5	73	Price per pound of P2O5 supplied by Superphosphate. Price is not per pound of total product applied, no conversion is needed.	Pound	$0.61	15	$9.15
Potassium, K2O	74	K2O supplied by Muriate Of Potash. Price is not per pound of total product applied, no conversion is needed.	Pound	$0.35	15	$5.25
Lime, ENM	75	Fertilizer: Limestone Spread on field.	Ton	$64.87	1	$64.87
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.	Acres	$3,407.79	0.3	$1,022.34
Native Perennial Grasses, Low Density	2750	Native perennial grasses, may include a small percentage of annual species for establishment purposes and/or if allowed by the CPS. Planted at lower to medium density (40 pure live seeds/sq ft and less). Includes material and shipping.	Acres	$111.33	0.3	$33.40
Mobilization						

Mobilization, medium equipment	1139	Equipment with 70-150 HP or typical weights between 14,000 and 30,000 pounds.	Each	$255.65	2	$511.30

Practice: 366 - Anaerobic Digester

Scenario: #7 - Covered Lagoon/Holding Pond

Scenario Description:

A covered lagoon can be part of a waste management system. It provides biological treatment of the waste in the absence of oxygen. This process for manure and other byproducts of animal agricultural operations will manage odors, reduce the net effect of greenhouse gas emissions, and/or reduce pathogens. This scenario is for all livestock operation sizes. The waste holding/treatment area is covered by waste treatment lagoon (359) or waste storage facility (313) and the cover is addressed under roofs and covers (367). Selection of digester type will be based on effluent consistency. Costs for this scenario are only for system controls, gas collection, and flaring system. Energy generation is not included with this scenario. Potential Associated Practices: Fence (382), Critical Area Planting (342), Nutrient Management (590), Waste Transfer (634), Heavy Use Area Protection (561), Roof and Covers (367), Solid/Liquid Waste Separation Facility (632), Waste Treatment Lagoon (359), and Waste Storage Facility (313).

Before Situation:

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

After Situation:

Manure and other agricultural by-products are being treated such that odors are managed and/or pathogens are reduced. Effluent from the digester is disposed of or utilized in a proper manner in accordance with a nutrient management plan. A covered lagoon/holding pond typically has a fexible top installed over an earthen storage/treatment facility for the purpose of capturing the biogas. Typical Design Scenario: 1,000 animal units (715 - 1,400 lbs dairy cows).

Feature Measure: Animals Units Contributing to Diges

Scenario Unit: Animal Unit

Scenario Typical Size: 1,000.0

Scenario Total Cost: $288,176.98

Scenario Cost/Unit: $288.18

Cost Details:

Component Name	ID	Description	Unit	Cost	QTY	Total
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	$109.25	1	$109.25
Equipment Installation						
Anaerobic Digester Gas Collection and Flare System	2484	Piping and collection system for biogas, controls for operating the digester system, flare excess gas to convert from methane to carbon dioxide Includes material, labor, and equipment.	Each	$287,415.25	1	$287,415.25
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	$70.59	2	$141.18
Mobilization, medium equipment	1139	Equipment with 70-150 HP or typical weights between 14,000 and 30,000 pounds.	Each	$255.65	2	$511.30

Practice: 366 - Anaerobic Digester

Scenario: #19 - Anaerobic Digester

Scenario Description:

An anaerobic digester can be part of a waste management system. It provides biological treatment of the waste in the absence of oxygen. This process for manure and other by-products of animal agricultural operations will manage odors, reduce the net effect of greenhouse gas emissions, and/or reduce pathogens. This scenario is for a generic anaerobic digester. Energy generation is not included with this scenario. Potential Associated Practices: Fence (382), Critical Area Planting (342), Nutrient Management (590), Waste Transfer (634), Heavy Use Area Protection (561), Roof and Covers (367), Waste Separation Facility (632), Waste Treatment Lagoon (359), and Waste Storage Facility (313).

Before Situation:

Manure and other agricultural by-products are not being utilized or controlled in an environmentally safe manner. The wastes are either accumulating at the source, or other location, or are being transported but not properly utilized or disposed. This situation poses an environmental threat of excessive nutrients, organics, and pathogens being transported into surface and ground waters, in addition to the use of excessive amounts of fertilizers. The treatment of manure and other agricultural by-products is desired in order to manage odors, and/or reduce pathogens.

After Situation:

Manure and other agricultural by-products are being treated such that odors are managed and/or pathogens are reduced. Effluent from the digester is disposed of or utilized in a proper manner in accordance with a nutrient management plan. The typical scenario also includes items necessary to maintain mesophylic or thermophylic temperatures for bacterial activity (i.e. piping and boiler or other heat source). Typical Design Scenario is each.

Feature Measure: Each

Scenario Unit: Number

Scenario Typical Size: 1.0

Scenario Total Cost: $1,251,032.84

Scenario Cost/Unit: $1,251,032.84

Cost Details:

Component Name	ID	Description	Unit	Cost	QTY	Total
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	$109.25	2	$218.50
Equipment Installation						
Anaerobic Digester	2478	Concrete anaerobic digester which includes poured walls, floor and top, reception and mixing tanks, piping installed in and/or around the digester for circulating heated liquid to maintain the necessary temperatures for efficient digester operation, piping and collection system for biogas, controls for operating digester and boiler system, boiler needed to maintain digester temperature, and flare excess gas to convert from methane to carbon dioxide. Includes material, labor, and equipment.	Each	$1,250,000.00	1	$1,250,000.00
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	$70.59	1	$70.59
Mobilization, medium equipment	1139	Equipment with 70-150 HP or typical weights between 14,000 and 30,000 pounds.	Each	$255.65	1	$255.65
Mobilization, large equipment	1140	Equipment >150HP or typical weights greater than 30,000 pounds or loads requiring over width or over length permits.	Each	$488.10	1	$488.10

Practice: 367 - Roofs and Covers

Scenario: #1 - Fabric Roof with Timber Foundation

Scenario Description:

104' x 42' hoop structure (4368 SF) with fabric cover with steel trusses and supporting foundation. Steel trusses are supported in 10"x10" PT Timber Posts embeded in the ground 6' and extending 8' above the ground. Posts are placed on 18" footings and are encased in concrete. Associated practices include Heavy Use Area Protection (561), Waste Storage Facility (313), Animal Mortality Facility (316), Composting Facility (317), Roof Runoff Structure (558), and other practices requireing a roof.

Before Situation:

Applicable where the exclusion of precipitation from an animal waste storage, composting facilities, heavy use area (barnyard or feedlot) or other appropriate application will improve an existing or planned system. Excess precipitation can cause manure laden runoff and impact surface and ground water resources.

After Situation:

Hoop structure with fabric cover with steel trusses and supporting timber foundation. Roof or cover will be engineered and installed in accordance with appropriate building codes and permits. Typical size is 104'x42' or 4,368 square feet. Roof or cover is typically installed over an approved barnyard or feedlot or other practiceas an approved component of a CNMP. The system is designed to exclude precipitation and allow proper management of animal wastes (manure or compost streams), thus mitigating the negative factors from the "before practice implementation".

Feature Measure: Footprint of the building

Scenario Unit: Square Feet

Scenario Typical Size: 4,368.0

Scenario Total Cost: $57,332.71

Scenario Cost/Unit: $13.13

Cost Details:

Component Name	ID	Description	Unit	Cost	QTY	Total
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 Yards	$481.12	18	$8,660.16
Earthfill, Manually Compacted	50	Earthfill, manually compacted, includes equipment and labor	Cubic Yards	$6.02	20	$120.40
Hydraulic Excavator, 1 CY	931	Track mounted hydraulic excavator with bucket capacity range of 0.8 to 1.5 CY. Equipment and power unit costs. Labor not included.	Hours	$109.36	20	$2,187.20
Auger, Truck Mounted	2049	Truck mounted auger for large diameter excavation. Includes equipment and labor.	Hours	$106.03	10	$1,060.30
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.	Hours	$27.56	60	$1,653.60
Equipment Operators, Heavy	233	Includes: Cranes, Hydraulic Excavators >=50 HP, Dozers, Paving Machines, Rock Trenchers, Trenchers >=12 in., Dump Trucks, Ag Equipment >=150 HP, Scrapers, Water Wagons.	Hours	$38.00	20	$760.00
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.	Hours	$46.88	20	$937.60
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 Feet	$1.89	3267	$6,174.63
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 Feet	$7.93	4368	$34,638.24
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	$70.59	2	$141.18
Mobilization, medium equipment	1139	Equipment with 70-150 HP or typical weights between 14,000 and 30,000 pounds.	Each	$255.65	2	$511.30
Mobilization, large equipment	1140	Equipment >150HP or typical weights greater than 30,000 pounds or loads requiring over width or over length permits.	Each	$488.10	1	$488.10

Practice: 367 - Roofs and Covers

Scenario: #2 - Fabric Roof with Concrete Foundation

Scenario Description:

104' x 42' hoop structure (4368 SF) with fabric cover with steel trusses and supporting concrete foundation. Concrete foundation is required due to shallow bedrock conditions and lack of proper embedment depth for timber posts. Steel truss is attached directly to top of concrete wall. Associated practices include Heavy Use Area Protection (561), Waste Storage Facility (313), Animal Mortality Facility (316), Composting Facility (317), Roof Runoff Structure (558), and other practices requireing a roof.

Before Situation:

Applicable where the exclusion of precipitation from an animal waste storage, composting facilities, heavy use area (barnyard or feedlot) or other appropriate application will improve an existing or planned system. Excess precipitation can cause manure laden runoff and impact surface and ground water resources.

After Situation:

Hoop structure with fabric cover with steel trusses and supporting timber/concrete foundation. Roof or cover will be engineered and installed in accordance with appropriate building codes and permits. Typical size is 104'x42' or 4,368 square feet. Roof or cover is typically installed over an approved barnyard or feedlot or other practiceas an approved component of a CNMP. The system is designed to exclude precipitation and allow proper management of animal wastes (manure or compost streams), thus mitigating the negative factors from the "before practice implementation".

Feature Measure: Footprint of the building

Scenario Unit: Square Feet

Scenario Typical Size: 4,368.0

Scenario Total Cost: $71,798.20

Scenario Cost/Unit: $16.44

Cost Details:

Component Name	ID	Description	Unit	Cost	QTY	Total
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 Yards	$481.12	65	$31,272.80
Earthfill, Manually Compacted	50	Earthfill, manually compacted, includes equipment and labor	Cubic Yards	$6.02	162	$975.24
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.	Hours	$109.36	20	$2,187.20
Labor						
Equipment Operators, Heavy	233	Includes: Cranes, Hydraulic Excavators >=50 HP, Dozers, Paving Machines, Rock Trenchers, Trenchers >=12 in., Dump Trucks, Ag Equipment >=150 HP, Scrapers, Water Wagons.	Hours	$38.00	20	$760.00
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.	Hours	$46.88	20	$937.60
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 Feet	$7.93	4368	$34,638.24
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	$171.94	3	$515.82
Mobilization, medium equipment	1139	Equipment with 70-150 HP or typical weights between 14,000 and 30,000 pounds.	Each	$255.65	2	$511.30

Practice: 367 - Roofs and Covers

Scenario: #3 - Fabric Roof with No Foundation

Scenario Description:

104' x 42' hoop structure (4368 SF) with fabric cover with steel trusses. Roof is designed to be mounted direclty on top of another practice, such as a WSF, which has been properly designed to support the roof. Steel trusses typically mounted on top of a concrete wall which has been properly design to support this additional load. Associated practices include Heavy Use Area Protection (561), Waste Storage Facility (313), Animal Mortality Facility (316), Composting Facility (317), Roof Runoff Structure (558), and other practices requireing a roof.

Before Situation:

Applicable where the exclusion of precipitation from an animal waste storage, composting facilities, heavy use area (barnyard or feedlot) or other appropriate application will improve an existing or planned system. Excess precipitation can cause manure laden runoff and impact surface and ground water resources.

After Situation:

Hoop structure with fabric cover with steel trusses and supporting timber/concrete foundation. Roof or cover will be engineered and installed in accordance with appropriate building codes and permits. Typical size is 104'x42' or 4,368 square feet. Roof or cover is typically installed over an approved barnyard or feedlot or other practiceas an approved component of a CNMP. The system is designed to exclude precipitation and allow proper management of animal wastes (manure or compost streams), thus mitigating the negative factors from the "before practice implementation".

Feature Measure: Footprint of the building

Scenario Unit: Square Feet

Scenario Typical Size: 4,368.0

Scenario Total Cost: $37,236.56

Scenario Cost/Unit: $8.52

Cost Details:

Component Name	ID	Description	Unit	Cost	QTY	Total
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.	Hours	$27.56	40	$1,102.40
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.	Hours	$46.88	10	$468.80
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 Feet	$7.93	4368	$34,638.24
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	$171.94	3	$515.82
Mobilization, medium equipment	1139	Equipment with 70-150 HP or typical weights between 14,000 and 30,000 pounds.	Each	$255.65	2	$511.30

Practice: 367 - Roofs and Covers

Scenario: #4 - Timber Framed Roof with Timber Foundation

Scenario Description:

40' x 64' timber framed building (2560 SF) with timber trusses. 8" x 10" posts are embedded 6' in ground with concrete footing/collar. Bottom chord of truss is 12' off the ground. Scenario is based upon Vermont NRCS Drawing VT124060B-C. Snow Load = 60 pdf and Wind Load = 90 mph. Associated practices include Heavy Use Area Protection (561), Waste Storage Facility (313), Animal Mortality Facility (316), Composting Facility (317), Roof Runoff Structure (558), and other practices requireing a roof.

Before Situation:

Applicable where the exclusion of precipitation from an animal waste storage, composting facilities, heavy use area (barnyard or feedlot) or other appropriate application will improve an existing or planned system and is the least cost alternative. Excess precipitation can cause manure laden runoff and impact surface and ground water resources.

After Situation:

The system is designed to exclude precipitation and allow proper management of animal wastes (manure or compost streams), thus mitigating the negative factors from the "before practice implementation".

Feature Measure: Footprint of the building

Scenario Unit: Square Feet

Scenario Typical Size: 2,560.0

Scenario Total Cost: $45,609.94

Scenario Cost/Unit: $17.82

Cost Details:

Component Name	ID	Description	Unit	Cost	QTY	Total
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 Yards	$481.12	12	$5,773.44
Skidsteer, 80 HP	933	Skidsteer loader with horsepower range of 60 to 90. Equipment and power unit costs. Labor not included.	Hours	$55.01	10	$550.10
Auger, Truck Mounted	2049	Truck mounted auger for large diameter excavation. Includes equipment and labor.	Hours	$106.03	10	$1,060.30
Labor						
Equipment Operators, Heavy	233	Includes: Cranes, Hydraulic Excavators >=50 HP, Dozers, Paving Machines, Rock Trenchers, Trenchers >=12 in., Dump Trucks, Ag Equipment >=150 HP, Scrapers, Water Wagons.	Hours	$38.00	10	$380.00
Materials						
Aggregate, Gravel, Graded	46	Gravel, includes materials, equipment and labor to transport and place. Includes washed and unwashed gravel.	Cubic Yards	$45.42	10	$454.20
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 Feet	$13.88	2560	$35,532.80
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	$171.94	5	$859.70
Mobilization, medium equipment	1139	Equipment with 70-150 HP or typical weights between 14,000 and 30,000 pounds.	Each	$255.65	2	$511.30
Mobilization, large equipment	1140	Equipment >150HP or typical weights greater than 30,000 pounds or loads requiring over width or over length permits.	Each	$488.10	1	$488.10

Practice: 367 - Roofs and Covers

Scenario: #5 - Timber Framed Roof with Concrete Foundation

Scenario Description:

40' x 80' timber framed building (3,200 SF) with timber trusses and supporting concrete foundation. Concrete foundation is required due shallow bedrock conditions and lack of embedment depth for timber post. 6" x 8" PT posts are mounted on top of 4' concrete knee wall. Knee wall foundation is pinned into bedrock. Bottom chord of truss is 14' off the ground. Scenario is based upon Vermont NRCS Drawing VT084060B-CW. Snow Load = 60 pdf and Wind Load = 90 mph. Associated practices include Heavy Use Area Protection (561), Waste Storage Facility (313), Animal Mortality Facility (316), Composting Facility (317), Roof Runoff Structure (558), and other practices requireing a roof.

Before Situation:

Applicable where the exclusion of precipitation from an animal waste storage, composting facilities, heavy use area (barnyard or feedlot) or other appropriate application will improve an existing or planned system and is the least cost alternative. Excess precipitation can cause manure laden runoff and impact surface and ground water resources.

After Situation:

The system is designed to exclude precipitation and allow proper management of animal wastes (manure or compost streams), thus mitigating the negative factors from the "before practice implementation".

Feature Measure: Footprint of the building

Scenario Unit: Square Feet

Scenario Typical Size: 3,200.0

Scenario Total Cost: $73,424.30

Scenario Cost/Unit: $22.95

Cost Details:

Component Name	ID	Description	Unit	Cost	QTY	Total
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 Yards	$481.12	50	$24,056.00
Hydraulic Excavator, 1 CY	931	Track mounted hydraulic excavator with bucket capacity range of 0.8 to 1.5 CY. Equipment and power unit costs. Labor not included.	Hours	$109.36	16	$1,749.76
Jack Hammer	2190	60-90 pound jack hammer (electric, pneumatic, or hydraulic). Equipment only.	Hours	$6.33	16	$101.28
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.	Hours	$27.56	16	$440.96
Equipment Operators, Heavy	233	Includes: Cranes, Hydraulic Excavators >=50 HP, Dozers, Paving Machines, Rock Trenchers, Trenchers >=12 in., Dump Trucks, Ag Equipment >=150 HP, Scrapers, Water Wagons.	Hours	$38.00	16	$608.00
Materials						
Aggregate, Gravel, Graded	46	Gravel, includes materials, equipment and labor to transport and place. Includes washed and unwashed gravel.	Cubic Yards	$45.42	15	$681.30
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 Feet	$13.88	3200	$44,416.00
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	$171.94	5	$859.70
Mobilization, medium equipment	1139	Equipment with 70-150 HP or typical weights between 14,000 and 30,000 pounds.	Each	$255.65	2	$511.30

Practice: 367 - Roofs and Covers

Scenario: #6 - Timber Framed Roof with No Foundation

Scenario Description:

40' x 80' timber framed building with timber trusses. Roof is designed to be mounted on top of another practice, such as a WSF, which as been designed to support the roof. 6" x 8" PT posts are typically mounted on top of a concrete wall which has been properly design to support this additional load. Bottom chord of truss is 14' off the ground. Scenario is based upon Vermont NRCS Drawing VT084060B-CW. Snow Load = 60 pdf and Wind Load = 90 mph. Associated practices include Heavy Use Area Protection (561), Waste Storage Facility (313), Animal Mortality Facility (316), Composting Facility (317), Roof Runoff Structure (558), and other practices requireing a roof.

Before Situation:

Applicable where the exclusion of precipitation from an animal waste storage, composting facilities, heavy use area (barnyard or feedlot) or other appropriate application will improve an existing or planned system and is the least cost alternative. Excess precipitation can cause manure laden runoff and impact surface and ground water resources.

After Situation:

The system is designed to exclude precipitation and allow proper management of animal wastes (manure or compost streams), thus mitigating the negative factors from the "before practice implementation".

Feature Measure: Footprint of the building

Scenario Unit: Square Feet

Scenario Typical Size: 3,200.0

Scenario Total Cost: $48,734.20

Scenario Cost/Unit: $15.23

Cost Details:

Component Name	ID	Description	Unit	Cost	QTY	Total
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.	Hours	$109.36	20	$2,187.20
Labor						
Equipment Operators, Heavy	233	Includes: Cranes, Hydraulic Excavators >=50 HP, Dozers, Paving Machines, Rock Trenchers, Trenchers >=12 in., Dump Trucks, Ag Equipment >=150 HP, Scrapers, Water Wagons.	Hours	$38.00	20	$760.00
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 Feet	$13.88	3200	$44,416.00
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	$171.94	5	$859.70
Mobilization, medium equipment	1139	Equipment with 70-150 HP or typical weights between 14,000 and 30,000 pounds.	Each	$255.65	2	$511.30

Practice: 367 - Roofs and Covers

Scenario: #7 - Small Timber Framed Roof with No Foundation < 1000 SF

Scenario Description:

Scenario is intended for small timber monoslope roofs which are typically less than 1000 SF in size. Typical size is 26' x 9' (overhang not included) timber framed building with rafters and no sides. Roof is designed to be mounted on top of another practice, such as a compost bin, SPCC facility, etc. which has been designed to support the roof. 6" x 8" PT posts are typically mounted on top of a concrete wall which has been properly design to support this additional load. Roof is typically 8' to 10' off the ground. Scenario is based upon Massachusettes Compost Bin Detail. Snow Load = 60 pdf and Wind Load = 90 mph. Associated practices include Heavy Use Area Protection (561), Waste Storage Facility (313), Animal Mortality Facility (316), Composting Facility (317), Roof Runoff Structure (558), and other practices requireing a roof.

Before Situation:

Applicable where the exclusion of precipitation from an animal waste storage, composting facilities, heavy use area (barnyard or feedlot) or other appropriate application will improve an existing or planned system and is the least cost alternative. Excess precipitation can cause runoff laden with manure or hydrocarbons to adversely impact surface and ground water resources.

After Situation:

The system is designed to exclude precipitation and allow proper management of animal wastes (manure or compost streams), thus mitigating the negative factors from the "before practice implementation".

Feature Measure: Footprint of the building

Scenario Unit: Square Feet

Scenario Typical Size: 234.0

Scenario Total Cost: $4,114.66

Scenario Cost/Unit: $17.58

Cost Details:

Component Name	ID	Description	Unit	Cost	QTY	Total
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.	Hours	$37.19	30	$1,115.70
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.	Hours	$27.56	30	$826.80
Materials						
Corrugated Steel, 22 gauge	224	Corrugated or ribbed, galvanized, 22 gauge, includes fasteners, materials only.	Square Feet	$2.70	356	$961.20
Dimension Lumber, Treated	1044	Treated dimension lumber with nominal thickness equal or less than 2". Includes lumber and fasteners	Board Feet	$1.10	716	$787.60
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 Feet	$1.89	224	$423.36

Practice: 367 - Roofs and Covers

Scenario: #8 - Steel Frame and Cover with Concrete Foundation

Scenario Description:

A steel framed building with steel "sheet" roof and supporting foundation. Manure is stored as a liquid in basins, tanks, and as a solid on concrete and earthen surfaces. Excess precipitation can cause premature filling of storages or cause nutrients to leach from solid manure piles leading to uncontrolled runoff as well as odor issues. Associated practices include Heavy Use Area Protection (561), Waste Storage Facility (313), Animal Mortality Facility (316), Composting Facility (317), Roof Runoff Structure (558), and other practices requireing a roof.

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. Roof or cover will be engineered and installed in accordance with appropriate building codes and permits. Typical size is 104'x42' or 4,368 square feet and is over an approved barnyard or feedlot as a component of a CNMP. The system is designed to exclude precipitation and allow proper management of animal wastes (manure or compost streams), thus mitigating the negative factors from the "before practice implementation".

Feature Measure: Footprint of building

Scenario Unit: Square Feet

Scenario Typical Size: 4,368.0

Scenario Total Cost: $84,973.44

Scenario Cost/Unit: $19.45

Cost Details:

Component Name	ID	Description	Unit	Cost	QTY	Total
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 Yards	$481.12	65	$31,272.80
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.	Hours	$109.36	20	$2,187.20
Labor						
Equipment Operators, Heavy	233	Includes: Cranes, Hydraulic Excavators >=50 HP, Dozers, Paving Machines, Rock Trenchers, Trenchers >=12 in., Dump Trucks, Ag Equipment >=150 HP, Scrapers, Water Wagons.	Hours	$38.00	20	$760.00
Materials						
Roof, Steel Frame Monoslope Building, 30' to 60' wide	1681	Steel Frame Monoslope Building, 30' to 60' width, includes materials, equipment, and installation. Does not include foundation preparation.	Square Feet	$11.47	4368	$50,100.96
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	$70.59	2	$141.18
Mobilization, medium equipment	1139	Equipment with 70-150 HP or typical weights between 14,000 and 30,000 pounds.	Each	$255.65	2	$511.30

Practice: 367 - Roofs and Covers

Scenario: #10 - Pump Building with No Foundation up to 500 SF

Scenario Description:

12' x 18' insulated timber framed pump or hopper building (216 SF). Building is designed to be constructed over a manure pump or a gravity manure hopper to protect practice from freezing and rain. Building is generally constructed with 2" x 6" studded walls with 2" x 8" roof rafters. Building is typically covered with 1/2" plywood sheeting. Roof is finished with asphalt shingles. Building ususally includes a door, window and small exhaust fan. Building is constructed on an existing concrete structure which was installed under Pumping Plant (533) or Waste Transfer (634). Associated practices include Pumping Plant (533), Waste Transfer (634), Heavy Use Area Protection (561), Waste Storage Facility (313), Roof Runoff Structure (558), and other practices requireing a roof.

Before Situation:

Applicable in cold/humid climates where elements could damage or hinder performance of a pumping plant or waste transfer system. Consequences can be pollution of ground and surface water resources and improper collection of nutrient resources which will not be properly field applied in accordance to an approved CNMP.

After Situation:

The system is designed to protect a pumping plant or waste transfer system from rain and cold weather and allow proper management of animal wastes, thus mitigating the negative factors from the "before practice implementation".

Feature Measure: Footprint of the building

Scenario Unit: Square Feet

Scenario Typical Size: 216.0

Scenario Total Cost: $3,571.20

Scenario Cost/Unit: $16.53

Cost Details:

Component Name	ID	Description	Unit	Cost	QTY	Total
Materials						
Post Frame Building, enclosed 4 sides	1046	Enclosed post frame building, four walls. Building sites with expected snow loads up to 30 lbs per square foot and wind exposure in semi protected areas (wooded or terrain with numerous closely spaced obstructions). Includes materials, shipping, and labor only.	Square Feet	$13.02	216	$2,812.32
Insulation, Fiberglass or cellulose, R-15	1196	Fiberglass or cellulose insulation R-15, includes materials, equipment and labor to install.	Square Feet	$0.93	816	$758.88

Practice: 367 - Roofs and Covers

Scenario: #20 - Flexible Membrane Cover

Scenario Description:

A fabricated rigid, semi-rigid, composite, 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 reduce the transmission of emissions or odors. Cover may exclude precipitation and/or capture biogas for controlled release for flaring or anaerobic digestion. Cover may be organic or inorganic. This scenario applies to either a permeable organic or inorganic cover/flexible membrane applied for odor control, rainfall exclusion or capture of biogas. Associated practices include Waste Storage Facility (313), Waste Treatment Lagoon (359), Anaerobic Digester (366), Animal Mortality Facility (316), Composting Facility (317), Roof Runoff Structure (558), Pumping Plant (533), and Waste Treatment (629).

Before Situation:

Applicable where the covering of an animal waste storage or treatment lagoon will improve management of an existing or planned agricultural waste management system by reducing the transmission of odors or by excluding precipitation.

After Situation:

A fabricated rigid, semi-rigid, composite, 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). Flexible cover will reduce the transmission of odors or will excluded precipitation from the animal waste storage or treatment lagoon.

Feature Measure: Surface of Membrane

Scenario Unit: Square Feet

Scenario Typical Size: 10,000.0

Scenario Total Cost: $81,832.37

Scenario Cost/Unit: $8.18

Cost Details:

Component Name	ID	Description	Unit	Cost	QTY	Total
Equipment Installation						
Earthfill, Manually Compacted	50	Earthfill, manually compacted, includes equipment and labor	Cubic Yards	$6.02	40	$240.80
Skidsteer, 80 HP	933	Skidsteer loader with horsepower range of 60 to 90. Equipment and power unit costs. Labor not included.	Hours	$55.01	20	$1,100.20
Track Loader, 95HP	935	Equipment and power unit costs. Labor not included.	Hours	$90.71	16	$1,451.36
Trencher, 8 in.	936	Equipment and power unit costs. Labor not included.	Hours	$47.70	8	$381.60
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.	Hours	$27.56	32	$881.92
Equipment Operators, Light	232	Includes: Skid Steer Loaders, Hydraulic Excavators <50 HP, Trenchers <12 in., Ag Equipment <150 HP, Pickup Trucks, Forklifts, Mulchers	Hours	$27.87	28	$780.36
Equipment Operators, Heavy	233	Includes: Cranes, Hydraulic Excavators >=50 HP, Dozers, Paving Machines, Rock Trenchers, Trenchers >=12 in., Dump Trucks, Ag Equipment >=150 HP, Scrapers, Water Wagons.	Hours	$38.00	16	$608.00
Materials						
Synthetic Liner, 40 mil	1387	Synthetic 40 mil HDPE, LLDPE, EPDM, etc membrane liner material. Includes materials and shipping only.	Square Yard	$6.29	12000	$75,480.00
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	$70.59	2	$141.18
Mobilization, medium equipment	1139	Equipment with 70-150 HP or typical weights between 14,000 and 30,000 pounds.	Each	$255.65	3	$766.95

Practice: 367 - Roofs and Covers

Scenario: #21 - Flexible Membrane Cover with Flare

Scenario Description:

A fabricated flexible membrane over a waste storage or treatment facility. The membrane will cover the entire surface of a waste storage or treatment facility (e.g. waste treatment lagoon or anaerobic digester). Cover will exclude precipitation and/or capture biogas for controlled release for flaring or anaerobic digestion. This scenario includes the gas collection and flare system to convert methane to carbon dioxide. Associated practices include Waste Storage Facility (313), Waste Treatment Lagoon (359), Anaerobic Digester (366), Animal Mortality Facility (316), Composting Facility (317), Roof Runoff Structure (558), Pumping Plant (533), and Waste Treatment (629).

Before 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 animal 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 fabricated flexible membrane over a 200 ft x 300 ft waste storage pond. The membrane will cover the entire surface of a waste storage or treatment facility (e.g. waste storage pond, waste treatment lagoon or anaerobic digester). A flare is included to burn off the captured emitted methane. Methane collection system under the cover is installed on a per acre rate basis. Precipitation is excluded from the animal waste storage or treatment facility and air quality is improved with the conversion of methane to carbon dioxide.

Feature Measure: Surface of Membrane

Scenario Unit: Square Feet

Scenario Typical Size: 60,000.0

Scenario Total Cost: $852,061.38

Scenario Cost/Unit: $14.20

Cost Details:

Component Name	ID	Description	Unit	Cost	QTY	Total
Equipment Installation						
Earthfill, Manually Compacted	50	Earthfill, manually compacted, includes equipment and labor	Cubic Yards	$6.02	100	$602.00
Skidsteer, 80 HP	933	Skidsteer loader with horsepower range of 60 to 90. Equipment and power unit costs. Labor not included.	Hours	$55.01	56	$3,080.56
Track Loader, 95HP	935	Equipment and power unit costs. Labor not included.	Hours	$90.71	40	$3,628.40
Trencher, 8 in.	936	Equipment and power unit costs. Labor not included.	Hours	$47.70	24	$1,144.80
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.	Hours	$37.19	40	$1,487.60
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.	Hours	$27.56	96	$2,645.76
Equipment Operators, Light	232	Includes: Skid Steer Loaders, Hydraulic Excavators <50 HP, Trenchers <12 in., Ag Equipment <150 HP, Pickup Trucks, Forklifts, Mulchers	Hours	$27.87	80	$2,229.60
Equipment Operators, Heavy	233	Includes: Cranes, Hydraulic Excavators >=50 HP, Dozers, Paving Machines, Rock Trenchers, Trenchers >=12 in., Dump Trucks, Ag Equipment >=150 HP, Scrapers, Water Wagons.	Hours	$38.00	40	$1,520.00
Materials						
Synthetic Liner, 40 mil	1387	Synthetic 40 mil HDPE, LLDPE, EPDM, etc membrane liner material. Includes materials and shipping only.	Square Yard	$6.29	72000	$452,880.00
Covered Lagoon Gas Collection System	1664	Piping and collection system for biogas. Includes labor and equipment.	Each	$252,118.64	1.4	$352,966.10
Covered Lagoon Flare	1666	Flare excess gas to convert from methane to carbon dioxide. Includes labor and equipment.	Each	$28,968.43	1	$28,968.43
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	$70.59	2	$141.18
Mobilization, medium equipment	1139	Equipment with 70-150 HP or typical weights between 14,000 and 30,000 pounds.	Each	$255.65	3	$766.95

Practice: 368 - Emergency Animal Mortality Management

Scenario: #13 - Burial

Scenario Description:

This scenario consists of the on-site burial of animal mortalities resulting from catastrophic events not related to disease. An earthen pit is excavated to contain the mortalities, and earth cover is placed over the mortalities to provide protection from predators to minimize pathogen survival or spreading. The purpose of the practice is to address resource concerns related to water quality degradation due to excessive nutrients, organics, and pathogens being transported into surface and groundwater resources. Air quality impacts due to odors will also be addressed. Potential Associated Practices: Pond Sealing or Lining, Bentonite Sealant (521C), Pond Sealing or Lining, Compacted Clay Treatment (521D), Pond Sealing or Lining, Soil Dispersant (521B), Fence (382), Critical Area Planting (342), Nutrient Management (590), Access Road (560), and Diversion (362).

Before Situation:

Animal mortality disposal is done in a manner that results in non-point source pollution of excessive nutrients, organics, and pathogens being transported into surface and groundwater resources. Improper operation results in odors and spread of pathogens from incomplete composting, incineration, or interaction with predators. No plan was formulated for catastrophic mortality events.

After Situation:

Catastrophic Animal mortalities resulting from causes not related to disease are being disposed in a manner that prevents non-point source pollution of excessive nutrients, organics, and pathogens being transported into surface and groundwater resources. Proper operation results in little to no odors, and protection from predators to minimize pathogen survival or spreading. An overall plan covers the burial of animals as a result of catastrophic mortality events. This typical scenario was developed based on the disposal of 25 head of mature cattle located near the area where the cattle have been found. The scenario includes equipment time and labor to recover and transport carcasses to the burial location. The scenario also includes a burial trench 4' deep plus 3' additional cover over carcasses. Construct a 6' x 60' (surface dimensions) burial site with appropriate cover. Site can handle mortality for 25 mature beef cattle. On site soils can be re-compacted to meet required imperviousness. Include 3' overfill or mounding excavated material to provide for settlement of the burial site and divert or minimize offsite runoff. Site to be located out of drainage areas, off-site water diverted and any runoff to spread out into a grassed area.

Feature Measure: Number of 1000 lbs Animal Units

Scenario Unit: Animal Unit

Scenario Typical Size: 25.0

Scenario Total Cost: $2,538.81

Scenario Cost/Unit: $101.55

Cost Details:

Component Name	ID	Description	Unit	Cost	QTY	Total
Equipment Installation						
Earthfill, Dumped and Spread	51	Earthfill, dumped and spread without compaction effort, includes equipment and labor	Cubic Yards	$3.81	94	$358.14
Tractor, agricultural, 120 HP	962	Agricultural tractor with horsepower range of 90 to 140. Equipment and power unit costs. Labor not included.	Hours	$50.84	12	$610.08
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 Yards	$1.72	94	$161.68
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.	Hours	$27.56	12	$330.72
Equipment Operators, Light	232	Includes: Skid Steer Loaders, Hydraulic Excavators <50 HP, Trenchers <12 in., Ag Equipment <150 HP, Pickup Trucks, Forklifts, Mulchers	Hours	$27.87	12	$334.44
Mobilization						
Mobilization, medium equipment	1139	Equipment with 70-150 HP or typical weights between 14,000 and 30,000 pounds.	Each	$255.65	1	$255.65
Mobilization, large equipment	1140	Equipment >150HP or typical weights greater than 30,000 pounds or loads requiring over width or over length permits.	Each	$488.10	1	$488.10

Practice: 368 - Emergency Animal Mortality Management

Scenario: #14 - In-House Composting

Scenario Description:

This scenario consists the emergency disposal of poultry mortality by composting in a static windrow. The cause of mortatiy is an event not related to disease. Additional carbon based bulking material is added to facilitate aeration and provide a proper C:N ratio. The windrow is turned at least once to go into another heat cycle prior to land application. Access is infrequent. This option may not be desirable for sites with limited area, karst topography, and not isolated from of public view. The purpose of the practice is to address resource concerns related to water quality degradation due to excessive nutrients, organics, and pathogens being transported into surface and groundwater resources. Air quality impacts due to odors will also be addressed. Potential Associated Practices: Pond Sealing or Lining, Bentonite Sealant (521C), Pond Sealing or Lining, Compacted Clay Treatment (521D), Pond Sealing or Lining, Soil Dispersant (521B), Fence (382), Critical Area Planting (342), Nutrient Management (590), Access Road (560), Diversion (362).

Before Situation:

Animal mortality is done in a manner that results in non-point source pollution of excessive nutrients, organics, and pathogens being transported into surface and groundwater resources. Improper operation results in odors and spread of pathogens from incomplete composting, or interaction with predators. No plan was formulated for catastrophic mortality events.

After Situation:

Animal mortality is being done in a manner that prevents non-point source pollution of excessive nutrients, organics, and pathogens being transported into surface and groundwater resources. Proper operation results in little to no odors, complete composting, and protection from predators to minimize pathogen survival or spreading. An overall plan covers normal and catastrophic mortality events. The typical scenario number of birds to be disposed of is 20,000, 4 pound birds which can be composted in-house. Composting requires 1.5 pounds of carbon per pound of bird. There is 0.5 pounds of litter per bird already on site. Wood chips (45 pcf) will be used as the additional carbon source. The composting windrow construction operation consists of 2 pieces of equipment and 2 add'l laborers: 1) stockpiling birds and litter in center of house; 2) construct 2 windrow bases using carbon material; 3) place carcass/litter mix on bases; 4) cover with carbon material; 5) cap windrows with any remaining litter; 6) after first heat cycle remove windrow from house and reconstruct outside house for finishing. Site to be located out of drainage areas, off-site water diverted and any runoff to spread out into a grassed area.

Feature Measure: Number of 1000 lbs Animal Units

Scenario Unit: Animal Unit

Scenario Typical Size: 80.0

Scenario Total Cost: $8,226.34

Scenario Cost/Unit: $102.83

Cost Details:

Component Name	ID	Description	Unit	Cost	QTY	Total
Equipment Installation						
Skidsteer, 80 HP	933	Skidsteer loader with horsepower range of 60 to 90. Equipment and power unit costs. Labor not included.	Hours	$55.01	28	$1,540.28
Aggregate, Wood Chips	1098	Includes materials, equipment and labor	Cubic Yards	$48.86	91	$4,446.26
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.	Hours	$27.56	28	$771.68
Equipment Operators, Light	232	Includes: Skid Steer Loaders, Hydraulic Excavators <50 HP, Trenchers <12 in., Ag Equipment <150 HP, Pickup Trucks, Forklifts, Mulchers	Hours	$27.87	28	$780.36
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	$171.94	4	$687.76

Practice: 368 - Emergency Animal Mortality Management

Scenario: #55 - Outside Windrow Composting

Scenario Description:

This scenario consists the emergency disposal of a large number of livestock mortality by composting in a static windrow. The cause of mortality is an event not related to disease. Additional carbon based bulking material is added to facilitate aeration and provide a proper C:N ratio. The windrow is turned at least once to go into another heat cycle prior to land application. Access is infrequent. This option may not be desirable for sites with limited area, karst topography, and not isolated from of public view. The purpose of the practice is to address resource concerns related to water quality degradation due to excessive nutrients, organics, and pathogens being transported into surface and groundwater resources. Air quality impacts due to odors will also be addressed. Potential Associated Practices: Fence (382), Critical Area Planting (342), Nutrient Management (590), Access Road (560), Diversion (362).

Before Situation:

Animal mortality is done in a manner that results in non-point source pollution of excessive nutrients, organics, and pathogens being transported into surface and groundwater resources. Improper operation results in odors and spread of pathogens from incomplete composting, or interaction with predators.

After Situation:

Animal mortality is being done in a manner that prevents non-point source pollution of excessive nutrients, organics, and pathogens being transported into surface and groundwater resources. Proper operation results in little to no odors, complete composting, and protection from predators to minimize pathogen survival or spreading. An overall plan covers normal and catastrophic mortality events. This typical scenario was developed based on the composting of 20 head of cattle averaging 1000 pound each which are moved to a location on-site that is suitable for composting. The scenario includes equipment time and labor to recover and transport carcasses to the composting location and the building an turning of the pile at the appropriate time. Composting requires 1.5 pounds of carbon per pound of animal. A small volume of green manure or waste feed is available on site. Wood chips (45 pcf) will be used as the carbon source. The composting windrow construction operation consists of 2 pieces of equipment and 1 add'l laborer: 1) collecting and transporting carcasses to compost site; 2) constructing compost windrow base using carbon material; 3) place carcasses 4) cover carcasses with green manure/waste feed; 4) cover with carbon material; 5) cap windrow with any remaining manure/feed; 6) after first heat cycle turn the windrow over and reconstruct for finishing. Site to be located out of drainage areas, off-site water diverted and any runoff to spread out into a grassed area.

Feature Measure: Number of 1000 lbs Animal Units

Scenario Unit: Animal Unit

Scenario Typical Size: 20.0

Scenario Total Cost: $15,339.40

Scenario Cost/Unit: $766.97

Cost Details:

Component Name	ID	Description	Unit	Cost	QTY	Total
Equipment Installation						
Tractor, agricultural, 120 HP	962	Agricultural tractor with horsepower range of 90 to 140. Equipment and power unit costs. Labor not included.	Hours	$50.84	55	$2,796.20
Aggregate, Wood Chips	1098	Includes materials, equipment and labor	Cubic Yards	$48.86	148	$7,231.28
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.	Hours	$27.56	55	$1,515.80
Equipment Operators, Light	232	Includes: Skid Steer Loaders, Hydraulic Excavators <50 HP, Trenchers <12 in., Ag Equipment <150 HP, Pickup Trucks, Forklifts, Mulchers	Hours	$27.87	55	$1,532.85
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.	Hours	$46.88	18	$843.84
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	$70.59	2	$141.18
Mobilization, medium equipment	1139	Equipment with 70-150 HP or typical weights between 14,000 and 30,000 pounds.	Each	$255.65	5	$1,278.25

Practice: 371 - Air Filtration and Scrubbing

Scenario: #4 - Biofilter-Traditional Horizontal

Scenario Description:

Porous filter media is utilized to filter the exhaust from animal confinement facilities to allow microbial activity to reduce objectionable odors. The typical installation is a horizontal media bed supported by a treated lumber substructure to allow airflow from multiple fans to be directed beneath and then up through the media. Vertical biofilters may also be utilized. The filter media is a combination of wood chips to maintain porosity and compost to provide the microorganisms for the air filtering activity. A typical mix ratio would be 80% wood chips and 20% compost. Ventilation system component alterations that may be required to facilitate the biofilter application are not included in the cost computation. Payment includes materials, equipment, and labor costs for installing the biofilter. A stabilized area around the biofilter is not included and must be addressed through the associated practice of Heavy Use Area Protection (561), if needed. Resource concern: Air – Objectionable Odors

Before Situation:

The animal confinement facility has an uncontrolled airflow that is causing objectionable odors.

After Situation:

A 32' X 200" horizontal media bed, 20" thick is supported by a treated lumber substructure to allow airflow to be directed beneath and then up through the media is installed adjacent to a swine production facility. Exhaust from the facility is directed to flow through the biofilter media to reduce objectionable odors. Maintainace of the media bed will be required on a 3-5 year cycle to maintain effectiveness. Associated practices include Heavy Use Area Protection (561), Amendments for Treatment of Agricultural Waste (591), Windbreak (380), Waste Storage Facility (313), Composting Facility (317), and CAP-Comprehensive Air Quality Management Plan (126).

Feature Measure: Biofilter Media Volume

Scenario Unit: Cubic Yards

Scenario Typical Size: 395.0

Scenario Total Cost: $14,631.04

Scenario Cost/Unit: $37.04

Cost Details:

Component Name	ID	Description	Unit	Cost	QTY	Total
Equipment Installation						
Dozer, 140 HP	927	Track mounted Dozer with horsepower range of 125 to 160. Equipment and power unit costs. Labor not included.	Hours	$104.83	2	$209.66
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.	Hours	$27.56	24	$661.44
Equipment Operators, Heavy	233	Includes: Cranes, Hydraulic Excavators >=50 HP, Dozers, Paving Machines, Rock Trenchers, Trenchers >=12 in., Dump Trucks, Ag Equipment >=150 HP, Scrapers, Water Wagons.	Hours	$38.00	2	$76.00
Materials						
Compost	265	A mixture of decaying organic matter, as from leaves and manure, used to improve soil structure and provide nutrients.	Ton	$43.63	20	$872.60
Dimension Lumber, Treated	1044	Treated dimension lumber with nominal thickness equal or less than 2". Includes lumber and fasteners	Board Feet	$1.10	9550	$10,505.00
Post, Wood, Untreated, 8-9 inch dia. X 8 ft.	1078	Wood Post, End 8-9 inch diameter x 8 foot long, untreated. Includes materials and shipping only.	Each	$30.70	30	$921.00
Plywood, 3/4 inch, treated	2363	Treated 4' x 8' sheets of 3/4 inch exterior grade plywood	Each	$36.18	30	$1,085.40
Biofilter Media Netting	2640	UV stabilized, 3/4 inch polypropylene mesh. Materials and shipping only.	Square Feet	$0.02	6400	$128.00
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	$171.94	1	$171.94

Practice: 371 - Air Filtration and Scrubbing

Scenario: #5 - Biofilter-Single Pit Fan

Scenario Description:

Establishment of a biofilter used to treat the air flow from a single waste pit ventilation fan in instances where control of the exhaust from all pit ventilation fans is not needed. Adequate moisture in the wood chip media is maintained for proper growth of bacteria. For each waste pit ventilation fan servicing a waste storage facility that is identified as exhausting odorous and/or particulate laden air into the atmosphere, a separate biofilter is installed. Payment includes materials, equipment, and labor costs for installing the biofilter. A stabilized area around the biofilter is not included and must be addressed through the associated practice of Heavy Use Area Protection (561), if needed.

Before Situation:

One or more pit ventilation fans of a manure storage facility on a Headquarters site are exhausting odorous and/or particulate laden air into the atmosphere.

After Situation:

Air Quality resource concerns are addressed through installation of the practice by reducing odors and/or particulate matter emissions. Exhaust from a 24” waste pit ventilation fan is piped to a 16’ wide by 20’ long by 4’ high horizontal biofilter constructed of a formed concrete bin that is filled with wood chip media, capable of handling 5,500 cubic feet per minute of airflow. The loading of odor and/or particulates into the air at the production facility is significantly reduced, resulting in a substantial improvement in air quality. Ammonia emissions are reduced approximately 60%; hydrogen sulfide about 80% and odor 60 to 80%. Associated practices include Heavy Use Area Protection (561), Amendments for Treatment of Agricultural Waste (591), Windbreak (380), Waste Storage Facility (313)and CAP-Comprehensive Air Quality Management Plan (126).

Feature Measure: Number of Biofilters Installed

Scenario Unit: Each

Scenario Typical Size: 1.0

Scenario Total Cost: $18,012.10

Scenario Cost/Unit: $18,012.10

Cost Details:

Component Name	ID	Description	Unit	Cost	QTY	Total
Equipment Installation						
Concrete, CIP, slab on grade, reinforced	37	Steel reinforced concrete formed and cast-in-placed as a slab on grade by chute placement. Typical strength is 3000 to 4000 psi. Includes materials, labor and equipment to transport, place and finish.	Cubic Yards	$362.36	10	$3,623.60
Concrete, CIP, formed reinforced	38	Steel reinforced concrete formed and cast-in-placed in formed structures such as walls or suspended slabs by chute placement. Typical strength is 3000 to 4000 psi. Includes materials, labor and equipment to transport, place and finish.	Cubic Yards	$481.12	11.3	$5,436.66
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 Yards	$2.31	33	$76.23
Truck, Pickup	939	Equipment and power unit costs. Labor not included.	Hours	$24.18	8	$193.44
Aggregate, Wood Chips	1098	Includes materials, equipment and labor	Cubic Yards	$48.86	24	$1,172.64
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.	Hours	$37.19	2	$74.38
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.	Hours	$27.56	6	$165.36
Materials						
Aggregate, Gravel, Graded	46	Gravel, includes materials, equipment and labor to transport and place. Includes washed and unwashed gravel.	Cubic Yards	$45.42	11	$499.62
Pipe, PE, 3/4 in., DR 9	996	Materials: - 3/4 inch - PE - 160 psi - ASTM D3035 DR 9	Feet	$0.38	50	$19.00
Pump, <= 5 HP, pump and motor, fixed cost portion	1009	Fixed cost portion of a pump less than or equal to 5 HP pump and motor. This portion is a base cost and is not dependant on horsepower. The total cost of any pump will include this fixed cost plus a variable cost portion. The completed pump and motor will include the motor and controls. Includes material and shipping only.	Each	$1,019.47	1	$1,019.47
Pump, <= 5 HP, pump and motor, variable cost portion	1010	Variable cost portion of a pump less than or equal to 5 HP pump and motor. This portion IS dependent on the total horsepower for the pump. The total cost of any pump will include this variable cost plus the fixed cost portion. The completed pump and motor will include the motor and controls. Includes material and shipping only.	Horsepower	$353.92	0.25	$88.48
Dimension Lumber, Treated	1044	Treated dimension lumber with nominal thickness equal or less than 2". Includes lumber and fasteners	Board Feet	$1.10	80	$88.00

Switches and Controls, programmable controller	1193	Programmable logic controller (with or without wireless telecommunications) commonly used to control pumps and irrigation systems	Each	$307.65	1	$307.65
Geotextile, non-woven, light weight	1209	Non-woven less than 8 ounce/square yard geotextile with staple anchoring. Materials and shipping only.	Square Yard	$1.64	36	$59.04
Micro Irrigation, surface drip tubing	1488	Tubing is installed above ground for surface drip irrigation, includes installation, and connections to the supply and flushing laterals. Tubing has emitters built in.	Feet	$0.32	100	$32.00
Articulated precast concrete planking, 5 Foot Wide block	1906	Articulated precast concrete blocks with a typical thickness of 4.5 inches. Includes materials only.	Square Feet	$7.76	320	$2,483.20
Pipe, PVC, 24 in., SCH 40	2046	Materials: - 24 inch - PVC - SCH 40 - ASTM D1785	Feet	$60.77	40	$2,430.80
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	$70.59	1	$70.59
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	$171.94	1	$171.94

Practice: 372 - Combustion System Improvement

Scenario: #5 - Reverse Osmosis <=250 GPH

Scenario Description:

A reverse osmosis (RO) unit, installed before the evaporator, filters the sap and removes ~ 75% of the water prior to getting to the evaporator. The unit is sized in gallons per hour. The size of the RO is determined based on the existing maple sugaring operation (number of taps and the capacity of the evaporator). This scenario includes units that process <= 250 gallons of sap per hour. With a RO unit able to remove excess water,it takes less time to boil the sap down, thus saving significant energy (oil & wood fuel) used in the process.

Before Situation:

A maple sugaring operation uses an evaporator (pan over a furnace) to boil sap to remove water to create syrup. It takes ~20 gallons of sap to make 1 gallon of syrup, which means 19 gallons of water has to be boiled off. A typical oil-fired evaporator consumes 3.5 to 4.5 gallons of fuel oil for each gallon of maple syrup produced.

After Situation:

With an efficient RO installed in the process, ~ 75% of the water is removed from the sap, thus cutting the boil time down by ~75%. An efficiency of 1 gallon fuel oil (or equivalent wood) per gallon of maple syrup is possible, thereby reducing energy consumption by 65-75%. Less fuel used yields decreased air emissions.

Feature Measure: capacity of unit

Scenario Unit: Gallons per Hour

Scenario Typical Size: 135.0

Scenario Total Cost: $5,234.15

Scenario Cost/Unit: $38.77

Cost Details:

Component Name	ID	Description	Unit	Cost	QTY	Total
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.	Hours	$37.19	3	$111.57
Materials						
Reverse Osmosis unit, fixed cost portion	2224	Fixed cost portion of a reverse osmosis unit used for maple syrup processing. Materials only.	Each	$3,158.33	1	$3,158.33
Reverse Osmosis unit, variable cost portion	2225	Variable cost portion of a reverse osmosis unit used for maple syrup processing. Materials only.	Gallons per Hour	$14.55	135	$1,964.25

Practice: 372 - Combustion System Improvement

Scenario: #6 - Reverse Osmosis >250 to <1000 GPH

Scenario Description:

A reverse osmosis (RO) unit, installed before the evaporator, filters the sap and removes ~ 75% of the water prior to getting to the evaporator. The unit is sized in gallons per hour. The size of the RO is determined based on the existing maple sugaring operation (number of taps and the capacity of the evaporator). This scenario includes units that process >250 to <1000 gallons of sap per hour. With a RO unit able to remove excess water,it takes less time to boil the sap down, thus saving significant energy (oil & wood fuel) used in the process.

Before Situation:

A maple sugaring operation uses an evaporator (pan over a furnace) to boil sap to remove water to create syrup. It takes ~20 gallons of sap to make 1 gallon of syrup, which means 19 gallons of water has to be boiled off. A typical oil-fired evaporator consumes 3.5 to 4.5 gallons of fuel oil for each gallon of maple syrup produced.

After Situation:

With an efficient RO installed in the process, ~ 75% of the water is removed from the sap, thus cutting the boil time down by ~75%. An efficiency of 1 gallon fuel oil (or equivalent wood) per gallon of maple syrup is possible, thereby reducing energy consumption by 65-75%. Less fuel used yields decreased air emissions.

Feature Measure: capacity of unit

Scenario Unit: Gallons per Hour

Scenario Typical Size: 365.0

Scenario Total Cost: $8,580.65

Scenario Cost/Unit: $23.51

Cost Details:

Component Name	ID	Description	Unit	Cost	QTY	Total
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.	Hours	$37.19	3	$111.57
Materials						
Reverse Osmosis unit, fixed cost portion	2224	Fixed cost portion of a reverse osmosis unit used for maple syrup processing. Materials only.	Each	$3,158.33	1	$3,158.33
Reverse Osmosis unit, variable cost portion	2225	Variable cost portion of a reverse osmosis unit used for maple syrup processing. Materials only.	Gallons per Hour	$14.55	365	$5,310.75

Practice: 372 - Combustion System Improvement

Scenario: #7 - Reverse Osmosis >=1000 GPH

Scenario Description:

A reverse osmosis (RO) unit, installed before the evaporator, filters the sap and removes ~ 75% of the water prior to getting to the evaporator. The unit is sized in gallons per hour. The size of the RO is determined based on the existing maple sugaring operation (number of taps and the capacity of the evaporator). This scenario includes units that process >= 1000 gallons of sap per hour. With a RO unit able to remove excess water,it takes less time to boil the sap down, thus saving significant energy (oil & wood fuel) used in the process.

Before Situation:

A maple sugaring operation uses an evaporator (pan over a furnace) to boil sap to remove water to create syrup. It takes ~20 gallons of sap to make 1 gallon of syrup, which means 19 gallons of water has to be boiled off. A typical oil-fired evaporator consumes 3.5 to 4.5 gallons of fuel oil for each gallon of maple syrup produced.

After Situation:

With an efficient RO installed in the process, ~ 75% of the water is removed from the sap, thus cutting the boil time down by ~75%. An efficiency of 1 gallon fuel oil (or equivalent wood) per gallon of maple syrup is possible, thereby reducing energy consumption by 65-75%. Less fuel used yields decreased air emissions.

Feature Measure: capacity of unit

Scenario Unit: Gallons per Hour

Scenario Typical Size: 1,200.0

Scenario Total Cost: $20,729.90

Scenario Cost/Unit: $17.27

Cost Details:

Component Name	ID	Description	Unit	Cost	QTY	Total
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.	Hours	$37.19	3	$111.57
Materials						
Reverse Osmosis unit, fixed cost portion	2224	Fixed cost portion of a reverse osmosis unit used for maple syrup processing. Materials only.	Each	$3,158.33	1	$3,158.33
Reverse Osmosis unit, variable cost portion	2225	Variable cost portion of a reverse osmosis unit used for maple syrup processing. Materials only.	Gallons per Hour	$14.55	1200	$17,460.00

Practice: 372 - Combustion System Improvement

Scenario: #8 - Steam Enhanced Preheater, <=24 SF

Scenario Description:

The unit sets over the evaporator pan and uses steam from the evaporator pan to pre-heat the sap to as high as 200ºF while at the same time injecting air into the sap to promote evaporation. Evaporation rates are increased by 65-75%, based on vendor analysis, leading to 40-43% energy savings. Sap is concentrated from Brix 2% to 4% or more before it enters the flue pan. Steam-enhanced systems require at least 9 feet from floor to ceiling. This scenario includes units <= 24 sq. ft. With increased evaporation, it takes less time to boil the sap down, thus saving significant energy (oil & wood fuel) used in the process, as well as labor.

Before Situation:

The evaporative process time for making concentrated maple syrup requires boiling ~20 gallons of sap to make 1 gallon of syrup, which means 19 gallons of water have to be boiled off, using more fuel and labor. A typical oil-fired evaporator consumes 3.5 to 4.5 gallons of fuel oil for each gallon of maple syrup produced.

After Situation:

The evaporative process time for making concentrated maple syrup requires boiling ~6 gallons of sap to make 1 gallon of syrup, which means 14 gallons of water were removed by the steam-enhanced system, using less fuel and labor. A typical oil-fired evaporator with a steam pan consumes 2.1 to 2.7 gallons of fuel oil for each gallon of maple syrup produced to remove water from the sap, improving the fuel efficiency and saving labor.

Feature Measure: Square Foot of steam pan

Scenario Unit: Square Feet

Scenario Typical Size: 12.0

Scenario Total Cost: $9,595.40

Scenario Cost/Unit: $799.62

Cost Details:

Component Name	ID	Description	Unit	Cost	QTY	Total
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.	Hours	$37.19	6	$223.14
Materials						
Sap Pre-Heater, High efficiency, fixed cost	2254	High efficiency sap pre-heater device, fixed cost portion. Materials only.	Each	$6,706.58	1	$6,706.58
Sap Pre-Heater, High efficiency, variable cost	2255	High efficiency sap pre-heater device, variable cost portion. Materials only.	Square Feet	$222.14	12	$2,665.68

Practice: 372 - Combustion System Improvement

Scenario: #9 - Steam Enhanced Preheater, >24 SF

Scenario Description:

The unit sets over the evaporator pan and uses steam from the evaporator pan to pre-heat the sap to as high as 200ºF while at the same time injecting air into the sap to promote evaporation. Evaporation rates are increased by 65-75%, based on vendor analysis, leading to 40-43% energy savings. Sap is concentrated from Brix 2% to 4% or more before it enters the flue pan. Steam-enhanced systems require at least 9 feet from floor to ceiling. This scenario includes units > 24 sq. ft. installed. With increased evaporation, it takes less time to boil the sap down, thus saving significant energy (oil & wood fuel) used in the process, as well as labor.

Before Situation:

The evaporative process time for making concentrated maple syrup requires boiling ~20 gallons of sap to make 1 gallon of syrup, which means 19 gallons of water have to be boiled off, using more fuel and labor. A typical oil-fired evaporator consumes 3.5 to 4.5 gallons of fuel oil for each gallon of maple syrup produced.

After Situation:

The evaporative process time for making concentrated maple syrup requires boiling ~6 gallons of sap to make 1 gallon of syrup, which means 14 gallons of water were removed by the steam-enhanced system, using less fuel and labor. A typical oil-fired evaporator with a steam pan consumes 2.1 to 2.7 gallons of fuel oil for each gallon of maple syrup produced to remove water from the sap, improving the fuel efficiency and saving labor.

Feature Measure: Square Foot of steam pan

Scenario Unit: Square Feet

Scenario Typical Size: 40.0

Scenario Total Cost: $12,536.41

Scenario Cost/Unit: $313.41

Cost Details:

Component Name	ID	Description	Unit	Cost	QTY	Total
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.	Hours	$37.19	8	$297.52
Materials						
Sap Pre-Heater, High efficiency, fixed cost	2254	High efficiency sap pre-heater device, fixed cost portion. Materials only.	Each	$6,706.58	0.5	$3,353.29
Sap Pre-Heater, High efficiency, variable cost	2255	High efficiency sap pre-heater device, variable cost portion. Materials only.	Square Feet	$222.14	40	$8,885.60

Practice: 372 - Combustion System Improvement

Scenario: #10 - Sap Preheater

Scenario Description:

The unit sets over the evaporator pan and uses steam from the evaporator pan to pre-heat the sap prior to entering the boiling pan. Heated sap takes much less time to boil, therfore decreases the process combustion time. Decreased combustion time means less fuel used and also results in less air emissions released. This device can increase the efficency of an evaporator pan by 15-20%. This scenario is for units <= 25 sq. ft installed. Resource concerns are energy efficieny and air quality.

Before Situation:

The evaporative process time for making concentrated maple syrup requires boiling ~20 gallons of sap to make 1 gallon of syrup, which means 19 gallons of water have to be boiled off, using much fuel and labor. A typical oil-fired evaporator consumes 3.5 to 4.5 gallons of fuel oil for each gallon of maple syrup produced.

After Situation:

A sap pre-heater device is installed over the evaporator pan and sap is boiled much faster. Decreasing the boiling time decreases combustion time saving both fuel and reducing air emissions.

Feature Measure: Size of preheater in SF

Scenario Unit: Square Feet

Scenario Typical Size: 10.0

Scenario Total Cost: $1,130.84

Scenario Cost/Unit: $113.08

Cost Details:

Component Name	ID	Description	Unit	Cost	QTY	Total
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.	Hours	$37.19	3	$111.57
Materials						
Sap Pre-Heater Device, <= 25 SF	1443	Install sap pre-heater device to reduce atmospheric emissions with an area of 25 square feet or less. Materials only.	Square Feet	$145.61	7	$1,019.27

Practice: 374 - Farmstead Energy Improvement

Scenario: #1 - Ventilation - 18 inch Exhaust

Scenario Description:

Replacement of a conventional exhaust fan with high volume, low speed, efficient exhaust fan. Fans being installed should be models previously tested by BESS Lab or the Air Movement and Control Association and be in top 20 percentile of fans tested. Practice certification will be through receipts and pictures from the applicant. Typical scenario includes the replacement of a 18" fan.

Before Situation:

Inefficient ventilation in an agricultural building.

After Situation:

High-efficiency ventilation system which reduces energy use. The new ventilation equipment will provide suitable air quality and reduce overall power requirements (kW) compared to the existing ventilation system as evidenced in an energy audit. Associated practices/activities: may include 122-AgEMP - HQ, and other activities within 374-Farmstead Energy Improvement. The resource concern is inefficient use of energy in the farm operation which increases dependence on non-renewable energy sources and can be addressed through improved energy efficiency. Any improvements are based on a Type 2 energy audit meeting the requirements of ASABE S612.

Feature Measure: Each fan replaced

Scenario Unit: Each

Scenario Typical Size: 1.0

Scenario Total Cost: $673.75

Scenario Cost/Unit: $673.75

Cost Details:

Component Name	ID	Description	Unit	Cost	QTY	Total
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.	Hours	$37.19	1	$37.19
Materials						
Fan, exhaust, 18 in. High Efficiency	2356	18 inch high efficiency exhaust fan, controls, wiring, and associated appurtenances. Materials and shipping only. Exhaust fan, controls, wiring and associated appurtenances (excludes installation) Ventilation - Exhaust Replacement of a conventional exhaust fan with high volume, low speed, efficient exhaust fan. Fans being installed should be models previously tested by BESS lab or the Air Movement and Control Association and be in top 20 percentile of fans tested.	Each	$636.56	1	$636.56

Practice: 374 - Farmstead Energy Improvement

Scenario: #2 - Ventilation - 24 inch Exhaust

Scenario Description:

Replacement of a conventional exhaust fan with high volume, low speed, efficient exhaust fan. Fans being installed should be models previously tested by BESS Lab or the Air Movement and Control Association and be in top 20 percentile of fans tested. Practice certification will be through receipts and pictures from the applicant. Typical scenario includes the replacement of a 24" fan.

Before Situation:

Inefficient ventilation in an agricultural building.

After Situation:

High-efficiency ventilation system which reduces energy use. The new ventilation equipment will provide suitable air quality and reduce overall power requirements (kW) compared to the existing ventilation system as evidenced in an energy audit. Associated practices/activities: may include 122-AgEMP - HQ, and other activities within 374-Farmstead Energy Improvement. The resource concern is inefficient use of energy in the farm operation which increases dependence on non-renewable energy sources and can be addressed through improved energy efficiency. Any improvements are based on a Type 2 energy audit meeting the requirements of ASABE S612.

Feature Measure: Each fan replaced

Scenario Unit: Each

Scenario Typical Size: 1.0

Scenario Total Cost: $757.00

Scenario Cost/Unit: $757.00

Cost Details:

Component Name	ID	Description	Unit	Cost	QTY	Total
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.	Hours	$37.19	1	$37.19
Materials						
Fan, exhaust, 24 in. High Efficiency	2357	24 inch high efficiency exhaust fan, controls, wiring, and associated appurtenances. Materials and shipping only. Exhaust fan, controls, wiring and associated appurtenances (excludes installation) Ventilation - Exhaust Replacement of a conventional exhaust fan with high volume, low speed, efficient exhaust fan. Fans being installed should be models previously tested by BESS lab or the Air Movement and Control Association and be in top 20 percentile of fans tested.	Each	$719.81	1	$719.81

Practice: 374 - Farmstead Energy Improvement

Scenario: #3 - Ventilation - 36 inch Exhaust

Scenario Description:

Replacement of a conventional exhaust fan with high volume, low speed, efficient exhaust fan. Fans being installed should be models previously tested by BESS Lab or the Air Movement and Control Association and be in top 20 percentile of fans tested. Practice certification will be through receipts and pictures from the applicant. Typical scenario includes the replacement of a 36" fan.

Before Situation:

Inefficient ventilation in an agricultural building.

After Situation:

High-efficiency ventilation system which reduces energy use. The new ventilation equipment will provide suitable air quality and reduce overall power requirements (kW) compared to the existing ventilation system as evidenced in an energy audit. Associated practices/activities: may include 122-AgEMP - HQ, and other activities within 374-Farmstead Energy Improvement. The resource concern is inefficient use of energy in the farm operation which increases dependence on non-renewable energy sources and can be addressed through improved energy efficiency. Any improvements are based on a Type 2 energy audit meeting the requirements of ASABE S612.

Feature Measure: Each fan replaced

Scenario Unit: Each

Scenario Typical Size: 1.0

Scenario Total Cost: $1,212.34

Scenario Cost/Unit: $1,212.34

Cost Details:

Component Name	ID	Description	Unit	Cost	QTY	Total
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.	Hours	$37.19	2	$74.38
Materials						
Fan, exhaust, 36 in. High Efficiency	1185	36 inch high efficiency exhaust fan, controls, wiring, and associated appurtenances. Materials only.	Each	$1,137.96	1	$1,137.96

Practice: 374 - Farmstead Energy Improvement

Scenario: #4 - Ventilation - 48 inch Exhaust

Scenario Description:

Replacement of a conventional exhaust fan with high volume, low speed, efficient exhaust fan. Fans being installed should be models previously tested by BESS Lab or the Air Movement and Control Association and be in top 20 percentile of fans tested. Practice certification will be through receipts and pictures from the applicant. Typical scenario includes the replacement of a 48" fan.

Before Situation:

Inefficient ventilation in an agricultural building.

After Situation:

High-efficiency ventilation system which reduces energy use. The new ventilation equipment will provide suitable air quality and reduce overall power requirements (kW) compared to the existing ventilation system as evidenced in an energy audit. Associated practices/activities: may include 122-AgEMP - HQ, and other activities within 374-Farmstead Energy Improvement. The resource concern is inefficient use of energy in the farm operation which increases dependence on non-renewable energy sources and can be addressed through improved energy efficiency. Any improvements are based on a Type 2 energy audit meeting the requirements of ASABE S612.

Feature Measure: Each fan replaced

Scenario Unit: Each

Scenario Typical Size: 1.0

Scenario Total Cost: $1,583.03

Scenario Cost/Unit: $1,583.03

Cost Details:

Component Name	ID	Description	Unit	Cost	QTY	Total
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.	Hours	$37.19	3	$111.57
Materials						
Fan, exhaust, 48 in. High Efficiency	1187	48 inch high efficiency exhaust fan, controls, wiring, and associated appurtenances. Materials only.	Each	$1,471.46	1	$1,471.46

Practice: 374 - Farmstead Energy Improvement

Scenario: #5 - Ventilation - HAF

Scenario Description:

A system of fans are installed to create a horizontal air circulation pattern; the new system promotes efficient heat and moisture distribution. In a typical 10,000 square foot greenhouse, 10 HAF fans are needed. Typical fan size is 20". Fan performance meets Energy Audit efficiency criteria as tested by AMCA or BESS Labs and is usually in the top 20% of fans tested.

Before Situation:

Inefficent air circulation system in a greenhouse.

After Situation:

Air circulation system which reduces energy use. The new equipment will provide suitable air quality and reduce overall power requirements (kW) compared to the existing system as evidenced in an energy audit. Associated practices/activities: may include 122-AgEMP - HQ, and other activities within 374-Farmstead Energy Improvement. The resource concern is inefficient use of energy in the farm operation which increases dependence on non-renewable energy sources and can be addressed through improved energy efficiency. Any improvements are based on a Type 2 energy audit meeting the requirements of ASABE S612.

Feature Measure: Each fan added

Scenario Unit: Each

Scenario Typical Size: 1.0

Scenario Total Cost: $364.35

Scenario Cost/Unit: $364.35

Cost Details:

Component Name	ID	Description	Unit	Cost	QTY	Total
Materials						
Fan, Horizontal, High Efficiency	2416	Horizontal air flow fan with a VER rating of at least 13 CFM/Watt. Includes materials only.	Each	$364.35	1	$364.35

Practice: 374 - Farmstead Energy Improvement

Scenario: #6 - Plate Cooler

Scenario Description:

The installation of all stainless steel dual pass plate cooler, type 316 stainless steel, with <=499 gal/hr capacity. Practice certification will be through receipts and pictures from the applicant.

Before Situation:

Inefficient milk cooling (minimal pre-cooling of milk before entering the bulk tank).

After Situation:

High-efficiency milk cooling system which reduces energy use. The new milk cooling equipment will pre-cool the milk and reduce overall power requirements (kW) compared to the existing milk cooling system (where most of the cooling was accomplished in the bulk tank) as evidenced in an energy audit. Associated practices/activities: may include 122-AgEMP - HQ, and other activities within 374-Farmstead Energy Improvement. The resource concern is inefficient use of energy in the farm operation which increases dependence on non-renewable energy sources and can be addressed through improved energy efficiency. Any improvements are based on a Type 2 energy audit meeting the requirements of ASABE S612.

Feature Measure: Each

Scenario Unit: Each

Scenario Typical Size: 1.0

Scenario Total Cost: $4,726.94

Scenario Cost/Unit: $4,726.94

Cost Details:

Component Name	ID	Description	Unit	Cost	QTY	Total
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.	Hours	$37.19	8	$297.52
Materials						
Plate Cooler, <= 499 gal/hr capacity	1176	Stainless Steel, dual pass plate cooler with < 499 gallon/hour capacity. Includes materials and shipping only.	Each	$4,429.42	1	$4,429.42

Practice: 374 - Farmstead Energy Improvement

Scenario: #7 - Scroll Compressor

Scenario Description:

Install a new scroll compressor, associated controls, wiring, and materials to retrofit an existing refrigeration system. A new condenser is not included in this typical scenario. Typical scenario includes a new 3 horsepower scroll compressor.

Before Situation:

Inefficient reciprocating compressor as a key component of the refrigeration system used as part of an agricultural operation, including to cool milk. The compressor is a critical part of the cooling system, affecting product quality, system reliability, and system efficiency.

After Situation:

A more efficient scroll compressor, which will reduce energy use, is evidenced by the energy audit. A comparably sized scroll compressor provides refrigeration capacity at a higher efficiency than a reciprocating compressor. Newer scroll compressor systems typically reduce electricity use by 15 to 25 percent compared to reciprocating compressors. Associated practices/activities: may include 122-AgEMP - HQ, and other activities within 374-Farmstead Energy Improvement. The resource concern is inefficient use of energy in the farm operation which increases dependence on non-renewable energy sources and can be addressed through improved energy efficiency. Any improvements are based on a Type 2 energy audit meeting the requirements of ASABE S612.

Feature Measure: Horse Power

Scenario Unit: Horsepower

Scenario Typical Size: 3.0

Scenario Total Cost: $5,853.41

Scenario Cost/Unit: $1,951.14

Cost Details:

Component Name	ID	Description	Unit	Cost	QTY	Total
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.	Hours	$37.19	4	$148.76
Materials						
Scroll Compressor - 3 HP	1182	Scroll compressor, 3 Horsepower, controls, wiring, and appurtenances. Materials only.	Each	$1,901.55	3	$5,704.65

Practice: 374 - Farmstead Energy Improvement

Scenario: #8 - Evaporator defrost heater control

Scenario Description:

Evaporator heater control to prevent unnecessary defrost cycles in mechanically refrigerated food storage spaces.

Before Situation:

Cooler evaporators are prone to frosting due to the relatively low temperature of the refrigerant and relatively high humidity resulting from stored produce (respiration metabolism). Most integrated refrigeration systems include a heater for defrosting the evaporator when frosting occurs. However, most are on timers which results in the heaters being activated whether the evaporator is frozen or not.

After Situation:

Defrost controls exist in the commercial market which, instead of working off timers, monitor the conditions of the evaporator and the stored space to determine when a defrost cycle is required. Electrical consumption is reduced due to a) the reduced heater duty and b) reduced cooling to recover from the defrost cycle. Additional benefit is achieved in enterprises storing bulk produce due to better control of consistent temperature and humidity in storage.

Feature Measure: Each

Scenario Unit: Each

Scenario Typical Size: 1.0

Scenario Total Cost: $858.71

Scenario Cost/Unit: $858.71

Cost Details:

Component Name	ID	Description	Unit	Cost	QTY	Total
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.	Hours	$37.19	2	$74.38
Materials						
Evaporator Defrost Heater Control Unit	2430	A control unit to monitor the conditions of the evaporator and the stored space to determine when a defrost cycle is required	Each	$784.33	1	$784.33

Practice: 374 - Farmstead Energy Improvement

Scenario: #9 - Variable Speed Drive < = 10 HP

Scenario Description:

The typical scenario consists of a variable speed drive (VSD) and appurtances, such as hook-ups, control panels, wiring, control blocks, filters, switches, pads, etc. attached to an electric motor used to drive a ventilation fan, irrigation pumps, vacuum pump, or similar equipment involved with agricultural production. The motor size, on which the VSD is added, is smaller than or equal to 10 HP.

Before Situation:

The system is inefficient when a motor operates at constant speed to satisfy a load which varies as to flow rate and/or pressure requirements.

After Situation:

An on-farm energy audit has determined that energy use can be reduced through use of a VSD to control electric motors. After the VSD is applied, the motor speed can be adjusted to reduce power requirements and better match varied flow or pressure requirements. Associated practices/activities: may include 122-AgEMP - HQ, and other activities within 374-Farmstead Energy Improvement. The resource concern is inefficient use of energy in the farm operation which increases dependence on non-renewable energy sources and can be addressed through improved energy efficiency. Any improvements are based on a Type 2 energy audit meeting the requirements of ASABE S612.

Feature Measure: Horsepower

Scenario Unit: Horsepower

Scenario Typical Size: 5.0

Scenario Total Cost: $1,419.17

Scenario Cost/Unit: $283.83

Cost Details:

Component Name	ID	Description	Unit	Cost	QTY	Total
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.	Hours	$37.19	8	$297.52
Materials						
Variable Speed Drive, 10 HP	1287	Variable speed drive for 10 Horsepower electric motor. Does not include motor. Materials only.	Horsepower	$194.41	2.5	$486.03
Variable Speed Drive, 5 HP	2348	Variable speed drive for 5 Horsepower electric motor. Does not include motor. Materials only.	Horsepower	$254.25	2.5	$635.63

Practice: 374 - Farmstead Energy Improvement

Scenario: #10 - Variable Speed Drive > 10 HP

Scenario Description:

The typical scenario consists of a variable speed drive (VSD) and appurtances, such as hook-ups, control panels, wiring, control blocks, filters, switches, pads, etc. attached to an electric motor used to drive a ventilation fan, irrigation pumps, vacuum pump, or similar equipment involved with agricultural production. The motor size, on which the VSD is added, is larger than 10 HP.

Before Situation:

The system is inefficient when a motor operates at constant speed to satisfy a load which varies as to flow rate and/or pressure requirements.

After Situation:

An on-farm energy audit has determined that energy use can be reduced through use of a VSD to control electric motors. After the VSD is applied, the motor speed can be adjusted to reduce power requirements and better match varied flow or pressure requirements. Associated practices/activities: may include 122-AgEMP - HQ, and other activities within 374-Farmstead Energy Improvement. The resource concern is inefficient use of energy in the farm operation which increases dependence on non-renewable energy sources and can be addressed through improved energy efficiency. Any improvements are based on a Type 2 energy audit meeting the requirements of ASABE S612.

Feature Measure: Horsepower

Scenario Unit: Horsepower

Scenario Typical Size: 50.0

Scenario Total Cost: $5,399.27

Scenario Cost/Unit: $107.99

Cost Details:

Component Name	ID	Description	Unit	Cost	QTY	Total
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.	Hours	$37.19	8	$297.52
Materials						
Variable Speed Drive, 50 HP	1288	Variable speed drive for 50 Horsepower electric motor. Does not include motor. Materials only.	Horsepower	$103.95	12.5	$1,299.38
Variable Speed Drive, 100 HP	1289	Variable speed drive for 100 Horsepower electric motor. Does not include motor. Materials only.	Horsepower	$98.51	12.5	$1,231.38
Variable Speed Drive, 200 HP	1290	Variable speed drive for 200 Horsepower electric motor. Does not include motor. Materials only.	Horsepower	$77.52	12.5	$969.00
Variable Speed Drive, 25 HP	2557	Variable speed drive for 25 Horsepower electric motor. Does not include motor. Materials only.	Horsepower	$128.16	12.5	$1,602.00

Practice: 374 - Farmstead Energy Improvement

Scenario: #11 - Automatic Controller System

Scenario Description:

The typical scenario consists of an automatic control system installed on an existing manually controlled agricultural system. Typical components may include any of the following: wiring, sensors, data logger, logic controller, communication link, software, switches, and relay.

Before Situation:

A manually controlled system is existing in an agricultural facility that causes the inefficient use of energy, as evidenced by an on-farm energy audit.

After Situation:

An on-farm energy audit has determined that energy use can be reduced through use of an automatic controller that helps regulates the energy consumption of the existing system. Associated practices/activities may include: 122-AgEMP - HQ, and other activities within 374-Farmstead Energy Improvement. The resource concern is inefficient use of energy in the farm operation which increases dependence on non-renewable energy sources and can be addressed through improved energy efficiency. Any improvements are based on a Type 2 energy audit meeting the requirements of ASABE S612.

Feature Measure: Each system

Scenario Unit: Each

Scenario Typical Size: 1.0

Scenario Total Cost: $1,971.49

Scenario Cost/Unit: $1,971.49

Cost Details:

Component Name	ID	Description	Unit	Cost	QTY	Total
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.	Hours	$37.19	8	$297.52
Materials						
Switches and Controls, temp sensors	1192	Temperature and soil moisture sensors installed as part of an electronic monitoring (with or without wireless telecommunications) commonly used to control pumps and irrigation systems	Each	$579.54	1	$579.54
Switches and Controls, programmable controller	1193	Programmable logic controller (with or without wireless telecommunications) commonly used to control pumps and irrigation systems	Each	$307.65	1	$307.65
Switches and Controls, Wi-Fi system and software	1194	Software with built-in cellular or Wi-Fi communication commonly used to control pumps and irrigation systems	Each	$786.78	1	$786.78

Practice: 374 - Farmstead Energy Improvement

Scenario: #12 - Greenhouse Step Controller System

Scenario Description:

The typical scenario consists of an automatic control system installed in place of an existing manually controlled system for ventilation, heating, and cooling in a greenhouse. Typical components may include any of the following: wiring, sensors, step controller, switches, and contactor relay panel.

Before Situation:

A manually controlled system is existing in a greenhouse that causes the inefficient use of energy for ventilation, heating and cooling, as evidenced by an on-farm energy audit.

After Situation:

An on-farm energy audit has determined that energy use can be reduced through use of an automatic controller that helps regulates the energy consumption of the existing greenhouse ventilation, heating and cooling systems. Associated practices/activities may include: 122-AgEMP - HQ, and other activities within 374-Farmstead Energy Improvement. The resource concern is inefficient use of energy in the farm operation which increases dependence on non-renewable energy sources and can be addressed through improved energy efficiency. Any improvements are based on a Type 2 energy audit meeting the requirements of ASABE S612.

Feature Measure: Each system

Scenario Unit: Each

Scenario Typical Size: 1.0

Scenario Total Cost: $1,339.03

Scenario Cost/Unit: $1,339.03

Cost Details:

Component Name	ID	Description	Unit	Cost	QTY	Total
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.	Hours	$37.19	3	$111.57
Materials						
Temperature Sensors	2462	Sensor used to measure and communicate temperature to the controlling mechanism in a refrigeration system. Includes materials and shipping only.	Each	$125.65	1	$125.65
Switches and controls, greenhouse step controller	2463	Step controller and associated appurtenances. Part of an electronic environmental control system commonly used in greenhouses. Includes materials and shipping only.	Each	$1,101.81	1	$1,101.81

Practice: 374 - Farmstead Energy Improvement

Scenario: #13 - Motor Upgrade <= 1 HP

Scenario Description:

The typical scenario consists of replacing an existing electric motor used to drive a ventilation fan, irrigation pumps, vacuum pump, or similar equipment involved with agricultural production with a new, high efficiency motor. The motor size is less than or equal to 1 horsepower.

Before Situation:

The system is inefficient with a standard efficiency motor.

After Situation:

An on-farm energy audit has determined that energy use can be reduced through use of a NEMA premium efficiency motor. Associated practices/activities may include: 122-AgEMP - HQ, and other activities within 374-Farmstead Energy Improvement. The resource concern is inefficient use of energy in the farm operation which increases dependence on non-renewable energy sources and can be addressed through improved energy efficiency. Any improvements are based on a Type 2 energy audit meeting the requirements of ASABE S612.

Feature Measure: Each

Scenario Unit: Each

Scenario Typical Size: 1.0

Scenario Total Cost: $599.79

Scenario Cost/Unit: $599.79

Cost Details:

Component Name	ID	Description	Unit	Cost	QTY	Total
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.	Hours	$37.19	4	$148.76
Materials						
Motor, electric, NEMA Premium, 1 HP	1169	Premium NEMA approved electric motor, 1 Horsepower and all required appurtenances. Includes materials and shipping only.	Each	$451.03	1	$451.03

Practice: 374 - Farmstead Energy Improvement

Scenario: #14 - Motor Upgrade > 1 and < 10 HP

Scenario Description:

The typical scenario consists of replacing an existing electric motor used to drive a ventilation fan, irrigation pumps, vacuum pump, or similar equipment involved with agricultural production with a new, high efficiency motor. The motor size is larger than 1 and less than 10 horsepower.

Before Situation:

The system is inefficient with a standard efficiency motor.

After Situation:

An on-farm energy audit has determined that energy use can be reduced through use of a NEMA premium efficiency motor. Associated practices/activities may include: 122-AgEMP - HQ, and other activities within 374-Farmstead Energy Improvement. The resource concern is inefficient use of energy in the farm operation which increases dependence on non-renewable energy sources and can be addressed through improved energy efficiency. Any improvements are based on a Type 2 energy audit meeting the requirements of ASABE S612.

Feature Measure: Each

Scenario Unit: Each

Scenario Typical Size: 1.0

Scenario Total Cost: $758.13

Scenario Cost/Unit: $758.13

Cost Details:

Component Name	ID	Description	Unit	Cost	QTY	Total
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.	Hours	$37.19	4	$148.76
Materials						
Motor, electric, NEMA Premium, 5 HP	1171	Premium NEMA approved electric motor, 5 Horsepower and all required appurtenances. Includes materials and shipping only.	Each	$609.37	1	$609.37

Practice: 374 - Farmstead Energy Improvement

Scenario: #15 - Motor Upgrade 10 - 100 HP

Scenario Description:

The typical scenario consists of replacing an existing electric motor used to drive a ventilation fan, irrigation pumps, vacuum pump, or similar equipment involved with agricultural production with a new, high efficiency motor. The motor size is equal to or larger than 10 and less than or equal to 100 horsepower.

Before Situation:

The system is inefficient with a standard efficiency motor.

After Situation:

An on-farm energy audit has determined that energy use can be reduced through use of a NEMA premium efficiency motor. Associated practices/activities may include: 122-AgEMP - HQ, and other activities within 374-Farmstead Energy Improvement. The resource concern is inefficient use of energy in the farm operation which increases dependence on non-renewable energy sources and can be addressed through improved energy efficiency. Any improvements are based on a Type 2 energy audit meeting the requirements of ASABE S612.

Feature Measure: Each

Scenario Unit: Each

Scenario Typical Size: 1.0

Scenario Total Cost: $2,692.98

Scenario Cost/Unit: $2,692.98

Cost Details:

Component Name	ID	Description	Unit	Cost	QTY	Total
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.	Hours	$37.19	8	$297.52
Materials						
Motor, electric, NEMA Premium, 10 HP	1172	Premium NEMA approved electric motor, 10 Horsepower and all required appurtenances. Includes materials and shipping only.	Each	$885.04	0.5	$442.52
Motor, electric, NEMA Premium, 50 HP	1173	Premium NEMA approved electric motor, 50 Horsepower and all required appurtenances. Includes materials and shipping only.	Each	$3,905.87	0.5	$1,952.94

Practice: 374 - Farmstead Energy Improvement

Scenario: #16 - Compressor Heat Recovery

Scenario Description:

A compressor heat recovery unit, similar to a water heater, captures waste heat from the compressors (milk cooling process) and uses it to preheat water to ~ 120 deg before it enters the hot water heater. Heat (energy) being lost to the environment will be captured and recycled to save energy in another part of the dairy operation.

Before Situation:

A dairy operation uses an electric hot water heater to heat water used for washing the milking equipment and to mix calf feed. The hot water heater needs to heat well water from ~55 deg to ~ 160 degrees for use. The electricity cost for the hot water heater is significant. Meanwhile milk collected is cooled in a bulk tank utilizing one or more compressors to remove the heat. This heat is typically released into the air by condenser fans and is lost energy.

After Situation:

The compressor heat recovery unit captures waste heat from the compressors (milk cooling process) and uses it to preheat water to ~ 120 deg before it goes to the hot water heater. Having to only heat the wash water the additional ~40 degrees, saves on energy/electricity needed to run the hotwater heater. This can reduce the annual water heating energy use and costs by ~ 50%.

Feature Measure: Each

Scenario Unit: Each

Scenario Typical Size: 1.0

Scenario Total Cost: $4,416.35

Scenario Cost/Unit: $4,416.35

Cost Details:

Component Name	ID	Description	Unit	Cost	QTY	Total
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.	Hours	$37.19	3	$111.57
Materials						
Compressor heat recovery (CHR) unit, High Efficiency	1899	Compressor heat recovery (CHR) units (insulated storage tanks with heat exchangers) added to a refrigeration system, use the heat extracted from a warm fluid (e.g., milk) that passes through the hot gas refrigerant line from the refrigeration system's co	Each	$4,304.78	1	$4,304.78

Practice: 374 - Farmstead Energy Improvement

Scenario: #17 - High Efficiency Hot Water Heater

Scenario Description:
An older inefficient hot water heater used at an agricultural operation is replaced with a high efficiency tankless unit.

Before Situation:
An agricultural operation uses an inefficient electric or oil-fired hot water heater that is approaching the end of its useful life and is a candidate for replacement. It is used to heat water for washing dairy milking equipment, washing towels, to mix calf feed, etc. The fuel cost for the hot water heater is significant.

After Situation:
An on-demand tankless water heater with efficiency rating as per a Type 2 energy audit meeting the requirements of ASABE S612 is installed. This significantly reduces the energy used for heating hot water at the agricultural operation.

Feature Measure: Each

Scenario Unit: Each

Scenario Typical Size: 1.0

Scenario Total Cost: $2,782.81

Scenario Cost/Unit: $2,782.81

Cost Details:

Component Name	ID	Description	Unit	Cost	QTY	Total
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.	Hours	$37.19	4	$148.76
Materials						
Water Heater, High Efficiency	2485	Water heater with efficiency rating as per ASABE-S612. Includes materials and shipping only.	Each	$2,634.05	1	$2,634.05

Practice: 374 - Farmstead Energy Improvement

Scenario: #18 - Heating (Building)

Scenario Description:

Replace existing low efficiency heaters with new high efficiency heaters. High-efficiency heating systems include any heating unit with annual fuel utilization efficiency (AFUE) of 90%+ for fuel oil and 93%+ for natural gas and propane. Applications may be air heating/building environment and hydronic (boiler) heating for agricultural operations, including under bench, or root zone heating. An alternative to heater replacement might be the addition of climate control system and electronic temperature controls with +/- 1 degree F differential, to reduce the annual run time. HEATER SIZING AND PAYMENT IS BASED ON INPUT BTU RATING.

Before Situation:

Buildings heated with low efficiency heaters or heaters without proper electronic climate controls

After Situation:

Higher efficiency heaters reduce energy consumption, energy costs, and GHG emissions. These replacement systems can be fueled by natural gas, propane, or fuel oil. Associated practices/activities: 122-AgEMP - HQ and other activities within 374-Farmstead Energy Improvement. The resource concern is inefficient use of energy in the farm operation which increases dependence on non-renewable energy sources and can be addressed through improved energy efficiency. Any improvements are based on a Type 2 energy audit meeting the requirements of ASABE S612. A 2880 sq.ft. hoop-house heated March-June in New England requires a total of at least 250,000 BTU input with 2 unit heaters.

Feature Measure: Input BTU Rating

Scenario Unit: 1,000 BTU/Hour

Scenario Typical Size: 270.0

Scenario Total Cost: $10,857.54

Scenario Cost/Unit: $40.21

Cost Details:

Component Name	ID	Description	Unit	Cost	QTY	Total
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.	Hours	$37.19	16	$595.04
Materials						
Heater, high efficiency	1165	Natural gas, propane, or fuel oil unit heater or boiler and venting materials. Based on input kBTU/hour. Includes materials and shipping only.	1,000 BTU/Hour	$16.42	625	$10,262.50

Practice: 374 - Farmstead Energy Improvement

Scenario: #19 - Greenhouse Roof Vent

Scenario Description:
Install a motorized roof vent system along the peak of an existing greenhouse. System includes: roof vent, motor, motor mount, and motor controller.

Before Situation:
Greenhouse ventilation is accomplished primarily with a fan installed in the endwall.

After Situation:
Greenhouse roof vent allow natural ventilation and eliminates the need to use of ventilation fans. Reduced electrical consumption reults in energy savings. Associated practices/activities: may include 122-AgEMP - HQ, 672-Building Envelope Improvement, and other activities within 374-Farmstead Energy Improvement. The resource concern is inefficient use of energy in the farm operation which increases dependence on non-renewable energy sources and can be addressed through improved energy efficiency. Any improvements are based on a Type 2 energy audit meeting the requirements of ASABE S612.

Feature Measure: Feet of roof vent installed

Scenario Unit: Feet

Scenario Typical Size: 125.0

Scenario Total Cost: $7,687.55

Scenario Cost/Unit: $61.50

Cost Details:

Component Name	ID	Description	Unit	Cost	QTY	Total
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.	Hours	$37.19	20	$743.80
Materials						
Vent, Greenhouse, Roof	2412	Roof vents installed on existing greenhouses. Typically 48 inches x 200 feet long. Comes with controller and wind speed sensor. Includes materials and shipping only.	Linear Feet	$55.55	125	$6,943.75

Practice: 374 - Farmstead Energy Improvement

Scenario: #20 - Root Zone Heating - Greenhouse In-Ground Distribution

Scenario Description:

Install a greenhouse in-ground root zone heat distribution system. Components include in-ground PEX tubing, manifold and valving, and insulation.

Before Situation:

Optimum plant growth temperatures in a greenhouse are maintained by heating the air of the greenhouse.

After Situation:

An inground root zone heating system is installed that provides heat directly to the growing media rather than heating the air of the greenhouse. This approach provides faster production, higher quality crops, and heating energy savings. Heat loss to the outside, and therefore energy consumption, is reduced. Associated practices/activities: may include 122-AgEMP - HQ, and other activities within 374-Farmstead Energy Improvement. The resource concern is inefficient use of energy in the farm operation which increases dependence on non-renewable energy sources and can be addressed through improved energy efficiency. Any improvements are based on a Type 2 energy audit meeting the requirements of ASABE S612.

Feature Measure: Linear feet of heating system

Scenario Unit: Feet

Scenario Typical Size: 1,200.0

Scenario Total Cost: $4,975.60

Scenario Cost/Unit: $4.15

Cost Details:

Component Name	ID	Description	Unit	Cost	QTY	Total
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.	Hours	$37.19	70	$2,603.30
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.	Hours	$27.56	70	$1,929.20
Materials						
In ground PEX tubing	2460	Piping used as part of hot water distribution system for in-ground rootzone heating. Includes materials and shipping only.	Feet	$0.27	1200	$324.00
Manifold and Valving (Valve Controllers)	2461	Valves and distribution manifolds (4 zones) used as part of a hot water distribution system for in-ground rootzone heating. Includes materials and shipping only.	Each	$59.55	2	$119.10

Practice: 374 - Farmstead Energy Improvement

Scenario: #21 - Reverse Osmosis <= 250 GPH

Scenario Description:

A reverse osmosis (RO) unit, installed before the evaporator, filters the sap and removes ~ 75% of the water prior to getting to the evaporator. The unit is sized in gallons per hour. The size of the RO is determined based on the existing maple sugaring operation (number of taps and the capacity of the evaporator). With a RO unit able to remove excess water,it takes less time to boil the sap down, thus saving significant energy (oil & wood fuel) used in the process. The system cost includes the RO unit, pump, vessel, membrane, wash tank, and installation. This scenario includes units that process <= 250 gallons of sap per hour.

Before Situation:

A maple sugaring operation uses an evaporator (pan over a furnace) to boil sap to remove water to create syrup. It takes ~20 gallons of sap to make 1 gallon of syrup, which means 19 gallons of water has to be boiled off. A typical oil-fired evaporator consumes 3.5 to 4.5 gallons of fuel oil for each gallon of maple syrup produced.

After Situation:

With an efficient RO installed in the process, ~ 75% of the water is removed from the sap, thus cutting the boil time down by ~75%. An efficiency of 1 gallon fuel oil (or equivalent wood) per gallon of maple syrup is possible, thereby reducing energy consumption by 65-75%. Associated practices/activities: may include 122-AgEMP - HQ, and other activities within 374-Farmstead Energy Improvement. The resource concern is inefficient use of energy in the farm operation which increases dependence on non-renewable energy sources and can be addressed through improved energy efficiency. Any improvements are based on a Type 2 energy audit meeting the requirements of ASABE S612.

Feature Measure: capacity of unit

Scenario Unit: Gallons per Hour

Scenario Typical Size: 135.0

Scenario Total Cost: $5,234.15

Scenario Cost/Unit: $38.77

Cost Details:

Component Name	ID	Description	Unit	Cost	QTY	Total
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.	Hours	$37.19	3	$111.57
Materials						
Reverse Osmosis unit, fixed cost portion	2224	Fixed cost portion of a reverse osmosis unit used for maple syrup processing. Materials only.	Each	$3,158.33	1	$3,158.33
Reverse Osmosis unit, variable cost portion	2225	Variable cost portion of a reverse osmosis unit used for maple syrup processing. Materials only.	Gallons per Hour	$14.55	135	$1,964.25

Practice: 374 - Farmstead Energy Improvement

Scenario: #22 - Reverse Osmosis >250 - <1000 GPH

Scenario Description:

A reverse osmosis (RO) unit, installed before the evaporator, filters the sap and removes ~ 75% of the water prior to getting to the evaporator. The unit is sized in gallons per hour. The size of the RO is determined based on the existing maple sugaring operation (number of taps and the capacity of the evaporator). With a RO unit able to remove excess water,it takes less time to boil the sap down, thus saving significant energy (oil & wood fuel) used in the process. The system costs includes the RO unit, pumps, vessels, membranes, wash tank, and installation. This scenario includes units that process >250 - <1000 gallons of sap per hour.

Before Situation:

A maple sugaring operation uses an evaporator (pan over a furnace) to boil sap to remove water to create syrup. It takes ~20 gallons of sap to make 1 gallon of syrup, which means 19 gallons of water has to be boiled off. A typical oil-fired evaporator consumes 3.5 to 4.5 gallons of fuel oil for each gallon of maple syrup produced.

After Situation:

With an efficient RO installed in the process, ~ 75% of the water is removed from the sap, thus cutting the boil time down by ~75%. An efficiency of 1 gallon fuel oil (or equivalent wood) per gallon of maple syrup is possible, thereby reducing energy consumption by 65-75%. Associated practices/activities: may include 122-AgEMP - HQ, and other activities within 374-Farmstead Energy Improvement. The resource concern is inefficient use of energy in the farm operation which increases dependence on non-renewable energy sources and can be addressed through improved energy efficiency. Any improvements are based on a Type 2 energy audit meeting the requirements of ASABE S612.

Feature Measure: capacity of unit

Scenario Unit: Gallons per Hour

Scenario Typical Size: 365.0

Scenario Total Cost: $8,580.65

Scenario Cost/Unit: $23.51

Cost Details:

Component Name	ID	Description	Unit	Cost	QTY	Total
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.	Hours	$37.19	3	$111.57
Materials						
Reverse Osmosis unit, fixed cost portion	2224	Fixed cost portion of a reverse osmosis unit used for maple syrup processing. Materials only.	Each	$3,158.33	1	$3,158.33
Reverse Osmosis unit, variable cost portion	2225	Variable cost portion of a reverse osmosis unit used for maple syrup processing. Materials only.	Gallons per Hour	$14.55	365	$5,310.75

Practice: 374 - Farmstead Energy Improvement

Scenario: #23 - Reverse Osmosis >= 1000 GPH

Scenario Description:

A reverse osmosis (RO) unit, installed before the evaporator, filters the sap and removes ~ 75% of the water prior to getting to the evaporator. The unit is sized in gallons per hour. The size of the RO is determined based on the existing maple sugaring operation (number of taps and the capacity of the evaporator). With a RO unit able to remove excess water,it takes less time to boil the sap down, thus saving significant energy (oil & wood fuel) used in the process. The system cost includes the RO unit, pumps, vessels, membranes, wash tank, and installation. This scenario includes units that process >= 1000 gallons of sap per hour.

Before Situation:

A maple sugaring operation uses an evaporator (pan over a furnace) to boil sap to remove water to create syrup. It takes ~20 gallons of sap to make 1 gallon of syrup, which means 19 gallons of water has to be boiled off. A typical oil-fired evaporator consumes 3.5 to 4.5 gallons of fuel oil for each gallon of maple syrup produced.

After Situation:

With an efficient RO installed in the process, ~ 75% of the water is removed from the sap, thus cutting the boil time down by ~75%. An efficiency of 1 gallon fuel oil (or equivalent wood) per gallon of maple syrup is possible, thereby reducing energy consumption by 65-75%. Associated practices/activities: may include 122-AgEMP - HQ, and other activities within 374-Farmstead Energy Improvement. The resource concern is inefficient use of energy in the farm operation which increases dependence on non-renewable energy sources and can be addressed through improved energy efficiency. Any improvements are based on a Type 2 energy audit meeting the requirements of ASABE S612.

Feature Measure: capacity of unit

Scenario Unit: Gallons per Hour

Scenario Typical Size: 1,200.0

Scenario Total Cost: $20,729.90

Scenario Cost/Unit: $17.27

Cost Details:

Component Name	ID	Description	Unit	Cost	QTY	Total
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.	Hours	$37.19	3	$111.57
Materials						
Reverse Osmosis unit, fixed cost portion	2224	Fixed cost portion of a reverse osmosis unit used for maple syrup processing. Materials only.	Each	$3,158.33	1	$3,158.33
Reverse Osmosis unit, variable cost portion	2225	Variable cost portion of a reverse osmosis unit used for maple syrup processing. Materials only.	Gallons per Hour	$14.55	1200	$17,460.00

Practice: 374 - Farmstead Energy Improvement

Scenario: #24 - Maple Syrup PreHeater <= 24 SF

Scenario Description:

The unit sets over the evaporator pan and uses steam from the evaporator pan to pre-heat the sap to as high as 200ºF while at the same time injecting air into the sap to promote evaporation. Evaporation rates are increased by 65-75%, based on vendor analysis, leading to 40-43% energy savings. Sap is concentrated from Brix 2% to 4% or more before it enters the flue pan. Steam-enhanced systems require at least 9 feet from floor to ceiling. This scenario includes units <= 24 sq. ft, with installation. With increased evaporation, it takes less time to boil the sap down, thus saving significant energy (oil & wood fuel) used in the process, as well as labor.

Before Situation:

The evaporative process time for making concentrated maple syrup requires boiling ~20 gallons of sap to make 1 gallon of syrup, which means 19 gallons of water have to be boiled off, using more fuel and labor. A typical oil-fired evaporator consumes 3.5 to 4.5 gallons of fuel oil for each gallon of maple syrup produced.

After Situation:

The evaporative process time for making concentrated maple syrup requires boiling ~6 gallons of sap to make 1 gallon of syrup, which means 14 gallons of water were removed by the steam-enhanced system, using less fuel and labor. A typical oil-fired evaporator with a steam pan consumes 2.1 to 2.7 gallons of fuel oil for each gallon of maple syrup produced to remove water from the sap, improving the fuel efficiency and saving labor. Associated practices/activities: may include 122-AgEMP - HQ, and other activities within 374-Farmstead Energy Improvement. The resource concern is inefficient use of energy in the farm operation which increases dependence on non-renewable energy sources and can be addressed through improved energy efficiency. Any improvements are based on a Type 2 energy audit meeting the requirements of ASABE S612.

Feature Measure: Square Foot of steam pan

Scenario Unit: Square Feet

Scenario Typical Size: 12.0

Scenario Total Cost: $9,760.76

Scenario Cost/Unit: $813.40

Cost Details:

Component Name	ID	Description	Unit	Cost	QTY	Total
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.	Hours	$37.19	6	$223.14
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.	Hours	$27.56	6	$165.36
Materials						
Sap Pre-Heater, High efficiency, fixed cost	2254	High efficiency sap pre-heater device, fixed cost portion. Materials only.	Each	$6,706.58	1	$6,706.58
Sap Pre-Heater, High efficiency, variable cost	2255	High efficiency sap pre-heater device, variable cost portion. Materials only.	Square Feet	$222.14	12	$2,665.68

Practice: 374 - Farmstead Energy Improvement

Scenario: #25 - Maple Syrup PreHeater > 24 SF

Scenario Description:

The unit sets over the evaporator pan and uses steam from the evaporator pan to pre-heat the sap to as high as 200ºF while at the same time injecting air into the sap to promote evaporation. Evaporation rates are increased by 65-75%, based on vendor analysis, leading to 40-43% energy savings. Sap is concentrated from Brix 2% to 4% or more before it enters the flue pan. Steam-enhanced systems require at least 9 feet from floor to ceiling. This scenario includes units > 24 sq. ft. with installation. With increased evaporation, it takes less time to boil the sap down, thus saving significant energy (oil & wood fuel) used in the process, as well as labor.

Before Situation:

The evaporative process time for making concentrated maple syrup requires boiling ~20 gallons of sap to make 1 gallon of syrup, which means 19 gallons of water have to be boiled off, using more fuel and labor. A typical oil-fired evaporator consumes 3.5 to 4.5 gallons of fuel oil for each gallon of maple syrup produced.

After Situation:

The evaporative process time for making concentrated maple syrup requires boiling ~6 gallons of sap to make 1 gallon of syrup, which means 14 gallons of water were removed by the steam-enhanced system, using less fuel and labor. A typical oil-fired evaporator with a steam pan consumes 2.1 to 2.7 gallons of fuel oil for each gallon of maple syrup produced to remove water from the sap, improving the fuel efficiency and saving labor. Associated practices/activities: may include 122-AgEMP - HQ, and other activities within 374-Farmstead Energy Improvement. The resource concern is inefficient use of energy in the farm operation which increases dependence on non-renewable energy sources and can be addressed through improved energy efficiency. Any improvements are based on a Type 2 energy audit meeting the requirements of ASABE S612.

Feature Measure: Square Foot of steam pan

Scenario Unit: Square Feet

Scenario Typical Size: 40.0

Scenario Total Cost: $16,110.18

Scenario Cost/Unit: $402.75

Cost Details:

Component Name	ID	Description	Unit	Cost	QTY	Total
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.	Hours	$37.19	8	$297.52
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.	Hours	$27.56	8	$220.48
Materials						
Sap Pre-Heater, High efficiency, fixed cost	2254	High efficiency sap pre-heater device, fixed cost portion. Materials only.	Each	$6,706.58	1	$6,706.58
Sap Pre-Heater, High efficiency, variable cost	2255	High efficiency sap pre-heater device, variable cost portion. Materials only.	Square Feet	$222.14	40	$8,885.60

Practice: 374 - Farmstead Energy Improvement

Scenario: #27 - Evaporator Wood-Fired, Gasifier

Scenario Description:

This practice is for the replacement of an inefficient evaporator with a new high efficiency evaporator with appurtenances. A high efficiency evaporator is designed to increase BTU output from the fuel source and provide a larger flue pan surface area to increase evaporation, thus reducing energy use. Wood-fired gasifer evaporator includes stainless steel sides and bottom, blowers, and stainless steel syrup and flue pans. A 3' x 12 wood-fired gasifier evaporator is common for moderately-sized maple operations in New England.

Before Situation:

The evaporative process time for making concentrated maple syrup is extended and more fuel used because the inefficient evaporator requires more boiling to remove water from the sap.

After Situation:

The evaporative process time for making concentrated maple syrup is reduced by 50% or more and fuel efficiency by 40% or more over standard wood evaporator. Associated practices/activities: may include 122-AgEMP - HQ, and other activities within 374-Farmstead Energy Improvement. The resource concern is inefficient use of energy in the farm operation which increases dependence on non-renewable energy sources and can be addressed through improved energy efficiency. Any improvements are based on a Type 2 energy audit meeting the requirements of ASABE S612.

Feature Measure: Square Foot of unit

Scenario Unit: Square Feet

Scenario Typical Size: 36.0

Scenario Total Cost: $31,016.72

Scenario Cost/Unit: $861.58

Cost Details:

Component Name	ID	Description	Unit	Cost	QTY	Total
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.	Hours	$37.19	4	$148.76
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.	Hours	$27.56	10	$275.60
Materials						
Evaporator, High efficiency, wood-fired, fixed cost	2266	High efficient wood fired evaporator used for maple syrup processing. Fixed cost portion. Materials only.	Each	$17,461.00	1	$17,461.00
Evaporator, High efficiency, wood-fired, variable cost	2267	High efficient wood fired evaporator used for maple syrup processing. Variable cost portion. Materials only.	Square Feet	$364.76	36	$13,131.36

Practice: 374 - Farmstead Energy Improvement

Scenario: #28 - Evaporator Oil-Fired, Parametric Control

Scenario Description:

This practice is for the replacement of an inefficient evaporator with a new high efficiency evaporator with appurtenances. A high efficiency evaporator is designed to increase BTU output from the fuel source and provide a larger flue pan surface area to increase evaporation, thus reducing energy use. Oil-fired evaporator includes stainless steel sides and bottom, oil burner, parametric controls, and stainless steel syrup and flue pans. A 4' x 12' oil-fired evaporator with parametric controls is common for moderately-sized maple operations in New England.

Before Situation:

The evaporative process time for making concentrated maple syrup is extended and more fuel used because the inefficient evaporator requires more boiling to remove water from the sap.

After Situation:

The evaporative process time for making concentrated maple syrup is reduced by 50% or more and fuel efficiency by 15% or more. Associated practices/activities: may include 122-AgEMP - HQ, and other activities within 374-Farmstead Energy Improvement. The resource concern is inefficient use of energy in the farm operation which increases dependence on non-renewable energy sources and can be addressed through improved energy efficiency. Any improvements are based on a Type 2 energy audit meeting the requirements of ASABE S612.

Feature Measure: Square Foot of unit

Scenario Unit: Square Feet

Scenario Typical Size: 48.0

Scenario Total Cost: $32,939.16

Scenario Cost/Unit: $686.23

Cost Details:

Component Name	ID	Description	Unit	Cost	QTY	Total
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.	Hours	$37.19	8	$297.52
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.	Hours	$27.56	12	$330.72
Materials						
Evaporator, High efficiency, oil-fired, fixed cost	2262	High efficient oil fired evaporator used for maple syrup processing. Fixed cost portion. Materials only.	Each	$15,181.16	1	$15,181.16
Evaporator, High efficiency, oil-fired, Variable cost	2263	High efficient oil fired evaporator used for maple syrup processing. Variable cost portion. Materials only.	Square Feet	$356.87	48	$17,129.76

Practice: 374 - Farmstead Energy Improvement

Scenario: #70 - Heating (Small Room)

Scenario Description:

Replace existing low efficiency heaters with new high efficiency heaters. High-efficiency heating systems include any heating unit with annual fuel utilization efficiency (AFUE) of 90%+ for fuel oil and 93%+ for natural gas and propane. Application is for air heating of small building/ room environments. Typical application is a 30,0000 BTU radiant heater. HEATER SIZING AND PAYMENT IS BASED ON INPUT BTU RATING.

Before Situation:

Building rooms heated with low efficiency heaters.

After Situation:

Higher efficiency heaters reduce energy consumption, energy costs, and GHG emissions. These replacement systems can be electric or fueled by natural gas, propane, or fuel oil. Associated practices/activities: 122-AgEMP - HQ and other activities within 374-Farmstead Energy Improvement. The resource concern is inefficient use of energy in the farm operation which increases dependence on non-renewable energy sources and can be addressed through improved energy efficiency. Any improvements are based on a Type 2 energy audit meeting the requirements of ASABE S612.

Feature Measure: Input BTU Rating

Scenario Unit: 1,000 BTU/Hour

Scenario Typical Size: 30.0

Scenario Total Cost: $566.98

Scenario Cost/Unit: $18.90

Cost Details:

Component Name	ID	Description	Unit	Cost	QTY	Total
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.	Hours	$37.19	2	$74.38
Materials						
Heater, high efficiency	1165	Natural gas, propane, or fuel oil unit heater or boiler and venting materials. Based on input kBTU/hour. Includes materials and shipping only.	1,000 BTU/Hour	$16.42	30	$492.60

Practice: 376 - Field Operations Emissions Reduction

Scenario: #1 - One Crop Per Year

Scenario Description:

Utilize equipment that allows a reduction the tillage passes through the field and/or utilizing precision GPS guidance to avoid overlap of tillage passes across the field per crop rotation. Utilize this practice only when residue and STIR values cannot be achieved when using the associated Residue and Tillage Management Practices: 329-No Till or 345-Reduced Tillage to achieve the air quality resource concern. The resource concern addressed is improved air quality by reducing combustion and particulate matter emissions primarily from tillage. The scenario costs are based on tillage equipment or GPS technology to achieve reduce tillage passes.

Before Situation:

Tillage operations are performed individually; each operation requiring a tractor or other power implement to pull the tillage implement resulting in multiple passes across the field. Each pass creates soil particulate emissions contributing to the area's reduced air quality.

After Situation:

A 376 Field Operations Emissions Reduction plan is developed showing a reduced number of field passes across the field (benchmark system compared to the planned system). As a result of applying this practice soil particulates in the air is reduced and the area's air quality is improved.

Feature Measure: Acres Treated

Scenario Unit: Acres

Scenario Typical Size: 40.0

Scenario Total Cost: $652.00

Scenario Cost/Unit: $16.30

Cost Details:

Component Name	ID	Description	Unit	Cost	QTY	Total
Equipment Installation						
Tillage, Primary	946	Includes heavy disking (offset) or chisel plow. Includes equipment, power unit and labor costs.	Acres	$16.30	40	$652.00

Practice: 376 - Field Operations Emissions Reduction

Scenario: #2 - Two Crops Per Year

Scenario Description:

Utilize equipment that allows a reduction of tillage passes through the field and/or precision GPS guidance to avoid overlap of tillage passes across the field per crop rotation. Utilize this practice only when residue and STIR values cannot be achieved when using the associated Residue and Tillage Management Practices: 329-No Till or 345-Reduced Tillage to achieve the air quality resource concern. The resource concern addressed is improved air quality by reducing combustion and particulate matter emissions primarily from tillage. The scenario cost is based on tillage equipment or GPS technology to achieve reduced tillage passes.

Before Situation:

Tillage operations are performed individually; each operation requiring a tractor or other power implement to pull the tillage implement resulting in multiple passes across the field. Each pass creates soil particulate emissions contributing to the area's reduced air quality.

After Situation:

A 376 Field Operations Emissions Reduction plan is developed showing a reduced number of field passes across the field (benchmark system compared to the planned system). As a result of applying this practice soil particulates in the air is reduced and the area's air quality is improved.

Feature Measure: Acres Treated

Scenario Unit: Acres

Scenario Typical Size: 40.0

Scenario Total Cost: $1,304.00

Scenario Cost/Unit: $32.60

Cost Details:

Component Name	ID	Description	Unit	Cost	QTY	Total
Equipment Installation						
Tillage, Primary	946	Includes heavy disking (offset) or chisel plow. Includes equipment, power unit and labor costs.	Acres	$16.30	80	$1,304.00

Practice: 378 - Pond

Scenario: #1 - Excavated Pit

Scenario Description:

A low-hazard water impoundment structure on agricultural lands to maintain or improve water quality and to provide water for livestock, fish and wildlife, recreation, fire control, developing renewable energy systems, and other related uses. Pond is created solely by excavation and impounds less than 3 feet against the embankment or spoil. Excavated material is spoiled or hauled off site, not placed in a designed embankment. Earthen spillway is constructed as needed. The resource concerns addressed include inadequate livestock water, excessive suspended sediment and turbidity in surface water, damage from sediment deposition, and reduced capacity of conveyances by sediment deposition.

Before Situation:

Area exists where water could naturally pool or run off to create a pond for livestock, wildlife, fire control, developing renewable energy systems, and other related uses, and to maintain or improve water quality. Failure of the pond will not result in loss of life; damage to homes, commercial or industrial buildings, main highways, or railroads; or in interruption of the use or service of public utilities.

After Situation:

The typical pond is constructed by excavating 2000 cubic yards and spreading the spoil outside the pool area when possible but most often hauling material offsite using an excavator, dozer, and/or similar excavation equipment. Vegetation will be completed under critical area planting (342). Other associated practices include 382, 516, 521A, 533, 614, 587, 396.

Feature Measure: Excavated Volume

Scenario Unit: Cubic Yards

Scenario Typical Size: 2,000.0

Scenario Total Cost: $16,265.40

Scenario Cost/Unit: $8.13

Cost Details:

Component Name	ID	Description	Unit	Cost	QTY	Total
Equipment Installation						
Dozer, 140 HP	927	Track mounted Dozer with horsepower range of 125 to 160. Equipment and power unit costs. Labor not included.	Hours	$104.83	40	$4,193.20
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.	Hours	$130.80	20	$2,616.00
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	$0.31	20000	$6,200.00
Labor						
Equipment Operators, Heavy	233	Includes: Cranes, Hydraulic Excavators >=50 HP, Dozers, Paving Machines, Rock Trenchers, Trenchers >=12 in., Dump Trucks, Ag Equipment >=150 HP, Scrapers, Water Wagons.	Hours	$38.00	60	$2,280.00
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	$488.10	2	$976.20

Practice: 378 - Pond

Scenario: #2 - Embankment Pond without Pipe

Scenario Description:

A water impoundment structure on agricultural land to maintain or improve water quality or to provide water for livestock, fish and wildlife, recreation, fire control, developing renewable energy systems, and other related uses. An earthen embankment will be constructed with an earthen auxiliary spillway. The resource concerns addressed include inadequate livestock water, excessive suspended sediment and turbidity in surface water, damage from sediment deposition, and reduced capacity of conveyances by sediment deposition.

Before Situation:

Area exists where water could naturally pool or run off to create a pond for livestock, wildlife, fire control, developing renewable energy systems, and other related uses, and to maintain or improve water quality. Failure of the embankment will not result in loss of life or damages of any kind.

After Situation:

The typical pond is constructed by excavating the pool area, constructing the auxiliary spillway, preparing the foundation as designed, and using 3100 cubic yards to create an embankment. The product of the storage times the effective height of the dam is less than 3,000. The effective height of the dam is 35 feet or less. The earthen auxiliary spillway will be constructed as designed. No principle spillway pipe will be used. Vegetation will be completed under critical area planting (342). Other associated practices include 382, 516, 521A, 533, 614, 587, 396.

Feature Measure: Embankment Volume

Scenario Unit: Cubic Yards

Scenario Typical Size: 3,100.0

Scenario Total Cost: $20,259.10

Scenario Cost/Unit: $6.54

Cost Details:

Component Name	ID	Description	Unit	Cost	QTY	Total
Equipment Installation						
Dozer, 140 HP	927	Track mounted Dozer with horsepower range of 125 to 160. Equipment and power unit costs. Labor not included.	Hours	$104.83	120	$12,579.60
Roller, static, towed, tamping foot	1328	Towed static tamping foot (sheepsfoot) roller compactor typically 60 inch diameter drum. Equipment cost only. Does not include pulling equipment. Add Tractor or Dozer.	Hours	$15.19	60	$911.40
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.	Hours	$37.19	20	$743.80
Equipment Operators, Heavy	233	Includes: Cranes, Hydraulic Excavators >=50 HP, Dozers, Paving Machines, Rock Trenchers, Trenchers >=12 in., Dump Trucks, Ag Equipment >=150 HP, Scrapers, Water Wagons.	Hours	$38.00	120	$4,560.00
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	$488.10	3	$1,464.30

Practice: 378 - Pond

Scenario: #3 - Embankment Pond with Pipe

Scenario Description:

A low-hazard water impoundment structure on agricultural land to maintain or improve water quality and to provide water for livestock, fish and wildlife, recreation, fire control, developing renewable energy systems, and other related uses. An earthen embankment will be constructed with a principle spillway conduit and earthen auxiliary spillway, as designed. The resource concerns addressed include inadequate livestock water, excessive suspended sediment and turbidity in surface water, damage from sediment deposition, and reduced capacity of conveyances by sediment deposition.

Before Situation:

Area exists where water could naturally pool or run off to create a pond for livestock, wildlife, fire control, developing renewable energy systems, and other related uses, and to maintain or improve water quality. Failure of the embankment will not result in loss of life or damages of any kind.

After Situation:

The typical low hazard pond is constructed by excavating the pool area, constructing the auxiliary spillway, preparing the foundation as designed, and using 3100 cubic yards to create an embankment. The product of the storage times the effective height of the dam is less than 3,000. The effective height of the dam is 35 feet or less. The principle spillway is installed using an approved conduit material. The earthen auxiliary spillway will be constructed as designed. Vegetation will be completed under critical area planting (342). Other associated practices include 382, 516, 521A, 533, 614, 587, 396.

Feature Measure: Embankment Volume

Scenario Unit: Cubic Yards

Scenario Typical Size: 3,100.0

Scenario Total Cost: $24,123.08

Scenario Cost/Unit: $7.78

Cost Details:

Component Name	ID	Description	Unit	Cost	QTY	Total
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 Yards	$481.12	3	$1,443.36
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 Yards	$2.31	1.6	$3.70
Dozer, 140 HP	927	Track mounted Dozer with horsepower range of 125 to 160. Equipment and power unit costs. Labor not included.	Hours	$104.83	120	$12,579.60
Roller, static, towed, tamping foot	1328	Towed static tamping foot (sheepsfoot) roller compactor typically 60 inch diameter drum. Equipment cost only. Does not include pulling equipment. Add Tractor or Dozer.	Hours	$15.19	60	$911.40
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.	Hours	$37.19	28	$1,041.32
Equipment Operators, Heavy	233	Includes: Cranes, Hydraulic Excavators >=50 HP, Dozers, Paving Machines, Rock Trenchers, Trenchers >=12 in., Dump Trucks, Ag Equipment >=150 HP, Scrapers, Water Wagons.	Hours	$38.00	120	$4,560.00
Materials						
Aggregate, Sand, Graded, Washed	45	Sand, typical ASTM C33 gradation, includes materials, equipment and labor to transport and place	Cubic Yards	$43.40	19.6	$850.64
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	$2.64	118	$311.52
Pipe, CMP, 30 in., 16 Gauge	1742	30 inch Corrugated Metal Pipe, Galvanized, Uncoated, 16 gage. Material cost only.	Feet	$27.59	8	$220.72
Pipe, CMP, 18 in., 16 Gauge	1743	18 inch Corrugated Metal Pipe, Galvanized, Uncoated, 16 gage. Material cost only.	Feet	$17.24	98	$1,689.52
Mobilization						
Mobilization, medium equipment	1139	Equipment with 70-150 HP or typical weights between 14,000 and 30,000 pounds.	Each	$255.65	2	$511.30

Practice: 380 - Windbreak/Shelterbelt Establishment

Scenario: #1 - 1 row windbreak, shrubs, hand planted

Scenario Description:

Single 500 foot row of shrubs for wind protection, wildlife habitat, or snow management. Shrubs planted by hand 4 feet apart. This practice is typically applied to crop, pasture or range lands. Resource Concerns to be addressed may include: Soil Erosion (wind); Excess/Insufficient Water (drifted snow, inefficient moisture management); Water Quality Degradation (excess nutrients in surface waters, excessive sediment in surface waters,); Degraded Plant Condition (undesirable plant productivity and health); Inadequate habitat for Fish and Wildlife (food, cover/shelter, continuity); Inefficient Energy Use (facilities, farming/ranching practices and field operations).

Before Situation:

Agricultural field, livestock paddock, feedlot or farmstead needing protection from wind, additional wildlife food and cover, or management of snow deposition

After Situation:

Wind velocity suitably reduced to reduce soil erosion, or to manage snow deposition. Additional wildlife food and cover.

Feature Measure: length of windbreak row(s)

Scenario Unit: Feet

Scenario Typical Size: 500.0

Scenario Total Cost: $306.33

Scenario Cost/Unit: $0.61

Cost Details:

Component Name	ID	Description	Unit	Cost	QTY	Total
Equipment Installation						
Truck, Pickup	939	Equipment and power unit costs. Labor not included.	Hours	$24.18	2	$48.36
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.	Hours	$11.47	2	$22.94
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.	Hours	$27.56	2	$55.12
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.	Hours	$46.88	2	$93.76
Materials						
Shrub, Seedling, Small	1506	Bare root shrub seedling, 6 to 18 inches tall, includes tropical containerized seedlings less than 10 cubic inches. Includes materials and shipping only.	Each	$0.67	125	$83.75
Wire flags	1586	Small vinyl flags attached to wire stakes, typically, 36 in. in length, for marking tree rows	Each	$0.12	20	$2.40

Practice: 380 - Windbreak/Shelterbelt Establishment

Scenario: #2 - 1 row windbreak, trees, hand planted

Scenario Description:

Single 500 foot row of conifer tree seedlings for wind protection, wildlife habitat, or snow management. Trees planted by hand 10 feet apart. This practice is typically applied to crop, pasture or range lands. Resource Concerns to be addressed may include: Soil Erosion (wind); Excess/Insufficient Water (drifted snow, inefficient moisture management); Water Quality Degradation (excess nutrients in surface waters, excessive sediment in surface waters,); Degraded Plant Condition (undesirable plant productivity and health); Inadequate habitat for Fish and Wildlife (food, cover/shelter, continuity); Inefficient Energy Use (facilities, farming/ranching practices and field operations).

Before Situation:

Agricultural field, livestock paddock, feedlot or farmstead needing protection from wind, additional wildlife food and cover, or management of snow deposition

After Situation:

Wind velocity suitably reduced to reduce soil erosion, or to manage snow deposition. Additional wildlife food and cover.

Feature Measure: length of windbreak row(s)

Scenario Unit: Feet

Scenario Typical Size: 500.0

Scenario Total Cost: $155.49

Scenario Cost/Unit: $0.31

Cost Details:

Component Name	ID	Description	Unit	Cost	QTY	Total
Equipment Installation						
Truck, Pickup	939	Equipment and power unit costs. Labor not included.	Hours	$24.18	1	$24.18
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.	Hours	$11.47	1	$11.47
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.	Hours	$27.56	1	$27.56
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.	Hours	$46.88	1	$46.88
Materials						
Tree, Conifer, Seedling, Medium	1514	Containerized conifer seedlings, 8 or 10 cubic inches; or bare root conifer seedlings 1+1 (two-year old seedlings that grew one year in the original seedbed and another year in a transplant bed), or bare root seedlings 2+0 (two-year old seedlings grown in their original seedbed). Includes materials and shipping only.	Each	$0.86	50	$43.00
Wire flags	1586	Small vinyl flags attached to wire stakes, typically, 36 in. in length, for marking tree rows	Each	$0.12	20	$2.40

Practice: 380 - Windbreak/Shelterbelt Establishment

Scenario: #3 - 2-row windbreak, shrubs, machine planted

Scenario Description:

Two 500 foot rows of shrubs for wind protection, energy conservation, wildlife habitat, air quality, snow management or to provide a visual screen. Shrubs planted with a tree planting machine 4 feet apart in the row with rows 16 feet apart. This practice is typically applied to crop, pasture or range lands. Resource Concerns to be addressed include: Soil Erosion (wind); Excess/Insufficient Water (drifted snow, inefficient moisture management); Water Quality Degradation (excess nutrients in surface waters, pesticides transported to surface waters, excessive sediment in surface waters,); Degraded Plant Condition (undesirable plant productivity and health); Inadequate habitat for Fish and Wildlife (food, cover/shelter, continuity); Livestock Production Limitation (inadequate shelter); Air Quality Impacts (emission of particulate matter, objectionable odors); Inefficient Energy Use (facilities, farming/ranching practices and field operations).

Before Situation:

Agricultural field, livestock paddock, feedlot or farmstead needing protection from wind, additional wildlife food and cover, odor mitigation, visual screen or management of snow deposition

After Situation:

Wind velocity suitably reduced to reduce soil erosion, energy loss or to manage snow deposition. Additional wildlife food and cover, mixing of odor plumes and visual screening.

Feature Measure: length of windbreak row(s)

Scenario Unit: Feet

Scenario Typical Size: 500.0

Scenario Total Cost: $327.85

Scenario Cost/Unit: $0.66

Cost Details:

Component Name	ID	Description	Unit	Cost	QTY	Total
Equipment Installation						
Truck, Pickup	939	Equipment and power unit costs. Labor not included.	Hours	$24.18	1	$24.18
Tractor, agricultural, 60 HP	963	Agricultural tractor with horsepower range of 50 to 90. Equipment and power unit costs. Labor not included.	Hours	$23.10	1	$23.10
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.	Hours	$5.96	1	$5.96
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.	Hours	$27.56	1	$27.56
Equipment Operators, Light	232	Includes: Skid Steer Loaders, Hydraulic Excavators <50 HP, Trenchers <12 in., Ag Equipment <150 HP, Pickup Trucks, Forklifts, Mulchers	Hours	$27.87	1	$27.87
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.	Hours	$46.88	1	$46.88
Materials						
Shrub, Seedling, Small	1506	Bare root shrub seedling, 6 to 18 inches tall, includes tropical containerized seedlings less than 10 cubic inches. Includes materials and shipping only.	Each	$0.67	250	$167.50
Wire flags	1586	Small vinyl flags attached to wire stakes, typically, 36 in. in length, for marking tree rows	Each	$0.12	40	$4.80

Practice: 380 - Windbreak/Shelterbelt Establishment

Scenario: #4 - 2-row windbreak, trees, machine planted

Scenario Description:

Two 500 foot rows of hardwood trees for wind protection, energy conservation, wildlife habitat, air quality, snow management or to provide a visual screen. Trees planted with a tree planting machine 10 feet apart in the row with rows 16 feet apart. Herbivores (deer, rabbits, etc.) are NOT expected to browse tree seedlings, tree protection is not needed. This practice is typically applied to crop, pasture or range lands. Resource Concerns to be addressed include: Soil Erosion (wind); Excess/Insufficient Water (drifted snow, inefficient moisture management); Water Quality Degradation (excess nutrients in surface waters, pesticides transported to surface waters, excessive sediment in surface waters,); Degraded Plant Condition (undesirable plant productivity and health); Inadequate habitat for Fish and Wildlife (food, cover/shelter, continuity); Livestock Production Limitation (inadequate shelter); Air Quality Impacts (emission of particulate matter, objectionable odors); Inefficient Energy Use (facilities, farming/ranching practices and field operations).

Before Situation:

Agricultural field, livestock paddock, feedlot or farmstead needing protection from wind, additional wildlife food and cover, odor mitigation, visual screen or management of snow deposition

After Situation:

Wind velocity suitably reduced to reduce soil erosion, energy loss or to manage snow deposition. Additional wildlife food and cover, mixing of odor plumes and visual screening.

Feature Measure: length of windbreak row(s)

Scenario Unit: Feet

Scenario Typical Size: 500.0

Scenario Total Cost: $393.90

Scenario Cost/Unit: $0.79

Cost Details:

Component Name	ID	Description	Unit	Cost	QTY	Total
Equipment Installation						
Truck, Pickup	939	Equipment and power unit costs. Labor not included.	Hours	$24.18	2	$48.36
Tractor, agricultural, 60 HP	963	Agricultural tractor with horsepower range of 50 to 90. Equipment and power unit costs. Labor not included.	Hours	$23.10	2	$46.20
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.	Hours	$5.96	2	$11.92
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.	Hours	$27.56	2	$55.12
Equipment Operators, Light	232	Includes: Skid Steer Loaders, Hydraulic Excavators <50 HP, Trenchers <12 in., Ag Equipment <150 HP, Pickup Trucks, Forklifts, Mulchers	Hours	$27.87	2	$55.74
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.	Hours	$46.88	2	$93.76
Materials						
Tree, Hardwood, Seedling, Small	1509	Bare root hardwood seedlings 6 to 18 inches tall; includes tropical containerized seedlings of 8 cubic inches or smaller. Includes materials and shipping only.	Each	$0.78	100	$78.00
Wire flags	1586	Small vinyl flags attached to wire stakes, typically, 36 in. in length, for marking tree rows	Each	$0.12	40	$4.80

Practice: 380 - Windbreak/Shelterbelt Establishment

Scenario: #6 - 3 or more row windbreak, shrub, machine planted

Scenario Description:

Three or more 500 foot rows of shrubs for wind protection, energy conservation, wildlife habitat, air quality, snow management. Shrubs planted with a tree planting machine, 4 feet apart in the row with rows 16 feet apart. This practice is typically applied to crop, pasture or range lands. Resource Concerns to be addressed include: Soil Erosion (wind); Excess/Insufficient Water (drifted snow, inefficient moisture management); Water Quality Degradation (excess nutrients in surface waters, pesticides transported to surface waters, excessive sediment in surface waters,); Degraded Plant Condition (undesirable plant productivity and health); Inadequate habitat for Fish and Wildlife (food, cover/shelter, continuity); Livestock Production Limitation (inadequate shelter); Air Quality Impacts (emission of particulate matter, objectionable odors); Inefficient Energy Use (facilities, farming/ranching practices and field operations).

Before Situation:

Agricultural field, livestock paddock, feedlot or farmstead needing protection from wind, additional wildlife food and cover, odor mitigation, visual screening or management of snow deposition

After Situation:

Wind velocity suitably reduced to reduce soil erosion, energy loss or to manage snow deposition. Additional wildlife food and cover, mixing of odor plumes and visual screening.

Feature Measure: length of windbreak row(s)

Scenario Unit: Feet

Scenario Typical Size: 500.0

Scenario Total Cost: $725.10

Scenario Cost/Unit: $1.45

Cost Details:

Component Name	ID	Description	Unit	Cost	QTY	Total
Equipment Installation						
Truck, Pickup	939	Equipment and power unit costs. Labor not included.	Hours	$24.18	3	$72.54
Tractor, agricultural, 60 HP	963	Agricultural tractor with horsepower range of 50 to 90. Equipment and power unit costs. Labor not included.	Hours	$23.10	3	$69.30
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.	Hours	$5.96	3	$17.88
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.	Hours	$27.56	3	$82.68
Equipment Operators, Light	232	Includes: Skid Steer Loaders, Hydraulic Excavators <50 HP, Trenchers <12 in., Ag Equipment <150 HP, Pickup Trucks, Forklifts, Mulchers	Hours	$27.87	3	$83.61
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.	Hours	$46.88	3	$140.64
Materials						
Shrub, Seedling, Small	1506	Bare root shrub seedling, 6 to 18 inches tall, includes tropical containerized seedlings less than 10 cubic inches. Includes materials and shipping only.	Each	$0.67	375	$251.25
Wire flags	1586	Small vinyl flags attached to wire stakes, typically, 36 in. in length, for marking tree rows	Each	$0.12	60	$7.20

Practice: 380 - Windbreak/Shelterbelt Establishment

Scenario: #7 - 3 or more tree rows machine planted windbreak

Scenario Description:

Three or more 500 foot rows of trees for wind protection, energy conservation, wildlife habitat, air quality, snow management or to provide a visual screen. The outside rows are conifers the inside row(s) are hardwoods. Trees 10 feet apart with rows 16 feet apart, planted with a tree planting machine. Herbivores are not expected to browse planted seedlings, so tree shelters are not needed. This practice is typically applied to crop, pasture or range lands. Resource Concerns to be addressed include: Soil Erosion (wind); Excess/Insufficient Water (drifted snow, inefficient moisture management); Water Quality Degradation (excess nutrients in surface waters, pesticides transported to surface waters, excessive sediment in surface waters,); Degraded Plant Condition (undesirable plant productivity and health); Inadequate habitat for Fish and Wildlife (food, cover/shelter, continuity); Livestock Production Limitation (inadequate shelter); Air Quality Impacts (emission of particulate matter, objectionable odors); Inefficient Energy Use (facilities, farming/ranching practices and field operations).

Before Situation:

Agricultural field, livestock paddock, feedlot or farmstead needing protection from wind, additional wildlife food and cover, odor mitigation, visual screening or management of snow deposition

After Situation:

Wind velocity suitably reduced to reduce soil erosion, energy loss or to manage snow deposition. Additional wildlife food and cover, mixing of odor plumes and visual screening.

Feature Measure: length of windbreak row(s)

Scenario Unit: Feet

Scenario Typical Size: 500.0

Scenario Total Cost: $440.90

Scenario Cost/Unit: $0.88

Cost Details:

Component Name	ID	Description	Unit	Cost	QTY	Total
Equipment Installation						
Truck, Pickup	939	Equipment and power unit costs. Labor not included.	Hours	$24.18	2	$48.36
Tractor, agricultural, 60 HP	963	Agricultural tractor with horsepower range of 50 to 90. Equipment and power unit costs. Labor not included.	Hours	$23.10	2	$46.20
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.	Hours	$5.96	2	$11.92
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.	Hours	$27.56	2	$55.12
Equipment Operators, Light	232	Includes: Skid Steer Loaders, Hydraulic Excavators <50 HP, Trenchers <12 in., Ag Equipment <150 HP, Pickup Trucks, Forklifts, Mulchers	Hours	$27.87	2	$55.74
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.	Hours	$46.88	2	$93.76
Materials						
Tree, Hardwood, Seedling, Small	1509	Bare root hardwood seedlings 6 to 18 inches tall; includes tropical containerized seedlings of 8 cubic inches or smaller. Includes materials and shipping only.	Each	$0.78	50	$39.00
Tree, Conifer, Seedling, Medium	1514	Containerized conifer seedlings, 8 or 10 cubic inches; or bare root conifer seedlings 1+1 (two-year old seedlings that grew one year in the original seedbed and another year in a transplant bed), or bare root seedlings 2+0 (two-year old seedlings grown in their original seedbed). Includes materials and shipping only.	Each	$0.86	100	$86.00
Wire flags	1586	Small vinyl flags attached to wire stakes, typically, 36 in. in length, for marking tree rows	Each	$0.12	40	$4.80

Practice: 380 - Windbreak/Shelterbelt Establishment

Scenario: #8 - 3 or more row windbreak, trees, machine planted

Scenario Description:

Three or more 500 foot rows of hardwood trees for wind protection, energy conservation, wildlife habitat, air quality, snow management or to provide a visual screen. Trees planted with a tree planting machine 10 feet apart in the row with rows 16 feet apart. Herbivore (deer, rabbits, etc.) damage is likely, so each tree must be protected with a rigid tube tree shelter. This practice is typically applied to crop, pasture or range lands. Resource Concerns to be addressed include: Soil Erosion (wind); Excess/Insufficient Water (drifted snow, inefficient moisture management); Water Quality Degradation (excess nutrients in surface waters, pesticides transported to surface waters, excessive sediment in surface waters,); Degraded Plant Condition (undesirable plant productivity and health); Inadequate habitat for Fish and Wildlife (food, cover/shelter, continuity); Livestock Production Limitation (inadequate shelter); Air Quality Impacts (emission of particulate matter, objectionable odors); Inefficient Energy Use (facilities, farming/ranching practices and field operations).

Before Situation:

Agricultural field, livestock paddock, feedlot or farmstead needing protection from wind, additional wildlife food and cover, odor mitigation, visual screen or management of snow deposition

After Situation:

Wind velocity suitably reduced to reduce soil erosion, energy loss or to manage snow deposition. Additional wildlife food and cover, mixing of odor plumes and visual screening.

Feature Measure: length of windbreak row(s)

Scenario Unit: Feet

Scenario Typical Size: 500.0

Scenario Total Cost: $1,225.80

Scenario Cost/Unit: $2.45

Cost Details:

Component Name	ID	Description	Unit	Cost	QTY	Total
Equipment Installation						
Truck, Pickup	939	Equipment and power unit costs. Labor not included.	Hours	$24.18	2	$48.36
Tractor, agricultural, 60 HP	963	Agricultural tractor with horsepower range of 50 to 90. Equipment and power unit costs. Labor not included.	Hours	$23.10	2	$46.20
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.	Hours	$5.96	2	$11.92
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.	Hours	$27.56	2	$55.12
Equipment Operators, Light	232	Includes: Skid Steer Loaders, Hydraulic Excavators <50 HP, Trenchers <12 in., Ag Equipment <150 HP, Pickup Trucks, Forklifts, Mulchers	Hours	$27.87	2	$55.74
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.	Hours	$46.88	2	$93.76
Materials						
Tree, Hardwood, Seedling, Small	1509	Bare root hardwood seedlings 6 to 18 inches tall; includes tropical containerized seedlings of 8 cubic inches or smaller. Includes materials and shipping only.	Each	$0.78	150	$117.00
Tree shelter, solid tube type, 5 in. x 48 in.	1571	5 inch x 48 inch tree tube for protection from animal damage. Materials only.	Each	$3.71	150	$556.50
Cable ties, plastic	1575	Plastic cable ties (typ. 8-12 in.) to assist in securing items. Materials only.	Each	$0.06	150	$9.00
Stakes, wood, 3/4 in. x 3/4 in. x 60 in.	1583	3/4 in. x 3/4 in. x 60 in. wood stakes to fasten items in place. Includes materials only.	Each	$1.50	150	$225.00
Wire flags	1586	Small vinyl flags attached to wire stakes, typically, 36 in. in length, for marking tree rows	Each	$0.12	60	$7.20

Practice: 381 - Silvopasture

Scenario: #3 - Non-commercial thinning with establishment of native grasses.

Scenario Description:

Non-commercial thinning of an existing stand of trees followed by establishment of native grasses.

Before Situation:

10-acre forest stand that is overstocked, with a basal area of 100 sq. ft. per acre. There is very little available forage for livestock, due to the dense shade of the tree canopy. Resource Concerns include Degraded Plant Condition - Undesirable Plant Productivity and Health, Inadequate Structure and Composition, Wildfire Hazard, Excessive Biomass Accumulation; Livestock Production Limitation - Inadequate Feed and Forage, and Inadequate Livestock Shelter.

After Situation:

The stand is thinned non-commercially to a basal area of 50 sq. ft. per acre, which will allow adequate sunlight to the forest floor for grass production, yet still provide shade and some protection from the elements for livestock and wildlife. Debris is removed, all tree cutting will leave the shortest possible stump height. The soil is prepared for planting using chemical and mechanical means, then a mix of native warm-season grasses will be established, providing forage to livestock and wildlife. All Resource Concerns listed above are adressed.

Feature Measure: Acres of silvopasture established

Scenario Unit: Acres

Scenario Typical Size: 10.0

Scenario Total Cost: $5,305.82

Scenario Cost/Unit: $530.58

Cost Details:

Component Name	ID	Description	Unit	Cost	QTY	Total
Equipment Installation						
Chainsaw	937	Equipment and power unit costs. Labor not included.	Hours	$7.15	60	$429.00
Tillage, Light	945	Includes light disking (tandem) or field cultivator. Includes equipment, power unit and labor costs.	Acres	$10.68	10	$106.80
Chemical, ground application	948	Chemical application performed by ground equipment. Includes equipment, power unit and labor costs.	Acres	$5.80	10	$58.00
Fertilizer, ground application, dry bulk	950	Dry bulk fertilizer application performed by ground equipment. Includes equipment, power unit and labor costs.	Acres	$6.63	10	$66.30
Lime application	953	Lime application performed by ground equipment. Includes equipment, power unit and labor costs.	Acres	$8.21	10	$82.10
Seeding Operation, No Till/Grass Drill	960	No Till drill or grass drill for seeding. Includes equipment, power unit and labor costs.	Acres	$21.92	2	$43.84
Cultipacking	1100	Includes equipment, power unit and labor costs.	Acres	$8.68	10	$86.80
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.	Hours	$27.56	60	$1,653.60
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.	Hours	$102.76	8	$822.08
Materials						
Phosphorus, P2O5	73	Price per pound of P2O5 supplied by Superphosphate. Price is not per pound of total product applied, no conversion is needed.	Pound	$0.61	500	$305.00
Potassium, K2O	74	K2O supplied by Muriate Of Potash. Price is not per pound of total product applied, no conversion is needed.	Pound	$0.35	500	$175.00
Lime, ENM	75	Fertilizer: Limestone Spread on field.	Ton	$64.87	20	$1,297.40
Tree Marking Paint	313	Trees to be cut through tree marking are physically identified through the application of paint on the tree. Typically one quart of paint is used to mark one acre of trees. Includes materials and shipping only.	Acres	$8.78	10	$87.80
Herbicide, Glyphosate	334	A broad-spectrum, non-selective systemic herbicide. Refer to WIN-PST for product names and active ingredients. Includes materials and shipping only.	Acres	$9.21	10	$92.10

Practice: 381 - Silvopasture

Scenario: #4 - Non-commercial thinning with establishment of introduced grasses.

Scenario Description:

Non-commercial thinning of an existing stand of trees followed by establishment of introduced grasses.

Before Situation:

10-acre forest stand that is overstocked, with a basal area of 100 sq. ft. per acre. There is very little available forage for livestock, due to the dense shade of the tree canopy. Resource Concerns include Degraded Plant Condition - Undesirable Plant Productivity and Health, Inadequate Structure and Composition, Wildfire Hazard, Excessive Biomass Accumulation; Livestock Production Limitation - Inadequate Feed and Forage, and Inadequate Livestock Shelter.

After Situation:

The stand is thinned non-commercially to a basal area of 50 sq. ft. per acre, which will allow adequate sunlight to the forest floor for grass production, yet still provide shade and some protection from the elements for livestock and wildlife. Debris is removed, all tree cutting will leave the shortest possible stump height. The soil is prepared for planting using chemical and mechanical means, then a mix of cool-season grasses and legumes will be established, providing forage to livestock and wildlife. All Resource Concerns listed above are adressed.

Feature Measure: Acres of silvopasture established

Scenario Unit: Acres

Scenario Typical Size: 10.0

Scenario Total Cost: $5,305.82

Scenario Cost/Unit: $530.58

Cost Details:

Component Name	ID	Description	Unit	Cost	QTY	Total
Equipment Installation						
Chainsaw	937	Equipment and power unit costs. Labor not included.	Hours	$7.15	60	$429.00
Tillage, Light	945	Includes light disking (tandem) or field cultivator. Includes equipment, power unit and labor costs.	Acres	$10.68	10	$106.80
Chemical, ground application	948	Chemical application performed by ground equipment. Includes equipment, power unit and labor costs.	Acres	$5.80	10	$58.00
Fertilizer, ground application, dry bulk	950	Dry bulk fertilizer application performed by ground equipment. Includes equipment, power unit and labor costs.	Acres	$6.63	10	$66.30
Lime application	953	Lime application performed by ground equipment. Includes equipment, power unit and labor costs.	Acres	$8.21	10	$82.10
Seeding Operation, No Till/Grass Drill	960	No Till drill or grass drill for seeding. Includes equipment, power unit and labor costs.	Acres	$21.92	2	$43.84
Cultipacking	1100	Includes equipment, power unit and labor costs.	Acres	$8.68	10	$86.80
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.	Hours	$27.56	60	$1,653.60
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.	Hours	$102.76	8	$822.08
Materials						
Phosphorus, P2O5	73	Price per pound of P2O5 supplied by Superphosphate. Price is not per pound of total product applied, no conversion is needed.	Pound	$0.61	500	$305.00
Potassium, K2O	74	K2O supplied by Muriate Of Potash. Price is not per pound of total product applied, no conversion is needed.	Pound	$0.35	500	$175.00
Lime, ENM	75	Fertilizer: Limestone Spread on field.	Ton	$64.87	20	$1,297.40
Tree Marking Paint	313	Trees to be cut through tree marking are physically identified through the application of paint on the tree. Typically one quart of paint is used to mark one acre of trees. Includes materials and shipping only.	Acres	$8.78	10	$87.80
Herbicide, Glyphosate	334	A broad-spectrum, non-selective systemic herbicide. Refer to WIN-PST for product names and active ingredients. Includes materials and shipping only.	Acres	$9.21	10	$92.10

Practice: 381 - Silvopasture

Scenario: #5 - Native Grass Establishment

Scenario Description:

Establishment of native grasses into an existing stand of trees that is already at an adequate density .

Before Situation:

10-acre forest stand that has a basal area of 50 sq. ft. per acre. There is very little available forage for livestock, due to undesirable species in the understory. Resource Concerns include Degraded Plant Condition - Undesirable Plant Productivity and Health, Inadequate Structure and Composition; Livestock Production Limitation - Inadequate Feed and Forage.

After Situation:

The soil is prepared for planting using chemical and mechanical means, then a mix of native warm-season grasses will be established, providing forage to livestock and wildlife. All Resource Concerns listed above are adressed.

Feature Measure: Acres of silvopasture established

Scenario Unit: Acres

Scenario Typical Size: 10.0

Scenario Total Cost: $2,313.34

Scenario Cost/Unit: $231.33

Cost Details:

Component Name	ID	Description	Unit	Cost	QTY	Total
Equipment Installation						
Tillage, Light	945	Includes light disking (tandem) or field cultivator. Includes equipment, power unit and labor costs.	Acres	$10.68	10	$106.80
Chemical, ground application	948	Chemical application performed by ground equipment. Includes equipment, power unit and labor costs.	Acres	$5.80	10	$58.00
Fertilizer, ground application, dry bulk	950	Dry bulk fertilizer application performed by ground equipment. Includes equipment, power unit and labor costs.	Acres	$6.63	10	$66.30
Lime application	953	Lime application performed by ground equipment. Includes equipment, power unit and labor costs.	Acres	$8.21	10	$82.10
Seeding Operation, No Till/Grass Drill	960	No Till drill or grass drill for seeding. Includes equipment, power unit and labor costs.	Acres	$21.92	2	$43.84
Cultipacking	1100	Includes equipment, power unit and labor costs.	Acres	$8.68	10	$86.80
Materials						
Phosphorus, P2O5	73	Price per pound of P2O5 supplied by Superphosphate. Price is not per pound of total product applied, no conversion is needed.	Pound	$0.61	500	$305.00
Potassium, K2O	74	K2O supplied by Muriate Of Potash. Price is not per pound of total product applied, no conversion is needed.	Pound	$0.35	500	$175.00
Lime, ENM	75	Fertilizer: Limestone Spread on field.	Ton	$64.87	20	$1,297.40
Herbicide, Glyphosate	334	A broad-spectrum, non-selective systemic herbicide. Refer to WIN-PST for product names and active ingredients. Includes materials and shipping only.	Acres	$9.21	10	$92.10

Practice: 381 - Silvopasture

Scenario: #6 - Grass Establishment

Scenario Description:
Establishment of introduced grasses into an existing stand of trees that is already at an adequate density .

Before Situation:
10-acre forest stand that has a basal area of 50 sq. ft. per acre. There is very little available forage for livestock, due to undesirable species in the understory. Resource Concerns include Degraded Plant Condition - Undesirable Plant Productivity and Health, Inadequate Structure and Composition; Livestock Production Limitation - Inadequate Feed and Forage.

After Situation:
The soil is prepared for planting using chemical and mechanical means, then a mix of cool-season grasses and legumes will be established, providing forage to livestock and wildlife. All Resource Concerns listed above are adressed.

Feature Measure: Acres of silvopasture established

Scenario Unit: Acres

Scenario Typical Size: 10.0

Scenario Total Cost: $2,313.34

Scenario Cost/Unit: $231.33

Cost Details:

Component Name	ID	Description	Unit	Cost	QTY	Total
Equipment Installation						
Tillage, Light	945	Includes light disking (tandem) or field cultivator. Includes equipment, power unit and labor costs.	Acres	$10.68	10	$106.80
Chemical, ground application	948	Chemical application performed by ground equipment. Includes equipment, power unit and labor costs.	Acres	$5.80	10	$58.00
Fertilizer, ground application, dry bulk	950	Dry bulk fertilizer application performed by ground equipment. Includes equipment, power unit and labor costs.	Acres	$6.63	10	$66.30
Lime application	953	Lime application performed by ground equipment. Includes equipment, power unit and labor costs.	Acres	$8.21	10	$82.10
Seeding Operation, No Till/Grass Drill	960	No Till drill or grass drill for seeding. Includes equipment, power unit and labor costs.	Acres	$21.92	2	$43.84
Cultipacking	1100	Includes equipment, power unit and labor costs.	Acres	$8.68	10	$86.80
Materials						
Phosphorus, P2O5	73	Price per pound of P2O5 supplied by Superphosphate. Price is not per pound of total product applied, no conversion is needed.	Pound	$0.61	500	$305.00
Potassium, K2O	74	K2O supplied by Muriate Of Potash. Price is not per pound of total product applied, no conversion is needed.	Pound	$0.35	500	$175.00
Lime, ENM	75	Fertilizer: Limestone Spread on field.	Ton	$64.87	20	$1,297.40
Herbicide, Glyphosate	334	A broad-spectrum, non-selective systemic herbicide. Refer to WIN-PST for product names and active ingredients. Includes materials and shipping only.	Acres	$9.21	10	$92.10

Practice: 381 - Silvopasture

Scenario: #7 - Tree and native grass establishment

Scenario Description:

Establishment of trees and native grasses into a field that contains neither suitable forage nor suitable tree cover for a silvopasture system.

Before Situation:

10-acre old field without suitable forage for livestock nor tree cover. There is very little available forage for livestock, due to undesirable species in the understory. Resource Concerns include Degraded Plant Condition - Undesirable Plant Productivity and Health, Inadequate Structure and Composition; Livestock Production Limitation - Inadequate Feed and Forage, and Inadequate Livestock Shelter.

After Situation:

The site will be prepared using chemical and mechanical means, a mix of native warm-season grasses will be established, and then 200 pine trees per acre will be planted, providing forage to livestock and wildlife, and, in time, producing a viable wood products crop. Per the conservation practice standard, livestock grazing will be deferred until the trees reach adequate height to resist damage, or use exclusion measures are established. All Resource Concerns listed above are adressed.

Feature Measure: Acres of silvopasture established

Scenario Unit: Acres

Scenario Typical Size: 10.0

Scenario Total Cost: $4,229.58

Scenario Cost/Unit: $422.96

Cost Details:

Component Name	ID	Description	Unit	Cost	QTY	Total
Equipment Installation						
Tillage, Light	945	Includes light disking (tandem) or field cultivator. Includes equipment, power unit and labor costs.	Acres	$10.68	10	$106.80
Chemical, ground application	948	Chemical application performed by ground equipment. Includes equipment, power unit and labor costs.	Acres	$5.80	10	$58.00
Fertilizer, ground application, dry bulk	950	Dry bulk fertilizer application performed by ground equipment. Includes equipment, power unit and labor costs.	Acres	$6.63	10	$66.30
Lime application	953	Lime application performed by ground equipment. Includes equipment, power unit and labor costs.	Acres	$8.21	10	$82.10
Seeding Operation, No Till/Grass Drill	960	No Till drill or grass drill for seeding. Includes equipment, power unit and labor costs.	Acres	$21.92	2	$43.84
Tractor, agricultural, 60 HP	963	Agricultural tractor with horsepower range of 50 to 90. Equipment and power unit costs. Labor not included.	Hours	$23.10	4	$92.40
Cultipacking	1100	Includes equipment, power unit and labor costs.	Acres	$8.68	10	$86.80
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.	Hours	$5.96	4	$23.84
Materials						
Phosphorus, P2O5	73	Price per pound of P2O5 supplied by Superphosphate. Price is not per pound of total product applied, no conversion is needed.	Pound	$0.61	500	$305.00
Potassium, K2O	74	K2O supplied by Muriate Of Potash. Price is not per pound of total product applied, no conversion is needed.	Pound	$0.35	500	$175.00
Lime, ENM	75	Fertilizer: Limestone Spread on field.	Ton	$64.87	20	$1,297.40
Herbicide, Glyphosate	334	A broad-spectrum, non-selective systemic herbicide. Refer to WIN-PST for product names and active ingredients. Includes materials and shipping only.	Acres	$9.21	10	$92.10
Tree, Hardwood, Seedling, Small	1509	Bare root hardwood seedlings 6 to 18 inches tall; includes tropical containerized seedlings of 8 cubic inches or smaller. Includes materials and shipping only.	Each	$0.78	2000	$1,560.00
Wire flags	1586	Small vinyl flags attached to wire stakes, typically, 36 in. in length, for marking tree rows	Each	$0.12	2000	$240.00

Practice: 381 - Silvopasture

Scenario: #8 - Tree, Grass, Legume Establishment

Scenario Description:

Establishment of trees and introduced grasses and legumes into a field that contains neither suitable forage nor suitable tree cover for a silvopasture system.

Before Situation:

10-acre old field without suitable forage for livestock nor tree cover. There is very little available forage for livestock, due to undesirable species in the understory. Resource Concerns include Degraded Plant Condition - Undesirable Plant Productivity and Health, Inadequate Structure and Composition; Livestock Production Limitation - Inadequate Feed and Forage, and Inadequate Livestock Shelter.

After Situation:

The site will be prepared using chemical and mechanical means, a mix of cool-season grasses and legumes will be established, and then 200 pine trees per acre will be planted, providing forage to livestock and wildlife, and, in time, producing a viable wood products crop. Per the conservation practice standard, livestock grazing will be deferred until the trees reach adequate height to resist damage, or use exclusion measures are established. All Resource Concerns listed above are adressed.

Feature Measure: Acres of silvopasture established

Scenario Unit: Acres

Scenario Typical Size: 10.0

Scenario Total Cost: $3,689.58

Scenario Cost/Unit: $368.96

Cost Details:

Component Name	ID	Description	Unit	Cost	QTY	Total
Equipment Installation						
Tillage, Light	945	Includes light disking (tandem) or field cultivator. Includes equipment, power unit and labor costs.	Acres	$10.68	10	$106.80
Chemical, ground application	948	Chemical application performed by ground equipment. Includes equipment, power unit and labor costs.	Acres	$5.80	10	$58.00
Fertilizer, ground application, dry bulk	950	Dry bulk fertilizer application performed by ground equipment. Includes equipment, power unit and labor costs.	Acres	$6.63	10	$66.30
Lime application	953	Lime application performed by ground equipment. Includes equipment, power unit and labor costs.	Acres	$8.21	10	$82.10
Seeding Operation, No Till/Grass Drill	960	No Till drill or grass drill for seeding. Includes equipment, power unit and labor costs.	Acres	$21.92	2	$43.84
Tractor, agricultural, 60 HP	963	Agricultural tractor with horsepower range of 50 to 90. Equipment and power unit costs. Labor not included.	Hours	$23.10	4	$92.40
Cultipacking	1100	Includes equipment, power unit and labor costs.	Acres	$8.68	10	$86.80
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.	Hours	$5.96	4	$23.84
Materials						
Phosphorus, P2O5	73	Price per pound of P2O5 supplied by Superphosphate. Price is not per pound of total product applied, no conversion is needed.	Pound	$0.61	500	$305.00
Potassium, K2O	74	K2O supplied by Muriate Of Potash. Price is not per pound of total product applied, no conversion is needed.	Pound	$0.35	500	$175.00
Lime, ENM	75	Fertilizer: Limestone Spread on field.	Ton	$64.87	20	$1,297.40
Herbicide, Glyphosate	334	A broad-spectrum, non-selective systemic herbicide. Refer to WIN-PST for product names and active ingredients. Includes materials and shipping only.	Acres	$9.21	10	$92.10
Tree, Conifer, Seedling, Small	1512	Containerized conifer seedlings, 4 or 6 cubic inches; or bare root conifer seedlings 1+0 (one-year old seedlings grown in their original seedbed). Includes materials and shipping only.	Each	$0.51	2000	$1,020.00
Wire flags	1586	Small vinyl flags attached to wire stakes, typically, 36 in. in length, for marking tree rows	Each	$0.12	2000	$240.00

Practice: 381 - Silvopasture

Scenario: #9 - Tree Establishment

Scenario Description:

Establishment of trees into an existing pasture that contains adequate native or introduced forage.

Before Situation:

10-acre pasture with suitable forage for livestock. There is very little protection from the elements (sun, wind, etc.) available to the livestock. Additionally, there are no long-term wood products being produced. Resource Concerns include Degraded Plant Condition - Undesirable Plant Productivity and Health, Inadequate Structure and Composition, Livestock Production Limitation - Inadequate Livestock Shelter.

After Situation:

The site will be prepared using Tree/Shrub Site Preparation (490), if needed, and then 200 pine trees per acre will be planted, providing shade and wind protection to livestock and wildlife, and, in time, producing a viable wood products crop. Per the conservation practice standard, livestock grazing will be deferred until the trees reach adequate height to resist damage, or use exclusion measures are established. All Resource Concerns listed above are adressed.

Feature Measure: Acres of silvopasture established

Scenario Unit: Acres

Scenario Typical Size: 10.0

Scenario Total Cost: $1,442.54

Scenario Cost/Unit: $144.25

Cost Details:

Component Name	ID	Description	Unit	Cost	QTY	Total
Equipment Installation						
Fertilizer, ground application, dry bulk	950	Dry bulk fertilizer application performed by ground equipment. Includes equipment, power unit and labor costs.	Acres	$6.63	10	$66.30
Tractor, agricultural, 60 HP	963	Agricultural tractor with horsepower range of 50 to 90. Equipment and power unit costs. Labor not included.	Hours	$23.10	4	$92.40
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.	Hours	$5.96	4	$23.84
Materials						
Tree, Conifer, Seedling, Small	1512	Containerized conifer seedlings, 4 or 6 cubic inches; or bare root conifer seedlings 1+0 (one-year old seedlings grown in their original seedbed). Includes materials and shipping only.	Each	$0.51	2000	$1,020.00
Wire flags	1586	Small vinyl flags attached to wire stakes, typically, 36 in. in length, for marking tree rows	Each	$0.12	2000	$240.00

Practice: 382 - Fence

Scenario: #1 - 2-4 Wire Electrified, High Tensile

Scenario Description:

Typically used to install a 2-4 wire electrified high tensile fence according to state specifications. Assumes posts, wire, fasteners, gates, fence charger, and labor. Fence will allow for implementation of a grazing management that allows for an adequate rest and recovery period, protection of sensitive area, improved water quality, reduction of noxious and invasive weeds.

Before Situation:

On grazing lands health and vigor are negatively impacted by poor grazing distribution, timing of grazing and inadequate rest and recovery periods. Water quality may be impacted by increased erosion and runoff, livestock access to water bodies may be uncontrolled. Reduced vegetative cover increases the opportunity for encroachment of noxious and invasive weeds.

After Situation:

Installation of fence will allow for implementation of grazing management that allows for an adequate rest and recovery period, protection of sensitive area, improved water quality, reduction of noxious and invasive weeds. Fence includes posts, wire, fasteners, gates, fence charger, etc... Two to four (three) strand wire is commonly installed. Fence will be installed with wildlife friendly considerations.

Feature Measure: Length of Fence

Scenario Unit: Feet

Scenario Typical Size: 2,640.0

Scenario Total Cost: $7,670.14

Scenario Cost/Unit: $2.91

Cost Details:

Component Name	ID	Description	Unit	Cost	QTY	Total
Equipment Installation						
Auger, Post driver attachment	934	Auger or post driver attachment to a tractor or skidsteer. Does not include power unit. Labor not included.	Hours	$12.74	28	$356.72
Chainsaw	937	Equipment and power unit costs. Labor not included.	Hours	$7.15	2	$14.30
Truck, Pickup	939	Equipment and power unit costs. Labor not included.	Hours	$24.18	20	$483.60
Tractor, agricultural, 60 HP	963	Agricultural tractor with horsepower range of 50 to 90. Equipment and power unit costs. Labor not included.	Hours	$23.10	28	$646.80
All terrain vehicles, ATV	965	Includes equipment, power unit and labor costs.	Hours	$21.14	10	$211.40
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.	Hours	$27.56	58	$1,598.48
Equipment Operators, Light	232	Includes: Skid Steer Loaders, Hydraulic Excavators <50 HP, Trenchers <12 in., Ag Equipment <150 HP, Pickup Trucks, Forklifts, Mulchers	Hours	$27.87	28	$780.36
Materials						
Wire, High Tensile, 12.5 Gauge, 4,000' roll	2	High Tensile 12.5 gauge, 4,000' roll. Includes materials and shipping only.	Each	$124.15	2	$248.30
Post, Wood, CCA treated, 4 in x 8 ft	10	Wood Post, Line 4 inch X 8 foot, CCA Treated. Includes materials and shipping only.	Each	$10.63	100	$1,063.00
Post, Wood, CCA treated, 6 in. x 8 ft.	12	Wood Post, End 6 inch dia. X 8 ft., CCA Treated. Includes materials and shipping only.	Each	$18.91	26	$491.66
Electric, Ground Rods	20	Electric, Ground Rod for electric fence. Includes materials and shipping only.	Each	$11.82	7	$82.74
Electric, Ground Rod Clamps	21	Electric, Ground Rod Clamps for electric fence. Includes materials and shipping only.	Each	$2.37	7	$16.59
Electric, Lightening Diverter	22	Electric, Lightening diverter for electric fence. Includes materials and shipping only.	Each	$9.46	1	$9.46
Electric, Insulated cable	23	Electric, Insulated cable for electric fence. Typically in spools of 100 to 200 feet. Includes materials and shipping only.	Each	$37.46	1	$37.46
Electric, Power Surge Protector	24	Electric, Power Surge Protector for electric fence. Includes materials and shipping only.	Each	$17.54	1	$17.54
Electric, Cutoff Switch	25	Electric, Cutoff Switch for electric fence. Includes materials and shipping only.	Each	$10.61	2	$21.22
Electric, Tester	26	Electric, Tester for electric fence. Includes materials and shipping only.	Each	$51.09	1	$51.09
Electric, Energizer, 6 joule	29	Electric, Energizer, 6 joule for electric fence. Includes materials and shipping only.	Each	$396.14	1	$396.14

Fence, Wire Assembly, High Tensile, Electric, 3 Strand	34	Brace pins, springs, strainers, battens, clips, crimp sleeves, staples, insulators, wrap around sleeves. Includes materials and shipping only.	Feet	$0.13	2640	$343.20
Gate, Pipe, 14 ft.	1058	6 rail tube gate, 16 gauge. Includes materials and shipping only.	Each	$228.10	2	$456.20
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	$171.94	2	$343.88

Practice: 382 - Fence

Scenario: #2 - 5-6 Wire, Electrified, High Tensile

Scenario Description:

Typically used to install a 5-6 wire electrified high tensile fence according to state specifications. Assumes posts, wire, fasteners, gates, fence charger, and labor. Fence will allow for implementation of a grazing management that allows for an adequate rest and recovery period, protection of sensitive area, improved water quality, reduction of noxious and invasive weeds.

Before Situation:

On grazing lands health and vigor are negatively impacted by poor grazing distribution, timing of grazing and inadequate rest and recovery periods. Water quality may be impacted by increased erosion and runoff, livestock access to water bodies may be uncontrolled. Reduced vegetative cover increases the opportunity for encroachment of noxious and invasive weeds.

After Situation:

Installation of fence will allow for implementation of grazing management that allows for an adequate rest and recovery period, protection of sensitive area, improved water quality, reduction of noxious and invasive weeds. Fence includes posts, wire, fasteners, gates, fence charger, etc...5 or 6 strand wire is commonly installed. Fence will be installed with wildlife friendly considerations.

Feature Measure: Length of Fence

Scenario Unit: Feet

Scenario Typical Size: 2,640.0

Scenario Total Cost: $8,535.38

Scenario Cost/Unit: $3.23

Cost Details:

Component Name	ID	Description	Unit	Cost	QTY	Total
Equipment Installation						
Auger, Post driver attachment	934	Auger or post driver attachment to a tractor or skidsteer. Does not include power unit. Labor not included.	Hours	$12.74	28	$356.72
Chainsaw	937	Equipment and power unit costs. Labor not included.	Hours	$7.15	2	$14.30
Truck, Pickup	939	Equipment and power unit costs. Labor not included.	Hours	$24.18	20	$483.60
Tractor, agricultural, 60 HP	963	Agricultural tractor with horsepower range of 50 to 90. Equipment and power unit costs. Labor not included.	Hours	$23.10	28	$646.80
All terrain vehicles, ATV	965	Includes equipment, power unit and labor costs.	Hours	$21.14	10	$211.40
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.	Hours	$27.56	74	$2,039.44
Equipment Operators, Light	232	Includes: Skid Steer Loaders, Hydraulic Excavators <50 HP, Trenchers <12 in., Ag Equipment <150 HP, Pickup Trucks, Forklifts, Mulchers	Hours	$27.87	22	$613.14
Materials						
Wire, High Tensile, 12.5 Gauge, 4,000' roll	2	High Tensile 12.5 gauge, 4,000' roll. Includes materials and shipping only.	Each	$124.15	4	$496.60
Post, Wood, CCA treated, 4 in x 8 ft	10	Wood Post, Line 4 inch X 8 foot, CCA Treated. Includes materials and shipping only.	Each	$10.63	100	$1,063.00
Post, Wood, CCA treated, 6 in. x 8 ft.	12	Wood Post, End 6 inch dia. X 8 ft., CCA Treated. Includes materials and shipping only.	Each	$18.91	26	$491.66
Electric, Ground Rods	20	Electric, Ground Rod for electric fence. Includes materials and shipping only.	Each	$11.82	7	$82.74
Electric, Ground Rod Clamps	21	Electric, Ground Rod Clamps for electric fence. Includes materials and shipping only.	Each	$2.37	7	$16.59
Electric, Lightening Diverter	22	Electric, Lightening diverter for electric fence. Includes materials and shipping only.	Each	$9.46	1	$9.46
Electric, Insulated cable	23	Electric, Insulated cable for electric fence. Typically in spools of 100 to 200 feet. Includes materials and shipping only.	Each	$37.46	1	$37.46
Electric, Power Surge Protector	24	Electric, Power Surge Protector for electric fence. Includes materials and shipping only.	Each	$17.54	1	$17.54
Electric, Cutoff Switch	25	Electric, Cutoff Switch for electric fence. Includes materials and shipping only.	Each	$10.61	2	$21.22
Electric, Tester	26	Electric, Tester for electric fence. Includes materials and shipping only.	Each	$51.09	1	$51.09
Electric, Energizer, 6 joule	29	Electric, Energizer, 6 joule for electric fence. Includes materials and shipping only.	Each	$396.14	1	$396.14

Fence, Wire Assembly, High Tensile, Electric, 3 Strand	34	Brace pins, springs, strainers, battens, clips, crimp sleeves, staples, insulators, wrap around sleeves. Includes materials and shipping only.	Feet	$0.13	5280	$686.40
Gate, Pipe, 14 ft.	1058	6 rail tube gate, 16 gauge. Includes materials and shipping only.	Each	$228.10	2	$456.20
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	$171.94	2	$343.88

Practice: 382 - Fence

Scenario: #3 - Woven Wire

Scenario Description:

Install a woven wire fence that is typically used for sheep, goats, horses, camelids, wildlife exclusion, shelterbelt/tree protection, etc. Woven wire fence includes posts, wire, fasteners, gates, and labor. Fence is installed according to state specifications and typically includes the use of barbed or electrified smooth wire for predator control. Fence will allow for implementation of a grazing management that allows for an adequate rest and recovery period, protection of sensitive areas, improved water quality, and reduction of noxious and invasive weeds.

Before Situation:

On grazing lands health and vigor are negatively impacted by poor grazing distribution, timing of grazing and inadequate rest and recovery periods. Water quality may be impacted by increased erosion and runoff, livestock access to water bodies may be uncontrolled. Reduced vegetative cover increases the opportunity for encroachment of noxious and invasive weeds.

After Situation:

Installation of fence will allow for implementation of a rotational grazing plan that allows for an adequate rest and recovery period, protection of sensitive area, improved water quality, reduction of noxious and invasive weeds. Woven wire fence includes posts, wire, fasteners, gates, etc. Woven wire is typically used in applications with sheep, goats, horses and camelids.

Feature Measure: Length of Fence

Scenario Unit: Feet

Scenario Typical Size: 2,640.0

Scenario Total Cost: $12,169.44

Scenario Cost/Unit: $4.61

Cost Details:

Component Name	ID	Description	Unit	Cost	QTY	Total
Equipment Installation						
Auger, Post driver attachment	934	Auger or post driver attachment to a tractor or skidsteer. Does not include power unit. Labor not included.	Hours	$12.74	46	$586.04
Chainsaw	937	Equipment and power unit costs. Labor not included.	Hours	$7.15	2	$14.30
Truck, Pickup	939	Equipment and power unit costs. Labor not included.	Hours	$24.18	30	$725.40
Tractor, agricultural, 60 HP	963	Agricultural tractor with horsepower range of 50 to 90. Equipment and power unit costs. Labor not included.	Hours	$23.10	46	$1,062.60
All terrain vehicles, ATV	965	Includes equipment, power unit and labor costs.	Hours	$21.14	10	$211.40
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.	Hours	$27.56	97	$2,673.32
Equipment Operators, Light	232	Includes: Skid Steer Loaders, Hydraulic Excavators <50 HP, Trenchers <12 in., Ag Equipment <150 HP, Pickup Trucks, Forklifts, Mulchers	Hours	$27.87	45	$1,254.15
Materials						
Wire, High Tensile, 12.5 Gauge, 4,000' roll	2	High Tensile 12.5 gauge, 4,000' roll. Includes materials and shipping only.	Each	$124.15	2	$248.30
Wire, Woven, Galvanized, 12.5 Gauge, 32 in	3	Galvanized 12.5 gauge, 32 inch - 330 foot roll. Includes materials and shipping only.	Each	$168.60	8	$1,348.80
Post, Wood, CCA treated, 4 in x 8 ft	10	Wood Post, Line 4 inch X 8 foot, CCA Treated. Includes materials and shipping only.	Each	$10.63	173	$1,838.99
Post, Wood, CCA treated, 6 in. x 8 ft.	12	Wood Post, End 6 inch dia. X 8 ft., CCA Treated. Includes materials and shipping only.	Each	$18.91	26	$491.66
Electric, Ground Rods	20	Electric, Ground Rod for electric fence. Includes materials and shipping only.	Each	$11.82	7	$82.74
Electric, Ground Rod Clamps	21	Electric, Ground Rod Clamps for electric fence. Includes materials and shipping only.	Each	$2.37	7	$16.59
Electric, Lightening Diverter	22	Electric, Lightening diverter for electric fence. Includes materials and shipping only.	Each	$9.46	1	$9.46
Electric, Insulated cable	23	Electric, Insulated cable for electric fence. Typically in spools of 100 to 200 feet. Includes materials and shipping only.	Each	$37.46	1	$37.46
Electric, Power Surge Protector	24	Electric, Power Surge Protector for electric fence. Includes materials and shipping only.	Each	$17.54	1	$17.54
Electric, Tester	26	Electric, Tester for electric fence. Includes materials and shipping only.	Each	$51.09	1	$51.09

Electric, Energizer, 3-4 joule	28	Electric, Energizer, 3-4 joule for electric fence. Includes materials and shipping only.	Each	$277.12	1	$277.12
Fence, Wire Assembly, High Tensile, Electric, 1 Strand	32	Brace pins, springs, strainers, battens, clips, crimp sleeves, staples, insulators, wrap around sleeves. Includes materials and shipping only.	Feet	$0.02	7920	$158.40
Fence, Wire Assembly, Woven Wire	35	Brace pins, twist sticks, staples. Includes materials and shipping only.	Feet	$0.10	2640	$264.00
Gate, Pipe, 14 ft.	1058	6 rail tube gate, 16 gauge. Includes materials and shipping only.	Each	$228.10	2	$456.20
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	$171.94	2	$343.88

Practice: 382 - Fence

Scenario: #4 - Barbed Wire

Scenario Description:

Install a multi-wire barbed wire according to state specifications. Assumes posts, wire, fasteners, gates, fence charger, and labor. Fence will allow for implementation of a grazing management that allows for an adequate rest and recovery period, protection of sensitive area, improved water quality, reduction of noxious and invasive weeds.

Before Situation:

On grazinglands health and vigor are negatively impacted by poor grazing distribution, timing of grazing and inadequate rest and recovery periods. Water quality is impacted by increased erosion and runoff, cattle access to water bodies is uncontrolled. Reduced vegetative cover increases the opportunity for encroachment of noxious and invasive weeds.

After Situation:

Installation of fence will allow for implementation of grazing management that allows for an adequate rest and recovery period, protection of sensitive area, improved water quality, reduction of noxious and invasive weeds. Fence includes posts, wire, fasteners, gates, fence charger, etc... Two to three strand wire is commonly installed. Fence will be installed with wildlife friendly considerations.

Feature Measure: Length of Fence

Scenario Unit: Feet

Scenario Typical Size: 2,640.0

Scenario Total Cost: $9,016.03

Scenario Cost/Unit: $3.42

Cost Details:

Component Name	ID	Description	Unit	Cost	QTY	Total
Equipment Installation						
Auger, Post driver attachment	934	Auger or post driver attachment to a tractor or skidsteer. Does not include power unit. Labor not included.	Hours	$12.74	46	$586.04
Chainsaw	937	Equipment and power unit costs. Labor not included.	Hours	$7.15	2	$14.30
Truck, Pickup	939	Equipment and power unit costs. Labor not included.	Hours	$24.18	20	$483.60
Tractor, agricultural, 60 HP	963	Agricultural tractor with horsepower range of 50 to 90. Equipment and power unit costs. Labor not included.	Hours	$23.10	46	$1,062.60
All terrain vehicles, ATV	965	Includes equipment, power unit and labor costs.	Hours	$21.14	10	$211.40
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.	Hours	$27.56	61	$1,681.16
Equipment Operators, Light	232	Includes: Skid Steer Loaders, Hydraulic Excavators <50 HP, Trenchers <12 in., Ag Equipment <150 HP, Pickup Trucks, Forklifts, Mulchers	Hours	$27.87	20	$557.40
Materials						
Wire, Barbed, Galvanized, 12.5 Gauge, 1,320' roll	1	Galvanized 12.5 gauge, 1,320' roll. Includes materials and shipping only.	Each	$77.50	8	$620.00
Post, Wood, CCA treated, 4 in x 8 ft	10	Wood Post, Line 4 inch X 8 foot, CCA Treated. Includes materials and shipping only.	Each	$10.63	173	$1,838.99
Post, Wood, CCA treated, 6 in. x 8 ft.	12	Wood Post, End 6 inch dia. X 8 ft., CCA Treated. Includes materials and shipping only.	Each	$18.91	26	$491.66
Fence, Wire Assembly, Barbed Wire	30	Brace pins, battens, clips, staples. Includes materials and shipping only.	Feet	$0.19	3520	$668.80
Gate, Pipe, 14 ft.	1058	6 rail tube gate, 16 gauge. Includes materials and shipping only.	Each	$228.10	2	$456.20
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	$171.94	2	$343.88

Practice: 382 - Fence

Scenario: #5 - Interior, electrified

Scenario Description:

Install permanent or semi-permanent light-duty electrified fence for interior subdivisions for a grazing system. Installation of fence will allow for implementation of a grazing management that allows for an adequate rest and recovery period, protection of sensitive area, improved water quality, reduction of noxious and invasive weeds.

Before Situation:

On grazing lands health and vigor are negatively impacted by poor grazing distribution, timing of grazing and inadequate rest and recovery periods. Water quality may be impacted by increased erosion and runoff, livestock access to water bodies may be uncontrolled. Reduced vegetative cover increases the opportunity for encroachment of noxious and invasive weeds.

After Situation:

Installation of interior fence will allow for implementation of grazing management that allows for an adequate rest and recovery period, protection of sensitive area, improved water quality, reduction of noxious and invasive weeds. Fence is used for laneways and/or subdivisions of grazing system.

Feature Measure: Length of Fence

Scenario Unit: Feet

Scenario Typical Size: 1,320.0

Scenario Total Cost: $1,647.81

Scenario Cost/Unit: $1.25

Cost Details:

Component Name	ID	Description	Unit	Cost	QTY	Total
Equipment Installation						
Auger, Post driver attachment	934	Auger or post driver attachment to a tractor or skidsteer. Does not include power unit. Labor not included.	Hours	$12.74	1	$12.74
Truck, Pickup	939	Equipment and power unit costs. Labor not included.	Hours	$24.18	5	$120.90
Tractor, agricultural, 60 HP	963	Agricultural tractor with horsepower range of 50 to 90. Equipment and power unit costs. Labor not included.	Hours	$23.10	1	$23.10
All terrain vehicles, ATV	965	Includes equipment, power unit and labor costs.	Hours	$21.14	3	$63.42
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.	Hours	$27.56	12	$330.72
Equipment Operators, Light	232	Includes: Skid Steer Loaders, Hydraulic Excavators <50 HP, Trenchers <12 in., Ag Equipment <150 HP, Pickup Trucks, Forklifts, Mulchers	Hours	$27.87	1	$27.87
Materials						
Wire, Polytape	7	Wire, Polytape for electric fence. Rolls of 655' to 825'. Includes materials and shipping only.	Each	$53.60	4	$214.40
Post, Wood, CCA treated, 5 in. x 8 ft.	11	Wood Post, End 5 inch dia. X 8 ft., CCA Treated. Includes materials and shipping only.	Each	$13.70	12	$164.40
Post, Steel T, 1.33 lbs, 6'	15	Steel Post, Studded 6' - 1.33 lb. Includes materials and shipping only.	Each	$6.08	44	$267.52
Fence, Wire Assembly, Barbed Wire	30	Brace pins, battens, clips, staples. Includes materials and shipping only.	Feet	$0.19	1320	$250.80
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	$171.94	1	$171.94

Practice: 382 - Fence

Scenario: #6 - Portable

Scenario Description:

Used for portable electrified fence that is manufactured for managing livestock on grazing systems within the confines of a permanent perimeter fence which supplies the electric charge. Typically used for polywire/tape fencing. Fence is installed according to state specifications and will facilitate implementation of grazing management that allows for an adequate rest and recovery period, protection of sensitive aresa, improved water quality, reduction of noxious and invasive weeds. This fence might also be used as an extension of a permanent fence where seasonal flooding or other conditions dicatate use of a removable fence. Typically one portable fence setup is used for a grazing system, and may be transported to fields within the system.

Before Situation:

On grazing lands health and vigor are negatively impacted by poor grazing distribution, timing of grazing and inadequate rest and recovery periods. Water quality may be impacted by increased erosion and runoff, livestock access to water bodies may be uncontrolled. Reduced vegetative cover increases the opportunity for encroachment of noxious and invasive weeds.

After Situation:

Pasture is subdivided into apporpriately-sized paddocks to control animal access to forage. Fence is comprised of materials manufactured for this use, including poly wire, rope, or tape, fiberglass rods, and reels to hold the conductors.Typical pasture is subdivided with a movable system to control livestock and allow for appropriate rest and recovery of forage.

Feature Measure: Length of Fence

Scenario Unit: Feet

Scenario Typical Size: 1,000.0

Scenario Total Cost: $763.23

Scenario Cost/Unit: $0.76

Cost Details:

Component Name	ID	Description	Unit	Cost	QTY	Total
Materials						
Wire, Polytape	7	Wire, Polytape for electric fence. Rolls of 655' to 825'. Includes materials and shipping only.	Each	$53.60	4	$214.40
Post, Steel T, 1.33 lbs, 6'	15	Steel Post, Studded 6' - 1.33 lb. Includes materials and shipping only.	Each	$6.08	2	$12.16
Post, Fiberglass, 11/16 in. X 6 ft.	19	Fiberglass line post, 11/16 in. diameter X 6 ft. length. Includes materials and shipping only.	Each	$8.01	67	$536.67

Practice: 382 - Fence

Scenario: #7 - Confinement

Scenario Description:

Install a rugged wood board or woven wire fence in confinement areas such as HUA's. Typically used on an areas less than 1/4 to 1/2 acre in size, such as a Heavy Use Area, Vegetated Treatment Area, or other situations where installation of fence reduces resource concerns associated with livestock feeding operations.

Before Situation:

Lack of HUA and/or appropriate confenement fence results in degradation of pasture, vegetated treatment areas, or other sensitive areas.

After Situation:

Installation of fence reduces resource concerns associated with livestock access and/or prevents conflicts between humans and threatened, endangered or sensitive species.

Feature Measure: Length of Fence

Scenario Unit: Feet

Scenario Typical Size: 330.0

Scenario Total Cost: $3,229.41

Scenario Cost/Unit: $9.79

Cost Details:

Component Name	ID	Description	Unit	Cost	QTY	Total
Equipment Installation						
Auger, Post driver attachment	934	Auger or post driver attachment to a tractor or skidsteer. Does not include power unit. Labor not included.	Hours	$12.74	11	$140.14
Truck, Pickup	939	Equipment and power unit costs. Labor not included.	Hours	$24.18	4	$96.72
Tractor, agricultural, 60 HP	963	Agricultural tractor with horsepower range of 50 to 90. Equipment and power unit costs. Labor not included.	Hours	$23.10	16	$369.60
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.	Hours	$27.56	24	$661.44
Equipment Operators, Light	232	Includes: Skid Steer Loaders, Hydraulic Excavators <50 HP, Trenchers <12 in., Ag Equipment <150 HP, Pickup Trucks, Forklifts, Mulchers	Hours	$27.87	16	$445.92
Materials						
Wire, Barbed, Galvanized, 12.5 Gauge, 1,320' roll	1	Galvanized 12.5 gauge, 1,320' roll. Includes materials and shipping only.	Each	$77.50	0.5	$38.75
Wire, Woven, Galvanized, 12.5 Gauge, 48 inch	4	Galvanized 12.5 gauge, 48 in. - 330' roll. Includes materials and shipping only.	Each	$263.35	1	$263.35
Post, Wood, CCA treated, 4 in x 8 ft	10	Wood Post, Line 4 inch X 8 foot, CCA Treated. Includes materials and shipping only.	Each	$10.63	21	$223.23
Post, Wood, CCA treated, 5 in. x 8 ft.	11	Wood Post, End 5 inch dia. X 8 ft., CCA Treated. Includes materials and shipping only.	Each	$13.70	12	$164.40
Post, Wood, CCA treated, 6 in. x 8 ft.	12	Wood Post, End 6 inch dia. X 8 ft., CCA Treated. Includes materials and shipping only.	Each	$18.91	12	$226.92
Gate, Pipe, 16 ft.	1059	6 rail tube gate, 16 gauge. Includes materials and shipping only.	Each	$255.06	1	$255.06
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	$171.94	2	$343.88

Practice: 382 - Fence

Scenario: #8 - Chain Link/Safety

Scenario Description:
A barrier (fence) implemented on an NRCS constructed waste storage system according to engineering design to exclude human access. Permanently installed fence built to keep humans away from waste ponds & lagoons.

Before Situation:
Where a NRCS designed and constructed waste storage pond is planned, and significant risk to human safety is determined to be evident.

After Situation:
A five foot high chain link fence is installed to exclude humans and livestock from the waste storage pond for safety purposes. The fenced area would typically be 100 wide x 175 long with one gate and installed by a fencing contractor.

Feature Measure: Length of Fence

Scenario Unit: Feet

Scenario Typical Size: 500.0

Scenario Total Cost: $6,636.99

Scenario Cost/Unit: $13.27

Cost Details:

Component Name	ID	Description	Unit	Cost	QTY	Total
Materials						
Fence, Chain Link	1079	Fence, Chain Link, 5 foot High, 9 ga Wire, Posts in Concrete on 10 foot Centers. Includes all materials, equipment and labor.	Feet	$12.98	500	$6,490.00
Gate, Chain Link, Slide Gate, Per LF	1081	Chain Link Gate, 5 feet tall, per linear foot. Installed in Concrete.	Feet	$146.99	1	$146.99

Practice: 382 - Fence

Scenario: #9 - 96 inch exclusion fence

Scenario Description:
Installation of fence reduces resource concerns associated with livestock feeding operations and/or wildlife access to prevent conflicts between humans and livestock or wildlife species.

Before Situation:
Wildlife negatively impacting sensitive areas such as riparian areas, windbreaks and shelterbelts or feed storage. Disease transmission from wildlife posses a significant health risk to domestic animals.

After Situation:
Installation of fence reduces resource concerns associated with livestock and/or wildlife access and prevents conflicts between humans and threatened, endangered or sensitive species. Fence includes posts, wire, fasteners, gates, etc...

Feature Measure: Legnth of fence

Scenario Unit: Feet

Scenario Typical Size: 1,320.0

Scenario Total Cost: $13,841.12

Scenario Cost/Unit: $10.49

Cost Details:

Component Name	ID	Description	Unit	Cost	QTY	Total
Equipment Installation						
Auger, Post driver attachment	934	Auger or post driver attachment to a tractor or skidsteer. Does not include power unit. Labor not included.	Hours	$12.74	40	$509.60
Truck, Pickup	939	Equipment and power unit costs. Labor not included.	Hours	$24.18	20	$483.60
Tractor, agricultural, 60 HP	963	Agricultural tractor with horsepower range of 50 to 90. Equipment and power unit costs. Labor not included.	Hours	$23.10	40	$924.00
All terrain vehicles, ATV	965	Includes equipment, power unit and labor costs.	Hours	$21.14	10	$211.40
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.	Hours	$27.56	105	$2,893.80
Equipment Operators, Light	232	Includes: Skid Steer Loaders, Hydraulic Excavators <50 HP, Trenchers <12 in., Ag Equipment <150 HP, Pickup Trucks, Forklifts, Mulchers	Hours	$27.87	40	$1,114.80
Materials						
Wire, Woven, Wildlife, 96 in.	6	High Tensile 12.5 gauge, 96 inch - 330 foot roll. Includes materials and shipping only.	Each	$534.69	4	$2,138.76
Post, Wood, CCA treated, 6 in. x 12-14 ft.	13	Wood Post, Line/End 6 inch dia. X 12-14 ft., CCA Treated. Includes materials and shipping only.	Each	$31.76	102	$3,239.52
Fence, Wire Assembly, Woven Wire	35	Brace pins, twist sticks, staples. Includes materials and shipping only.	Feet	$0.10	1320	$132.00
Gate, Game, 8 ft. High X 16 ft. Wide	1086	16 ft. Wide Game Gate (8 ft. tall). Includes materials and shipping only.	Each	$479.88	2	$959.76
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.	Dollars	$1.00	890	$890.00
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	$171.94	2	$343.88

Practice: 384 - Woody Residue Treatment

Scenario: #1 - Orchard/Vineyard prunings/removals

Scenario Description:

Slash created from orchard/vineyard prunings is chipped or mulched and removed from the site in order to accomplish one or more purposes: reducing wildfire fuels and insect/disease substrate; improving access; and/or reducing potential risk to livestock and humans. Air emission reductions are achieved by chipping or shredding the materials in lieu of burning them. Material may be incorporated in the soil, used as a dust suppressant on unpaved roads or traffic areas. Resource concerns include Wildfire hazard from excessive biomass accumulation and Emissions of particulate matter.

Before Situation:

Wood waste is either burned, creating an air quality issue, or left in place creating a wildfire hazard, an impediment to access, or a potential site for harboring pests. Energy conservation was not implemented.

After Situation:

Treatment of pruning residue results in the reduction in air pollutants, energy conservation occurred, improvement in access, and the reduction of sites that can harbor pests.

Feature Measure: Acres of orchard/vineyard with slas

Scenario Unit: Acres

Scenario Typical Size: 20.0

Scenario Total Cost: $5,396.55

Scenario Cost/Unit: $269.83

Cost Details:

Component Name	ID	Description	Unit	Cost	QTY	Total
Equipment Installation						
Skidsteer, 80 HP	933	Skidsteer loader with horsepower range of 60 to 90. Equipment and power unit costs. Labor not included.	Hours	$55.01	16	$880.16
Brush Chipper, 6 in. capacity	938	Brush Chipper, 6 inch capacity, typically 35 HP. Includes chipper and power unit. Labor not included.	Hours	$30.40	16	$486.40
Truck, dump, 8 CY	1401	Dump truck for moving bulk material. Typically capacity is 12 ton or 8 cubic yards. Includes equipment only.	Hours	$58.86	16	$941.76
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.	Hours	$27.56	48	$1,322.88
Equipment Operators, Light	232	Includes: Skid Steer Loaders, Hydraulic Excavators <50 HP, Trenchers <12 in., Ag Equipment <150 HP, Pickup Trucks, Forklifts, Mulchers	Hours	$27.87	48	$1,337.76
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	$171.94	1	$171.94
Mobilization, medium equipment	1139	Equipment with 70-150 HP or typical weights between 14,000 and 30,000 pounds.	Each	$255.65	1	$255.65

Practice: 384 - Woody Residue Treatment

Scenario: #2 - Restoration/conservation treatment following catastrophic events

Scenario Description:

The use of a combination of hand (chainsaw) and heavy equipment similar to those used in logging to treat slash resulting from catastrophic events such as fire, wind, severe pest outbreak, ice storm, etc. This scenario will remove/treat the larger material the size of which is consistent with the large equipment used. Resource concerns include: Excessive plant pest pressure, Potential emissions of particulate matter, Wildfire hazard from excessive biomass accumulation, and Habitat degradation.

Before Situation:

A large amount of slash and woody residue is created as a result of a non-silvicultural event such as a wind storm, wildfire, ice storm, pest outbreak, etc. Because the slash and residue is created by a catastrophic event that can cause tree-lodging, snags, broken tops, etc.; treatment is both difficult and dangerous. The presence of this material causes adverse effects on the forest include limiting access for management purposes, increasing the wildfire hazard, increasing the risk of potential harm to humans and livestock, and providing harboring sites for pests.

After Situation:

The material resulting from the catastrophic event is reduced to a level that will minimize the resource concerns.

Feature Measure: Acres of affected forest

Scenario Unit: Acres

Scenario Typical Size: 20.0

Scenario Total Cost: $18,249.35

Scenario Cost/Unit: $912.47

Cost Details:

Component Name	ID	Description	Unit	Cost	QTY	Total
Equipment Installation						
Track Loader, 95HP	935	Equipment and power unit costs. Labor not included.	Hours	$90.71	40	$3,628.40
Chainsaw	937	Equipment and power unit costs. Labor not included.	Hours	$7.15	80	$572.00
Log skidder	942	Equipment and power unit costs. Labor not included.	Hours	$124.33	40	$4,973.20
Truck, dump, 8 CY	1401	Dump truck for moving bulk material. Typically capacity is 12 ton or 8 cubic yards. Includes equipment only.	Hours	$58.86	40	$2,354.40
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.	Hours	$27.56	80	$2,204.80
Equipment Operators, Light	232	Includes: Skid Steer Loaders, Hydraulic Excavators <50 HP, Trenchers <12 in., Ag Equipment <150 HP, Pickup Trucks, Forklifts, Mulchers	Hours	$27.87	80	$2,229.60
Equipment Operators, Heavy	233	Includes: Cranes, Hydraulic Excavators >=50 HP, Dozers, Paving Machines, Rock Trenchers, Trenchers >=12 in., Dump Trucks, Ag Equipment >=150 HP, Scrapers, Water Wagons.	Hours	$38.00	40	$1,520.00
Mobilization						
Mobilization, medium equipment	1139	Equipment with 70-150 HP or typical weights between 14,000 and 30,000 pounds.	Each	$255.65	3	$766.95

Practice: 384 - Woody Residue Treatment

Scenario: #3 - Woody residue/silvicultural slash treatment-light

Scenario Description:

Treating an area of forest slash to reduce hazardous fuels and the risk of insect and disease, improve organic matter and reduce erosion while improving water quality. Slash is treated with both hand (cutting, lopping, etc.) and mechanically (masticating, chipping, etc.). Typically done by hand and light equipment. Resource concerns include: Wildfire hazard from excessive biomass accumulation and potential Excessive plant pest pressure.

Before Situation:

Woody material resulting from a silvicultural practice such as pruning or a light thinning operation is causing both fire hazard and pest issues.

After Situation:

Fire and pest issues are reduced with slash spread out and in contact with the ground. Additional benefits include reduced soil movement. The soil is protected and/or enhanced.

Feature Measure: Acres treated

Scenario Unit: Acres

Scenario Typical Size: 40.0

Scenario Total Cost: $8,739.65

Scenario Cost/Unit: $218.49

Cost Details:

Component Name	ID	Description	Unit	Cost	QTY	Total
Equipment Installation						
Chainsaw	937	Equipment and power unit costs. Labor not included.	Hours	$7.15	80	$572.00
Truck, Pickup	939	Equipment and power unit costs. Labor not included.	Hours	$24.18	40	$967.20
Mechanical cutter, chopper	943	Forestry mulcher, flail shredder, hydro axe, brush cutter, etc. Equipment and power unit costs. Labor not included.	Hours	$90.63	40	$3,625.20
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.	Hours	$27.56	80	$2,204.80
Equipment Operators, Light	232	Includes: Skid Steer Loaders, Hydraulic Excavators <50 HP, Trenchers <12 in., Ag Equipment <150 HP, Pickup Trucks, Forklifts, Mulchers	Hours	$27.87	40	$1,114.80
Mobilization						
Mobilization, medium equipment	1139	Equipment with 70-150 HP or typical weights between 14,000 and 30,000 pounds.	Each	$255.65	1	$255.65

Practice: 384 - Woody Residue Treatment

Scenario: #4 - Chipping and hauling off-site

Scenario Description:

Reducing woody waste created during forestry, agroforestry and horticultural activities by gathering, chipping, and hauling off site to achieve management objectives. Does not include transport from property to a commercial facility. Resource concerns include potential Emissions of particulate matter, potential Excessive plant pest pressure, and Wildfire hazard from excessive biomass accumulation .

Before Situation:

Woody residue causes management issues including resource access, fire hazard and sites for harboring pests.

After Situation:

Fire and pest issues are reduced. Air and energy resources are conserved.

Feature Measure: Acres treated

Scenario Unit: Acres

Scenario Typical Size: 20.0

Scenario Total Cost: $6,373.69

Scenario Cost/Unit: $318.68

Cost Details:

Component Name	ID	Description	Unit	Cost	QTY	Total
Equipment Installation						
Chainsaw	937	Equipment and power unit costs. Labor not included.	Hours	$7.15	20	$143.00
Brush Chipper, 6 in. capacity	938	Brush Chipper, 6 inch capacity, typically 35 HP. Includes chipper and power unit. Labor not included.	Hours	$30.40	20	$608.00
Log skidder	942	Equipment and power unit costs. Labor not included.	Hours	$124.33	10	$1,243.30
Truck, dump, 8 CY	1401	Dump truck for moving bulk material. Typically capacity is 12 ton or 8 cubic yards. Includes equipment only.	Hours	$58.86	20	$1,177.20
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.	Hours	$27.56	40	$1,102.40
Equipment Operators, Light	232	Includes: Skid Steer Loaders, Hydraulic Excavators <50 HP, Trenchers <12 in., Ag Equipment <150 HP, Pickup Trucks, Forklifts, Mulchers	Hours	$27.87	60	$1,672.20
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	$171.94	1	$171.94
Mobilization, medium equipment	1139	Equipment with 70-150 HP or typical weights between 14,000 and 30,000 pounds.	Each	$255.65	1	$255.65

Practice: 384 - Woody Residue Treatment

Scenario: #5 - Forest Slash Treatment - Med/Heavy

Scenario Description:

Treating an area of significant woody plant residues to reduce hazardous fuels and the risk of insect and disease, improve organic matter, decrease unwanted habitat, and reduce erosion while improving water quality. Slash is to be lopped/treated/crushed within a foot of the ground or moved off site to meet state fire hazard reduction standards. Typically heavy equipment are used such as masticators, mulchers, drum choppers, etc. Hand work with chainsaws are used on steep slopes. Resource concerns include potential Emission of particulate matter, Wildfire hazard from excessive biomass accumulation, Excessive plant pest pressure, and Habitat degradation.

Before Situation:

Heavy woody material (difficult to walk through) resulting from silvicultural/management operations caused both fire hazard, access, potential harm to humans and animals, and pest issues.

After Situation:

Fire, access, and pest issues are reduced with slash spread out and in contact with the ground. An additional benefit is reduced soil movement.

Feature Measure: Acres treated

Scenario Unit: Acres

Scenario Typical Size: 40.0

Scenario Total Cost: $16,572.50

Scenario Cost/Unit: $414.31

Cost Details:

Component Name	ID	Description	Unit	Cost	QTY	Total
Equipment Installation						
Chainsaw	937	Equipment and power unit costs. Labor not included.	Hours	$7.15	40	$286.00
Truck, Pickup	939	Equipment and power unit costs. Labor not included.	Hours	$24.18	40	$967.20
Heavy mechanical site prep, drum chopping	1316	Mechanical operations that pushing trees and vegetation and crushing them with a water filled roller chopper. Requires heavy equipment such as dozers. Includes equipment, power unit and labor costs.	Acres	$133.61	80	$10,688.80
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.	Hours	$27.56	40	$1,102.40
Equipment Operators, Heavy	233	Includes: Cranes, Hydraulic Excavators >=50 HP, Dozers, Paving Machines, Rock Trenchers, Trenchers >=12 in., Dump Trucks, Ag Equipment >=150 HP, Scrapers, Water Wagons.	Hours	$38.00	80	$3,040.00
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	$488.10	1	$488.10

Practice: 386 - Field Border

Scenario: #5 - Field Border, Native Species

Scenario Description:

A strip of permanent vegetation established at the edge or around the perimeter of an agricultural field. Practice includes seedbed prep and planting of organic seed for herbaceous species.

Before Situation:

Before practice conditions may vary widely. Fields may have erosion issues from wind or water, a field border may be needed to manage pest populations, protect soil and water quality, provide wildlife food and cover, provide pollinator habitat, or a field border may be used to increase carbon storage and improve air quality. Water quality, soil erosion and/or wildlife food and cover may all be primary resource concerns.

After Situation:

The 386 Implementation Requirements have been developed and applied for the site. This practice when applied around a field may support and connect other buffer practices while creating a buffer between organic systems and conventional cropping systems. Native grasses and legumes will be established in the field border to the extent needed to meet the resource needs and producer objectives. Minimum field border widths shall be based on NRCS local design criteria specific to the purpose for installing the practice. Species selected shall be adapted to the site, not function as a host for diseases of a field crop, and have physical characteristics necessary to control wind and water erosion to tolerable levels on the field border area.

Feature Measure: number of acres

Scenario Unit: Acres

Scenario Typical Size: 1.0

Scenario Total Cost: $165.29

Scenario Cost/Unit: $165.29

Cost Details:

Component Name	ID	Description	Unit	Cost	QTY	Total
Equipment Installation						
Tillage, Light	945	Includes light disking (tandem) or field cultivator. Includes equipment, power unit and labor costs.	Acres	$10.68	3	$32.04
Seeding Operation, No Till/Grass Drill	960	No Till drill or grass drill for seeding. Includes equipment, power unit and labor costs.	Acres	$21.92	1	$21.92
Materials						
Native Perennial Grasses, Low Density	2750	Native perennial grasses, may include a small percentage of annual species for establishment purposes and/or if allowed by the CPS. Planted at lower to medium density (40 pure live seeds/sq ft and less). Includes material and shipping.	Acres	$111.33	1	$111.33

Practice: 386 - Field Border

Scenario: #6 - Field Border, Introduced Species

Scenario Description:

A strip of permanent vegetation established at the edge or around the perimeter of an agricultural field. Practice includes seedbed prep and planting of introduced species.

Before Situation:

Before practice conditions may vary widely. Fields may have erosion issues from wind or water, a field border may be needed to manage pest populations, protect soil and water quality, provide wildlife food and cover, provide pollinator habitat, or a field border may be used to increase carbon storage and improve air quality. Water quality, soil erosion and/or wildlife food and cover may all be primary resource concerns.

After Situation:

The 386 Implementation Requirements have been developed and applied for the site. This practice when applied around a field may support and connect other buffer practices within and between fields. Introduced grasses and legumes will be established in the field border to the extent needed to meet the resource needs and producer objectives. Minimum field border widths shall be based on NRCS local design criteria specific to the purpose for installing the practice. Species selected shall be adapted to site, will not function as a host for diseases of a field crop, and have physical characteristics necessary to control wind and water erosion to tolerable levels on the field border area.

Feature Measure: Number of acres

Scenario Unit: Acres

Scenario Typical Size: 1.0

Scenario Total Cost: $102.82

Scenario Cost/Unit: $102.82

Cost Details:

Component Name	ID	Description	Unit	Cost	QTY	Total
Equipment Installation						
Tillage, Light	945	Includes light disking (tandem) or field cultivator. Includes equipment, power unit and labor costs.	Acres	$10.68	1	$10.68
Seeding Operation, No Till/Grass Drill	960	No Till drill or grass drill for seeding. Includes equipment, power unit and labor costs.	Acres	$21.92	1	$21.92
Materials						
Nitrogen (N), Urea	71	Price per pound of N supplied by Urea. Price is not per pound of total product applied, no conversion is needed.	Pound	$0.47	30	$14.10
Phosphorus, P2O5	73	Price per pound of P2O5 supplied by Superphosphate. Price is not per pound of total product applied, no conversion is needed.	Pound	$0.61	20	$12.20
Introduced Perennial Grasses, Legumes and/or Forbs, Medium Density	2748	Introduced perennial grasses, legumes, and/or forbs, may include a small percentage of annual species for establishment purposes and/or if allowed by the CPS. Planted at medium to higher density (41-60 pure live seeds/sq ft). Includes material and shipping.	Acres	$43.92	1	$43.92

Practice: 386 - Field Border

Scenario: #7 - Field Border, Pollinator

Scenario Description:

A strip of permanent vegetation established at the edge or around the perimeter of a field. This practice may also apply to recreation land or other land uses where agronomic crops including forages are grown. Practice includes seedbed prep and planting of pollinator friendly species.

Before Situation:

Before practice conditions may vary widely. Fields may have erosion issues from wind or water, a field border may be needed to manage pest populations, protect soil and water quality, provide wildlife food and cover, provide pollinator habitat, or a field border may be used to increase carbon storage and improve air quality. Water quality, soil erosion and/or wildlife food and cover may all be primary resource concerns.

After Situation:

The 386 Implementation Requirements have been developed and applied for the site. This practice when applied around a field may support and connect other buffer practices within and between fields. Pollinator herbaceous plantings will provide species which flower throughout the growing season. This provides a source of nectar for adult pollinators and a diversity of herbaceous material for immature pollinator life stages and for nesting. Minimum field border widths shall be based on NRCS local design criteria specific to the purpose for installing the practice. Species selected shall be adapted to site, will not function as a host for diseases of a field crop, and have physical characteristics necessary to control wind and water erosion to tolerable levels on the field border area.

Feature Measure: Number of acres

Scenario Unit: Acres

Scenario Typical Size: 1.0

Scenario Total Cost: $512.74

Scenario Cost/Unit: $512.74

Cost Details:

Component Name	ID	Description	Unit	Cost	QTY	Total
Equipment Installation						
Tillage, Light	945	Includes light disking (tandem) or field cultivator. Includes equipment, power unit and labor costs.	Acres	$10.68	3	$32.04
Seeding Operation, No Till/Grass Drill	960	No Till drill or grass drill for seeding. Includes equipment, power unit and labor costs.	Acres	$21.92	1	$21.92
Materials						
Native Perennial Grasses, Legumes and/or Forb Mix for Targeted Wildlife/Pollinator Habitat or Ecological Restoration, moderate commercial availability	2619	Diverse mix of native perennial grasses, legumes and forbs, less than 50% grasses, may include biennials and a small percentage of annual species for establishment purposes and/or if allowed by the CPS. This is a mix composed of species required to meet specific wildlife/pollinator habitat or ecological requirements. Seed is moderately easy to purchase commercially. Includes materials and shipping.	Acres	$458.78	1	$458.78

Practice: 386 - Field Border

Scenario: #28 - Field Border, Native Species, Forgone Income

Scenario Description:

A strip of permanent vegetation established at the edge or around the perimeter of an agricultural field. Practice includes seedbed prep and planting of native species. The area of the field border is taken out of production.

Before Situation:

Before practice conditions may vary widely. Fields may have erosion issues from wind or water, a field border may be needed to manage pest populations, protect soil and water quality, provide wildlife food and cover, provide pollinator habitat, or a field border may be used to increase carbon storage and improve air quality. Water quality, soil erosion and/or wildlife food and cover may all be primary resource concerns.

After Situation:

The 386 Implementation Requirements have been developed and applied for the site. This practice when applied around a field may support and connect other buffer practices within and between fields. Native grasses, legumes and forbs will be established in the field borders to the extent needed to meet the resource needs and producer objectives. Minimum field border widths shall be based on NRCS local design criteria specific to the purpose for installing the practice. Native species shall be selected that do not function as a host for diseases of a field crop and have physical characteristics necessary to control wind and water erosion to tolerable levels on the field border area.

Feature Measure: number of acres

Scenario Unit: Acres

Scenario Typical Size: 1.0

Scenario Total Cost: $435.76

Scenario Cost/Unit: $435.76

Cost Details:

Component Name	ID	Description	Unit	Cost	QTY	Total
Equipment Installation						
Tillage, Light	945	Includes light disking (tandem) or field cultivator. Includes equipment, power unit and labor costs.	Acres	$10.68	3	$32.04
Seeding Operation, No Till/Grass Drill	960	No Till drill or grass drill for seeding. Includes equipment, power unit and labor costs.	Acres	$21.92	1	$21.92
Foregone Income						
FI, Corn Dryland	1959	Dryland Corn is Primary Crop	Acres	$270.47	1	$270.47
Materials						
Native Perennial Grasses, Low Density	2750	Native perennial grasses, may include a small percentage of annual species for establishment purposes and/or if allowed by the CPS. Planted at lower to medium density (40 pure live seeds/sq ft and less). Includes material and shipping.	Acres	$111.33	1	$111.33

Practice: 386 - Field Border

Scenario: #29 - Field Border, Introduced Species, Forgone Income

Scenario Description:

A strip of permanent vegetation established at the edge or around the perimeter of an agricultural field. Practice includes seedbed prep and planting of introduced species. The area of the field border is taken out of production.

Before Situation:

Before practice conditions may vary widely. Fields may have erosion issues from wind or water, a field border may be needed to manage pest populations, protect soil and water quality, provide wildlife food and cover, provide pollinator habitat, or a field border may be used to increase carbon storage and improve air quality. Water quality, soil erosion and/or wildlife food and cover may all be primary resource concerns.

After Situation:

The 386 Implementation Requirements have been developed and applied for the site. This practice when applied around a field may support and connect other buffer practices within and between fields. Introduced grasses and legumes will be established for the field border to the extent needed to meet the resource needs and producer objectives. Minimum field border widths shall be based on NRCS local design criteria specific to the purpose for installing the practice. Introduced species of grasses, legumes, forbs or shrubs shall be selected that are adapted to site, will not function as a host for diseases of a field crop and have physical characteristics necessary to control wind and water erosion to tolerable levels on the field border area.

Feature Measure: Number of acres

Scenario Unit: Acres

Scenario Typical Size: 1.0

Scenario Total Cost: $373.29

Scenario Cost/Unit: $373.29

Cost Details:

Component Name	ID	Description	Unit	Cost	QTY	Total
Equipment Installation						
Tillage, Light	945	Includes light disking (tandem) or field cultivator. Includes equipment, power unit and labor costs.	Acres	$10.68	1	$10.68
Seeding Operation, No Till/Grass Drill	960	No Till drill or grass drill for seeding. Includes equipment, power unit and labor costs.	Acres	$21.92	1	$21.92
Foregone Income						
FI, Corn Dryland	1959	Dryland Corn is Primary Crop	Acres	$270.47	1	$270.47
Materials						
Nitrogen (N), Urea	71	Price per pound of N supplied by Urea. Price is not per pound of total product applied, no conversion is needed.	Pound	$0.47	30	$14.10
Phosphorus, P2O5	73	Price per pound of P2O5 supplied by Superphosphate. Price is not per pound of total product applied, no conversion is needed.	Pound	$0.61	20	$12.20
Introduced Perennial Grasses, Legumes and/or Forbs, Medium Density	2748	Introduced perennial grasses, legumes, and/or forbs, may include a small percentage of annual species for establishment purposes and/or if allowed by the CPS. Planted at medium to higher density (41-60 pure live seeds/sq ft). Includes material and shipping.	Acres	$43.92	1	$43.92

Practice: 386 - Field Border

Scenario: #30 - Field Border, Pollinator, Forgone Income

Scenario Description:

A strip of permanent vegetation established at the edge or around the perimeter of an agricultural field. Practice includes seedbed prep and planting of pollinator friendly herbaceous species. The area of the field border is taken out of production.

Before Situation:

Before practice conditions may vary widely. Fields may have erosion issues from wind or water, a field border may be needed to manage pest populations, protect soil and water quality, provide wildlife food and cover, provide pollinator habitat, or a field border may be used to increase carbon storage and improve air quality. Water quality, soil erosion and/or wildlife food and cover may all be primary resource concerns.

After Situation:

The 386 Implementation Requirements have been developed and applied for the site. This practice when applied around a field may support and connect other buffer practices within and between fields. Pollinator herbaceous plantings will provide species which flower throughout the growing season. This provides a source of nectar for adult pollinators and a diversity of herbaceous material for immature pollinator life stages and for nesting. Minimum field border widths shall be based on NRCS local design criteria specific to the purpose for installing the practice. Species selected shall meet the pollinator habitat requirements of the state and be adapted to site; not function as a host for diseases of a field crop and; have physical characteristics necessary to control wind and water erosion to tolerable levels on the field border area.

Feature Measure: Number of acres

Scenario Unit: Acres

Scenario Typical Size: 1.0

Scenario Total Cost: $783.21

Scenario Cost/Unit: $783.21

Cost Details:

Component Name	ID	Description	Unit	Cost	QTY	Total
Equipment Installation						
Tillage, Light	945	Includes light disking (tandem) or field cultivator. Includes equipment, power unit and labor costs.	Acres	$10.68	3	$32.04
Seeding Operation, No Till/Grass Drill	960	No Till drill or grass drill for seeding. Includes equipment, power unit and labor costs.	Acres	$21.92	1	$21.92
Foregone Income						
FI, Corn Dryland	1959	Dryland Corn is Primary Crop	Acres	$270.47	1	$270.47
Materials						
Native Perennial Grasses, Legumes and/or Forb Mix for Targeted Wildlife/Pollinator Habitat or Ecological Restoration, moderate commercial availability	2619	Diverse mix of native perennial grasses, legumes and forbs, less than 50% grasses, may include biennials and a small percentage of annual species for establishment purposes and/or if allowed by the CPS. This is a mix composed of species required to meet specific wildlife/pollinator habitat or ecological requirements. Seed is moderately easy to purchase commercially. Includes materials and shipping.	Acres	$458.78	1	$458.78

Practice: 390 - Riparian Herbaceous Cover

Scenario: #2 - Plugging and Seeding

Scenario Description:

Plugging: This scenario addresses inadequate herbaceous plant community function or diversity within the specific transitional zone between terrestrial and aquatic habitats in rangeland, pasture, cropland, and forest where natural seeding methods and/or management is unlikely to improve the plant community within a reasonable time period. This scenario applies to work not covered under NRCS Conservation Practice Range Planting (528), Forage and Biomass Planting (512), Critical Area Planting (342), Filter Strip (393), Restoration and Management of Rare and Declining Habitats (643), Streambank and Shoreline Protection (580), Vegetated Treatment Area (635), Wetland Enhancement (659), or Wetland Restoration (657). 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 intermittant flooding and saturated soils where the exising plant community has been disturbed, destroyed, or the species diversity is unable to provide proper function and/or adequate habitat. Where the establishment of a diverse riparian herbaceous plant community is desired, an adapted mix of grasses, sedges, rushes, ferns, legumes, and/or forbs tolerant to the site conditions will be planted. Grasses such as prairie cordgrass (Spartina pectinata), sedges, rushes, and/or ferns will be planted using plugs. Additional site adapted species of grasses, legumes, and/or forbs may be added 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

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 conern(s). Existing conditions often require suppression or eradication of current vegetation by conventional mechanical or chemical (Herbaceous Weed Control (315)) methods to ensure establishment success of the new planting.

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.

Feature Measure: Acres of Riparian Herbaceous Cover

Scenario Unit: Acres

Scenario Typical Size: 0.5

Scenario Total Cost: $9,456.96

Scenario Cost/Unit: $18,913.92

Cost Details:

Component Name	ID	Description	Unit	Cost	QTY	Total
Equipment Installation						
Tillage, Light	945	Includes light disking (tandem) or field cultivator. Includes equipment, power unit and labor costs.	Acres	$10.68	1	$10.68
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.	Hours	$27.56	40	$1,102.40
Materials						
Native Aquatic Plants, Emergent or Submerged	2336	Native aquatic emergent or submerged. All required materials for establishing vegetation. Includes material and shipping.	Each	$1.00	8000	$8,000.00
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	$171.94	2	$343.88

Practice: 390 - Riparian Herbaceous Cover

Scenario: #3 - Warm Season Grass w/ Forbs

Scenario Description:

Warm Season Grasses with Forbs: This scenario addresses inadequate herbaceous plant community function or diversity within the specific transitional zone between terrestrial and aquatic habitats in rangeland, pasture, cropland, and forest where natural seeding methods and/or management is unlikely to improve the plant community within a reasonable time period. This scenario applies to work not covered under NRCS Conservation Practice Range Planting (528), Forage and Biomass Planting (512), Critical Area Planting (342), Filter Strip (393), Restoration and Management of Rare and Declining Habitats (643), Streambank and Shoreline Protection (580), Vegetated Treatment Area (635), Wetland Enhancement (659), or Wetland Restoration (657). 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 intermittant flooding and saturated soils where the exising plant community has been disturbed, destroyed, or the species diversity is unable to provide proper function and/or adequate habitat. Where the establishment of a diverse riparian herbaceous plant community is desired, an adapted mix of primarily warm season 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

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 conern(s). Existing conditions often require suppression or eradication of current vegetation by conventional mechanical or chemical (Herbaceous Weed Control (315)) methods to ensure establishment success of the new planting.

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.

Feature Measure: Acres of Riparian Herbaceous Cover

Scenario Unit: Acres

Scenario Typical Size: 0.5

Scenario Total Cost: $533.90

Scenario Cost/Unit: $1,067.80

Cost Details:

Component Name	ID	Description	Unit	Cost	QTY	Total
Equipment Installation						
Tillage, Light	945	Includes light disking (tandem) or field cultivator. Includes equipment, power unit and labor costs.	Acres	$10.68	1	$10.68
Seeding Operation, No Till/Grass Drill	960	No Till drill or grass drill for seeding. Includes equipment, power unit and labor costs.	Acres	$21.92	1	$21.92
Tractor, agricultural, 120 HP	962	Agricultural tractor with horsepower range of 90 to 140. Equipment and power unit costs. Labor not included.	Hours	$50.84	2	$101.68
Labor						
Equipment Operators, Light	232	Includes: Skid Steer Loaders, Hydraulic Excavators <50 HP, Trenchers <12 in., Ag Equipment <150 HP, Pickup Trucks, Forklifts, Mulchers	Hours	$27.87	2	$55.74
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	$171.94	2	$343.88

Practice: 390 - Riparian Herbaceous Cover

Scenario: #4 - Cool Season Grasses w/ Forbs

Scenario Description:

Cool Season Grasses with Forbs: This scenario addresses inadequate herbaceous plant community function or diversity within the specific transitional zone between terrestrial and aquatic habitats in rangeland, pasture, cropland, and forest where natural seeding methods and/or management is unlikely to improve the plant community within a reasonable time period. This scenario applies to work not covered under NRCS Conservation Practice Range Planting (528), Forage and Biomass Planting (512), Critical Area Planting (342), Filter Strip (393), Restoration and Management of Rare and Declining Habitats (643), Streambank and Shoreline Protection (580), Vegetated Treatment Area (635), Wetland Enhancement (659), or Wetland Restoration (657). 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 intermittant flooding and saturated soils where the exising plant community has been disturbed, destroyed, or the species diversity is unable to provide proper function and/or adequate habitat. Where the establishment of a diverse riparian herbaceous plant community is desired, an adapted mix of primarily cool season 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

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 conern(s). Existing conditions often require suppression or eradication of current vegetation by conventional mechanical or chemical (Herbaceous Weed Control (315)) methods to ensure establishment success of the new planting. Soil quality may be reduced due to compaction and may require light tillage to prepare a proper seedbed.

After 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.

Feature Measure: Acres of Riparian Herbaceous Cover

Scenario Unit: Acres

Scenario Typical Size: 0.5

Scenario Total Cost: $533.90

Scenario Cost/Unit: $1,067.80

Cost Details:

Component Name	ID	Description	Unit	Cost	QTY	Total
Equipment Installation						
Tillage, Light	945	Includes light disking (tandem) or field cultivator. Includes equipment, power unit and labor costs.	Acres	$10.68	1	$10.68
Seeding Operation, No Till/Grass Drill	960	No Till drill or grass drill for seeding. Includes equipment, power unit and labor costs.	Acres	$21.92	1	$21.92
Tractor, agricultural, 120 HP	962	Agricultural tractor with horsepower range of 90 to 140. Equipment and power unit costs. Labor not included.	Hours	$50.84	2	$101.68
Labor						
Equipment Operators, Light	232	Includes: Skid Steer Loaders, Hydraulic Excavators <50 HP, Trenchers <12 in., Ag Equipment <150 HP, Pickup Trucks, Forklifts, Mulchers	Hours	$27.87	2	$55.74
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	$171.94	2	$343.88

Practice: 390 - Riparian Herbaceous Cover

Scenario: #58 - Pollinator Habitat

Scenario Description:

Pollinator Habitat: This scenario addresses inadequate herbaceous plant community function or diversity within the specific transitional zone between terrestrial and aquatic habitats in rangeland, pasture, cropland, and forest where natural seeding methods and/or management is unlikely to improve the plant community within a reasonable time. The typical setting for this scenario is 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 adequate habitat. Where the establishment of a diverse riparian herbaceous plant community is desired, an adapted mix of grasses, sedges, rushes, ferns, legumes, and/or forbs tolerant to the site conditions will be planted. Site adapted species of grasses, legumes, and/or forbs will be planted by no-till or range drill seeding methods as necessary to accomplish the intended purpose(s). Where chemical control of undesirable vegetation, including invasive species, is required to reduce competition for the desired plant community the Herbaceous Weed Control (315) practice should be used. Include 5-10 adapted forb species that bloom sequentially throughout the growing season. 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 nationwide.

Before Situation:

Riparian zone vegetation is currently an undesirable or inadequate stand of perennial or annual vegetation as determined by the NRCS Stream Visual Assessment Protocol. Natural reseeding or vegetation management is unlikely to improve the plant community within a reasonable amount of time. Existing vegetation does not provide adequate food, cover, and/or connectivity for riparian wildlife, and contributes insufficient amounts of organic matter for stream species food and cover. Riparian vegetation quality and/or quantity have been compromised by human activities and/or access of vehicles, people, and/or livestock to the extent that the riparian area is not functioning to provide the necessary stream and riparian habitat components. Existing conditions often require suppression or eradication of current vegetation by conventional mechanical or chemical methods to ensure establishment success of the new planting.

After Situation:

The riparian zone 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.

Feature Measure: Acres of Riparian Herbaceous Cover

Scenario Unit: Acres

Scenario Typical Size: 0.5

Scenario Total Cost: $491.13

Scenario Cost/Unit: $982.26

Cost Details:

Component Name	ID	Description	Unit	Cost	QTY	Total
Equipment Installation						
Seeding Operation, No Till/Grass Drill	960	No Till drill or grass drill for seeding. Includes equipment, power unit and labor costs.	Acres	$21.92	0.5	$10.96
Tractor, agricultural, 60 HP	963	Agricultural tractor with horsepower range of 50 to 90. Equipment and power unit costs. Labor not included.	Hours	$23.10	1	$23.10
Labor						
Equipment Operators, Light	232	Includes: Skid Steer Loaders, Hydraulic Excavators <50 HP, Trenchers <12 in., Ag Equipment <150 HP, Pickup Trucks, Forklifts, Mulchers	Hours	$27.87	2	$55.74
Materials						
Native Perennial Grasses, Legumes and/or Forb Mix for Targeted Wildlife/Pollinator Habitat or Ecological Restoration, moderate commercial availability	2619	Diverse mix of native perennial grasses, legumes and forbs, less than 50% grasses, may include biennials and a small percentage of annual species for establishment purposes and/or if allowed by the CPS. This is a mix composed of species required to meet specific wildlife/pollinator habitat or ecological requirements. Seed is moderately easy to purchase commercially. Includes materials and shipping.	Acres	$458.78	0.5	$229.39
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	$171.94	1	$171.94

Practice: 391 - Riparian Forest Buffer

Scenario: #1 - Bare Root, All Shelters

Scenario Description:

Establish a buffer of trees and/or shrubs into a suitably prepared site to restore riparian plant communities and associated benefits. Typically used to plant bare-root trees and/or shrubs according to state specifications . Assumes all hardwood trees have shelters/protectors. Does not include weed barrier - use Mulching (484).

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.

Feature Measure: Area of planting

Scenario Unit: Acres

Scenario Typical Size: 1.0

Scenario Total Cost: $2,652.30

Scenario Cost/Unit: $2,652.30

Cost Details:

Component Name	ID	Description	Unit	Cost	QTY	Total
Equipment Installation						
Truck, Pickup	939	Equipment and power unit costs. Labor not included.	Hours	$24.18	8	$193.44
All terrain vehicles, ATV	965	Includes equipment, power unit and labor costs.	Hours	$21.14	8	$169.12
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.	Hours	$10.75	8	$86.00
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.	Hours	$11.47	24	$275.28
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.	Hours	$27.56	24	$661.44
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.	Hours	$46.88	4	$187.52
Materials						
Shrub, Seedling, Medium	1507	Bare root shrub seedling, 18 to 36 inches tall; includes tropical containerized seedlings 10 to 20 cubic inches. Includes materials and shipping only.	Each	$1.41	100	$141.00
Tree, Hardwood, Seedling, Medium	1510	Bare root hardwood seedlings 18 to 36 inches tall; includes tropical containerized seedlings of 10 to 20 cubic inches. Includes materials and shipping only.	Each	$1.52	250	$380.00
Tree, Conifer, Seedling, Small	1512	Containerized conifer seedlings, 4 or 6 cubic inches; or bare root conifer seedlings 1+0 (one-year old seedlings grown in their original seedbed). Includes materials and shipping only.	Each	$0.51	100	$51.00
Tree shelter, solid tube type, 3-1/4 in. x 36 in.	1561	3-1/4 inch x 36 inch tree tube for protection from animal damage. Materials only.	Each	$1.91	250	$477.50
Stake, bamboo, 3/8 in. x 36 in.	1584	3/8 in. x 36 in. bamboo stakes to anchor items in place. Inlcudes materials and shipping only.	Each	$0.12	250	$30.00

Practice: 391 - Riparian Forest Buffer

Scenario: #2 - Bare Root, Half Shelters

Scenario Description:

Establish a buffer of trees and/or shrubs into a suitably prepared site to restore riparian plant communities and associated benefits. Typically used to plant bare-root trees and/or shrubs according to state specifications . Assumes half of the hardwood trees have shelters/protectors. Does not include weed barrier - use Mulching (484).

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.

Feature Measure: Area of planting

Scenario Unit: Acres

Scenario Typical Size: 1.0

Scenario Total Cost: $2,413.55

Scenario Cost/Unit: $2,413.55

Cost Details:

Component Name	ID	Description	Unit	Cost	QTY	Total
Equipment Installation						
Truck, Pickup	939	Equipment and power unit costs. Labor not included.	Hours	$24.18	8	$193.44
All terrain vehicles, ATV	965	Includes equipment, power unit and labor costs.	Hours	$21.14	8	$169.12
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.	Hours	$10.75	8	$86.00
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.	Hours	$11.47	24	$275.28
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.	Hours	$27.56	24	$661.44
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.	Hours	$46.88	4	$187.52
Materials						
Shrub, Seedling, Medium	1507	Bare root shrub seedling, 18 to 36 inches tall; includes tropical containerized seedlings 10 to 20 cubic inches. Includes materials and shipping only.	Each	$1.41	100	$141.00
Tree, Hardwood, Seedling, Medium	1510	Bare root hardwood seedlings 18 to 36 inches tall; includes tropical containerized seedlings of 10 to 20 cubic inches. Includes materials and shipping only.	Each	$1.52	250	$380.00
Tree, Conifer, Seedling, Small	1512	Containerized conifer seedlings, 4 or 6 cubic inches; or bare root conifer seedlings 1+0 (one-year old seedlings grown in their original seedbed). Includes materials and shipping only.	Each	$0.51	100	$51.00
Tree shelter, solid tube type, 3-1/4 in. x 36 in.	1561	3-1/4 inch x 36 inch tree tube for protection from animal damage. Materials only.	Each	$1.91	125	$238.75
Stake, bamboo, 3/8 in. x 36 in.	1584	3/8 in. x 36 in. bamboo stakes to anchor items in place. Inlcudes materials and shipping only.	Each	$0.12	250	$30.00

Practice: 391 - Riparian Forest Buffer

Scenario: #3 - Bare Root, No Shelters

Scenario Description:

Establish a buffer of trees and/or shrubs into a suitably prepared site to restore riparian plant communities and associated benefits. Typically used to plant bare-root trees and/or shrubs according to state specifications . Assumes none of the hardwood trees have shelters/protectors. Does not include weed barrier - use Mulching (484).

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.

Feature Measure: Area of planting

Scenario Unit: Acres

Scenario Typical Size: 1.0

Scenario Total Cost: $2,174.80

Scenario Cost/Unit: $2,174.80

Cost Details:

Component Name	ID	Description	Unit	Cost	QTY	Total
Equipment Installation						
Truck, Pickup	939	Equipment and power unit costs. Labor not included.	Hours	$24.18	8	$193.44
All terrain vehicles, ATV	965	Includes equipment, power unit and labor costs.	Hours	$21.14	8	$169.12
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.	Hours	$10.75	8	$86.00
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.	Hours	$11.47	24	$275.28
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.	Hours	$27.56	24	$661.44
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.	Hours	$46.88	4	$187.52
Materials						
Shrub, Seedling, Medium	1507	Bare root shrub seedling, 18 to 36 inches tall; includes tropical containerized seedlings 10 to 20 cubic inches. Includes materials and shipping only.	Each	$1.41	100	$141.00
Tree, Hardwood, Seedling, Medium	1510	Bare root hardwood seedlings 18 to 36 inches tall; includes tropical containerized seedlings of 10 to 20 cubic inches. Includes materials and shipping only.	Each	$1.52	250	$380.00
Tree, Conifer, Seedling, Small	1512	Containerized conifer seedlings, 4 or 6 cubic inches; or bare root conifer seedlings 1+0 (one-year old seedlings grown in their original seedbed). Includes materials and shipping only.	Each	$0.51	100	$51.00
Stake, bamboo, 3/8 in. x 36 in.	1584	3/8 in. x 36 in. bamboo stakes to anchor items in place. Inlcudes materials and shipping only.	Each	$0.12	250	$30.00

Practice: 391 - Riparian Forest Buffer

Scenario: #5 - High Risk Areas

Scenario Description:

Installation of a riparian buffer on annually tilled cropland which lacks a native seed source of woody plants. In addition, ice scour, droughty soils, undercut banks, and shorter growing seasons create a situation where increasing the planting density improves the success of the buffer in difficult conditions by allowing for mortality.

Before Situation:

The riverbank lacks woody vegetation and is in sod or corn which creates a situation where topple along the river bank is common on an annual basis at a rate of up-to 10 feet per year or more. The riverbank is vertical or undercut. Impacts to water quality and wildlife habitat result from a lack of woody riparian vegetation, due to higher water temperatures, siltation, excess nutrients and a lack of escape or nesting cover.

After Situation:

Planted woody vegetation begins to shade competing herbaceous vegetation, allowing native regeneration, and developing a faster response to reducing bank erosion. As larger deeply rooted trees and shrubs slide into the river, the riverbank returns to a more normal angle of repose. Bank erosion isn't stopped on outside bends of the river, but the erosion is slowed to a more normal rate.

Feature Measure: Area of Planting

Scenario Unit: Acres

Scenario Typical Size: 1.0

Scenario Total Cost: $8,251.51

Scenario Cost/Unit: $8,251.51

Cost Details:

Component Name	ID	Description	Unit	Cost	QTY	Total
Equipment Installation						
Truck, Pickup	939	Equipment and power unit costs. Labor not included.	Hours	$24.18	16	$386.88
All terrain vehicles, ATV	965	Includes equipment, power unit and labor costs.	Hours	$21.14	16	$338.24
Trailer, enclosed, large	1502	Large enclosed trailer (30' to 50' in length) pulled by a semi truck to transport materials and equipment. Truck not included.	Hours	$12.29	16	$196.64
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.	Hours	$11.47	48	$550.56
Foregone Income						
FI, Corn Dryland	1959	Dryland Corn is Primary Crop	Acres	$270.47	1	$270.47
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.	Hours	$27.56	48	$1,322.88
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.	Hours	$46.88	16	$750.08
Materials						
Shrub, Potted, Small	1524	Potted shrub seedling, 1 quart to 1 gallon. Includes materials and shipping only.	Each	$6.41	100	$641.00
Tree, Hardwood, Potted, Small	1529	Potted hardwood seedling, 1 quart to 1 gallon. Includes materials and shipping only.	Each	$7.78	236	$1,836.08
Tree, Conifer, Potted, Small	1534	Potted conifer seedling, 1 quart to 1 gallon. Includes materials and shipping only.	Each	$5.71	100	$571.00
Tree shelter, solid tube type, 4 in. x 48 in.	1566	4 inch x 48 inch tree tube for protection from animal damage. Materials only.	Each	$4.22	236	$995.92
Stakes, wood, 1 in. x 1 in. x 48 in.	1578	1 in. x 1 in. x 48 in. wood stakes to fasten items in place. Includes materials only.	Each	$1.66	236	$391.76

Practice: 391 - Riparian Forest Buffer

Scenario: #27 - Large container, hand planted

Scenario Description:

Establish a buffer of trees and/or shrubs into a suitably prepared site to restore riparian plant communities and provide conservation benefits. The buffer will be located adjacent to a watercourse or waterbody and designed with dimensions and plant spacings that fully implement the practice. The planting will consist of hand-planted large shrubs, evergreen, and deciduous trees. Tree shelters will be placed on all trees and shrubs. Resource concerns include: Plant productivity and health, Plant structure and composition, Sediment transported to surface water, Nutrients transported to surface water, Elevated water temperature, Pesticides transported to surface water, Pathogens and chemicals from manure, biosolids, or compost applications transported to surface water, Bank erosion from streams, shorelines, or water conveyance channels, Terrestrial habitat for wildlife and invertebrates, Aquatic habitat for fish and other organisms.

Before Situation:

Typical settings include degraded or converted riparian forests, and nonforest conditions with undesirable amounts or types of vegetation. Active bank erosion is contributing sediment, nutrients, pesticides, pathogens, chemicals, or organics into surface waters. Water temperature is elevated due to lack of shade. Habitat is not desirable for fish, wildlife or invertebrates.

After Situation:

A riparian buffer of trees and shrubs has been restored and is functioning properly to provide stability, filtration, shade, and desirable habitat to address identified resource concerns.

Feature Measure: Area of planting

Scenario Unit: Acres

Scenario Typical Size: 3.0

Scenario Total Cost: $8,979.79

Scenario Cost/Unit: $2,993.26

Cost Details:

Component Name	ID	Description	Unit	Cost	QTY	Total
Equipment Installation						
Truck, Pickup	939	Equipment and power unit costs. Labor not included.	Hours	$24.18	8	$193.44
All terrain vehicles, ATV	965	Includes equipment, power unit and labor costs.	Hours	$21.14	12	$253.68
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.	Hours	$10.75	35	$376.25
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.	Hours	$11.47	70	$802.90
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.	Hours	$27.56	70	$1,929.20
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.	Hours	$46.88	35	$1,640.80
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.	Hours	$102.76	2	$205.52
Materials						
Shrub, Potted, Medium	1527	Potted shrub seedling, 2 gallons or larger. Includes materials and shipping only.	Each	$13.67	100	$1,367.00
Tree, Hardwood, Potted, Medium	1532	Potted hardwood seedling, 2 gallons or larger. Includes materials and shipping only.	Each	$14.60	50	$730.00
Tree, Conifer, Potted, Medium	1537	Potted conifer seedling, 2 gallons or larger. Includes materials and shipping only.	Each	$13.76	50	$688.00
Tree shelter, mesh tree tube, 48 in.	1556	48 inch tall vexar or other open weave tubular tree shelter to protect from animal damage. Materials only.	Each	$1.02	50	$51.00
Tree shelter, solid tube type, 4 in. x 24 in.	1563	4 inch x 24 inch tree tube for protection from animal damage. Materials only.	Each	$2.05	100	$205.00
Tree shelter, solid tube type, 4 in. x 60 in.	1567	4 inch x 60 inch tree tube for protection from animal damage. Materials only.	Each	$4.26	50	$213.00
Cable ties, plastic	1575	Plastic cable ties (typ. 8-12 in.) to assist in securing items. Materials only.	Each	$0.06	400	$24.00
Stakes, wood, 3/4 in. x 3/4 in. x 60 in.	1583	3/4 in. x 3/4 in. x 60 in. wood stakes to fasten items in place. Includes materials only.	Each	$1.50	200	$300.00

Practice: 393 - Filter Strip

Scenario: #5 - Filter Strip, Native species

Scenario Description:

A strip or area of herbaceous vegetation that removes contaminants from overland flow. Practice includes seedbed prep and planting of native species.

Before Situation:

Annual cropland, grazing land, or disturbed land (including forestland) allows for runoff of suspended solids, dissolved and/or associated contaminants into environmentally-sensitive areas such as wetlands, riparian zones, critical habitat and neighboring nonagricultural properties. Water Quality resource concerns are associated with this practice.

After Situation:

The 393 Implementation Requirements are developed for the site and applied. The planned filter strip will be established and maintained per the practice plan that will meet the criteria for the planned purpose(s). The vegetation will consist of native species. The filter strip will have adequate width to filter the planned pollutants. The practice includes seedbed preparation, seeding, and seed. Species selected shall be able to withstand partial burial by sediment and tolerant of herbicides used on contribution area while protecting environmentally-sensitive areas.

Feature Measure: number of acres

Scenario Unit: Acres

Scenario Typical Size: 1.0

Scenario Total Cost: $244.72

Scenario Cost/Unit: $244.72

Cost Details:

Component Name	ID	Description	Unit	Cost	QTY	Total
Equipment Installation						
Tillage, Light	945	Includes light disking (tandem) or field cultivator. Includes equipment, power unit and labor costs.	Acres	$10.68	3	$32.04
Seeding Operation, No Till/Grass Drill	960	No Till drill or grass drill for seeding. Includes equipment, power unit and labor costs.	Acres	$21.92	1	$21.92
All terrain vehicles, ATV	965	Includes equipment, power unit and labor costs.	Hours	$21.14	1.5	$31.71
Materials						
Native Perennial Grasses, Medium Density	2751	Native perennial grasses, may include a small percentage of annual species for establishment purposes and/or if allowed by the CPS. Planted at medium to higher density (41-60 pure live seeds/sq ft). Includes material and shipping.	Acres	$159.05	1	$159.05

Practice: 393 - Filter Strip

Scenario: #6 - Filter Strip, Introduced species

Scenario Description:

A strip or area of herbaceous vegetation that removes contaminants from overland flow. Practice includes seedbed prep and planting of introduced species.

Before Situation:

Annual cropland, grazing land, or disturbed land (including forestland) allows for runoff of suspended solids, dissolved and/or associated contaminants into environmentally-sensitive areas such as wetlands, riparian zones, critical habitat and neighboring nonagricultural properties. Water Quality resource concerns are associated with this practice.

After Situation:

The 393 Implementation Requirements are developed for the site and applied. The planned filter strip will be established and maintained per the practice plan that will meet the criteria for the planned purpose(s). The vegetation will consist of introduced species. The filter strip will have adequate width to filter the planned pollutants. The practice includes seedbed preparation, seeding, and seed. Species selected shall be able to withstand partial burial by sediment and tolerant of herbicides used on contribution area while protecting environmentally-sensitive areas.

Feature Measure: Number of acres

Scenario Unit: Acres

Scenario Typical Size: 1.0

Scenario Total Cost: $175.70

Scenario Cost/Unit: $175.70

Cost Details:

Component Name	ID	Description	Unit	Cost	QTY	Total
Equipment Installation						
Tillage, Light	945	Includes light disking (tandem) or field cultivator. Includes equipment, power unit and labor costs.	Acres	$10.68	3	$32.04
Fertilizer, ground application, dry bulk	950	Dry bulk fertilizer application performed by ground equipment. Includes equipment, power unit and labor costs.	Acres	$6.63	1	$6.63
Seeding Operation, No Till/Grass Drill	960	No Till drill or grass drill for seeding. Includes equipment, power unit and labor costs.	Acres	$21.92	1	$21.92
All terrain vehicles, ATV	965	Includes equipment, power unit and labor costs.	Hours	$21.14	1.5	$31.71
Materials						
Nitrogen (N), Urea	71	Price per pound of N supplied by Urea. Price is not per pound of total product applied, no conversion is needed.	Pound	$0.47	30	$14.10
Phosphorus, P2O5	73	Price per pound of P2O5 supplied by Superphosphate. Price is not per pound of total product applied, no conversion is needed.	Pound	$0.61	20	$12.20
Introduced Perennial Grasses, Legumes and/or Forbs, High Density	2749	Introduced perennial grasses, legumes, and/or forbs, may include a small percentage of annual species for establishment purposes and/or if allowed by the CPS. Planted at high density (greater than 60 pure live seeds/sq ft). Includes material and shipping.	Acres	$57.10	1	$57.10

Practice: 393 - Filter Strip

Scenario: #23 - Filter Strip, Native species, Forgone Income

Scenario Description:

A strip or area of herbaceous vegetation that removes contaminants from overland flow. Practice includes seedbed prep and planting of native species. The area of the filter strip is taken out of production.

Before Situation:

Annual cropland, grazing land, or disturbed land (including forestland) allows for runoff of suspended solids, dissolved and/or associated contaminants into environmentally-sensitive areas such as wetlands, riparian zones, critical habitat and neighboring non-ag properties. Water Quality resource concerns are associated with this practice.

After Situation:

The 393 Implementation Requirements are developed for the site and applied. The planned filter strip will be established and maintained per the practice plan that will meet the criteria for the planned purpose(s). The vegetation will consist of native species. The filter strip will have adequate width to filter the planned pollutants. The practice includes seedbed preparation, seeding, and seed. Species selected shall be able to withstand partial burial by sediment and tolerant of herbicides used on the contribution area while protecting environmentally-sensitive areas. The area of the filter strip is taken out of production.

Feature Measure: number of acres

Scenario Unit: Acres

Scenario Typical Size: 1.0

Scenario Total Cost: $515.19

Scenario Cost/Unit: $515.19

Cost Details:

Component Name	ID	Description	Unit	Cost	QTY	Total
Equipment Installation						
Tillage, Light	945	Includes light disking (tandem) or field cultivator. Includes equipment, power unit and labor costs.	Acres	$10.68	3	$32.04
Seeding Operation, No Till/Grass Drill	960	No Till drill or grass drill for seeding. Includes equipment, power unit and labor costs.	Acres	$21.92	1	$21.92
All terrain vehicles, ATV	965	Includes equipment, power unit and labor costs.	Hours	$21.14	1.5	$31.71
Foregone Income						
FI, Corn Dryland	1959	Dryland Corn is Primary Crop	Acres	$270.47	1	$270.47
Materials						
Native Perennial Grasses, Medium Density	2751	Native perennial grasses, may include a small percentage of annual species for establishment purposes and/or if allowed by the CPS. Planted at medium to higher density (41-60 pure live seeds/sq ft). Includes material and shipping.	Acres	$159.05	1	$159.05

Practice: 393 - Filter Strip

Scenario: #24 - Filter Strip, Introduced species, Forgone Income

Scenario Description:

A strip or area of herbaceous vegetation that removes contaminants from overland flow. Practice includes seedbed prep and planting of introduced species. The area of the filter strip is taken out of production.

Before Situation:

Annual cropland, grazing land, or disturbed land (including forestland) allows for runoff of suspended solids, dissolved and/or associated contaminants into environmentally-sensitive areas such as wetlands, riparian zones, critical habitat and neighboring non-ag properties. Water Quality resource concerns are associated with this practice.

After Situation:

The 393 Implementation Requirements are developed for the site and applied. The planned filter strip will be established and maintained per the practice plan that will meet the criteria for the planned purpose(s). The vegetation will consist of introduced species. The filter strip will have adequate width to filter the planned pollutants. The practice includes seedbed preparation, seeding, and seed. Species selected shall be able to withstand partial burial by sediment and tolerant of herbicides used on contribution area while protecting environmentally-sensitive areas. The area of the filter strip is taken out of production.

Feature Measure: Number of acres

Scenario Unit: Acres

Scenario Typical Size: 1.0

Scenario Total Cost: $446.17

Scenario Cost/Unit: $446.17

Cost Details:

Component Name	ID	Description	Unit	Cost	QTY	Total
Equipment Installation						
Tillage, Light	945	Includes light disking (tandem) or field cultivator. Includes equipment, power unit and labor costs.	Acres	$10.68	3	$32.04
Fertilizer, ground application, dry bulk	950	Dry bulk fertilizer application performed by ground equipment. Includes equipment, power unit and labor costs.	Acres	$6.63	1	$6.63
Seeding Operation, No Till/Grass Drill	960	No Till drill or grass drill for seeding. Includes equipment, power unit and labor costs.	Acres	$21.92	1	$21.92
All terrain vehicles, ATV	965	Includes equipment, power unit and labor costs.	Hours	$21.14	1.5	$31.71
Foregone Income						
FI, Corn Dryland	1959	Dryland Corn is Primary Crop	Acres	$270.47	1	$270.47
Materials						
Nitrogen (N), Urea	71	Price per pound of N supplied by Urea. Price is not per pound of total product applied, no conversion is needed.	Pound	$0.47	30	$14.10
Phosphorus, P2O5	73	Price per pound of P2O5 supplied by Superphosphate. Price is not per pound of total product applied, no conversion is needed.	Pound	$0.61	20	$12.20
Introduced Perennial Grasses, Legumes and/or Forbs, High Density	2749	Introduced perennial grasses, legumes, and/or forbs, may include a small percentage of annual species for establishment purposes and/or if allowed by the CPS. Planted at high density (greater than 60 pure live seeds/sq ft). Includes material and shipping.	Acres	$57.10	1	$57.10

Practice: 394 - Firebreak

Scenario: #16 - Constructed - Light Equipment

Scenario Description:

Installation of a bare-ground firebreak of a minimum width of 15' around a 20 acre field/farm using farm equipment (2 passes). Generally water control devices such as water bars are not needed due either to the lack of steep terrain or the temporary nature of the firebreak. Resource concerns include Wildfire hazard from excessive biomass accumulation, Undesirable plant productivity and health, Inadequate plant structure and composition, and Habitat degradation.

Before Situation:

Tract, field, or farm lacks adequate firebreaks to either reduce the spread of wildfires or contain a prescribed burn. Installation will be accomplished by making two passes with the use of typical farm equipment such as tractors, plows, disks, or similar implements.

After Situation:

The property is adequately protected from wildfire or can be safely prescribe burned.

Feature Measure: Length of firebreak

Scenario Unit: 100 Foot

Scenario Typical Size: 40.0

Scenario Total Cost: $157.44

Scenario Cost/Unit: $3.94

Cost Details:

Component Name	ID	Description	Unit	Cost	QTY	Total
Equipment Installation						
Truck, Pickup	939	Equipment and power unit costs. Labor not included.	Hours	$24.18	2	$48.36
Tillage, Light	945	Includes light disking (tandem) or field cultivator. Includes equipment, power unit and labor costs.	Acres	$10.68	2	$21.36
Tillage, Primary	946	Includes heavy disking (offset) or chisel plow. Includes equipment, power unit and labor costs.	Acres	$16.30	2	$32.60
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.	Hours	$27.56	2	$55.12

Practice: 394 - Firebreak

Scenario: #17 - Constructed - Medium equipment, flat-medium slopes

Scenario Description:

Use of medium equipment such as small dozers to blade, disk, plow, etc. 10' wide bare-soil firebreaks on slopes less than 15%. Generally, water control devices such as water bars are limited to 10 or less per 1,000 feet when properly planned and installed using the same equipment. Resource concerns include Wildfire hazards from excessive biomass accumulation, Undesirable plant productivity and health, Inadequate plant structure and composition, and Habitat degradation.

Before Situation:

Tract, field, or farm lacks adequate firebreaks to either reduce the spread of wildfires or contain a prescribed burn. Conditions such as topography, the presence of brush and trees, etc. make the use of typical farm equipment impractical.

After Situation:

The property is adequately protected from wildfire or can be safely prescribe burned and the potential for excessive erosion from the firebreak is negligible.

Feature Measure: Length of firebreak

Scenario Unit: Feet

Scenario Typical Size: 3,000.0

Scenario Total Cost: $1,567.70

Scenario Cost/Unit: $0.52

Cost Details:

Component Name	ID	Description	Unit	Cost	QTY	Total
Equipment Installation						
Dozer, 80 HP	929	Track mounted Dozer with horsepower range of 60 to 90. Equipment and power unit costs. Labor not included.	Hours	$55.20	4	$220.80
Water Bars	1500	Installation of graded trail water controlling structures such as water bars, broad based dips for erosion control. Typical cross section is 1.5 feet high with 4:1 side slopes yielding about 0.33 CY/ft of length.	Feet	$2.89	325	$939.25
Labor						
Equipment Operators, Heavy	233	Includes: Cranes, Hydraulic Excavators >=50 HP, Dozers, Paving Machines, Rock Trenchers, Trenchers >=12 in., Dump Trucks, Ag Equipment >=150 HP, Scrapers, Water Wagons.	Hours	$38.00	4	$152.00
Mobilization						
Mobilization, medium equipment	1139	Equipment with 70-150 HP or typical weights between 14,000 and 30,000 pounds.	Each	$255.65	1	$255.65

Practice: 394 - Firebreak

Scenario: #18 - Constructed - Medium equipment, steep slopes

Scenario Description:

Use of equipment such as small dozers to blade 10' wide bare-soil firebreaks on slopes greater than 15%. Water control devices such as water bars placed at approximately 15 to 25 per 1,000 ft section of firebreak, are necessary to control erosion. These will be installed with the same equipment. Resource concerns include Wildfire hazard from excessive biomass accumulation, Undesirable plant productivity and health, Inadequate plant structure and composition, Habitat degradation, Soil erosion, and Excessive sediment in surface waters.

Before Situation:

Tract, field, or farm lacks adequate firebreaks to either reduce the spread of wildfires or contain a prescribed burn. Conditions such as topography, the presence of brush and trees, etc. make the use of typical farm equipment impractical. As slopes increase, the potential for excessive erosion increases from soil disturbances. Therefore the installation of water control devices such as water bars will be important in protecting the resource base.

After Situation:

The property is adequately protected from wildfire or can be safely prescribe burned and the potential for excessive erosion from the firebreak is minimized.

Feature Measure: Length of firebreak

Scenario Unit: Feet

Scenario Typical Size: 1,000.0

Scenario Total Cost: $1,495.45

Scenario Cost/Unit: $1.50

Cost Details:

Component Name	ID	Description	Unit	Cost	QTY	Total
Equipment Installation						
Dozer, 80 HP	929	Track mounted Dozer with horsepower range of 60 to 90. Equipment and power unit costs. Labor not included.	Hours	$55.20	4	$220.80
Water Bars	1500	Installation of graded trail water controlling structures such as water bars, broad based dips for erosion control. Typical cross section is 1.5 feet high with 4:1 side slopes yielding about 0.33 CY/ft of length.	Feet	$2.89	300	$867.00
Labor						
Equipment Operators, Heavy	233	Includes: Cranes, Hydraulic Excavators >=50 HP, Dozers, Paving Machines, Rock Trenchers, Trenchers >=12 in., Dump Trucks, Ag Equipment >=150 HP, Scrapers, Water Wagons.	Hours	$38.00	4	$152.00
Mobilization						
Mobilization, medium equipment	1139	Equipment with 70-150 HP or typical weights between 14,000 and 30,000 pounds.	Each	$255.65	1	$255.65

Practice: 394 - Firebreak

Scenario: #19 - Vegetated permanent firebreak

Scenario Description:

Establishing a 20 foot wide strip of permanent vegetation that will serve as a green firebreak. Scenario includes clearing the site, preparing the seedbed, seeding (typically cool season grasses and/or legumes), and applying needed soil amendments. Clearing will be achieved with the use of a bush hog or similar equipment. Seedbed preparation and vegetation establishment will be accomplished with farm equipment. Soil amendments will be applied according to local FOTG guidance. This scenario does not include follow-up maintenance operations such as weed control. mowing, etc. Resource concerns include Wildfire hazard from excessive biomass accumulation, Soil erosion, and Excessive sediment in surface waters.

Before Situation:

Tract, field, or farm lacks adequate firebreaks to either reduce the spread of wildfires or contain a prescribed burn.

After Situation:

The property is adequately protected from wildfire or can be safely prescribe burned. Wildlife habitat will also be enhanced and the potential for erosion from the firebreak is minimized.

Feature Measure: Length of firebreak

Scenario Unit: Feet

Scenario Typical Size: 3,000.0

Scenario Total Cost: $937.37

Scenario Cost/Unit: $0.31

Cost Details:

Component Name	ID	Description	Unit	Cost	QTY	Total
Equipment Installation						
Mower, Bush Hog	940	Equipment and power unit costs. Labor not included.	Hours	$50.43	4	$201.72
Tillage, Light	945	Includes light disking (tandem) or field cultivator. Includes equipment, power unit and labor costs.	Acres	$10.68	2	$21.36
Tillage, Primary	946	Includes heavy disking (offset) or chisel plow. Includes equipment, power unit and labor costs.	Acres	$16.30	4	$65.20
Fertilizer, ground application, dry bulk	950	Dry bulk fertilizer application performed by ground equipment. Includes equipment, power unit and labor costs.	Acres	$6.63	1	$6.63
Lime application	953	Lime application performed by ground equipment. Includes equipment, power unit and labor costs.	Acres	$8.21	1	$8.21
Seeding Operation, No Till/Grass Drill	960	No Till drill or grass drill for seeding. Includes equipment, power unit and labor costs.	Acres	$21.92	1	$21.92
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.	Hours	$27.56	8	$220.48
Materials						
Phosphorus, P2O5	73	Price per pound of P2O5 supplied by Superphosphate. Price is not per pound of total product applied, no conversion is needed.	Pound	$0.61	70	$42.70
Potassium, K2O	74	K2O supplied by Muriate Of Potash. Price is not per pound of total product applied, no conversion is needed.	Pound	$0.35	70	$24.50
Lime, ENM	75	Fertilizer: Limestone Spread on field.	Ton	$64.87	1	$64.87
Introduced Perennial Grasses, Legumes and/or Forbs, Medium Density	2748	Introduced perennial grasses, legumes, and/or forbs, may include a small percentage of annual species for establishment purposes and/or if allowed by the CPS. Planted at medium to higher density (41-60 pure live seeds/sq ft). Includes material and shipping.	Acres	$43.92	2	$87.84
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	$171.94	1	$171.94

Practice: 394 - Firebreak

Scenario: #20 - Constructed - Wide, bladed or disked firebreak

Scenario Description:

Installing a bare-ground firebreak with a width of 30' or more on gently to strongly sloping slopes with equipment such as a dozer with a heavy disk. Using smaller equipment, erosion control devices such as water bars will be installed at approximately 15 to 25 per 1,000 feet of firebreak length. Devices will have stable outlets. Resource concerns include Wildfire hazard from excessive biomass accumulation, Undesirable plant productivity and health, Inadequate plant structure and composition, Habitat degradation, Soil erosion, and Excessive sediment in surface waters.

Before Situation:

Tract, field, or farm lacks adequate firebreaks to either reduce the spread of wildfires or contain a prescribed burn. Wide firebreaks are needed due to topography, high wildfire risk or to their use as down-wind breaks for prescribed burns. Conditions such as topography, the presence of brush and trees, etc. make the use of typical farm equipment impractical. As slopes increase, the potential for excessive erosion increases from soil disturbances. Therefore the installation of water control devices such as water bars will be important in protecting the resource base.

After Situation:

The property is adequately protected from wildfire or can be safely prescribe burned and the potential for excessive erosion from the firebreak is minimized.

Feature Measure: Length of firebreak

Scenario Unit: Feet

Scenario Typical Size: 1,000.0

Scenario Total Cost: $3,844.62

Scenario Cost/Unit: $3.84

Cost Details:

Component Name	ID	Description	Unit	Cost	QTY	Total
Equipment Installation						
Dozer, 80 HP	929	Track mounted Dozer with horsepower range of 60 to 90. Equipment and power unit costs. Labor not included.	Hours	$55.20	8	$441.60
Fire Plow	1306	Heavy wildland plow or disk used for installing firebreaks. Equipment costs only for plow, use with a dozer component. Labor not included.	Hours	$36.73	4	$146.92
Water Bars	1500	Installation of graded trail water controlling structures such as water bars, broad based dips for erosion control. Typical cross section is 1.5 feet high with 4:1 side slopes yielding about 0.33 CY/ft of length.	Feet	$2.89	800	$2,312.00
Labor						
Equipment Operators, Heavy	233	Includes: Cranes, Hydraulic Excavators >=50 HP, Dozers, Paving Machines, Rock Trenchers, Trenchers >=12 in., Dump Trucks, Ag Equipment >=150 HP, Scrapers, Water Wagons.	Hours	$38.00	12	$456.00
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	$488.10	1	$488.10

Practice: 395 - Stream Habitat Improvement and Management

Scenario: #2 - Mechanical 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.

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.

Feature Measure: Bankfull width x reach length

Scenario Unit: Acres

Scenario Typical Size: 1.0

Scenario Total Cost: $21,087.42

Scenario Cost/Unit: $21,087.42

Cost Details:

Component Name	ID	Description	Unit	Cost	QTY	Total
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.	Hours	$130.80	16	$2,092.80
Truck, dump, 12 CY	1215	Dump truck for moving bulk material. Typically capacity is 16 ton or 12 cubic yards. Includes equipment only.	Hours	$78.77	8	$630.16
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.	Hours	$27.56	40	$1,102.40
Equipment Operators, Heavy	233	Includes: Cranes, Hydraulic Excavators >=50 HP, Dozers, Paving Machines, Rock Trenchers, Trenchers >=12 in., Dump Trucks, Ag Equipment >=150 HP, Scrapers, Water Wagons.	Hours	$38.00	24	$912.00
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.	Hours	$46.88	16	$750.08
Materials						
Aggregate, Sand, Graded, Washed	45	Sand, typical ASTM C33 gradation, includes materials, equipment and labor to transport and place	Cubic Yards	$43.40	20	$868.00
Aggregate, Gravel, Graded	46	Gravel, includes materials, equipment and labor to transport and place. Includes washed and unwashed gravel.	Cubic Yards	$45.42	30	$1,362.60
Compost	265	A mixture of decaying organic matter, as from leaves and manure, used to improve soil structure and provide nutrients.	Ton	$43.63	1	$43.63
Tree & Shrub, Woody, Cuttings, Large	1309	Woody pole cuttings or posts 2 to 6 inches in diameter and 6 ft. long. Includes materials and shipping only.	Each	$14.97	300	$4,491.00
Boulder	1761	Rock boulders (approximately 5 ft dia. 6.67 Tons) Inlcudes materials and delivery (up to 100 miles) only.	Ton	$66.53	40	$2,661.20
Steel, rebar	1832	Steel rebar, grade 60. Materials only.	Pound	$0.69	50	$34.50
Aggregate, river rock	1834	Well graded, rounded mineral substrates derived from local riverine settings. Includes materials and local delivery	Ton	$36.99	15	$554.85
Log, un-anchored	2035	Price of log picked up at the Mill. Includes material only.	Ton	$163.19	30	$4,895.70

Root Wad	2045	Tree stump buried into the streambank with the roots left exposed. Includes material only.	Ton	$10.02	20	$200.40
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	$488.10	1	$488.10

Practice: 395 - Stream Habitat Improvement and Management

Scenario: #3 - 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 biologis 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.

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.

Feature Measure: Bankfull width x reach length

Scenario Unit: Acres

Scenario Typical Size: 1.0

Scenario Total Cost: $17,605.62

Scenario Cost/Unit: $17,605.62

Cost Details:

Component Name	ID	Description	Unit	Cost	QTY	Total
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.	Hours	$130.80	16	$2,092.80
Truck, dump, 12 CY	1215	Dump truck for moving bulk material. Typically capacity is 16 ton or 12 cubic yards. Includes equipment only.	Hours	$78.77	8	$630.16
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.	Hours	$27.56	16	$440.96
Equipment Operators, Heavy	233	Includes: Cranes, Hydraulic Excavators >=50 HP, Dozers, Paving Machines, Rock Trenchers, Trenchers >=12 in., Dump Trucks, Ag Equipment >=150 HP, Scrapers, Water Wagons.	Hours	$38.00	24	$912.00
Materials						
Aggregate, Gravel, Graded	46	Gravel, includes materials, equipment and labor to transport and place. Includes washed and unwashed gravel.	Cubic Yards	$45.42	150	$6,813.00
Tree & Shrub, Woody, Cuttings, Large	1309	Woody pole cuttings or posts 2 to 6 inches in diameter and 6 ft. long. Includes materials and shipping only.	Each	$14.97	100	$1,497.00
Boulder	1761	Rock boulders (approximately 5 ft dia. 6.67 Tons) Inlcudes materials and delivery (up to 100 miles) only.	Ton	$66.53	60	$3,991.80
Aggregate, river rock	1834	Well graded, rounded mineral substrates derived from local riverine settings. Includes materials and local delivery	Ton	$36.99	20	$739.80
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	$488.10	1	$488.10

Practice: 395 - Stream Habitat Improvement and Management

Scenario: #4 - 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 senario 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.

Feature Measure: stream length X bankfull width

Scenario Unit: Acres

Scenario Typical Size: 1.0

Scenario Total Cost: $34,832.40

Scenario Cost/Unit: $34,832.40

Cost Details:

Component Name	ID	Description	Unit	Cost	QTY	Total
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.	Hours	$130.80	16	$2,092.80
Truck, dump, 12 CY	1215	Dump truck for moving bulk material. Typically capacity is 16 ton or 12 cubic yards. Includes equipment only.	Hours	$78.77	8	$630.16
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.	Hours	$37.19	60	$2,231.40
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.	Hours	$27.56	24	$661.44
Equipment Operators, Heavy	233	Includes: Cranes, Hydraulic Excavators >=50 HP, Dozers, Paving Machines, Rock Trenchers, Trenchers >=12 in., Dump Trucks, Ag Equipment >=150 HP, Scrapers, Water Wagons.	Hours	$38.00	24	$912.00
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.	Hours	$46.88	180	$8,438.40
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.	Hours	$102.76	32	$3,288.32
Materials						
Aggregate, Gravel, Graded	46	Gravel, includes materials, equipment and labor to transport and place. Includes washed and unwashed gravel.	Cubic Yards	$45.42	80	$3,633.60
Compost	265	A mixture of decaying organic matter, as from leaves and manure, used to improve soil structure and provide nutrients.	Ton	$43.63	1	$43.63
Tree & Shrub, Woody, Cuttings, Large	1309	Woody pole cuttings or posts 2 to 6 inches in diameter and 6 ft. long. Includes materials and shipping only.	Each	$14.97	300	$4,491.00

Boulder	1761	Rock boulders (approximately 5 ft dia. 6.67 Tons) Inlcudes materials and delivery (up to 100 miles) only.	Ton	$66.53	40	$2,661.20
Steel, rebar	1832	Steel rebar, grade 60. Materials only.	Pound	$0.69	8	$5.52
Aggregate, river rock	1834	Well graded, rounded mineral substrates derived from local riverine settings. Includes materials and local delivery	Ton	$36.99	7	$258.93
Log, un-anchored	2035	Price of log picked up at the Mill. Includes material only.	Ton	$163.19	30	$4,895.70
Root Wad	2045	Tree stump buried into the streambank with the roots left exposed. Includes material only.	Ton	$10.02	10	$100.20
Mobilization						
Mobilization, large equipment	1140	Equipment >150HP or typical weights greater than 30,000 pounds or loads requiring over width or over length permits.	Each	$488.10	1	$488.10

Practice: 395 - Stream Habitat Improvement and Management

Scenario: #5 - Conifer Tree Revetment

Scenario Description:

This scenario involves placement of anchored conifer trees along the streambank in order to improve bank stability and 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 conifer tree revetment 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. Coinfer tree revetments should be placed in streams to protect stream banks and create 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 bank stability and 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.

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 conifer tree revetments or similar 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.

Feature Measure: Cubic Yard of CTR

Scenario Unit: Cubic Yards

Scenario Typical Size: 200.0

Scenario Total Cost: $12,853.35

Scenario Cost/Unit: $64.27

Cost Details:

Component Name	ID	Description	Unit	Cost	QTY	Total
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.	Hours	$130.80	20	$2,616.00
Chainsaw	937	Equipment and power unit costs. Labor not included.	Hours	$7.15	20	$143.00
Log skidder	942	Equipment and power unit costs. Labor not included.	Hours	$124.33	20	$2,486.60
Jack Hammer	2190	60-90 pound jack hammer (electric, pneumatic, or hydraulic). Equipment only.	Hours	$6.33	20	$126.60
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.	Hours	$37.19	60	$2,231.40
Equipment Operators, Heavy	233	Includes: Cranes, Hydraulic Excavators >=50 HP, Dozers, Paving Machines, Rock Trenchers, Trenchers >=12 in., Dump Trucks, Ag Equipment >=150 HP, Scrapers, Water Wagons.	Hours	$38.00	40	$1,520.00
Materials						
Erosion Control Blanket, biodegradable	1213	Biodegradable erosion control blanket, typically a composite of natural fibers with reinforcing polymer netting. Materials and shipping only.	Square Yard	$1.32	175	$231.00
Steel cable grips, lockable, 1/4 in.	2181	Lockable wire rope grips for 1/4 inch galvanized steel cable. Materials and shipping only.	Each	$12.10	30	$363.00
Cable, Galvanized steel	2182	Galvanized steel aircraft cable in 7 x 19 strand core. Materials and shipping only.	Feet	$0.51	405	$206.55
Anchor, earthen, low disturbance, large	2184	Low disturbance, galvanized or aluminum alloy earthen anchors with holding power greather than 3,000 pounds in normal soil. Materials and shipping only.	Each	$43.40	45	$1,953.00
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	$488.10	2	$976.20

Practice: 395 - Stream Habitat Improvement and Management

Scenario: #6 - Constructed Log Jam

Scenario Description:

This scenario involves placement of anchored hardwood trees (known as a constructed log jam) along the streambank 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 constructed log jam 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. Constructed log jams should be placed in streams to create 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 bank stability and 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.

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 constructed log jams or similar 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.

Feature Measure: Cubic Yard of CLJ

Scenario Unit: Cubic Yards

Scenario Typical Size: 130.0

Scenario Total Cost: $10,774.80

Scenario Cost/Unit: $82.88

Cost Details:

Component Name	ID	Description	Unit	Cost	QTY	Total
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.	Hours	$130.80	20	$2,616.00
Chainsaw	937	Equipment and power unit costs. Labor not included.	Hours	$7.15	20	$143.00
Log skidder	942	Equipment and power unit costs. Labor not included.	Hours	$124.33	20	$2,486.60
Jack Hammer	2190	60-90 pound jack hammer (electric, pneumatic, or hydraulic). Equipment only.	Hours	$6.33	20	$126.60
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.	Hours	$37.19	40	$1,487.60
Equipment Operators, Heavy	233	Includes: Cranes, Hydraulic Excavators >=50 HP, Dozers, Paving Machines, Rock Trenchers, Trenchers >=12 in., Dump Trucks, Ag Equipment >=150 HP, Scrapers, Water Wagons.	Hours	$38.00	40	$1,520.00
Materials						
Erosion Control Blanket, biodegradable	1213	Biodegradable erosion control blanket, typically a composite of natural fibers with reinforcing polymer netting. Materials and shipping only.	Square Yard	$1.32	120	$158.40
Steel cable grips, lockable, 1/4 in.	2181	Lockable wire rope grips for 1/4 inch galvanized steel cable. Materials and shipping only.	Each	$12.10	24	$290.40
Cable, Galvanized steel	2182	Galvanized steel aircraft cable in 7 x 19 strand core. Materials and shipping only.	Feet	$0.51	200	$102.00
Anchor, earthen, low disturbance, large	2184	Low disturbance, galvanized or aluminum alloy earthen anchors with holding power greather than 3,000 pounds in normal soil. Materials and shipping only.	Each	$43.40	20	$868.00
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	$488.10	2	$976.20

Practice: 395 - Stream Habitat Improvement and Management

Scenario: #7 - Boulder 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 biologists 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.

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.

Feature Measure: Cubic Yard of Boulder Cluster

Scenario Unit: Cubic Yards

Scenario Typical Size: 25.0

Scenario Total Cost: $3,093.92

Scenario Cost/Unit: $123.76

Cost Details:

Component Name	ID	Description	Unit	Cost	QTY	Total
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.	Hours	$130.80	8	$1,046.40
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.	Hours	$27.56	8	$220.48
Equipment Operators, Heavy	233	Includes: Cranes, Hydraulic Excavators >=50 HP, Dozers, Paving Machines, Rock Trenchers, Trenchers >=12 in., Dump Trucks, Ag Equipment >=150 HP, Scrapers, Water Wagons.	Hours	$38.00	8	$304.00
Materials						
Boulder	1761	Rock boulders (approximately 5 ft dia. 6.67 Tons) Inlcudes materials and delivery (up to 100 miles) only.	Ton	$66.53	15	$997.95
Aggregate, river rock	1834	Well graded, rounded mineral substrates derived from local riverine settings. Includes materials and local delivery	Ton	$36.99	1	$36.99
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	$488.10	1	$488.10

Practice: 395 - Stream Habitat Improvement and Management

Scenario: #8 - Complex Stream Structure

Scenario Description:

This scenario describes the implementation of a stream habitat improvement and management project that places a complex stream structure such as a J-Hook or Rock Vane in or adjacent to the stream channel as habitat components. A project design for a complex stream structure 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 (but must be sized for adequate stability) 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 biologis 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.

After Situation:

Stream habitat within the project reach is improving as a result of placing complex stream structures including J-Hooks and Rock Vanes 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.

Feature Measure: Cubic Yard of Stream Structure

Scenario Unit: Cubic Yards

Scenario Typical Size: 20.0

Scenario Total Cost: $11,449.38

Scenario Cost/Unit: $572.47

Cost Details:

Component Name	ID	Description	Unit	Cost	QTY	Total
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.	Hours	$130.80	32	$4,185.60
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.	Hours	$27.56	40	$1,102.40
Equipment Operators, Heavy	233	Includes: Cranes, Hydraulic Excavators >=50 HP, Dozers, Paving Machines, Rock Trenchers, Trenchers >=12 in., Dump Trucks, Ag Equipment >=150 HP, Scrapers, Water Wagons.	Hours	$38.00	32	$1,216.00
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.	Hours	$46.88	32	$1,500.16
Materials						
Boulder	1761	Rock boulders (approximately 5 ft dia. 6.67 Tons) Inlcudes materials and delivery (up to 100 miles) only.	Ton	$66.53	40	$2,661.20
Aggregate, river rock	1834	Well graded, rounded mineral substrates derived from local riverine settings. Includes materials and local delivery	Ton	$36.99	8	$295.92
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	$488.10	1	$488.10

Practice: 395 - Stream Habitat Improvement and Management

Scenario: #9 - Stream Restoration - Low

Scenario Description:

This scenario describes the implementation of a stream habitat improvement and management project where the existing stream shows a low departure from targeted stream conditions but resotration 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 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 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 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 0.35 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. 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 designin 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.

Feature Measure: Area of Stream Restoration determi

Scenario Unit: Acres

Scenario Typical Size: 0.4

Scenario Total Cost: $51,787.90

Scenario Cost/Unit: $147,965.43

Cost Details:

Component Name	ID	Description	Unit	Cost	QTY	Total
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.	Hours	$130.80	60	$7,848.00
Chainsaw	937	Equipment and power unit costs. Labor not included.	Hours	$7.15	32	$228.80
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.	Hours	$37.19	60	$2,231.40
Equipment Operators, Heavy	233	Includes: Cranes, Hydraulic Excavators >=50 HP, Dozers, Paving Machines, Rock Trenchers, Trenchers >=12 in., Dump Trucks, Ag Equipment >=150 HP, Scrapers, Water Wagons.	Hours	$38.00	60	$2,280.00
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.	Hours	$46.88	30	$1,406.40
Materials						
Erosion Control Blanket, biodegradable	1213	Biodegradable erosion control blanket, typically a composite of natural fibers with reinforcing polymer netting. Materials and shipping only.	Square Yard	$1.32	400	$528.00
Tree & Shrub, Woody, Cuttings, Large	1309	Woody pole cuttings or posts 2 to 6 inches in diameter and 6 ft. long. Includes materials and shipping only.	Each	$14.97	60	$898.20
Boulder	1761	Rock boulders (approximately 5 ft dia. 6.67 Tons) Inlcudes materials and delivery (up to 100 miles) only.	Ton	$66.53	250	$16,632.50
Aggregate, river rock	1834	Well graded, rounded mineral substrates derived from local riverine settings. Includes materials and local delivery	Ton	$36.99	500	$18,495.00
Root Wad	2045	Tree stump buried into the streambank with the roots left exposed. Includes material only.	Ton	$10.02	75	$751.50
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	$488.10	1	$488.10

Practice: 395 - Stream Habitat Improvement and Management

Scenario: #10 - Stream Restoration - Moderate

Scenario Description:

This scenario describes the implementation of a stream habitat improvement and management project where the existing stream shows a moderate departure from targeted stream conditions and resotration 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 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 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 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 0.35 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. 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 designin 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.

Feature Measure: Area of Stream Restoration determi

Scenario Unit: Acres

Scenario Typical Size: 0.4

Scenario Total Cost: $81,542.10

Scenario Cost/Unit: $232,977.43

Cost Details:

Component Name	ID	Description	Unit	Cost	QTY	Total
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.	Hours	$130.80	80	$10,464.00
Chainsaw	937	Equipment and power unit costs. Labor not included.	Hours	$7.15	40	$286.00
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.	Hours	$37.19	80	$2,975.20
Equipment Operators, Heavy	233	Includes: Cranes, Hydraulic Excavators >=50 HP, Dozers, Paving Machines, Rock Trenchers, Trenchers >=12 in., Dump Trucks, Ag Equipment >=150 HP, Scrapers, Water Wagons.	Hours	$38.00	80	$3,040.00
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.	Hours	$46.88	40	$1,875.20
Materials						
Erosion Control Blanket, biodegradable	1213	Biodegradable erosion control blanket, typically a composite of natural fibers with reinforcing polymer netting. Materials and shipping only.	Square Yard	$1.32	800	$1,056.00
Tree & Shrub, Woody, Cuttings, Large	1309	Woody pole cuttings or posts 2 to 6 inches in diameter and 6 ft. long. Includes materials and shipping only.	Each	$14.97	80	$1,197.60
Boulder	1761	Rock boulders (approximately 5 ft dia. 6.67 Tons) Inlcudes materials and delivery (up to 100 miles) only.	Ton	$66.53	500	$33,265.00
Aggregate, river rock	1834	Well graded, rounded mineral substrates derived from local riverine settings. Includes materials and local delivery	Ton	$36.99	700	$25,893.00
Root Wad	2045	Tree stump buried into the streambank with the roots left exposed. Includes material only.	Ton	$10.02	100	$1,002.00
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	$488.10	1	$488.10

Practice: 395 - Stream Habitat Improvement and Management

Scenario: #11 - Stream Restoration - High

Scenario Description:

This scenario describes the implementation of a stream habitat improvement and management project where the existing stream shows a high departure from targeted stream conditions and resotration 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 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 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 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 0.35 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. 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 designin 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.

Feature Measure: Area of Stream Restoration determi

Scenario Unit: Acres

Scenario Typical Size: 0.4

Scenario Total Cost: $125,297.50

Scenario Cost/Unit: $357,992.86

Cost Details:

Component Name	ID	Description	Unit	Cost	QTY	Total
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.	Hours	$130.80	160	$20,928.00
Chainsaw	937	Equipment and power unit costs. Labor not included.	Hours	$7.15	80	$572.00
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.	Hours	$37.19	120	$4,462.80
Equipment Operators, Heavy	233	Includes: Cranes, Hydraulic Excavators >=50 HP, Dozers, Paving Machines, Rock Trenchers, Trenchers >=12 in., Dump Trucks, Ag Equipment >=150 HP, Scrapers, Water Wagons.	Hours	$38.00	160	$6,080.00
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.	Hours	$46.88	80	$3,750.40
Materials						
Erosion Control Blanket, biodegradable	1213	Biodegradable erosion control blanket, typically a composite of natural fibers with reinforcing polymer netting. Materials and shipping only.	Square Yard	$1.32	800	$1,056.00
Tree & Shrub, Woody, Cuttings, Large	1309	Woody pole cuttings or posts 2 to 6 inches in diameter and 6 ft. long. Includes materials and shipping only.	Each	$14.97	160	$2,395.20
Boulder	1761	Rock boulders (approximately 5 ft dia. 6.67 Tons) Inlcudes materials and delivery (up to 100 miles) only.	Ton	$66.53	700	$46,571.00
Aggregate, river rock	1834	Well graded, rounded mineral substrates derived from local riverine settings. Includes materials and local delivery	Ton	$36.99	1000	$36,990.00
Root Wad	2045	Tree stump buried into the streambank with the roots left exposed. Includes material only.	Ton	$10.02	200	$2,004.00
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	$488.10	1	$488.10

Practice: 395 - Stream Habitat Improvement and Management

Scenario: #18 - Manual Instream wood placement

Scenario Description:

This scenario involves placement of large wood (trees, and trees with root wads) into a stream channel in order to improve aquatic habitat that currently does not meet quality criteria for stream species habitat. Implementation of this scenario includes the use of only manual equipment and chainsaws. The large wood will not be anchored or cabled. The large wood will be naturally sorted and naturally pinned. Large wood additions implemented as a result of this scenario will use a combination of griphoist pulled-downed trees (leaving roots attached to the bank or pulled in from the forested landscape) and "cut and drop" techniques. A stream assessment (e.g., 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 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 should be placed in streams to create pool habitat according to NRCS engineering specifications and with close review & approval of a fish habitat biologist. The planned activity will meet the current 395 standard, and facilitating practice standards, and include work windows to protect aquatic and riparian species, and to protect vegetation and substrates impacted by 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. Records demonstrating implementation of this scenario will address resource concerns for stream species of concern are 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 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 large wood 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.

Feature Measure: Bankfull width x reach length

Scenario Unit: Acres

Scenario Typical Size: 1.0

Scenario Total Cost: $8,519.20

Scenario Cost/Unit: $8,519.20

Cost Details:

Component Name	ID	Description	Unit	Cost	QTY	Total
Equipment Installation						
Chainsaw	937	Equipment and power unit costs. Labor not included.	Hours	$7.15	24	$171.60
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.	Hours	$37.19	5	$185.95
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.	Hours	$27.56	36	$992.16
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.	Hours	$46.88	18	$843.84
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.	Hours	$102.76	5	$513.80
Materials						
Log, un-anchored	2035	Price of log picked up at the Mill. Includes material only.	Ton	$163.19	35	$5,711.65
Root Wad	2045	Tree stump buried into the streambank with the roots left exposed. Includes material only.	Ton	$10.02	10	$100.20

Practice: 396 - Aquatic Organism Passage

Scenario: #1 - Concrete Dam Removal

Scenario Description:

Full or partial removal of a concrete dam to restore aquatic organism passage, improve water quality, and promote functional river ecology and geomorphology. The extent of removal (full or partial) is determined through consultations with the dam owner in consideration of prevailing regulations and site historical status. Adjacent floodplain surfaces above and below the target dam are considered in the planning process to account for shifts in streamflow and geomorphic regime. Resulting channel dimensions and profile are determined on a site-specific basis to reflect--to the fullest extent possible--pre-dam conditions. Pre-removal sediment assays are completed to determine the toxicity of sediment stored behind the dam. Planning for the reclamation and management of stored sediments is completed according to geomorphic conditions, prevailing regulations, and the results of sediment toxicity investigations. Removal is done with an assortment of equipment, including tracked excavators outfitted with hydraulic chisels, hammers and/or buckets with "thumbs", bull dozers, skid steers, cranes, front-end loaders, and dump trucks. Alternative demolition techniques may include the use of high explosives, diamond-chain, or similar circular saws to remove the dam in a piecewise manner. Removed materials are trucked away and disposed or recycled off-site. Disturbed areas are revegetated using Critical Area Planting (342). Scenario does not include additional measures needed in the active channel and floodplain to account for post-removal changes to stream plan, pattern, or profile, or reclamation of any former impounded areas. Additional structural measures may be necessary to address constructed features associated with the removed dam including canals, raceways, adjacent spillways, navigation locks, access and maintenance roads, or similar civil works. RESOURCE CONCERNS: INADEQUATE HABITAT FOR FISH AND WILDLIFE –Habitat degradation; EXCESS WATER – Ponding, flooding, seasonal high water table, seeps, and drifted snow; WATER QUALITY DEGRADATION – Elevated water temperature. Payments for these associated practices are made separately and are covered by other typical scenarios and payment schedules. See relevant CPS for additional information. ---Site Preparation and Reclamation associated with project footprint: (326) Clearing and Snagging, (342) Critical Area Planting, (382) Fence, (390) Riparian Herbaceous Cover, (391) Riparian Forest Buffer, (612) Tree/Shrub Establishment ---Reach Planning/Habitat Enhancement: (395) Stream Habitat Improvement and Management, ---Structural Measures Associated with Scenario but outside of project footprint: (410) Grade Stabilization Structure, (584) Channel Bed Stabilization, (580) Streambank and Shoreline Protection, (587) Structure for Water Control

Before Situation:

A channel-spanning concrete dam no longer has functional use, may be failing, or creates a hazard to downstream capital infrastructure or communities. The dam blocks upstream aquatic organism migration, and downstream migrants may be diverted into hydraulic structures that increase mortality or result in migration delays or dead-ends. The dam disrupts the downstream cycling and transport of sediment, woody material and nutrients. The pool created by the dam may impair water quality by increasing temperatures, capturing fine sediment--sometimes laden with heavy metals or other pollutants--later mobilized by high flow events, and creating slackwater habitat for invasive aquatic vegetation. Non-native or exotic fish species inhabit the pool and predate upon and/or displace native fish.

After Situation:

The existing dam is removed and reach geometry and slope are restored to pre-dam conditions to the fullest extent practicable. Aquatic organism passage and river ecology and geomorphic conditions are restored to pre-dam conditions to the fullest extent practicable. Resource Concerns are addressed within the context of the site.

Feature Measure: Cubic Yards of concrete in dam and

Scenario Unit: Cubic Yards

Scenario Typical Size: 250.0

Scenario Total Cost: $122,047.89

Scenario Cost/Unit: $488.19

Cost Details:

Component Name	ID	Description	Unit	Cost	QTY	Total
Equipment Installation						
Clearing and Grubbing	40	Clearing and Grubbing, includes materials, equipment and labor	Acres	$315.96	1.5	$473.94
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.	Hours	$130.80	320	$41,856.00
Skidsteer, 80 HP	933	Skidsteer loader with horsepower range of 60 to 90. Equipment and power unit costs. Labor not included.	Hours	$55.01	160	$8,801.60
Water management, Flooding & dewatering	969	Includes equipment and power unit. Labor not included.	Acre Feet	$272.03	50	$13,601.50
Truck, dump, 18 CY	1400	Dump truck for moving bulk material. Typically capacity is 25 ton or 18 cubic yards. Includes equipment only.	Hours	$98.15	40	$3,926.00
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	$0.31	6100	$1,891.00
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.	Hours	$37.19	160	$5,950.40
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.	Hours	$27.56	160	$4,409.60
Equipment Operators, Heavy	233	Includes: Cranes, Hydraulic Excavators >=50 HP, Dozers, Paving Machines, Rock Trenchers, Trenchers >=12 in., Dump Trucks, Ag Equipment >=150 HP, Scrapers, Water Wagons.	Hours	$38.00	520	$19,760.00

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.	Hours	$46.88	80	$3,750.40
Materials						
Rock Riprap, graded, angular, material and shipping	1200	Graded Rock Riprap for all gradation ranges. Includes materials and delivery only.	Ton	$35.35	450	$15,907.50
Mobilization						
Mobilization, medium equipment	1139	Equipment with 70-150 HP or typical weights between 14,000 and 30,000 pounds.	Each	$255.65	1	$255.65
Mobilization, large equipment	1140	Equipment >150HP or typical weights greater than 30,000 pounds or loads requiring over width or over length permits.	Each	$488.10	3	$1,464.30

Practice: 396 - Aquatic Organism Passage

Scenario: #2 - Earthen Dam Removal less than or equal to 1000 cu. yd.

Scenario Description:

Full removal of an earthen dam to restore aquatic organism passage, improve water quality, and promote functional river ecology and geomorphology. The removal extent is determined through consultations with the dam owner in consideration of prevailing regulations and site historical status. Adjacent floodplain surfaces above and below the target dam are considered in the planning process to account for shifts in streamflow and geomorphic regime. Resulting channel dimensions and profile are determined on a site-specific basis to reflect, to the fullest extent possible, pre-dam conditions. Pre-removal sediment assays are be completed as necessary to determine the toxicity of sediment stored behind the dam. Planning for the reclamation and management of stored sediments is completed according to geomorphic conditions, prevailing regulations, and the results of sediment toxicity investigations. Removal is done with an assortment of equipment, including tracked excavators outfitted with hydraulic chisels, hammers and/or buckets with "thumbs", bull dozers, skid steers, cranes, front-end loaders, and dump trucks. Removed materials are trucked away and disposed or recycled off-site, unless native streambed material found in the embankment can be used in site reclamation. Disturbed areas are revegetated using Critical Area Planting (342). Scenario does not include additional measures needed in the active channel and floodplain to account for post-removal changes to stream plan, pattern, or profile, or reclamation of any former impounded areas. Additional structural measures may be necessary to address constructed features associated with the removed dam including head gates, canals, raceways, access and maintenance roads, or similar civil works. RESOURCE CONCERNS: INADEQUATE HABITAT FOR FISH AND WILDLIFE –Habitat degradation; EXCESS WATER – Ponding, flooding, seasonal high water table, seeps, and drifted snow; WATER QUALITY DEGRADATION – Elevated water temperature. Payments for these associated practices are made separately and are covered by other typical scenarios and payment schedules. See relevant CPS for additional information. ---Site Preparation and Reclamation associated with project footprint: (326) Clearing and Snagging, (342) Critical Area Planting, (382) Fence, (390) Riparian Herbaceous Cover, (391) Riparian Forest Buffer, (612) Tree/Shrub Establishment ---Reach Planning/Habitat Enhancement: (395) Stream Habitat Improvement and Management, ---Structural Measures Associated with Scenario but outside of project footprint: (410) Grade Stabilization Structure, (584) Channel Bed Stabilization, (580) Streambank and Shoreline Protection, (587) Structure for Water Control

Before Situation:

A channel-spanning earthen dam no longer has functional use, may be failing, or creates a hazard to downstream capital infrastructure or communities. The dam blocks upstream aquatic organism migration, and downstream migrants may be diverted into hydraulic structures that increase mortality or result in migration delays or dead-ends. The dam disrupts the downstream cycling and transport of sediment, woody material and nutrients. The pool created by the dam may impair water quality by increasing temperatures, capturing fine sediment--sometimes laden with heavy metals or other pollutants--later mobilized by high flow events, and creating slackwater habitat for invasive aquatic vegetation. Non-native or exotic fish species inhabit the pool and predate upon and/or displace native fish.

After Situation:

The existing dam is removed and reach geometry and slope are restored to pre-dam conditions to the fullest extent practicable. Aquatic organism passage and river ecology and geomorphic conditions are restored to pre-dam conditions to the fullest extent practicable. Resource Concerns are addressed within the context of the site.

Feature Measure: Cubic Yards of earthen embankmen

Scenario Unit: Cubic Yards

Scenario Typical Size: 500.0

Scenario Total Cost: $63,485.88

Scenario Cost/Unit: $126.97

Cost Details:

Component Name	ID	Description	Unit	Cost	QTY	Total
Equipment Installation						
Clearing and Grubbing	40	Clearing and Grubbing, includes materials, equipment and labor	Acres	$315.96	3	$947.88
Dozer, 140 HP	927	Track mounted Dozer with horsepower range of 125 to 160. Equipment and power unit costs. Labor not included.	Hours	$104.83	40	$4,193.20
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.	Hours	$130.80	100	$13,080.00
Skidsteer, 80 HP	933	Skidsteer loader with horsepower range of 60 to 90. Equipment and power unit costs. Labor not included.	Hours	$55.01	100	$5,501.00
Water management, Flooding & dewatering	969	Includes equipment and power unit. Labor not included.	Acre Feet	$272.03	50	$13,601.50
Truck, dump, 18 CY	1400	Dump truck for moving bulk material. Typically capacity is 25 ton or 18 cubic yards. Includes equipment only.	Hours	$98.15	40	$3,926.00
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	$0.31	8600	$2,666.00
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.	Hours	$37.19	40	$1,487.60
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.	Hours	$27.56	80	$2,204.80

Equipment Operators, Heavy	233	Includes: Cranes, Hydraulic Excavators >=50 HP, Dozers, Paving Machines, Rock Trenchers, Trenchers >=12 in., Dump Trucks, Ag Equipment >=150 HP, Scrapers, Water Wagons.	Hours	$38.00	280	$10,640.00
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.	Hours	$46.88	80	$3,750.40
Mobilization						
Mobilization, medium equipment	1139	Equipment with 70-150 HP or typical weights between 14,000 and 30,000 pounds.	Each	$255.65	2	$511.30
Mobilization, large equipment	1140	Equipment >150HP or typical weights greater than 30,000 pounds or loads requiring over width or over length permits.	Each	$488.10	2	$976.20

Practice: 396 - Aquatic Organism Passage

Scenario: #3 - Blockage Removal

Scenario Description:

Removal of passage barriers, including small relict earthen diversions (e.g., splash dams), failing or undersized culverts, and sediment or large woody material (>10cm diameter and 2m length) from mass wasting or major flood events. Instream material associated with the previously mentioned circumstances or structures prevents aquatic organism passage by the creation of channel-spanning blockages, or areas of shallow depth, high velocities, or extensive changes in water surface elevation. In addition, these features may encourage abrupt channel changes that endanger adjacent capital infrastructure or transportation corridors. Excessive stream bank erosion by flows deflected around or impounded behind these features may impair water quality by introducing fine sediment out of phase with the natural hydrograph and the life history requirements of native aquatic species. Removal is done with an assortment of equipment, including tracked excavators outfitted with buckets with "thumbs", bull dozers, skid steers, front-end loaders, and dump trucks. The channel and adjacent floodplain are restored to pre-blockage conditions to the fullest extent practicable. Removed materials are trucked away and disposed or recycled off-site, unless native streambed material found in the blockage can be used in site reclamation. Large woody material, if present, is used for instream reclamation, replaced in the channel downstream of the blockage, or trucked offsite for disposal or stockpiling for future projects. Disturbed areas are revegetated using Critical Area Planting (342). Scenario does not include additional measures needed in the active channel and floodplain. RESOURCE CONCERNS: INADEQUATE HABITAT FOR FISH AND WILDLIFE –Habitat degradation; EXCESS WATER – Ponding, flooding, seasonal high water table, seeps, and drifted snow; WATER QUALITY DEGRADATION – Elevated water temperature; SOIL EROSION– Excessive bank erosion from streams shorelines or water conveyance channels Payments for these associated practices are made separately and are covered by other typical scenarios and payment schedules. See relevant CPS for additional information. ---Site Preparation and Reclamation associated with project footprint: (342) Critical Area Planting, (382) Fence, (390) Riparian Herbaceous Cover, (391) Riparian Forest Buffer, (612) Tree/Shrub Establishment; (643) Restoration and Management of Rare and Declining Habitats. ---Reach Planning/Habitat Enhancement: (395) Stream Habitat Improvement and Management, ---Structural Measures Associated with Scenario but outside of project footprint: (410) Grade Stabilization Structure, (584) Channel Bed Stabilization, (580) Streambank and Shoreline Protection

Before Situation:

An instream feature spanning the active channel creates hydraulic conditions that exceed the swimming or crawling abilities of native aquatic organisms. Event-driven mass wasting or instream deposits of coarse sediment create channel blockages or areas of shallow, fast-moving water. An instream plug of material transported to the site by flood flows or delivered to the channel from a hillslope failure not only blocks passage, but may deflect the stream toward a new course than endangers adjacent capital infrastructure or transportation corridors. Elevated risks associated with eventual over-topping or failure of the blockage to downstream features or communities are imminent in the event of a blockage that forms a temporary dam. Accelerated instream or lateral channel erosion may introduce fine sediment that impairs water quality.

After Situation:

The instream barrier is removed by a combination of methods and equipment and the channel and affected floodplain are restored to pre-blockage conditions to the fullest extent practicable. Resource Concerns are addressed within the context of the site.

Feature Measure: Cubic Yards of mineral sediment, fil

Scenario Unit: Cubic Yards

Scenario Typical Size: 200.0

Scenario Total Cost: $5,159.30

Scenario Cost/Unit: $25.80

Cost Details:

Component Name	ID	Description	Unit	Cost	QTY	Total
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.	Hours	$130.80	24	$3,139.20
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	$0.31	2000	$620.00
Labor						
Equipment Operators, Heavy	233	Includes: Cranes, Hydraulic Excavators >=50 HP, Dozers, Paving Machines, Rock Trenchers, Trenchers >=12 in., Dump Trucks, Ag Equipment >=150 HP, Scrapers, Water Wagons.	Hours	$38.00	24	$912.00
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	$488.10	1	$488.10

Practice: 396 - Aquatic Organism Passage

Scenario: #4 - Nature-Like Fishway

Scenario Description:

Nature-like fishways, also known as roughened channels, rock ramps, or bypass channels, are constructed features that provide passage around an instream barrier or in place of a removed barrier. Fishway design is based on simulating or mimicking adjacent stream characteristics, using natural materials, and providing suitable passage conditions over a range of flows for a wide variety of fish species and other aquatic organisms. Nature-like fishways provide enhanced passage conditions compared to concrete or aluminum (Alaskan Steeppass) ladders, and are not as susceptible to debris-related operational issues. When used to bypass an instream barrier, they require a larger footprint than instream structures, and may also require control structures to regulate flow through the fishway or address tailwater fluctuations affecting the fishway entrance (downstream end). Fishway design includes an assessment of adjacent stream characteristics, including channel geometry, slope, sediment texture and composition, and major geomorphic units that govern channel plan, pattern and profile. In the case of a fishway that bypasses an instream barrier, the design is tailored to these elements, the elevation required to ascend the barrier, and the known range of flow variation or operations. For fishways constructed in the place of a removed barrier, the design may be a hybrid approach that meets the same criteria, although in a smaller instream footprint. Nature-like fishways are constructed with an assortment of equipment used for excavation, placing material, and delivering and removing material. Construction elements generally include an assortment of rock used to create riffles, cascades, or riffle-pool sequences with between 6 to 12 inches of water surface elevation drop between adjacent structures. Large woody material is used to create channel structural elements in some settings, when available and where approved by oversight agencies. Removed materials are trucked away and disposed or recycled off-site, unless excavated native streambed material can be used in fishway construction. Large woody material or removed trees, if present, are used for fishway construction trucked offsite for disposal, or trucked offsite for stockpiling for future projects. Disturbed areas are revegetated using Critical Area Planting (342) and access control and signage are provided. Scenario does not include additional measures needed in the active channel and floodplain or at an existing dam necessary to control flow associated with nature-like fishway. Scenario based on a fishway that is 100 ft long and 25 ft wide. RESOURCE CONCERNS: INADEQUATE HABITAT FOR FISH AND WILDLIFE –Habitat degradation; EXCESS WATER – Ponding, flooding, seasonal high water table, seeps, and drifted snow; WATER QUALITY DEGRADATION – Elevated water temperature; EROSION– Excessive bank erosion from streams shorelines or water conveyance channels Payments for these associated practices are made separately and are covered by other typical scenarios and payment schedules. See relevant CPS for additional information. ---Site Preparation and Reclamation associated with project footprint: (326) Clearing and Snagging, (342) Critical Area Planting, (382) Fence, (390) Riparian Herbaceous Cover, (391) Riparian Forest Buffer, (612) Tree/Shrub Establishment ---Reach Planning/Habitat Enhancement: (395) Stream Habitat Improvement and Management, ---Structural Measures Associated with Scenario but outside of project footprint: (410) Grade Stabilization Structure, (582) Open Channel, (584) Channel Bed Stabilization, (580) Streambank and Shoreline Protection, (587) Structure for Water Control

Before Situation:

An instream barrier prevents upstream migration of native aquatic organisms and no support exists for removal. Similarly, an instream barrier is removed, and interested parties require maintenance of an upstream pool or pond. The subject stream contains a number of migrating aquatic organisms ranging in size from small to large with a range of propulsion abilities--weak to strong swimmers and animals that crawl along the bottom. In either case--barrier removal or bypassing an existing barrier--local sentiment to preserve existing or natural conditions and the desire to provide passage for a range of aquatic organisms indicate the use of a nature-like fishway. Adequate space for a bypass channel is available, and adjacent landowners approve.

After Situation:

A nature-like fishway is constructed in place of a removed barrier or around an existing barrier. The fishway is designed to mimic the adjacent natural stream, and is constructed of rock and/or large woody material that provides quality passage conditions for a number of species and geomorphic stability over a range of flows. Resource Concerns are addressed within the context of the site.

Feature Measure: Length of Fishway x Width of Chan

Scenario Unit: Square Feet

Scenario Typical Size: 2,500.0

Scenario Total Cost: $35,078.50

Scenario Cost/Unit: $14.03

Cost Details:

Component Name	ID	Description	Unit	Cost	QTY	Total
Equipment Installation						
Geotextile, woven	42	Woven Geotextile Fabric. Includes materials, equipment and labor	Square Yard	$1.33	280	$372.40
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.	Hours	$130.80	40	$5,232.00
Skidsteer, 80 HP	933	Skidsteer loader with horsepower range of 60 to 90. Equipment and power unit costs. Labor not included.	Hours	$55.01	40	$2,200.40
Water management, Flooding & dewatering	969	Includes equipment and power unit. Labor not included.	Acre Feet	$272.03	10	$2,720.30
Truck, dump, 18 CY	1400	Dump truck for moving bulk material. Typically capacity is 25 ton or 18 cubic yards. Includes equipment only.	Hours	$98.15	40	$3,926.00
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.	Hours	$27.56	40	$1,102.40
Equipment Operators, Heavy	233	Includes: Cranes, Hydraulic Excavators >=50 HP, Dozers, Paving Machines, Rock Trenchers, Trenchers >=12 in., Dump Trucks, Ag Equipment >=150 HP, Scrapers, Water Wagons.	Hours	$38.00	80	$3,040.00

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.	Hours	$46.88	40	$1,875.20
Materials						
Boulder	1761	Rock boulders (approximately 5 ft dia. 6.67 Tons) Inlcudes materials and delivery (up to 100 miles) only.	Ton	$66.53	100	$6,653.00
Aggregate, river rock	1834	Well graded, rounded mineral substrates derived from local riverine settings. Includes materials and local delivery	Ton	$36.99	195	$7,213.05
Mobilization						
Mobilization, medium equipment	1139	Equipment with 70-150 HP or typical weights between 14,000 and 30,000 pounds.	Each	$255.65	1	$255.65
Mobilization, large equipment	1140	Equipment >150HP or typical weights greater than 30,000 pounds or loads requiring over width or over length permits.	Each	$488.10	1	$488.10

Practice: 396 - Aquatic Organism Passage

Scenario: #6 - Stream Simulation Culvert -with Headwall

Scenario Description:

A multi-plate galvanized steel or aluminum culvert (arch or box) used at a road-stream crossing to provide aquatic organism passage (AOP) and promote stream ecological and geomorphic function. They commonly attach to preformed reinforced or poured-in-place concrete footings. Bottomless culverts used for AOP are sized according to geomorphic analyses, not just an estimate of runoff and streamflow at the site from the contributing watershed. In addition, bottomless culverts used for AOP are filled with a mixture of rock and gravel sized to emulate site stream conditions and geomorphic units in the channel. The simulated streambed material is continuous throughout the culvert barrel, and blended with the intact streambed at the culvert inlet and outlet. The first estimate of culvert span is obtained by analyzing bankfull channel width on a reach of stream not affected by an existing road crossing or other conditions that alter self-formed conditions. In the case of a culvert replacement, bankfull investigations are begun at least 10-20 estimated bankfull channel widths above the existing stream crossing. Culvert span is then increased according to channel bed composition and texture, bank characteristics, channel alignment at the crossing section, and other parameters that may affect channel dynamics and stability. Typical size 14' span, 4' rise, 38' length Once the culvert span is determined, culvert length will be dictated by roadway geometry and loading requirements, and site stream conditions. Concrete headwalls and/or wingwalls may be necessary in shorter installations and/or where fill/roadway cover is limited or the stream alignment is not perpendicular to the road axis. Culvert wall thickness and footing requirements are determined by road loading requirements and site geotechnical investigations. Generally, the preferred footing is a T-design with a spread footing with stem wall. Connecting the culvert leg to the footing can be done by welding, grouting, or bolting. Stream geomorphic characteristics, including the reach longitudinal profile, channel cross-sectional shape, substrate composition and arrangement, and bank shape and composition are determined. Bottomless arch or box culverts are commonly delivered in sections and bolted together in the field. Smaller arches can be delivered in one piece. They are installed with an assortment of equipment used for excavation, placing material, and delivering and removing material. Construction elements generally include an assortment of rock used to create riffles, cascades, or riffle-pool sequences with between 6 to 12 inches of water surface elevation drop between adjacent structures. Stream dewatering and diversion around the work site is often required, and temporary road closure or re-routing may also be required. Channel bed material within the culvert barrel varies according to prevailing stream characteristics at the crossing site. Footings are placed or poured, and the new streambed is set at a slope that matches the design longitudinal profile, and backfilled with a bed mixture that mimics adjacent stream characteristics with special attention to channel pattern. Once the simulated streambed between the footings is complete, the culvert sections are assembled and attached to the footings. Larger rock may be placed along the footing/culvert stemwall to protect the connection from damage by transported bedload. The roadway is replaced and any necessary armoring and revegetating material is placed at the culvert inlet and outlet where it intersects the road fill prism. Other actions include construction staking and signage, soil erosion and pollution control, removal and disposal of the old culvert, and topsoil conservation for site reclamation. Disturbed areas are revegetated using Critcal Area Planting (342). Scenario does not include additional measures needed to address channel incision, bank stability, and other factors associated with the presence of the stream crossing. Scenario does not include concrete for head or wingwalls. Scenario based on a structure with 16' span and 20' long with bolt on metal footings. RESOURCE CONCERNS: INADEQUATE HABITAT FOR FISH AND WILDLIFE –Habitat degradation; EXCESS WATER – Ponding, flooding, seasonal high water table, seeps, and drifted snow; WATER QUALITY DEGRADATION – Elevated water temperature; SOIL EROSION– Excessive bank erosion from streams shorelines or water conveyance channels Payments for these associated practices are made separately and are covered by other typical scenarios and payment schedules. See relevant CPS for additional information. ---Site Preparation and Reclamation associated with project footprint: (342) Critical Area Planting, (382) Fence, (390) Riparian Herbaceous Cover, (391) Riparian Forest Buffer, (612) Tree/Shrub Establishment; ---Reach Planning/Habitat Enhancement: (395) Stream Habitat Improvement and Management, ---Structural Measures Associated with Scenario but outside of project footprint: (410) Grade Stabilization Structure, (584) Channel Bed Stabilization, (580) Streambank and Shoreline Protection

Before Situation:

An existing undersized culvert has contributed to general bed and bank scour downstream of a road crossing, and may have contributed to the deposition of a wedge of sediment upstream of the road crossing. The road may be overtopped by high flows, resulting in outright failure, landowner accessibility problems, access by and to emergency services, and hamper post-flood recovery efforts. An upstream impoundment created by the undersized culvert has contributed to water quality problems including high water temperatures and the deposition and later mobilization of polluted fine sediment. Native aquatic organisms are unable to pass through the road crossing because the culvert outlet is perched above the downstream pool, and high velocities are not negotiable by animals that are able to leap into the culvert barrel.

After Situation:

The undersized culvert is replaced with a bottomless arch or box culvert sized, placed, and backfilled with material determined by geomorphic analyses performed in a reference reach upstream of the crossing location. Aluminum headwalls are included with the installation which allows for a shorter installation length. Geomorphic and ecological functions are preserved through the crossing site, enhancing AOP, water quality, and culvert longevity. In addition, because the culvert is sized to promote the transport of streamflow and the materials it carries, it requires decreased maintenance activities over time. Landowners are able to access their holdings across a range of flows, and are able to seek and receive emergency and post-flood recovery services. Resource Concerns are addressed within the context of the site.

Feature Measure: horizontal surface area (span x leng

Scenario Unit: Square Feet

Scenario Typical Size: 532.0

Scenario Total Cost: $54,156.04

Scenario Cost/Unit: $101.80

Cost Details:

Component Name	ID	Description	Unit	Cost	QTY	Total
Equipment Installation						
Geotextile, woven	42	Woven Geotextile Fabric. Includes materials, equipment and labor	Square Yard	$1.33	100	$133.00
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.	Hours	$130.80	64	$8,371.20
Truck, dump, 12 CY	1215	Dump truck for moving bulk material. Typically capacity is 16 ton or 12 cubic yards. Includes equipment only.	Hours	$78.77	32	$2,520.64
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.	Hours	$27.56	64	$1,763.84
Equipment Operators, Heavy	233	Includes: Cranes, Hydraulic Excavators >=50 HP, Dozers, Paving Machines, Rock Trenchers, Trenchers >=12 in., Dump Trucks, Ag Equipment >=150 HP, Scrapers, Water Wagons.	Hours	$38.00	64	$2,432.00
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.	Hours	$46.88	32	$1,500.16
Materials						
Aggregate, river rock	1834	Well graded, rounded mineral substrates derived from local riverine settings. Includes materials and local delivery	Ton	$36.99	100	$3,699.00
Culvert, Multi-Plate arch	1979	Multi-plate arch culvert, typically 7 Gauge corrugated plate. Includes metal arch materials only, does not include footings.	Pound	$1.56	21000	$32,760.00
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	$488.10	2	$976.20

Practice: 396 - Aquatic Organism Passage

Scenario: #7 - Stream Simulation Culvert - no Headwall

Scenario Description:

A multi-plate galvanized steel or aluminum culvert (arch or box) used at a road-stream crossing to provide aquatic organism passage (AOP) and promote stream ecological and geomorphic function. They commonly attach to preformed reinforced or poured-in-place concrete footings or a bolt on metal plate footer. Bottomless culverts used for AOP are sized according to geomorphic analyses, not just an estimate of runoff and stream flow at the site from the contributing watershed. In addition, bottomless culverts used for AOP are filled with a mixture of rock and gravel sized to emulate site stream conditions and geomorphic units in the channel. The simulated streambed material is continuous throughout the culvert barrel, and blended with the intact streambed at the culvert inlet and outlet. The first estimate of culvert span is obtained by analyzing bankfull channel width on a reach of stream not affected by an existing road crossing or other conditions that alter self-formed conditions. In the case of a culvert replacement, bankfull investigations are begun at least 10-20 estimated bankfull channel widths above the existing stream crossing. Culvert span is then increased according to channel bed composition and texture, bank characteristics, channel alignment at the crossing section, and other parameters that may affect channel dynamics and stability. Once the culvert span is determined, culvert length will be dictated by roadway geometry and loading requirements, and site stream conditions. Concrete headwalls and/or wingwalls are not included in this scenario. Culvert wall thickness and footing requirements are determined by road loading requirements and site geotechnical investigations. Generally, the preferred footing is a T-design with a spread footing with stem wall. Connecting the culvert leg to the footing can be done by welding, grouting, or bolting. Stream geomorphic characteristics, including the reach longitudinal profile, channel cross-sectional shape, substrate composition and arrangement, and bank shape and composition are determined. Bottomless arch or box culverts are commonly delivered in sections and bolted together in the field. Smaller arches can be delivered in one piece. They are installed with an assortment of equipment used for excavation, placing material, and delivering and removing material. Construction elements generally include an assortment of rock used to create riffles, cascades, or riffle-pool sequences with between 6 to 12 inches of water surface elevation drop between adjacent structures. Stream dewatering and diversion around the work site is often required, and temporary road closure or re-routing may also be required. Channel bed material within the culvert barrel varies according to prevailing stream characteristics at the crossing site. Footings are placed or poured, and the new streambed is set at a slope that matches the design longitudinal profile, and backfilled with a bed mixture that mimics adjacent stream characteristics with special attention to channel pattern. Once the simulated streambed between the footings is complete, the culvert sections are assembled and attached to the footings. Larger rock may be placed along the footing/culvert stemwall to protect the connection from damage by transported bedload. The roadway is replaced and any necessary armoring and revegetating material is placed at the culvert inlet and outlet where it intersects the road fill prism. Other actions include construction staking and signage, soil erosion and pollution control, removal and disposal of the old culvert, and topsoil conservation for site reclamation. Disturbed areas are revegetated using Critcal Area Planting (342). Scenario does not include additional measures needed to address channel incision, bank stability, and other factors associated with the presence of the stream crossing. Scenario does not include concrete for head or wingwalls. Scenario based on metal arch culvert 12' span, 48' long RESOURCE CONCERNS: INADEQUATE HABITAT FOR FISH AND WILDLIFE –Habitat degradation; EXCESS WATER – Ponding, flooding, seasonal high water table, seeps, and drifted snow; WATER QUALITY DEGRADATION – Elevated water temperature; SOIL EROSION– Excessive bank erosion from streams shorelines or water conveyance channels Payments for these associated practices are made separately and are covered by other typical scenarios and payment schedules. See relevant CPS for additional information. ---Site Preparation and Reclamation associated with project footprint: (342) Critical Area Planting, (382) Fence, (390) Riparian Herbaceous Cover, (391) Riparian Forest Buffer, (612) Tree/Shrub Establishment; ---Reach Planning/Habitat Enhancement: (395) Stream Habitat Improvement and Management, ---Structural Measures Associated with Scenario but outside of project footprint: (410) Grade Stabilization Structure, (584) Channel Bed Stabilization, (580) Streambank and Shoreline Protection

Before Situation:

An existing undersized culvert has contributed to general bed and bank scour downstream of a road crossing, and may have contributed to the deposition of a wedge of sediment upstream of the road crossing. The road may be overtopped by high flows, resulting in outright failure, landowner accessibility problems, access by and to emergency services, and hamper post-flood recovery efforts. An upstream impoundment created by the undersized culvert has contributed to water quality problems including high water temperatures and the deposition and later mobilization of polluted fine sediment. Native aquatic organisms are unable to pass through the road crossing because the culvert outlet is perched above the downstream pool, and high velocities are not negotiable by animals that are able to leap into the culvert barrel.

After Situation:

The undersized culvert is replaced with a bottomless arch or box culvert sized, placed, and backfilled with material determined by geomorphic analyses performed in a reference reach upstream of the crossing location. Geomorphic and ecological functions are preserved through the crossing site, enhancing AOP, water quality, and culvert longevity. In addition, because the culvert is sized to promote the transport of streamflow and the materials it carries, it requires decreased maintenance activities over time. Landowners are able to access their holdings across a range of flows, and are able to seek and receive emergency and post-flood recovery services. Resource Concerns are addressed within the context of the site.

Feature Measure: horizontal area (span x length)

Scenario Unit: Square Feet

Scenario Typical Size: 576.0

Scenario Total Cost: $43,120.73

Scenario Cost/Unit: $74.86

Cost Details:

Component Name	ID	Description	Unit	Cost	QTY	Total
Equipment Installation						
Geotextile, woven	42	Woven Geotextile Fabric. Includes materials, equipment and labor	Square Yard	$1.33	200	$266.00
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.	Hours	$130.80	24	$3,139.20
Water management, Flooding & dewatering	969	Includes equipment and power unit. Labor not included.	Acre Feet	$272.03	25	$6,800.75
Truck, dump, 12 CY	1215	Dump truck for moving bulk material. Typically capacity is 16 ton or 12 cubic yards. Includes equipment only.	Hours	$78.77	24	$1,890.48
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.	Hours	$27.56	24	$661.44
Equipment Operators, Heavy	233	Includes: Cranes, Hydraulic Excavators >=50 HP, Dozers, Paving Machines, Rock Trenchers, Trenchers >=12 in., Dump Trucks, Ag Equipment >=150 HP, Scrapers, Water Wagons.	Hours	$38.00	24	$912.00
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.	Hours	$46.88	24	$1,125.12
Materials						
Aggregate, Gravel, Ungraded, Quarry Run	1099	Includes materials, equipment and labor	Cubic Yards	$34.43	50	$1,721.50
Aggregate, river rock	1834	Well graded, rounded mineral substrates derived from local riverine settings. Includes materials and local delivery	Ton	$36.99	90	$3,329.10
Footing, concrete, precast	1836	Precast spread footing with stemwall, T-shaped, with channel built to accept arched culvert leg. Includes materials only.	Feet	$66.74	96	$6,407.04
Culvert, Multi-Plate arch	1979	Multi-plate arch culvert, typically 7 Gauge corrugated plate. Includes metal arch materials only, does not include footings.	Pound	$1.56	10500	$16,380.00
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	$488.10	1	$488.10

Practice: 396 - Aquatic Organism Passage

Scenario: #8 - Concrete Box Culvert

Scenario Description:

A four-sided precast concrete box (square or rectangular) culvert used at a road-stream crossing to provide aquatic organism passage (AOP) and promote stream ecological and geomorphic function. Concrete box culverts are generally available in sections of 1-foot increments. Concrete box culverts used for AOP are sized according to geomorphic analyses, not just an estimate of runoff and streamflow at the site from the contributing watershed. In addition, concrete box culverts used for AOP are filled with a mixture of rock and gravel sized to emulate site stream conditions and geomorphic units in the channel. The simulated streambed material is continuous throughout the culvert barrel, and blended with the intact streambed at the culvert inlet and outlet. The first estimate of culvert width is obtained by analyzing bankfull channel width on a reach of stream not affected by an existing road crossing or other conditions that alter self-formed conditions. In the case of a culvert replacement, bankfull investigations are begun at least 10-20 estimated bankfull channel widths above the existing stream crossing. Culvert width is then increased according to channel bed composition and texture, bank characteristics, channel alignment at the crossing section, and other parameters that may affect channel dynamics and stability. Once the culvert width is determined, culvert length will be determined by roadway geometry and loading requirements, and site stream conditions. Concrete headwalls and/or wingwalls may be necessary in shorter installations and/or where fill/roadway cover is limited or the stream alignment is not perpendicular to the road axis. Stream geomorphic characteristics, including the reach longitudinal profile, channel cross-sectional shape, substrate composition and arrangement, and bank shape and composition are determined. Concrete box culverts are delivered in sections and assembled onsite, and require adequate bed compaction throughout the crossing section. They are installed with an assortment of equipment used for excavation, placing material, and delivering and removing material. Construction elements generally include an assortment of rock used to create riffles, cascades, or riffle-pool sequences with between 6 to 12 inches of water surface elevation drop between adjacent structures. Stream dewatering and diversion around the work site is often required, and temporary road closure or re-routing may also be required. Channel bed material within the culvert barrel varies according to prevailing stream characteristics at the crossing site. The new streambed is set at a slope that matches the design longitudinal profile, and backfilled with a bed mixture that mimics adjacent stream characteristics with special attention to channel pattern. The roadway is replaced and any necessary armoring and revegetating material is placed at the culvert inlet and outlet where it intersects the road fill prism. Other actions include construction staking and signage, soil erosion and pollution control, removal and disposal of the old culvert, and topsoil conservation for site reclamation. Disturbed areas are revegetated with Critical Area Planting (342). Scenario does not include additional measures needed to address channel incision, bank stability, and other factors associated with the presence of the stream crossing. Scenario based on box culvert with 8' span and 20' long RESOURCE CONCERNS: INADEQUATE HABITAT FOR FISH AND WILDLIFE –Habitat degradation; EXCESS WATER – Ponding, flooding, seasonal high water table, seeps, and drifted snow; WATER QUALITY DEGRADATION – Elevated water temperature; SOIL EROSION– Excessive bank erosion from streams shorelines or water conveyance channels Payments for these associated practices are made separately and are covered by other typical scenarios and payment schedules. See relevant CPS for additional information. ---Site Preparation and Reclamation associated with project footprint: (342) Critical Area Planting, (382) Fence, (390) Riparian Herbaceous Cover, (391) Riparian Forest Buffer, (612) Tree/Shrub Establishment; ---Reach Planning/Habitat Enhancement: (395) Stream Habitat Improvement and Management, ---Structural Measures Associated with Scenario but outside of project footprint: (410) Grade Stabilization Structure, (584) Channel Bed Stabilization, (580) Streambank and Shoreline Protection

Before Situation:

An existing undersized culvert as contributed to general bed and bank scour downstream of a road crossing, and may have contributed to the deposition of a wedge of sediment upstream of the road crossing. The road may be overtopped by high flows, resulting in outright failure, landowner accessibility problems, access by and to emergency services, and hamper post-flood recovery efforts. An upstream impoundment created by the undersized culvert has contributed to water quality problems including high water temperatures and the deposition and later mobilization of polluted fine sediment. Native aquatic organisms are unable to pass through the road crossing because the culvert outlet is perched above the downstream pool, and high velocities are not negotiable by animals that are able to leap into the culvert barrel.

After Situation:

The undersized culvert is replaced with a concrete box culvert sized, placed, and backfilled with material determined by geomorphic analyses performed in a reference reach upstream of the crossing location. Geomorphic and ecological functions are preserved through the crossing site, enhancing AOP, water quality, and culvert longevity. In addition, because the culvert is sized to promote the transport of streamflow and the materials it carries, it requires decreased maintenance activities over time. Landowners are able to access their holdings across a range of flows, and are able to seek and receive emergency and post-flood recovery services. Resource Concerns are addressed within the context of the site.

Feature Measure: horizontal area (span x length)

Scenario Unit: Square Feet

Scenario Typical Size: 160.0

Scenario Total Cost: $21,297.96

Scenario Cost/Unit: $133.11

Cost Details:

Component Name	ID	Description	Unit	Cost	QTY	Total
Equipment Installation						
Geotextile, woven	42	Woven Geotextile Fabric. Includes materials, equipment and labor	Square Yard	$1.33	100	$133.00
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.	Hours	$130.80	16	$2,092.80
Water management, Flooding & dewatering	969	Includes equipment and power unit. Labor not included.	Acre Feet	$272.03	25	$6,800.75
Truck, dump, 12 CY	1215	Dump truck for moving bulk material. Typically capacity is 16 ton or 12 cubic yards. Includes equipment only.	Hours	$78.77	16	$1,260.32
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.	Hours	$27.56	16	$440.96

Equipment Operators, Heavy	233	Includes: Cranes, Hydraulic Excavators >=50 HP, Dozers, Paving Machines, Rock Trenchers, Trenchers >=12 in., Dump Trucks, Ag Equipment >=150 HP, Scrapers, Water Wagons.	Hours	$38.00	16	$608.00
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.	Hours	$46.88	16	$750.08
Materials						
Aggregate, river rock	1834	Well graded, rounded mineral substrates derived from local riverine settings. Includes materials and local delivery	Ton	$36.99	45	$1,664.55
Culvert, box, 6 ft x 8 ft	2175	Precast concrete box culvert, 6 feet x 8 feet length. Typically in 4 foot sections. Materials only.	Feet	$352.97	20	$7,059.40
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	$488.10	1	$488.10

Practice: 396 - Aquatic Organism Passage

Scenario: #10 - Bridge, Precast Abutment

Scenario Description:

A channel-spanning structure that carries a road or trailway across a river or stream. Constructed of timber, i-beams, or concrete, bridges are attached at either end to prefabricated or precast concrete. Longer span bridges may require instream pilings to support the travel surface. Bridge decking can be timber, concrete, asphalt, or some combination thereof. Bridge design is completed to conform to loading requirements and site conditions. Geotechnical investigations are used to determine the best support structure suited to a given site. The bridge deck is designed to rest on abutments placed on the adjacent floodplain. Bridge components are delivered to the site and assembled by a combination of equipment and manual labor. They are installed with an assortment of equipment used for excavation, placing material, delivering and removing material, and lifting bridge components from delivery trucks onto the constructed bridge support elements. Other actions include construction staking and signage, soil erosion and pollution control, removal and disposal of the old culvert (if applicable), and topsoil conservation for site reclamation. Stream diversion is not necessary since the bridge will be constructed above the active channel. Disturbed areas are revegetated using Critical Area Planting (342). Scenario does not include additional measures needed to address channel incision, bank stability, and other factors associated with the presence of the bridge crossing. RESOURCE CONCERNS: INADEQUATE HABITAT FOR FISH AND WILDLIFE –Habitat degradation; EXCESS WATER – Ponding, flooding, seasonal high water table, seeps, and drifted snow; WATER QUALITY DEGRADATION – Elevated water temperature; SOIL EROSION– Excessive bank erosion from streams shorelines or water conveyance channels Payments for these associated practices are made separately and are covered by other typical scenarios and payment schedules. See relevant CPS for additional information. ---Site Preparation and Reclamation associated with project footprint: (326) Clearing and Snagging, (342) Critical Area Planting, (382) Fence, (390) Riparian Herbaceous Cover, (391) Riparian Forest Buffer, (612) Tree/Shrub Establishment; ---Reach Planning/Habitat Enhancement: (395) Stream Habitat Improvement and Management, ---Structural Measures Associated with Scenario but outside of project footprint: (410) Grade Stabilization Structure, (582) Open Channel, (584) Channel Bed Stabilization, (580) Streambank and Shoreline Protection

Before Situation:

An existing stream crossing outfitted with an undersized culvert has a history of maintenance issues and failure. The downstream channel has experienced bed and bank scour, and the crossing may have to the deposition of a wedge of sediment upstream of the road. The road may be overtopped by high flows, resulting in outright failure, landowner accessibility problems, access by and to emergency services, and hamper post-flood recovery efforts. An upstream impoundment created by the undersized culvert has contributed to water quality problems including high water temperatures and the deposition and later mobilization of polluted fine sediment. Native aquatic organisms are unable to pass through the road crossing because the culvert outlet is perched above the downstream pool, and high velocities are not negotiable by animals that are able to leap into the culvert barrel.

After Situation:

The undersized culvert is replaced with a timber bridge placed on precast concrete abutments. The bridge deck is composed of timber planks, and elevated, continuous railings run down each side connecting one abutment to its counterpart on the opposite bank. Signs on either approach indicate bridge capacity and weight restrictions. Because the bridge spans the active channel and sits atop the adjacent floodplain surface, geomorphic and ecological functions are preserved through the crossing site, enhancing AOP, water quality, and culvert longevity. Landowners are able to access their holdings across a range of flows, and are able to seek and receive emergency and post-flood recovery services. Resource Concerns are addressed within the context of the site. Typical dimensions: 16' wide x 30' long bridge sitting on 6' tall abutments.

Feature Measure: Area of bridge deck

Scenario Unit: Square Feet

Scenario Typical Size: 480.0

Scenario Total Cost: $57,591.78

Scenario Cost/Unit: $119.98

Cost Details:

Component Name	ID	Description	Unit	Cost	QTY	Total
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.	Hours	$31.96	40	$1,278.40
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.	Hours	$130.80	60	$7,848.00
Skidsteer, 80 HP	933	Skidsteer loader with horsepower range of 60 to 90. Equipment and power unit costs. Labor not included.	Hours	$55.01	40	$2,200.40
Truck, dump, 18 CY	1400	Dump truck for moving bulk material. Typically capacity is 25 ton or 18 cubic yards. Includes equipment only.	Hours	$98.15	40	$3,926.00
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.	Hours	$37.19	40	$1,487.60
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.	Hours	$27.56	60	$1,653.60
Equipment Operators, Heavy	233	Includes: Cranes, Hydraulic Excavators >=50 HP, Dozers, Paving Machines, Rock Trenchers, Trenchers >=12 in., Dump Trucks, Ag Equipment >=150 HP, Scrapers, Water Wagons.	Hours	$38.00	180	$6,840.00
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.	Hours	$46.88	40	$1,875.20

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.	Hours	$102.76	120	$12,331.20
Materials						
Dimension Lumber, Treated	1044	Treated dimension lumber with nominal thickness equal or less than 2". Includes lumber and fasteners	Board Feet	$1.10	2500	$2,750.00
Rock Riprap, graded, angular, material and shipping	1200	Graded Rock Riprap for all gradation ranges. Includes materials and delivery only.	Ton	$35.35	100	$3,535.00
Epoxy anchor	1599	Galvanized bolts anchored into concrete or stone using epoxy adhesive. Includes materials and labor to drill and install.	Each	$18.05	12	$216.60
Steel, structural steel members	1779	Structural steel, includes materials and fabrication.	Pound	$1.26	5360	$6,753.60
Footing, concrete, precast	1836	Precast spread footing with stemwall, T-shaped, with channel built to accept arched culvert leg. Includes materials only.	Feet	$66.74	40	$2,669.60
Pipe, PE, 4 in., DR 9, perforated	2140	Materials: - 4 inch - Perforated PE- 160 psi - ASTM D3035 DR 9	Feet	$10.53	60	$631.80
Galvanized Bolts, large	2166	5/8" x 12" galvanized timber bolts. Materials only.	Each	$4.47	24	$107.28
Mobilization						
Mobilization, medium equipment	1139	Equipment with 70-150 HP or typical weights between 14,000 and 30,000 pounds.	Each	$255.65	2	$511.30
Mobilization, large equipment	1140	Equipment >150HP or typical weights greater than 30,000 pounds or loads requiring over width or over length permits.	Each	$488.10	2	$976.20

Practice: 396 - Aquatic Organism Passage

Scenario: #11 - Bridge, Prefabricated

Scenario Description:

A channel-spanning structure constructure from a manufactured concrete or steel bridge structure that has been certified by a PE that carries a road or trailway across a river or stream. Bridge design is completed to conform to loading requirements and site conditions. The bridge deck is designed to rest on abutments placed on the adjacent floodplain. Bridge components are delivered to the site and assembled by a combination of equipment and manual labor. They are installed with an assortment of equipment used for excavation, placing material, delivering and removing material, and lifting bridge components from delivery trucks onto the constructed bridge support elements. Other actions include construction staking and signage, soil erosion and pollution control, removal and disposal of the old culvert (if applicable), and topsoil conservation for site reclamation. Channel diversion or dewatering is required since an existing blockage will be removed for bridge construction. Disturbed areas are revegetated using Critical Area Planting (342). Scenario does not include additional measures needed to address channel incision, bank stability, and other factors associated with the presence of the bridge crossing. Typical size 30' long and 16' wide. RESOURCE CONCERNS: INADEQUATE HABITAT FOR FISH AND WILDLIFE –Habitat degradation; EXCESS WATER – Ponding, flooding, seasonal high water table, seeps, and drifted snow; WATER QUALITY DEGRADATION – Elevated water temperature; SOIL EROSION– Excessive bank erosion from streams shorelines or water conveyance channels Assoicated Practices: (326) Clearing and Snagging, (342) Critical Area Planting, (382) Fence, (390) Riparian Herbaceous Cover, (391) Riparian Forest Buffer, (612) Tree/Shrub Establishment; (395) Stream Habitat Improvement and Management, (410) Grade Stabilization Structure, (582) Open Channel, (584) Channel Bed Stabilization, (580) Streambank and Shoreline Protection

Before Situation:

An existing undersized culvert creates an upstream passage blockage to fish and other aquatic organisms. The existing crossing does not meet State or Federal fish passage guidance.

After Situation:

The undersized culvert is replaced with a manufactured bridge placed on precast concrete abutments. The bridge deck is composed of concrete or steel and elevated, continuous railings run down each side connecting one abutment to its counterpart on the opposite bank. Signs on either approach indicate bridge capacity and weight restrictions. Because the bridge spans the active channel and sits atop the adjacent floodplain surface, geomorphic and ecological functions are preserved through the crossing site, enhancing AOP, water quality, and culvert longevity. Resource Concerns are addressed within the context of the site. Typical Scenario is for a 30' span bridge 15' wide on precast concrete abutments.

Feature Measure: Area of Bridge Deck

Scenario Unit: Square Feet

Scenario Typical Size: 480.0

Scenario Total Cost: $70,004.77

Scenario Cost/Unit: $145.84

Cost Details:

Component Name	ID	Description	Unit	Cost	QTY	Total
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 Yards	$481.12	18	$8,660.16
Backhoe, 80 HP	926	Wheel mounted backhoe excavator with horsepower range of 60 to 90. Equipment and power unit costs. Labor not included.	Hours	$31.96	40	$1,278.40
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.	Hours	$130.80	20	$2,616.00
Water management, Flooding & dewatering	969	Includes equipment and power unit. Labor not included.	Acre Feet	$272.03	50	$13,601.50
Truck, dump, 18 CY	1400	Dump truck for moving bulk material. Typically capacity is 25 ton or 18 cubic yards. Includes equipment only.	Hours	$98.15	10	$981.50
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.	Hours	$37.19	34	$1,264.46
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.	Hours	$27.56	60	$1,653.60
Equipment Operators, Heavy	233	Includes: Cranes, Hydraulic Excavators >=50 HP, Dozers, Paving Machines, Rock Trenchers, Trenchers >=12 in., Dump Trucks, Ag Equipment >=150 HP, Scrapers, Water Wagons.	Hours	$38.00	70	$2,660.00
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.	Hours	$46.88	20	$937.60
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.	Hours	$102.76	80	$8,220.80

Materials						
Painting, steel surface, Impermeable	2165	Painting of steel surface with an impermeable coating. Includes materials and application	Square Feet	$0.90	1260	$1,134.00
Bridge, steel or concrete, pre-Manufactured Bridge	2193	A premanufactured steel or precast prestressed concrete bridge rated for an HS 25 highway loading. Typical width is 14', length is variable. Includes railing system. Includes materials and shipping only.	Square Feet	$58.34	450	$26,253.00
Mobilization						
Mobilization, medium equipment	1139	Equipment with 70-150 HP or typical weights between 14,000 and 30,000 pounds.	Each	$255.65	1	$255.65
Mobilization, large equipment	1140	Equipment >150HP or typical weights greater than 30,000 pounds or loads requiring over width or over length permits.	Each	$488.10	1	$488.10

Practice: 396 - Aquatic Organism Passage

Scenario: #12 - Concrete Ladder

Scenario Description:

Formed, reinforced, poured-in-place concrete structures outfitted with baffles (Denil), vertical slots, pools and weirs, submerged orifices, chutes or some combination thereof to provide upstream passage for aquatic organisms over dams and other hydraulic structures. Although fish ladder designs vary according to target species and site conditions, they can generally be described as a three-sided concrete channel with integrated hydraulic features that provide a gradual elevation increase across some distance that allows aquatic organism to swim over a barrier--they convert the total barrier head elevation into passable increments. Concrete ladders are often constructed with resting pools and may have switchbacks. The primary water source for a concrete ladder comes from streamflow diverted into the ladder exit (upstream end) and since it is passed through the ladder to the river below, it is not a consumptive use. These ladders often require flow control and regulating devices (sometimes automated), gates, and may need auxiliary pumps to provide attraction flows at the ladder entrance (downstream end) or augment flow in the ladder. Gages above and below the dam are required to inform ladder operation. Trash racks are used at the upstream end to block debris from entering the ladder. Concrete ladders also require frequent maintenance, and flow through unautomated ladders may need to be adjusted manually when adjacent river conditions or dam operations change. Concrete ladder designs can be complex and require interactions between engineering and ecological sciences for successful implementation. For example, the ladder entrance is one of the most important elements of the structure, and placement of this entrance in the downstream reach is a function of site characteristics and aquatic organism biology. In addition, some aquatic animals will not swim through a submerged orifice, so use of pool-orifice ladders is not recommended. Partners associated with dam ownership and operation, regulatory agencies, and others are consulted and included in the design and construction process. Ladder designs account for run volume and timing, and the swimming capabilities of target species. Some ladders in highly visible areas are finished with masonry facades to blend the ladder to the site in the interest of aesthetics or to conform with historic appearances. Concrete ladders are constructed with equipment for excavation, placing material, and delivering and removing material. Lifts or booms are required to place concrete into forms. Because ladders are often attached to existing dams, personnel familiar with the dam structure are involved at all phases of the process to ensure that plans conform with site requirements. Bed and bank excavation are necessary to create the location for concrete ladders, so site isolation and sediment and erosion control measures are used. Disturbed areas are revegetated using Critical Area Planting (342) and access control and signage are provided. Scenario does not include additional measures in the adjacent active channel necessary to control flow, address channel elevation or stability, or encourage fish guidance into the concrete ladder. Scenario does not include structures used as counting stations or to trap and sample upstream migrants. RESOURCE CONCERNS: INADEQUATE HABITAT FOR FISH AND WILDLIFE –Habitat degradation Payments for these associated practices are made separately and are covered by other typical scenarios and payment schedules. See relevant CPS for additional information. ---Site Preparation and Reclamation associated with project footprint: (326) Clearing and Snagging, (342) Critical Area Planting, (382) Fence, (390) Riparian Herbaceous Cover, (391) Riparian Forest Buffer, (612) Tree/Shrub Establishment ---Reach Planning/Habitat Enhancement: (395) Stream Habitat Improvement and Management, ---Structural Measures Associated with Scenario but outside of project footprint: (410) Grade Stabilization Structure, (582) Open Channel, (584) Channel Bed Stabilization, (580) Streambank and Shoreline Protection, (587) Structure for Water Control

Before Situation:

An operational, low hazard class fixed crest concrete dam becomes the target of parties interested in providing fish passage. The dam presently blocks the upstream migration of a number of native aquatic organisms, and suitable spawning and rearing habitats for targeted fish species exists in upstream river reaches. Assessment of site conditions, dam operation, and target species swimming abilities indicate that a concrete ladder will provide suitable passage conditions during the migration season and pass the expected run volume without excessive delays.

After Situation:

A concrete pool and chute ladder outfitted with aluminum internal features and 2 turn/resting pool is installed. The ladder is attached to the face and abutment of the dam, and the entrance is located along the streambank where migrating aquatic organisms are likely to encounter it. The ladder passes the estimated run volume with minimal delays, and native aquatic animals are able to reach upstream spawning and rearing areas and successfully produce offspring that become part of the population. The ladder has an operating plan that stipulates actions and responsible parties for every month of the year. The ladder is fenced to control access and signage indicating its function and relevant warnings is provided at numerous locations. Resource Concerns are addressed within the context of the site. Typical size to raise fish 10 ft: 15' wide x 250 ft long. Each step will raise the water 6 inches.

Feature Measure: Barrier height (feet)

Scenario Unit: Feet

Scenario Typical Size: 10.0

Scenario Total Cost: $592,988.91

Scenario Cost/Unit: $59,298.89

Cost Details:

Component Name	ID	Description	Unit	Cost	QTY	Total
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 Yards	$481.12	500	$240,560.00
Clearing and Grubbing	40	Clearing and Grubbing, includes materials, equipment and labor	Acres	$315.96	3	$947.88
Backhoe, 80 HP	926	Wheel mounted backhoe excavator with horsepower range of 60 to 90. Equipment and power unit costs. Labor not included.	Hours	$31.96	80	$2,556.80
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.	Hours	$130.80	960	$125,568.00
Skidsteer, 80 HP	933	Skidsteer loader with horsepower range of 60 to 90. Equipment and power unit costs. Labor not included.	Hours	$55.01	480	$26,404.80
Water management, Flooding & dewatering	969	Includes equipment and power unit. Labor not included.	Acre Feet	$272.03	111	$30,195.33

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.	Hours	$72.23	120	$8,667.60
Truck, dump, 12 CY	1215	Dump truck for moving bulk material. Typically capacity is 16 ton or 12 cubic yards. Includes equipment only.	Hours	$78.77	180	$14,178.60
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.	Hours	$37.19	960	$35,702.40
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.	Hours	$27.56	960	$26,457.60
Equipment Operators, Heavy	233	Includes: Cranes, Hydraulic Excavators >=50 HP, Dozers, Paving Machines, Rock Trenchers, Trenchers >=12 in., Dump Trucks, Ag Equipment >=150 HP, Scrapers, Water Wagons.	Hours	$38.00	1520	$57,760.00
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.	Hours	$46.88	480	$22,502.40
Mobilization						
Mobilization, medium equipment	1139	Equipment with 70-150 HP or typical weights between 14,000 and 30,000 pounds.	Each	$255.65	2	$511.30
Mobilization, large equipment	1140	Equipment >150HP or typical weights greater than 30,000 pounds or loads requiring over width or over length permits.	Each	$488.10	2	$976.20

Practice: 396 - Aquatic Organism Passage

Scenario: #15 - Low Water Crossing

Scenario Description:

Structure installed on low volume or on unimproved roads at watercourse crossings. Primary use is to allow livestock and equipment access to other parcels of land or operational units. Low-water crossings provide safe and stable stream crossings that don't negatively impact water and ecological quality while remaining stable across a wide range of flows. Variations exist, but a common application consists of an improved or hardened ford located above a hydraulic control (e.g., bedrock outcropping, riffle, or step composed of coarse substrates). Properly designed and installed low water crossings provide aquatic organism passage (AOP), promote stream ecological and geomorphic function, remain stable over time, and can pass sediment and woody debris. Conservation planning and interaction with the landowner is vital to determine if existing crossings can be consolidated into fewer, more reliable locations. Characterizing a site according to its watershed position and geomorphic function will aid design decisions. Optimal AOP conditions are usually realized when the backfill is composed of a mixture that mimics bed material as evaluated from a reference reach adjacent to the crossing—preferably at least 10-20 estimated bankfull channel widths above an existing crossing to avoid effects that alter channel geometry or bedform composition and spacing. Low water crossings are installed with an assortment of equipment used for excavation, placing material, and delivering and removing material. Low water crossings provide the best mix of function and longevity when they are designed and built to conform to existing channel geometry and slope, constructed to match the shape of the existing channel, and oriented to cross the stream at a 90 degree angle. Crossing width, measured along the downstream axis, should not exceed 2X bankfull width. Low water crossings are commonly constructed by overexcavating the crossing section 6-12 inches below the existing streambed and backfilling the void with well-graded rock back to natural bed elevation. Geotextile lining may be required in some settings. Rock size and gradation is the smallest mix needed to remain stable under prevailing flow conditions—larger rock can endanger livestock and turbulence impairs passage. Sand or soil may be added into the mix to seal the section to ensure that the stream doesn't percolate into the crossing substrate. Smaller material increases bed diversity, chokes voids between bigger stones, and helps preserve passage quality. Smaller rock smaller (< 2 inches) at the finished surface may become lodged in livestock hooves. The road/trail surface of the crossing should be extended to an elevation that exceeds the known high water level on each side of the crossing. The downstream edge of the crossing should not produce a sharp drop in water surface to preserve AOP quality and discourage sediment deposition and debris accumulation. Other actions include construction staking and signage, soil erosion and pollution control, removal and disposal of the old culvert, and topsoil conservation for site reclamation. Disturbed areas are revegetated using Critical Area Planting (342). Scenario does not include additional measures needed to address channel incision, bank stability, and other factors associated with the presence of the stream crossing. Stream corridor fencing should be considered to control livestock access and preserve water and riparian quality. RESOURCE CONCERNS: INADEQUATE HABITAT FOR FISH AND WILDLIFE –Habitat degradation Payments for these associated practices are made separately and are covered by other typical scenarios and payment schedules. See relevant CPS for additional information. ---Site Preparation and Reclamation associated with project footprint: (326) Clearing and Snagging, (342) Critical Area Planting, (382) Fence, (390) Riparian Herbaceous Cover, (391) Riparian Forest Buffer, (612) Tree/Shrub Establishment ---Reach Planning/Habitat Enhancement: (395) Stream Habitat Improvement and Management, ---Structural Measures Associated with Scenario but outside of project footprint: (410) Grade Stabilization Structure, (582) Open Channel, (584) Channel Bed Stabilization, (580) Streambank and Shoreline Protection, (587) Structure for Water Control

Before Situation:

A small farming operation has a mixture of pastures, hay meadows, and crops that all require seasonal movement of equipment and livestock between parcels. Four unimproved stream crossings provide unreliable access across the property and require yearly maintenance to clear debris and sediment. Farm equipment has gotten stuck in the past, and uncontrolled livestock access and frequent crossing or loafing in the stream contributes to chronic water quality problems associated with elevated fine sediment, high water temperatures, invasive aquatic vegetation, and fecal coliform bacteria. Livestock avoid three of the crossings when streamflow increases moderately. Two of the crossings are overwide and shallow, and impair AOP. The property and landowner's yearly operations are reviewed by conservation planners and—with the input and agreement of the landowner—it is decided that three of the four crossings can be eliminated and consolidated at one site above a cobble/boulder deposit in the stream.

After Situation:

An improved ford is constructed by excavating the channel just upstream of the boulder/cobble hydraulic control. The cut is lined with geotextile to control seepage and subsurface flow, and backfilled up to the existing bed elevation with a well-graded mix of rock sized to mimic the material in the channel upstream of the crossing. The finished crossing surface is at grade with the up and downstream channel elevation, and no drop exists along the downstream edge. Approaches on either side of the crossing are extended up to the adjacent floodplain surface, and the finished instream portion of the ford matches the existing channel cross section. Approach slopes are shallow enough for expected equipment traffic, including towed combinations, and armored as needed with larger rock to protect against erosion that may occur when the floodplain is inundated. The crossing is fenced and gated to control livestock access and provide greater flexibility to the landowner's grazing needs. AOP is provided, and the crossing remains stable across a range of flow and sediment and debris transport events. Resource Concerns are addressed within the context of the site.

Feature Measure: Cubic Yard of Crossing Material

Scenario Unit: Cubic Yards

Scenario Typical Size: 42.0

Scenario Total Cost: $11,088.22

Scenario Cost/Unit: $264.01

Cost Details:

Component Name	ID	Description	Unit	Cost	QTY	Total
Equipment Installation						
Clearing and Grubbing	40	Clearing and Grubbing, includes materials, equipment and labor	Acres	$315.96	0.5	$157.98
Geotextile, woven	42	Woven Geotextile Fabric. Includes materials, equipment and labor	Square Yard	$1.33	85	$113.05
Earthfill, Manually Compacted	50	Earthfill, manually compacted, includes equipment and labor	Cubic Yards	$6.02	24	$144.48
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.	Hours	$130.80	16	$2,092.80
Skidsteer, 80 HP	933	Skidsteer loader with horsepower range of 60 to 90. Equipment and power unit costs. Labor not included.	Hours	$55.01	16	$880.16
Truck, dump, 18 CY	1400	Dump truck for moving bulk material. Typically capacity is 25 ton or 18 cubic yards. Includes equipment only.	Hours	$98.15	16	$1,570.40
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.	Hours	$37.19	16	$595.04
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.	Hours	$27.56	16	$440.96
Equipment Operators, Heavy	233	Includes: Cranes, Hydraulic Excavators >=50 HP, Dozers, Paving Machines, Rock Trenchers, Trenchers >=12 in., Dump Trucks, Ag Equipment >=150 HP, Scrapers, Water Wagons.	Hours	$38.00	48	$1,824.00
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.	Hours	$46.88	16	$750.08
Materials						
Aggregate, river rock	1834	Well graded, rounded mineral substrates derived from local riverine settings. Includes materials and local delivery	Ton	$36.99	48	$1,775.52
Mobilization						
Mobilization, medium equipment	1139	Equipment with 70-150 HP or typical weights between 14,000 and 30,000 pounds.	Each	$255.65	1	$255.65
Mobilization, large equipment	1140	Equipment >150HP or typical weights greater than 30,000 pounds or loads requiring over width or over length permits.	Each	$488.10	1	$488.10

Practice: 396 - Aquatic Organism Passage

Scenario: #16 - Step Pool Weir

Scenario Description:

Step pool wiers are constructed features that provide passage around an instream barrier or in place of a removed barrier. Step Pool Weirs are constructed with an assortment of equipment used for excavation, placing material, and delivering and removing material. Disturbed areas are revegetated using Critical Area Planting (342) and access control and signage are provided. Scenario does not include additional measures needed in the active channel and floodplain or at an existing dam necessary to control flow associated with nature-like fishway. Typical size 100' long, 35' wide RESOURCE CONCERNS: INADEQUATE HABITAT FOR FISH AND WILDLIFE –Habitat degradation; EXCESS WATER – Ponding, flooding, seasonal high water table, seeps, and drifted snow; WATER QUALITY DEGRADATION – Elevated water temperature; EROSION– Excessive bank erosion from streams shorelines or water conveyance channels Assoicated Practices (326) Clearing and Snagging, (342) Critical Area Planting, (382) Fence, (390) Riparian Herbaceous Cover, (391) Riparian Forest Buffer, (612) Tree/Shrub Establishment, 580 Streambank and Shoreline Protection, (395) Stream Habitat Improvement and Management, (410) Grade Stabilization Structure, (582) Open Channel, (584) Channel Bed Stabilization, (580) Streambank and Shoreline Protection, (587) Structure for Water Control580 Streambank and Shoreline Protection

Before Situation:

An instream barrier prevents upstream migration of native aquatic organisms and no support exists for removal. Similarly, an instream barrier is removed, and interested parties require maintenance of an upstream pool or pond.

After Situation:

A step pool weir is constructed in place of a removed barrier. The step pool weir is constructed of rock that provides quality passage conditions for a number of species and geomorphic stability over a range of flows. Resource Concerns are addressed within the context of the site. The typical scenario is for a 35' wide channel 100 feet long with weirs every 10'.

Feature Measure: length x width of fishway

Scenario Unit: Square Feet

Scenario Typical Size: 3,500.0

Scenario Total Cost: $110,589.43

Scenario Cost/Unit: $31.60

Cost Details:

Component Name	ID	Description	Unit	Cost	QTY	Total
Equipment Installation						
Geotextile, woven	42	Woven Geotextile Fabric. Includes materials, equipment and labor	Square Yard	$1.33	390	$518.70
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.	Hours	$130.80	40	$5,232.00
Skidsteer, 80 HP	933	Skidsteer loader with horsepower range of 60 to 90. Equipment and power unit costs. Labor not included.	Hours	$55.01	40	$2,200.40
Water management, Flooding & dewatering	969	Includes equipment and power unit. Labor not included.	Acre Feet	$272.03	10	$2,720.30
Truck, dump, 18 CY	1400	Dump truck for moving bulk material. Typically capacity is 25 ton or 18 cubic yards. Includes equipment only.	Hours	$98.15	40	$3,926.00
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.	Hours	$27.56	40	$1,102.40
Equipment Operators, Heavy	233	Includes: Cranes, Hydraulic Excavators >=50 HP, Dozers, Paving Machines, Rock Trenchers, Trenchers >=12 in., Dump Trucks, Ag Equipment >=150 HP, Scrapers, Water Wagons.	Hours	$38.00	80	$3,040.00
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.	Hours	$46.88	10	$468.80
Materials						
Boulder	1761	Rock boulders (approximately 5 ft dia. 6.67 Tons) Inlcudes materials and delivery (up to 100 miles) only.	Ton	$66.53	1200	$79,836.00
Aggregate, river rock	1834	Well graded, rounded mineral substrates derived from local riverine settings. Includes materials and local delivery	Ton	$36.99	292	$10,801.08
Mobilization						
Mobilization, medium equipment	1139	Equipment with 70-150 HP or typical weights between 14,000 and 30,000 pounds.	Each	$255.65	1	$255.65
Mobilization, large equipment	1140	Equipment >150HP or typical weights greater than 30,000 pounds or loads requiring over width or over length permits.	Each	$488.10	1	$488.10

Practice: 396 - Aquatic Organism Passage

Scenario: #45 - Timber Bridge with Block Abutments

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 precast concrete block abutments, steel girders, and timber deck. Travel surface shall be wooden or concrete deck surface. Load is H-25. Width is 16 feet including curbs. Abutments are <= 6 feet. Typical size: 20' long, 16' wide with 6' abutments.

Before Situation:

An undersized structure is causing a velocity, depth, or jump barrier for aquatic organisms. Existing structure may also be causing stream or road erosion.

After Situation:

Access and water flow are able to cross each other in a stable manner while providing for passage of aquatic organisms. Stream flow is not impeded and a stable base exists for equipment, people and/or animals to cross. Associated practices could be (342) Critical Area Planting, (560) Access Road, (575) Animal Trails and Walkways, (566) Recreational Trails and Walkways, (500) Obstruction Removal, or (584) Channel Stabilization.

Feature Measure: square footage of bridge deck

Scenario Unit: Square Feet

Scenario Typical Size: 320.0

Scenario Total Cost: $24,425.77

Scenario Cost/Unit: $76.33

Cost Details:

Component Name	ID	Description	Unit	Cost	QTY	Total
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.	Hours	$130.80	24	$3,139.20
Skidsteer, 80 HP	933	Skidsteer loader with horsepower range of 60 to 90. Equipment and power unit costs. Labor not included.	Hours	$55.01	24	$1,320.24
Truck, dump, 18 CY	1400	Dump truck for moving bulk material. Typically capacity is 25 ton or 18 cubic yards. Includes equipment only.	Hours	$98.15	24	$2,355.60
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.	Hours	$27.56	8	$220.48
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.	Hours	$27.56	48	$1,322.88
Equipment Operators, Heavy	233	Includes: Cranes, Hydraulic Excavators >=50 HP, Dozers, Paving Machines, Rock Trenchers, Trenchers >=12 in., Dump Trucks, Ag Equipment >=150 HP, Scrapers, Water Wagons.	Hours	$38.00	24	$912.00
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.	Hours	$46.88	24	$1,125.12
Materials						
Aggregate, Gravel, Ungraded, Quarry Run	1099	Includes materials, equipment and labor	Cubic Yards	$34.43	57	$1,962.51
Block, pre-cast concrete, modular	1496	Pre-cast concrete blocks, typically 2ft x 2ft x 6ft , includes installation and delivery.	Cubic Yards	$109.95	13	$1,429.35
Steel, structural steel members	1779	Structural steel, includes materials and fabrication.	Pound	$1.26	3700	$4,662.00
Structural Timber Piles, Treated Timber Bridge	2583	Timber Piles for timber bridge abutments, Includes materials only.	Board Feet	$2.24	2336	$5,232.64
Mobilization						
Mobilization, medium equipment	1139	Equipment with 70-150 HP or typical weights between 14,000 and 30,000 pounds.	Each	$255.65	1	$255.65
Mobilization, large equipment	1140	Equipment >150HP or typical weights greater than 30,000 pounds or loads requiring over width or over length permits.	Each	$488.10	1	$488.10

Practice: 396 - Aquatic Organism Passage

Scenario: #46 - Bridge, CIP abutment, Geotech Investigation

Scenario Description:

A channel-spanning structure that carries a road or trailway across a river or stream. Constructed of timber, i-beams, or concrete, bridges are attached at either end to prefabricated, reinforced and poured-in-place, or piling abutments capped/surrounded with concrete. Longer span bridges may require instream pilings to support the travel surface. Bridge decking can be timber, concrete, asphalt, or some combination thereof. Typical size 30' long and 16' wide. Bridge design is completed to conform to loading requirements and site conditions. Geotechnical investigations are used to determine the best support structure suited to a given site. The bridge deck is designed to rest on abutments placed on the adjacent floodplain. Bridge components are delivered to the site and assembled by a combination of equipment and manual labor. They are installed with an assortment of equipment used for excavation, placing material, delivering and removing material, and lifting bridge components from delivery trucks onto the constructed bridge support elements. Other actions include construction staking and signage, soil erosion and pollution control, removal and disposal of the old culvert (if applicable), and topsoil conservation for site reclamation. Stream diversion is not necessary since the bridge will be constructed above the active channel. Disturbed areas are revegetated using Critical Area Planting (342). Scenario does not include additional measures needed to address channel incision, bank stability, and other factors associated with the presence of the bridge crossing. RESOURCE CONCERNS: INADEQUATE HABITAT FOR FISH AND WILDLIFE –Habitat degradation; EXCESS WATER – Ponding, flooding, seasonal high water table, seeps, and drifted snow; WATER QUALITY DEGRADATION – Elevated water temperature; SOIL EROSION– Excessive bank erosion from streams shorelines or water conveyance channels Payments for these associated practices are made separately and are covered by other typical scenarios and payment schedules. See relevant CPS for additional information. ---Site Preparation and Reclamation associated with project footprint: (326) Clearing and Snagging, (342) Critical Area Planting, (382) Fence, (390) Riparian Herbaceous Cover, (391) Riparian Forest Buffer, (612) Tree/Shrub Establishment; ---Reach Planning/Habitat Enhancement: (395) Stream Habitat Improvement and Management, ---Structural Measures Associated with Scenario but outside of project footprint: (410) Grade Stabilization Structure, (582) Open Channel, (584) Channel Bed Stabilization, (580) Streambank and Shoreline Protection

Before Situation:

An existing stream crossing outfitted with an undersized culvert has a history of maintenance issues and failure. The downstream channel has experienced bed and bank scour, and the crossing may have to the deposition of a wedge of sediment upstream of the road. The road may be overtopped by high flows, resulting in outright failure, landowner accessibility problems, access by and to emergency services, and hamper post-flood recovery efforts. An upstream impoundment created by the undersized culvert has contributed to water quality problems including high water temperatures and the deposition and later mobilization of polluted fine sediment. Native aquatic organisms are unable to pass through the road crossing because the culvert outlet is perched above the downstream pool, and high velocities are not negotiable by animals that are able to leap into the culvert barrel.

After Situation:

The undersized culvert is replaced with a timber bridge placed on precast concrete abutments. The bridge deck is composed of timber planks, and elevated, continuous railings run down each side connecting one abutment to its counterpart on the opposite bank. Signs on either approach indicate bridge capacity and weight restrictions. Because the bridge spans the active channel and sits atop the adjacent floodplain surface, geomorphic and ecological functions are preserved through the crossing site, enhancing AOP, water quality, and culvert longevity. Landowners are able to access their holdings across a range of flows, and are able to seek and receive emergency and post-flood recovery services. Resource Concerns are addressed within the context of the site.

Feature Measure: Area of bridge deck

Scenario Unit: Square Feet

Scenario Typical Size: 480.0

Scenario Total Cost: $71,383.96

Scenario Cost/Unit: $148.72

Cost Details:

Component Name	ID	Description	Unit	Cost	QTY	Total
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 Yards	$481.12	32	$15,395.84
Backhoe, 80 HP	926	Wheel mounted backhoe excavator with horsepower range of 60 to 90. Equipment and power unit costs. Labor not included.	Hours	$31.96	40	$1,278.40
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.	Hours	$130.80	60	$7,848.00
Skidsteer, 80 HP	933	Skidsteer loader with horsepower range of 60 to 90. Equipment and power unit costs. Labor not included.	Hours	$55.01	40	$2,200.40
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.	Hours	$72.23	8	$577.84
Truck, dump, 18 CY	1400	Dump truck for moving bulk material. Typically capacity is 25 ton or 18 cubic yards. Includes equipment only.	Hours	$98.15	40	$3,926.00
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.	Hours	$37.19	40	$1,487.60

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.	Hours	$27.56	60	$1,653.60
Equipment Operators, Heavy	233	Includes: Cranes, Hydraulic Excavators >=50 HP, Dozers, Paving Machines, Rock Trenchers, Trenchers >=12 in., Dump Trucks, Ag Equipment >=150 HP, Scrapers, Water Wagons.	Hours	$38.00	180	$6,840.00
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.	Hours	$46.88	40	$1,875.20
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.	Hours	$102.76	120	$12,331.20
Materials						
Dimension Lumber, Treated	1044	Treated dimension lumber with nominal thickness equal or less than 2". Includes lumber and fasteners	Board Feet	$1.10	2500	$2,750.00
Rock Riprap, graded, angular, material and shipping	1200	Graded Rock Riprap for all gradation ranges. Includes materials and delivery only.	Ton	$35.35	100	$3,535.00
Epoxy anchor	1599	Galvanized bolts anchored into concrete or stone using epoxy adhesive. Includes materials and labor to drill and install.	Each	$18.05	12	$216.60
Steel, structural steel members	1779	Structural steel, includes materials and fabrication.	Pound	$1.26	5360	$6,753.60
Pipe, PE, 4 in., DR 9, perforated	2140	Materials: - 4 inch - Perforated PE- 160 psi - ASTM D3035 DR 9	Feet	$10.53	60	$631.80
Galvanized Bolts, large	2166	5/8" x 12" galvanized timber bolts. Materials only.	Each	$4.47	24	$107.28
Mobilization						
Mobilization, medium equipment	1139	Equipment with 70-150 HP or typical weights between 14,000 and 30,000 pounds.	Each	$255.65	2	$511.30
Mobilization, large equipment	1140	Equipment >150HP or typical weights greater than 30,000 pounds or loads requiring over width or over length permits.	Each	$488.10	1	$488.10
Mobilization, large equipment	1140	Equipment >150HP or typical weights greater than 30,000 pounds or loads requiring over width or over length permits.	Each	$488.10	2	$976.20

Practice: 396 - Aquatic Organism Passage

Scenario: #49 - Crossing Decomissioning with Abutments

Scenario Description:

Removal of existing crossing consisting of failing or undersized culverts that is causing a barrier to aquatic organism passage. Abutments will be placed so that a temporary bridge can be used during timber harvest and removed when it is no longer needed. Using a temporary bridge will reduce maintenance expense for the producer. Instream material associated with the previously mentioned circumstances or structures prevents aquatic organism passage by the creation of channel-spanning blockages, or areas of shallow depth, high velocities, or extensive changes in water surface elevation. In addition, these features may encourage abrupt channel changes that endanger adjacent capital infrastructure or transportation corridors. Excessive streambank erosion by flows deflected around or impounded behind these features may impair water quality by introducing fine sediment out of phase with the natural hydrograph and the life history requirements of native aquatic species. Removal is done with an assortment of equipment, including tracked excavators outfitted with buckets with "thumbs" and dump trucks. The channel and adjacent floodplain are stabilized to the fullest extent practicable. Removed materials are trucked away and disposed or recycled off-site, unless native streambed material found in the blockage can be used in site reclamation. Large woody material, if present, is used for instream reclamation, replaced in the channel downstream of the blockage, or trucked offsite for disposal or stockpiling for future projects. Disturbed areas are revegetated using Critical Area Planting (342). Scenario does not include additional measures needed in the active channel and floodplain. RESOURCE CONCERNS: INADEQUATE HABITAT FOR FISH AND WILDLIFE –Habitat degradation; EXCESS WATER – Ponding, flooding, seasonal high water table, seeps, and drifted snow; WATER QUALITY DEGRADATION – Elevated water temperature; SOIL EROSION– Excessive bank erosion from streams shorelines or water conveyance channels Payments for these associated practices are made separately and are covered by other typical scenarios and payment schedules. See relevant CPS for additional information. ---Site Preparation and Reclamation associated with project footprint: (342) Critical Area Planting, (382) Fence, (390) Riparian Herbaceous Cover, (391) Riparian Forest Buffer, (612) Tree/Shrub Establishment; (643) Restoration and Management of Rare and Declining Habitats. ---Reach Planning/Habitat Enhancement: (395) Stream Habitat Improvement and Management, ---Structural Measures Associated with Scenario but outside of project footprint: (410) Grade Stabilization Structure, (584) Channel Bed Stabilization, (580) Streambank and Shoreline Protection

Before Situation:

An instream feature spanning the active channel creates hydraulic conditions that exceed the swimming or crawling abilities of native aquatic organisms. Event-driven mass wasting or instream deposits of coarse sediment create channel blockages or areas of shallow, fast-moving water. An instream plug of material transported to the site by flood flows or delivered to the channel from a hillslope failure not only blocks passage, but may deflect the stream toward a new course than endangers adjacent capital infrastructure or transportation corridors. Elevated risks associated with eventual over-topping or failure of the blockage to downstream features or communities are imminent in the event of a blockage that forms a temporary dam. Accelerated instream or lateral channel erosion may introduce fine sediment that impairs water quality.

After Situation:

The instream barrier is removed by a combination of methods and equipment and the channel and affected floodplain are restored to pre-blockage conditions to the fullest extent practicable. Resource Concerns are addressed within the context of the site

Feature Measure: Number of crossings to decmission

Scenario Unit: Each

Scenario Typical Size: 1.0

Scenario Total Cost: $15,027.65

Scenario Cost/Unit: $15,027.65

Cost Details:

Component Name	ID	Description	Unit	Cost	QTY	Total
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.	Hours	$130.80	24	$3,139.20
Skidsteer, 80 HP	933	Skidsteer loader with horsepower range of 60 to 90. Equipment and power unit costs. Labor not included.	Hours	$55.01	24	$1,320.24
Truck, dump, 18 CY	1400	Dump truck for moving bulk material. Typically capacity is 25 ton or 18 cubic yards. Includes equipment only.	Hours	$98.15	24	$2,355.60
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.	Hours	$27.56	24	$661.44
Equipment Operators, Heavy	233	Includes: Cranes, Hydraulic Excavators >=50 HP, Dozers, Paving Machines, Rock Trenchers, Trenchers >=12 in., Dump Trucks, Ag Equipment >=150 HP, Scrapers, Water Wagons.	Hours	$38.00	48	$1,824.00
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.	Hours	$46.88	24	$1,125.12
Materials						
Aggregate, Gravel, Ungraded, Quarry Run	1099	Includes materials, equipment and labor	Cubic Yards	$34.43	45	$1,549.35
Block, pre-cast concrete, modular	1496	Pre-cast concrete blocks, typically 2ft x 2ft x 6ft , includes installation and delivery.	Cubic Yards	$109.95	21	$2,308.95
Mobilization						

Mobilization, medium equipment	1139	Equipment with 70-150 HP or typical weights between 14,000 and 30,000 pounds.	Each	$255.65	1	$255.65
Mobilization, large equipment	1140	Equipment >150HP or typical weights greater than 30,000 pounds or loads requiring over width or over length permits.	Each	$488.10	1	$488.10

Practice: 396 - Aquatic Organism Passage

Scenario: #55 - Earthen Dam Removal

Scenario Description:

Full removal of an earthen dam to restore aquatic organism passage, improve water quality, and promote functional river ecology and geomorphology. The removal extent is determined through consultations with the dam owner in consideration of prevailing regulations and site historical status. Adjacent floodplain surfaces above and below the target dam are considered in the planning process to account for shifts in streamflow and geomorphic regime. Resulting channel dimensions and profile are determined on a site-specific basis to reflect, to the fullest extent possible, pre-dam conditions. Pre-removal sediment assays are be completed as necessary to determine the toxicity of sediment stored behind the dam. Planning for the reclamation and management of stored sediments is completed according to geomorphic conditions, prevailing regulations, and the results of sediment toxicity investigations. Removal is done with an assortment of equipment, including tracked excavators outfitted with hydraulic chisels, hammers and/or buckets with "thumbs", bull dozers, skid steers, cranes, front-end loaders, and dump trucks. Removed materials are trucked away and disposed or recycled off-site, unless native streambed material found in the embankment can be used in site reclamation. Disturbed areas are revegetated with a mix of site-adapted species. Scenario does not include additional measures needed in the active channel and floodplain to account for post-removal changes to stream plan, pattern, or profile, or reclamation of any former impounded areas. Additional structural measures may be necessary to address constructed features associated with the removed dam including head gates, canals, raceways, access and maintenance roads, or similar civil works. RESOURCE CONCERNS: INADEQUATE HABITAT FOR FISH AND WILDLIFE –Habitat degradation; EXCESS WATER – Ponding, flooding, seasonal high water table, seeps, and drifted snow; WATER QUALITY DEGRADATION – Elevated water temperature. Payments for these associated practices are made separately and are covered by other typical scenarios and payment schedules. See relevant CPS for additional information. ---Site Preparation and Reclamation associated with project footprint: (326) Clearing and Snagging, (342) Critical Area Planting, (382) Fence, (390) Riparian Herbaceous Cover, (391) Riparian Forest Buffer, (612) Tree/Shrub Establishment ---Reach Planning/Habitat Enhancement: (395) Stream Habitat Improvement and Management, ---Structural Measures Associated with Scenario but outside of project footprint: (410) Grade Stabilization Structure, (584) Channel Bed Stabilization, (580) Streambank and Shoreline Protection, (587) Structure for Water Control

Before Situation:

A channel-spanning earthen dam no longer has functional use, may be failing, or creates a hazard to downstream capital infrastructure or communities. The dam blocks upstream aquatic organism migration, and downstream migrants may be diverted into hydraulic structures that increase mortality or result in migration delays or dead-ends. The dam disrupts the downstream cycling and transport of sediment, woody material and nutrients. The pool created by the dam may impair water quality by increasing temperatures, capturing fine sediment--sometimes laden with heavy metals or other pollutants--later mobilized by high flow events, and creating slackwater habitat for invasive aquatic vegetation. Non-native or exotic fish species inhabit the pool and predate upon and/or displace native fish.

After Situation:

The existing dam is removed and reach geometry and slope are restored to pre-dam conditions to the fullest extent practicable. Aquatic organism passage and river ecology and geomorphic conditions are restored to pre-dam conditions to the fullest extent practicable. Resource Concerns are addressed within the context of the site.

Feature Measure: Cubic Yards of earthen embankmen

Scenario Unit: Cubic Yards

Scenario Typical Size: 500.0

Scenario Total Cost: $31,183.26

Scenario Cost/Unit: $62.37

Cost Details:

Component Name	ID	Description	Unit	Cost	QTY	Total
Equipment Installation						
Clearing and Grubbing	40	Clearing and Grubbing, includes materials, equipment and labor	Acres	$315.96	3	$947.88
Dozer, 140 HP	927	Track mounted Dozer with horsepower range of 125 to 160. Equipment and power unit costs. Labor not included.	Hours	$104.83	40	$4,193.20
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.	Hours	$130.80	60	$7,848.00
Skidsteer, 80 HP	933	Skidsteer loader with horsepower range of 60 to 90. Equipment and power unit costs. Labor not included.	Hours	$55.01	60	$3,300.60
Water management, Flooding & dewatering	969	Includes equipment and power unit. Labor not included.	Acre Feet	$272.03	6	$1,632.18
Truck, dump, 12 CY	1215	Dump truck for moving bulk material. Typically capacity is 16 ton or 12 cubic yards. Includes equipment only.	Hours	$78.77	60	$4,726.20
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.	Hours	$37.19	40	$1,487.60
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.	Hours	$27.56	60	$1,653.60
Equipment Operators, Heavy	233	Includes: Cranes, Hydraulic Excavators >=50 HP, Dozers, Paving Machines, Rock Trenchers, Trenchers >=12 in., Dump Trucks, Ag Equipment >=150 HP, Scrapers, Water Wagons.	Hours	$38.00	40	$1,520.00
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.	Hours	$46.88	40	$1,875.20

Mobilization

Mobilization, medium equipment	1139	Equipment with 70-150 HP or typical weights between 14,000 and 30,000 pounds.	Each	$255.65	4	$1,022.60
Mobilization, large equipment	1140	Equipment >150HP or typical weights greater than 30,000 pounds or loads requiring over width or over length permits.	Each	$488.10	2	$976.20

Practice: 396 - Aquatic Organism Passage

Scenario: #56 - Bridge, Prefabricated with Bolted Metal Abutments

Scenario Description:

A channel-spanning structure constructed from a manufactured steel bridge structure that has been certified by a PE that carries a road or trailway across a river or stream. Bridge design is completed to conform to loading requirements and site conditions. The bridge deck is designed to rest on abutments placed on a bolted metal crib filled with gravel or rock. Other abutment types are not practical due to distance from an improved road. Bridge components are delivered to the site and assembled by a combination of equipment and manual labor. They are installed with an assortment of equipment used for excavation, placing material, delivering and removing material, and lifting bridge components from delivery trucks onto the constructed bridge support elements. Other actions include construction staking and signage, soil erosion and pollution control, removal and disposal of the old culvert (if applicable), and topsoil conservation for site reclamation. Channel diversion or dewatering is required since an existing blockage will be removed for bridge construction. Disturbed areas are revegetated using Critical Area Planting (342). Scenario does not include additional measures needed to address channel incision, bank stability, and other factors associated with the presence of the bridge crossing. Typical size 30' long and 16' wide. RESOURCE CONCERNS: INADEQUATE HABITAT FOR FISH AND WILDLIFE –Habitat degradation; EXCESS WATER – Ponding, flooding, seasonal high water table, seeps, and drifted snow; WATER QUALITY DEGRADATION – Elevated water temperature; SOIL EROSION– Excessive bank erosion from streams shorelines or water conveyance channels Associated Practices: (326) Clearing and Snagging, (342) Critical Area Planting, (382) Fence, (390) Riparian Herbaceous Cover, (391) Riparian Forest Buffer, (612) Tree/Shrub Establishment; (395) Stream Habitat Improvement and Management, (410) Grade Stabilization Structure, (582) Open Channel, (584) Channel Bed Stabilization, (580) Streambank and Shoreline Protection

Before Situation:

An existing undersized culvert creates an upstream passage blockage to fish and other aquatic organisms. The existing crossing does not meet State or Federal fish passage guidance

After Situation:

The undersized culvert is replaced with a manufactured bridge placed on precast concrete abutments. The bridge deck is composed of concrete or steel and elevated, continuous railings run down each side connecting one abutment to its counterpart on the opposite bank. Signs on either approach indicate bridge capacity and weight restrictions. Because the bridge spans the active channel and sits atop the adjacent floodplain surface, geomorphic and ecological functions are preserved through the crossing site, enhancing AOP, water quality, and culvert longevity. Resource Concerns are addressed within the context of the site. Typical Scenario is for a 30' span bridge 15' wide on precast concrete abutments.

Feature Measure: Area of Bridge Deck

Scenario Unit: Square Feet

Scenario Typical Size: 480.0

Scenario Total Cost: $124,247.36

Scenario Cost/Unit: $258.85

Cost Details:

Component Name	ID	Description	Unit	Cost	QTY	Total
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.	Hours	$130.80	80	$10,464.00
Skidsteer, 80 HP	933	Skidsteer loader with horsepower range of 60 to 90. Equipment and power unit costs. Labor not included.	Hours	$55.01	40	$2,200.40
Water management, Flooding & dewatering	969	Includes equipment and power unit. Labor not included.	Acre Feet	$272.03	30	$8,160.90
Crane, truck mounted, hydraulic, 80 ton	2569	80 ton capacity truck mounted hydraulic crane. Equipment cost only.	Hours	$204.28	32	$6,536.96
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.	Hours	$27.56	368	$10,142.08
Equipment Operators, Heavy	233	Includes: Cranes, Hydraulic Excavators >=50 HP, Dozers, Paving Machines, Rock Trenchers, Trenchers >=12 in., Dump Trucks, Ag Equipment >=150 HP, Scrapers, Water Wagons.	Hours	$38.00	120	$4,560.00
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.	Hours	$46.88	40	$1,875.20
Materials						
Aggregate, Gravel, Ungraded, Quarry Run	1099	Includes materials, equipment and labor	Cubic Yards	$34.43	240	$8,263.20
Rock Riprap, graded, angular, material and shipping	1200	Graded Rock Riprap for all gradation ranges. Includes materials and delivery only.	Ton	$35.35	42	$1,484.70
Block, pre-cast concrete, modular	1496	Pre-cast concrete blocks, typically 2ft x 2ft x 6ft , includes installation and delivery.	Cubic Yards	$109.95	4.7	$516.77
Steel, structural steel members	1779	Structural steel, includes materials and fabrication.	Pound	$1.26	32000	$40,320.00

Bridge, steel or concrete, pre-Manufactured Bridge	2193	A premanufactured steel or precast prestressed concrete bridge rated for an HS 25 highway loading. Typical width is 14', length is variable. Includes railing system. Includes materials and shipping only.	Square Feet	$58.34	480	$28,003.20
Mobilization						
Mobilization, medium equipment	1139	Equipment with 70-150 HP or typical weights between 14,000 and 30,000 pounds.	Each	$255.65	1	$255.65
Mobilization, large equipment	1140	Equipment >150HP or typical weights greater than 30,000 pounds or loads requiring over width or over length permits.	Each	$488.10	3	$1,464.30

Practice: 397 - Aquaculture Pond

Scenario: #2 - With Rock Bottom

Scenario Description:

Typical practice is 1 acre (surface area) pond , 3:1 side slopes, average 5' depth with a 6" gravel placed in pond bottom as required for certain species of fish. The construction of a aquaculture pond to facilitate the containment of cultured organisms, efficient use of water and the maintenance of water quality. This practice is to be used where the soils and conditions on site are conducive to the creation of a gravel-lined pond, an earthen pond with gravel lining is suitable for the cultured species as well as the planned aquaculture system, and the respective state agencies allow for the culture of the targeted species in earthen ponds. The resource concerns addressed include excess nutrients in surface and ground waters, inefficient water use, and habitat degradation. Typical pond inlet and outlet shall be Structure for Water Control (587). Costs include all equipment necessary to excavate, grade and shape an aquaculture pond and furnish and place gravel. Water Control Structure and Seeding not included.

Before Situation:

In the before situation, an aquaculture producer has an existing aquaculture pond system that one or more of the following concerns: excessive seepage or frequent release of nutrient laden aquaculture water, potential of loss of non-native aquaculture production fish species to the native environment, and/or poor growing conditions for the current aquaculture species.

After Situation:

Aquaculture pond is typically 1 acre in surface area, 5 feet deep with 3:1 side slopes with 6” of gravel on the bottom. The identified resource concerns on site are addressed. The practice is installed using a dozer. Drainage tile, if needed, will be installed according to Subsurface Drain (606). Outlets, if needed will be installed using Structure for Water Control (587). Liner if needed will be installed using Pond Sealing (521 A, B, C, or D). Water Well, Pumps, and Access Roads may also be needed and will be installed using those standards as appropriate.

Feature Measure: Acre of Aquaculture Pond

Scenario Unit: Acres

Scenario Typical Size: 1.0

Scenario Total Cost: $69,309.66

Scenario Cost/Unit: $69,309.66

Cost Details:

Component Name	ID	Description	Unit	Cost	QTY	Total
Equipment Installation						
Geotextile, woven	42	Woven Geotextile Fabric. Includes materials, equipment and labor	Square Yard	$1.33	4840	$6,437.20
Excavation, common earth, large equipment, 150 ft	1223	Bulk excavation of common earth including sand and gravel with dozer >100 HP with average push distance of 150 feet. Includes equipment and labor.	Cubic Yards	$4.06	7581	$30,778.86
Labor						
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.	Hours	$46.88	2	$93.76
Materials						
Aggregate, Gravel, Graded	46	Gravel, includes materials, equipment and labor to transport and place. Includes washed and unwashed gravel.	Cubic Yards	$45.42	690	$31,339.80
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	$171.94	1	$171.94
Mobilization, large equipment	1140	Equipment >150HP or typical weights greater than 30,000 pounds or loads requiring over width or over length permits.	Each	$488.10	1	$488.10

Practice: 397 - Aquaculture Pond

Scenario: #5 - Concrete Pond

Scenario Description:

Typical practice is a 90' by 45' pond, average 4' depth (16,200 cubic feet) with a waste sump constructed of 10 CY of concrete to collect and remove waste. The construction of an aquaculture pond to facilitate the efficient collection and transfer of waste, the containment of cultured organisms, efficient use of water and the maintenance of water quality. This practice is to be used where the soils and conditions on site are not conducive to the creation of an earthen pond, an earthen pond is not suitable for the planned aquaculture system, or the respective state agencies will not allow for the culture of the targeted species in earthen ponds. This scenario could also be used when a producer has an existing earthen pond(s), and a flow-through aquaculture system, and is going to convert to a recirculating aquaculture system (RAS) to conserve surface or groundwater withdrawals. This scenario is used where the frequent removal of wasted from the culture unit are required, to meet water quality objectives. The resource concerns addressed include excess nutrients in surface and ground waters, inefficient water use, and habitat degradation. Typical pond inlet and outlet shall be a Structure for Water Control (587). Costs include all equipment necessary to excavate, grade and shape an aquaculture pond and construct reinforced concrete waste sump. Water Control Structure and Seeding not included.

Before Situation:

In the before situation, an aquaculture producer has an existing aquaculture pond system with one or more of the following concerns: excessive seepage or frequent release of nutrient laden aquaculture water, potential of loss of non-native aquaculture production fish species to the native environment, and/or poor growing conditions for the current aquaculture species. The desired water quality objectives are not met, wastes are accumulating within the pond, the health and condition of the cultures species are in decline, and/or wastes are being discharged to downstream waters. The diversion of surface water into the existing aquaculture system (flow-through) is having detrimental effects on the source (stream, lake, pond), and the conversion from a flow-through system to a RAS will minimize water withdrawals from the source water.

After Situation:

Aquaculture pond is typically 4,050 square feet in surface area (90' by 45'), 4 feet deep, with floor slab and walls constructed of reinforced concrete, and a waste sump. The identified resource concerns are addressed. The practice is installed using a dozer and concrete equipment. Drainage tile, if needed, will be installed according to Subsurface Drain (606). Inlets and outlets, if needed will be installed using Structure for Water Control (587). Liner if needed will be installed using Pond Sealing (521 A, B, C, or D). Water Well, Pumps, and Access Roads may also be needed and will be installed using those standards as appropriate.

Feature Measure: Cubic Yard of Aquaculture Pond

Scenario Unit: Cubic Yards

Scenario Typical Size: 600.0

Scenario Total Cost: $128,412.06

Scenario Cost/Unit: $214.02

Cost Details:

Component Name	ID	Description	Unit	Cost	QTY	Total
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 Yards	$481.12	227	$109,214.24
Geotextile, woven	42	Woven Geotextile Fabric. Includes materials, equipment and labor	Square Yard	$1.33	450	$598.50
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 Yards	$4.58	1750	$8,015.00
Labor						
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.	Hours	$46.88	40	$1,875.20
Materials						
Aggregate, Gravel, Graded	46	Gravel, includes materials, equipment and labor to transport and place. Includes washed and unwashed gravel.	Cubic Yards	$45.42	181	$8,221.02
Deactivated. Fish Screen, Welded Stainless Steel	2059	Stainless Steel Fish Screen. Includes materials and shipping only.	Each	$0.00	2	$0.00
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	$488.10	1	$488.10

Practice: 398 - Fish Raceway or Tank

Scenario: #2 - Fish Raceway-Parallel

Scenario Description:

The construction of a concrete fish raceway to facilitate the collection of wastes, the containment of cultured fish, and to maintain water quality. Typical practice is side by side 100' long x 6' wide x 3.5' deep concrete raceway with a quiescent zone for waste collection and sloped floors as per the conservation practice standard. This scenario includes all necessary labor and materials for excavation, aggregate, cast-in-place concrete, fish screens, weir boards, and concrete sealing with epoxy paint.

Before Situation:

In the before situation, an aquaculture producer has an aquaculture production system with one or more of the following concerns: excessive seepage or frequent release of nutrient laden aquaculture water, potential of loss of non-native aquaculture production fish species to the native environment, and/or poor growing conditions for the current aquaculture species.

After Situation:

Fish raceway is typically 4,480 cubic feet in size (100'x12.8'x3.5') with 0.8' thick slab and 0.8' thick walls of cast in place, reinforced concrete. The practice is installed using a hydraulic excavator, and concrete pump truck. Drainage tile, if needed, will be installed according to Subsurface Drain (606). Inlets and outlets, if needed will be installed using Structure for Water Control (587). Pipeline, Pumping Plant, Water Well, and Access Roads may also be needed and will be installed using those standards as appropriate.

Feature Measure: Cubic Foot of Fish Raceway

Scenario Unit: Cubic Feet

Scenario Typical Size: 4,480.0

Scenario Total Cost: $62,792.55

Scenario Cost/Unit: $14.02

Cost Details:

Component Name	ID	Description	Unit	Cost	QTY	Total
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 Yards	$481.12	87	$41,857.44
Geotextile, woven	42	Woven Geotextile Fabric. Includes materials, equipment and labor	Square Yard	$1.33	374	$497.42
Skidsteer, 80 HP	933	Skidsteer loader with horsepower range of 60 to 90. Equipment and power unit costs. Labor not included.	Hours	$55.01	24	$1,320.24
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.	Hours	$72.23	24	$1,733.52
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 Yards	$4.58	1056	$4,836.48
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.	Hours	$37.19	24	$892.56
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.	Hours	$27.56	60	$1,653.60
Equipment Operators, Light	232	Includes: Skid Steer Loaders, Hydraulic Excavators <50 HP, Trenchers <12 in., Ag Equipment <150 HP, Pickup Trucks, Forklifts, Mulchers	Hours	$27.87	24	$668.88
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.	Hours	$46.88	60	$2,812.80
Materials						
Aggregate, Gravel, Graded	46	Gravel, includes materials, equipment and labor to transport and place. Includes washed and unwashed gravel.	Cubic Yards	$45.42	73	$3,315.66
Dimension Lumber, untreated	1045	Untreated dimension lumber with nominal thickness equal or less than 2". Includes lumber and fasteners.	Board Feet	$0.91	108	$98.28
Painting, porous surface, impermeable	1497	Painting of concrete, foam or other porous surfaces with an impermeable coating. Includes materials and application.	Square Feet	$0.88	2684	$2,361.92
Deactivated. Fish Screen, Welded Stainless Steel	2059	Stainless Steel Fish Screen. Includes materials and shipping only.	Each	$0.00	4	$0.00
Mobilization						

Mobilization, medium equipment	1139	Equipment with 70-150 HP or typical weights between 14,000 and 30,000 pounds.	Each	$255.65	1	$255.65
Mobilization, large equipment	1140	Equipment >150HP or typical weights greater than 30,000 pounds or loads requiring over width or over length permits.	Each	$488.10	1	$488.10

Practice: 399 - Fishpond Management

Scenario: #3 - Aerator, surface

Scenario Description:

Aerator added to existing fishpond to obtain desired oxygen levels. Typically 1 aerator needed per pond. Certain oxygen levels in the fishpond are needed for optimum vegetation, habitat and water quality. Oxygen levels and size of aerator needed are determined by a conservation planner, engineer or per existing supported data. Aerator planning and placement specifications can be found in "AEN-3: Aeration of ponds used in aquaculture". Resource concerns addressed include: Inadequate Habitat for Fish and Wildlife - Habitat degradation; Water Quality Degradation - Elevated water temperature.

Before Situation:

Existing fishpond has insufficent levels of oxygen available for desired fish species in pond. Habitat and water quality degraded, as well as health of the fish population.

After Situation:

Aerator sized appropriately for fishpond has been established and oxygen is at an optimum level. Participant will follow Operation and Maintenance guidance to ensure aerator maintained to continually provide appropriate oxygen levels for fishpond.

Feature Measure: Acre of pond managed

Scenario Unit: Acres

Scenario Typical Size: 1.0

Scenario Total Cost: $1,505.70

Scenario Cost/Unit: $1,505.70

Cost Details:

Component Name	ID	Description	Unit	Cost	QTY	Total
Equipment Installation						
Truck, Pickup	939	Equipment and power unit costs. Labor not included.	Hours	$24.18	2	$48.36
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.	Hours	$27.56	2	$55.12
Materials						
Post, Steel T, 1.33 lbs, 10 ft.	17	Steel Post, Studded 10 ft. - 1.33 lb. Includes materials and shipping only.	Each	$11.14	2	$22.28
Aerator, pond, 1 hp	1708	1 hp Aerator for pond or tank with less than 10 acres of surface area. Materials only.	Each	$1,208.00	1	$1,208.00
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	$171.94	1	$171.94

Practice: 399 - Fishpond Management

Scenario: #4 - Aerator, subsurface

Scenario Description:

Aerator added to existing fishpond to obtain desired oxygen levels. Typically 1 aerator needed per pond. Certain oxygen levels in the fishpond are needed for optimum vegetation, habitat and water quality. Oxygen levels and size of aerator needed are determined by a conservation planner, engineer or per existing supported data. Aerator planning and placement specifications can be found in "AEN-3: Aeration of ponds used in aquaculture". Resource concerns addressed include: Inadequate Habitat for Fish and Wildlife - Habitat degradation; Water Quality Degradation - Elevated water temperature. Associated Practice: Critical Area Planting - 342

Before Situation:

Existing fishpond has insufficent levels of oxygen available for desired fish species in pond. Habitat and water quality degraded, as well as health of the fish population.

After Situation:

Aerator sized appropriately for fishpond has been established and oxygen is at an optimum level. Participant will follow Operation and Maintenance guidance to ensure aerator maintained to continually provide appropriate oxygen levels for fishpond.

Feature Measure: Acre of pond managed

Scenario Unit: Acres

Scenario Typical Size: 1.0

Scenario Total Cost: $3,753.61

Scenario Cost/Unit: $3,753.61

Cost Details:

Component Name	ID	Description	Unit	Cost	QTY	Total
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 Yards	$2.31	8	$18.48
Truck, Pickup	939	Equipment and power unit costs. Labor not included.	Hours	$24.18	2	$48.36
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.	Hours	$27.56	4	$110.24
Materials						
Pipe, PVC, 3 in., SCH 40	977	Materials: - 3 inch - PVC - SCH 40 - ASTM D1785	Feet	$2.69	50	$134.50
Aerator - subsurface	1821	Aeration system, ponds, subsurface air. Includes shipping.	Each	$3,098.15	1	$3,098.15
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	$171.94	2	$343.88

Practice: 399 - Fishpond Management

Scenario: #5 - Planting Native Vegetation

Scenario Description:

Native, aquatic vegetation will be established by plugs and or tubers. Both emergent and submerged vegetation will be established using hand tools or other small equipment as needed. Vegetation will be established to ensure approprite cover for desired fish species. Plants will be established at a rate, location and density as prescribed by the conservation planner or other resource. A typical setting will plant between 2-5 aquatic plants per 10 SF. This scenario may include replacing of non desired plants with appropriate native plants. Resource Concerns addressed include: Degraded Plant Condition - Excessive plant pest pressure; Inadequate Habitat for Fish and Wildlife - Habitat degradation. Practice installation may also address: Water Quality Degradation - Elevated water temperatures.

Before Situation:

Established fish pond which has had insufficient vegetation for desired fish species. Vegetation consists either primarily of non-desired plants or is not of a density to provide adequate cover for fish species. Fishpond is typically 1 acre in size, 1/4 acre of fishpond will receive native vegetation restoration.

After Situation:

Vegetation in fishpond is of a density and composition that is suitable for desired fish species. Vegetation is native plants. Resource concerns have been addressed. Participant will follow Operation and Maintenance guidelines to ensure established plants will thrive. If plant die-off occurs prior to lifespan of practice, participant is required to re-establish vegetation to NRCS Standards and Specifications.

Feature Measure: Acre of vegetation planted

Scenario Unit: Acres

Scenario Typical Size: 1.0

Scenario Total Cost: $2,902.22

Scenario Cost/Unit: $2,902.22

Cost Details:

Component Name	ID	Description	Unit	Cost	QTY	Total
Equipment Installation						
Truck, Pickup	939	Equipment and power unit costs. Labor not included.	Hours	$24.18	2	$48.36
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.	Hours	$27.56	32	$881.92
Materials						
Native Aquatic Plants, Emergent or Submerged	2336	Native aquatic emergent or submerged. All required materials for establishing vegetation. Includes material and shipping.	Each	$1.00	1800	$1,800.00
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	$171.94	1	$171.94

Practice: 399 - Fishpond Management

Scenario: #6 - Depth Management

Scenario Description:

Management of existing fishpond by excavation or placement of material to create deep open water. Fishpond currently does not provide optimum habitat for desired species. Excavated material will either be relocated within fish pond, or sited appropriately so as to not cause any negative environmental effects. Changes to depth will be based upon recommendations by conservation planner or other indidvidual with appropriate credentials. Resource Concerns addressed include: Inadequate Habitat for Fish and Wildlife - Habitat degradation. Practice installation may also address: Water Quality Degradation - Elevated water temperatures. Associated Practice (if required): Critical Area Planting - 342

Before Situation:

Existing fish pond lacks sufficent depth, diversity of depth or desired bottom structure to provide optimum habitat for desired fish species.

After Situation:

Depth and bottom structure of fishpond are appropriate for desired fish species. Resource concerns have been addressed. Participant will follow Operation and Maintenance guidance to ensure created habitat is maintained and continues to provide the benefits to the resources.

Feature Measure: Acre of pond managed

Scenario Unit: Acres

Scenario Typical Size: 1.0

Scenario Total Cost: $22,208.76

Scenario Cost/Unit: $22,208.76

Cost Details:

Component Name	ID	Description	Unit	Cost	QTY	Total
Equipment Installation						
Water management, Flooding & dewatering	969	Includes equipment and power unit. Labor not included.	Acre Feet	$272.03	4	$1,088.12
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 Yards	$4.58	1200	$5,496.00
Truck, dump, 18 CY	1400	Dump truck for moving bulk material. Typically capacity is 25 ton or 18 cubic yards. Includes equipment only.	Hours	$98.15	100	$9,815.00
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	$0.31	1200	$372.00
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.	Hours	$27.56	24	$661.44
Equipment Operators, Heavy	233	Includes: Cranes, Hydraulic Excavators >=50 HP, Dozers, Paving Machines, Rock Trenchers, Trenchers >=12 in., Dump Trucks, Ag Equipment >=150 HP, Scrapers, Water Wagons.	Hours	$38.00	100	$3,800.00
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	$488.10	2	$976.20

Practice: 399 - Fishpond Management

Scenario: #7 - Depth Management, Littoral Shelf

Scenario Description:

Management of existing fishpond by excavation or placement of material to create deep open water and creation of littoral shelves. Fishpond currently does not provide optimum habitat for desired species. Excavated material will either be relocated within fish pond, or sited appropriately so as to not cause any negative environmental effects. Changes to depth will be based upon recommendations by conservation planner or other indidvidual with appropriate credentials. Resource Concerns addressed include: Inadequate Habitat for Fish and Wildlife - Habitat degradation. Practice installation may also address: Water Quality Degradation - Elevated water temperatures. Associated Practice (if required): Critical Area Planting - 342

Before Situation:

Existing fish pond lacks sufficent depth, diversity of depth or desired bottom structure to provide optimum habitat for desired fish species.

After Situation:

Depth and bottom structure of fishpond are appropriate for desired fish species. Resource concerns have been addressed. Participant will follow Operation and Maintenance guidance to ensure created habitat is maintained and continues to provide the benefits to the resources.

Feature Measure: Acre of pond managed

Scenario Unit: Acres

Scenario Typical Size: 1.0

Scenario Total Cost: $23,757.54

Scenario Cost/Unit: $23,757.54

Cost Details:

Component Name	ID	Description	Unit	Cost	QTY	Total
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.	Hours	$109.36	8	$874.88
Water management, Flooding & dewatering	969	Includes equipment and power unit. Labor not included.	Acre Feet	$272.03	4	$1,088.12
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 Yards	$4.58	1200	$5,496.00
Truck, dump, 18 CY	1400	Dump truck for moving bulk material. Typically capacity is 25 ton or 18 cubic yards. Includes equipment only.	Hours	$98.15	100	$9,815.00
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	$0.31	1200	$372.00
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.	Hours	$27.56	24	$661.44
Equipment Operators, Heavy	233	Includes: Cranes, Hydraulic Excavators >=50 HP, Dozers, Paving Machines, Rock Trenchers, Trenchers >=12 in., Dump Trucks, Ag Equipment >=150 HP, Scrapers, Water Wagons.	Hours	$38.00	108	$4,104.00
Materials						
Aggregate, river rock	1834	Well graded, rounded mineral substrates derived from local riverine settings. Includes materials and local delivery	Ton	$36.99	10	$369.90
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	$488.10	2	$976.20

Practice: 399 - Fishpond Management

Scenario: #8 - Littoral Shelf

Scenario Description:

Management of existing fishpond by creation of littoral shelf. Fishpond currently does not provide optimum habitat for desired species. Changes to depth will be based upon recommendations by conservation planner or other indidvidual with appropriate credentials. Resource Concerns addressed include: Inadequate Habitat for Fish and Wildlife - Habitat degradation. Practice installation may also address: Water Quality Degradation - Elevated water temperatures. Associated Practice (if required): Critical Area Planting - 342

Before Situation:

Existing fish pond lacks sufficent depth, diversity of depth or desired bottom structure to provide optimum habitat for desired fish species.

After Situation:

Depth and bottom structure of fishpond are appropriate for desired fish species. Resource concerns have been addressed. Participant will follow Operation and Maintenance guidance to ensure created habitat is maintained and continues to provide the benefits to the resources.

Feature Measure: Acre of pond managed

Scenario Unit: Acres

Scenario Typical Size: 1.0

Scenario Total Cost: $3,809.64

Scenario Cost/Unit: $3,809.64

Cost Details:

Component Name	ID	Description	Unit	Cost	QTY	Total
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.	Hours	$109.36	8	$874.88
Water management, Flooding & dewatering	969	Includes equipment and power unit. Labor not included.	Acre Feet	$272.03	4	$1,088.12
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.	Hours	$27.56	24	$661.44
Equipment Operators, Heavy	233	Includes: Cranes, Hydraulic Excavators >=50 HP, Dozers, Paving Machines, Rock Trenchers, Trenchers >=12 in., Dump Trucks, Ag Equipment >=150 HP, Scrapers, Water Wagons.	Hours	$38.00	8	$304.00
Materials						
Aggregate, river rock	1834	Well graded, rounded mineral substrates derived from local riverine settings. Includes materials and local delivery	Ton	$36.99	10	$369.90
Mobilization						
Mobilization, medium equipment	1139	Equipment with 70-150 HP or typical weights between 14,000 and 30,000 pounds.	Each	$255.65	2	$511.30

Practice: 400 - Bivalve Aquaculture Gear and Biofouling Control

Scenario: #2 - Infaunal Culture Yrs 2&3

Scenario Description:

The acquisition and use of additional aquaculture gear and biofouling control on 1 acre of bivalves, usually clams that are seeded in the substrate, in intertidal marine areas where biofouling of aquaculture production gear occurs. The biofouled gear is removed from the farm site and taken on land to be cleaned using environmentally appropriate biofoul control methods, including but not limited to air drying, brine dip, vinegar dip, fresh water dip, sweeping, power washing, and/or a combination of the aforementioned methods. The gear is cleaned and stored on land at an acceptable location, such as a heavy use area suitable for the size and intensity of the aquaculture operation. The planned practice will meet the current 400 conservation practice standard. Implementation will result in the proper rate, method and timing of gear and biofouling controls, including increased level of monitoring, frequency of cleaning, cycling/rotating and hauling gear, disposing of waste gear, and keeping records demonstrating implementation of the 400 criteria. Payment for implementation is to defray the costs of increased labor above normal operating procedures and recordkeeping for the first year of the growth cycle.

Before Situation:

Aquaculture gear (predator exclusion apparatus) is overgrown with biofouling organisms; water flow and food supply is significantly reduced endangering shellfish health and growth. Increased drag increases risk of gear escaping into the marine environment; escaped gear presents entanglement hazards to marine wildlife. Organic loading and aquatic nuisance species release are negative impacts of in-water gear cleaning activities.

After Situation:

The aquaculturist has additional gear (approximately 20%) which is cycled with biofouled gear in the water. The biofouled gear is cleaned using environmentally appropriate biofoul control methods, including but not limited to air drying, brine dip, vinegar dip, fresh water dip, sweeping, power washing, or a combination of methods. The gear is cleaned and stored on land at an acceptable location for the size and intensity of the aquaculture operation. Damaged gear is removed from the farm site and transported on shore for proper disposal. Records documenting the cycling of gear are maintained. Additional conservation practices such as 561- Heavy Use Area, and 422- Hedgerow Planting should be considered and planned under the respective scenarios. The material removed from the cage will be land applied, composted, or land filled as appropriate. The influx of biofouling to the marine environment as a result of cleaning gear is eliminated.

Feature Measure: 20 beds/acre; 900sf/bed

Scenario Unit: Acres

Scenario Typical Size: 1.0

Scenario Total Cost: $661.44

Scenario Cost/Unit: $661.44

Cost Details:

Component Name	ID	Description	Unit	Cost	QTY	Total
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.	Hours	$27.56	24	$661.44

Practice: 400 - Bivalve Aquaculture Gear and Biofouling Control

Scenario: #5 - Epifaunal-Bags Only-Yrs.2&3

Scenario Description:

The acquisition and use of additional aquaculture gear to cycle with production gear in near-shore, intertidal and sub tidal marine areas where biofouling of aquaculture production gear occurs. The cultured organisms are transferred from the biofouled gear to the "clean gear" and returned to the water. The biofouled gear is removed from the farm site and taken on land to be cleaned using environmentally appropriate biofoul control methods, including but not limited to air drying, brine dip, vinegar dip, fresh water dip, sweeping, power washing, and/or a combination of the aforementioned methods. The gear is cleaned and stored on land at an acceptable location, such as a heavy use area suitable for the size and intensity of the aquaculture operation. The planned practice will meet the current 400 conservation practice standard. Implementation will result in the proper rate, method and timing of gear and biofouling controls, including increased level of monitoring, frequency of cleaning, cycling/rotating and hauling gear, disposing of waste gear, and keeping records demonstrating implementation of the 400 criteria. Payment for implementation is to defray the costs of increased labor above normal operating procedures and recordkeeping for the second and third year of the growth cycle.

Before Situation:

Aquaculture gear (preditor exclusion apparatus) is overgrown with biofouling organisms; water flow and food supply is significantly reduced endagering shellfish health and growth. Increased drag increases risk of gear escaping into the marine environment; escaped gear presents entanglement hazards to marine wildlife. Organic loading and aquatic nuisance species release are negative impacts of in-water gear cleaning activities.

After Situation:

The aquaculturist has additional gear (approximately 20%) which is cycled with biofouled gear in the water. The biofouled gear is cleaned using environmentally appropriate biofoul control methods, including but not limited to air drying, brine dip, vinegar dip, fresh water dip, sweeping, power washing, or a combination of methods. The gear is cleaned and stored on land at an acceptable location for the size and intensity of the aquaculture operation. Damaged gear is removed from the farm site and transported on shore for proper disposal. Records documenting the cycling of gear are maintained. Additional conservation practices such as 561- Heavy Use Area, and 422- Hedgerow Planting should be considered and planned under the respective scenarios. The material removed from the cage will be land applied, composted, or land filled as appropriate. The influx of biofouling to the marine environment as a result of cleaning gear is eliminated.

Feature Measure: 50,000 bivalves

Scenario Unit: Each

Scenario Typical Size: 1.0

Scenario Total Cost: $578.76

Scenario Cost/Unit: $578.76

Cost Details:

Component Name	ID	Description	Unit	Cost	QTY	Total
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.	Hours	$27.56	21	$578.76

Practice: 400 - Bivalve Aquaculture Gear and Biofouling Control

Scenario: #10 - Epifaunal-Cage Cycling-Yrs.2&3

Scenario Description:

The acquisition and use of additional aquaculture gear to cycle with production gear in near-shore, intertidal and sub tidal marine areas where biofouling of aquaculture production gear occurs. The cultured organisms are transferred from the biofouled gear to the "clean gear" and returned to the water. The biofouled gear is removed from the farm site and taken on land to be cleaned using environmentally appropriate biofoul control methods, including but not limited to air drying, brine dip, vinegar dip, fresh water dip, sweeping, power washing, and/or a combination of the aforementioned methods. The gear is cleaned and stored on land at an acceptable location, such as a heavy use area suitable for the size and intensity of the aquaculture operation. The planned practice will meet the current 400 conservation practice standard. Implementation will result in the proper rate, method and timing of gear and biofouling controls, including increased level of monitoring, frequency of cleaning, cycling/rotating and hauling gear, disposing of waste gear, and keeping records demonstrating implementation of the 400 criteria. Payment for implementation is to defray the costs of increased labor above normal operating procedures and recordkeeping for the second and third year of the growth cycle.

Before Situation:

Aquaculture gear (predator exclusion apparatus) is overgrown with biofouling organisms; water flow and food supply is significantly reduced endangering shellfish health and growth. Increased drag increases risk of gear escaping into the marine environment; escaped gear presents entanglement hazards to marine wildlife. Organic loading and aquatic nuisance species release are negative impacts of in-water gear cleaning activities.

After Situation:

The aquaculturist has additional gear (approximately 20%) which is cycled with biofouled gear in the water. The biofouled gear is cleaned using environmentally appropriate biofoul control methods, including but not limited to air drying, brine dip, vinegar dip, fresh water dip, sweeping, power washing, or a combination of methods. The gear is cleaned and stored on land at an acceptable location for the size and intensity of the aquaculture operation. Damaged gear is removed from the farm site and transported on shore for proper disposal. Records documenting the cycling of gear are maintained. Additional conservation practices such as 561- Heavy Use Area, and 422- Hedgerow Planting should be considered and planned under the respective scenarios. The material removed from the cage will be land applied, composted, or land filled as appropriate. The influx of biofouling to the marine environment as a result of cleaning gear is eliminated.

Feature Measure: 50,000 bivalves

Scenario Unit: Each

Scenario Typical Size: 1.0

Scenario Total Cost: $2,149.68

Scenario Cost/Unit: $2,149.68

Cost Details:

Component Name	ID	Description	Unit	Cost	QTY	Total
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.	Hours	$27.56	78	$2,149.68

Practice: 400 - Bivalve Aquaculture Gear and Biofouling Control

Scenario: #11 - Epifaunal-Trip- Cage Cyc-Yrs.2&3

Scenario Description:

The acquisition and use of additional aquaculture gear to cycle with production gear in near-shore, intertidal and sub tidal marine areas where biofouling of aquaculture production gear occurs. The cultured organisms are transferred from the biofouled gear to the "clean gear" and returned to the water. The biofouled gear is removed from the farm site and taken on land to be cleaned using environmentally appropriate biofoul control methods, including but not limited to air drying, brine dip, vinegar dip, fresh water dip, sweeping, power washing, and/or a combination of the aforementioned methods. The gear is cleaned and stored on land at an acceptable location, such as a heavy use area suitable for the size and intensity of the aquaculture operation. The planned practice will meet the current 400 conservation practice standard. Implementation will result in the proper rate, method and timing of gear and biofouling controls, including increased level of monitoring, frequency of cleaning, cycling/rotating and hauling gear, disposing of waste gear, and keeping records demonstrating implementation of the 400 criteria. Payment for implementation is to defray the costs of increased labor above normal operating procedures and recordkeeping for the second and third year of the growth cycle.

Before Situation:

Aquaculture gear (predator exclusion apparatus) is overgrown with biofouling organisms; water flow and food supply is significantly reduced endangering shellfish health and growth. Increased drag increases risk of gear escaping into the marine environment; escaped gear presents entanglement hazards to marine wildlife. Organic loading and aquatic nuisance species release are negative impacts of in-water gear cleaning activities.

After Situation:

The aquaculturist has additional gear (approximately 20%) which is cycled with biofouled gear in the water. The biofouled gear is cleaned using environmentally appropriate biofoul control methods, including but not limited to air drying, brine dip, vinegar dip, fresh water dip, sweeping, power washing, or a combination of methods. The gear is cleaned and stored on land at an acceptable location for the size and intensity of the aquaculture operation. Damaged gear is removed from the farm site and transported on shore for proper disposal. Records documenting the cycling of gear are maintained. Additional conservation practices such as 561- Heavy Use Area, and 422- Hedgerow Planting should be considered and planned under the respective scenarios. The material removed from the cage will be land applied, composted, or land filled as appropriate. The influx of biofouling to the marine environment as a result of cleaning gear is eliminated.

Feature Measure: 50,000 bivalves

Scenario Unit: Each

Scenario Typical Size: 1.0

Scenario Total Cost: $1,157.52

Scenario Cost/Unit: $1,157.52

Cost Details:

Component Name	ID	Description	Unit	Cost	QTY	Total
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.	Hours	$27.56	42	$1,157.52

Practice: 402 - Dam

Scenario: #4 - pipe principal spillway

Scenario Description:

This scenario is the construction of an earthen embankment to impound water. A corrugated metal pipe (CMP) principal spillway will be constructed. A metal trash guard protects the spillway inlet. A circular CMP riser connects to a CMP barrel that runs through the dam to outlet safely downstream. A sand diaphram is installed in the embankment. This scenario assists in addressing the resource concerns: excessive runoff, flooding or ponding, inefficient water use on irrigated land, reduced capacity of conveyances by sediment deposition.

Before Situation:

Area exists where water could naturally pool or run off to create a pond for livestock, wildlife, fire control, flood control, or irrigation. The site meets satisfactory conditions according to the standard.

After Situation:

The typical dam is constructed by excavation and compaction to create an embankment. The principal spillway is completed by using a CMP riser with a metal trash gaurd and a CMP barrel. A sand diaphragm is installed. Vegetation will be completed under Critical Area Planting (342) standard. . Other associated practices such as; Fence (382), Pipeline (516), Pumping Plant (533), Watering Facility (614), Structure For Water Control (587), and Aquatic Organism Passage (396) will use the corresponding Standard(s) as appropriate.

Feature Measure: Embankment Volume

Scenario Unit: Cubic Yards

Scenario Typical Size: 25,000.0

Scenario Total Cost: $184,979.75

Scenario Cost/Unit: $7.40

Cost Details:

Component Name	ID	Description	Unit	Cost	QTY	Total
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 Yards	$481.12	1	$481.12
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 Yards	$2.31	25000	$57,750.00
Earthfill, Roller Compacted	49	Earthfill, roller or machine compacted, includes equipment and labor	Cubic Yards	$4.66	25000	$116,500.00
Earthfill, Manually Compacted	50	Earthfill, manually compacted, includes equipment and labor	Cubic Yards	$6.02	90	$541.80
Trenching, Earth, 12 in. x 48 in.	53	Trenching, earth, 12 inch wide x 48 inch depth, includes equipment and labor for trenching and backfilling	Feet	$1.38	130	$179.40
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.	Hours	$37.19	21	$780.99
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.	Hours	$27.56	20	$551.20
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.	Hours	$46.88	40	$1,875.20
Materials						
Aggregate, Sand, Graded, Washed	45	Sand, typical ASTM C33 gradation, includes materials, equipment and labor to transport and place	Cubic Yards	$43.40	52	$2,256.80
Pipe, PVC, 2 in., SCH 40	976	Materials: - 2 inch - PVC - SCH 40 - ASTM D1785	Feet	$1.29	90	$116.10
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	$2.64	60	$158.40
Pipe, CMP, 30 in., 16 Gauge	1742	30 inch Corrugated Metal Pipe, Galvanized, Uncoated, 16 gage. Material cost only.	Feet	$27.59	35	$965.65
Pipe, CMP, 18 in., 16 Gauge	1743	18 inch Corrugated Metal Pipe, Galvanized, Uncoated, 16 gage. Material cost only.	Feet	$17.24	130	$2,241.20
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	$70.59	1	$70.59
Mobilization, medium equipment	1139	Equipment with 70-150 HP or typical weights between 14,000 and 30,000 pounds.	Each	$255.65	2	$511.30

Practice: 410 - Grade Stabilization Structure

Scenario: #1 - Check Dams

Scenario Description:

Typical setting is on a 40-acre pasture/hayland field having a slope of 5 to 10 percent where ephemeral gullies have formed. Typical installation consists of stabilizing/regrading a gully and installing six check dams with a top width of 3', average height of 2.5', 19' length, and 2:1 side slopes; containing an average of 14 CY of rock riprap for a total of 84 CY. 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.

Before Situation:

The operator presently has erosion gullies forming and/or worsening on the farmland and impacting the useable area and the downstream water quality. Erosion from the gullies is allowing soil and possibly nutrients to be transported to downstream receiving waters degrading water quality and causing soil loss.

After Situation:

Area is stabilized. The advancement and/or formation of gullies is stopped, soil from gullies no longer leaves the farm, useable farm area is increased, sedimentation and other pollution hazards are decreased, and water quality downstream is protected. Any needed vegetation of disturbed areas use Critical Area Planting (342).

Feature Measure: Cubic Yards of Riprap, as measued i

Scenario Unit: Cubic Yards

Scenario Typical Size: 84.0

Scenario Total Cost: $9,719.60

Scenario Cost/Unit: $115.71

Cost Details:

Component Name	ID	Description	Unit	Cost	QTY	Total
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 Yards	$1.72	160	$275.20
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.	Hours	$27.56	20	$551.20
Materials						
Rock Riprap, Placed with geotextile	44	Rock Riprap, placed with geotextile, includes materials, equipment and labor to transport and place	Cubic Yards	$94.25	84	$7,917.00
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	$488.10	2	$976.20

Practice: 410 - Grade Stabilization Structure

Scenario: #2 - Embankment, Pipe <= 6 inch

Scenario Description:

An earthen embankment dam with a principal spillway pipe of 6 inches or less. Assessment shows anti-seep collars or sand diaphragms are not required. To stabilized the grade and control erosion in natural or artificial channels, to prevent the formation or advancing of gullies, and to enhance environmental quality and reduce pollution hazards. Applied in areas where the concentration and flow velocity of water require structures to stabilize the grade in channels or to control gully erosion. Cost estimate is based upon a typical amount of earthfill of 2,000 cubic yards, and 80 feet of pipe 6" PVC pipe with a canopy inlet. A small, non-lined plunge pool protects the outlet channel. Disturbed areas are protected with permanent vegetative cover. Addresses resource concerns such as soil erosion-concentrated flow erosion and water quality degradation.

Before Situation:

The operator presently has gullies forming and/or worsening on the farmland and impacting the useable area and the downstream water quality. Erosion from the gullies is allowing soil and possibly nutrients to be transported to downstream receiving waters degrading water quality and causing soil loss.

After Situation:

Area is stabilized. The advancement and/or formation of gullies is stopped, soil from gullies no longer leaves the farm, useable farm area is increased, sedimentation and other pollution hazards are decreased, and water quality downstream is protected. Any needed re-vegetation of disturbed areas use Critical Area Planting (342). Other associated practices such as; Pond (378), Dam (402), Fence (382), Pumping Plant (533), Watering Facility (614), and Livestock Pipeline (516) will use the corresponding Standard(s) as appropriate.

Feature Measure: Cubic Yards of Earthfill

Scenario Unit: Cubic Yards

Scenario Typical Size: 2,000.0

Scenario Total Cost: $12,854.54

Scenario Cost/Unit: $6.43

Cost Details:

Component Name	ID	Description	Unit	Cost	QTY	Total
Equipment Installation						
Earthfill, Roller Compacted	49	Earthfill, roller or machine compacted, includes equipment and labor	Cubic Yards	$4.66	2000	$9,320.00
Earthfill, Manually Compacted	50	Earthfill, manually compacted, includes equipment and labor	Cubic Yards	$6.02	20	$120.40
Hydraulic Excavator, 1 CY	931	Track mounted hydraulic excavator with bucket capacity range of 0.8 to 1.5 CY. Equipment and power unit costs. Labor not included.	Hours	$109.36	8	$874.88
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.	Hours	$37.19	20	$743.80
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.	Hours	$27.56	16	$440.96
Equipment Operators, Heavy	233	Includes: Cranes, Hydraulic Excavators >=50 HP, Dozers, Paving Machines, Rock Trenchers, Trenchers >=12 in., Dump Trucks, Ag Equipment >=150 HP, Scrapers, Water Wagons.	Hours	$38.00	8	$304.00
Materials						
Pipe, PVC, 6 in., SCH 40	980	Materials: - 6 inch - PVC - SCH 40 - ASTM D1785	Feet	$6.74	80	$539.20
Mobilization						
Mobilization, medium equipment	1139	Equipment with 70-150 HP or typical weights between 14,000 and 30,000 pounds.	Each	$255.65	2	$511.30

Practice: 410 - Grade Stabilization Structure

Scenario: #3 - Embankment, Pipe 8-12 inch

Scenario Description:

An earthen embankment dam with a principle spillway pipe between 8 and 12 inches, anti-seep collars or sand diaphragm, and excavated plunge pool basin. Installed to stabilized the grade and control erosion in natural or artificial channels, to prevent the formation or advancing of gullies, and to enhance environmental quality and reduce pollution hazards. Applied in areas where the concentration and flow velocity of water require structures to stabilize the grade in channels or to control gully erosion. Cost estimate is based upon a typical amount of earthfill of 2,500 cubic yards, 90 feet of 10" PVC pipe with a canopy inlet, and 3 cubic yard sand diaphragm. A non-lined plunge pool protects the outlet channel. Disturbed areas are protected with permanent vegetative cover. Addresses resource concerns such as soil erosion-concentrated flow erosion and water quality degradation.

Before Situation:

The operator presently has gullies forming and/or worsening on the farmland and impacting the useable area and the downstream water quality. Erosion from the gullies is allowing soil and possibly nutrients to be transported to downstream receiving waters degrading water quality and causing soil loss.

After Situation:

Area is stabilized. The advancement and/or formation of gullies is stopped, soil from gullies no longer leaves the farm, useable farm area is increased, sedimentation and other pollution hazards are decreased, and water quality downstream is protected. Any needed re-vegetation of disturbed areas use Critical Area Planting (342). Other associated practices such as; Pond (378), Dam (402), Fence (382), Pumping Plant (533), Watering Facility (614), and Livestock Pipeline (516) will use the corresponding Standard(s) as appropriate.

Feature Measure: Cubic Yards of Earthfill

Scenario Unit: Cubic Yards

Scenario Typical Size: 2,500.0

Scenario Total Cost: $18,950.75

Scenario Cost/Unit: $7.58

Cost Details:

Component Name	ID	Description	Unit	Cost	QTY	Total
Equipment Installation						
Earthfill, Roller Compacted	49	Earthfill, roller or machine compacted, includes equipment and labor	Cubic Yards	$4.66	2500	$11,650.00
Earthfill, Manually Compacted	50	Earthfill, manually compacted, includes equipment and labor	Cubic Yards	$6.02	30	$180.60
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.	Hours	$109.36	16	$1,749.76
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.	Hours	$37.19	30	$1,115.70
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.	Hours	$27.56	30	$826.80
Equipment Operators, Heavy	233	Includes: Cranes, Hydraulic Excavators >=50 HP, Dozers, Paving Machines, Rock Trenchers, Trenchers >=12 in., Dump Trucks, Ag Equipment >=150 HP, Scrapers, Water Wagons.	Hours	$38.00	16	$608.00
Materials						
Aggregate, Sand, Graded, Washed	45	Sand, typical ASTM C33 gradation, includes materials, equipment and labor to transport and place	Cubic Yards	$43.40	3	$130.20
Pipe, PVC, 2 in., SCH 40	976	Materials: - 2 inch - PVC - SCH 40 - ASTM D1785	Feet	$1.29	60	$77.40
Pipe, PVC, 10 in., SCH 80	1351	Materials: - 10 inch - PVC - SCH 80 - ASTM D1785	Feet	$22.56	90	$2,030.40
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	$70.59	1	$70.59
Mobilization, medium equipment	1139	Equipment with 70-150 HP or typical weights between 14,000 and 30,000 pounds.	Each	$255.65	2	$511.30

Practice: 410 - Grade Stabilization Structure

Scenario: #4 - Embankment, Pipe >12 inch

Scenario Description:

An earthen embankment dam with a principle spillway pipe greater than 12 inches. Installed to stabilized the grade and control erosion in natural or artificial channels, to prevent the formation or advancing of gullies, and to enhance environmental quality and reduce pollution hazards. Applied in areas where the concentration and flow velocity of water require structures to stabilize the grade in channels or to control gully erosion. Cost estimate is based upon a typical amount of earthfill of 2,500 cubic yards, smooth steel drop inlet principle spillway with a 7 ft riser and 90 ft barrel, and 82 Square feet of anti-seep collars. A rock lined plunge pool protects the outlet channel. Disturbed areas are protected with permanent vegetative cover. Addresses resource concerns such as soil erosion-concentrated flow erosion and water quality degradation.

Before Situation:

The operator presently has gullies forming and/or worsening on the farmland and impacting the useable area and the downstream water quality. Erosion from the gullies is allowing soil and possibly nutrients to be transported to downstream receiving waters degrading water quality and causing soil loss.

After Situation:

Area is stabilized. The advancement and/or formation of gullies is stopped, soil from gullies no longer leaves the farm, useable farm area is increased, sedimentation and other pollution hazards are decreased, and water quality downstream is protected. Any needed re-vegetation of disturbed areas use Critical Area Planting (342). Other associated practices such as; Pond (378), Dam (402), Fence (382), Pumping Plant (533), Watering Facility (614), and Livestock Pipeline (516) will use the corresponding Standard(s) as appropriate.

Feature Measure: Cubic Yards of Earthfill

Scenario Unit: Cubic Yards

Scenario Typical Size: 2,500.0

Scenario Total Cost: $24,019.23

Scenario Cost/Unit: $9.61

Cost Details:

Component Name	ID	Description	Unit	Cost	QTY	Total
Equipment Installation						
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 Yards	$179.94	1	$179.94
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 Yards	$481.12	2	$962.24
Earthfill, Roller Compacted	49	Earthfill, roller or machine compacted, includes equipment and labor	Cubic Yards	$4.66	2500	$11,650.00
Earthfill, Manually Compacted	50	Earthfill, manually compacted, includes equipment and labor	Cubic Yards	$6.02	129	$776.58
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.	Hours	$109.36	20	$2,187.20
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.	Hours	$37.19	40	$1,487.60
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.	Hours	$27.56	48	$1,322.88
Equipment Operators, Heavy	233	Includes: Cranes, Hydraulic Excavators >=50 HP, Dozers, Paving Machines, Rock Trenchers, Trenchers >=12 in., Dump Trucks, Ag Equipment >=150 HP, Scrapers, Water Wagons.	Hours	$38.00	16	$608.00
Materials						
Rock Riprap, Placed with geotextile	44	Rock Riprap, placed with geotextile, includes materials, equipment and labor to transport and place	Cubic Yards	$94.25	14	$1,319.50
Dimension Lumber, Treated	1044	Treated dimension lumber with nominal thickness equal or less than 2". Includes lumber and fasteners	Board Feet	$1.10	30	$33.00
Steel, Plate, 1/8 in.	1047	Flat Steel Plate, 1/8 inch thick, materials only.	Square Feet	$4.02	82	$329.64
Pipe, Steel, 12 in., Std Wt, USED	1356	Materials: - USED - 12 inch - Steel Std Wt	Feet	$25.27	90	$2,274.30
Pipe, Steel, 16 in., Std Wt, USED	1357	Materials: - USED - 16 inch - Steel Std Wt	Feet	$43.78	7	$306.46
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	$70.59	1	$70.59
Mobilization, medium equipment	1139	Equipment with 70-150 HP or typical weights between 14,000 and 30,000 pounds.	Each	$255.65	2	$511.30

Practice: 410 - Grade Stabilization Structure

Scenario: #5 - Embankment, Soil Treatment

Scenario Description:

An earthen embankment dam with a principal spillway pipe where on site soils are not acceptable and require extra processing or hauling from off farm, distances greater than one mile. Installed to stabilized the grade and control erosion in natural or artificial channels, to prevent the formation or advancing of gullies, and to enhance environmental quality and reduce pollution hazards. Applied in areas where the concentration and flow velocity of water require structures to stabilize the grade in channels or to control gully erosion. Cost estimate is based upon a typical amount of earthfill of 2,500 cubic yards, 90 feet of 10" PVC, pipe with a canopy inlet, and 3 cubic yard sand diaphragm. A non-lined plunge pool protects the outlet channel. Disturbed areas are protected with permanent vegetative cover. Addresses resource concerns such as soil erosion-concentrated flow erosion and water quality degradation.

Before Situation:

The operator presently has gullies forming and/or worsening on the farmland and impacting the useable area and the downstream water quality. Erosion from the gullies is allowing soil and possibly nutrients to be transported to downstream receiving waters degrading water quality and causing soil loss.

After Situation:

Area is stabilized. The advancement and/or formation of gullies is stopped, soil from gullies no longer leaves the farm, useable farm area is increased, sedimentation and other pollution hazards are decreased, and water quality downstream is protected. Any needed re-vegetation of disturbed areas use Critical Area Planting (342). Other associated practices such as; Pond (378), Dam (402), Fence (382), Pumping Plant (533), Watering Facility (614), and Livestock Pipeline (516) will use the corresponding Standard(s) as appropriate.

Feature Measure: Cubic Yards of Earthfill

Scenario Unit: Cubic Yards

Scenario Typical Size: 2,500.0

Scenario Total Cost: $26,686.07

Scenario Cost/Unit: $10.67

Cost Details:

Component Name	ID	Description	Unit	Cost	QTY	Total
Equipment Installation						
Earthfill, Roller Compacted	49	Earthfill, roller or machine compacted, includes equipment and labor	Cubic Yards	$4.66	2500	$11,650.00
Earthfill, Manually Compacted	50	Earthfill, manually compacted, includes equipment and labor	Cubic Yards	$6.02	29	$174.58
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.	Hours	$109.36	10	$1,093.60
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	$0.31	25000	$7,750.00
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.	Hours	$37.19	40	$1,487.60
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.	Hours	$27.56	40	$1,102.40
Equipment Operators, Heavy	233	Includes: Cranes, Hydraulic Excavators >=50 HP, Dozers, Paving Machines, Rock Trenchers, Trenchers >=12 in., Dump Trucks, Ag Equipment >=150 HP, Scrapers, Water Wagons.	Hours	$38.00	16	$608.00
Materials						
Aggregate, Sand, Graded, Washed	45	Sand, typical ASTM C33 gradation, includes materials, equipment and labor to transport and place	Cubic Yards	$43.40	3	$130.20
Pipe, PVC, 2 in., SCH 40	976	Materials: - 2 inch - PVC - SCH 40 - ASTM D1785	Feet	$1.29	60	$77.40
Pipe, PVC, 10 in., SCH 80	1351	Materials: - 10 inch - PVC - SCH 80 - ASTM D1785	Feet	$22.56	90	$2,030.40
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	$70.59	1	$70.59
Mobilization, medium equipment	1139	Equipment with 70-150 HP or typical weights between 14,000 and 30,000 pounds.	Each	$255.65	2	$511.30

Practice: 410 - Grade Stabilization Structure

Scenario: #6 - Pipe Drop, Plastic

Scenario Description:

A full flow pipe drop (ie: riser and barrel) grade stabilization structure designed and constructed using plastic pipe without anti-seep collars. This is typically a earthen dry dam structure with no permanent storage (water or sediment), however some structures may have some permanent pool / storage but do not have 35 years of sediment life. Payment rate is based upon the riser weir length (Diameter x 3.14) in feet times the length of the pipe barrel in (feet). Installed to stabilized the grade and control erosion in natural or artificial channels, to prevent the formation or advancing of gullies, and to enhance environmental quality and reduce pollution hazards. Applied in areas where the concentration and flow velocity of water require structures to stabilize the grade in channels or to control gully erosion. Cost estimate is based upon 6 ft high 18" (1.5') PVC riser with a 40 ft long barrel (1.5' x 3.14 x 40' = 188 SF). Disturbed areas are protected with permanent vegetative cover. Addresses resource concerns such as soil erosion-concentrated flow erosion and water quality degradation.

Before Situation:

The operator presently has gullies forming and/or worsening on the farmland and impacting the useable area and the downstream water quality. Erosion from the gullies is allowing soil and possibly nutrients to be transported to downstream receiving waters degrading water quality and causing soil loss.

After Situation:

Area is stabilized. The advancement and/or formation of gullies is stopped, soil from gullies no longer leaves the farm, useable farm area is increased, sedimentation and other pollution hazards are decreased, and water quality downstream is protected. Any needed re-vegetation of disturbed areas use Critical Area Planting (342). Other associated practices such as; Pond (378), Dam (402), Fence (382), Channel Bed Stabilization (584), Dike (356), Grassed Waterway (412), Structure for Water Control (587), and Irrigation Canal or Lateral (320) will use the corresponding Standard(s) as appropriate.

Feature Measure: Riser Weir Length x Barrel Length

Scenario Unit: Square Feet

Scenario Typical Size: 188.0

Scenario Total Cost: $7,078.04

Scenario Cost/Unit: $37.65

Cost Details:

Component Name	ID	Description	Unit	Cost	QTY	Total
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 Yards	$481.12	1	$481.12
Earthfill, Roller Compacted	49	Earthfill, roller or machine compacted, includes equipment and labor	Cubic Yards	$4.66	100	$466.00
Earthfill, Manually Compacted	50	Earthfill, manually compacted, includes equipment and labor	Cubic Yards	$6.02	20	$120.40
Hydraulic Excavator, 1 CY	931	Track mounted hydraulic excavator with bucket capacity range of 0.8 to 1.5 CY. Equipment and power unit costs. Labor not included.	Hours	$109.36	8	$874.88
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.	Hours	$27.56	8	$220.48
Equipment Operators, Heavy	233	Includes: Cranes, Hydraulic Excavators >=50 HP, Dozers, Paving Machines, Rock Trenchers, Trenchers >=12 in., Dump Trucks, Ag Equipment >=150 HP, Scrapers, Water Wagons.	Hours	$38.00	8	$304.00
Materials						
Pipe, PVC, 18 in., SCH 40	1373	Materials: - 18 inch - PVC - SCH 40 - ASTM D1785	Feet	$37.17	40	$1,486.80
Coupling, PVC, Tee, 24x18, SCH 40	1374	Materials: - Tee, 24 x 18 inch - PVC - SCH 40 - ASTM D1785	Each	$2,433.50	1	$2,433.50
Pipe, PVC, 24 in., SCH 40	2046	Materials: - 24 inch - PVC - SCH 40 - ASTM D1785	Feet	$60.77	6	$364.62
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	$70.59	1	$70.59
Mobilization, medium equipment	1139	Equipment with 70-150 HP or typical weights between 14,000 and 30,000 pounds.	Each	$255.65	1	$255.65

Practice: 410 - Grade Stabilization Structure

Scenario: #7 - Pipe Drop, Steel

Scenario Description:

A full flow pipe drop (ie: riser and barrel) grade stabilization structure designed and constructed with a metal anti-seep collar. This is typically a earthen dry dam structure with no permanent storage (water or sediment), however some structures may have some permanent pool / storage but do not have 35 years of sediment life. Payment rate is based upon the riser weir length (Diameter x 3.14) in feet times the length of the pipe barrel in (feet). Installed to stabilized the grade and control erosion in natural or artificial channels, to prevent the formation or advancing of gullies, and to enhance environmental quality and reduce pollution hazards. Applied in areas where the concentration and flow velocity of water require structures to stabilize the grade in channels or to control gully erosion. Cost estimate is based upon a smooth steel pipe drop structure with a 36", 12' tall riser and a 100' long 30" barrel (Riser Weir length x Barrel Length = 3ft x 3.14 x 30ft = 940). Disturbed areas are protected with permanent vegetative cover. Addresses resource concerns such as soil erosion-concentrated flow erosion and water quality degradation.

Before Situation:

The operator presently has gullies forming and/or worsening on the farmland and impacting the useable area and the downstream water quality. Erosion from the gullies is allowing soil and possibly nutrients to be transported to downstream receiving waters degrading water quality and causing soil loss.

After Situation:

Area is stabilized. The advancement and/or formation of gullies is stopped, soil from gullies no longer leaves the farm, useable farm area is increased, sedimentation and other pollution hazards are decreased, and water quality downstream is protected. Any needed re-vegetation of disturbed areas use Critical Area Planting (342). Other associated practices such as; Pond (378), Dam (402), Fence (382), Channel Bed Stabilization (584), Dike (356), Grassed Waterway (412), Structure for Water Control (587), and Irrigation Canal or Lateral (320) will use the corresponding Standard(s) as appropriate.

Feature Measure: Riser Weir Length x Barrel Length

Scenario Unit: Square Feet

Scenario Typical Size: 940.0

Scenario Total Cost: $34,694.64

Scenario Cost/Unit: $36.91

Cost Details:

Component Name	ID	Description	Unit	Cost	QTY	Total
Equipment Installation						
Earthfill, Roller Compacted	49	Earthfill, roller or machine compacted, includes equipment and labor	Cubic Yards	$4.66	600	$2,796.00
Earthfill, Manually Compacted	50	Earthfill, manually compacted, includes equipment and labor	Cubic Yards	$6.02	100	$602.00
Hydraulic Excavator, 1 CY	931	Track mounted hydraulic excavator with bucket capacity range of 0.8 to 1.5 CY. Equipment and power unit costs. Labor not included.	Hours	$109.36	4	$437.44
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.	Hours	$37.19	16	$595.04
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.	Hours	$27.56	16	$440.96
Equipment Operators, Heavy	233	Includes: Cranes, Hydraulic Excavators >=50 HP, Dozers, Paving Machines, Rock Trenchers, Trenchers >=12 in., Dump Trucks, Ag Equipment >=150 HP, Scrapers, Water Wagons.	Hours	$38.00	8	$304.00
Materials						
Steel, Plate, 1/8 in.	1047	Flat Steel Plate, 1/8 inch thick, materials only.	Square Feet	$4.02	30	$120.60
Pipe, Steel, 30 in., Std Wt	1369	Materials: - 30 inch - Steel Std Wt	Feet	$250.86	100	$25,086.00
Pipe, Steel, 36 in., Std Wt	1370	Materials: - 36 inch - Steel Std Wt	Feet	$301.84	12	$3,622.08
Steel, Plate, 3/8 in.	1375	Flat steel plate, 3/8 inch thickness. Materials only.	Square Feet	$12.07	9	$108.63
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	$70.59	1	$70.59
Mobilization, medium equipment	1139	Equipment with 70-150 HP or typical weights between 14,000 and 30,000 pounds.	Each	$255.65	2	$511.30

Practice: 410 - Grade Stabilization Structure

Scenario: #8 - Weir Drop Structures

Scenario Description:

A Straight, semicircular, or Box Drop structure composed of metal or reinforced concrete used to stabilized the grade and control erosion in natural or artificial channels, to prevent the formation or advancing of gullies, and to enhance environmental quality and reduce pollution hazards. Applied in areas where the concentration and flow velocity of water require structures to stabilize the grade in channels or to control gully erosion. Cost estimate is based upon a semicircular steel toe wall structure with a drop of 3ft and weir length of 30ft (90 square feet). The unit of payment measurement is defined as weir length times drop in "feet". The drop (feet) is defined as the structure inlet crest elevation minus the control outlet elevation (ie: outlet apron elevation).Disturbed areas are protected with permanent vegetative cover. Addresses resource concerns such as soil erosion-concentrated flow erosion and water quality degradation.

Before Situation:

The operator presently has gullies forming and/or worsening on the farmland and impacting the useable area and the downstream water quality. Erosion from the gullies is allowing soil and possibly nutrients to be transported to downstream receiving waters degrading water quality and causing soil loss.

After Situation:

Area is stabilized. The advancement and/or formation of gullies is stopped, soil from gullies no longer leaves the farm, useable farm area is increased, sedimentation and other pollution hazards are decreased, and water quality downstream is protected. Any needed re-vegetation of disturbed areas use Critical Area Planting (342). Other associated practices such as; Pond (378), Dam (402), Fence (382), Channel Bed Stabilization (584), Dike (356), Grassed Waterway (412), Structure for Water Control (587), Subsurface Drain (606), and Underground Outlet (620) will use the corresponding Standard(s) as appropriate.

Feature Measure: Feet of Weir length times Drop Hei

Scenario Unit: Square Feet

Scenario Typical Size: 90.0

Scenario Total Cost: $10,637.40

Scenario Cost/Unit: $118.19

Cost Details:

Component Name	ID	Description	Unit	Cost	QTY	Total
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 Yards	$481.12	9	$4,330.08
Geotextile, woven	42	Woven Geotextile Fabric. Includes materials, equipment and labor	Square Yard	$1.33	9	$11.97
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 Yards	$2.31	40	$92.40
Earthfill, Roller Compacted	49	Earthfill, roller or machine compacted, includes equipment and labor	Cubic Yards	$4.66	75	$349.50
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.	Hours	$109.36	5	$546.80
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.	Hours	$37.19	16	$595.04
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.	Hours	$27.56	40	$1,102.40
Equipment Operators, Heavy	233	Includes: Cranes, Hydraulic Excavators >=50 HP, Dozers, Paving Machines, Rock Trenchers, Trenchers >=12 in., Dump Trucks, Ag Equipment >=150 HP, Scrapers, Water Wagons.	Hours	$38.00	8	$304.00
Materials						
Aggregate, Gravel, Graded	46	Gravel, includes materials, equipment and labor to transport and place. Includes washed and unwashed gravel.	Cubic Yards	$45.42	3	$136.26
Rock Riprap, graded, angular, material and shipping	1200	Graded Rock Riprap for all gradation ranges. Includes materials and delivery only.	Ton	$35.35	11	$388.85
Corrugated Steel, 12 Gauge, galvanized	1376	Corrugated Steel, 12 gauge, 3 inch by 1 inch corrugations, galvanized, meets ASTM A 929. Materials only.	Square Feet	$10.59	212	$2,245.08
Pipe, CMP, 12 in., 14 Gauge	1377	12 inch - Corrugated Steel Pipe. Galvanized, uncoated. 14 Gauge. Materials only.	Feet	$11.86	2	$23.72
Mobilization						
Mobilization, medium equipment	1139	Equipment with 70-150 HP or typical weights between 14,000 and 30,000 pounds.	Each	$255.65	2	$511.30

Practice: 410 - Grade Stabilization Structure

Scenario: #9 - Rock Drop Structures

Scenario Description:

A Straight Drop structure constructed of rock riprap held in place by galvanized wire, such as, gabion baskets, fence panels, or "sausage" baskets. This structure could also be constructed of non reinforced concrete blocks. These structures are used to stabilized the grade and control erosion in natural or artificial channels, to prevent the formation or advancing of gullies, and to enhance environmental quality and reduce pollution hazards. Applied in areas where the concentration and flow velocity of water require structures to stabilize the grade in channels or to control gully erosion. Cost estimate is based upon a gabion wall structure with a drop of 3ft and weir length of 8ft (48 square feet). The unit of payment measurement is defined as weir length times drop in "feet". The drop (feet) is defined as the structure inlet crest elevation minus the control outlet elevation (ie: outlet apron elevation).Disturbed areas are protected with permanent vegetative cover. Addresses resource concerns such as soil erosion-concentrated flow erosion and water quality degradation.

Before Situation:

The operator presently has gullies forming and/or worsening on the farmland and impacting the useable area and the downstream water quality. Erosion from the gullies is allowing soil and possibly nutrients to be transported to downstream receiving waters degrading water quality and causing soil loss.

After Situation:

Area is stabilized. The advancement and/or formation of gullies is stopped, soil from gullies no longer leaves the farm, useable farm area is increased, sedimentation and other pollution hazards are decreased, and water quality downstream is protected. Any needed re-vegetation of disturbed areas use Critical Area Planting (342). Other associated practices such as; Pond (378), Dam (402), Fence (382), Channel Bed Stabilization (584), Dike (356), Grassed Waterway (412), Structure for Water Control (587), Subsurface Drain (606), and Underground Outlet (620) will use the corresponding Standard(s) as appropriate.

Feature Measure: Feet of Weir length times Drop Hei

Scenario Unit: Square Feet

Scenario Typical Size: 48.0

Scenario Total Cost: $4,509.95

Scenario Cost/Unit: $93.96

Cost Details:

Component Name	ID	Description	Unit	Cost	QTY	Total
Equipment Installation						
Geotextile, woven	42	Woven Geotextile Fabric. Includes materials, equipment and labor	Square Yard	$1.33	23	$30.59
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 Yards	$2.31	7	$16.17
Earthfill, Roller Compacted	49	Earthfill, roller or machine compacted, includes equipment and labor	Cubic Yards	$4.66	40	$186.40
Hydraulic Excavator, 1 CY	931	Track mounted hydraulic excavator with bucket capacity range of 0.8 to 1.5 CY. Equipment and power unit costs. Labor not included.	Hours	$109.36	5	$546.80
Tractor, agricultural, 210 HP	1201	Agricultural tractor with horsepower range of 190 to 240. Equipment and power unit costs. Labor not included.	Hours	$94.54	8	$756.32
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.	Hours	$27.56	16	$440.96
Equipment Operators, Heavy	233	Includes: Cranes, Hydraulic Excavators >=50 HP, Dozers, Paving Machines, Rock Trenchers, Trenchers >=12 in., Dump Trucks, Ag Equipment >=150 HP, Scrapers, Water Wagons.	Hours	$38.00	8	$304.00
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.	Hours	$46.88	16	$750.08
Materials						
Gabion basket or mat	1378	Gabion baskets or mats installed and filled on grade, includes materials, transport, equipment, and labor, does not include geotextile fabric.	Cubic Yards	$138.19	7	$967.33
Mobilization						
Mobilization, medium equipment	1139	Equipment with 70-150 HP or typical weights between 14,000 and 30,000 pounds.	Each	$255.65	2	$511.30

Practice: 410 - Grade Stabilization Structure

Scenario: #10 - Log Drop Structures

Scenario Description:

A Straight Drop structure constructed using bioengineering principles. In this instance the drop structure is constructed of logs, rock riprap, and earthfill. These structures are used to stabilized the grade and control erosion in natural or artificial channels, to prevent the formation or advancing of gullies, and to enhance environmental quality and reduce pollution hazards. Applied in areas where the concentration and flow velocity of water require structures to stabilize the grade in channels or to control gully erosion. Cost estimate is based upon an 8 foot weir length and 3 foot drop. The unit of payment measurement is each. Disturbed areas are protected with permanent vegetative cover. Addresses resource concerns such as soil erosion-concentrated flow erosion and water quality degradation.

Before Situation:

The operator presently has gullies forming and/or worsening on the farmland and impacting the useable area and the downstream water quality. Erosion from the gullies is allowing soil and possibly nutrients to be transported to downstream receiving waters degrading water quality and causing soil loss.

After Situation:

Area is stabilized using using an engineered structure utilizing natural materials (bioengineered). The advancement and/or formation of gullies is stopped, soil from gullies no longer leaves the farm, useable farm area is increased, sedimentation and other pollution hazards are decreased, and water quality downstream is protected. Any needed re-vegetation of disturbed areas use Critical Area Planting (342). Other associated practices such as; Pond (378), Dam (402), Fence (382), Channel Bed Stabilization (584), Dike (356), Grassed Waterway (412), Structrue for Water Control (587), Subsurface Drain (606), and Underground Outlet (620) will use the corresponding Standard(s) as appropriate.

Feature Measure: Each

Scenario Unit: Each

Scenario Typical Size: 1.0

Scenario Total Cost: $6,228.87

Scenario Cost/Unit: $6,228.87

Cost Details:

Component Name	ID	Description	Unit	Cost	QTY	Total
Equipment Installation						
Geotextile, woven	42	Woven Geotextile Fabric. Includes materials, equipment and labor	Square Yard	$1.33	11	$14.63
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 Yards	$2.31	10	$23.10
Earthfill, Roller Compacted	49	Earthfill, roller or machine compacted, includes equipment and labor	Cubic Yards	$4.66	40	$186.40
Hydraulic Excavator, 1 CY	931	Track mounted hydraulic excavator with bucket capacity range of 0.8 to 1.5 CY. Equipment and power unit costs. Labor not included.	Hours	$109.36	12	$1,312.32
Chainsaw	937	Equipment and power unit costs. Labor not included.	Hours	$7.15	4	$28.60
Truck, Pickup	939	Equipment and power unit costs. Labor not included.	Hours	$24.18	4	$96.72
Tractor, agricultural, 210 HP	1201	Agricultural tractor with horsepower range of 190 to 240. Equipment and power unit costs. Labor not included.	Hours	$94.54	20	$1,890.80
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.	Hours	$8.19	4	$32.76
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.	Hours	$27.56	20	$551.20
Equipment Operators, Light	232	Includes: Skid Steer Loaders, Hydraulic Excavators <50 HP, Trenchers <12 in., Ag Equipment <150 HP, Pickup Trucks, Forklifts, Mulchers	Hours	$27.87	8	$222.96
Equipment Operators, Heavy	233	Includes: Cranes, Hydraulic Excavators >=50 HP, Dozers, Paving Machines, Rock Trenchers, Trenchers >=12 in., Dump Trucks, Ag Equipment >=150 HP, Scrapers, Water Wagons.	Hours	$38.00	16	$608.00
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.	Hours	$46.88	16	$750.08
Mobilization						
Mobilization, medium equipment	1139	Equipment with 70-150 HP or typical weights between 14,000 and 30,000 pounds.	Each	$255.65	2	$511.30

Practice: 410 - Grade Stabilization Structure

Scenario: #11 - Sheetpile Weir

Scenario Description:

A Straight, Square, or Box Drop structure composed of steel sheetpile used to stabilize the grade and control erosion in natural or artificial channels, to prevent the formation or advancing of gullies, and to enhance environmental quality and reduce pollution hazards. Applied in areas where the concentration and flow velocity of water require structures to stabilize the grade in channels or to control gully erosion. Cost estimate is based upon a semicircular steel toe wall structure with a drop of 3ft and weir length of 30ft (90 square feet). The unit of payment measurement is defined as weir length times drop in "feet". The drop (feet) is defined as the structure inlet crest elevation minus the control outlet elevation (ie: outlet apron elevation).Disturbed areas are protected with permanent vegetative cover. Addresses resource concerns such as soil erosion-concentrated flow erosion and water quality degradation.

Before Situation:

The operator presently has gullies forming and/or worsening on the farmland and impacting the useable area and the downstream water quality. Erosion from the gullies is allowing soil and possibly nutrients to be transported to downstream receiving waters degrading water quality and causing soil loss.

After Situation:

Area is stabilized. The advancement and/or formation of gullies is stopped, soil from gullies no longer leaves the farm, useable farm area is increased, sedimentation and other pollution hazards are decreased, and water quality downstream is protected. Any needed re-vegetation of disturbed areas use Critical Area Planting (342). Other associated practices such as; Pond (378), Dam (402), Fence (382), Channel Bed Stabilization (584), Dike (356), Grassed Waterway (412), Structure for Water Control (587), Subsurface Drain (606), and Underground Outlet (620) will use the corresponding Standard(s) as appropriate.

Feature Measure: Feet of Weir length times Drop Hei

Scenario Unit: Square Feet

Scenario Typical Size: 90.0

Scenario Total Cost: $26,885.65

Scenario Cost/Unit: $298.73

Cost Details:

Component Name	ID	Description	Unit	Cost	QTY	Total
Equipment Installation						
Earthfill, Dumped and Spread	51	Earthfill, dumped and spread without compaction effort, includes equipment and labor	Cubic Yards	$3.81	250	$952.50
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 Yards	$4.58	250	$1,145.00
Sheet piling, steel, 15'	1337	Steel sheet pile, panels or barrier driven up to 15 feet and left in place. Includes materials, equipment and labor.	Square Feet	$30.78	750	$23,085.00
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.	Hours	$37.19	20	$743.80
Materials						
Rock Riprap, Placed with geotextile	44	Rock Riprap, placed with geotextile, includes materials, equipment and labor to transport and place	Cubic Yards	$94.25	5	$471.25
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	$488.10	1	$488.10

Practice: 410 - Grade Stabilization Structure

Scenario: #12 - Concrete Weir

Scenario Description:

A Straight Drop structure constructed of reinforced concrete. These structures are used to stabilized the grade and control erosion in natural or artificial channels, to prevent the formation or advancing of gullies, and to enhance environmental quality and reduce pollution hazards. Applied in areas where the concentration and flow velocity of water require structures to stabilize the grade in channels or to control gully erosion. Cost estimate is based upon a reinforced concrete structure with a drop of 3ft and weir length of 8ft (48 square feet). The unit of payment measurement is defined as weir length times drop in "feet". The drop (feet) is defined as the structure inlet crest elevation minus the control outlet elevation (ie: outlet apron elevation).Disturbed areas are protected with permanent vegetative cover. Addresses resource concerns such as soil erosion-concentrated flow erosion and water quality degradation.

Before Situation:

The operator presently has gullies forming and/or worsening on the farmland and impacting the useable area and the downstream water quality. Erosion from the gullies is allowing soil and possibly nutrients to be transported to downstream receiving waters degrading water quality and causing soil loss.

After Situation:

Area is stabilized. The advancement and/or formation of gullies is stopped, soil from gullies no longer leaves the farm, useable farm area is increased, sedimentation and other pollution hazards are decreased, and water quality downstream is protected. Any needed re-vegetation of disturbed areas use Critical Area Planting (342). Other associated practices such as; Pond (378), Dam (402), Fence (382), Channel Bed Stabilization (584), Dike (356), Grassed Waterway (412), Structure for Water Control (587), Subsurface Drain (606), and Underground Outlet (620) will use the corresponding Standard(s) as appropriate.

Feature Measure: Feet of Weir length times Drop Hei

Scenario Unit: Square Feet

Scenario Typical Size: 48.0

Scenario Total Cost: $12,990.20

Scenario Cost/Unit: $270.63

Cost Details:

Component Name	ID	Description	Unit	Cost	QTY	Total
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 Yards	$481.12	15	$7,216.80
Earthfill, Dumped and Spread	51	Earthfill, dumped and spread without compaction effort, includes equipment and labor	Cubic Yards	$3.81	300	$1,143.00
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 Yards	$4.58	300	$1,374.00
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.	Hours	$37.19	40	$1,487.60
Materials						
Rock Riprap, Placed with geotextile	44	Rock Riprap, placed with geotextile, includes materials, equipment and labor to transport and place	Cubic Yards	$94.25	6	$565.50
Aggregate, Gravel, Graded	46	Gravel, includes materials, equipment and labor to transport and place. Includes washed and unwashed gravel.	Cubic Yards	$45.42	5	$227.10
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	$488.10	2	$976.20

Practice: 410 - Grade Stabilization Structure

Scenario: #13 - Catch Basin and Pipe =< 24 inch

Scenario Description:

A catch basin structure constructed of concrete and a grate with an outlet pipe. These structures are used to stabilized the grade and control erosion in natural or artificial channels, to prevent the formation or advancing of gullies, and to enhance environmental quality and reduce pollution hazards. Applied in areas where the concentration and flow velocity of water require structures to stabilize the grade in channels or to control gully erosion. Cost estimate is based upon a standard catch basin plus length of pipe. Disturbed areas are protected with permanent vegetative cover. Addresses resource concerns such as soil erosion-concentrated flow erosion and water quality degradation.

Before Situation:

The operator presently has gullies forming and/or worsening on the farmland and impacting the useable area and the downstream water quality. Erosion from the gullies is allowing soil and possibly nutrients to be transported to downstream receiving waters degrading water quality and causing soil loss.

After Situation:

Area is stabilized. The advancement and/or formation of gullies is stopped, soil from gullies no longer leaves the farm, useable farm area is increased, sedimentation and other pollution hazards are decreased, and water quality downstream is protected. Any needed re-vegetation of disturbed areas use Critical Area Planting (342). Other associated practices such as; Pond (378), Dam (402), Fence (382), Channel Bed Stabilization (584), Dike (356), Grassed Waterway (412), Structure for Water Control (587), Subsurface Drain (606), and Underground Outlet (620) will use the corresponding Standard(s) as appropriate.

Feature Measure: Catch Basin Structure

Scenario Unit: Each

Scenario Typical Size: 1.0

Scenario Total Cost: $7,796.78

Scenario Cost/Unit: $7,796.78

Cost Details:

Component Name	ID	Description	Unit	Cost	QTY	Total
Equipment Installation						
Earthfill, Manually Compacted	50	Earthfill, manually compacted, includes equipment and labor	Cubic Yards	$6.02	100	$602.00
Excavation, common earth, large equipment, 150 ft	1223	Bulk excavation of common earth including sand and gravel with dozer >100 HP with average push distance of 150 feet. Includes equipment and labor.	Cubic Yards	$4.06	100	$406.00
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.	Hours	$27.56	40	$1,102.40
Materials						
Pipe, HDPE, CPT, Double Wall, Soil Tight, 18 in.	1245	Pipe, Corrugated HDPE Double Wall, 18 inch diameter with soil tight joints - AASHTO M294. Material cost only.	Feet	$14.52	200	$2,904.00
Catch Basin, concrete, 60 in dia.	1754	Precast 60-in diameter catch basin, 6 feet deep, with collar and grate cover. Materials only.	Each	$2,294.28	1	$2,294.28
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	$488.10	1	$488.10

Practice: 410 - Grade Stabilization Structure

Scenario: #14 - Catch Basin and Pipe >24 inch

Scenario Description:

A catch basin structure constructed of concrete and a grate with an outlet pipe. These structures are used to stabilized the grade and control erosion in natural or artificial channels, to prevent the formation or advancing of gullies, and to enhance environmental quality and reduce pollution hazards. Applied in areas where the concentration and flow velocity of water require structures to stabilize the grade in channels or to control gully erosion. Cost estimate is based upon a standard catch basin plus length of pipe. Disturbed areas are protected with permanent vegetative cover. Addresses resource concerns such as soil erosion-concentrated flow erosion and water quality degradation.

Before Situation:

The operator presently has gullies forming and/or worsening on the farmland and impacting the useable area and the downstream water quality. Erosion from the gullies is allowing soil and possibly nutrients to be transported to downstream receiving waters degrading water quality and causing soil loss.

After Situation:

Area is stabilized. The advancement and/or formation of gullies is stopped, soil from gullies no longer leaves the farm, useable farm area is increased, sedimentation and other pollution hazards are decreased, and water quality downstream is protected. Any needed re-vegetation of disturbed areas use Critical Area Planting (342). Other associated practices such as; Pond (378), Dam (402), Fence (382), Channel Bed Stabilization (584), Dike (356), Grassed Waterway (412), Structure for Water Control (587), Subsurface Drain (606), and Underground Outlet (620) will use the corresponding Standard(s) as appropriate.

Feature Measure: Catch Basin Structure

Scenario Unit: Each

Scenario Typical Size: 1.0

Scenario Total Cost: $13,856.78

Scenario Cost/Unit: $13,856.78

Cost Details:

Component Name	ID	Description	Unit	Cost	QTY	Total
Equipment Installation						
Earthfill, Manually Compacted	50	Earthfill, manually compacted, includes equipment and labor	Cubic Yards	$6.02	100	$602.00
Excavation, common earth, large equipment, 150 ft	1223	Bulk excavation of common earth including sand and gravel with dozer >100 HP with average push distance of 150 feet. Includes equipment and labor.	Cubic Yards	$4.06	100	$406.00
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.	Hours	$27.56	40	$1,102.40
Materials						
Pipe, HDPE, CPT, Double Wall, Soil Tight, 36 in.	1248	Pipe, Corrugated HDPE Double Wall, 36 inch diameter with soil tight joints - AASHTO M294. Material cost only.	Feet	$44.82	200	$8,964.00
Catch Basin, concrete, 60 in dia.	1754	Precast 60-in diameter catch basin, 6 feet deep, with collar and grate cover. Materials only.	Each	$2,294.28	1	$2,294.28
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	$488.10	1	$488.10

Practice: 410 - Grade Stabilization Structure

Scenario: #15 - Rock Chute

Scenario Description:

A Rock Chute structure constructed of rock riprap, bedding, and geotextile. Structure includes inlet and outlet apron. These structures are used to stabilized the grade and control erosion in natural or artificial channels, to prevent the formation or advancing of gullies, and to enhance environmental quality and reduce pollution hazards. Applied in areas where the concentration and flow velocity of water require structures to stabilize the grade in channels or to control gully erosion. Cost estimate is based upon an 8' bottom width chute with 3:1 side slopes. Costs developed from scenario created using NRCS Rock Chute spreadsheet. Disturbed areas are protected with permanent vegetative cover. Addresses resource concerns such as soil erosion-concentrated flow erosion and water quality degradation.

Before Situation:

The operator presently has gullies forming and/or worsening on the farmland and impacting the useable area and the downstream water quality. Erosion from the gullies is allowing soil and possibly nutrients to be transported to downstream receiving waters degrading water quality and causing soil loss.

After Situation:

Area is stabilized. The advancement and/or formation of gullies is stopped, soil from gullies no longer leaves the farm, useable farm area is increased, sedimentation and other pollution hazards are decreased, and water quality downstream is protected. Any needed re-vegetation of disturbed areas use Critical Area Planting (342). Other associated practices such as; Pond (378), Dam (402), Fence (382), Channel Bed Stabilization (584), Dike (356), Grassed Waterway (412), Structure for Water Control (587), Subsurface Drain (606), and Underground Outlet (620) will use the corresponding Standard(s) as appropriate.

Feature Measure: Cubic Yard of Rock Chute Material

Scenario Unit: Cubic Yards

Scenario Typical Size: 200.0

Scenario Total Cost: $23,179.12

Scenario Cost/Unit: $115.90

Cost Details:

Component Name	ID	Description	Unit	Cost	QTY	Total
Equipment Installation						
Earthfill, Roller Compacted	49	Earthfill, roller or machine compacted, includes equipment and labor	Cubic Yards	$4.66	500	$2,330.00
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 Yards	$4.58	700	$3,206.00
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.	Hours	$27.56	20	$551.20
Materials						
Rock Riprap, Placed with geotextile	44	Rock Riprap, placed with geotextile, includes materials, equipment and labor to transport and place	Cubic Yards	$94.25	154	$14,514.50
Aggregate, Gravel, Graded	46	Gravel, includes materials, equipment and labor to transport and place. Includes washed and unwashed gravel.	Cubic Yards	$45.42	46	$2,089.32
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	$488.10	1	$488.10

Practice: 412 - Grassed Waterway

Scenario: #2 - Base Waterway, Seeding

Scenario Description:

Typical grassed waterway is 500 ' long, 12' bottom, 8:1 side slopes, 1.5' depth, half excavation. (Foot print of waterway = 500' x 36' = 18,000 SF). A grassed waterway that is a shaped or graded channel and is established with suitable vegetation to carry surface water at a non-erosive velocity to a stable outlet. This practice addresses Concentrated Flow Erosion (Classic Gully & Ephemeral Erosion) and Excessive Sediment in surface waters. Waterway area measured from top of bank to top of bank. Seeding area is 20% greater than waterway area to account for disturbed areas. Costs include excavation, associated work to construct the overall shape and grade of the waterway as well as lime, fertilizer, and seed.

Before Situation:

The field has a small gulley which is cutting deeper into the field as time goes on, so it needs to be stopped or controlled. Excessive sedimentation and soil erosion as a result from ephemeral or classic gully erosion. Gully has formed in field as a result of excessive runoff and poor cropping techniques. Grassed waterway is also commonly installed to covey runoff from concentrated flows, terrarces, diversions, or water control structures or similar practices to a suitable, stable outlet.

After Situation:

Installed grassed waterway is 500 ' long, 12' bottom, 8:1 side slopes, 1.5' depth. (Foot print of waterway = 500' x 36' = 18,000 SF). The practice is installed using a dozer. If erosion control blankets for seedbed establishment/protection is needed, use conservation practice Mulching (484). Drainage tile, if needed, will be installed according to Subsurface Drain (606). Outlets, if needed will be installed using Structure for Water Control (587). If inlet Structures are needed with the drainage tile, then those will be installed using Underground Outlet (620).

Feature Measure: Area of Waterway in Square Feet

Scenario Unit: Square Feet

Scenario Typical Size: 18,000.0

Scenario Total Cost: $5,264.65

Scenario Cost/Unit: $0.29

Cost Details:

Component Name	ID	Description	Unit	Cost	QTY	Total
Equipment Installation						
Tillage, Light	945	Includes light disking (tandem) or field cultivator. Includes equipment, power unit and labor costs.	Acres	$10.68	1	$10.68
Fertilizer, ground application, dry bulk	950	Dry bulk fertilizer application performed by ground equipment. Includes equipment, power unit and labor costs.	Acres	$6.63	1	$6.63
Lime application	953	Lime application performed by ground equipment. Includes equipment, power unit and labor costs.	Acres	$8.21	1	$8.21
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.	Acres	$12.00	1	$12.00
Cultipacking	1100	Includes equipment, power unit and labor costs.	Acres	$8.68	1	$8.68
Excavation, common earth, small equipment, 50 ft	1220	Bulk excavation of common earth with dozer <100 HP with average push distance of 50 feet. Includes equipment and labor.	Cubic Yards	$2.37	1340	$3,175.80
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.	Hours	$27.56	11	$303.16
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.	Hours	$46.88	4	$187.52
Materials						
Nitrogen (N), Urea	71	Price per pound of N supplied by Urea. Price is not per pound of total product applied, no conversion is needed.	Pound	$0.47	25	$11.75
Phosphorus, P2O5	73	Price per pound of P2O5 supplied by Superphosphate. Price is not per pound of total product applied, no conversion is needed.	Pound	$0.61	25	$15.25
Potassium, K2O	74	K2O supplied by Muriate Of Potash. Price is not per pound of total product applied, no conversion is needed.	Pound	$0.35	25	$8.75
Lime, ENM	75	Fertilizer: Limestone Spread on field.	Ton	$64.87	1	$64.87
Straw bales	2186	Straw bales buried at defined intervals to halt rill and gulley formation. Materials and shipping only.	Each	$8.63	65	$560.95
Native and Introduced Perennial Grasses, Legumes and/or Forbs, Medium Density	2756	A mix of native and introduced perennial grasses, legumes, and/or forbs, grasses typically greater than 50% of the mix, may include a small percentage of annual species for establishment purposes and/or if allowed by the CPS. Planted at medium to high density (41-60 pure live seeds/sq ft). Includes material and shipping.	Acres	$123.45	1	$123.45

Mobilization

Mobilization, medium equipment	1139	Equipment with 70-150 HP or typical weights between 14,000 and 30,000 pounds.	Each	$255.65	3	$766.95

Practice: 420 - Wildlife Habitat Planting

Scenario: #126 - Highly Specialized Habitat Requirements (Monarch) on Non-Cropland, No FI

Scenario Description:

A wildlife habitat evaluation or plant community inventory indicates a potential to improve specialized wildlife habitat (Monarch) by altering the current vegetation conditions (species diversity, richness, structure and pattern) by establishing herbaceous plants. This practice scenario applies to cropland not in production and non-cropland. The inadequate wildlife habitat resource concern is met by planting highly specialized seed and plant materials that are not readily available. To avoid excessive weed competition, more intensive site prep and post-planting management (e.g. mowing) is necessary for establishment of desired species. Control or suppression of noxious or invasive species is not required or was previously controlled through the successful implementation of CPS 314 or CPS 315.

Before Situation:

Vegetative habitat conditions (species diversity, richness, structure and pattern) do not meet planning criteria and have the potential to meet or exceed the minimum criteria. Current conditions and management are insufficient to address identified limiting habitat factor(s) or to increase planning criteria above a current planning criterion of at least 50% of the potential.

After Situation:

The Wildlife Habitat Planting criteria have been successfully installed. The land is covered with permanent vegetation which provides cover and food for Monarch butterflies, wildlife and beneficial insects. The site meets or exceeds planning criteria for inadequate wildlife habitat.

Feature Measure: Acres planted

Scenario Unit: Acres

Scenario Typical Size: 1.0

Scenario Total Cost: $1,413.23

Scenario Cost/Unit: $1,413.23

Cost Details:

Component Name	ID	Description	Unit	Cost	QTY	Total
Equipment Installation						
Tillage, Light	945	Includes light disking (tandem) or field cultivator. Includes equipment, power unit and labor costs.	Acres	$10.68	3	$32.04
Tillage, Primary	946	Includes heavy disking (offset) or chisel plow. Includes equipment, power unit and labor costs.	Acres	$16.30	1	$16.30
Mechanical weed control, Vegetation termination	957	Mechanical operations, Includes: Roller/crimper, mower, shredder, etc. Includes equipment, power unit and labor costs.	Acres	$20.46	2	$40.92
Seeding Operation, No Till/Grass Drill	960	No Till drill or grass drill for seeding. Includes equipment, power unit and labor costs.	Acres	$21.92	1	$21.92
Materials						
Native Perennial Grasses, Legumes and/or Forbs Mix for Targeted Wildlife/Pollinator Habitat or Ecological Restoration, limited species availability.	2618	Diverse mix of native perennial grasses, legumes and forbs, less than 50% grasses, may include biennials and a small percentage of annual species for establishment purposes and/or if allowed by the CPS. This is a mix composed of species required to meet specific wildlife/pollinator habitat or ecological requirements. Seed is moderately easy to purchase commercially. Includes materials and shipping.	Acres	$1,019.69	1	$1,019.69
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	$70.59	4	$282.36

Practice: 420 - Wildlife Habitat Planting

Scenario: #165 - High Species Diversity on Fallow or Non-Cropland, no Foregone Income

Scenario Description:

A wildlife habitat evaluation or plant community inventory indicates a potential to improve wildlife habitat by altering the current vegetation conditions (species diversity, richness, structure and pattern) by establishing herbaceous plants. This practice scenario applies to areas not in production (e.g. – fallow areas, forest understory, and non-cropped areas in and around crop fields). The inadequate wildlife habitat resource concern is met by planting a moderately diverse mix of seeds that is readily available for purchase from multiple vendors. Seed is typically not available from traditional agricultural vendors and requires making a special order or ordering online. Planting will be completed in combination with control of pervasive weeds. Intensive site preparation and post- planting weed management (e.g. mowing) is necessary for establishment of desired species due to a well-established existing stand of undesirable vegetation. Control or suppression of existing vegetation, including noxious or invasive species prior to and after planting is accomplished through the successful implementation of other practice standards, including CPS 314 or CPS 315.

Before Situation:

Vegetative habitat conditions (species diversity, richness, structure and pattern) do not meet planning criteria and do not have the potential to meet or exceed the minimum criteria through vegetative management activities alone. Current conditions and management are insufficient to address identified limiting habitat factor(s) or to increase planning criteria above a current planning criterion of at least 50% of the potential.

After Situation:

Desired species have been planted and the Wildlife Habitat Planting criteria have been successfully implemented. The species of vegetation selected will provide the identified habitat requirements for target species once it has successfully established. As a result, the site will meet or exceed planning criteria for inadequate wildlife habitat.

Feature Measure: acres planted (per acre)

Scenario Unit: Acres

Scenario Typical Size: 5.0

Scenario Total Cost: $2,669.20

Scenario Cost/Unit: $533.84

Cost Details:

Component Name	ID	Description	Unit	Cost	QTY	Total
Equipment Installation						
Seeding Operation, No Till/Grass Drill	960	No Till drill or grass drill for seeding. Includes equipment, power unit and labor costs.	Acres	$21.92	5	$109.60
Labor						
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.	Hours	$46.88	2	$93.76
Materials						
Native Perennial Grasses, Legumes and/or Forb Mix for Targeted Wildlife/Pollinator Habitat or Ecological Restoration, moderate commercial availability	2619	Diverse mix of native perennial grasses, legumes and forbs, less than 50% grasses, may include biennials and a small percentage of annual species for establishment purposes and/or if allowed by the CPS. This is a mix composed of species required to meet specific wildlife/pollinator habitat or ecological requirements. Seed is moderately easy to purchase commercially. Includes materials and shipping.	Acres	$458.78	5	$2,293.90
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	$171.94	1	$171.94

Practice: 420 - Wildlife Habitat Planting

Scenario: #166 - Specialized Habitat Requirements on Non-Cropland, no Foregone Income

Scenario Description:

A wildlife habitat evaluation or plant community inventory indicates a potential to improve wildlife habitat by altering the current vegetation conditions (species diversity, richness, structure and pattern) by establishing herbaceous plants. This practice scenario applies to areas not in production (e.g. – fallow areas, forest understory, and non-cropped areas in and around crop fields). The inadequate wildlife habitat resource concern is met by planting a specialized and often diverse mix of seeds that is NOT readily available for purchase. Seed is not available from traditional agricultural vendors and requires making a special order. Cost of seed is high due to limited availability. Plant materials selected are needed to meet specific habitat requirements or ecosystem functions. Planting will be completed in combination with control of pervasive weeds. Intensive site preparation and post- planting weed management (e.g. mowing) is necessary for establishment of desired species due to a well-established existing stand of undesirable vegetation. Control or suppression of existing vegetation, including noxious or invasive species prior to and after planting is accomplished through the successful implementation of other practice standards, including CPS 314 or CPS 315.

Before Situation:

Vegetative habitat conditions (species diversity, richness, structure and pattern) do not meet planning criteria and do not have the potential to meet or exceed the minimum criteria through vegetative management activities alone. Current conditions and management are insufficient to address identified limiting habitat factor(s) or to increase planning criteria above a current planning criterion of at least 50% of the potential.

After Situation:

Desired species have been planted and the Wildlife Habitat Planting criteria have been successfully implemented. The species of vegetation selected will provide the identified habitat requirements for target species once it has successfully established. As a result, the site will meet or exceed planning criteria for inadequate wildlife habitat.

Feature Measure: acres planted (per acre)

Scenario Unit: Acres

Scenario Typical Size: 5.0

Scenario Total Cost: $5,557.46

Scenario Cost/Unit: $1,111.49

Cost Details:

Component Name	ID	Description	Unit	Cost	QTY	Total
Equipment Installation						
Seeding Operation, No Till/Grass Drill	960	No Till drill or grass drill for seeding. Includes equipment, power unit and labor costs.	Acres	$21.92	5	$109.60
Labor						
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.	Hours	$46.88	2	$93.76
Materials						
Native Perennial Grasses, Legumes and/or Forbs Mix for Targeted Wildlife/Pollinator Habitat or Ecological Restoration, limited species availability.	2618	Diverse mix of native perennial grasses, legumes and forbs, less than 50% grasses, may include biennials and a small percentage of annual species for establishment purposes and/or if allowed by the CPS. This is a mix composed of species required to meet specific wildlife/pollinator habitat or ecological requirements. Seed is moderately easy to purchase commercially. Includes materials and shipping.	Acres	$1,019.69	5	$5,098.45
Mobilization						
Mobilization, medium equipment	1139	Equipment with 70-150 HP or typical weights between 14,000 and 30,000 pounds.	Each	$255.65	1	$255.65

Practice: 420 - Wildlife Habitat Planting

Scenario: #167 - High Species Diversity on Cropland with Foregone Income

Scenario Description:

A wildlife habitat evaluation or plant community inventory indicates a potential to improve wildlife habitat by altering the current vegetation conditions (species diversity, richness, structure and pattern) and changing use (annual crop to permanent vegetation) by establishing herbaceous plants. This practice scenario applies to cropland currently in production. The inadequate wildlife habitat resource concern is met by planting a specialized and often diverse mix of seeds that is NOT readily available for purchase. Seed is not available from traditional agricultural vendors and requires making a special order. Cost of seed is high due to limited availability. Plant materials selected are needed to meet specific habitat requirements or ecosystem functions. Weed pressure is minimal due to current and past management. Intensive site preparation and post- planting weed management is NOT necessary for establishment. Control or suppression of existing undesirable vegetation is accomplished through a single herbicide treatment at time, or just prior to planting and is included in this scenarios payment rate

Before Situation:

Vegetative habitat conditions (species diversity, richness, structure and pattern) do not meet planning criteria and do not have the potential to meet or exceed the minimum criteria through vegetative management activities alone. Current conditions and management are insufficient to address identified limiting habitat factor(s) or to increase planning criteria above a current planning criterion of at least 50% of the potential.

After Situation:

The land is no longer in production. Desired species have been planted and the Wildlife Habitat Planting criteria have been successfully implemented. The species of vegetation selected will provide the identified habitat requirements for target species once it has successfully established. As a result, the site will meet or exceed planning criteria for inadequate wildlife habitat.

Feature Measure: acres planted (per acre)

Scenario Unit: Acres

Scenario Typical Size: 5.0

Scenario Total Cost: $4,344.66

Scenario Cost/Unit: $868.93

Cost Details:

Component Name	ID	Description	Unit	Cost	QTY	Total
Equipment Installation						
Chemical, ground application	948	Chemical application performed by ground equipment. Includes equipment, power unit and labor costs.	Acres	$5.80	5	$29.00
Seeding Operation, No Till/Grass Drill	960	No Till drill or grass drill for seeding. Includes equipment, power unit and labor costs.	Acres	$21.92	5	$109.60
Foregone Income						
FI, Corn Dryland	1959	Dryland Corn is Primary Crop	Acres	$270.47	5	$1,352.35
Labor						
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.	Hours	$46.88	4	$187.52
Materials						
Herbicide, Glyphosate	334	A broad-spectrum, non-selective systemic herbicide. Refer to WIN-PST for product names and active ingredients. Includes materials and shipping only.	Acres	$9.21	5	$46.05
Native Perennial Grasses, Legumes and/or Forb Mix for Targeted Wildlife/Pollinator Habitat or Ecological Restoration, moderate commercial availability	2619	Diverse mix of native perennial grasses, legumes and forbs, less than 50% grasses, may include biennials and a small percentage of annual species for establishment purposes and/or if allowed by the CPS. This is a mix composed of species required to meet specific wildlife/pollinator habitat or ecological requirements. Seed is moderately easy to purchase commercially. Includes materials and shipping.	Acres	$458.78	5	$2,293.90
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	$70.59	1	$70.59
Mobilization, medium equipment	1139	Equipment with 70-150 HP or typical weights between 14,000 and 30,000 pounds.	Each	$255.65	1	$255.65

Practice: 420 - Wildlife Habitat Planting

Scenario: #168 - Specialized Habitat Requirements on Cropland with Foregone Income

Scenario Description:

A wildlife habitat evaluation or plant community inventory indicates a potential to improve wildlife habitat by altering the current vegetation conditions (species diversity, richness, structure and pattern) and changing use (annual crop to permanent vegetation) by establishing herbaceous plants. This practice scenario applies to cropland currently in production. The inadequate wildlife habitat resource concern is met by planting a moderately diverse mix of seeds that is readily available for purchase from multiple vendors. Seed is typically not available from traditional agricultural vendors and requires making a special order or ordering online. Weed pressure is minimal due to current and past management. Intensive site preparation and post- planting weed management is NOT necessary for establishment. Control or suppression of existing undesirable vegetation is accomplished through a single herbicide treatment at time, or just prior to planting and is included in this scenarios payment rate.

Before Situation:

Vegetative habitat conditions (species diversity, richness, structure and pattern) do not meet planning criteria and have the potential to meet or exceed the minimum criteria. Current conditions and management are insufficient to address identified limiting habitat factor(s) or to increase planning criteria above a current planning criterion of at least 50% of the potential.

After Situation:

The land is no longer in production. Desired species have been planted and the Wildlife Habitat Planting criteria have been successfully implemented. The species of vegetation selected will provide the identified habitat requirements for target species once it has successfully established. As a result, the site will meet or exceed planning criteria for inadequate wildlife habitat.

Feature Measure: acres planted (per acre)

Scenario Unit: Acres

Scenario Typical Size: 5.0

Scenario Total Cost: $7,065.50

Scenario Cost/Unit: $1,413.10

Cost Details:

Component Name	ID	Description	Unit	Cost	QTY	Total
Equipment Installation						
Chemical, ground application	948	Chemical application performed by ground equipment. Includes equipment, power unit and labor costs.	Acres	$5.80	5	$29.00
Seeding Operation, No Till/Grass Drill	960	No Till drill or grass drill for seeding. Includes equipment, power unit and labor costs.	Acres	$21.92	5	$109.60
Foregone Income						
FI, Corn Dryland	1959	Dryland Corn is Primary Crop	Acres	$270.47	5	$1,352.35
Labor						
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.	Hours	$46.88	4	$187.52
Materials						
Herbicide, Glyphosate	334	A broad-spectrum, non-selective systemic herbicide. Refer to WIN-PST for product names and active ingredients. Includes materials and shipping only.	Acres	$9.21	5	$46.05
Native Perennial Grasses, Legumes and/or Forbs Mix for Targeted Wildlife/Pollinator Habitat or Ecological Restoration, limited species availability.	2618	Diverse mix of native perennial grasses, legumes and forbs, less than 50% grasses, may include biennials and a small percentage of annual species for establishment purposes and/or if allowed by the CPS. This is a mix composed of species required to meet specific wildlife/pollinator habitat or ecological requirements. Seed is moderately easy to purchase commercially. Includes materials and shipping.	Acres	$1,019.69	5	$5,098.45
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	$70.59	1	$70.59
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	$171.94	1	$171.94

Practice: 420 - Wildlife Habitat Planting

Scenario: #169 - Very Small Acreage (<.5 ac) Planting with Seedlings

Scenario Description:

***This scenario should be limited to very small areas. *** A wildlife habitat evaluation or plant community inventory indicates a potential to improve wildlife habitat by altering the current vegetation conditions (species diversity, richness, structure and pattern) by establishing small patches of native shrubs. It has been determined that small patches of strategically placed shrub habitat offer vital habitat components for target species. Participant will typically hire labor to assist with portions of implementation. Site requires mechanical and chemical site preparation to ensure a suitable plant bed and adequate weed control. Both actions are included in this scenario. Utilizing plugs/sprigs/potted plants following plant bed preparation is needed to ensure successful establishment due to site restrictions.

Before Situation:

Vegetative habitat conditions (species diversity, richness, structure and pattern) do not meet planning criteria and have the potential to meet or exceed the minimum criteria. Current conditions and management are insufficient to address identified limiting habitat factor(s) or to increase planning criteria above a current planning criterion of at least 50% of the potential.

After Situation:

The Wildlife Habitat Planting criteria have been successfully implemented. The site has been mechanically and chemically treated and planting has occurred. The area is adequately stocked with desired species and full coverage of permanent vegetation is expected. The vegetative cover will provide the desired habitat requirements for target wildlife. The site meets or exceeds planning criteria for inadequate wildlife habitat.

Feature Measure: acres planted (per 1/4 acre)

Scenario Unit: Acres

Scenario Typical Size: 0.3

Scenario Total Cost: $6,824.42

Scenario Cost/Unit: $27,297.69

Cost Details:

Component Name	ID	Description	Unit	Cost	QTY	Total
Equipment Installation						
Tillage, Light	945	Includes light disking (tandem) or field cultivator. Includes equipment, power unit and labor costs.	Acres	$10.68	0.25	$2.67
Cultipacking	1100	Includes equipment, power unit and labor costs.	Acres	$8.68	0.25	$2.17
Chemical, ground application, forested land	1313	Chemical application performed by ground equipment where trees and terrain impede passage of wide boom sprayers. Utilizes forestry application methods that include heavy equipment such as skidders. Includes material, equipment, power unit and labor costs.	Acres	$111.16	0.25	$27.79
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.	Hours	$27.56	4	$110.24
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.	Hours	$46.88	4	$187.52
Materials						
Herbicide, Glyphosate	334	A broad-spectrum, non-selective systemic herbicide. Refer to WIN-PST for product names and active ingredients. Includes materials and shipping only.	Acres	$9.21	0.25	$2.30
Tree & Shrub, Specialty	1523	Locally-sourced, culturally significant, native, or other highly specialized trees and shrubs (e.g., American chestnut, American elm, Canada yew, Sagebrush). Potted or balled and burlapped tree or shrub, 5 gallon. Includes materials and shipping only.	Each	$9.19	680	$6,249.20
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	$70.59	1	$70.59
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	$171.94	1	$171.94

Practice: 420 - Wildlife Habitat Planting

Scenario: #170 - Low Species Diversity on Non-Cropland, no Foregone Income

Scenario Description:

A wildlife habitat evaluation or plant community inventory indicates a potential to improve wildlife habitat by altering the current vegetation conditions (species diversity, richness, structure and pattern) by establishing herbaceous plants. This practice scenario applies to areas not in production (e.g. – fallow areas, forest understory, and non-cropped areas in and around crop fields). The inadequate wildlife habitat resource concern is met by planting a low diversity, low cost mix of readily available seeds in combination with control of pervasive weeds. Intensive site preparation and post- planting weed management (e.g. mowing) is necessary for establishment of desired species due to a well-established existing stand of undesirable vegetation. Control or suppression of existing vegetation, including noxious or invasive species prior to and after planting is accomplished through the successful implementation of other practice standards, including CPS 314 or CPS 315.

Before Situation:

Vegetative habitat conditions (species diversity, richness, structure and pattern) do not meet planning criteria and do not have the potential to meet or exceed the minimum criteria through vegetative management activities alone. Current conditions and management are insufficient to address identified limiting habitat factor(s) or to increase planning criteria above a current planning criterion of at least 50% of the potential.

After Situation:

Desired species have been planted and the Wildlife Habitat Planting criteria have been successfully implemented. The species of vegetation selected will provide the identified habitat requirements for target species once it has successfully established. As a result, the site will meet or exceed planning criteria for inadequate wildlife habitat.

Feature Measure: acres planted (per acre)

Scenario Unit: Acres

Scenario Typical Size: 5.0

Scenario Total Cost: $1,280.05

Scenario Cost/Unit: $256.01

Cost Details:

Component Name	ID	Description	Unit	Cost	QTY	Total
Equipment Installation						
Seeding Operation, No Till/Grass Drill	960	No Till drill or grass drill for seeding. Includes equipment, power unit and labor costs.	Acres	$21.92	5	$109.60
Labor						
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.	Hours	$46.88	2	$93.76
Materials						
Native Perennial Grasses, Legumes and/or Forbs, Low Density	2753	A mix of native perennial grasses, legumes, and/or forbs, grasses typically greater than 50% of the mix, may include a small percentage of annual species for establishment purposes and/or if allowed by the CPS. Planted at lower to medium density (40 pure live seeds/sq ft and less). Species typically easy to purchase. Includes material and shipping.	Acres	$180.95	5	$904.75
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	$171.94	1	$171.94

Practice: 420 - Wildlife Habitat Planting

Scenario: #171 - Low Species Diversity on Cropland with Foregone Income

Scenario Description:

A wildlife habitat evaluation or plant community inventory indicates a potential to improve wildlife habitat by altering the current vegetation conditions (species diversity, richness, structure and pattern) and changing use (annual crop to permanent vegetation) by establishing herbaceous plants. This practice scenario applies to cropland currently in production. The inadequate wildlife habitat resource concern is met by planting a low diversity, low cost mix of readily available seeds. Weed pressure is minimal due to current and past management. Intensive site preparation and post- planting weed management is NOT necessary for establishment. Control or suppression of existing undesirable vegetation is accomplished through a single herbicide treatment at time, or just prior to planting and is included in this scenarios payment rate. Post planting weed treatment may be necessary and will be accomplished by applying additional practice standards (e.g. – CPS 314 & CPS 315)

Before Situation:

Vegetative habitat conditions (species diversity, richness, structure and pattern) do not meet planning criteria and do not have the potential to meet or exceed the minimum criteria through vegetative management activities alone. Current conditions and management are insufficient to address identified limiting habitat factor(s) or to increase planning criteria above a current planning criterion of at least 50% of the potential.

After Situation:

The land is no longer in production. Desired species have been planted and the Wildlife Habitat Planting criteria have been successfully implemented. The species of vegetation selected will provide the identified habitat requirements for target species once it has successfully established. As a result, the site will meet or exceed planning criteria for inadequate wildlife habitat

Feature Measure: acres planted (per acre)

Scenario Unit: Acres

Scenario Typical Size: 5.0

Scenario Total Cost: $2,871.80

Scenario Cost/Unit: $574.36

Cost Details:

Component Name	ID	Description	Unit	Cost	QTY	Total
Equipment Installation						
Chemical, ground application	948	Chemical application performed by ground equipment. Includes equipment, power unit and labor costs.	Acres	$5.80	5	$29.00
Seeding Operation, No Till/Grass Drill	960	No Till drill or grass drill for seeding. Includes equipment, power unit and labor costs.	Acres	$21.92	5	$109.60
Foregone Income						
FI, Corn Dryland	1959	Dryland Corn is Primary Crop	Acres	$270.47	5	$1,352.35
Labor						
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.	Hours	$46.88	4	$187.52
Materials						
Herbicide, Glyphosate	334	A broad-spectrum, non-selective systemic herbicide. Refer to WIN-PST for product names and active ingredients. Includes materials and shipping only.	Acres	$9.21	5	$46.05
Native Perennial Grasses, Legumes and/or Forbs, Low Density	2753	A mix of native perennial grasses, legumes, and/or forbs, grasses typically greater than 50% of the mix, may include a small percentage of annual species for establishment purposes and/or if allowed by the CPS. Planted at lower to medium density (40 pure live seeds/sq ft and less). Species typically easy to purchase. Includes material and shipping.	Acres	$180.95	5	$904.75
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	$70.59	1	$70.59
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	$171.94	1	$171.94

Practice: 422 - Hedgerow Planting

Scenario: #1 - Pollinator Habitat

Scenario Description:

Where pollinator habitat is an additional wildlife habitat concern this scenario addresses the resource concern of inadequate fish and wildlife habitat. It provides both physical habitat by providing areas that are not disturbed by annual tillage and provides pollen and nector throughout the growing season by establishing a diverse mixture of flowering plants. Typically a mixture of 5 or more species is planted to improve diversity so that pollen and nector are avaiable as long as possible. Typical installation is in or at the edge of cropland or pasture. Typical installation involves tillage to prepare the site for planting. Flowering trees and shrubs adapted for local climatic and edaphic conditions are typically planted at eight foot intervals (this will vary with species selection and density goals). A native grass adapted to the local climatic and edaphic conditions will be drilled into the site at a rate that will achieve a minimum of 20 seeds per square foot. A locally adapted mixture of at 3 pollen and nectar producing plants will be drilled into the site. The species list in the component section of this scenario are strictly for deriving a cost. Species adapted to local climatic and edaphic conditions will be listed in the specification for the site. There is tremendous overlap between this practice and conservation practice 380 Windbreak/Shelterbelt establishment. The main difference is that conservation practice 380 is exclusively woody plants where practice 422 provides for the use of herbaceous materials. If a fence is needed to facilitate establishment use practice 382, Fence.

Before Situation:

Pollen and nector sources are lacking or are only availble for part of the growing season. Large cropland tracks lack undisturbed areas for ground nesting bees

After Situation:

Flowering plants supply pollen and nector throughout the growing season. Undisturbed areas provide nesting sites for bees and other native pollinators.

Feature Measure: Length of Hedgerow

Scenario Unit: Feet

Scenario Typical Size: 800.0

Scenario Total Cost: $3,129.85

Scenario Cost/Unit: $3.91

Cost Details:

Component Name	ID	Description	Unit	Cost	QTY	Total
Equipment Installation						
Tillage, Primary	946	Includes heavy disking (offset) or chisel plow. Includes equipment, power unit and labor costs.	Acres	$16.30	0.25	$4.08
Seeding Operation, No Till/Grass Drill	960	No Till drill or grass drill for seeding. Includes equipment, power unit and labor costs.	Acres	$21.92	0.25	$5.48
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.	Hours	$27.56	100	$2,756.00
Materials						
Tree, Conifer, Seedling, Large	1515	Containerized conifer seedlings, 15 or 20 cubic inches; or bare root conifer seedlings 2+1 (three-year old seedlings that grew two years in the original seedbed and another year in a transplant bed) or bare root seedlings 3+0 and older (three-year or older seedlings grown in their original seedbed, or transplanted seedlings). Includes materials and shipping only.	Each	$1.33	100	$133.00
Tree shelter, mesh tree tube, 24 in.	1555	24 inch tall vexar or other open weave tubular tree shelter to protect from animal damage. Materials only.	Each	$0.40	100	$40.00
Animal repellent, chemical	1907	Chemical animal repellent to protect trees from animal damage. Includes materials and shipping only.	Gallons	$31.15	0.25	$7.79
Native Perennial Grasses, Legumes and/or Forb Mix for Targeted Wildlife/Pollinator Habitat or Ecological Restoration, moderate commercial availability	2619	Diverse mix of native perennial grasses, legumes and forbs, less than 50% grasses, may include biennials and a small percentage of annual species for establishment purposes and/or if allowed by the CPS. This is a mix composed of species required to meet specific wildlife/pollinator habitat or ecological requirements. Seed is moderately easy to purchase commercially. Includes materials and shipping.	Acres	$458.78	0.4	$183.51

Practice: 422 - Hedgerow Planting

Scenario: #2 - Contour

Scenario Description:

Typically installation of this scenario is within an annually cropped field. The hedge row is planted on the contour to provide a physical and visual aid to contour farming. This scenario is used to facilitate additional measures that address the resource concerns of; sheet and rill soil erosion and Water Quality Degradation, excess sediment in surface waters. Trees, shrubs, and grasses adapted for local climatic and edaphic conditions are typically planted at eight foot intervals (this will vary with species selection and density goals). Species selected should be at least three feet tall at maturity. There is tremendous overlap between this practice and conservation practice 380 Windbreak/Shelterbelt establishment. The main difference is that conservation practice 380 is exclusively woody plants where practice 422 provides for the use of herbaceous materials. If a fence is needed to facilitate establishment use practice 382, Fence.

Before Situation:

Contour farming practices are made difficult or less effective due to a lack of visual clues as to the location of the contours. Soil is lost to sheet and rill erosion. Sediments are deposited into surface waters.

After Situation:

Hedgerow planted on the contour presents a physical and visual guide for tillage and planting operations on the contour. Soil erosion from sheet and rill sources is reduced and the resultant deposition of sediment to surface waters is in turn reduced.

Feature Measure: Length of Hedgerow

Scenario Unit: Feet

Scenario Typical Size: 800.0

Scenario Total Cost: $3,396.64

Scenario Cost/Unit: $4.25

Cost Details:

Component Name	ID	Description	Unit	Cost	QTY	Total
Equipment Installation						
Tillage, Primary	946	Includes heavy disking (offset) or chisel plow. Includes equipment, power unit and labor costs.	Acres	$16.30	0.25	$4.08
Seeding Operation, No Till/Grass Drill	960	No Till drill or grass drill for seeding. Includes equipment, power unit and labor costs.	Acres	$21.92	0.25	$5.48
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.	Hours	$27.56	100	$2,756.00
Materials						
Tree, Conifer, Potted, Small	1534	Potted conifer seedling, 1 quart to 1 gallon. Includes materials and shipping only.	Each	$5.71	100	$571.00
Tree shelter, mesh tree tube, 24 in.	1555	24 inch tall vexar or other open weave tubular tree shelter to protect from animal damage. Materials only.	Each	$0.40	100	$40.00
Animal repellent, chemical	1907	Chemical animal repellent to protect trees from animal damage. Includes materials and shipping only.	Gallons	$31.15	0.25	$7.79
Introduced Perennial Grasses, Legumes and/or Forbs, Low Density	2747	Introduced perennial grasses, legumes, and/or forbs, may include a small percentage of annual species for establishment purposes and/or if allowed by the CPS. Planted at lower to medium density (40 pure live seeds/sq ft and less). Includes material and shipping.	Acres	$30.75	0.4	$12.30

Practice: 422 - Hedgerow Planting

Scenario: #4 - Wildlife, Warm Season Grass

Scenario Description:

Typically installed in or at the edge of cropland or pasture this scenario is used to address the Inadequate Habitat for Fish and Wildlife resource concern. Specifically, the establishment of dense vegetation in a linear design can be used to provide for several habitat elements depending on the needs identified in the habitat assessment. This scenario can provide: habitat conectivity, food, and cover for wildlife depending on design and plant species selection. The 422 standard for wildlife criteria calls for a minimum of two species of native plants.Typical installation involves tillage to prepare the site for planting. 2 Trees and/or shrubs adapted for local climatic and edaphic conditions are typically plant at eight foot intervals (this will vary with species selection and density goals). A mix of 2 native warm season grasses adapted to the local climatic and edaphic conditions will be drilled into the site at a rate that will achieve a minimum of 20 seeds per square foot. The species list in the component section of this scenario are strictly for deriving a cost. Plant species adapted to the local climatic and edaphic conditions that address the resource concern will be stated in the specification for the site. There is tremendous overlap between this practice and conservation practice 380 Windbreak/Shelterbelt establishment. The main difference is that conservation practice 380 is exclusively woody plants where practice 422 provides for the use of herbaceous materials. If a fence is needed to facilitate establishment use practice 382, Fence.

Before Situation:

Habitat patches lack connectivity. Cover is inadequate to allow wildlife to exploit cropland food resources. Berries and mast are limited.

After Situation:

Inadequate habitat for fish and wildlife is addressed for needs identified in the resource assessment. Habitat patches are connected by dense hedgerow vegetation. Food resources in crop fields are made availble by their proximity to hedgerow cover. Planting may include fruit and mast bearing species, improving food supply, depending on needs being addressed.

Feature Measure: Length of Hedgerow

Scenario Unit: Feet

Scenario Typical Size: 800.0

Scenario Total Cost: $3,428.87

Scenario Cost/Unit: $4.29

Cost Details:

Component Name	ID	Description	Unit	Cost	QTY	Total
Equipment Installation						
Tillage, Primary	946	Includes heavy disking (offset) or chisel plow. Includes equipment, power unit and labor costs.	Acres	$16.30	0.25	$4.08
Seeding Operation, No Till/Grass Drill	960	No Till drill or grass drill for seeding. Includes equipment, power unit and labor costs.	Acres	$21.92	0.25	$5.48
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.	Hours	$27.56	100	$2,756.00
Materials						
Tree, Conifer, Potted, Small	1534	Potted conifer seedling, 1 quart to 1 gallon. Includes materials and shipping only.	Each	$5.71	100	$571.00
Tree shelter, mesh tree tube, 24 in.	1555	24 inch tall vexar or other open weave tubular tree shelter to protect from animal damage. Materials only.	Each	$0.40	100	$40.00
Animal repellent, chemical	1907	Chemical animal repellent to protect trees from animal damage. Includes materials and shipping only.	Gallons	$31.15	0.25	$7.79
Native Perennial Grasses, Low Density	2750	Native perennial grasses, may include a small percentage of annual species for establishment purposes and/or if allowed by the CPS. Planted at lower to medium density (40 pure live seeds/sq ft and less). Includes material and shipping.	Acres	$111.33	0.4	$44.53

Practice: 422 - Hedgerow Planting

Scenario: #6 - Wildlife Cool Season

Scenario Description:

Typically installed in or at the edge of cropland or pasture this scenario is used to address the Inadequate Habitat for Fish and Wildlife resource concern. Specifically, the establishment of dense vegetation in a linear design can be used to provide for several habitat elements depending on the needs identified in the habitat assessment. This scenario can provide: habitat conectivity, food, and cover for wildlife depending on design and plant species selection. The 422 standard for wildlife criteria calls for a minimum of two species of native plants.Typical installation involves tillage to prepare the site for planting. 2 Trees and/or shrubs adapted for local climatic and edaphic conditions are typically plant at eight foot intervals (this will vary with species selection and density goals). A native cool season grass adapted to the local climatic and edaphic conditions will be drilled into the site at a rate that will achieve a minimum of 20 seeds per square foot. The species list in the component section of this scenario are strictly for deriving a cost. Plant species adapted to the local climatic and edaphic conditions that address the resource concern will be stated in the specification for the site. There is tremendous overlap between this practice and conservation practice 380 Windbreak/Shelterbelt establishment. The main difference is that conservation practice 380 is exclusively woody plants where practice 422 provides for the use of herbaceous materials. If a fence is needed to facilitate establishment use practice 382, Fence.

Before Situation:

Habitat patches lack connectivity. Cover is inadequate to allow wildlife to exploit cropland food resources. Berries and mast are limited.

After Situation:

Inadequate habitat for fish and wildlife is addressed for needs identified in the resource assessment. Habitat patches are connected by dense hedgerow vegetation. Food resources in crop fields are made availble by their proximity to hedgerow cover. Planting may include fruit and mast bearing species, improving food supply, depending on needs being addressed.

Feature Measure: Length of Hedgerow

Scenario Unit: Feet

Scenario Typical Size: 800.0

Scenario Total Cost: $3,637.85

Scenario Cost/Unit: $4.55

Cost Details:

Component Name	ID	Description	Unit	Cost	QTY	Total
Equipment Installation						
Tillage, Primary	946	Includes heavy disking (offset) or chisel plow. Includes equipment, power unit and labor costs.	Acres	$16.30	0.25	$4.08
Seeding Operation, No Till/Grass Drill	960	No Till drill or grass drill for seeding. Includes equipment, power unit and labor costs.	Acres	$21.92	0.25	$5.48
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.	Hours	$27.56	100	$2,756.00
Materials						
Shrub, Potted, Small	1524	Potted shrub seedling, 1 quart to 1 gallon. Includes materials and shipping only.	Each	$6.41	100	$641.00
Tree shelter, mesh tree tube, 24 in.	1555	24 inch tall vexar or other open weave tubular tree shelter to protect from animal damage. Materials only.	Each	$0.40	100	$40.00
Animal repellent, chemical	1907	Chemical animal repellent to protect trees from animal damage. Includes materials and shipping only.	Gallons	$31.15	0.25	$7.79
Native Perennial Grasses, Legumes and/or Forb Mix for Targeted Wildlife/Pollinator Habitat or Ecological Restoration, moderate commercial availability	2619	Diverse mix of native perennial grasses, legumes and forbs, less than 50% grasses, may include biennials and a small percentage of annual species for establishment purposes and/or if allowed by the CPS. This is a mix composed of species required to meet specific wildlife/pollinator habitat or ecological requirements. Seed is moderately easy to purchase commercially. Includes materials and shipping.	Acres	$458.78	0.4	$183.51

Practice: 423 - Hillside Ditch

Scenario: #3 - Channel, Hand Labor

Scenario Description:

A hillside ditch is a channel that has a supporting ridge on the lower side, constructed with hand labor across the slope at defined gradient and horizontal or vertical interval, with or without a vegetative barrier to safely control the flow of water by diverting runoff from upland sloping areas to a stable outlet. The resource concerns addressed include soil erosion, water quality degradation, and excess runoff.

Before Situation:

Hillside Ditch applies to steeply sloping sites where surface flow is damaging sloping upland, and there is sufficient soil depth for constructing a hillside ditch system. Hillside ditches shall not be used to provide protection to buildings, roads, or other improvements.

After Situation:

A hillside ditch is constructed with hand labor and consist of approximately 300 feet of channel that has a supporting ridge on the lower side, constructed across the slope at defined gradient and horizontal or vertical interval, with or without a vegetative barrier to safely control the flow of water by diverting runoff from upland sloping areas to a stable outlet. A hiiside ditch controls and reduces soil erosion, water quality degradation, and excess runoff. Any needed vegetation will be completed under critical area planting (342). Erosion control during construction activities will use Stormwater Runoff Control (570). Other associated practices include Critical Area Planting (342), Grassed Waterway (412), Underground Outlet (620), Mulching (484), Subsurface Drainage (606), Lined Waterway or Outlet (468), Underground Outlet (620), and Grade Stabilization Structure (410).

Feature Measure: Length of Channel

Scenario Unit: Feet

Scenario Typical Size: 300.0

Scenario Total Cost: $611.86

Scenario Cost/Unit: $2.04

Cost Details:

Component Name	ID	Description	Unit	Cost	QTY	Total
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.	Hours	$27.56	20.5	$564.98
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.	Hours	$46.88	1	$46.88

Practice: 423 - Hillside Ditch

Scenario: #4 - Channel, Equipment

Scenario Description:

A hillside ditch is a channel that has a supporting ridge on the lower side, constructed with equipment across the slope at defined gradient and horizontal or vertical interval, with or without a vegetative barrier to safely control the flow of water by diverting runoff from upland sloping areas to a stable outlet. The resource concerns addressed include soil erosion, water quality degradation, and excess runoff.

Before Situation:

A hillside ditch applies to steeply sloping sites where surface flow is damaging sloping upland, and there is sufficient soil depth for constructing a hillside ditch system. Hillside ditches shall not be used to provide protection to buildings, roads, or other improvements.

After Situation:

A hillside ditch is constructed with equipment and consists of approximately 200 cubic yards of excavated channel that has a supporting ridge on the lower side, constructed across the slope at defined gradient and horizontal or vertical interval, with or without a vegetative barrier to safely control the flow of water by diverting runoff from upland sloping areas to a stable outlet. A hiiside ditch controls and reduces soil erosion, water quality degradation, and controls excess runoff. Any needed vegetation will be completed under critical area planting (342). Erosion control during construction activities will use Stormwater Runoff Control (570). Other associated practices include Critical Area Planting (342), Grassed Waterway (412), Underground Outlet (620), Mulching (484), Subsurface Drainage (606), Lined Waterway or Outlet (468), Underground Outlet (620), and Grade Stabilization Structure (410).

Feature Measure: Volume of Channel

Scenario Unit: Cubic Yards

Scenario Typical Size: 200.0

Scenario Total Cost: $622.41

Scenario Cost/Unit: $3.11

Cost Details:

Component Name	ID	Description	Unit	Cost	QTY	Total
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 Yards	$2.31	200	$462.00
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.	Hours	$27.56	1	$27.56
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.	Hours	$46.88	1	$46.88
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	$171.94	0.5	$85.97

Practice: 430 - Irrigation Pipeline

Scenario: #1 - PVC (Iron Pipe Size) 8in or less diam

Scenario Description:

Description: Below ground installation of PVC (Iron Pipe Size) pipeline. PVC (IPS) is manufactured in sizes (nominal diameter) from ½-inch to 36-inch; typical practice sizes range from 2-inch to 24-inch; and typical scenario size is 6-inch. Construct 1,000 feet of 6-inch, Class 125 (SDR-32.5), PVC pipeline with appurtenances, installed below ground with a minimum of 2.5 feet of ground cover. The unit is weight of pipe material in pounds. 1,000 feet of 6-inch, Class 125 (SDR-32.5) PVC pipe weighs 2.596 lb/ft, or a total of 2,596 pounds. Appurtenances include: couplings, fittings, air vents, pressure relief valves, thrust blocks, risers, and inline valves, and are included in the cost of pipe material (additional 10% of pipe material quantity). Cost of appurtenances does not include flow meters or backflow preventers. Typical installation applies to soils with no special bedding requirements. Resource Concerns: Inefficient Use of Irrigation Water; Inefficient Energy Use. Associated Practices: 436 - Irrigation Reservoir; 441 - Irrigation System, Microirrigation; 442 - Irrigation System, Sprinkler; 443 - Irrigation System, Surface & Subsurface; 447 - Irrigation System, Tailwater Recovery; 533 - Pumping Plant; 634 - Waste Transfer.

Before Situation:

Pipeline needed to replace or supplement inefficient irrigation conveyance systems.

After Situation:

1,000 LF of 6" Diam PVC 125 psi pipeline is installed to convey and/or distribute water to irrigation systems or reservoirs, minimizing non-beneficial water use, reducing soil erosion, and/or reducing energy use.

Feature Measure: Weight of Pipe

Scenario Unit: Pound

Scenario Typical Size: 2,596.0

Scenario Total Cost: $8,959.03

Scenario Cost/Unit: $3.45

Cost Details:

Component Name	ID	Description	Unit	Cost	QTY	Total
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 Yards	$2.31	250	$577.50
Backhoe, 80 HP	926	Wheel mounted backhoe excavator with horsepower range of 60 to 90. Equipment and power unit costs. Labor not included.	Hours	$31.96	8	$255.68
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.	Hours	$37.19	16	$595.04
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.	Hours	$27.56	40	$1,102.40
Equipment Operators, Light	232	Includes: Skid Steer Loaders, Hydraulic Excavators <50 HP, Trenchers <12 in., Ag Equipment <150 HP, Pickup Trucks, Forklifts, Mulchers	Hours	$27.87	12	$334.44
Materials						
Pipe, PVC, dia. < 18 in., weight priced	1323	Polyvinyl Chloride (PVC) pressure rated pipe priced by the weight of the pipe materials for pipes with diameters less than 18 inch. Materials only.	Pound	$1.93	2856	$5,512.08
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	$70.59	1	$70.59
Mobilization, medium equipment	1139	Equipment with 70-150 HP or typical weights between 14,000 and 30,000 pounds.	Each	$255.65	2	$511.30

Practice: 430 - Irrigation Pipeline

Scenario: #2 - PVC (Iron Pipe Size) 8in or less diameter with 4 in sand bedding

Scenario Description:

Description: Below ground installation of PVC (Iron Pipe Size) pipeline. PVC (IPS) is manufactured in sizes (nominal diameter) from ½-inch to 36-inch; typical practice sizes range from 2-inch to 24-inch; and typical scenario size is 6-inch. Construct 1,000 feet of 6-inch, Class 125 (SDR-32.5), PVC pipeline with appurtenances, installed below ground with a minimum of 2.5 feet of ground cover. The unit is weight of pipe material in pounds. 1,000 feet of 6-inch, Class 125 (SDR-32.5) PVC pipe weighs 2.596 lb/ft, or a total of 2,596 pounds. Appurtenances include: couplings, fittings, air vents, pressure relief valves, thrust blocks, risers, and inline valves, and are included in the cost of pipe material (additional 10% of pipe material quantity). Cost of appurtenances does not include flow meters or backflow preventers. Typical installation applies to rocky soils which require 4" of sand bedding. Resource Concerns: Inefficient Use of Irrigation Water; Inefficient Energy Use. Associated Practices: 436 - Irrigation Reservoir; 441 - Irrigation System, Microirrigation; 442 - Irrigation System, Sprinkler; 443 - Irrigation System, Surface & Subsurface; 447 - Irrigation System, Tailwater Recovery; 533 - Pumping Plant; 634 - Waste Transfer.

Before Situation:

Pipeline needed to replace or supplement inefficient irrigation conveyance systems.

After Situation:

1,000 LF of 6" Diam PVC 125 psi pipeline with 4" of sand bedding is installed to convey and/or distribute water to irrigation systems or reservoirs, minimizing non-beneficial water use, reducing soil erosion, and/or reducing energy use.

Feature Measure: Weight of Pipe

Scenario Unit: Pound

Scenario Typical Size: 2,596.0

Scenario Total Cost: $9,385.78

Scenario Cost/Unit: $3.62

Cost Details:

Component Name	ID	Description	Unit	Cost	QTY	Total
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 Yards	$2.31	250	$577.50
Backhoe, 80 HP	926	Wheel mounted backhoe excavator with horsepower range of 60 to 90. Equipment and power unit costs. Labor not included.	Hours	$31.96	8	$255.68
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	$0.31	250	$77.50
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.	Hours	$37.19	16	$595.04
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.	Hours	$27.56	40	$1,102.40
Equipment Operators, Light	232	Includes: Skid Steer Loaders, Hydraulic Excavators <50 HP, Trenchers <12 in., Ag Equipment <150 HP, Pickup Trucks, Forklifts, Mulchers	Hours	$27.87	12	$334.44
Materials						
Pipe, PVC, dia. < 18 in., weight priced	1323	Polyvinyl Chloride (PVC) pressure rated pipe priced by the weight of the pipe materials for pipes with diameters less than 18 inch. Materials only.	Pound	$1.93	2856	$5,512.08
Earthfill Material, purchased, common	2060	Purchased earthfill materials includes both silt or clay. Material only.	Cubic Yards	$13.97	25	$349.25
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	$70.59	1	$70.59
Mobilization, medium equipment	1139	Equipment with 70-150 HP or typical weights between 14,000 and 30,000 pounds.	Each	$255.65	2	$511.30

Practice: 430 - Irrigation Pipeline

Scenario: #3 - PVC (Iron Pipe Size) 10in or more diameter

Scenario Description:

Description: Below ground installation of PVC (Iron Pipe Size) pipeline. PVC (IPS) is manufactured in sizes (nominal diameter) from ½-inch to 36-inch; typical practice sizes range from 2-inch to 24-inch; and typical scenario size is 12-inch. Construct 1,000 feet of 12-inch, Class 200 (SDR-21), PVC pipeline with appurtenances, installed below ground with a minimum of 2.5 feet of ground cover. The unit is weight of pipe material in pounds. 1,000 feet of 12-inch, Class 200 (SDR-21) PVC pipe weighs 14.43 lb/ft, or a total of 14,430 pounds. Appurtenances include: couplings, fittings, air vents, pressure relief valves, thrust blocks, risers, and inline valves, and are included in the cost of pipe material (additional 10% of pipe material quantity). Cost of appurtenances does not include flow meters or backflow preventers. Typical installation applies to soils with no special bedding requirements. Resource Concerns: Inefficient Use of Irrigation Water; Inefficient Energy Use. Associated Practices: 436 - Irrigation Reservoir; 441 - Irrigation System, Microirrigation; 442 - Irrigation System, Sprinkler; 443 - Irrigation System, Surface & Subsurface; 447 - Irrigation System, Tailwater Recovery; 533 - Pumping Plant; 634 - Waste Transfer.

Before Situation:

Pipeline needed to replace or supplement inefficient irrigation conveyance systems.

After Situation:

1,000 LF of 12" Diam PVC 200 psi pipeline is installed to convey and/or distribute water to irrigation systems or reservoirs, minimizing non-beneficial water use, reducing soil erosion, and/or reducing energy use.

Feature Measure: Weight of Pipe

Scenario Unit: Pound

Scenario Typical Size: 14,430.0

Scenario Total Cost: $34,641.78

Scenario Cost/Unit: $2.40

Cost Details:

Component Name	ID	Description	Unit	Cost	QTY	Total
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 Yards	$2.31	260	$600.60
Backhoe, 80 HP	926	Wheel mounted backhoe excavator with horsepower range of 60 to 90. Equipment and power unit costs. Labor not included.	Hours	$31.96	12	$383.52
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.	Hours	$37.19	24	$892.56
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.	Hours	$27.56	40	$1,102.40
Equipment Operators, Light	232	Includes: Skid Steer Loaders, Hydraulic Excavators <50 HP, Trenchers <12 in., Ag Equipment <150 HP, Pickup Trucks, Forklifts, Mulchers	Hours	$27.87	16	$445.92
Materials						
Pipe, PVC, dia. < 18 in., weight priced	1323	Polyvinyl Chloride (PVC) pressure rated pipe priced by the weight of the pipe materials for pipes with diameters less than 18 inch. Materials only.	Pound	$1.93	15873	$30,634.89
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	$70.59	1	$70.59
Mobilization, medium equipment	1139	Equipment with 70-150 HP or typical weights between 14,000 and 30,000 pounds.	Each	$255.65	2	$511.30

Practice: 430 - Irrigation Pipeline

Scenario: #4 - PVC (Iron Pipe Size) 10in or more diameter with 4 in sand bedding

Scenario Description:

Description: Below ground installation of PVC (Iron Pipe Size) pipeline. PVC (IPS) is manufactured in sizes (nominal diameter) from ½-inch to 36-inch; typical practice sizes range from 2-inch to 24-inch; and typical scenario size is 12-inch. Construct 1,000 feet of 12-inch, Class 200 (SDR-21), PVC pipeline with appurtenances, installed below ground with a minimum of 2.5 feet of ground cover. The unit is weight of pipe material in pounds. 1,000 feet of 12-inch, Class 200 (SDR-21) PVC pipe weighs 14.43 lb/ft, or a total of 14,430 pounds. Appurtenances include: couplings, fittings, air vents, pressure relief valves, thrust blocks, risers, and inline valves, and are included in the cost of pipe material (additional 10% of pipe material quantity). Cost of appurtenances does not include flow meters or backflow preventers. Typical installation applies to soils with no special bedding requirements. Resource Concerns: Inefficient Use of Irrigation Water; Inefficient Energy Use. Associated Practices: 436 - Irrigation Reservoir; 441 - Irrigation System, Microirrigation; 442 - Irrigation System, Sprinkler; 443 - Irrigation System, Surface & Subsurface; 447 - Irrigation System, Tailwater Recovery; 533 - Pumping Plant; 634 - Waste Transfer.

Before Situation:

Pipeline needed to replace or supplement inefficient irrigation conveyance systems.

After Situation:

1,000 LF of 12" Diam PVC 200 psi pipeline is installed to convey and/or distribute water to irrigation systems or reservoirs, minimizing non-beneficial water use, reducing soil erosion, and/or reducing energy use.

Feature Measure: Weight of Pipe

Scenario Unit: Pound

Scenario Typical Size: 14,430.0

Scenario Total Cost: $35,068.53

Scenario Cost/Unit: $2.43

Cost Details:

Component Name	ID	Description	Unit	Cost	QTY	Total
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 Yards	$2.31	260	$600.60
Backhoe, 80 HP	926	Wheel mounted backhoe excavator with horsepower range of 60 to 90. Equipment and power unit costs. Labor not included.	Hours	$31.96	12	$383.52
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	$0.31	250	$77.50
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.	Hours	$37.19	24	$892.56
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.	Hours	$27.56	40	$1,102.40
Equipment Operators, Light	232	Includes: Skid Steer Loaders, Hydraulic Excavators <50 HP, Trenchers <12 in., Ag Equipment <150 HP, Pickup Trucks, Forklifts, Mulchers	Hours	$27.87	16	$445.92
Materials						
Pipe, PVC, dia. < 18 in., weight priced	1323	Polyvinyl Chloride (PVC) pressure rated pipe priced by the weight of the pipe materials for pipes with diameters less than 18 inch. Materials only.	Pound	$1.93	15873	$30,634.89
Earthfill Material, purchased, common	2060	Purchased earthfill materials includes both silt or clay. Material only.	Cubic Yards	$13.97	25	$349.25
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	$70.59	1	$70.59
Mobilization, medium equipment	1139	Equipment with 70-150 HP or typical weights between 14,000 and 30,000 pounds.	Each	$255.65	2	$511.30

Practice: 430 - Irrigation Pipeline

Scenario: #5 - HDPE (Iron Pipe Size & Tubing) greater than 3in to 8in diameter

Scenario Description:

Description: Below ground installation of HDPE (Iron Pipe Size & Tubing) pipeline. HDPE (IPS & Tubing) is manufactured in sizes (nominal diameter) from ½-inch to 24-inch; typical practice sizes range from 2-inch to 24-inch; and typical scenario size is 6-inch. Construct 1,000 feet of 6-inch, Class 100 (SDR-17), HDPE pipeline with appurtenances, installed below ground with a minimum 2.5 feet of ground cover. The unit is weight of pipe material in pounds. 1,000 feet of 6-inch, Class 100 (SDR-17), HDPE weighs 3.251 lb/ft, or a total of 3,251 pounds. Appurtenances include: fittings, air vents, pressure relief valves, thrust blocks, risers, and inline valves, and are included in the cost of pipe material (additional 10% of pipe material quantity). Cost of appurtenances does not include flow meters or backflow preventers. Typical installation applies to soils with no special bedding requirements. Resource Concerns: Inefficient Use of Irrigation Water; Inefficient Energy Use. Associated Practices: 436 - Irrigation Reservoir; 441 - Irrigation System, Microirrigation; 442 - Irrigation System, Sprinkler; 443 - Irrigation System, Surface & Subsurface; 447 - Irrigation System, Tailwater Recovery; 533 - Pumping Plant; 634 - Waste Transfer.

Before Situation:

Pipeline needed to replace or supplement inefficient irrigation conveyance systems.

After Situation:

1,000 LF of 6" Diam HDPE 100 psi pipeline is installed to convey and/or distribute water to irrigation systems or reservoirs, minimizing non-beneficial water use, reducing soil erosion, and/or reducing energy use.

Feature Measure: Weight of Pipe

Scenario Unit: Pound

Scenario Typical Size: 3,251.0

Scenario Total Cost: $13,150.63

Scenario Cost/Unit: $4.05

Cost Details:

Component Name	ID	Description	Unit	Cost	QTY	Total
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 Yards	$2.31	250	$577.50
Backhoe, 80 HP	926	Wheel mounted backhoe excavator with horsepower range of 60 to 90. Equipment and power unit costs. Labor not included.	Hours	$31.96	8	$255.68
Fuser for HDPE Pipe	1383	Fusing machine for 1 to 12 inch diameter HDPE pipe joints. Equipment costs only. Does not include labor.	Hours	$19.85	13	$258.05
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.	Hours	$37.19	16	$595.04
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.	Hours	$27.56	48	$1,322.88
Equipment Operators, Light	232	Includes: Skid Steer Loaders, Hydraulic Excavators <50 HP, Trenchers <12 in., Ag Equipment <150 HP, Pickup Trucks, Forklifts, Mulchers	Hours	$27.87	12	$334.44
Materials						
Pipe, HDPE, smooth wall, weight priced	1379	High Density Polyethylene (HDPE) compound manufactured into smooth wall pipe. Materials only.	Pound	$2.56	3576	$9,154.56
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	$70.59	2	$141.18
Mobilization, medium equipment	1139	Equipment with 70-150 HP or typical weights between 14,000 and 30,000 pounds.	Each	$255.65	2	$511.30

Practice: 430 - Irrigation Pipeline

Scenario: #6 - HDPE (Iron Pipe Size & Tubing) 10in or more diameter

Scenario Description:

Description: Below ground installation of HDPE (Iron Pipe Size & Tubing) pipeline. HDPE (IPS & Tubing) is manufactured in sizes (nominal diameter) from ½-inch to 24-inch; typical practice sizes range from 2-inch to 24-inch; and typical scenario size is 12-inch. Construct 1,000 feet of 12-inch, Class 130 (SDR-13.5), HDPE pipeline with appurtenances, installed below ground with a minimum 2 feet of ground cover. The unit is weight of pipe material in pounds. 1,000 feet of 12-inch, Class 130 (SDR-13.5), HDPE weighs 14.89 lb/ft, or a total of 14,890 pounds. Appurtenances include: fittings, air vents, pressure relief valves, thrust blocks, risers, and inline valves, and are included in the cost of pipe material (additional 10% of pipe material quantity). Cost of appurtenances does not include flow meters or backflow preventers. Typical installation applies to soils with no special bedding requirements. Resource Concerns: Inefficient Use of Irrigation Water; Inefficient Energy Use. Associated Practices: 436 - Irrigation Reservoir; 441 - Irrigation System, Microirrigation; 442 - Irrigation System, Sprinkler; 443 - Irrigation System, Surface & Subsurface; 447 - Irrigation System, Tailwater Recovery; 533 - Pumping Plant; 634 - Waste Transfer.

Before Situation:

Pipeline needed to replace or supplement inefficient irrigation conveyance systems.

After Situation:

1,000 LF of 12" Diam HDPE 130 psi pipelinePipeline installed to convey and/or distribute water to irrigation systems or reservoirs, minimizing non-beneficial water use, reducing soil erosion, and/or reducing energy use.

Feature Measure: Weight of Pipe

Scenario Unit: Pound

Scenario Typical Size: 14,890.0

Scenario Total Cost: $46,188.73

Scenario Cost/Unit: $3.10

Cost Details:

Component Name	ID	Description	Unit	Cost	QTY	Total
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 Yards	$2.31	260	$600.60
Backhoe, 80 HP	926	Wheel mounted backhoe excavator with horsepower range of 60 to 90. Equipment and power unit costs. Labor not included.	Hours	$31.96	12	$383.52
Fuser for HDPE Pipe	1383	Fusing machine for 1 to 12 inch diameter HDPE pipe joints. Equipment costs only. Does not include labor.	Hours	$19.85	13	$258.05
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.	Hours	$37.19	16	$595.04
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.	Hours	$27.56	48	$1,322.88
Equipment Operators, Light	232	Includes: Skid Steer Loaders, Hydraulic Excavators <50 HP, Trenchers <12 in., Ag Equipment <150 HP, Pickup Trucks, Forklifts, Mulchers	Hours	$27.87	16	$445.92
Materials						
Pipe, HDPE, smooth wall, weight priced	1379	High Density Polyethylene (HDPE) compound manufactured into smooth wall pipe. Materials only.	Pound	$2.56	16379	$41,930.24
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	$70.59	2	$141.18
Mobilization, medium equipment	1139	Equipment with 70-150 HP or typical weights between 14,000 and 30,000 pounds.	Each	$255.65	2	$511.30

Practice: 430 - Irrigation Pipeline

Scenario: #7 - Surface HDPE (Iron Pipe Size & Tubing)

Scenario Description:

Description: On-ground surface installation of HDPE (Iron Pipe Size & Tubing) pipeline. HDPE (IPS & Tubing) is manufactured in sizes (nominal diameter) from ½-inch to 24-inch; typical practice sizes range from 2-inch to 24-inch; and typical scenario size is 2-inch. Construct 1,000 ft of 2-inch, Class 200 (SDR-9.0), HDPE pipeline with appurtenances, installed on the ground surface. The unit is weight of pipe material in pounds. 1,000 feet of 2-inch, Class 200 (SDR-9.0), HDPE weighs 0.744 lb/ft, or a total of 744 pounds. Appurtenances include: fittings, air vents, pressure relief valves, anchors, thrust blocks, risers, and inline valves, and are included in the cost of pipe material (additional 15% of pipe material quantity). Cost of appurtenances does not include flow meters or backflow preventers. Typical installation applies to soils with no special bedding requirements. Resource Concerns: Inefficient Use of Irrigation Water; Inefficient Energy Use. Associated Practices: 436 - Irrigation Reservoir; 441 - Irrigation System, Microirrigation; 442 - Irrigation System, Sprinkler; 443 - Irrigation System, Surface & Subsurface; 447 - Irrigation System, Tailwater Recovery; 533 - Pumping Plant; 634 - Waste Transfer.

Before Situation:

Pipeline needed to replace or supplement inefficient irrigation conveyance systems.

After Situation:

1000 LF of 2" HDPE 200 psi pipeline is installed to convey and/or distribute water to irrigation systems or reservoirs, minimizing non-beneficial water use, reducing soil erosion, and/or reducing energy use.

Feature Measure: Weight of Pipe

Scenario Unit: Pound

Scenario Typical Size: 744.0

Scenario Total Cost: $2,892.60

Scenario Cost/Unit: $3.89

Cost Details:

Component Name	ID	Description	Unit	Cost	QTY	Total
Equipment Installation						
Fuser for HDPE Pipe	1383	Fusing machine for 1 to 12 inch diameter HDPE pipe joints. Equipment costs only. Does not include labor.	Hours	$19.85	6	$119.10
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.	Hours	$27.56	16	$440.96
Materials						
Pipe, HDPE, smooth wall, weight priced	1379	High Density Polyethylene (HDPE) compound manufactured into smooth wall pipe. Materials only.	Pound	$2.56	856	$2,191.36
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	$70.59	2	$141.18

Practice: 430 - Irrigation Pipeline

Scenario: #8 - Horizontal Boring

Scenario Description:

Install an irrigation pipeline under a road using directional drilling or horizontal boring equipment. Boring is done approximately 50" below the road surface. Road is approximatley 30' wide and length of boring is 50'. This scenario shall only be used if no other alignement is feasible. The only length of pipeline included is the scenario is for the road crossing. This scenario only pertains to horizontal boring through overburden material, not rock. Typical installation applies to soils with no special bedding requirements. The typical scenario costs include a12" steel carrier pipe, 6" PVC irrigation pipeline, horizontal boring equipment, excavator and misc. labor. Associated Practices: 436 - Irrigation Reservoir; 441 - Irrigation System, Microirrigation; 442 - Irrigation System, Sprinkler; 443 - Irrigation System, Surface & Subsurface; 447 - Irrigation System, Tailwater Recovery; 533 - Pumping Plant; 634 - Waste Transfer.

Before Situation:

Pipeline needed to replace or supplement inefficient irrigation conveyance systems.

After Situation:

50 LF of 6" PVC irrigation pipeline will be installed with a carrier pipe to convey and/or distribute water to irrigation systems or reservoirs, minimizing non-beneficial water use, reducing soil erosion, and/or reducing energy use.

Feature Measure: Foot of Pipe

Scenario Unit: Feet

Scenario Typical Size: 50.0

Scenario Total Cost: $9,266.02

Scenario Cost/Unit: $185.32

Cost Details:

Component Name	ID	Description	Unit	Cost	QTY	Total
Equipment Installation						
Horizontal Boring, Greater Than 3 in. diameter	1132	Includes equipment, labor and setup.	Feet	$111.55	50	$5,577.50
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.	Hours	$27.56	8	$220.48
Materials						
Pipe, PVC, 6 in., SDR 26	990	Materials: - 6 inch - PVC - SDR 26 160 psi - ASTM D2241	Feet	$6.15	50	$307.50
Pipe, CMP, 14-12 gauge, weight priced	1589	14 and 12 gauge galvanized helical corrugated metal pipe priced by the weight of the pipe materials. Materials only.	Pound	$0.99	2676	$2,649.24
Mobilization						
Mobilization, medium equipment	1139	Equipment with 70-150 HP or typical weights between 14,000 and 30,000 pounds.	Each	$255.65	2	$511.30

Practice: 430 - Irrigation Pipeline

Scenario: #47 - Surface Aluminum (Aluminum Irrigation Pipe)

Scenario Description:

Description: On-ground surface installation of Aluminum Irrigation Pipe (AIP) pipeline. AIP is manufactured in sizes (nominal diameter) from 2-inch to 12-inch; typical practice sizes range from 6-inch to 12-inch; and typical scenario size is 8-inch. Construct 1/8 mile (660 feet) of 8-inch, 0.050-inch wall, Aluminum Irrigation Pipe (AIP) with appurtenances, installed on the ground surface. The unit is weight of pipe in pounds of pipe material. 660 feet of 8-inch, 0.050-inch wall, AIP weighs 1.47 lb/ft, or a total of 970 pounds. Appurtenances include: couplings, fittings, air vents, risers, and inline valves, and are included in the cost of pipe material (additional 10% of pipe material quantity). Cost of appurtenances does not include flow meters or backflow preventers. Typical installation applies to soils with no special bedding requirements. Resource Concerns: Inefficient Use of Irrigation Water; Inefficient Energy Use. Associated Practices: 436 - Irrigation Reservoir; 441 - Irrigation System, Microirrigation; 442 - Irrigation System, Sprinkler; 443 - Irrigation System, Surface & Subsurface; 447 - Irrigation System, Tailwater Recovery; 533 - Pumping Plant; 634 - Waste Transfer.

Before Situation:

Pipeline needed to replace or supplement inefficient irrigation conveyance systems.

After Situation:

Pipeline installed to convey and/or distribute water to irrigation systems or reservoirs, minimizing non-beneficial water use, reducing soil erosion, and/or reducing energy use.

Feature Measure: Weight of Pipe

Scenario Unit: Pound

Scenario Typical Size: 970.0

Scenario Total Cost: $3,886.08

Scenario Cost/Unit: $4.01

Cost Details:

Component Name	ID	Description	Unit	Cost	QTY	Total
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.	Hours	$27.56	8	$220.48
Materials						
Pipe, aluminum, smooth wall, weight priced	1382	Aluminum manufactured into smooth wall pipe	Pound	$4.64	790	$3,665.60

Practice: 430 - Irrigation Pipeline

Scenario: #49 - HDPE (Iron Pipe Size & Tubing) up to 3 inch diameter

Scenario Description:

Description: Below ground installation of HDPE (Iron Pipe Size & Tubing) pipeline. HDPE (IPS & Tubing) is manufactured in sizes (nominal diameter) from ½-inch to 24-inch; typical practice sizes range from 3/4-inch to 3-inch; and typical scenario size is 1.5-inch. Construct 500 feet of 1.5-inch, Class 100 (SDR-17), HDPE pipeline with appurtenances, installed below ground with a minimum 2.5 feet of ground cover. The unit is pounds. Appurtenances include: fittings, air vents, pressure relief valves, thrust blocks, risers, and inline valves, and are included in the cost of pipe material (additional 10% of pipe material quantity). Cost of appurtenances does not include flow meters or backflow preventers. Typical installation applies to soils with no special bedding requirements. Typical size: 500 ft x 0.271 lbs/ft = 136 lbs Resource Concerns: Inefficient Use of Irrigation Water; Inefficient Energy Use. Associated Practices: 436 - Irrigation Reservoir; 441 - Irrigation System, Microirrigation; 442 - Irrigation System, Sprinkler; 443 - Irrigation System, Surface & Subsurface; 447 - Irrigation System, Tailwater Recovery; 533 - Pumping Plant; 634 - Waste Transfer.

Before Situation:

Pipeline needed to replace or supplement inefficient irrigation conveyance systems.

After Situation:

500 LF of 1.5" Diameter HDPE 100 psi pipeline is installed to convey and/or distribute water to irrigation systems or reservoirs, minimizing non-beneficial water use, reducing soil erosion, and/or reducing energy use.

Feature Measure: Weight of pipeline used

Scenario Unit: Pound

Scenario Typical Size: 136.0

Scenario Total Cost: $2,944.29

Scenario Cost/Unit: $21.65

Cost Details:

Component Name	ID	Description	Unit	Cost	QTY	Total
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.	Hours	$31.96	24	$767.04
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.	Hours	$27.56	24	$661.44
Equipment Operators, Heavy	233	Includes: Cranes, Hydraulic Excavators >=50 HP, Dozers, Paving Machines, Rock Trenchers, Trenchers >=12 in., Dump Trucks, Ag Equipment >=150 HP, Scrapers, Water Wagons.	Hours	$38.00	24	$912.00
Materials						
Pipe, HDPE, smooth wall, weight priced	1379	High Density Polyethylene (HDPE) compound manufactured into smooth wall pipe. Materials only.	Pound	$2.56	136	$348.16
Mobilization						
Mobilization, medium equipment	1139	Equipment with 70-150 HP or typical weights between 14,000 and 30,000 pounds.	Each	$255.65	1	$255.65

Practice: 432 - Dry Hydrant

Scenario: #2 - PVC

Scenario Description:

A non-pressurized permanent PVC pipe assembly system installed into an adequate water source with an all weather access that permits the withdrawal of water by suction for fire suppression. The location must have an adequate volume of water available, where transport vehicles can access the site, and where a source of water is needed for fire suppression. The resource concerns addressed include reduced visibility due to fire and lack of access to water for fire suppression.

Before Situation:

A location where an adequate volume of water is available, where transport vehicles can access the site, and where an adequate source of water is needed for fire suppression.

After Situation:

The typical dry hydrant will use 200 ft. of 6 inch PVC pipe, installed into an adequate water source with an all weather access that permits the withdrawal of water by suction for fire suppression. The pipe is fitted with an intake strainer and hydrant head with standard fire truck hose adapters acceptable to the local fire department, for quick connect/release. Plastic pipe is protected from ultraviolet rays. The dry hydrant is constructed by installing the pipe using a backhoe or other trenching equipment. Vegetation of disturbed areas will be completed under critical area planting (342). All weather access will use Heavy Use Area Protection (561). Erosion control during construction activities will use Stormwater Runoff Control (570). Other associated practices include Pond (378), Dam (402), Access Road (560), and Access Control (472).

Feature Measure: Number

Scenario Unit: Each

Scenario Typical Size: 1.0

Scenario Total Cost: $3,106.81

Scenario Cost/Unit: $3,106.81

Cost Details:

Component Name	ID	Description	Unit	Cost	QTY	Total
Equipment Installation						
Trenching, Earth, 12 in. x 48 in.	53	Trenching, earth, 12 inch wide x 48 inch depth, includes equipment and labor for trenching and backfilling	Feet	$1.38	200	$276.00
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.	Hours	$27.56	16	$440.96
Materials						
Pipe, PVC, 6 in., SCH 40	980	Materials: - 6 inch - PVC - SCH 40 - ASTM D1785	Feet	$6.74	200	$1,348.00
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 Feet	$1.89	122	$230.58
Well Cap, 6 in.	1786	Well cap, 6 inch. Materials only.	Each	$38.27	1	$38.27
Well Screen, plastic, 6 in.	1999	6 inch PVC well screen. Materials only.	Feet	$18.05	1	$18.05
Pipe, PVC, 6 in., Elbow, 45 degree	2283	Pipe, PVC Schedule 40, 6 inch Diameter, Elbow, 45 Degree. Material cost only.	Each	$34.60	3	$103.80
Pipe, PVC, 6 in., Coupling	2286	Pipe, PVC Schedule 40, 6 inch Diameter, Coupling. Material cost only.	Each	$15.17	7	$106.19
Deactivated. Dry Hydrant head assembly, 6 in. PVC, 90 degree	2288	Dry Hydrant assembly for 6 inch PVC pipe consisting of 90º degree pipe elbow, bronze insert with 6-inch NST male thread, rubber "O" ring, threaded cap, conical strainer, and end cap. Material cost only.	Each	$0.00	1	$0.00
Pipe, PVC Cement	2292	PVC Cement, 16 Oz. For Use With PVC, CPVC, ABS, Schedule 40 And 80 Pipes And Fittings.	Each	$16.22	1	$16.22
Pipe, PVC Primer Cleaner	2293	PVC Primer, 16 Oz. For Use With PVC and CPVC Pipes And Fittings.	Each	$14.03	1	$14.03
Post, Rebar 1/2 in. x 8 ft.	2294	Fabricated post consisting of 1/2 inch diameter rebar approximately 8 feet long. Material only.	Each	$3.41	1	$3.41
Mobilization						
Mobilization, medium equipment	1139	Equipment with 70-150 HP or typical weights between 14,000 and 30,000 pounds.	Each	$255.65	2	$511.30

Practice: 436 - Irrigation Reservoir

Scenario: #1 - Embankment Dam with On-Site Borrow

Scenario Description:

The reservoir, created by an embankment built across a natural depression, with an 18" diameter principal spillway outlet through the embankment, is controlled by a canal-style gate. Outlet can also serve as overflow protection with a 12" diameter standpipe and tee to the 18" pipe. Any watershed runoff will be diverted around reservoir. It will be built with approximately 4,500 cubic yards of on-site material. It will be about 19.9 feet high and 200 feet long and hold approximately 1,000,000 gallons (3 acre-feet). The top of berm will be 10 feet wide and the embankment side slopes will be 2.5 H to 1 V up and down stream. Resource concern: Insufficient Water - Inefficient use of irrigation water. Associated practices include: 521 - Pond Sealing or Lining (various); 320 - Irrigation Canal or Lateral; 430 - Irrigation Pipeline; 428 - Irrigation Ditch Lining; 533 - Pumping Plant; 440 series - Irrigation Systems; 378 - Pond; 447 - Irrigation System, Tailwater Recovery; 484 - Mulching; and 342 - Critical Area Planting.

Before Situation:

Current system relies on an intermittent or low-flow rate water source. This results in untimely and/or inefficient water application. Divert water around - no spillway

After Situation:

This is an embankment, installed across a natural off-stream intermittent watercourse, used to store water for subsequent irrigation. It will be used to accumulate and store water for timely and efficient application of water through an irrigation system The water source could be a well, irrigation district pipeline, and/or a pump from a stream. It is designed to deliver water by gravity to an open ditch or non-pressurized pipeline, generally in excess of 5 cfs. All earthen materials will be from on-site sources.

Feature Measure: Volume of Compacted Eartfill

Scenario Unit: Cubic Yards

Scenario Typical Size: 4,500.0

Scenario Total Cost: $26,713.08

Scenario Cost/Unit: $5.94

Cost Details:

Component Name	ID	Description	Unit	Cost	QTY	Total
Equipment Installation						
Earthfill, Roller Compacted	49	Earthfill, roller or machine compacted, includes equipment and labor	Cubic Yards	$4.66	4500	$20,970.00
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.	Hours	$27.56	16	$440.96
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.	Hours	$46.88	8	$375.04
Materials						
Pipe, HDPE, CPT, Double Wall, Soil Tight, 12 in.	1244	Pipe, Corrugated HDPE Double Wall, 12 inch diameter with soil tight joints - AASHTO M294. Material cost only.	Feet	$8.77	36	$315.72
Pipe, HDPE, CPT, Double Wall, Soil Tight, 18 in.	1245	Pipe, Corrugated HDPE Double Wall, 18 inch diameter with soil tight joints - AASHTO M294. Material cost only.	Feet	$14.52	120	$1,742.40
Screw gate, cast iron, 18 in. diameter, 10/0 head	1917	18 inch diameter cast iron screw (canal) gate rated at 10 seating head 0 feet unseating head. Materials only.	Each	$1,069.25	1	$1,069.25
Coupling, HDPE CPT Dual Wall, Tee, 18 in. x 18 in. x 12 in.	1921	Tee, 18 inch x 18 inch x 12 inch - HDPE CPT Tee. Materials only.	Each	$312.21	1	$312.21
Mobilization						
Mobilization, medium equipment	1139	Equipment with 70-150 HP or typical weights between 14,000 and 30,000 pounds.	Each	$255.65	2	$511.30
Mobilization, large equipment	1140	Equipment >150HP or typical weights greater than 30,000 pounds or loads requiring over width or over length permits.	Each	$488.10	2	$976.20

Practice: 436 - Irrigation Reservoir

Scenario: #2 - Embankment Reservoir under 30 Acre-Feet

Scenario Description:

This is a small rectangular embankment reservoir with a 10" diameter principal spillway through the embankment controlled by a canal-type gate. It is designed to accumulate, store, and deliver water by gravity to an open ditch or non-pressurized pipeline, in excess of 5 cfs. It will have an inside dimension of about 375 feet square, with 12 feet of fill and about 1600 feet total length of embankment (along the centerline). The embankment top will be 10 feet wide and the side slopes will no steeper than 2.5 H to 1 V inside and out. It will be built with approximately 28,500 cubic yards of on-site material. It will have a maximum water depth of 10 feet with 2 feet of freeboard and no auxiliary spillway. Volume is approximately 30 ac-ft (10,000,000 gallons). Resource Concern: Insufficient Water - Inefficient use of irrigation water. Associated Practices: 521 - Pond Sealing or Lining (various); 320 - Irrigation Canal or Lateral; 430 - Irrigation Pipeline; 428 - Irrigation Ditch Lining; 533 - Pumping Plant; 440 series - Irrigation Systems; 447 - Irrigation System, Tailwater Recovery; 378 - Pond; 484 - Mulching; and 342 - Critical Area Planting.

Before Situation:

Current system relies on an intermittent or low-flow rate water source. This results in untimely and/or inefficient water application.

After Situation:

The square reservoir will be built on a relatively flat site and be used to accumulate and store water for timely application through an irrigation system. The water source could be a stream, an irrigation well, or an irrigation district canal.

Feature Measure: Volume of Compacted Earthfill

Scenario Unit: Cubic Yards

Scenario Typical Size: 28,500.0

Scenario Total Cost: $137,888.00

Scenario Cost/Unit: $4.84

Cost Details:

Component Name	ID	Description	Unit	Cost	QTY	Total
Equipment Installation						
Earthfill, Roller Compacted	49	Earthfill, roller or machine compacted, includes equipment and labor	Cubic Yards	$4.66	28500	$132,810.00
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.	Hours	$27.56	16	$440.96
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.	Hours	$46.88	8	$375.04
Materials						
Pipe, HDPE, CPT, Double Wall, Soil Tight, 10 in.	1243	Pipe, Corrugated HDPE Double Wall, 10 inch diameter with soil tight joints - AASHTO M252. Material cost only.	Feet	$6.22	100	$622.00
Screw gate, cast iron, 10 in. diameter, 10/0 head	1916	10 inch diameter cast iron screw (canal) gate rated at 10 seating head 0 feet unseating head. Materials only.	Each	$766.70	1	$766.70
Catwalk, metal	1918	Metal pedestrian walk way giving access to the valve on a structure, typically 3' wide with railing. Materials only.	Feet	$69.29	20	$1,385.80
Mobilization						
Mobilization, medium equipment	1139	Equipment with 70-150 HP or typical weights between 14,000 and 30,000 pounds.	Each	$255.65	2	$511.30
Mobilization, large equipment	1140	Equipment >150HP or typical weights greater than 30,000 pounds or loads requiring over width or over length permits.	Each	$488.10	2	$976.20

Practice: 436 - Irrigation Reservoir

Scenario: #5 - Plastic Tank

Scenario Description:

A 3,000 Gallon, above-ground, High Density Polyethylene plastic enclosed tank, is installed on 6" of well-compacted drain rock or a 4" thick reinforced concrete support pad, to store water from a reliable source for irrigation of an area less than one acre. The scenario assumes the typical dimensions of the tank are 102" in diameter and 93" tall. The scenario also assumes a 126" diameter gravel base or concrete pad to extend a minimum of 12" past the base of tank for adequate foundation support. This cost estimate scenario is for cost of the tank and pad only and does not include estimate for pumps, pipe, or connecting fittings. Resource Concern: Insufficient Water - Inefficient use of irrigation water. Associated Practices: 430 - Irrigation Pipeline; 441 - Irrigation System, Microirrigation; 442 - Irrigation System, Sprinkler; 533 - Pumping Plant; 447 - Irrigation System, Tailwater Recovery.

Before Situation:

Insufficient volume of water to complete an irrigation cycle at the required flow rate.

After Situation:

An above-ground plastic tank, constructed to withstand the elements, is used to accumulate and store water between irrigation cycles for a very small irrigation system. This allows for an improved flow rate and timing of water application. Sources of water could be a well, a domestic water system, a large roof area, a water ram , or a pump drawing water from a stream.

Feature Measure: Volume of Tank Storage

Scenario Unit: Gallons

Scenario Typical Size: 3,000.0

Scenario Total Cost: $4,938.72

Scenario Cost/Unit: $1.65

Cost Details:

Component Name	ID	Description	Unit	Cost	QTY	Total
Equipment Installation						
Skidsteer, 80 HP	933	Skidsteer loader with horsepower range of 60 to 90. Equipment and power unit costs. Labor not included.	Hours	$55.01	6	$330.06
Plate compactor	1915	Manually guided vibratroy plate compactor. Equipment only.	Hours	$4.33	4	$17.32
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.	Hours	$27.56	32	$881.92
Equipment Operators, Heavy	233	Includes: Cranes, Hydraulic Excavators >=50 HP, Dozers, Paving Machines, Rock Trenchers, Trenchers >=12 in., Dump Trucks, Ag Equipment >=150 HP, Scrapers, Water Wagons.	Hours	$38.00	6	$228.00
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.	Hours	$46.88	16	$750.08
Materials						
Tank, Poly Enclosed Storage, >1,000	1075	Water storage tanks. Includes materials and shipping only.	Gallons	$0.67	3000	$2,010.00
Aggregate, Gravel, Ungraded, Quarry Run	1099	Includes materials, equipment and labor	Cubic Yards	$34.43	2	$68.86
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	$70.59	2	$141.18
Mobilization, medium equipment	1139	Equipment with 70-150 HP or typical weights between 14,000 and 30,000 pounds.	Each	$255.65	2	$511.30

Practice: 436 - Irrigation Reservoir

Scenario: #6 - Plastic Tank Buried

Scenario Description:

A 3,000 Gallon, High Density Polyethylene plastic enclosed tank, is buried with a gravel base and 2' of cover, to store water from a reliable source for greenhouse irrigation of an area less than one acre. The tank is buried to prevent freezing if water is needed in the winter when seedling are started. The scenario assumes the typical dimensions of the tank are 102" in diameter and 93" tall. The scenario also assumes a 126" diameter gravel base to extend a minimum of 12" past the base of tank for adequate foundation support. This cost estimate scenario is for cost of the tank, gravel base, excavation and backfill only and does not include estimate for pumps, pipe, or connecting fittings. Resource Concern: Insufficient Water - Inefficient use of irrigation water. Associated Practices: 430 - Irrigation Pipeline; 441 - Irrigation System, Microirrigation; 442 - Irrigation System, Sprinkler; 533 - Pumping Plant; 447 - Irrigation System, Tailwater Recovery.

Before Situation:

Insufficient volume of water to complete an irrigation cycle at the required flow rate.

After Situation:

A buried plastic tank is used to accumulate and store water between irrigation cycles for a very small irrigation system. This allows for an improved flow rate and timing of water application. Sources of water could be a well, a domestic water system, a large roof area, a water ram , or a pump drawing water from a stream.

Feature Measure: Volume of Tank Storage

Scenario Unit: Gallons

Scenario Typical Size: 3,000.0

Scenario Total Cost: $5,573.94

Scenario Cost/Unit: $1.86

Cost Details:

Component Name	ID	Description	Unit	Cost	QTY	Total
Equipment Installation						
Earthfill, Roller Compacted	49	Earthfill, roller or machine compacted, includes equipment and labor	Cubic Yards	$4.66	90	$419.40
Excavation, common earth, large equipment, 150 ft	1223	Bulk excavation of common earth including sand and gravel with dozer >100 HP with average push distance of 150 feet. Includes equipment and labor.	Cubic Yards	$4.06	120	$487.20
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.	Hours	$27.56	32	$881.92
Equipment Operators, Heavy	233	Includes: Cranes, Hydraulic Excavators >=50 HP, Dozers, Paving Machines, Rock Trenchers, Trenchers >=12 in., Dump Trucks, Ag Equipment >=150 HP, Scrapers, Water Wagons.	Hours	$38.00	8	$304.00
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.	Hours	$46.88	16	$750.08
Materials						
Tank, Poly Enclosed Storage, >1,000	1075	Water storage tanks. Includes materials and shipping only.	Gallons	$0.67	3000	$2,010.00
Aggregate, Gravel, Ungraded, Quarry Run	1099	Includes materials, equipment and labor	Cubic Yards	$34.43	2	$68.86
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	$70.59	2	$141.18
Mobilization, medium equipment	1139	Equipment with 70-150 HP or typical weights between 14,000 and 30,000 pounds.	Each	$255.65	2	$511.30

Practice: 436 - Irrigation Reservoir

Scenario: #7 - Fiberglass Tank

Scenario Description:

A 10,000 Gallon above ground, enclosed, fiberglass tank, is installed on 6" of well compacted drain rock support pad. The tank is used to store water from a reliable source for irrigation of areas less than 3 acres. The scenario assumes the typical dimensions of the tank are 15 feet in diameter and 8 feet tall. The scenario also assumes a 19 feet diameter gravel base pad to extend a minimum of 2 feet past the base of tank for adequate foundation support. This cost estimate scenario is for cost of the tank and pad only and does not include estimate for pumps, pipe, fittings for the pipeline, or catchment area. Resource Concern: Insufficient Water - Inefficient use of irrigation water. Associated Practices: 430 - Irrigation Pipeline; 441 - Irrigation System, Microirrigation; 442 - Irrigation System, Sprinkler; 533 - Pumping Plant; 447 - Irrigation System, Tailwater Recovery.

Before Situation:

Insufficient volume of water to complete an irrigation cycle at the required flow rate.

After Situation:

A large fiberglass enclosed tank, capable of withstanding the elements, is used to accumulate and store water between irrigation cycles for a very small irrigation system. This allows for an improved flow rate and timing of water application and better efficiency. Sources of water could be a well, a domestic water system, a very large roof area, a water ram , or a pump drawing water from a stream.

Feature Measure: Volume of Tank Storage

Scenario Unit: Gallons

Scenario Typical Size: 10,000.0

Scenario Total Cost: $12,733.64

Scenario Cost/Unit: $1.27

Cost Details:

Component Name	ID	Description	Unit	Cost	QTY	Total
Equipment Installation						
Skidsteer, 80 HP	933	Skidsteer loader with horsepower range of 60 to 90. Equipment and power unit costs. Labor not included.	Hours	$55.01	8	$440.08
Plate compactor	1915	Manually guided vibratroy plate compactor. Equipment only.	Hours	$4.33	4	$17.32
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.	Hours	$27.56	40	$1,102.40
Equipment Operators, Heavy	233	Includes: Cranes, Hydraulic Excavators >=50 HP, Dozers, Paving Machines, Rock Trenchers, Trenchers >=12 in., Dump Trucks, Ag Equipment >=150 HP, Scrapers, Water Wagons.	Hours	$38.00	8	$304.00
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.	Hours	$46.88	24	$1,125.12
Materials						
Aggregate, Gravel, Ungraded, Quarry Run	1099	Includes materials, equipment and labor	Cubic Yards	$34.43	6	$206.58
Tank, Fiberglass Enclosed Storage, 10,000 gallon	1919	10,000 gallon capacity enclosed fiberglass water storage tank. Includes tank anchoring materials and delivery.	Each	$8,885.66	1	$8,885.66
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	$70.59	2	$141.18
Mobilization, medium equipment	1139	Equipment with 70-150 HP or typical weights between 14,000 and 30,000 pounds.	Each	$255.65	2	$511.30

Practice: 436 - Irrigation Reservoir

Scenario: #8 - Excavated Spread On Site

Scenario Description:

A reservoir with top width and lengths of 100'x100', 10ft deep, 1ft freeboard, 2:1 slopes is excavated in a relatively flat site and earthfill is spread on site. It is designed to accumulate, store, deliver or regulate water for a surface irrigation system. Resource concern: Insufficient Water - Inefficient use of irrigation water. Associated Practices: 521 - Pond Sealing or Lining (various); 320 - Irrigation Canal or Lateral; 430 - Irrigation Pipeline; 428 - Irrigation Ditch Lining; 533 - Pumping Plant; 440 series - Irrigation Systems; 447 - Irrigation System, Tailwater Recovery; 378 - Pond; 484 - Mulching; and 342 - Critical Area Planting.

Before Situation:

Current system relies on an intermittent or low-flow rate water source. This results in untimely and/or inefficient water application.

After Situation:

An excavated reservoir will be built on a relatively flat site and be used to accumulate and store water for timely application through an irrigation system. The water source could be a stream or a spring.

Feature Measure: Volume of excavated earth

Scenario Unit: Cubic Yards

Scenario Typical Size: 2,400.0

Scenario Total Cost: $16,896.12

Scenario Cost/Unit: $7.04

Cost Details:

Component Name	ID	Description	Unit	Cost	QTY	Total
Equipment Installation						
Dozer, 200 HP	928	Track mounted Dozer with horsepower range of 160 to 250. Equipment and power unit costs. Labor not included.	Hours	$206.77	24	$4,962.48
Excavation, common earth, large equipment, 1500 ft	1221	Bulk excavation of common earth including sand and gravel with scrapers with average haul distance of 1500 feet. Includes equipment and labor.	Cubic Yards	$3.91	2400	$9,384.00
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.	Hours	$27.56	24	$661.44
Equipment Operators, Heavy	233	Includes: Cranes, Hydraulic Excavators >=50 HP, Dozers, Paving Machines, Rock Trenchers, Trenchers >=12 in., Dump Trucks, Ag Equipment >=150 HP, Scrapers, Water Wagons.	Hours	$38.00	24	$912.00
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	$488.10	2	$976.20

Practice: 436 - Irrigation Reservoir

Scenario: #9 - Excavated Spread Off Site

Scenario Description:

A reservoir with top width and lengths of 100'x100', 10ft deep, 1ft freeboard, 2:1 slopes is excavated in a relatively flat site and earthfill is hauled for spreading off site. It is designed to accumulate, store, deliver or regulate water for a surface irrigation system. Resource concern: Insufficient Water - Inefficient use of irrigation water. Associated Practices: 521 - Pond Sealing or Lining (various); 320 - Irrigation Canal or Lateral; 430 - Irrigation Pipeline; 428 - Irrigation Ditch Lining; 533 - Pumping Plant; 440 series - Irrigation Systems; 447 - Irrigation System, Tailwater Recovery; 378 - Pond; 484 - Mulching; and 342 - Critical Area Planting.

Before Situation:

Current system relies on an intermittent or low-flow rate water source. This results in untimely and/or inefficient water application.

After Situation:

An excavated reservoir will be built on a relatively flat site and be used to accumulate and store water for timely application through an irrigation system. The water source could be a stream or a spring.

Feature Measure: Volume of excavated earth

Scenario Unit: Cubic Yards

Scenario Typical Size: 2,400.0

Scenario Total Cost: $20,616.12

Scenario Cost/Unit: $8.59

Cost Details:

Component Name	ID	Description	Unit	Cost	QTY	Total
Equipment Installation						
Dozer, 200 HP	928	Track mounted Dozer with horsepower range of 160 to 250. Equipment and power unit costs. Labor not included.	Hours	$206.77	24	$4,962.48
Excavation, common earth, large equipment, 1500 ft	1221	Bulk excavation of common earth including sand and gravel with scrapers with average haul distance of 1500 feet. Includes equipment and labor.	Cubic Yards	$3.91	2400	$9,384.00
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	$0.31	12000	$3,720.00
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.	Hours	$27.56	24	$661.44
Equipment Operators, Heavy	233	Includes: Cranes, Hydraulic Excavators >=50 HP, Dozers, Paving Machines, Rock Trenchers, Trenchers >=12 in., Dump Trucks, Ag Equipment >=150 HP, Scrapers, Water Wagons.	Hours	$38.00	24	$912.00
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	$488.10	2	$976.20

Practice: 436 - Irrigation Reservoir

Scenario: #10 - Tailwater Recovery Greenhouse

Scenario Description:

A 1,000 Gallon, High Density Polyethylene plastic enclosed tank, is installed in a greenhouse to recover, store, and re-use tailwater from ebb and flow benches. Typical sizing would be 0.5 gal/SF of bench area. The tank are typically installed below the greenhouse floor. The scenario assumes a typical 1,000 gal tank dimensions of 100" L x 52" X 66" H. Sand gravel mix is assumed for backfill up to 30". This cost estimate scenario is for cost of the tank and pad only and does not include estimate for pumps, pipe, or connecting fittings. Resource Concern: Insufficient Water - Inefficient use of irrigation water. Associated Practices: 430 - Irrigation Pipeline; 441 - Irrigation System, Microirrigation; 442 - Irrigation System, Sprinkler; 533 - Pumping Plant; 447 - Irrigation System, Tailwater Recovery.

Before Situation:

Insufficient volume of water to complete an irrigation cycle at the required flow rate.

After Situation:

A below ground plastic tank, is used to accumulate and store water between irrigation cycles for a very small irrigation system. This allows for an improved flow rate and timing of water application. Sources of water could be a well, a domestic water system, a large roof area, a water ram , or a pump drawing water from a stream.

Feature Measure: Volume of Tank Storage

Scenario Unit: Gallons

Scenario Typical Size: 1,000.0

Scenario Total Cost: $4,517.98

Scenario Cost/Unit: $4.52

Cost Details:

Component Name	ID	Description	Unit	Cost	QTY	Total
Equipment Installation						
Skidsteer, 80 HP	933	Skidsteer loader with horsepower range of 60 to 90. Equipment and power unit costs. Labor not included.	Hours	$55.01	8	$440.08
Plate compactor	1915	Manually guided vibratroy plate compactor. Equipment only.	Hours	$4.33	4	$17.32
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.	Hours	$27.56	40	$1,102.40
Equipment Operators, Heavy	233	Includes: Cranes, Hydraulic Excavators >=50 HP, Dozers, Paving Machines, Rock Trenchers, Trenchers >=12 in., Dump Trucks, Ag Equipment >=150 HP, Scrapers, Water Wagons.	Hours	$38.00	8	$304.00
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.	Hours	$46.88	24	$1,125.12
Materials						
Tank, Poly Enclosed Storage, >1,000	1075	Water storage tanks. Includes materials and shipping only.	Gallons	$0.67	1000	$670.00
Aggregate, Gravel, Ungraded, Quarry Run	1099	Includes materials, equipment and labor	Cubic Yards	$34.43	6	$206.58
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	$70.59	2	$141.18
Mobilization, medium equipment	1139	Equipment with 70-150 HP or typical weights between 14,000 and 30,000 pounds.	Each	$255.65	2	$511.30

Practice: 436 - Irrigation Reservoir

Scenario: #19 - Excavated Tailwater Pit

Scenario Description:

This is an excavated pit with a control structure. It is designed to accumulate, store, deliver or regulate water for a surface irrigation system. It will have a bottom width of 20 ft and length of 1,250 feet. The side slopes will be no steeper than 1.5 H to 1 V inside and out. It will be built with approximately 20,000 cubic yards of on-site material. It will have a maximum water depth of 10 feet with 1 feet of freeboard. Volume is approximately 12 ac-ft (3,950,303 gallons). Resource concern: Insufficient Water - Inefficient use of irrigation water. Associated Practices: 521 - Pond Sealing or Lining (various); 320 - Irrigation Canal or Lateral; 430 - Irrigation Pipeline; 428 - Irrigation Ditch Lining; 533 - Pumping Plant; 440 series - Irrigation Systems; 447 - Irrigation System, Tailwater Recovery; 378 - Pond; 484 - Mulching; and 342 - Critical Area Planting.

Before Situation:

Current system relies on an intermittent or low-flow rate water source. This results in untimely and/or inefficient water application.

After Situation:

An excavated regulating reservoir will be built on a relatively flat site and be used to accumulate and store water for timely application through an irrigation system. The water source could be a stream or an irrigation district canal.

Feature Measure: Volume of Earth Excavated

Scenario Unit: Cubic Yards

Scenario Typical Size: 19,600.0

Scenario Total Cost: $46,507.85

Scenario Cost/Unit: $2.37

Cost Details:

Component Name	ID	Description	Unit	Cost	QTY	Total
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 Yards	$2.31	19600	$45,276.00
Mobilization						
Mobilization, medium equipment	1139	Equipment with 70-150 HP or typical weights between 14,000 and 30,000 pounds.	Each	$255.65	1	$255.65
Mobilization, large equipment	1140	Equipment >150HP or typical weights greater than 30,000 pounds or loads requiring over width or over length permits.	Each	$488.10	2	$976.20

Practice: 441 - Irrigation System, Microirrigation

Scenario: #1 - SDI (Subsurface Drip Irrigation)

Scenario Description:

A subsurface drip irrigation system (SDI) with a lateral spacing between 37-59 inches. This buried drip irrigation system utilizes a thinwall dripperline (drip tube) or durabe 10 to 15 mil tape with inline emitters at a uniform spacing for the system laterals. The dripperline or tape is normally installed by being plowed in approx 10-14 inches deep with a chisel shank type plow equipped with tape reels. This type of drip irrigation system utilizes a buried supply manifold with automated zone control valves and a buried flush manifold with manual flush valves. This permanent micro-irrigation system includes an automated filter station, flow meter, backflow prevention device, automated control box or timer, the thinwall dipperline or tape for laterals, both a supply and a flushing manifold and numerous types of water control valves. This is an all-inclusive system starting with the filter station including all required system components out to the flush valves. The water supply line from the water source to the filter station is an irrigation pipeline (430) and is not included as part of this system. Resource Concerns: Insufficient Water - Inefficient use of irrigation water, Degraded Plant Condition - Undesirable plant productivity and health, Water Quality Degradation - Excessive sediment in surface waters, and Inefficient Energy Use - Equipment and facilities. Associated Practices: 533-Pumping Plant, 449- Irrigation Water Management, 430 - Irrigation Pipeline, 610 - Salinity & Sodic Soil Management, 328-Conservation Crop Rotation, and 590 - Nutrient Management.

Before Situation:

Typical before irrigation situation would normally be an existing inefficient surface or sprinkler irrigation system on a cropland or hayland field. The existing irrigation system would experience poor, non-uniform irrigation applications and significant water losses affecting both water quantity and water quality

After Situation:

A typical practice would be the installation of a subsurface drip irrigation system (SDI) on a 15 acre of permanent crops such as berries. The system lateral (thinwall dripperline or tape) spacing would 6ft. This highly efficient SDI (buried) irrigation system provides irrigation water directly to the plant root zone eliminating application losses resulting in a very high water application efficiency and properly designed these SDI systems are capable of very uniform water applications. Typical field size is 15 acres.

Feature Measure: Acres in System

Scenario Unit: Acres

Scenario Typical Size: 15.0

Scenario Total Cost: $30,752.93

Scenario Cost/Unit: $2,050.20

Cost Details:

Component Name	ID	Description	Unit	Cost	QTY	Total
Equipment Installation						
Trenching, Earth, 12 in. x 48 in.	53	Trenching, earth, 12 inch wide x 48 inch depth, includes equipment and labor for trenching and backfilling	Feet	$1.38	2000	$2,760.00
Trenching, Pipeline Plowing	1096	Includes equipment and labor for plowing small diameter lines in common earth (< 3")	Feet	$1.10	820	$902.00
Micro Irrigation, chemical injection equipment	1987	Chemical Injector Pump, plus chemigation check valve, injector ports, and appurtenances, Installation included.	Each	$1,813.43	1	$1,813.43
Materials						
Pipe, HDPE, smooth wall, weight priced	1379	High Density Polyethylene (HDPE) compound manufactured into smooth wall pipe. Materials only.	Pound	$2.56	868	$2,222.08
Micro Irrigation, control valves and timers	1485	Automatic controller and timer, to turn on and off the sets for micro irrigation, installation and valves. Based on control unit, not number of valves controlled.	Each	$400.44	1	$400.44
Water Meter, Microirrigation, <= 2”, with Volume Totalizer	2437	Microirrigation water meter less than or equal to 2 inch diameter, with volume totalizer. Includes materials only.	Each	$423.91	1	$423.91
Micro Irrigation, Media Filter, 12” to 24” Dia. tank, Equipped for Auto Flush	2466	Sand or media filter for Micro irrigation system. Includes filter, plumbing, connections and automatic controller. Unit is complete and installed. Unit is each Filter in a filter station that normally includes 2 or more filters.	Each	$3,713.63	2	$7,427.26
Micro Irrigation, buried drip tape	2521	Tape that is installed underground for sub-surface drip irrigation, includes installation, and connections to the supply and flushing laterals. Tape is a minimum of 10 mil thick thick and has emitters built in. Includes labor and installtion.	Feet	$0.12	118125	$14,175.00
Micro Irrigation, screen or disc filter, < 3"	2524	Micro Irrigation, small manual flush screen or disc filter, <3 inch nominal size. Includes materials only.	Each	$201.22	1	$201.22
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	$171.94	1	$171.94
Mobilization, medium equipment	1139	Equipment with 70-150 HP or typical weights between 14,000 and 30,000 pounds.	Each	$255.65	1	$255.65

Practice: 441 - Irrigation System, Microirrigation

Scenario: #2 - Automated Surface Permanent PE Tube with Media Filter Laterals 9 ft oc

Scenario Description:

An permanent automated micro-irrigation system is installed above-ground or on trellis utilizing surface UV resistant PE tubing with integrated emitters to provide irrigation for an orchard, vineyard, or other perennial crop grown in a grid pattern. The typical system is a permanent system installed on a 10 acre orchard. The orchard has a plant spacing of 8 feet x 9 feet. Laterals are spaced 9 feet apart. This system typically includes automatic controls, a media filter system, PE tubing laterals, PVC manifolds, and submains, valves, fittings, emitters, etc. This practice applies to systems designed to discharge < 60 gal/hr at each individual lateral discharge point. Does not include the pumping plant, power source, or water source (well or reservoir). Resource Concerns: Insufficient Water - Inefficient use of irrigation water, Degraded Plant Condition - Undesirable plant productivity and health, Water Quality Degradation - Excessive sediment in surface waters, and Inefficient Energy Use - Equipment and facilities. Associated Practices: 533-Pumping Plant, 449- Irrigation Water Management, 430 - Irrigation Pipeline, 610 - Salinity & Sodic Soil Management, 328-Conservation Crop Rotation, and 590 - Nutrient Management.

Before Situation:

An orchard has an inefficient surface irrigation system causing irrigation water loss that impacts water quality and water quantity.

After Situation:

An automated surface microirrigation system with media filter with laterals at 9ft o.c. is utilized to provide highly efficient irrigation to an orchard. Water applications are reduced and runoff eliminated. Offsite water quality is improved, and on site water use is reduced.

Feature Measure: Acres in System

Scenario Unit: Acres

Scenario Typical Size: 10.0

Scenario Total Cost: $31,918.18

Scenario Cost/Unit: $3,191.82

Cost Details:

Component Name	ID	Description	Unit	Cost	QTY	Total
Equipment Installation						
Trenching, Earth, 12 in. x 48 in.	53	Trenching, earth, 12 inch wide x 48 inch depth, includes equipment and labor for trenching and backfilling	Feet	$1.38	1500	$2,070.00
Micro Irrigation, chemical injection equipment	1987	Chemical Injector Pump, plus chemigation check valve, injector ports, and appurtenances, Installation included.	Each	$1,813.43	1	$1,813.43
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.	Hours	$27.56	40	$1,102.40
Materials						
Pipe, HDPE, smooth wall, weight priced	1379	High Density Polyethylene (HDPE) compound manufactured into smooth wall pipe. Materials only.	Pound	$2.56	650	$1,664.00
Micro Irrigation, control valves and timers	1485	Automatic controller and timer, to turn on and off the sets for micro irrigation, installation and valves. Based on control unit, not number of valves controlled.	Each	$400.44	1	$400.44
Micro Irrigation, surface drip tubing	1488	Tubing is installed above ground for surface drip irrigation, includes installation, and connections to the supply and flushing laterals. Tubing has emitters built in.	Feet	$0.32	52640	$16,844.80
Water Meter, Microirrigation, <= 2”, with Volume Totalizer	2437	Microirrigation water meter less than or equal to 2 inch diameter, with volume totalizer. Includes materials only.	Each	$423.91	1	$423.91
Micro Irrigation, Media Filter, 12” to 24” Dia. tank, Equipped for Auto Flush	2466	Sand or media filter for Micro irrigation system. Includes filter, plumbing, connections and automatic controller. Unit is complete and installed. Unit is each Filter in a filter station that normally includes 2 or more filters.	Each	$3,713.63	2	$7,427.26
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	$171.94	1	$171.94

Practice: 441 - Irrigation System, Microirrigation

Scenario: #3 - Surface Permanent PE tube with Media Filter Laterals 9 ft oc

Scenario Description:

An permanent micro-irrigation system is installed utilizing surface UV resistant PE tubing with integrated emitters to provide irrigation for an orchard, vineyard, or other perennial crop. The typical system is a permanent system installed on a 10 acre orchard on the ground surface or attached to a trellis. The orchard has a plant spacing of 8 feet x 9 feet. Laterals are spaced 9 feet apart. This system typically includes manual controls, a media filter system, PE tubing laterals, PVC manifolds, and submains, valves, fittings, emitters, etc. This practice applies to systems designed to discharge < 60 gal/hr at each individual lateral discharge point. Does not include the pumping plant, power source, or water source (well or reservoir). Resource Concerns: Insufficient Water - Inefficient use of irrigation water, Degraded Plant Condition - Undesirable plant productivity and health, Water Quality Degradation - Excessive sediment in surface waters, and Inefficient Energy Use - Equipment and facilities. Associated Practices: 533-Pumping Plant, 449- Irrigation Water Management, 430 - Irrigation Pipeline, 610 - Salinity & Sodic Soil Management, 328-Conservation Crop Rotation, and 590 - Nutrient Management.

Before Situation:

An orchard has an inefficient surface irrigation system causing irrigation water loss that impacts water quality and water quantity.

After Situation:

A surface microirrigation system with media filter with laterals at 9ft o.c. is utilized to provide highly efficient irrigation to an orchard. Water applications are reduced and runoff eliminated. Offsite water quality is improved, and on site water use is reduced.

Feature Measure: Acres in System

Scenario Unit: Acres

Scenario Typical Size: 10.0

Scenario Total Cost: $31,097.74

Scenario Cost/Unit: $3,109.77

Cost Details:

Component Name	ID	Description	Unit	Cost	QTY	Total
Equipment Installation						
Trenching, Pipeline Plowing	1096	Includes equipment and labor for plowing small diameter lines in common earth (< 3")	Feet	$1.10	1500	$1,650.00
Micro Irrigation, chemical injection equipment	1987	Chemical Injector Pump, plus chemigation check valve, injector ports, and appurtenances, Installation included.	Each	$1,813.43	1	$1,813.43
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.	Hours	$27.56	40	$1,102.40
Materials						
Pipe, HDPE, smooth wall, weight priced	1379	High Density Polyethylene (HDPE) compound manufactured into smooth wall pipe. Materials only.	Pound	$2.56	650	$1,664.00
Micro Irrigation, surface drip tubing	1488	Tubing is installed above ground for surface drip irrigation, includes installation, and connections to the supply and flushing laterals. Tubing has emitters built in.	Feet	$0.32	52640	$16,844.80
Water Meter, Microirrigation, <= 2”, with Volume Totalizer	2437	Microirrigation water meter less than or equal to 2 inch diameter, with volume totalizer. Includes materials only.	Each	$423.91	1	$423.91
Micro Irrigation, Media Filter, 12” to 24” Dia. tank, Equipped for Auto Flush	2466	Sand or media filter for Micro irrigation system. Includes filter, plumbing, connections and automatic controller. Unit is complete and installed. Unit is each Filter in a filter station that normally includes 2 or more filters.	Each	$3,713.63	2	$7,427.26
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	$171.94	1	$171.94

Practice: 441 - Irrigation System, Microirrigation

Scenario: #4 - Surface Permanent PE Tube Disk or Screen Filter Laterals 9 ft oc

Scenario Description:

An permanent micro-irrigation system is installed utilizing surface UV resistant PE tubing with integrated emitters to provide irrigation for an orchard, vineyard, or other perennial crop. The typical system is a permanent system installed on a 10 acre orchard on the ground surface or attached to a trellis. The orchard has a plant spacing of 8 feet x 9 feet. Laterals are spaced 9 feet apart. This system typically includes manual controls, disk or screen filters, PE tubing laterals, PVC manifolds, and submains, valves, fittings, emitters, etc. This practice applies to systems designed to discharge < 60 gal/hr at each individual lateral discharge point. This scenario assumes a well water source. Does not include the pumping plant, power source, or water source (well or reservoir). Resource Concerns: Insufficient Water - Inefficient use of irrigation water, Degraded Plant Condition - Undesirable plant productivity and health, Water Quality Degradation - Excessive sediment in surface waters, and Inefficient Energy Use - Equipment and facilities. Associated Practices: 533-Pumping Plant, 449- Irrigation Water Management, 430 - Irrigation Pipeline, 610 - Salinity & Sodic Soil Management, 328-Conservation Crop Rotation, and 590 - Nutrient Management.

Before Situation:

Ann orchard has an inefficient surface irrigation system causing irrigation water loss that impacts water quality and water quantity.

After Situation:

A surface microirrigation system with disk or screen filters with laterals at 9ft o.c. is utilized to provide highly efficient irrigation to an orchard. Water applications are reduced and runoff eliminated. Offsite water quality is improved, and on site water use is reduced.

Feature Measure: Acres in System

Scenario Unit: Acres

Scenario Typical Size: 10.0

Scenario Total Cost: $25,258.98

Scenario Cost/Unit: $2,525.90

Cost Details:

Component Name	ID	Description	Unit	Cost	QTY	Total
Equipment Installation						
Trenching, Pipeline Plowing	1096	Includes equipment and labor for plowing small diameter lines in common earth (< 3")	Feet	$1.10	1500	$1,650.00
Micro Irrigation, chemical injection equipment	1987	Chemical Injector Pump, plus chemigation check valve, injector ports, and appurtenances, Installation included.	Each	$1,813.43	1	$1,813.43
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.	Hours	$27.56	40	$1,102.40
Materials						
Pipe, HDPE, smooth wall, weight priced	1379	High Density Polyethylene (HDPE) compound manufactured into smooth wall pipe. Materials only.	Pound	$2.56	650	$1,664.00
Micro Irrigation, screen filter, => 100 gpm	1484	Screen filter for Micro irrigation system with 100 gpm or greater capacity. Includes plumbing, connections and automatic controller. Unit is complete and installed. Unit price per filter, not per filter station.	Each	$794.25	2	$1,588.50
Micro Irrigation, surface drip tubing	1488	Tubing is installed above ground for surface drip irrigation, includes installation, and connections to the supply and flushing laterals. Tubing has emitters built in.	Feet	$0.32	52640	$16,844.80
Water Meter, Microirrigation, <= 2”, with Volume Totalizer	2437	Microirrigation water meter less than or equal to 2 inch diameter, with volume totalizer. Includes materials only.	Each	$423.91	1	$423.91
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	$171.94	1	$171.94

Practice: 441 - Irrigation System, Microirrigation

Scenario: #5 - Automated Surface Permanent PE Tube with Media Filter Laterals 14 ft oc

Scenario Description:

An permanent automated micro-irrigation system is installed utilizing surface UV resistant PE tubing with integrated emitters to provide irrigation for an orchard, vinyard, or other permanent crop. The typical system is installed on a 10 acre orchard on the ground surface or attached to a trellis. The orchard has a plant spacing of 12 feet x 14 feet. Laterals are spaced 14 feet apart. This system typically includes automatic controls, a media filter system, PE tubing laterals, PVC manifolds, and submains, valves, fittings, emitters, etc. This practice applies to systems designed to discharge < 60 gal/hr at each individual lateral discharge point. Does not include the pumping plant, power source, or water source (well or reservoir). Resource Concerns: Insufficient Water - Inefficient use of irrigation water, Degraded Plant Condition - Undesirable plant productivity and health, Water Quality Degradation - Excessive sediment in surface waters, and Inefficient Energy Use - Equipment and facilities. Associated Practices: 533-Pumping Plant, 449- Irrigation Water Management, 430 - Irrigation Pipeline, 610 - Salinity & Sodic Soil Management, 328-Conservation Crop Rotation, and 590-Nutrient Management.

Before Situation:

An orchard has an inefficient surface irrigation system causing irrigation water loss that impacts water quality and water quantity.

After Situation:

An automated surface microirrigation system with media filter and laterals at 14 ft o.c. is utilized to provide highly efficient irrigation to an orchard. Water applications are reduced and runoff eliminated. Offsite water quality is improved, and on site water use is reduced.

Feature Measure: Acres in System

Scenario Unit: Acres

Scenario Typical Size: 10.0

Scenario Total Cost: $25,373.38

Scenario Cost/Unit: $2,537.34

Cost Details:

Component Name	ID	Description	Unit	Cost	QTY	Total
Equipment Installation						
Trenching, Pipeline Plowing	1096	Includes equipment and labor for plowing small diameter lines in common earth (< 3")	Feet	$1.10	1500	$1,650.00
Micro Irrigation, chemical injection equipment	1987	Chemical Injector Pump, plus chemigation check valve, injector ports, and appurtenances, Installation included.	Each	$1,813.43	1	$1,813.43
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.	Hours	$27.56	40	$1,102.40
Materials						
Pipe, HDPE, smooth wall, weight priced	1379	High Density Polyethylene (HDPE) compound manufactured into smooth wall pipe. Materials only.	Pound	$2.56	650	$1,664.00
Micro Irrigation, control valves and timers	1485	Automatic controller and timer, to turn on and off the sets for micro irrigation, installation and valves. Based on control unit, not number of valves controlled.	Each	$400.44	1	$400.44
Micro Irrigation, surface drip tubing	1488	Tubing is installed above ground for surface drip irrigation, includes installation, and connections to the supply and flushing laterals. Tubing has emitters built in.	Feet	$0.32	33500	$10,720.00
Water Meter, Microirrigation, <= 2”, with Volume Totalizer	2437	Microirrigation water meter less than or equal to 2 inch diameter, with volume totalizer. Includes materials only.	Each	$423.91	1	$423.91
Micro Irrigation, Media Filter, 12” to 24” Dia. tank, Equipped for Auto Flush	2466	Sand or media filter for Micro irrigation system. Includes filter, plumbing, connections and automatic controller. Unit is complete and installed. Unit is each Filter in a filter station that normally includes 2 or more filters.	Each	$3,713.63	2	$7,427.26
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	$171.94	1	$171.94

Practice: 441 - Irrigation System, Microirrigation

Scenario: #6 - Surface Permanent PE Tube with Media Filter Laterals 14 ft oc

Scenario Description:

An permanent micro-irrigation system is installed utilizing surface UV resistant PE tubing with integrated emitters to provide irrigation for an orchard, vinyard, or other permanent crop. The typical system is installed on a 10 acre orchard on the ground surface or attached to a trellis. The orchard has a plant spacing of 12 feet x 14 feet. Laterals are spaced 14 feet apart. This system typically includes manual controls, a media filter system, PE tubing laterals, PVC manifolds, and submains, valves, fittings, emitters, etc. This practice applies to systems designed to discharge < 60 gal/hr at each individual lateral discharge point. Does not include the pumping plant, power source, or water source (well or reservoir). Resource Concerns: Insufficient Water - Inefficient use of irrigation water, Degraded Plant Condition - Undesirable plant productivity and health, Water Quality Degradation - Excessive sediment in surface waters, and Inefficient Energy Use - Equipment and facilities. Associated Practices: 533-Pumping Plant, 449- Irrigation Water Management, 430 - Irrigation Pipeline, 610 - Salinity & Sodic Soil Management, 328-Conservation Crop Rotation, and 590-Nutrient Management.

Before Situation:

Ann orchard has an inefficient surface irrigation system causing irrigation water loss that impacts water quality and water quantity.

After Situation:

A surface microirrigation system with media filter and laterals at 14 ft o.c. is utilized to provide highly efficient irrigation to an orchard. Water applications are reduced and runoff eliminated. Offsite water quality is improved, and on site water use is reduced.

Feature Measure: Acres in System

Scenario Unit: Acres

Scenario Typical Size: 10.0

Scenario Total Cost: $24,972.94

Scenario Cost/Unit: $2,497.29

Cost Details:

Component Name	ID	Description	Unit	Cost	QTY	Total
Equipment Installation						
Trenching, Pipeline Plowing	1096	Includes equipment and labor for plowing small diameter lines in common earth (< 3")	Feet	$1.10	1500	$1,650.00
Micro Irrigation, chemical injection equipment	1987	Chemical Injector Pump, plus chemigation check valve, injector ports, and appurtenances, Installation included.	Each	$1,813.43	1	$1,813.43
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.	Hours	$27.56	40	$1,102.40
Materials						
Pipe, HDPE, smooth wall, weight priced	1379	High Density Polyethylene (HDPE) compound manufactured into smooth wall pipe. Materials only.	Pound	$2.56	650	$1,664.00
Micro Irrigation, surface drip tubing	1488	Tubing is installed above ground for surface drip irrigation, includes installation, and connections to the supply and flushing laterals. Tubing has emitters built in.	Feet	$0.32	33500	$10,720.00
Water Meter, Microirrigation, <= 2”, with Volume Totalizer	2437	Microirrigation water meter less than or equal to 2 inch diameter, with volume totalizer. Includes materials only.	Each	$423.91	1	$423.91
Micro Irrigation, Media Filter, 12” to 24” Dia. tank, Equipped for Auto Flush	2466	Sand or media filter for Micro irrigation system. Includes filter, plumbing, connections and automatic controller. Unit is complete and installed. Unit is each Filter in a filter station that normally includes 2 or more filters.	Each	$3,713.63	2	$7,427.26
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	$171.94	1	$171.94

Practice: 441 - Irrigation System, Microirrigation

Scenario: #7 - Surface Permanent PE Tube with Disk or Screen filter laterals 14 ft oc

Scenario Description:

An permanent micro-irrigation system is installed utilizing surface UV resistant PE tubing with integrated emitters to provide irrigation for an orchard, vineyard, or other permanent crop. The typical system is installed on a 10 acre orchard on the ground surface or attached to a trellis. The orchard has a plant spacing of 12 feet x 14 feet. Laterals are spaced 14 feet apart. This system typically includes manual controls, a disk or screen filter system, PE tubing laterals, PVC manifolds, and submains, valves, fittings, emitters, etc. This practice applies to systems designed to discharge < 60 gal/hr at each individual lateral discharge point. Does not include the pumping plant, power source, or water source (well or reservoir). Resource Concerns: Insufficient Water - Inefficient use of irrigation water, Degraded Plant Condition - Undesirable plant productivity and health, Water Quality Degradation - Excessive sediment in surface waters, and Inefficient Energy Use - Equipment and facilities. Associated Practices: 533-Pumping Plant, 449- Irrigation Water Management, 430 - Irrigation Pipeline, 610 - Salinity & Sodic Soil Management, 328-Conservation Crop Rotation, and 590-Nutrient Management.

Before Situation:

An orchard has an inefficient surface irrigation system causing irrigation water loss that impacts water quality and water quantity.

After Situation:

A surface microirrigation system with disk or screen filter and laterals at 14 ft o.c. is utilized to provide highly efficient irrigation to an orchard. Water applications are reduced and runoff eliminated. Offsite water quality is improved, and on site water use is reduced.

Feature Measure: Acres in System

Scenario Unit: Acres

Scenario Typical Size: 10.0

Scenario Total Cost: $19,134.18

Scenario Cost/Unit: $1,913.42

Cost Details:

Component Name	ID	Description	Unit	Cost	QTY	Total
Equipment Installation						
Trenching, Pipeline Plowing	1096	Includes equipment and labor for plowing small diameter lines in common earth (< 3")	Feet	$1.10	1500	$1,650.00
Micro Irrigation, chemical injection equipment	1987	Chemical Injector Pump, plus chemigation check valve, injector ports, and appurtenances, Installation included.	Each	$1,813.43	1	$1,813.43
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.	Hours	$27.56	40	$1,102.40
Materials						
Pipe, HDPE, smooth wall, weight priced	1379	High Density Polyethylene (HDPE) compound manufactured into smooth wall pipe. Materials only.	Pound	$2.56	650	$1,664.00
Micro Irrigation, screen filter, => 100 gpm	1484	Screen filter for Micro irrigation system with 100 gpm or greater capacity. Includes plumbing, connections and automatic controller. Unit is complete and installed. Unit price per filter, not per filter station.	Each	$794.25	2	$1,588.50
Micro Irrigation, surface drip tubing	1488	Tubing is installed above ground for surface drip irrigation, includes installation, and connections to the supply and flushing laterals. Tubing has emitters built in.	Feet	$0.32	33500	$10,720.00
Water Meter, Microirrigation, <= 2”, with Volume Totalizer	2437	Microirrigation water meter less than or equal to 2 inch diameter, with volume totalizer. Includes materials only.	Each	$423.91	1	$423.91
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	$171.94	1	$171.94

Practice: 441 - Irrigation System, Microirrigation

Scenario: #8 - Microjet with Filter

Scenario Description:

A micro-irrigation system, utilizing micro-jets to provide irrigation and\or frost protection for an orchard or other specialty crops grown in a grid pattern. The system is installed with all fittings, control valves, pressure reducing/regulating valves, air/vacuum release, disc filters, pressure gauges, submains, lateral lines, and micro-jet sprayers to deliver water to the trees. This practice applies to systems designed to discharge < 60 gal/hr at each individual lateral discharge point. Does not include Pump, Power source, Water source (well or reservoir). The typical installation is a permanent, microjet -irrigation system installed on a 60 acre orchard. Typical tree spacing is 20' x 20' feet. The water supply line from the water source to the zone valves is an irrigation pipeline (430) and is not included as part of this system. Resource Concerns: Insufficient Water - Inefficient use of irrigation water, Degraded Plant Condition - Undesirable plant productivity and health, Water Quality Degradation - Excessive sediment in surface waters, and Inefficient Energy Use - Equipment and facilities. Associated Practices: 533-Pumping Plant, 449- Irrigation Water Management, 430 - Irrigation Pipeline, 610 - Salinity & Sodic Soil Management, 328-Conservation Crop Rotation, and 590-Nutrient Management.

Before Situation:

An orchard has an inefficient irrigation system causing irrigation water loss that impacts water quality and water quantity.

After Situation:

A micro-spray microirrigation system is utilized to provide highly efficient irrigation to an orchard. Water applications are reduced and runoff eliminated. Offsite water quality is improved, and on site water use is reduced.

Feature Measure: Acres in System

Scenario Unit: Acres

Scenario Typical Size: 60.0

Scenario Total Cost: $175,085.78

Scenario Cost/Unit: $2,918.10

Cost Details:

Component Name	ID	Description	Unit	Cost	QTY	Total
Equipment Installation						
Trenching, Pipeline Plowing	1096	Includes equipment and labor for plowing small diameter lines in common earth (< 3")	Feet	$1.10	3520	$3,872.00
Micro Irrigation, chemical injection equipment	1987	Chemical Injector Pump, plus chemigation check valve, injector ports, and appurtenances, Installation included.	Each	$1,813.43	1	$1,813.43
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.	Hours	$27.56	24	$661.44
Materials						
Pipe, PVC, dia. < 18 in., weight priced	1323	Polyvinyl Chloride (PVC) pressure rated pipe priced by the weight of the pipe materials for pipes with diameters less than 18 inch. Materials only.	Pound	$1.93	4800	$9,264.00
Micro Irrigation, control valves and timers	1485	Automatic controller and timer, to turn on and off the sets for micro irrigation, installation and valves. Based on control unit, not number of valves controlled.	Each	$400.44	1	$400.44
Micro Irrigation, emitters or sprays and tubing	1489	Emitters or sprays that are installed above ground for micro or drip irrigation. Includes installation and connections to the supply and flushing laterals. Tubing for the emitters is included in this item.	Feet	$1.04	143748	$149,497.92
Micro Irrigation, Media Filter, 12” to 24” Dia. tank, Equipped for Auto Flush	2466	Sand or media filter for Micro irrigation system. Includes filter, plumbing, connections and automatic controller. Unit is complete and installed. Unit is each Filter in a filter station that normally includes 2 or more filters.	Each	$3,713.63	2	$7,427.26
Water Meter, Microirrigation, >2" and <= 8", with Volume Totalizer	2523	Microirrigation water meter greater than 2" and less than or equal to 8 inch diameter, with volume totalizer. Includes materials only.	Each	$1,977.35	1	$1,977.35
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	$171.94	1	$171.94

Practice: 441 - Irrigation System, Microirrigation

Scenario: #9 - Surface Tape <5 acres

Scenario Description:

A micro-irrigation system using drip tape or similar type micro-irrigation material placed on the soil surface for vegetables or field crops. Spacing of drip tape or similar type micro irrigation material is based on soil type or row alignment but will typically vary from 18" to 36". This system typically includes a filter system, PE manifolds fittings, drip tape, etc. This practice applies to systems designed to discharge < 60 gal/hr at each individual discharge point. Does not include the pumping plant, power source, or water source. Surface placed drip tape will not meet the 441 practice life and will normally need replacement every year. After first installation drip tape will be replaced as operation and maintenance issue as required for proper operation of the system. Resource Concerns: Insufficient Water - Inefficient use of irrigation water, Degraded Plant Condition - Undesirable plant productivity and health, Water Quality Degradation - Excessive sediment in surface waters, and Inefficient Energy Use - Equipment and Facilities. Associated Practices: 533-Pumping Plant, 449-Irrigation Water Management, 430 - Irrigation Pipeline, 610 - Salinity & Sodic Soil Management, 328-Conservation Crop Rotation, 590 Nutrient Management, and 595-Itegrated Pest Management.

Before Situation:

A typical before irrigation situation would normally be an existing inefficient sprinkler or surface irrigation system for vegetable or other crop production system. The existing irrigation system would experience poor, nonuniform irrigation applicatons and significant water losses affecting both water quantity and water quality.

After Situation:

A surface placed microirrigation system is utilized to provide highly efficient irrigation to a field. Water applications are reduced and runoff eliminated. Offsite water quality is improved, and on site water use is reduced. Drip tape will be replaced as operation and maintenance issue as required for proper operation of the system. A typical scenario consists of a 1/2 acre irrigated field with lateral spacing of 2 feet.

Feature Measure: Acres in System

Scenario Unit: Acres

Scenario Typical Size: 0.5

Scenario Total Cost: $2,007.96

Scenario Cost/Unit: $4,015.92

Cost Details:

Component Name	ID	Description	Unit	Cost	QTY	Total
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.	Hours	$27.56	4	$110.24
Materials						
Pipe, HDPE, smooth wall, weight priced	1379	High Density Polyethylene (HDPE) compound manufactured into smooth wall pipe. Materials only.	Pound	$2.56	49	$125.44
Micro Irrigation, surface drip tape	2522	Tape is installed above ground for surface drip irrigation on annual crops, includes installation, and connections to the supply and flushing laterals. Tape is a minimum of 10 mil thick and has emitters built in.	Feet	$0.10	11979	$1,197.90
Micro Irrigation, screen or disc filter, < 3"	2524	Micro Irrigation, small manual flush screen or disc filter, <3 inch nominal size. Includes materials only.	Each	$201.22	2	$402.44
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	$171.94	1	$171.94

Practice: 441 - Irrigation System, Microirrigation

Scenario: #10 - Surface Tape > or = 5 acres

Scenario Description:

A micro-irrigation system using drip tape or similar type micro-irrigation material placed on the soil surface for vegetables or other field crops. Spacing of drip tape similar type micro irrigation material is based on soil type or row alignment but will typically vary from 18" to 36". This system typically includes a filter system, PE manifolds fittings, drip tape, etc. Does not include the pumping plant, power source, or water source. Surface placed drip tape will not meet the 441 practice life and will normally need replacement every year. After first installation drip tape will be replaced as a part of regular operation and maintenance as required for proper operation of the system. Resource Concerns: Insufficient Water - Inefficient use of irrigation water, Degraded Plant Condition - Undesirable plant productivity and health, Water Quality Degradation - Excessive sediment in surface waters, and Inefficient Energy Use - Equipment and Facilities. Associated Practices: 533-Pumping Plant, 449-Irrigation Water Management, 430 - Irrigation Pipeline, 610 - Salinity & Sodic Soil Management, 328-Conservation Crop Rotation, 590 Nutrient Management, and 595-Itegrated Pest Management.

Before Situation:

A typical before irrigation situation would include an existing inefficient sprinkler or surface irrigation system used to irrigate vegetables or other crops. The existing irrigation system would supply excessive or inadequate non-uniform irrigation applicatons with significant water losses affecting both water quantity and water quality.

After Situation:

A surface placed microirrigation system is utilized to provide highly efficient irrigation to a field. Crop water requirements are met. Water applications are normally reduced and runoff eliminated. Offsite water quality is improved, and on site water use reduced. Drip tape will be replaced as operation and maintenance issue as required for proper operation of the system. A typical scenario consists of a 20 acre irrigated field with lateral spacing of 2 feet.

Feature Measure: Acres in System

Scenario Unit: Acres

Scenario Typical Size: 20.0

Scenario Total Cost: $52,655.71

Scenario Cost/Unit: $2,632.79

Cost Details:

Component Name	ID	Description	Unit	Cost	QTY	Total
Equipment Installation						
Trenching, Earth, 12 in. x 48 in.	53	Trenching, earth, 12 inch wide x 48 inch depth, includes equipment and labor for trenching and backfilling	Feet	$1.38	1500	$2,070.00
Micro Irrigation, chemical injection equipment	1987	Chemical Injector Pump, plus chemigation check valve, injector ports, and appurtenances, Installation included.	Each	$1,813.43	1	$1,813.43
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.	Hours	$27.56	32	$881.92
Materials						
Valve, Air Vacuum Release, Manual	1041	Materials for <2 inch Manual Air/Vacuum Relief Valve	Each	$30.19	2	$60.38
Pipe, HDPE, smooth wall, weight priced	1379	High Density Polyethylene (HDPE) compound manufactured into smooth wall pipe. Materials only.	Pound	$2.56	650	$1,664.00
Micro Irrigation, control valves and timers	1485	Automatic controller and timer, to turn on and off the sets for micro irrigation, installation and valves. Based on control unit, not number of valves controlled.	Each	$400.44	2	$800.88
Ball Valve, 4 in.	1726	4 inch ball valve, metal body. Materials only.	Each	$334.64	6	$2,007.84
Water Meter, Microirrigation, <= 2”, with Volume Totalizer	2437	Microirrigation water meter less than or equal to 2 inch diameter, with volume totalizer. Includes materials only.	Each	$423.91	1	$423.91
Micro Irrigation, Media Filter, 12” to 24” Dia. tank, Equipped for Auto Flush	2466	Sand or media filter for Micro irrigation system. Includes filter, plumbing, connections and automatic controller. Unit is complete and installed. Unit is each Filter in a filter station that normally includes 2 or more filters.	Each	$3,713.63	2	$7,427.26
Micro Irrigation, surface drip tape	2522	Tape is installed above ground for surface drip irrigation on annual crops, includes installation, and connections to the supply and flushing laterals. Tape is a minimum of 10 mil thick and has emitters built in.	Feet	$0.10	348480	$34,848.00
Micro Irrigation, screen or disc filter, < 3"	2524	Micro Irrigation, small manual flush screen or disc filter, <3 inch nominal size. Includes materials only.	Each	$201.22	2	$402.44
Mobilization						
Mobilization, medium equipment	1139	Equipment with 70-150 HP or typical weights between 14,000 and 30,000 pounds.	Each	$255.65	1	$255.65

Practice: 441 - Irrigation System, Microirrigation

Scenario: #11 - Multiple Outlet Drip

Scenario Description:

A micro-irrigation system is installed in a commercial greenhouse or nursery. The system is installed with all fittings, control valves, pressure reducing/regulating valves, air/vacuum release, screen filter, pressure gauges, submain, lateral lines, and emitters to deliver water to potted plants or in-ground crops. Multiple outlet drip (MOD) emitters or micro sprays are used. Associated Practices: Irrigation Pipeline (430), Irrigation Water Management (449)

Before Situation:

Crops in a 5,000 SF greenhouse have an inefficient irrigation system causing irrigation water loss. A surface water source is available.

After Situation:

A micro-spray or multiple outlet drip microirrigation system is utilized to provide highly efficient irrigation to a greenhouse. Water applications are reduced and runoff eliminated. Offsite water quality is improved, and on site water use is reduced.

Feature Measure: Sq Ft in Green House system.

Scenario Unit: Square Feet

Scenario Typical Size: 5,000.0

Scenario Total Cost: $2,140.46

Scenario Cost/Unit: $0.43

Cost Details:

Component Name	ID	Description	Unit	Cost	QTY	Total
Equipment Installation						
Trenching, Pipeline Plowing	1096	Includes equipment and labor for plowing small diameter lines in common earth (< 3")	Feet	$1.10	500	$550.00
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.	Hours	$27.56	12	$330.72
Materials						
Pipe, HDPE, smooth wall, weight priced	1379	High Density Polyethylene (HDPE) compound manufactured into smooth wall pipe. Materials only.	Pound	$2.56	131	$335.36
Micro Irrigation, drip irrigation system, small scale	2170	An above ground, small scale, micro-irrigation system. Includes miniature emitters, tubes, or applicators placed along a water delivery line. Includes materials and shipping only.	Square Feet	$0.07	5000	$350.00
Micro Irrigation, screen or disc filter, < 3"	2524	Micro Irrigation, small manual flush screen or disc filter, <3 inch nominal size. Includes materials only.	Each	$201.22	2	$402.44
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	$171.94	1	$171.94

Practice: 441 - Irrigation System, Microirrigation

Scenario: #12 - Hoop House Surface Microirrigation

Scenario Description:

Surface Microirrigation system for 30' x 96' seasonal high tunnel, 24" rows with emmitters on a 12" spacing. Resource Concerns: Insufficient Water - Inefficient use of irrigation water, Degraded Plant Condition - Undesirable plant productivity and health, Water Quality Degradation - Excessive sediment in surface waters, and Inefficient Energy Use - Equipment and facilities. Associated Practices: 533-Pumping Plant, 449- Irrigation Water Management, 430 - Irrigation Pipeline, 328-Conservation Crop Rotation, and 590 Nutrient Management.

Before Situation:

A field has an inefficient garden-hose based sprinkler irrigation system causing irrigation water loss that impacts water quality and water quantity.

After Situation:

A surface placed microirrigation system is utilized to provide highly efficient irrigation to an area. Water applications are reduced and runoff eliminated. Offsite water quality is improved, and on site water use is reduced.

Feature Measure: Microirrigation area

Scenario Unit: Square Feet

Scenario Typical Size: 2,880.0

Scenario Total Cost: $513.06

Scenario Cost/Unit: $0.18

Cost Details:

Component Name	ID	Description	Unit	Cost	QTY	Total
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.	Hours	$27.56	4	$110.24
Materials						
Micro Irrigation, drip irrigation system, small scale	2170	An above ground, small scale, micro-irrigation system. Includes miniature emitters, tubes, or applicators placed along a water delivery line. Includes materials and shipping only.	Square Feet	$0.07	2880	$201.60
Micro Irrigation, screen or disc filter, < 3"	2524	Micro Irrigation, small manual flush screen or disc filter, <3 inch nominal size. Includes materials only.	Each	$201.22	1	$201.22

Practice: 442 - Sprinkler System

Scenario: #3 - Lateral Move System > 1000 LF

Scenario Description:

Installation of a linear or lateral move sprinkler system with flow meter and 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) Payment rate is figured per foot of installed hardware length.

Before Situation:

A 76 acre field is irrigated with a high flow sprinkler system. 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.

Feature Measure: Length of Linear Move Lateral

Scenario Unit: Feet

Scenario Typical Size: 1,280.0

Scenario Total Cost: $116,097.20

Scenario Cost/Unit: $90.70

Cost Details:

Component Name	ID	Description	Unit	Cost	QTY	Total
Materials						
Flow Meter, with Electronic Index	1452	10 inch Turbine Irrigation flow meter, with Electronic Index, Rate and Volume, permanently installed. Materials only.	Each	$2,813.69	1	$2,813.69
Irrigation, Lateral Move Pivot, Fixed Cost Portion	2448	Fixed cost portion of a lateral move pivot system with appurtenances. This portion includes all sprinkers, installation, pipe, tower.	Each	$12,839.03	1	$12,839.03
Irrigation, Lateral Move Pivot, Variable Cost Portion	2449	Variable cost portion of lateral move pivot system with appurtenances. This portion includes all sprinkers, installation, pipe, tower.	Feet	$83.16	1200	$99,792.00
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	$70.59	2	$141.18
Mobilization, medium equipment	1139	Equipment with 70-150 HP or typical weights between 14,000 and 30,000 pounds.	Each	$255.65	2	$511.30

Practice: 442 - Sprinkler System

Scenario: #6 - Solid Set System

Scenario Description:

A solid set irrigation 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:

The typical installation will be on cropland with some existing inefficient irrigation. The farm is typically producing specialty crops, such as fresh vegetables.

After Situation:

The typical system is installed on 4 acres. The installed solid set system has 1-6 inch pipe sizes and sprinklers set 30 - 50 ft apart. Improved distribution uniformity and irrigation efficiency will result.

Feature Measure: Area of Irrigation System

Scenario Unit: Acres

Scenario Typical Size: 4.0

Scenario Total Cost: $17,088.90

Scenario Cost/Unit: $4,272.23

Cost Details:

Component Name	ID	Description	Unit	Cost	QTY	Total
Materials						
Irrigation, Solid Set, w/Appurtenances	324	Solid Set irrigation system that includes pipe, sprinklers, connections, installation and appurtenances.	Acres	$4,236.93	4	$16,947.72
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	$70.59	2	$141.18

Practice: 442 - Sprinkler System

Scenario: #7 - Traveling Gun System, < 2 inch Hose

Scenario Description:

A portable small gun system used to apply irrigation water on small fields. A small traveling gun irrigation system is installed to apply water uniformly and at an acceptable application rate operated under pressure to effectively irrigate less than 5 acres. The irrigation system is installed with all necessary appurtenances. 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:

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:

A small traveling gun irrigation system is installed to irrigate 5 acres based on the determined spacing needs. Irrigation is applied efficiently and uniformly to maintain adequate soil water for plant growth without causing excessive water loss, erosion, or water quality degradation The irrigation system is installed with all necessary appurtenances.

Feature Measure: Number of Traveling Gun Systems

Scenario Unit: Each

Scenario Typical Size: 1.0

Scenario Total Cost: $9,051.69

Scenario Cost/Unit: $9,051.69

Cost Details:

Component Name	ID	Description	Unit	Cost	QTY	Total
Materials						
Irrigation, Traveling Gun System with <= 2 in. Nominal size hose, and appurtenances light duty	1478	Irrigation, Traveling Gun System with <= 2 inch 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	$6,034.46	1.5	$9,051.69

Practice: 442 - Sprinkler System

Scenario: #8 - Traveling Gun System, 2 inch to 3 inch Hose

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 3” PE pipe is attached to the cart on one end and a large reel on the other end. The reel serves as storage are 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.

Feature Measure: Number of Traveling Gun Systems

Scenario Unit: Each

Scenario Typical Size: 1.0

Scenario Total Cost: $22,538.25

Scenario Cost/Unit: $22,538.25

Cost Details:

Component Name	ID	Description	Unit	Cost	QTY	Total
Materials						
Irrigation, Traveling Gun System, > 2 to 3 inch Nominal size hose	1479	Irrigation, Traveling Gun System with 2.3 to 3 inch 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	$7,512.75	3	$22,538.25

Practice: 442 - Sprinkler System

Scenario: #9 - Traveling Gun System, > 3 inch Hose

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, 1200' 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. 1200' or more flexible 4" PE pipe is attached to the cart on one end and a large reel on the other end. The reel serves as storage are 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.

Feature Measure: Number of Traveling Gun Systems

Scenario Unit: Each

Scenario Typical Size: 1.0

Scenario Total Cost: $42,627.52

Scenario Cost/Unit: $42,627.52

Cost Details:

Component Name	ID	Description	Unit	Cost	QTY	Total
Materials						
Irrigation, Traveling Gun System, > 3 inch Nominal size hose	1762	Irrigation, Traveling Gun System with > 3 inch Nominal size hose with appurtenances. This includes the sprinkler gun, traveler cart, hard hose, reel, connections, controls, and installation. Normal hose length 1300'	Each	$42,627.52	1	$42,627.52

Practice: 442 - Sprinkler System

Scenario: #10 - Pod System

Scenario Description:

A portable irrigation system consisting of Polyethylene (PE) pipe and pods that have attached sprinklers. This scenario addresses installation of all pod style irrigation sprinkler systems. 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:

Pastureland is flood irrigated and has poor irrigation efficiency and distribution uniformity. The slope and irregular shape of the field limit the potential for improved management to improve the irrigation efficiency or the distribution uniformity. Irrigation water moves both within the field and off it, resulting in wet areas, runoff and deep percolation. Runoff from the field flows into streams, water courses, and other water bodies. Excess applied irrigation water infiltrates into ground water causing degradation to the receiving waters.

After Situation:

A 10 acre irrigated pasture with a medium pressure irrigation system consisting of sprinkler pods along a PE line is installed. The pods and PE line are placed in different sections of the pasture by dragging both with a four wheeler. The PE line is 660 feet in length and has 14 pods evenly spaced along its length. The improved distribution uniformity and irrigation efficiency reduces the inefficient use of water on irrigated land, reducing irrigation water applied and energy use. Water application rates meet the pasture vegetation consumptive use requirements. Runoff and deep percolation as a result of irrigation are eliminated, and the receiving waters are no longer degraded.

Feature Measure: Number of Sprinkler Pods

Scenario Unit: Each

Scenario Typical Size: 14.0

Scenario Total Cost: $3,875.68

Scenario Cost/Unit: $276.83

Cost Details:

Component Name	ID	Description	Unit	Cost	QTY	Total
Materials						
Irrigation, Pod System, w/Appurtenances	323	Pod irrigation system that includes pod, pipe, sprinklers, connections, and appurtenances. Includes materials only.	Each	$266.75	14	$3,734.50
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	$70.59	2	$141.18

Practice: 442 - Sprinkler System

Scenario: #13 - Cranberry System Modification

Scenario Description:

A solid-set irrigation system on a cranberry bog is retrofitted by moving and replacing heads at a closer spacing on the laterals with heads meeting high emission uniformity criteria. Resource concerns include: Insufficient Water (Inefficient use of irrigation water), Water Quality Degradation (Excess nutrients in surface and ground waters). Associated Practices: Irrigation Pipeline (430), Pumping Plant (533), Irrigation Water Management (449)

Before Situation:

An existing permanent irrigation system in a cranberry bogs does not meet coefficient of uniformity (CU), distribution uniformity (DU) criteria. Low/high application rates result in damage to crop and poor delivery of chemigation.

After Situation:

A planned irrigation system is modified such that all components necessary are installed to efficiently apply water. The modified system meets or exceeds the high criteria of CU>or= 85% and DU >or= 76% and SC <or= 1.3, Min. in/hr >or= 0.095, Avg in/hr <or= 0.25. This 15 acre scenario is based on a systems for 3 5-acre bogs. The retrofit does not include any changes in the lateral sizes or location.

Feature Measure: Area of Irrigation System

Scenario Unit: Acres

Scenario Typical Size: 15.0

Scenario Total Cost: $25,300.62

Scenario Cost/Unit: $1,686.71

Cost Details:

Component Name	ID	Description	Unit	Cost	QTY	Total
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.	Hours	$27.56	24	$661.44
Materials						
Irrigation System, Cranberry, System Modification	1121	Modify an existing solid set by moving heads and replacing heads with heads meeting required uniformity criteria.	Acres	$1,542.86	15	$23,142.90
Irrigation, Cranberry, Inline, Screen, Filter, 1,125 Gallon per Minute Capacity	2446	Custom made in-line screen filter for cranberry irrigation on 15 ac (1,125gpm) capacity.	Each	$1,324.34	1	$1,324.34
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	$171.94	1	$171.94

Practice: 442 - Sprinkler System

Scenario: #14 - Cranberry Complete System Replacement

Scenario Description:

A solid-set irrigation system on a cranberry bog is replaced with a new system of mainlines, laterals, and heads meeting required emission uniformity criteria. Resource concerns include: Insufficient Water (Inefficient use of irrigation water), Water Quality Degradation (Excess nutrients in surface and ground waters). Associated Practices: Irrigation Pipeline (430), Pumping Plant (533), Irrigation Water Management (449)

Before Situation:

An existing permanent irrigation system in a cranberry bogs does not meet coefficient of uniformity (CU), distribution uniformity (DU) criteria. Low/high application rates result in damage to crop and poor delivery of chemigation.

After Situation:

A planned irrigation system is installed such that all components necessary are installed to efficiently apply water. The new system meets or exceeds the criteria of CU>or= 85% and DU >or= 76% and SC <or= 1.3, Min. in/hr >or= 0.095, Avg in/hr <or= 0.25. This 15 acre scenario is based on a systems for 3 5-acre bogs.

Feature Measure: Area of Irrigation System

Scenario Unit: Acres

Scenario Typical Size: 15.0

Scenario Total Cost: $39,519.78

Scenario Cost/Unit: $2,634.65

Cost Details:

Component Name	ID	Description	Unit	Cost	QTY	Total
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.	Hours	$37.19	645	$23,987.55
Materials						
Irrigation, Cranberry, Replace	1122	Replace a solid set system with a high uniformity layout and heads	Acres	$935.73	15	$14,035.95
Irrigation, Cranberry, Inline, Screen, Filter, 1,125 Gallon per Minute Capacity	2446	Custom made in-line screen filter for cranberry irrigation on 15 ac (1,125gpm) capacity.	Each	$1,324.34	1	$1,324.34
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	$171.94	1	$171.94

Practice: 442 - Sprinkler System

Scenario: #37 - Linear Move System

Scenario Description:

Installation of a 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) Payment rate is figured per foot of installed hardware length.

Before Situation:

A 76 acre field is flood irrigated. Application of irrigation water is inefficient and non-uniform. Irrigation water is typically over applied in some parts of the field, and under applied in others. Deep percolation from the excess irrigation delivers excess nutrients salts, and chemicals to the ground water. Runoff from the field contains excess nutrients and degrades the receiving waters. Irrigated induced erosion is excessive.

After 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.

Feature Measure: Length of Linear Move Lateral

Scenario Unit: Feet

Scenario Typical Size: 1,280.0

Scenario Total Cost: $144,366.96

Scenario Cost/Unit: $112.79

Cost Details:

Component Name	ID	Description	Unit	Cost	QTY	Total
Materials						
Linear Move System with appurtenances	322	Linear/lateral move system including: central tower, lateral towers, pipes, sprinklers, controllers, installation.	Acres	$1,890.98	76	$143,714.48
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	$70.59	2	$141.18
Mobilization, medium equipment	1139	Equipment with 70-150 HP or typical weights between 14,000 and 30,000 pounds.	Each	$255.65	2	$511.30

Practice: 442 - Sprinkler System

Scenario: #40 - Traveling Boom

Scenario Description:

A portable traveling boom sprayer system used to apply irrigation water. A traveling boom irrigation system is installed to apply water uniformly and at an acceptable application rate operated under pressure to effectively irrigate field crops. The irrigation system is installed with all necessary appurtenances. 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) 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 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. As the water travels through the air from the sprinkler to the ground, a portion evaporates, reducing efficiency.

After Situation:

The spray cart applies irrigation water in an appropriate quantity and location that eliminates both runoff and deep percolation. By reducing the time the spray is traveling through the air evaporation losses are reduced greatly increasing efficiency. The traveling boom system is typically located on 50 acres or less of hay/pasture land, or 100 acres or less of cropland. The system includes an irrigation boom mounted onto a movable cart. 1200’ or more flexible 4” 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.

Feature Measure: Length of sprayer fully extended

Scenario Unit: Linear Feet

Scenario Typical Size: 160.0

Scenario Total Cost: $66,036.78

Scenario Cost/Unit: $412.73

Cost Details:

Component Name	ID	Description	Unit	Cost	QTY	Total
Equipment Installation						
Irrigation Sprinkler Traveling Boom	2671	Irrigation sprinkler traveling boom. Typical 160 foot boom with cart. All appurtenances including nozzles and end guns included. Hard hose and reel not included. Materials only.	Each	$23,409.26	1	$23,409.26
Materials						
Irrigation, Traveling Gun System, > 3 inch Nominal size hose	1762	Irrigation, Traveling Gun System with > 3 inch Nominal size hose with appurtenances. This includes the sprinkler gun, traveler cart, hard hose, reel, connections, controls, and installation. Normal hose length 1300'	Each	$42,627.52	1	$42,627.52

Practice: 442 - Sprinkler System

Scenario: #46 - Center Pivot System

Scenario Description:

Installation of a low pressure center pivot system. Resource concerns include: Soil Erosion (Concentrated flow erosion e.g. irrigation induced), Insufficient Water (Inefficient use of irrigation water), Water Quality Degradation (Excess nutrients in surface and ground waters, Excessive salts in surface and ground waters, Excess pathogens and chemicals from manure, bio-solids or compost applications). Associated Practices: Irrigation Pipeline (430), Pumping Plant (533), Irrigation Water Management (449)

Before Situation:

A 160 acre field is flood irrigated. Application of irrigation water is inefficient and non-uniform. Irrigation water is typically over applied in some parts of the field, and under applied in others. Deep percolation from the excess irrigation delivers excess nutrients salts, and chemicals to the ground water. Runoff from the field contains excess nutrients and degrades the receiving waters. Irrigated induced erosion is excessive.

After Situation:

The existing surface irrigation system is converted to a low pressure center pivot. Corners are converted to non-irrigated cropland. The pivot is 1300 feet in length with pressure regulators and low pressure sprinklers 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.

Feature Measure: Length of Center Pivot Lateral

Scenario Unit: Feet

Scenario Typical Size: 1,300.0

Scenario Total Cost: $82,553.20

Scenario Cost/Unit: $63.50

Cost Details:

Component Name	ID	Description	Unit	Cost	QTY	Total
Materials						
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	$5,408.72	1	$5,408.72
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.	Feet	$58.84	1300	$76,492.00
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	$70.59	2	$141.18
Mobilization, medium equipment	1139	Equipment with 70-150 HP or typical weights between 14,000 and 30,000 pounds.	Each	$255.65	2	$511.30

Practice: 443 - Irrigation System, Surface and Subsurface

Scenario: #1 - Flood Floor Irrigation

Scenario Description:

The scenario consists of a concrete floor and under floor water distribution system. The plants receive water from the flooded floor through the root zone. Only needed water is taken up by the soil medium. After irrigation completed all water is cycled to the holding tank and is reused for the next irrigation cycle. For pumps - use 533 - Pumping Plant , for piping use 430 - Irrigatin Pipeline. Based on flood floor design.

Before Situation:

The greenhouse plants are watered by hand or by sprinkler system. Water drips onto the floor and sinks into the earthen floor, runs off or evaporates. Water is lost to the plants and can become contaminated with fertilizers or pesticides.

After Situation:

Greenhouse irrigation water is supplied by a Flood-Floor irrigation system. Water is taken up by the soil medium. All remaining water is recycled for reuse. No water is wasted or contaminated.

Feature Measure: Square foot of flooded area

Scenario Unit: Square Feet

Scenario Typical Size: 21,600.0

Scenario Total Cost: $152,688.09

Scenario Cost/Unit: $7.07

Cost Details:

Component Name	ID	Description	Unit	Cost	QTY	Total
Equipment Installation						
Concrete, CIP, slab on grade, reinforced	37	Steel reinforced concrete formed and cast-in-placed as a slab on grade by chute placement. Typical strength is 3000 to 4000 psi. Includes materials, labor and equipment to transport, place and finish.	Cubic Yards	$362.36	300	$108,708.00
Micro Irrigation, chemical injection equipment	1987	Chemical Injector Pump, plus chemigation check valve, injector ports, and appurtenances, Installation included.	Each	$1,813.43	1	$1,813.43
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.	Hours	$37.19	48	$1,785.12
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.	Hours	$27.56	128	$3,527.68
Materials						
Pipe, PVC, 6 in., SCH 40	980	Materials: - 6 inch - PVC - SCH 40 - ASTM D1785	Feet	$6.74	400	$2,696.00
Pipe, PVC, 8 in., SCH 40	981	Materials: - 8 inch - PVC - SCH 40 - ASTM D1785	Feet	$10.15	2125	$21,568.75
Tank, Poly enclosed Storage, 300-1000 gal	1074	Water storage tanks. Includes materials and shipping only.	Gallons	$0.83	14000	$11,620.00
Tank, Float Valve Assembly	1077	Float Valve, Stem, Swivel, Float Ball	Each	$81.21	1	$81.21
Micro Irrigation, control valves and timers	1485	Automatic controller and timer, to turn on and off the sets for micro irrigation, installation and valves. Based on control unit, not number of valves controlled.	Each	$400.44	2	$800.88
Micro Irrigation, screen filter, < 100 gpm	1617	Screen filter for Micro Irrigation used in small systems. Includes filter. No controls are included or needed.	Each	$87.02	1	$87.02

Practice: 443 - Irrigation System, Surface and Subsurface

Scenario: #2 - Flood (Ebb and Flow) Bench Irrigation

Scenario Description:

The scenario consists of an aluminun flood bench system. The plants receive water from the flooded bench through the root zone. Only needed water is taken up by the soil medium. After irrigation completed all water is cycled to the holding tank and is reused for the next irrigation cycle. For pumps - use 533 - Pumping Plant, for holding tank use 436 - Irrigation Reservoir , for piping use 430 - Irrigation Pipeline. The component includes the piping and manifold distribution system for the benches. Also includes the return piping to the holding tank.

Before Situation:

The greenhouse plants are watered by hand or by sprinkler system. Water drips onto the floor and sinks into the earthen floor, runs off or evaporates. Water is lost to the plants and can become contaminated with fertilizers or pesticides.

After Situation:

Greenhouse plants are irrigated with an aluminun flood bench (Ebb and Flow) system. The plants receive water from the flooded bench through the root zone. Water is taken up by the soil medium. All remaining water is recycled for reuse. No water is wasted or contaminated.

Feature Measure: Square foot of bench installed

Scenario Unit: Square Feet

Scenario Typical Size: 2,000.0

Scenario Total Cost: $22,500.44

Scenario Cost/Unit: $11.25

Cost Details:

Component Name	ID	Description	Unit	Cost	QTY	Total
Equipment Installation						
Irrigation Flood Bench system	2231	Sliding benches or troughs used for potted plant irrigation. Distribution system is included in benches. Includes materials, labor, and equipment costs.	Square Feet	$11.05	2000	$22,100.00
Materials						
Micro Irrigation, control valves and timers	1485	Automatic controller and timer, to turn on and off the sets for micro irrigation, installation and valves. Based on control unit, not number of valves controlled.	Each	$400.44	1	$400.44

Practice: 449 - Irrigation Water Management

Scenario: #1 - Basic IWM <= 30 acres

Scenario Description:

A low Intensity irrigation water management system for producers using a checkbook method (crop grown, soil moisture conditions prior to irrigation, dates of irrigation start and stop, depths of irrigation applied, duration of irrigations, and amount of rainfall). For a typical scenario, soil moisture is determined by the feel method, volumes of irrigation water are based on energy or water district bills, records are kept on paper copies, and calculations are made by hand. Resource Concerns: Insufficient Water Supply-Inefficient use of irrigation water; Degraded Plant Condition-Undesirable plant productivity and health, and Inefficient Energy Use-Equipment and facilities. Associated Practices: 441-Irrigation System Microirrigation, 442-Irrigation System Sprinkler, 443-Irrigation System Surface and Subsurface.

Before Situation:

The irrigator decides when to irrigate based on general crop or soil appearance or limited soil moisture monitoring. System run times are based on past apparent success. The typical irrigated field is a 30 acre corn field with a surface irrigation system.

After Situation:

Irrigations are scheduled based on measured crop water requirements. Records are used to evaluate results of past irrigation events and influence future irrigations. The irrigator keeps records of soil moisture, crop water use, rainfall amounts and irrigation timing and amounts. At the end of the irrigation season all the data has been reviewed and evaluated. Improvements planned for the next season have been determined.

Feature Measure: Irrigated Area Managed

Scenario Unit: Acres

Scenario Typical Size: 30.0

Scenario Total Cost: $1,125.12

Scenario Cost/Unit: $37.50

Cost Details:

Component Name	ID	Description	Unit	Cost	QTY	Total
Labor						
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.	Hours	$46.88	24	$1,125.12

Practice: 449 - Irrigation Water Management

Scenario: #2 - Basic IWM > 30 acres

Scenario Description:

A low Intensity irrigation water management system for producers using a checkbook method (crop grown, soil moisture conditions prior to irrigation, dates of irrigation start and stop, depths of irrigation applied, duration of irrigations, and amount of rainfall). For a typical scenario, soil moisture is determined by the feel method, volumes of irrigation water are based on energy or water district bills, records are kept on paper copies, and calculations are made by hand. Resource Concerns: Insufficient Water Supply-Inefficient use of irrigation water; Degraded Plant Condition-Undesirable plant productivity and health, and Inefficient Energy Use-Equipment and facilities. Associated Practices: 441-Irrigation System Microirrigation, 442-Irrigation System Sprinkler, and 443-Irrigation System Surface and Subsurface.

Before Situation:

The irrigator decides when to irrigate based on general crop or soil appearance or limited soil moisture monitoring. System run times are based on past apparent success. The typical irrigated field is a 125 acre corn field with a sprinkler irrigation system.

After Situation:

Irrigations are scheduled based on measured crop water requirements. Records are used to evaluate results of past irrigation events and influence future irrigations. The irrigator keeps records of soil moisture, crop water use, rainfall amounts and irrigation timing and amounts. At the end of the irrigation season all the data has been reviewed and evaluated. Improvements planned for the next season have been determined.

Feature Measure: Irrigated Area Managed

Scenario Unit: Acres

Scenario Typical Size: 125.0

Scenario Total Cost: $1,720.64

Scenario Cost/Unit: $13.77

Cost Details:

Component Name	ID	Description	Unit	Cost	QTY	Total
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.	Hours	$27.56	8	$220.48
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.	Hours	$46.88	32	$1,500.16

Practice: 449 - Irrigation Water Management

Scenario: #3 - Intermediate IWM <= 30 acres

Scenario Description:

A medium intensity irrigation water management system for producers using a checkbook method (crop grown, soil moisture conditions prior to irrigation, dates of irrigation start and stop, depths of irrigation applied, duration of irrigations, and amount of rainfall). For a typical scenario, soil moisture is determined by in-field moisture sensors with manual downloads. Irrigation amounts are recorded from a flow meter near the pump. Records are input manually into an irrigation scheduling computer program. Resource Concerns: Insufficient Water Supply-Inefficient use of irrigation water; Degraded Plant Condition-Undesirable plant productivity and health, and Inefficient Energy Use-Equipment and facilities. Associated Practices: 441-Irrigation System Microirrigation, 442-Irrigation System Sprinkler, and 443-Irrigation System Surface and Subsurface.

Before Situation:

The farmer decides when to irrigate based on general crop or soil appearance or limited soil moisture monitoring. System run times are based on past apparent success. The typical irrigated field is a 30 acre corn field with a surface irrigation system.

After Situation:

Irrigations are scheduled based on measured crop water requirements. Records are used to evaluate results of past irrigation events and influence future irrigations. The irrigator keeps records of soil moisture, crop water use, rainfall amounts and irrigation timing and amounts. At the end of the irrigation season all the data has been reviewed and evaluated. Improvements planned for the next season have been determined.

Feature Measure: Irrigated Area Managed

Scenario Unit: Acres

Scenario Typical Size: 30.0

Scenario Total Cost: $1,500.16

Scenario Cost/Unit: $50.01

Cost Details:

Component Name	ID	Description	Unit	Cost	QTY	Total
Labor						
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.	Hours	$46.88	32	$1,500.16

Practice: 449 - Irrigation Water Management

Scenario: #4 - Intermediate IWM > 30 acres

Scenario Description:

A medium intensity irrigation water management system for producers using a checkbook method (crop grown, soil moisture conditions prior to irrigation, dates of irrigation start and stop, depths of irrigation applied, duration of irrigations, and amount of rainfall). For a typical scenario, soil moisture is determined by in field moisture sensors with manual downloads. Irrigation amounts are recorded from a flow meter near the pump. Records are input manually into an irrigation scheduling computer program. Resource Concerns: Insufficient Water Supply-Inefficient use of irrigation water; Degraded Plant Condition-Undesirable plant productivity and health, and Inefficient Energy Use-Equipment and facilities. Associated Practices: 441-Irrigation System Microirrigation, 442-Irrigation System Sprinkler, and 443-Irrigation System Surface and Subsurface.

Before Situation:

The farmer decides when to irrigate based on general crop or soil appearance or limited soil moisture monitoring. System run times are based on past apparent success. The typical irrigated field is a 125 acre corn field with a sprinkler irrigation system.

After Situation:

Irrigations are scheduled based on measured crop water requirements. Records are used to evaluate results of past irrigation events and influence future irrigations. The irrigator keeps records of soil moisture, crop water use, rainfall amounts and irrigation timing and amounts. At the end of the irrigation season all the data has been reviewed and evaluated. Improvements planned for the next season have been determined.

Feature Measure: Irrigated Area Managed

Scenario Unit: Acres

Scenario Typical Size: 125.0

Scenario Total Cost: $2,205.92

Scenario Cost/Unit: $17.65

Cost Details:

Component Name	ID	Description	Unit	Cost	QTY	Total
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.	Hours	$27.56	12	$330.72
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.	Hours	$46.88	40	$1,875.20

Practice: 449 - Irrigation Water Management

Scenario: #5 - Advanced IWM <= 30 acres

Scenario Description:

A high intensity irrigation water management system for producers using a checkbook method with advanced methods of determining irrigation water applied, and estimating crop evapotranspiration, monitoring field soil moisture, or monitoring crop temperature stress. Typical methods include flow measurement, daily record keeping, and use of real-time evapotranspiration estimates (such as those provided dedicated weather stations) and/or soil moisture sensors with automated data logging to monitor field soil moisture content and/or crop temperature. For this scenario, soil moisture is determined by automated soil moisture monitoring stations equiped with telemetry data. Irrigation amounts are recorded from a flow meter near the pump. Telemetry data is automatically sent to a computer with irrigation software. Irrigator also receives real time data via mobile phone applications. Some data such as total water applied may be entered into computer software manually. Resource Concerns: Insufficient Water Supply-Inefficient use of irrigation water; Degraded Plant Condition-Undesirable plant productivity and health, and Inefficient Energy Use-Equipment and facilities. Associated Practices: 441-Irrigation System Microirrigation, 442-Irrigation System Sprinkler, and 443-Irrigation System Surface and Subsurface.

Before Situation:

The farmer decides when to irrigate based on general crop or soil appearance or limited soil moisture monitoring. System run times are based on past apparent success. The typical irrigated field is a 30 acre corn field with a surface irrigation system.

After Situation:

Irrigations are scheduled based on measured crop water requirements. Records are used to evaluate results of past irrigation events and influence future irrigations. The irrigator keeps records of soil moisture, crop water use, rainfall amounts and irrigation timing and amounts. At the end of the irrigation season all the data has been reviewed and evaluated. Improvements planned for the next season have been determined.

Feature Measure: Irrigated Area Managed

Scenario Unit: Acres

Scenario Typical Size: 30.0

Scenario Total Cost: $1,875.20

Scenario Cost/Unit: $62.51

Cost Details:

Component Name	ID	Description	Unit	Cost	QTY	Total
Labor						
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.	Hours	$46.88	40	$1,875.20

Practice: 449 - Irrigation Water Management

Scenario: #6 - Advanced IWM > 30 acres

Scenario Description:

A high intensity irrigation water management system for producers using a checkbook method with advanced methods of determining irrigation water applied, and estimating crop evapotranspiration, monitoring field soil moisture, or monitoring crop temperature stress. Typical methods include flow measurement, daily record keeping, and use of real-time evapotranspiration estimates (such as those provided dedicated weather stations) and/or soil moisture sensors with automated data logging to monitor field soil moisture content and/or crop temperature. For this scenario, soil moisture is determined by automated soil moisture monitoring stations equiped with telemetry data. Irrigation amounts are recorded from a flow meter near the pump. Telemetry data is automatically sent to a computer with irrigation software. Irrigator also receives real time data via mobile phone applications. Some data such as total water applied may be entered into computer software manually. Resource Concerns: Insufficient Water Supply-Inefficient use of irrigation water; Degraded Plant Condition-Undesirable plant productivity and health, and Inefficient Energy Use-Equipment and facilities. Associated Practices: 441-Irrigation System Microirrigation, 442-Irrigation System Sprinkler, and 443-Irrigation System Surface and Subsurface.

Before Situation:

The farmer decides when to irrigate based on general crop or soil appearance or limited soil moisture monitoring. System run times are based on past apparent success. The typical irrigated field is a 125 acre corn field with sprinkler irrigation.

After Situation:

Irrigations are scheduled based on measured crop water requirements. Records are used to evaluate results of past irrigation events and influence future irrigations. The irrigator keeps records of soil moisture, crop water use, rainfall amounts and irrigation timing and amounts. At the end of the irrigation season all the data has been reviewed and evaluated. Improvements planned for the next season have been determined.

Feature Measure: Irrigated Area Managed

Scenario Unit: Acres

Scenario Typical Size: 125.0

Scenario Total Cost: $2,691.20

Scenario Cost/Unit: $21.53

Cost Details:

Component Name	ID	Description	Unit	Cost	QTY	Total
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.	Hours	$27.56	16	$440.96
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.	Hours	$46.88	48	$2,250.24

Practice: 449 - Irrigation Water Management

Scenario: #7 - Soil Moisture Sensors_1st Year

Scenario Description:

This practice includes the installation of soil moisture sensors such as tensiometers, gyp blocks, capacitance sensors etc, that are installed and read to determine point in time soil moisture by depth; and the labor of using the equipment for the first year. The installation includes the purchase of soil moisture meters and sensors, installation equipment, and labor to install and utilize sensors and readings in making IWM decisions during first year. Typical Scenario involves installation of resistance sensor blocks in a 80 acre field of irrigated cropland. Producer periodically monitors soil moisture sensors during the growing season. Meters used to read sensors may be portable. This scenario only applies to year one IWM. The appropriate labor on ly IWM scenario applies in subsequent contract years. 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: 441-Irrigation System Microirrigation, 442-Irrigation System Sprinkler, and 443-Irrigation System Surface and Subsurface, 587-Structure for water Control, 328-Conservation Crop Rotation, and 590-Nutrient Management.

Before Situation:

Producer uses feel method to estimate soil moisture for scheduling irrigation.

After Situation:

Producer has installed four sensors at each monitoring site to a depth of four feet with one sensor representing each foot of depth. Producer uses periodic soil moisture measurements to schedule irrigation resulting in improved irrigation water managment and reduced energy use.

Feature Measure: Number of Measuring Sites

Scenario Unit: Each

Scenario Typical Size: 2.0

Scenario Total Cost: $3,120.57

Scenario Cost/Unit: $1,560.29

Cost Details:

Component Name	ID	Description	Unit	Cost	QTY	Total
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.	Hours	$27.56	12	$330.72
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.	Hours	$46.88	40	$1,875.20
Materials						
Soil Moisture Meter	1455	Soil Moisture Sensor Reader. Equipment only.	Each	$234.59	1	$234.59
Soil Moisture Sensor	1456	Soil moisture resistance sensor W/10' cables. Equipment only.	Each	$67.36	8	$538.88
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	$70.59	2	$141.18

Practice: 449 - Irrigation Water Management

Scenario: #8 - Soil Moisture Sensors with Data Recorder_1stYear

Scenario Description:

This practice includes the installation of electrical soil moisture sensors such as capacitance or resistance sensors that are monitored to determine soil moisture. The installation includes the purchase of soil moisture sensors, installation equipment (probe or auger), and a data logger to log continuous soil moisture data that can be downloaded to a personal computer and associated graphing software. The scenario also includes the labor associated wtih using the equipment for the first year. Typical Scenario involves installation of resistance sensor blocks in a 120 acre field of sprinkler irrigated cropland. Producer periodically monitors soil moisture sensors during the growing season. This scenario only applies to year one of the IWM. The appropriate labor only IWM scenario applies in subsequent contract years. 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: 441-Irrigation System Microirrigation, 442-Irrigation System Sprinkler, and 443-Irrigation System Surface and Subsurface, 587-Structure for water Control, 328-Conservation Crop Rotation, and 590-Nutrient Management.

Before Situation:

Producer uses feel method to estimate soil moisture for scheduling irrigation in the field.

After Situation:

Producer has installed four sensors at each monitoring site to a depth of four feet with one sensor representing each foot of depth. Producer periodically downloads continuously recorded soil moisture measurements that are used to schedule irrigation more effectively resulting in improved irrigation water managment and reduced energy use.

Feature Measure: Number of Measuring Sites

Scenario Unit: Each

Scenario Typical Size: 2.0

Scenario Total Cost: $4,174.04

Scenario Cost/Unit: $2,087.02

Cost Details:

Component Name	ID	Description	Unit	Cost	QTY	Total
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.	Hours	$27.56	12	$330.72
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.	Hours	$46.88	40	$1,875.20
Materials						
Data Logger	1453	Data Logger W/Graphic Output for water management. Materials only.	Each	$644.03	2	$1,288.06
Soil Moisture Sensor	1456	Soil moisture resistance sensor W/10' cables. Equipment only.	Each	$67.36	8	$538.88
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	$70.59	2	$141.18

Practice: 449 - Irrigation Water Management

Scenario: #9 - Cranberry Auto Start

Scenario Description:

An autostart system designed to remotely monitor and control irrigation, frost protection, and crop cooling through user-defined start and stop settings for temperature and soil moisture. This is the installation of a self-contained control unit, custom harness, one pump-house master radio, two field radios with up to 1 mile line of sight in protective enclosure each with wireless temperature and soil moisture sensors, heavy-duty discharge pressure sensor, and cellular communications kit. An internet connection is required. One auto-start system is required for each irrigation pump. Typical scenario is a 15 acre irrigated cranberry bog. Resource concerns: Insufficient water - Inefficient use of irrigation water; Inefficient energy use - Equipment and facilities and Farming/ranching practices and field operations. Associated Practices: 374 - Farmstead Energy Improvement; 430 - Irrigation Pipeline; 441-Irrigation System Microirrigation, 442-Irrigation System Sprinkler, and 443-Irrigation System Surface and Subsurface.

Before Situation:

Irrigation Setting: Producer uses feel method to estimate soil moisture for scheduling irrigation in the fields, traveling to and from multiple pumps to manually start and stop them. Result is over/under water application, runoff, water loss and energy loss. Frost Protection Setting: Producer uses weather forecasts and thermometers to estimate air temperature in the fields, traveling to and from multiple pumps to manually start and stop them. Result is over/under water application, runoff, water loss and energy loss. Crop Cooling Setting: Producer uses weather forecasts, thermometers, and visual observation to estimate air temperature and crop stress in the fields, traveling to and from multiple pumps to manually start and stop them. Result is over/under water application, runoff, water loss and energy loss.

After Situation:

An autostart system is installed on an existing pumping plant meeting Nebraska performance criteria. The pump is remotely controlled allowing user-defined start and stop settings based on real-time data collected by soil moisture sensors and wireless temperature sensors in the fields, reducing water, energy usage, and runoff.

Feature Measure: Number of pumps

Scenario Unit: Each

Scenario Typical Size: 1.0

Scenario Total Cost: $6,354.32

Scenario Cost/Unit: $6,354.32

Cost Details:

Component Name	ID	Description	Unit	Cost	QTY	Total
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.	Hours	$37.19	20	$743.80
Materials						
Solar Panels, fixed cost portion	1031	Fixed cost portion of the Solar Panels. This portion is a base cost for all Solar Panels and is not dependant on KiloWatt. The total cost of any Solar Panels will include this fixed cost plus a variable cost portion. The completed Solar Panels will include all materials (electrical, controllers, service drops and etc). This cost will include material, labor and equipment.	Each	$273.31	1	$273.31
Solar Panels, variable cost portion	1135	Variable cost portion of the Solar Panels. This portion IS dependent on the total Kilowatt for the Solar Panels. The total cost of any Solar Panels will include this variable cost plus the fixed cost portion. The completed Solar Panels will include all materials (electrical, controllers, and service drop, etc). This cost will include material, labor and equipment.	Kilowatt	$2,429.59	0.1	$242.96
Switches and Controls, temp sensors	1192	Temperature and soil moisture sensors installed as part of an electronic monitoring (with or without wireless telecommunications) commonly used to control pumps and irrigation systems	Each	$579.54	1	$579.54
Switches and Controls, Wi-Fi system and software	1194	Software with built-in cellular or Wi-Fi communication commonly used to control pumps and irrigation systems	Each	$786.78	1	$786.78
Weather Station, Advanced	2550	Advance Weather Station which collects and records recording rainfall, humidity, barometric pressure, wind speed, temperature, and solar radiation from a solar powered self-standing tripod to an advance weather recording console. Used for both 449 advance irrigation water management and for Activity 202 water quality monitoring .	Each	$811.13	1	$811.13
Switches and Controls, Telemetry System, Irrigation, Wireless, Advanced or Complex	2689	Programmable telemetry logic controller for advanced irrigation systems. Includes cellular modem, wireless receiver, antennas, high-current relay module in waterproof enclosure. Also has the capacity to support, wireless sensors, solar panels, GPS location data and cellular telemetry. Compatible with all major automation controllers and panels	Each	$1,426.64	1	$1,426.64
Switches and Controls - Engine Controller, Advanced or Complex	2690	Configurable input and output engine controller for manual or automatic control on either mechanically or electronically governed engines. Controls start/stop and advanced throttling options,	Each	$1,419.57	1	$1,419.57
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	$70.59	1	$70.59

Practice: 449 - Irrigation Water Management

Scenario: #14 - IWM w weather station

Scenario Description:

This practice includes the installation of a weather station that is monitored to determine crop water use, status of heat and/or frost conditions to permit the producer to make informed irrigation decisions. The installation includes the purchase and installation of equipment, and a data logger to log continuous weather data including rainfall, temp, solar radiation, humidity, wind speed and soil moisture sensors that can be downloaded to a personal computer and associated graphing software. Typical Scenario involves installation on a 120 acre field of irrigated cropland. Producer periodically monitors the station during the growing season to determine timing and amounts of water to apply based on soil moisture sensors, field checks and weather station data. Producer keeps records of collected data and resulting irrigation decisions. This scenario only applies to year one of IWM. The appropriate labor-only IWM scenario applies in subsequent contract years. Resource Concerns: Insufficient Water Supply-Inefficient use of irrigation water; Water Quality; Degraded Plant Condition-Undesirable plant productivity and health, and Inefficient Energy Use-Equipment and facilities. Associated Practices: 441-Irrigation System Microirrigation, 442-Irrigation System Sprinkler, 443-Irrigation System Surface and Subsurface

Before Situation:

To meet crop water requirements, the producer schedules irrigations based on the calendar and what has apparently worked in the past. For cooling/frost protection, irrigation start and run times are based on broad regional weather forecasts.

After Situation:

Producer has installed a weather station and periodically downloads continuously recorded data that is used to schedule irrigation more effectively resulting in improved irrigation water management and reduced energy use. Field checks are made by irrigator to ground truth station data with crop.

Feature Measure: Number of weather stations

Scenario Unit: Each

Scenario Typical Size: 1.0

Scenario Total Cost: $4,643.41

Scenario Cost/Unit: $4,643.41

Cost Details:

Component Name	ID	Description	Unit	Cost	QTY	Total
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.	Hours	$27.56	20	$551.20
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.	Hours	$102.76	4	$411.04
Materials						
Solar Panels, fixed cost portion	1031	Fixed cost portion of the Solar Panels. This portion is a base cost for all Solar Panels and is not dependant on KiloWatt. The total cost of any Solar Panels will include this fixed cost plus a variable cost portion. The completed Solar Panels will include all materials (electrical, controllers, service drops and etc). This cost will include material, labor and equipment.	Each	$273.31	1	$273.31
Switches and Controls, temp sensors	1192	Temperature and soil moisture sensors installed as part of an electronic monitoring (with or without wireless telecommunications) commonly used to control pumps and irrigation systems	Each	$579.54	1	$579.54
Data Logger with Telemetry System	1454	Data Logger W/Graphic Output for water management and telemetry - data communication device with power supply in a weather proof enclosure. Equipment only.	Each	$1,577.29	1	$1,577.29
Soil Moisture Meter	1455	Soil Moisture Sensor Reader. Equipment only.	Each	$234.59	1	$234.59
Soil Moisture Sensor	1456	Soil moisture resistance sensor W/10' cables. Equipment only.	Each	$67.36	2	$134.72
Weather Station, Advanced	2550	Advance Weather Station which collects and records recording rainfall, humidity, barometric pressure, wind speed, temperature, and solar radiation from a solar powered self-standing tripod to an advance weather recording console. Used for both 449 advance irrigation water management and for Activity 202 water quality monitoring .	Each	$811.13	1	$811.13
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	$70.59	1	$70.59

Practice: 450 - Anionic Polyacrylamide (PAM) Application

Scenario: #5 - PAM Application

Scenario Description:

Control of irrigation induced erosion (typically in furrow irrigated fields) through the direct application of water-soluble Polyacrylamide (PAM) into the irrigation water supply (1 to 3 ounce sprinkled at 3-5 ft furrow inlet or metered at 10 ppm directly into the head ditch). PAM comes in granular, liquid oil emulsion, tablet, and block forms. This typical application is for an 80-acre furrow irrigated row crop field, with one PAM application (1-1.5 lb/ac, creating a 10 ppm concentration of the granular PAM in the head ditch metered via large fish feeder) at first irrigation followed by two additional applications (reduced rates of 0.5-1 lb/ac, or about 1-5 ppm in the inflow water) after cultivations. Resource Concern: Soil erosion. Associated Practices: 443-Irrigation System, Surface and Subsurface, 449-Irrigation Water Management.

Before Situation:

Irrigated lands susceptible to irrigation-induced erosion, excluding peat soils, and where the sodium adsorption ratio (SAR) of irrigation water is less than 15.

After Situation:

Erosion is minimized in furrow irrigated field.

Feature Measure: Weight of PAM Applied

Scenario Unit: Pound

Scenario Typical Size: 240.0

Scenario Total Cost: $1,571.52

Scenario Cost/Unit: $6.55

Cost Details:

Component Name	ID	Description	Unit	Cost	QTY	Total
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.	Hours	$27.56	12	$330.72
Materials						
Anionic Polyacrylamide (PAM)	1279	Water Soluble PAM, granular bulk, for mixing with irrigation water. Includes materials and shipping only.	Pound	$5.17	240	$1,240.80

Practice: 460 - Land Clearing

Scenario: #1 - Non-Heavy Equipment

Scenario Description:

Site preparation of a field with a labor crew, chainsaws, chippers or similar equipment removing trees and shrubs to achieve a conservation objective. Typical scenario is approximately 1 acre of trees and shrubs to be cleared. The resource concern is determined by the conservation objective met with the final practice applied to the field.

Before Situation:

Forested field of approximately 1 acre, with moderate density evenly spaced tree canopy.

After Situation:

Labor crew uses chainsaws, chippers, or similar equipment to clear trees and prepare the field for a conservation objective, includes on-site disposal as necessary. Associated practices, like plantings, other structures, or irrigation/drainage water management practices, would be contracted separately as needed.

Feature Measure: Area Cleared

Scenario Unit: Acres

Scenario Typical Size: 1.0

Scenario Total Cost: $903.63

Scenario Cost/Unit: $903.63

Cost Details:

Component Name	ID	Description	Unit	Cost	QTY	Total
Equipment Installation						
Chainsaw	937	Equipment and power unit costs. Labor not included.	Hours	$7.15	24	$171.60
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.	Hours	$27.56	24	$661.44
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	$70.59	1	$70.59

Practice: 460 - Land Clearing

Scenario: #2 - Heavy Equipment

Scenario Description:

Site preparation of a field with dozer or equivalent heavy equipment to acheive a conservation objective. Typical scenario is approximately 10 acres of trees and shrubs to be cleared. The resource concern is determined by the conservation objective met with the final practice applied to the field.

Before Situation:

Forested field of approximately 10 acres, with moderate density evenly spaced tree canopy.

After Situation:

Crew uses 200 HP dozer to clear trees and prepare field for conservation objective, includes on-site debris disposal as necessary. Associated practices, like plantings, other structures, or irrigation/drainage water management practices, would be contracted separately as needed.

Feature Measure: Area Cleared

Scenario Unit: Acres

Scenario Typical Size: 10.0

Scenario Total Cost: $11,381.30

Scenario Cost/Unit: $1,138.13

Cost Details:

Component Name	ID	Description	Unit	Cost	QTY	Total
Equipment Installation						
Dozer, 200 HP	928	Track mounted Dozer with horsepower range of 160 to 250. Equipment and power unit costs. Labor not included.	Hours	$206.77	40	$8,270.80
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.	Hours	$27.56	40	$1,102.40
Equipment Operators, Heavy	233	Includes: Cranes, Hydraulic Excavators >=50 HP, Dozers, Paving Machines, Rock Trenchers, Trenchers >=12 in., Dump Trucks, Ag Equipment >=150 HP, Scrapers, Water Wagons.	Hours	$38.00	40	$1,520.00
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	$488.10	1	$488.10

Practice: 466 - Land Smoothing

Scenario: #1 - Minor Shaping

Scenario Description:
Removing irregularities on the land surface of cropland by use of heavy equipment.

Before Situation:
Field damaged by flooding, past agricultural practices, or other topographich issues causing drainage or field workablity issues. Typically less than 100 cy/acre material moved.

After Situation:
Land level, backhoe, bulldozer or other heavy equipment used to correct irregulaties and address drainage or workablity issues.

Feature Measure: Acres of land treated

Scenario Unit: Acres

Scenario Typical Size: 40.0

Scenario Total Cost: $4,010.00

Scenario Cost/Unit: $100.25

Cost Details:

Component Name	ID	Description	Unit	Cost	QTY	Total
Equipment Installation						
Dozer, 140 HP	927	Track mounted Dozer with horsepower range of 125 to 160. Equipment and power unit costs. Labor not included.	Hours	$104.83	25	$2,620.75
Scraper, pull, 7 CY	1206	Pull type earthmoving scraper with 7 CY capacity. Does not include pulling equipment or labor. Add Tractor or Dozer, 160 HP typically required for single scraper.	Hours	$17.57	25	$439.25
Labor						
Equipment Operators, Heavy	233	Includes: Cranes, Hydraulic Excavators >=50 HP, Dozers, Paving Machines, Rock Trenchers, Trenchers >=12 in., Dump Trucks, Ag Equipment >=150 HP, Scrapers, Water Wagons.	Hours	$38.00	25	$950.00

Practice: 466 - Land Smoothing

Scenario: #2 - Cranberry Bog Leveling

Scenario Description:
Leveling of the base of cranberry bogs during bog renovation to reduce water needs during flooding and improve equipment operation and efficiency

Before Situation:
Uneven old bogs require excessive water for flooding.

After Situation:
Irregularities in the land surface are removed using a laser level and dozer. Multiple small bog cells are accessed for treatment.

Feature Measure: Acres of land treated

Scenario Unit: Acres

Scenario Typical Size: 5.0

Scenario Total Cost: $2,711.70

Scenario Cost/Unit: $542.34

Cost Details:

Component Name	ID	Description	Unit	Cost	QTY	Total
Equipment Installation						
Dozer, 140 HP	927	Track mounted Dozer with horsepower range of 125 to 160. Equipment and power unit costs. Labor not included.	Hours	$104.83	14	$1,467.62
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.	Hours	$27.56	14	$385.84
Equipment Operators, Heavy	233	Includes: Cranes, Hydraulic Excavators >=50 HP, Dozers, Paving Machines, Rock Trenchers, Trenchers >=12 in., Dump Trucks, Ag Equipment >=150 HP, Scrapers, Water Wagons.	Hours	$38.00	14	$532.00
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	$70.59	1	$70.59
Mobilization, medium equipment	1139	Equipment with 70-150 HP or typical weights between 14,000 and 30,000 pounds.	Each	$255.65	1	$255.65

Practice: 468 - Lined Waterway or Outlet

Scenario: #1 - Turf Reinforced Matting

Scenario Description:

Install 300 ' long by 15' wide by 1.5' deep trapezoidal or parabolic shaped waterway lined with Turf Reinforced Matting (TRM). 1/2 the channel is excavated. Excess excavation is spoiled in the immediate area. TRM is installed over 100% of the width of the waterway to prevent scour and aid in waterway establishment. Cost include excavation, spoiling of excess material, and furnishing and installing TRM. Lined waterway width is measured from top of bank to top of bank. Scenario includes seeding and mulching disturbed areas on both sides of waterway (~20'). 300' x 40' / 43,560 ~ 0.25 Acre.

Before Situation:

Excessive sedimentation and soil erosion as a result of ephemeral or classic gully erosion. Velocities are generally too high or saturated soil conditions make it difficult to establish a grassed waterway.

After Situation:

TRM lined waterway is 300 ' long by 15' wide by 1.5' deep. The practice is installed using a hydraulic excavator. TRM is installed by laborers. Associated practices are Subsurface Drain (606), Underground Outlet (620), Structure for Water Control (587), and Critical Area Seeding (342).

Feature Measure: Square Foot of Waterway

Scenario Unit: Square Feet

Scenario Typical Size: 4,500.0

Scenario Total Cost: $7,440.37

Scenario Cost/Unit: $1.65

Cost Details:

Component Name	ID	Description	Unit	Cost	QTY	Total
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 Yards	$2.31	90	$207.90
Tillage, Light	945	Includes light disking (tandem) or field cultivator. Includes equipment, power unit and labor costs.	Acres	$10.68	0.25	$2.67
Fertilizer, ground application, dry bulk	950	Dry bulk fertilizer application performed by ground equipment. Includes equipment, power unit and labor costs.	Acres	$6.63	0.25	$1.66
Cultipacking	1100	Includes equipment, power unit and labor costs.	Acres	$8.68	0.25	$2.17
Labor						
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.	Hours	$46.88	4	$187.52
Materials						
Nitrogen (N), Urea	71	Price per pound of N supplied by Urea. Price is not per pound of total product applied, no conversion is needed.	Pound	$0.47	7	$3.29
Phosphorus, P2O5	73	Price per pound of P2O5 supplied by Superphosphate. Price is not per pound of total product applied, no conversion is needed.	Pound	$0.61	7	$4.27
Potassium, K2O	74	K2O supplied by Muriate Of Potash. Price is not per pound of total product applied, no conversion is needed.	Pound	$0.35	7	$2.45
Lime, ENM	75	Fertilizer: Limestone Spread on field.	Ton	$64.87	0.25	$16.22
Turf reinforcement mat	1212	Synthetic turf reinforcement mat with staple anchoring. Includes materials, equipment and labor.	Square Yard	$11.01	535	$5,890.35
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.	Acres	$3,407.79	0.25	$851.95
Introduced Perennial Grasses, Legumes and/or Forbs, High Density	2749	Introduced perennial grasses, legumes, and/or forbs, may include a small percentage of annual species for establishment purposes and/or if allowed by the CPS. Planted at high density (greater than 60 pure live seeds/sq ft). Includes material and shipping.	Acres	$57.10	0.25	$14.28
Mobilization						
Mobilization, medium equipment	1139	Equipment with 70-150 HP or typical weights between 14,000 and 30,000 pounds.	Each	$255.65	1	$255.65

Practice: 468 - Lined Waterway or Outlet

Scenario: #2 - Riprap

Scenario Description:

Install 300 ' long by 15' wide by 1.5' deep trapezoidal or parabolic shaped waterway lined with riprap (D100 = 9", Velocity ~ 8 ft/sec). Volume of riprap placed = 205 CY. 1/2 the channel depth is excavated, before excavation for riprap. Excess excavation is spoiled in the immediate area. Riprap is installed over 100% of the width of the waterway to prevent scour. Cost include excavation, spoiling of excess material, geotextile underlayment and installing 9" Rock Riprap. Lined waterway width is measured from top of bank to top of bank. Scenario also includes seeding and mulching disturbed areas on both sides of waterway (~20 feet). 300' x 40' / 43560 ~ 0.25 Acre.

Before Situation:

Excessive sedimentation and soil erosion as a result of ephemeral or classic gully erosion. Velocities are generally too high or saturated soil conditions make it difficult to establish a grassed waterway.

After Situation:

Rock lined waterway is 300 ' long by 15' wide by 1.5' deep (Riprap = 205 CY). Waterway is excavated and rock is placed using a hydraulic excavator. Geotextile underlayment is installed by laborers. Associated practices are Subsurface Drain (606), Underground Outlet (620), Structure for Water Control (587), and Critical Area Seeding (342).

Feature Measure: Cubic Yards of Riprap Placed

Scenario Unit: Cubic Yards

Scenario Typical Size: 205.0

Scenario Total Cost: $21,455.06

Scenario Cost/Unit: $104.66

Cost Details:

Component Name	ID	Description	Unit	Cost	QTY	Total
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 Yards	$2.31	295	$681.45
Tillage, Light	945	Includes light disking (tandem) or field cultivator. Includes equipment, power unit and labor costs.	Acres	$10.68	0.25	$2.67
Fertilizer, ground application, dry bulk	950	Dry bulk fertilizer application performed by ground equipment. Includes equipment, power unit and labor costs.	Acres	$6.63	0.25	$1.66
Cultipacking	1100	Includes equipment, power unit and labor costs.	Acres	$8.68	0.25	$2.17
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.	Hours	$27.56	4	$110.24
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.	Hours	$46.88	4	$187.52
Materials						
Rock Riprap, Placed with geotextile	44	Rock Riprap, placed with geotextile, includes materials, equipment and labor to transport and place	Cubic Yards	$94.25	205	$19,321.25
Nitrogen (N), Urea	71	Price per pound of N supplied by Urea. Price is not per pound of total product applied, no conversion is needed.	Pound	$0.47	7	$3.29
Phosphorus, P2O5	73	Price per pound of P2O5 supplied by Superphosphate. Price is not per pound of total product applied, no conversion is needed.	Pound	$0.61	7	$4.27
Potassium, K2O	74	K2O supplied by Muriate Of Potash. Price is not per pound of total product applied, no conversion is needed.	Pound	$0.35	7	$2.45
Lime, ENM	75	Fertilizer: Limestone Spread on field.	Ton	$64.87	0.25	$16.22
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.	Acres	$3,407.79	0.25	$851.95
Introduced Perennial Grasses, Legumes and/or Forbs, High Density	2749	Introduced perennial grasses, legumes, and/or forbs, may include a small percentage of annual species for establishment purposes and/or if allowed by the CPS. Planted at high density (greater than 60 pure live seeds/sq ft). Includes material and shipping.	Acres	$57.10	0.25	$14.28
Mobilization						
Mobilization, medium equipment	1139	Equipment with 70-150 HP or typical weights between 14,000 and 30,000 pounds.	Each	$255.65	1	$255.65

Practice: 468 - Lined Waterway or Outlet

Scenario: #3 - Concrete

Scenario Description:

Install 300 ' long by 15' wide by 1.5' deep trapezoidal or parabolic shaped waterway lined with concrete. 1/2 the channel is excavated, before excavation for concrete and subgrade material. Excess excavation is spoiled in the immediate area. Concrete is installed over 100% of the width of the waterway to prevent scour. Cost include excavation, spoiling of excess material, 6" of clean sand or gravel subgrade, and 5" reinforced concrete slab. Lined waterway width is measured from top of bank to top of bank.

Before Situation:

Excessive sedimentation and soil erosion as a result of ephemeral or classic gully erosion. Velocities are generally too high or saturated soil conditions make it difficult to establish a grassed waterway. Usually installed in locations where rock or other lining materials are not readily available.

After Situation:

Concrete lined waterway is 300 ' long by 15' wide by 1.5' deep. Waterway is excavated using a hydraulic excavator. Concrete slab is placed on 6" of clean sand or #57 stone. Concrete is placed, graded and screeded by laborers. Associated practices are Subsurface Drain (606), Underground Outlet (620), Structure for Water Control (587), and Critical Area Seeding (342).

Feature Measure: Square Foot of Waterway

Scenario Unit: Square Feet

Scenario Typical Size: 4,500.0

Scenario Total Cost: $35,185.21

Scenario Cost/Unit: $7.82

Cost Details:

Component Name	ID	Description	Unit	Cost	QTY	Total
Equipment Installation						
Concrete, CIP, slab on grade, reinforced	37	Steel reinforced concrete formed and cast-in-placed as a slab on grade by chute placement. Typical strength is 3000 to 4000 psi. Includes materials, labor and equipment to transport, place and finish.	Cubic Yards	$362.36	80	$28,988.80
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 Yards	$2.31	280	$646.80
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.	Hours	$27.56	4	$110.24
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.	Hours	$46.88	4	$187.52
Materials						
Aggregate, Gravel, Graded	46	Gravel, includes materials, equipment and labor to transport and place. Includes washed and unwashed gravel.	Cubic Yards	$45.42	110	$4,996.20
Mobilization						
Mobilization, medium equipment	1139	Equipment with 70-150 HP or typical weights between 14,000 and 30,000 pounds.	Each	$255.65	1	$255.65

Practice: 468 - Lined Waterway or Outlet

Scenario: #9 - Stone Centered Grassed Waterway

Scenario Description:

Typical stone centered grassed waterway is 500 ' long, 8' bottom, 8:1 side slopes, 1.0' depth, half excavation. A stone centered grassed waterway is a shaped or graded channel with the middle one third of the channel lined with rock or stone. Waterway is established with suitable vegetation to carry surface water at a non-erosive velocity to a stable outlet. This practice addresses Concentrated Flow Erosion (Classic Gully & Ephemeral Erosion) and Excessive Sediment in surface waters. Stone Centered Grassed Waterway area is measured from top of bank to top of bank. Seeding area is 20% greater than foot print of the waterway area to account for disturbed areas. Costs include excavation, rock center with geotextile and associated work to construct the overall shape and grade of the waterway.

Before Situation:

The field has a small gulley which is cutting deeper into the field as time goes on, so it needs to be stopped or controlled. Excessive sedimentation and soil erosion as a result from ephemeral or classic gully erosion. Gully has formed in field as a result of excessive runoff and poor cropping techniques. Stone Centered Grassed Waterway is also commonly installed to covey runoff from concentrated flows, terrarces, diversions, or water control structures or similar practices to a suitable, stable outlet. A stone centered grassed waterway is used in areas where design velocity is slightly high (2 fps) than the allowable velocity of the soil.

After Situation:

Installed stone centered grassed waterway is 500 ' long, 8' bottom, 8:1 side slopes, 1.0' depth. The practice is installed using a dozer. Use Critical Area Planting (342) for establishment of waterway vegetation. If erosion control blankets or mulching for seedbed establishment/protection are needed, use conservation practice Mulching (484). Drainage tile, if needed, will be installed accoring to Subsurface Drain (606). Outlets, if needed will be installed using Structure for Water Control (587). If inlet Structures are needed with the drainage tile, then those will be installed using Underground Outlet (620).

Feature Measure: Total Area of Waterway in Square F

Scenario Unit: Square Feet

Scenario Typical Size: 12,000.0

Scenario Total Cost: $16,446.92

Scenario Cost/Unit: $1.37

Cost Details:

Component Name	ID	Description	Unit	Cost	QTY	Total
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 Yards	$2.31	115	$265.65
Tillage, Light	945	Includes light disking (tandem) or field cultivator. Includes equipment, power unit and labor costs.	Acres	$10.68	1	$10.68
Fertilizer, ground application, dry bulk	950	Dry bulk fertilizer application performed by ground equipment. Includes equipment, power unit and labor costs.	Acres	$6.63	1	$6.63
Seeding Operation, No Till/Grass Drill	960	No Till drill or grass drill for seeding. Includes equipment, power unit and labor costs.	Acres	$21.92	1	$21.92
Cultipacking	1100	Includes equipment, power unit and labor costs.	Acres	$8.68	1	$8.68
Excavation, common earth, small equipment, 50 ft	1220	Bulk excavation of common earth with dozer <100 HP with average push distance of 50 feet. Includes equipment and labor.	Cubic Yards	$2.37	300	$711.00
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.	Hours	$27.56	12	$330.72
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.	Hours	$46.88	4	$187.52
Materials						
Rock Riprap, Placed with geotextile	44	Rock Riprap, placed with geotextile, includes materials, equipment and labor to transport and place	Cubic Yards	$94.25	115	$10,838.75
Nitrogen (N), Urea	71	Price per pound of N supplied by Urea. Price is not per pound of total product applied, no conversion is needed.	Pound	$0.47	17	$7.99
Phosphorus, P2O5	73	Price per pound of P2O5 supplied by Superphosphate. Price is not per pound of total product applied, no conversion is needed.	Pound	$0.61	17	$10.37
Potassium, K2O	74	K2O supplied by Muriate Of Potash. Price is not per pound of total product applied, no conversion is needed.	Pound	$0.35	17	$5.95
Lime, ENM	75	Fertilizer: Limestone Spread on field.	Ton	$64.87	1	$64.87
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.	Acres	$3,407.79	1	$3,407.79

Introduced Perennial Grasses, Legumes and/or Forbs, High Density	2749	Introduced perennial grasses, legumes, and/or forbs, may include a small percentage of annual species for establishment purposes and/or if allowed by the CPS. Planted at high density (greater than 60 pure live seeds/sq ft). Includes material and shipping.	Acres	$57.10	1	$57.10
Mobilization						
Mobilization, medium equipment	1139	Equipment with 70-150 HP or typical weights between 14,000 and 30,000 pounds.	Each	$255.65	2	$511.30

Practice: 472 - Access Control

Scenario: #1 - Trails/Roads Access Control

Scenario Description:

Restricting access to the use of forest/farm roads and trails by the use of a gate and limited fencing. Resource concerns include Undesirable plant productivity and health, Concentrated flow erosion, Soil compaction, Excessive sediment in surface waters, and Wildlife habitat degradation.

Before Situation:

Roads are damaged or misused, illegal activities occur and/or forest resources are at risk. Extensive amount of fencing (other than that needed to restrict access at the site of ingress) is not included in this scenario, but instead will be planned and installed with the Fence practice (382).

After Situation:

Roads are protected, illegal activities are stopped and/or forest resources are secure.

Feature Measure: Number

Scenario Unit: Each

Scenario Typical Size: 1.0

Scenario Total Cost: $668.52

Scenario Cost/Unit: $668.52

Cost Details:

Component Name	ID	Description	Unit	Cost	QTY	Total
Equipment Installation						
Auger, Post driver attachment	934	Auger or post driver attachment to a tractor or skidsteer. Does not include power unit. Labor not included.	Hours	$12.74	2	$25.48
Truck, Pickup	939	Equipment and power unit costs. Labor not included.	Hours	$24.18	4	$96.72
Tractor, agricultural, 60 HP	963	Agricultural tractor with horsepower range of 50 to 90. Equipment and power unit costs. Labor not included.	Hours	$23.10	4	$92.40
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.	Hours	$27.56	4	$110.24
Materials						
Post, Wood, CCA treated, 3-4 in. x 7 ft.	9	Wood Post, Line 3-4 inch dia. X 7 ft., CCA Treated. Includes materials and shipping only.	Each	$8.09	4	$32.36
Post, Wood, CCA treated, 6 in. x 8 ft.	12	Wood Post, End 6 inch dia. X 8 ft., CCA Treated. Includes materials and shipping only.	Each	$18.91	4	$75.64
Gate, Pipe, 12 ft.	1057	6 rail tube gate, 16 gauge. Includes materials and shipping only.	Each	$195.18	1	$195.18
Concrete mix, bag	1226	Pre-mixed dry concrete mix in 60 pound bag. Materials only.	Each	$4.05	10	$40.50

Practice: 472 - Access Control

Scenario: #2 - Animal exclusion from sensitive areas

Scenario Description:

Excluding animals from an area in order to address identified resource concerns. This is for facilitating exclusion of animals to protect or enhance natural resource values. Control will be by temporary electric fencing. Any need for permanent fencing will be planned and installed using the Fence practice (382). Clearing of brush and trees is not necessary. Resource concerns include Wildlife Habitat degradation, Undesirable plant productivity and health, and/or Excessive sediment in surface waters.

Before Situation:

Sensitive areas are threatened by the adverse actions of domestic and/or wild animals. The importance of the sensitive areas can include (but are not limited to): wildlife habitat, plant species composition, newly established trees and/or plants, stream bank stability, and/or water quality.

After Situation:

Sensitive areas are protected from the adverse actions of domestic and/or wild animals by excluding them from the area.

Feature Measure: Length of fence

Scenario Unit: Feet

Scenario Typical Size: 500.0

Scenario Total Cost: $1,058.76

Scenario Cost/Unit: $2.12

Cost Details:

Component Name	ID	Description	Unit	Cost	QTY	Total
Equipment Installation						
Truck, Pickup	939	Equipment and power unit costs. Labor not included.	Hours	$24.18	4	$96.72
Fence, Wire Assembly, High Tensile Electric, 5 Strand	1087	Brace pins, springs, strainers, battens, clips, crimp sleeves, staples, insulators, wrap around sleeves. Includes materials and shipping only.	Feet	$0.17	500	$85.00
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.	Hours	$27.56	20	$551.20
Materials						
Post, Wood, CCA treated, 4 in x 8 ft	10	Wood Post, Line 4 inch X 8 foot, CCA Treated. Includes materials and shipping only.	Each	$10.63	10	$106.30
Property/Safety Signs	293	Plastic Fence safety or property sign - Printed on both sides 6 pre-drilled holes for hanging or nailing. 7.5 x 4.75 inch. Includes materials and shipping only.	Each	$1.36	35	$47.60
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	$171.94	1	$171.94

Practice: 472 - Access Control

Scenario: #3 - Forest/Farm Access Control

Scenario Description:

Restricting human access to a field/farm/property through use of signage and other markings. Resource concerns include Undesirable plant productivity and health, Excessive sediment in surface waters, Concentrated flow erosion, and Wildlife habitat degradation.

Before Situation:

A 20 acre tract (field, farm. forests, etc.) is being damaged or misused by illegal activities that put the resources/property at risk or needs controlled access due to an active management operation such as pest management or timber harvesting. The perimeter needs marking with paint (at 100 foot intervals) and signs at points of ingress. Surveying is not necessary.

After Situation:

The property is adequately marked and protected, illegal activities are stopped and/or forest resources are secure.

Feature Measure: <Unknown>

Scenario Unit: Feet

Scenario Typical Size: 1,500.0

Scenario Total Cost: $297.48

Scenario Cost/Unit: $0.20

Cost Details:

Component Name	ID	Description	Unit	Cost	QTY	Total
Equipment Installation						
Truck, Pickup	939	Equipment and power unit costs. Labor not included.	Hours	$24.18	4	$96.72
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.	Hours	$27.56	4	$110.24
Materials						
Property/Safety Signs	293	Plastic Fence safety or property sign - Printed on both sides 6 pre-drilled holes for hanging or nailing. 7.5 x 4.75 inch. Includes materials and shipping only.	Each	$1.36	2	$2.72
Tree Marking Paint	313	Trees to be cut through tree marking are physically identified through the application of paint on the tree. Typically one quart of paint is used to mark one acre of trees. Includes materials and shipping only.	Acres	$8.78	10	$87.80

Practice: 472 - Access Control

Scenario: #4 - Navigational Delineation

Scenario Description:

Marine bivalve aquaculture operations or restored native oyster reefs located in tidal and subtidal working waters that are controlled by the operator and leased from state local authorities. Growing areas average 2 acres in size and are typically sited in close proximity to other aquaculture operations/facilities, and interface with other resource uses including public boating and swimming. Restored reef areas range in size from 1/4 acres to 1 acre . Reef are being delineated to prevent harvesting since they are located in established sanctuaries. Natural resource concerns addressed by this option include water quality degradation - Excessive Sediment in Surface Waters and Petroleum, Heavy Metals and Other Pollutants Transported to Surface Water , and resulting from uncontrolled access by boats and other human activities. Resource concerns addressed by delineatin restored reefs include: Water Quality Degradation, Excessive Nutrient in Surface Water and Fish and Wildlife – Inadequate Habitat – Inadequate Habitat Cover/Shelter.

Before Situation:

Shellfish aquaculture operations and restored oyster reefs that are located in tidal and subtidal working waters that are controlled by the participant and leased from local authorities are not delineated . The shellfish beds average 2 acres in size and are typically sited in close proximity to other aquaculture operations/facilities, and interface with other resource uses including public boating and swimming. The danger of boats or swimmers accidentally coming in contact with shellfish beds is much greater if beds are not delineated with navigational boundaries. Restored reefs are located in sanctuaries where harvesting is prohibited. It is difficult for recreational users of the tidal areas to know where the sanctuaries are located

After Situation:

Shellfish producer shall install standard navigational delineation devices to mark the boundaries of shellfish growing areas to avoid boat strikes, petrochemical spills, and accidental intrusions by small craft (kayaks) or swimmers. Restored reefs are protected from harvesting since both recreational and commercial harvesters know these areas are protected.

Feature Measure: Buoy/rope system for delineation

Scenario Unit: Each

Scenario Typical Size: 1.0

Scenario Total Cost: $699.66

Scenario Cost/Unit: $699.66

Cost Details:

Component Name	ID	Description	Unit	Cost	QTY	Total
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.	Hours	$27.56	4	$110.24
Materials						
Buoy	2037	20 inch inflatable polyform ball. Includes materials and shipping only.	Each	$87.67	4	$350.68
Buoy tether	2038	3/8 inch polypropylene line (marine quality). Includes materials and shipping only.	Feet	$0.16	200	$32.00
Screw Pin Anchor Shackles, Galvanize-Steel, 1/4 in.	2040	Tether connectors for buoy and anchor. Includes materials and shipping only.	Each	$4.35	8	$34.80
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	$171.94	1	$171.94

Practice: 472 - Access Control

Scenario: #5 - Hibernaculum Bat Gate

Scenario Description:

Installation of a gate to control access to caves and other natural formation that provide bat roosting and hibernation sites. Bats are most vulnerable when they are hibernating. Human intrusion stirs and wakes up the bats, causing them to deplete their fat supplies at an accelerated rate and reducing their chances of surviving the winter. Gating hibernacula entrances to prevent trespass is one of the chief measures of protecting bat species. Additionally, gates prevent human access to dangerous and unstable mines, reducing chances of serious accidents. Gates allow bats to pass through, don't interfere with air circulation, and prevent unauthorized access.

Before Situation:

Caves and other natural formations that provide roosting and hibernating habitat have can be accessed during all times of the years. Access by humans for recreation disturbs the bats during critical life cycles. This can cause a decrease in population of these important animals.

After Situation:

Hibernaculum gates are are installed to control access to important bat roosting and hiberating sites. The controlled access will help protect the colonies of bats

Feature Measure: <Unknown>

Scenario Unit: Square Feet

Scenario Typical Size: 100.0

Scenario Total Cost: $8,339.95

Scenario Cost/Unit: $83.40

Cost Details:

Component Name	ID	Description	Unit	Cost	QTY	Total
Materials						
Property/Safety Signs	293	Plastic Fence safety or property sign - Printed on both sides 6 pre-drilled holes for hanging or nailing. 7.5 x 4.75 inch. Includes materials and shipping only.	Each	$1.36	1	$1.36
Bat Gate	1129	Bat Gate Assembly, Includes materials, equipment and labor.	Square Feet	$77.68	100	$7,768.00
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.	Dollars	$1.00	500	$500.00
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	$70.59	1	$70.59

Practice: 472 - Access Control

Scenario: #6 - BioSecurity Access Control

Scenario Description:

Restricting access in the use of farm roads by the use of signage, a gate and limited fencing. A well-constructed and maintained operation strengthens a biosecurity plan by aiding cleaning and disinfection processes and by reducing the risks associated with visitors, service personnel, and pests. Resource concerns include Domestic Animals - Stress and Mortality.

Before Situation:

People, vehicles and equipment entering and moving unrestricted within the farm pose a serious biosecurity threat; they can carry pests, soil, and crop debris. The risk is increased with shared, contracted, and second-hand vehicles and equipment, due to their use on other farms with unknown biosecurity status. Care must also be taken with people's activities, non-agricultural vehicles and equipment that must travel within the farm (e.g. earth-moving equipment, gas exploration equipment, utility service vehicles).

After Situation:

Access of people and vehicles is controlled aiding in the cleaning and disinfection processes and by reducing the risks associated with visitors, service personnel, and pests.

Feature Measure: <Unknown>

Scenario Unit: Feet

Scenario Typical Size: 50.0

Scenario Total Cost: $1,281.50

Scenario Cost/Unit: $25.63

Cost Details:

Component Name	ID	Description	Unit	Cost	QTY	Total
Equipment Installation						
Auger, Post driver attachment	934	Auger or post driver attachment to a tractor or skidsteer. Does not include power unit. Labor not included.	Hours	$12.74	2	$25.48
Truck, Pickup	939	Equipment and power unit costs. Labor not included.	Hours	$24.18	8	$193.44
Tractor, agricultural, 60 HP	963	Agricultural tractor with horsepower range of 50 to 90. Equipment and power unit costs. Labor not included.	Hours	$23.10	4	$92.40
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.	Hours	$27.56	16	$440.96
Materials						
Post, Wood, CCA treated, 3-4 in. x 7 ft.	9	Wood Post, Line 3-4 inch dia. X 7 ft., CCA Treated. Includes materials and shipping only.	Each	$8.09	4	$32.36
Post, Wood, CCA treated, 6 in. x 8 ft.	12	Wood Post, End 6 inch dia. X 8 ft., CCA Treated. Includes materials and shipping only.	Each	$18.91	4	$75.64
Property/Safety Signs	293	Plastic Fence safety or property sign - Printed on both sides 6 pre-drilled holes for hanging or nailing. 7.5 x 4.75 inch. Includes materials and shipping only.	Each	$1.36	10	$13.60
Gate, Pipe, 12 ft.	1057	6 rail tube gate, 16 gauge. Includes materials and shipping only.	Each	$195.18	1	$195.18
Concrete mix, bag	1226	Pre-mixed dry concrete mix in 60 pound bag. Materials only.	Each	$4.05	10	$40.50
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	$171.94	1	$171.94

Practice: 484 - Mulching

Scenario: #1 - Straw or Hay, Manual Application

Scenario Description:

Manual application of straw/hay mulch or other other state approved natural material to reduce erosion, moderate soil temperature, conserve soil moisture and/or facilitate the establishment of vegetative cover.

Before Situation:

Typical scenario ranges from a 0.1 to 1.0 acre disturbed site around a newly constructed structural practice to a 5-10 acre irrigated orchard/vineyard. Water quantity and soil moisture is a concern. The potential for soil erosion is high and mulch is needed to stabilize the soil, facilitate the establishment of vegetative cover.

After Situation:

Straw mulch has been applied to areas needing mulch. Erosion and sedimentation is reduced, water and soil quality is protected, and vegetative cover is established. Soil moisture is conserved, energy use associated with irrigation is decreased.

Feature Measure: Area Covered by Mulch

Scenario Unit: Acres

Scenario Typical Size: 1.0

Scenario Total Cost: $450.19

Scenario Cost/Unit: $450.19

Cost Details:

Component Name	ID	Description	Unit	Cost	QTY	Total
Equipment Installation						
Truck, Pickup	939	Equipment and power unit costs. Labor not included.	Hours	$24.18	0.5	$12.09
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.	Hours	$27.56	10	$275.60
Materials						
Straw	1237	Small grain straw (non organic and certified organic). Includes materials only.	Ton	$65.00	2.5	$162.50

Practice: 484 - Mulching

Scenario: #2 - Straw or Hay, Mechanical Application

Scenario Description:

Mechanical application of straw/hay mulch using large round hay bales and a bale mulcher/processor. Practice will reduce erosion, moderate soil temperature, conserve soil moisture and/or facilitate the establishment of vegetative cover.

Before Situation:

Potatoes or other crops are harvested too late to establish winter cover in northern regions. Harvest churns up soil form digging/harvest and ground is left bare through winter. Fall and spring rains, along with snow melt, cause excessive soil loss.

After Situation:

Mulch is applied to fields using large round hay bales and a bale mulcher/processor. Erosion and sedimentation is reduced, water and soil quality is protected, and vegetative cover is established. Soil moisture is conserved, energy use associated with irrigation is decreased.

Feature Measure: Area Covered by Mulch

Scenario Unit: Acres

Scenario Typical Size: 10.0

Scenario Total Cost: $1,488.21

Scenario Cost/Unit: $148.82

Cost Details:

Component Name	ID	Description	Unit	Cost	QTY	Total
Equipment Installation						
Truck, Pickup	939	Equipment and power unit costs. Labor not included.	Hours	$24.18	3	$72.54
Tractor, agricultural, 60 HP	963	Agricultural tractor with horsepower range of 50 to 90. Equipment and power unit costs. Labor not included.	Hours	$23.10	6	$138.60
Mulcher, straw blower	1305	Straw bale mulcher/blower to mechanically spread small or large straw bales. Labor not included.	Hours	$44.95	3	$134.85
Labor						
Equipment Operators, Light	232	Includes: Skid Steer Loaders, Hydraulic Excavators <50 HP, Trenchers <12 in., Ag Equipment <150 HP, Pickup Trucks, Forklifts, Mulchers	Hours	$27.87	6	$167.22
Materials						
Straw	1237	Small grain straw (non organic and certified organic). Includes materials only.	Ton	$65.00	15	$975.00

Practice: 484 - Mulching

Scenario: #3 - Aggregate

Scenario Description:
Application of bark, wood chips, peat/sand mix or other state approved aggregate material where mulch is needed. Typically used to prevent erosion, improve vegetative cover, improve soil quality, or conserve soil moisture.

Before Situation:
Vegetative cover is poor/declining. The potential for soil erosion is high and mulch is needed to stabilize the soil.

After Situation:
Exposed soil is mulched with appropriate materials according to state specifications. Erosion and sedimentation is reduced, water and soil quality is protected.

Feature Measure: Area mulched

Scenario Unit: 1,000 Square Foot

Scenario Typical Size: 1.0

Scenario Total Cost: $416.21

Scenario Cost/Unit: $416.21

Cost Details:

Component Name	ID	Description	Unit	Cost	QTY	Total
Equipment Installation						
Tractor, agricultural, 60 HP	963	Agricultural tractor with horsepower range of 50 to 90. Equipment and power unit costs. Labor not included.	Hours	$23.10	0.5	$11.55
Aggregate, Wood Chips	1098	Includes materials, equipment and labor	Cubic Yards	$48.86	8	$390.88
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.	Hours	$27.56	0.5	$13.78

Practice: 484 - Mulching

Scenario: #4 - Erosion Control Blanket

Scenario Description:
Installation of erosion control blanket on critical areas with steep slopes, grassed waterways or diversions. Blanket is typically made of coconut coir, wood fiber, or straw and is typically covered on both sides with polypropylene netting. Used to help control erosion and establish vegetative cover.

Before Situation:
There are areas of concentrated flow and a grassed waterway is being installed. Soil erosion is a concern and there is little to no vegetation.

After Situation:
The erosion control blanket is placed on concentrated flow areas and secured with ground staples. Soil erosion is minimized and vegetative cover is established.

Feature Measure: Area Covered by Mulch

Scenario Unit: 1,000 Square Foot

Scenario Typical Size: 10.0

Scenario Total Cost: $2,010.96

Scenario Cost/Unit: $201.10

Cost Details:

Component Name	ID	Description	Unit	Cost	QTY	Total
Equipment Installation						
Truck, Pickup	939	Equipment and power unit costs. Labor not included.	Hours	$24.18	2	$48.36
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.	Hours	$27.56	18	$496.08
Materials						
Erosion Control Blanket, biodegradable	1213	Biodegradable erosion control blanket, typically a composite of natural fibers with reinforcing polymer netting. Materials and shipping only.	Square Yard	$1.32	1111	$1,466.52

Practice: 484 - Mulching

Scenario: #5 - Synthetic Material

Scenario Description:

Installation of geotextile, biodegradable plastic, polyethylene plastic, or other state approved synthetic mulch to conserve soil moisture, moderate soil temperature and provide erosion control. Payment based based on total acres mulched (not the actual area of the rows that are mulched). Assumes 4 ft wide material with 6 feet between rows providing 7260 ft of material per acre.

Before Situation:

Site conditions very. Typically scenarios include new tree and shrub plantings, irrigated orchards or vineyards, or annual and perennial specialty crops. Water quantity and soil moisture is a concern.

After Situation:

Synthetic mulch is applied in rows with a mulch layer or by other mechanized means. Soil moisture is conserved, energy use associated with irrigation is decreased.

Feature Measure: Acres Mulched

Scenario Unit: Acres

Scenario Typical Size: 1.0

Scenario Total Cost: $333.25

Scenario Cost/Unit: $333.25

Cost Details:

Component Name	ID	Description	Unit	Cost	QTY	Total
Materials						
Mulch, biodegradable plastic, 0.8 mil	1304	0.8 mil starch-based biodegradable plastic mulch, with anchoring. Includes materials and shipping only.	Square Yard	$0.31	1075	$333.25

Practice: 484 - Mulching

Scenario: #6 - Tree and Shrub

Scenario Description:

Weed barrier fabric or other suitable natural or synthetic mulch is installed with a new tree and shrub planting. Typically used to prevent erosion and conserve soil moisture during the installation of conservation practices. Rate is per tree/shrub.

Before Situation:

Site conditions vary. Typical scenario is an installation of 100 native trees and shrubs to enhance wildlife habitat. Sites are often remote and trees may not be planted in rows, requiring each tree to be mulched individually

After Situation:

Weed barrier squares are installed around individual trees and shrubs. Soil moisture is conserved and establishment of trees/shrubs is improved. Erosion is minimized.

Feature Measure: Number of Trees Mulched

Scenario Unit: Each

Scenario Typical Size: 100.0

Scenario Total Cost: $66.50

Scenario Cost/Unit: $0.67

Cost Details:

Component Name	ID	Description	Unit	Cost	QTY	Total
Equipment Installation						
Geotextile, woven	42	Woven Geotextile Fabric. Includes materials, equipment and labor	Square Yard	$1.33	50	$66.50

Practice: 490 - Tree/Shrub Site Preparation

Scenario: #1 - Mechanical - Heavy

Scenario Description:

This practice involves the use of heavy machinery to treat an area in order to improve site conditions for establishing trees and/or shrubs. Typical sites include trees and brush cover that is not appropriate to the site or providing the desired condition for the landowner. This practice is typically used to address the following resource concerns: degraded plant condition - undesirable plant productivity and health and inadequate structure and composition and soil quality degredation - soil erosion - sheet and rill.

Before Situation:

The site is dominated by undesirable vegetation including herbaceous plants and significant amounts of woody vegetation (trees and brush) occupying the site. There is also a significant component of woody debris onsite. Noxious and invasive species may also be present on the site. Soils are compacted as a result of past heavy equipment activities or from other land uses. Sheet and rill erosion is ocurring in areas where the soil was severely disturbed expsoing bare soil. If left untreated, soil compaction and erosion issues will result in poor survival or reduced growth of trees/shrubs to be established on the site.

After Situation:

Undesirable vegetation has been removed using mechanical methods reducing competition for target trees and/or shrubs. Woody debris has been removed to facilitate tree/shrub planting operations. Soil compaction has been alleviated, allowing penetration of moisture and allowing roots to grow properly. Site conditions are favorable for successful establishment of trees and/or shrubs. The typical size is 40 acres.

Feature Measure: Area of Treatment

Scenario Unit: Acres

Scenario Typical Size: 40.0

Scenario Total Cost: $8,726.58

Scenario Cost/Unit: $218.16

Cost Details:

Component Name	ID	Description	Unit	Cost	QTY	Total
Equipment Installation						
Heavy mechanical site prep, shearing, V-blade, K-G blading	1314	Mechanical operations that shear trees and vegetation. Requires heavy equipment such as dozers, Includes equipment, power unit and labor costs.	Acres	$151.06	24	$3,625.44
Heavy mechanical site prep, raking	1317	Mechanical operations that pushing and raking trees and vegetation. Requires heavy equipment such as dozers. Includes equipment, power unit and labor costs.	Acres	$163.49	24	$3,923.76
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.	Hours	$27.56	8	$220.48
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.	Hours	$46.88	10	$468.80
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	$488.10	1	$488.10

Practice: 490 - Tree/Shrub Site Preparation

Scenario: #2 - Mechanical - Light

Scenario Description:

This practice involves the use of light/moderate machinery to clear above ground vegetation and to also rip/cut/lift underground root systems in order to improve site conditions for establishing trees and/or shrubs. Typical sites include abandoned fields, pastures, rangelands, agricultural fields or forestlands that have been harvested. This following resource concerns: soil quality degredation - compaction, soil erosion - sheet and rill, and degraded plant condition - undesirable plant productivity and health and inadequate structure and composition.

Before Situation:

Undesirable vegetation is present on the site including herbaceous plants and sparse woody competition. Noxious and invasive species may also be present on the site. If left uncontrolled, undesirable vegetation will inhibit successful establishment of target species of trees and/or shrubs. Soils are compacted as a result of harvesting heavy equipment activities or other land uses.

After Situation:

Undesirable vegetation has been removed using a bush hog to knock down stand vegetation and heavy tillage equipment is used to breakup and lift root systems, breakup plow pans (<18" deep), thus enhancing the conditions for planting and survival of trees and/or shrubs. Soil compaction has been alleviated, allowing penetration of moisture and allowing roots to grow properly. Site conditions are favorable for successful establishment of trees and/or shrubs. The typical size of the practice is 40 acres.

Feature Measure: Area of Treatment

Scenario Unit: Acres

Scenario Typical Size: 40.0

Scenario Total Cost: $3,079.14

Scenario Cost/Unit: $76.98

Cost Details:

Component Name	ID	Description	Unit	Cost	QTY	Total
Equipment Installation						
Mower, Bush Hog	940	Equipment and power unit costs. Labor not included.	Hours	$50.43	20	$1,008.60
Tillage, Primary	946	Includes heavy disking (offset) or chisel plow. Includes equipment, power unit and labor costs.	Acres	$16.30	30	$489.00
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.	Hours	$27.56	5	$137.80
Equipment Operators, Light	232	Includes: Skid Steer Loaders, Hydraulic Excavators <50 HP, Trenchers <12 in., Ag Equipment <150 HP, Pickup Trucks, Forklifts, Mulchers	Hours	$27.87	20	$557.40
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.	Hours	$46.88	8	$375.04
Mobilization						
Mobilization, medium equipment	1139	Equipment with 70-150 HP or typical weights between 14,000 and 30,000 pounds.	Each	$255.65	2	$511.30

Practice: 490 - Tree/Shrub Site Preparation

Scenario: #3 - Chemical - Ground Application

Scenario Description:

This practice involves the use of various herbicides applied using ground-based machinery (and some hack-n-squirt treatment of select trees) in order to remove undesirable vegetation and improve site conditions for establishing trees and/or shrubs. Typical sites include abandoned fields, pastures, rangelands, agricultural fields or forestland that was recently harvested. This practice is typically used to address the following resource concerns: degraded plant condition - undesirable plant productivity and health and inadequate structure and composition.

Before Situation:

Undesirable vegetation is present on the site including herbaceous plants and woody vegetation. Noxious and invasive species may also be present on the site. If left uncontrolled, undesirable vegetation will inhibit successful establishment of target species of trees and/or shrubs.

After Situation:

Undesirable vegetation has been treated using appropriate herbicides, reducing competition for target trees and/or shrubs. Site conditions are favorable for successful establishment of trees and/or shrubs. The typical size of the practice is 40 acres.

Feature Measure: Area of Treatment

Scenario Unit: Acres

Scenario Typical Size: 40.0

Scenario Total Cost: $7,613.53

Scenario Cost/Unit: $190.34

Cost Details:

Component Name	ID	Description	Unit	Cost	QTY	Total
Equipment Installation						
Chemical, spot treatment, single stem application	964	Ground applied chemical to individual plants or group of plants, e.g., backpack sprayer treatment. Equipment and labor cost included.	Hours	$71.67	20	$1,433.40
Chemical, ground application, forested land	1313	Chemical application performed by ground equipment where trees and terrain impede passage of wide boom sprayers. Utilizes forestry application methods that include heavy equipment such as skidders. Includes material, equipment, power unit and labor costs.	Acres	$111.16	40	$4,446.40
Labor						
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.	Hours	$46.88	20	$937.60
Materials						
Herbicide, Glyphosate	334	A broad-spectrum, non-selective systemic herbicide. Refer to WIN-PST for product names and active ingredients. Includes materials and shipping only.	Acres	$9.21	40	$368.40
Herbicide, Triclopyor	338	Refer to WIN-PST for product names and active ingredients. Materials and shipping	Acres	$27.92	4	$111.68
Herbicide, Surfactant	1095	Surfactants reduce the surface tension of water to produce more uniform coverage and penetration of herbicides, and weed killers. Paraffin Based Petroleum Surfactant. Refer to WIN-PST for product names and active ingredients. Includes materials and shipping only.	Acres	$1.51	40	$60.40
Mobilization						
Mobilization, medium equipment	1139	Equipment with 70-150 HP or typical weights between 14,000 and 30,000 pounds.	Each	$255.65	1	$255.65

Practice: 490 - Tree/Shrub Site Preparation

Scenario: #4 - Chemical - Aerial Application

Scenario Description:

This practice involves the use of herbicides applied by helicoptor in order to remove undesirable vegetation and improve site conditions for establishing trees and/or shrubs. This typical scenraio includes open land such as abandoned fields, pastures or forestlands that were recently harvested. This practice is typically used to address the following resource concerns: degraded plant condition - undesirable plant productivity and health and inadequate structure and composition.

Before Situation:

Undesirable vegetation is present on the site including herbaceous plants and woody competition. Noxious and invasive species may also be present on the site. If left uncontrolled, undesirable vegetation will inhibit successful establishment of target species of trees and/or shrubs.

After Situation:

Undesirable vegetation has been treated using appropriate herbicides, reducing competition for target trees and/or shrubs. Site conditions are favorable for successful establishment of trees and/or shrubs. The typical size of the practice is 40 acres.

Feature Measure: Area of Treatment

Scenario Unit: Acres

Scenario Typical Size: 40.0

Scenario Total Cost: $2,485.92

Scenario Cost/Unit: $62.15

Cost Details:

Component Name	ID	Description	Unit	Cost	QTY	Total
Equipment Installation						
Chemical, aerial application, helicopter	1991	Chemical application performed by helicopter on forest only. Includes equipment, mobilization, and labor.	Acres	$36.54	40	$1,461.60
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.	Hours	$27.56	8	$220.48
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.	Hours	$46.88	8	$375.04
Materials						
Herbicide, Glyphosate	334	A broad-spectrum, non-selective systemic herbicide. Refer to WIN-PST for product names and active ingredients. Includes materials and shipping only.	Acres	$9.21	40	$368.40
Herbicide, Surfactant	1095	Surfactants reduce the surface tension of water to produce more uniform coverage and penetration of herbicides, and weed killers. Paraffin Based Petroleum Surfactant. Refer to WIN-PST for product names and active ingredients. Includes materials and shipping only.	Acres	$1.51	40	$60.40

Practice: 490 - Tree/Shrub Site Preparation

Scenario: #5 - Chemical - Hand Application

Scenario Description:

This practice involves the use of various herbicides applied using backpack sprayer or similar equipment, and hack-n-squirt for tree control, in order to remove undesirable vegetation and improve site conditions for establishing trees and/or shrubs. Typical sites include lands such as old fields, pastures, rangelands, agricultural fields, previous forestlands that have been abandoned and are now covered with a mixture of grasses, forbs, shrubs and some remnant trees. Resource concerns are: degraded plant condition - undesirable plant productivity and health and inadequate structure and composition.

Before Situation:

Undesirable vegetation, including woody and herbaceous plants, occupy 100 % of the on the site. Noxious and invasive species may also be present on the site. If left uncontrolled, undesirable vegetation will inhibit successful establishment of target species of trees and/or shrubs.

After Situation:

Undesirable vegetation has been treated using appropriate herbicides, reducing competition for target trees and/or shrubs. Site conditions are favorable for successful establishment of trees and/or shrubs. The typical size of the practice is 40 acres.

Feature Measure: area of treatment

Scenario Unit: Acres

Scenario Typical Size: 40.0

Scenario Total Cost: $4,537.08

Scenario Cost/Unit: $113.43

Cost Details:

Component Name	ID	Description	Unit	Cost	QTY	Total
Equipment Installation						
Chemical, spot treatment, single stem application	964	Ground applied chemical to individual plants or group of plants, e.g., backpack sprayer treatment. Equipment and labor cost included.	Hours	$71.67	40	$2,866.80
Labor						
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.	Hours	$46.88	20	$937.60
Materials						
Herbicide, 2,4-D + Dica	331	Broadleaf herbicide labeled for cropland and pasture. Refer to WIN-PST for product names and active ingredients. Materials and shipping.	Acres	$12.60	40	$504.00
Herbicide, Imazapyr	336	Pre and post-emergent, non-selective herbicide for control of undesirable vegetation in non-crop areas. Refer to WIN-PST for product names and active ingredients. Includes materials and shipping only.	Acres	$42.07	4	$168.28
Herbicide, Surfactant	1095	Surfactants reduce the surface tension of water to produce more uniform coverage and penetration of herbicides, and weed killers. Paraffin Based Petroleum Surfactant. Refer to WIN-PST for product names and active ingredients. Includes materials and shipping only.	Acres	$1.51	40	$60.40

Practice: 490 - Tree/Shrub Site Preparation

Scenario: #6 - Hand site preparation

Scenario Description:

This practice typically involves grubbing all vegetation from the area of ground prior to the establishment of trees and/or shrubs. Typical sites include land such as old fields, pastures, rangelands, agricultural fields, or abandoned forests that are mostly grass or weed covered. This practice is typically used to address the following resource concerns: degraded plant condition - undesirable plant productivity and health and inadequate structure.

Before Situation:

The site contains undesirable vegetation including herbaceous and woody plants. Noxious and invasive species may also be present on the site. If left uncontrolled, undesirable vegetation will inhibit successful establishment of target species of trees and/or shrubs. Soils are compacted as a result of recent timber harvesting activities or other land uses. If left untreated poor survival or reduced growth of trees/shrubs will occur and wildlife habitat conditions will not improve.

After Situation:

All undesirable vegetation has been grubbed out of a 4 ft by 4 ft area, leaving bare soil, at each planting spot. Tree seedlings and/or shrubs are planted at each spot. Adequate moisture, space and light is available allowing plants to grow properly. Site conditions are favorable for successful establishment of trees and/or shrubs. The typical size is 10 acres.

Feature Measure: Area of Treatment

Scenario Unit: Acres

Scenario Typical Size: 10.0

Scenario Total Cost: $2,640.92

Scenario Cost/Unit: $264.09

Cost Details:

Component Name	ID	Description	Unit	Cost	QTY	Total
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.	Hours	$27.56	55	$1,515.80
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.	Hours	$46.88	24	$1,125.12

Practice: 490 - Tree/Shrub Site Preparation

Scenario: #7 - Windbreak - Site Preparation

Scenario Description:

This practice involves the use of various chemical/tillage methods to allow for the planting of a windbreak. Site preparation includes chemically killing vegegation prior to mechanical site preparation that includes appropriate methods to allow for planting of the site which may include one or all of the following, ripping, disking, and harrowing. This practice may be applied on all lands needing treatment to facilitate establishment of trees and/or shrubs to facilitate establishment of a windbreak. Typical sites include open land such as old fields, pastures, rangelands and agricultural fields. Resource concerns: Soil erosion--Wind erosion, .

Before Situation:

Undesirable vegetation, including woody and herbaceous plants, is present on the site. Noxious and invasive species may also be present on the site. If left uncontrolled, undesirable vegetation will inhibit successful establishment of target species of trees and/or shrubs. Soil is compacted as a result of prior land management activities.

After Situation:

Undesirable vegetation has been treated using appropriate herbicides, reducing competition for target trees and/or shrubs. Site conditions are favorable for successful establishment of trees and/or shrubs. The typical size is 1.5 acres.

Feature Measure: area of treatment

Scenario Unit: Acres

Scenario Typical Size: 1.5

Scenario Total Cost: $361.52

Scenario Cost/Unit: $241.01

Cost Details:

Component Name	ID	Description	Unit	Cost	QTY	Total
Equipment Installation						
Tillage, Light	945	Includes light disking (tandem) or field cultivator. Includes equipment, power unit and labor costs.	Acres	$10.68	1.5	$16.02
Chemical, ground application	948	Chemical application performed by ground equipment. Includes equipment, power unit and labor costs.	Acres	$5.80	1.5	$8.70
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.	Hours	$27.56	2	$55.12
Materials						
Herbicide, 2,4-D	330	Broadleaf herbicide labeled for cropland and pasture. Refer to WIN-PST for product names and active ingredients. Includes materials and shipping only.	Acres	$6.63	1.5	$9.95
Herbicide, Glyphosate	334	A broad-spectrum, non-selective systemic herbicide. Refer to WIN-PST for product names and active ingredients. Includes materials and shipping only.	Acres	$9.21	1.5	$13.82
Herbicide, Surfactant	1095	Surfactants reduce the surface tension of water to produce more uniform coverage and penetration of herbicides, and weed killers. Paraffin Based Petroleum Surfactant. Refer to WIN-PST for product names and active ingredients. Includes materials and shipping only.	Acres	$1.51	1.5	$2.27
Mobilization						
Mobilization, medium equipment	1139	Equipment with 70-150 HP or typical weights between 14,000 and 30,000 pounds.	Each	$255.65	1	$255.65

Practice: 500 - Obstruction Removal

Scenario: #1 - Removal and Disposal of Brush and Trees up to 6 inch Diameter

Scenario Description:

Remove and disposal of brush and trees < 6 inches in diameter by demolition, excavation or other means required for removal. Dispose of all brush and trees so that it does not impede subsequent work or cause onsite or offsite damage. Dispose of all brush and trees by removal to an approved landfill, wood chipping and or land distribution, or recycling center, burial at an approved location or burning. If burning is used, implement appropriate smoke management to protect public health and safety. Remove and dispose of brush and trees in order to apply conservation practices or facilitate the planned land use. Brush and tree removal will address the resource concerns of the prevention or hindrance to the installation of conservation practices or present a hazard to their use and enjoyment.

Before Situation:

On any land where existing obstructions interfere with planned land use development, public safety or infrastructure. The site may be abandoned mine lands, construction sites, recreation areas, farms, ranches, and areas affected by natural disasters. This is not intended for the removal of obstructions from aquatic environments.

After Situation:

The typical area will be a 2.0 acre impaired area. The removal of brush and trees < 6 inch diameter will be performed with the use of equipment and hand labor. Dispose of all brush and trees from the obstruction removal so that it does not impede subsequent work or cause onsite or offsite damage. Revegetate or otherwise protect from erosion disturbed areas as soon as possible. Refer to NRCS Conservation Practice Standard 342, Critical Area Planting for seedbed preparation, seeding, fertilizing, and mulching requirements. The practice is to improve site conditions in order to apply conservation practices or facilitate better use of the landscape.

Feature Measure: Land Area

Scenario Unit: Acres

Scenario Typical Size: 2.0

Scenario Total Cost: $2,271.89

Scenario Cost/Unit: $1,135.95

Cost Details:

Component Name	ID	Description	Unit	Cost	QTY	Total
Equipment Installation						
Dozer, 140 HP	927	Track mounted Dozer with horsepower range of 125 to 160. Equipment and power unit costs. Labor not included.	Hours	$104.83	8	$838.64
Brush Chipper, 6 in. capacity	938	Brush Chipper, 6 inch capacity, typically 35 HP. Includes chipper and power unit. Labor not included.	Hours	$30.40	8	$243.20
Truck, Pickup	939	Equipment and power unit costs. Labor not included.	Hours	$24.18	8	$193.44
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.	Hours	$37.19	8	$297.52
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.	Hours	$27.56	8	$220.48
Equipment Operators, Light	232	Includes: Skid Steer Loaders, Hydraulic Excavators <50 HP, Trenchers <12 in., Ag Equipment <150 HP, Pickup Trucks, Forklifts, Mulchers	Hours	$27.87	8	$222.96
Mobilization						
Mobilization, medium equipment	1139	Equipment with 70-150 HP or typical weights between 14,000 and 30,000 pounds.	Each	$255.65	1	$255.65

Practice: 500 - Obstruction Removal

Scenario: #2 - Removal and Disposal of Brush and Trees over 6 inch Diameter

Scenario Description:

Remove and disposal of brush and trees > 6 inches in diameter by demolition, excavation or other means required for removal. Dispose of all brush and trees so that it does not impede subsequent work or cause onsite or offsite damage. Dispose of all brush and trees by removal to an approved landfill, wood chipping and or land distribution, or recycling center, burial at an approved location or burning. If burning is used, implement appropriate smoke management to protect public health and safety. Remove and dispose of brush and trees in order to apply conservation practices or facilitate the planned land use. Brush and tree removal will address the resource concerns of the prevention or hindrance to the installation of conservation practices or present a hazard to their use and enjoyment.

Before Situation:

On any land where existing obstructions interfere with planned land use development, public safety or infrastructure. The site may be abandoned mine lands, construction sites, recreation areas, farms, ranches, and areas affected by natural disasters. This is not intended for the removal of obstructions from aquatic environments.

After Situation:

The typical area will be a 2.0 acre impaired area. The removal of brush and trees > 6 inch diameter will be performed with the use of equipment and hand labor. Dispose of all brush and trees from the obstruction removal so that it does not impede subsequent work or cause onsite or offsite damage. Revegetate or otherwise protect from erosion disturbed areas as soon as possible. Refer to NRCS Conservation Practice Standard 342, Critical Area Planting for seedbed preparation, seeding, fertilizing, and mulching requirements. The practice is to improve site conditions in order to apply conservation practices or facilitate better use of the landscape.

Feature Measure: Land Area

Scenario Unit: Acres

Scenario Typical Size: 2.0

Scenario Total Cost: $4,763.28

Scenario Cost/Unit: $2,381.64

Cost Details:

Component Name	ID	Description	Unit	Cost	QTY	Total
Equipment Installation						
Dozer, 200 HP	928	Track mounted Dozer with horsepower range of 160 to 250. Equipment and power unit costs. Labor not included.	Hours	$206.77	12	$2,481.24
Truck, Pickup	939	Equipment and power unit costs. Labor not included.	Hours	$24.18	12	$290.16
Brush Chipper, 15 in. capacity	1868	Brush Chipper, 15 inch capacity, typically 165 HP. Includes chipper and power unit. Does not include labor.	Hours	$63.24	12	$758.88
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.	Hours	$37.19	12	$446.28
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.	Hours	$27.56	12	$330.72
Equipment Operators, Heavy	233	Includes: Cranes, Hydraulic Excavators >=50 HP, Dozers, Paving Machines, Rock Trenchers, Trenchers >=12 in., Dump Trucks, Ag Equipment >=150 HP, Scrapers, Water Wagons.	Hours	$38.00	12	$456.00

Practice: 500 - Obstruction Removal

Scenario: #3 - Removal and Disposal of Fence

Scenario Description:

Remove and disposal of all existing fences by demolition, excavation or other means required for removal. Dispose of all fence materials from the site so that it does not impede subsequent work or cause onsite or offsite damage. Dispose of all materials by removal to an approved landfill, wood chipping and land distribution, or recycling center, burial at an approved location or burning. If burning is used, implement appropriate smoke management to protect public health and safety. Remove and dispose of the unwanted fence obstruction in order to apply conservation practices such as Upland Wildlife Habitat Management (645) or facilitate the planned land use. Fence removal will address the resource concerns of the prevention or hindrance to the installation of conservation practices or present a hazard to their use and enjoyment and reduce hazards to wildlife.

Before Situation:

On any land where existing fence interferes with planned land use development, public safety, wildlife movement and habitat, or infrastructure. The site may be abandoned mine lands, construction sites, recreation areas, farms, ranches, and areas affected by natural disasters. This is not intended for the removal of obstructions from aquatic environments.

After Situation:

The typical fence will be 2640 in linear feet. The removal of the fence will be performed with the use of equipment and hand labor. Dispose of all debris from the fence removal so that it does not impede subsequent work or cause onsite or offsite damage. Revegetate or otherwise protect from erosion disturbed areas as soon as possible. Refer to NRCS Conservation Practice Standard 342, Critical Area Planting for seedbed preparation, seeding, fertilizing, and mulching requirements. The practice is to improve site conditions in order to apply conservation practices or facilitate better use of the landscape such as Upland Wildlife Habitat Management (645).

Feature Measure: Length of Fence

Scenario Unit: Feet

Scenario Typical Size: 2,640.0

Scenario Total Cost: $2,948.05

Scenario Cost/Unit: $1.12

Cost Details:

Component Name	ID	Description	Unit	Cost	QTY	Total
Equipment Installation						
Skidsteer, 80 HP	933	Skidsteer loader with horsepower range of 60 to 90. Equipment and power unit costs. Labor not included.	Hours	$55.01	20	$1,100.20
Truck, Pickup	939	Equipment and power unit costs. Labor not included.	Hours	$24.18	20	$483.60
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.	Hours	$27.56	20	$551.20
Equipment Operators, Light	232	Includes: Skid Steer Loaders, Hydraulic Excavators <50 HP, Trenchers <12 in., Ag Equipment <150 HP, Pickup Trucks, Forklifts, Mulchers	Hours	$27.87	20	$557.40
Mobilization						
Mobilization, medium equipment	1139	Equipment with 70-150 HP or typical weights between 14,000 and 30,000 pounds.	Each	$255.65	1	$255.65

Practice: 500 - Obstruction Removal

Scenario: #4 - Removal and Disposal of Rock and or Boulders

Scenario Description:

Remove and disposal of rock and or boulders by drilling, blasting, demolition, excavation or other means required for removal. Dispose of all rocks and or boulders so that it does not impede subsequent work or cause onsite or offsite damage. Dispose of all rock and or boulders by removal to an approved location, or reuse location. Remove and dispose all rock and or boulders in order to apply conservation practices or facilitate the planned land use. Rocks and or boulders will address the resource concerns of the prevention or hindrance to the installation of conservation practices or present a hazard to their use and enjoyment.

Before Situation:

On any land where existing obstructions interfere with planned land use development, public safety or infrastructure. The site may be abandoned mine lands, construction sites, recreation areas, farms, ranches, and areas affected by natural disasters. This is not intended for the removal of obstructions from aquatic environments.

After Situation:

The typical area will be a 20 acre impaired area. The removal of rock and or boulders will be performed by drilling, blasting, demolition, excavation or other means required for removal with the use of heavy equipment and hand labor. Dispose of all rocks and boulders from the obstruction removal so that it does not impede subsequent work or cause onsite or offsite damage. Revegetate or otherwise protect from erosion disturbed areas as soon as possible. Refer to NRCS Conservation Practice Standard 342, Critical Area Planting for seedbed preparation, seeding, fertilizing, and mulching requirements. The practice is to improve site conditions in order to apply conservation practices or facilitate better use of the landscape.

Feature Measure: Area

Scenario Unit: Acres

Scenario Typical Size: 20.0

Scenario Total Cost: $63,136.80

Scenario Cost/Unit: $3,156.84

Cost Details:

Component Name	ID	Description	Unit	Cost	QTY	Total
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.	Hours	$62.17	240	$14,920.80
Truck, dump, 18 CY	1400	Dump truck for moving bulk material. Typically capacity is 25 ton or 18 cubic yards. Includes equipment only.	Hours	$98.15	240	$23,556.00
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.	Hours	$37.19	240	$8,925.60
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.	Hours	$27.56	240	$6,614.40
Equipment Operators, Heavy	233	Includes: Cranes, Hydraulic Excavators >=50 HP, Dozers, Paving Machines, Rock Trenchers, Trenchers >=12 in., Dump Trucks, Ag Equipment >=150 HP, Scrapers, Water Wagons.	Hours	$38.00	240	$9,120.00

Practice: 500 - Obstruction Removal

Scenario: #5 - Removal and Disposal of Steel and or Concrete Structures

Scenario Description:

Remove and disposal of steel and or concrete structures by demolition, excavation or other means required for removal. Dispose of all steel and or concrete structures so that it does not impede subsequent work or cause onsite or offsite damage. Dispose of all steel and or concrete structures by removal to an approved location, or reuse location. Remove and dispose all steel and or concrete structures in order to apply conservation practices or facilitate the planned land use. Steel and or concrete structure removal will address the resource concerns of the prevention or hindrance to the installation of conservation practices or present a hazard to their use and enjoyment.

Before Situation:

On any land where existing obstructions interfere with planned land use development, public safety or infrastructure. The site may be abandoned mine lands, construction sites, recreation areas, farms, ranches, and areas affected by natural disasters. This is not intended for the removal of obstructions from aquatic environments.

After Situation:

The typical area will be a 2000 square feet of impaired land. The removal of steel and or concrete structures will be performed by demolition, excavation or other means required for removal with the use of heavy equipment and hand labor. Dispose of all steel and or concrete structures from the obstruction removal so that it does not impede subsequent work or cause onsite or offsite damage. Revegetate or otherwise protect from erosion disturbed areas as soon as possible. Refer to NRCS Conservation Practice Standard 342, Critical Area Planting for seedbed preparation, seeding, fertilizing, and mulching requirements. The practice is to improve site conditions in order to apply conservation practices or facilitate better use of the landscape.

Feature Measure: Land Area

Scenario Unit: Square Feet

Scenario Typical Size: 2,000.0

Scenario Total Cost: $30,069.76

Scenario Cost/Unit: $15.03

Cost Details:

Component Name	ID	Description	Unit	Cost	QTY	Total
Equipment Installation						
Dozer, 200 HP	928	Track mounted Dozer with horsepower range of 160 to 250. Equipment and power unit costs. Labor not included.	Hours	$206.77	64	$13,233.28
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.	Hours	$62.17	64	$3,978.88
Truck, dump, 18 CY	1400	Dump truck for moving bulk material. Typically capacity is 25 ton or 18 cubic yards. Includes equipment only.	Hours	$98.15	64	$6,281.60
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.	Hours	$37.19	64	$2,380.16
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.	Hours	$27.56	64	$1,763.84
Equipment Operators, Heavy	233	Includes: Cranes, Hydraulic Excavators >=50 HP, Dozers, Paving Machines, Rock Trenchers, Trenchers >=12 in., Dump Trucks, Ag Equipment >=150 HP, Scrapers, Water Wagons.	Hours	$38.00	64	$2,432.00

Practice: 500 - Obstruction Removal

Scenario: #6 - Removal and Disposal of Wood Structures

Scenario Description:

Remove and disposal of wood structures by demolition, excavation or other means required for removal. Dispose of all wood structures so that it does not impede subsequent work or cause onsite or offsite damage. Dispose of all wood structures by removal to an approved location, landfill, or reuse location. Remove and dispose all wood structures in order to apply conservation practices or facilitate the planned land use. Wood structure removal will address the resource concerns of the prevention or hindrance to the installation of conservation practices or present a hazard to their use and enjoyment.

Before Situation:

On any land where existing obstructions interfere with planned land use development, public safety or infrastructure. The site may be abandoned mine lands, construction sites, recreation areas, farms, ranches, and areas affected by natural disasters. This is not intended for the removal of obstructions from aquatic environments.

After Situation:

The typical area will be a 2000 square feet of impaired land. The removal of wood structures will be performed by demolition, excavation or other means required for removal with the use of heavy equipment and hand labor. Dispose of all wood structures from the obstruction removal so that it does not impede subsequent work or cause onsite or offsite damage. Revegetate or otherwise protect from erosion disturbed areas as soon as possible. Refer to NRCS Conservation Practice Standard 342, Critical Area Planting for seedbed preparation, seeding, fertilizing, and mulching requirements. The practice is to improve site conditions in order to apply conservation practices or facilitate better use of the landscape.

Feature Measure: Land Area

Scenario Unit: Square Feet

Scenario Typical Size: 2,000.0

Scenario Total Cost: $15,034.88

Scenario Cost/Unit: $7.52

Cost Details:

Component Name	ID	Description	Unit	Cost	QTY	Total
Equipment Installation						
Dozer, 200 HP	928	Track mounted Dozer with horsepower range of 160 to 250. Equipment and power unit costs. Labor not included.	Hours	$206.77	32	$6,616.64
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.	Hours	$62.17	32	$1,989.44
Truck, dump, 18 CY	1400	Dump truck for moving bulk material. Typically capacity is 25 ton or 18 cubic yards. Includes equipment only.	Hours	$98.15	32	$3,140.80
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.	Hours	$37.19	32	$1,190.08
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.	Hours	$27.56	32	$881.92
Equipment Operators, Heavy	233	Includes: Cranes, Hydraulic Excavators >=50 HP, Dozers, Paving Machines, Rock Trenchers, Trenchers >=12 in., Dump Trucks, Ag Equipment >=150 HP, Scrapers, Water Wagons.	Hours	$38.00	32	$1,216.00

Practice: 500 - Obstruction Removal

Scenario: #7 - Rock Excavation

Scenario Description:

Drilling, blasting, excavation and removal of "competent" (non-rippable) rock. Rock is excavated so that it does not impede the installation of a conservation practice. Excavated rock is hauled to an approved staging area for reuse or disposal area. Rock excavation is necessary to install a conservation practices or to facilitate the planned land use. Resource concerns is the prevention and/or hindrance of installing a conservation practices or removal of a safety hazard.

Before Situation:

On any land where "competent rock" interferes with planned land use development, public safety or infrastructure. The site may be abandoned mine lands, construction sites, recreation areas, farms, ranches, and areas affected by natural disasters. This is not intended for the removal of obstructions from aquatic environments.

After Situation:

The excavation of "compentent" (non-rippable) rock will be performed by drilling, blasting, excavation, demolition, or other means required for removal with the use of heavy equipment. Rock shall be removed from the sites so that it does not impede in the subsequent installation of conservation practices or cause a safety hazard. Revegetate or otherwise protect from erosion disturbed areas as soon as possible. Refer to NRCS Conservation Practice Standard 342, Critical Area Planting for seedbed preparation, seeding, fertilizing, and mulching requirements. The practice is to improve site conditions in order to apply conservation practices or facilitate better use of the landscape.

Feature Measure: Cubic Yards of Rock to be Excavate

Scenario Unit: Cubic Yards

Scenario Typical Size: 200.0

Scenario Total Cost: $8,378.40

Scenario Cost/Unit: $41.89

Cost Details:

Component Name	ID	Description	Unit	Cost	QTY	Total
Equipment Installation						
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 Yards	$4.58	200	$916.00
Drilling & Blasting Rock, Bulk with blasting mats	1397	Bulk drilling & Blasting of rock or boulders in locations requiring the use of blasting mats (Min. 175 CY, Max 1500 CY). Includes all equipment, labor and supplies to complete the blast.	Cubic Yards	$19.75	200	$3,950.00
Truck, dump, 18 CY	1400	Dump truck for moving bulk material. Typically capacity is 25 ton or 18 cubic yards. Includes equipment only.	Hours	$98.15	15	$1,472.25
Labor						
Equipment Operators, Heavy	233	Includes: Cranes, Hydraulic Excavators >=50 HP, Dozers, Paving Machines, Rock Trenchers, Trenchers >=12 in., Dump Trucks, Ag Equipment >=150 HP, Scrapers, Water Wagons.	Hours	$38.00	15	$570.00
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.	Hours	$46.88	15	$703.20
Mobilization						
Mobilization, medium equipment	1139	Equipment with 70-150 HP or typical weights between 14,000 and 30,000 pounds.	Each	$255.65	3	$766.95

Practice: 500 - Obstruction Removal

Scenario: #8 - Concrete Slab Removal

Scenario Description:

Cutting, demolishion, excavation and removal of concrete slab. Concrete slab is demolished and removed so that it does not impede the installation of a conservation practice. Excavated concrete rubble is hauled to an approved disposal area. Concrete slab demolishion and removal is necessary to install a conservation practices or to facilitate the planned land use. Resource concerns is the prevention and/or hindrance of installing a conservation practices or removal of a safety hazard.

Before Situation:

On any land where an existing concrete slab interferes with planned land use development, public safety or infrastructure. The site may be an existing heavy use area (barnyard), waste storage facility, building foundation, etc.

After Situation:

The demolishion and removal of a concrete slab will be performed by cutting the concrete with a diamond saw, breaking and removing the concrete with an excavator, removing the concrete rubble from the construction site with a skidsteer load and hauling the rubble off site with a dump truck. Concrete slab shall be removed from the sites so that it does not impede in the subsequent installation of conservation practices or cause a safety hazard. Revegetate or otherwise protect from erosion disturbed areas as soon as possible. The practice is to improve site conditions in order to apply conservation practices or facilitate better use of the landscape. Other associated practices are 313 - Waste Storage Facility, 561 - Heavy Use Area Protection, 634 - Waste Transfer, 533 - Pumping Plant, 558 - Roof Runoff Structure, etc.

Feature Measure: Square Feet of Concrete Slab to be

Scenario Unit: Square Feet

Scenario Typical Size: 750.0

Scenario Total Cost: $2,772.74

Scenario Cost/Unit: $3.70

Cost Details:

Component Name	ID	Description	Unit	Cost	QTY	Total
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.	Hours	$109.36	5	$546.80
Skidsteer, 80 HP	933	Skidsteer loader with horsepower range of 60 to 90. Equipment and power unit costs. Labor not included.	Hours	$55.01	5	$275.05
Truck, dump, 12 CY	1215	Dump truck for moving bulk material. Typically capacity is 16 ton or 12 cubic yards. Includes equipment only.	Hours	$78.77	5	$393.85
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.	Hours	$27.56	3	$82.68
Equipment Operators, Light	232	Includes: Skid Steer Loaders, Hydraulic Excavators <50 HP, Trenchers <12 in., Ag Equipment <150 HP, Pickup Trucks, Forklifts, Mulchers	Hours	$27.87	5	$139.35
Equipment Operators, Heavy	233	Includes: Cranes, Hydraulic Excavators >=50 HP, Dozers, Paving Machines, Rock Trenchers, Trenchers >=12 in., Dump Trucks, Ag Equipment >=150 HP, Scrapers, Water Wagons.	Hours	$38.00	10	$380.00
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.	Hours	$46.88	1	$46.88
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	$70.59	2	$141.18
Mobilization, medium equipment	1139	Equipment with 70-150 HP or typical weights between 14,000 and 30,000 pounds.	Each	$255.65	3	$766.95

Practice: 511 - Forage Harvest Management

Scenario: #1 - Improved Forage Quality

Scenario Description:
Improved cultural practices and recordkeeping result in better forage quality and better livestock performance.

Before Situation:
Forage cutting heights are as close to the ground as equipment will allow resulting in very low stubble height. Plant regrowth is very slow. Forage quality tests are not regularly done. Records of forage quality components, cutting heights, moisture content, and harvest schedule are not regularly kept.

After Situation:
Forage cutting heights are raised to leave at least 3-4" stubble height for cool season grasses and 6- 8" (use a boot on the mower) for warm season grasses. Increased residual forage results in much faster plant regrowth. Forage quality tests are submitted to an accredited lab for analysis. Records of forage quality components, cutting heights, moisture content, and harvest schedule are regularly kept to track increased forage quality and improved livestock performance.

Feature Measure: Improved Relative Feed Value

Scenario Unit: Acres

Scenario Typical Size: 30.0

Scenario Total Cost: $169.18

Scenario Cost/Unit: $5.64

Cost Details:

Component Name	ID	Description	Unit	Cost	QTY	Total
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	$109.25	1	$109.25
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.	Hours	$37.19	1	$37.19
Materials						
Test, Plant Tissue Test	301	Tissue analysis for crops. Includes materials and shipping only.	Each	$22.74	1	$22.74

Practice: 511 - Forage Harvest Management

Scenario: #2 - Organic Preemptive Harvest

Scenario Description:

Preemptive harvest of forage crops to prevent damage from insects (such as leafhopper on alfalfa) or other pests results in better forage quality and better livestock performance.

Before Situation:

Forage pests are usually controlled with pesticides.

After Situation:

In organic or transitioning to organic systems, forage pests are controlled by executing a preemptive harvest before pests can damage forage quality. Forage yields are reduced because of immature stage of forage growth and forage quality may also be affected. Forage tests are submitted to an accredited lab for analysis to verify forage quality. Records of forage quality components are used to adjust feeding rations.

Feature Measure: Relative Feed Value Maintained

Scenario Unit: Acres

Scenario Typical Size: 30.0

Scenario Total Cost: $552.98

Scenario Cost/Unit: $18.43

Cost Details:

Component Name	ID	Description	Unit	Cost	QTY	Total
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	$109.25	1	$109.25
Foregone Income						
FI, Grazing AUMs	2079	Grazing is the Primary Land Use	Animal Unit Month	$19.19	20	$383.80
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.	Hours	$37.19	1	$37.19
Materials						
Test, Plant Tissue Test	301	Tissue analysis for crops. Includes materials and shipping only.	Each	$22.74	1	$22.74

Practice: 511 - Forage Harvest Management

Scenario: #3 - Perennial Crops - Delayed Mowing

Scenario Description:

In perennial forage crops, the delaying the harvest of the first cutting to promote the reproduction of ground nesting birds. Delaying the harvest of the first cutting will benefit ground nesting birds; research at the University of Vermont showed that breeding success for declining grassland songbirds (e.g. Bobolink) went from 0 on a regularly harvested hay field to 2.8 fledglings per female per year when the the first harvest on a hayfield was delayed until August 1st. Bobolinks, Eastern Meadowlarks, and Savannah Sparrows require a nesting period to fledge young that lasts through the end of July in most parts of the eastern US. The delayed harvest results in a decrease in overall forage quality. Farmers could see as much as a 50% reduction in market value due to declines in protein (~50%) and digestibility (~20%), making the forage crop less palatable and lower in relative feed value. The selected fields should be large enough to promote ground nesting birds. After young have fledged the field will be harvested for dry forages.

Before Situation:

Perennial forage crops are produced and harvested; ground nesting birds are disturbed and/or fledgling birds are killed in the process.

After Situation:

Annual crops are harvested with a delayed mowing; forage quality is compromised, however, the survival of ground nesting birds is promoted.

Feature Measure: Increased grassland bird populatio

Scenario Unit: Acres

Scenario Typical Size: 30.0

Scenario Total Cost: $744.88

Scenario Cost/Unit: $24.83

Cost Details:

Component Name	ID	Description	Unit	Cost	QTY	Total
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	$109.25	1	$109.25
Foregone Income						
FI, Grazing AUMs	2079	Grazing is the Primary Land Use	Animal Unit Month	$19.19	30	$575.70
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.	Hours	$37.19	1	$37.19
Materials						
Test, Plant Tissue Test	301	Tissue analysis for crops. Includes materials and shipping only.	Each	$22.74	1	$22.74

Practice: 512 - Pasture and Hay Planting

Scenario: #1 - Cool Season, Establish or Reseed

Scenario Description:

Establish/reeseed adapted perennial introduced cool season grasses and legumes. Used for either conventional or no-till seeding of perennial introduced cool season grasses for pasture or hayland. Assumes fertilizer, seed, equipment and labor for seed bed prep, tillage, seeding ,and spreading. Does not include foregone income for conversion of cropland.

Before Situation:

Typically installed on an a poor or nonexistent stand of grass species. Resource concerns include: sheet and rill erosion, ephemeral gully erosion, decreased water quality from runoff of sediment, low soil quality (including organic matter depletion) and low species diversity.

After Situation:

Field is prepared for seeding, and lime and nutrients are spread according to soil test results. Cool season grasses and legumes are established on pasture or hayland. Erosion is minimized and there is reduced sedimentation and nutrient runoff. Water and soil quality is improved (including an increase in organic matter).

Feature Measure: Acres of Forage and Biomass Planti

Scenario Unit: Acres

Scenario Typical Size: 10.0

Scenario Total Cost: $3,574.80

Scenario Cost/Unit: $357.48

Cost Details:

Component Name	ID	Description	Unit	Cost	QTY	Total
Equipment Installation						
Tillage, Light	945	Includes light disking (tandem) or field cultivator. Includes equipment, power unit and labor costs.	Acres	$10.68	10	$106.80
Tillage, Primary	946	Includes heavy disking (offset) or chisel plow. Includes equipment, power unit and labor costs.	Acres	$16.30	10	$163.00
Fertilizer, ground application, dry bulk	950	Dry bulk fertilizer application performed by ground equipment. Includes equipment, power unit and labor costs.	Acres	$6.63	10	$66.30
Lime application	953	Lime application performed by ground equipment. Includes equipment, power unit and labor costs.	Acres	$8.21	10	$82.10
Seeding Operation, No Till/Grass Drill	960	No Till drill or grass drill for seeding. Includes equipment, power unit and labor costs.	Acres	$21.92	10	$219.20
Cultipacking	1100	Includes equipment, power unit and labor costs.	Acres	$8.68	10	$86.80
Materials						
Nitrogen (N), Urea	71	Price per pound of N supplied by Urea. Price is not per pound of total product applied, no conversion is needed.	Pound	$0.47	500	$235.00
Phosphorus, P2O5	73	Price per pound of P2O5 supplied by Superphosphate. Price is not per pound of total product applied, no conversion is needed.	Pound	$0.61	500	$305.00
Potassium, K2O	74	K2O supplied by Muriate Of Potash. Price is not per pound of total product applied, no conversion is needed.	Pound	$0.35	1000	$350.00
Lime, ENM	75	Fertilizer: Limestone Spread on field.	Ton	$64.87	20	$1,297.40
Test, Soil Test, Standard	299	Includes materials, shiping, labor, and equipment costs.	Each	$11.76	1	$11.76
Annual Grasses, Legumes or Forbs	2732	A mix of annual grasses, legumes and/or forbs, mostly introduced but may be native. Used for temporary cover or cover crops. Includes material and shipping.	Acres	$47.95	10	$479.50
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	$171.94	1	$171.94

Practice: 512 - Pasture and Hay Planting

Scenario: #2 - Cool Season, Establish or Reseed, Foregone Income

Scenario Description:

Establish adapted perennial introduced cool season grasses and legumes. Used for either conventional or no-till seeding of perennial introduced cool season grasses for pasture or hayland. Assumes fertilizer, seed, equipment and labor for seed bed prep, tillage, seeding ,and spreading. Includes foregone income for conversion of cropland, typically silage corn, to pasture or hay.

Before Situation:

Typically installed on a 10 acre corn field that being converted to long-term grazing or hay. Resource concerns include: sheet and rill erosion, ephemeral gully erosion, decreased water quality from runoff of sediment and/or manure from the field, and low soil quality (including organic matter depletion) from continuous cropping of silage corn.

After Situation:

Field is prepared for seeding, and lime and nutrients are spread according to soil test results. Cool season grasses and legumes are established on pasture or hayland. Erosion is minimized and there is reduced sedimentation and nutrient runoff. Water and soil quality is improved (including an increase in organic matter).

Feature Measure: Acres of Forage and Biomass Planti

Scenario Unit: Acres

Scenario Typical Size: 10.0

Scenario Total Cost: $5,822.15

Scenario Cost/Unit: $582.22

Cost Details:

Component Name	ID	Description	Unit	Cost	QTY	Total
Equipment Installation						
Tillage, Light	945	Includes light disking (tandem) or field cultivator. Includes equipment, power unit and labor costs.	Acres	$10.68	10	$106.80
Tillage, Primary	946	Includes heavy disking (offset) or chisel plow. Includes equipment, power unit and labor costs.	Acres	$16.30	10	$163.00
Fertilizer, ground application, dry bulk	950	Dry bulk fertilizer application performed by ground equipment. Includes equipment, power unit and labor costs.	Acres	$6.63	10	$66.30
Lime application	953	Lime application performed by ground equipment. Includes equipment, power unit and labor costs.	Acres	$8.21	10	$82.10
Seeding Operation, No Till/Grass Drill	960	No Till drill or grass drill for seeding. Includes equipment, power unit and labor costs.	Acres	$21.92	10	$219.20
Cultipacking	1100	Includes equipment, power unit and labor costs.	Acres	$8.68	10	$86.80
Foregone Income						
FI, Corn Dryland	1959	Dryland Corn is Primary Crop	Acres	$270.47	10	$2,704.70
FI, Hay, General Grass	2122	General Grass Hay is Primary Land Use	Ton	$30.49	-15	($457.35)
Materials						
Nitrogen (N), Urea	71	Price per pound of N supplied by Urea. Price is not per pound of total product applied, no conversion is needed.	Pound	$0.47	500	$235.00
Phosphorus, P2O5	73	Price per pound of P2O5 supplied by Superphosphate. Price is not per pound of total product applied, no conversion is needed.	Pound	$0.61	500	$305.00
Potassium, K2O	74	K2O supplied by Muriate Of Potash. Price is not per pound of total product applied, no conversion is needed.	Pound	$0.35	1000	$350.00
Lime, ENM	75	Fertilizer: Limestone Spread on field.	Ton	$64.87	20	$1,297.40
Test, Soil Test, Standard	299	Includes materials, shiping, labor, and equipment costs.	Each	$11.76	1	$11.76
Annual Grasses, Legumes or Forbs	2732	A mix of annual grasses, legumes and/or forbs, mostly introduced but may be native. Used for temporary cover or cover crops. Includes material and shipping.	Acres	$47.95	10	$479.50
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	$171.94	1	$171.94

Practice: 512 - Pasture and Hay Planting

Scenario: #3 - Cool Season, Establish or Reseed, Organic

Scenario Description:

Establish/reseed adapted organic perennial introduced cool season grasses and legumes. Used for either conventional or no-till seeding of perennial introduced cool season grasses for pasture or hayland. Assumes nutrients, seed, equipment and labor for seed bed prep, tillage, seeding ,and spreading.

Before Situation:

Typically installed on an a poor or nonexistent stand of grass species that is certified organic or transitioning to organic. Resource concerns include: sheet and rill erosion, ephemeral gully erosion, decreased water quality from runoff of sediment, low soil quality (including organic matter depletion) and low species diversity.

After Situation:

Field is prepared for seeding, and lime and nutrients are spread according to soil test results. Organic cool season grasses and legumes are established on pasture or hayland. Erosion is minimized and there is reduced sedimentation and nutrient runoff. Water and soil quality is improved (including an increase in organic matter).

Feature Measure: Acres of Forage and Biomass Planti

Scenario Unit: Acres

Scenario Typical Size: 10.0

Scenario Total Cost: $4,386.92

Scenario Cost/Unit: $438.69

Cost Details:

Component Name	ID	Description	Unit	Cost	QTY	Total
Equipment Installation						
Tillage, Light	945	Includes light disking (tandem) or field cultivator. Includes equipment, power unit and labor costs.	Acres	$10.68	10	$106.80
Tillage, Primary	946	Includes heavy disking (offset) or chisel plow. Includes equipment, power unit and labor costs.	Acres	$16.30	10	$163.00
Fertilizer, ground application, dry bulk	950	Dry bulk fertilizer application performed by ground equipment. Includes equipment, power unit and labor costs.	Acres	$6.63	10	$66.30
Lime application	953	Lime application performed by ground equipment. Includes equipment, power unit and labor costs.	Acres	$8.21	10	$82.10
Manure, compost, application	955	Loading, hauling and spreading manure/compost by ground equipment. Includes equipment, power unit and labor costs.	Hours	$128.88	4	$515.52
Seeding Operation, No Till/Grass Drill	960	No Till drill or grass drill for seeding. Includes equipment, power unit and labor costs.	Acres	$21.92	10	$219.20
Cultipacking	1100	Includes equipment, power unit and labor costs.	Acres	$8.68	10	$86.80
Materials						
Lime, ENM	75	Fertilizer: Limestone Spread on field.	Ton	$64.87	20	$1,297.40
Manure	264	Organic matter can be used as organic fertilizer in agriculture	Ton	$18.70	50	$935.00
Potassium, Organic	268	ORGANIC Potassium	Pound	$0.15	500	$75.00
Test, Soil Test, Standard	299	Includes materials, shiping, labor, and equipment costs.	Each	$11.76	1	$11.76
Certified Organic, Perennial Grasses, Legumes and/or Forbs	2340	Perennial grasses, legumes, and/or forbs, mostly introduced but may be native, may include biennials. Used for permanent plantings such as pastures. Certified organic. Includes material and shipping only.	Acres	$65.61	10	$656.10
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	$171.94	1	$171.94

Practice: 512 - Pasture and Hay Planting

Scenario: #4 - Cool Season, Establish or Reseed, Organic, Foregone Income

Scenario Description:

Establish/reseed adapted organic perennial introduced cool season grasses and legumes. Used for either conventional or no-till seeding of perennial introduced cool season grasses for pasture or hayland. Assumes nutrients, seed, equipment and labor for seed bed prep, tillage, seeding ,and spreading. Includes foregone income for conversion of certified organic cropland, typically silage corn, to pasture or hay.

Before Situation:

Typically installed on an a poor or nonexistent stand of grass species that is certified organic or transitioning to organic. Resource concerns include: sheet and rill erosion, ephemeral gully erosion, decreased water quality from runoff of sediment, low soil quality (including organic matter depletion) and low species diversity.

After Situation:

Field is prepared for seeding, and lime and nutrients are spread according to soil test results. Organic cool season grasses and legumes are established on pasture or hayland. Erosion is minimized and there is reduced sedimentation and nutrient runoff. Water and soil quality is improved (including an increase in organic matter).

Feature Measure: Acres of Forage and Biomass Planti

Scenario Unit: Acres

Scenario Typical Size: 10.0

Scenario Total Cost: $7,039.97

Scenario Cost/Unit: $704.00

Cost Details:

Component Name	ID	Description	Unit	Cost	QTY	Total
Equipment Installation						
Tillage, Light	945	Includes light disking (tandem) or field cultivator. Includes equipment, power unit and labor costs.	Acres	$10.68	10	$106.80
Tillage, Primary	946	Includes heavy disking (offset) or chisel plow. Includes equipment, power unit and labor costs.	Acres	$16.30	10	$163.00
Fertilizer, ground application, dry bulk	950	Dry bulk fertilizer application performed by ground equipment. Includes equipment, power unit and labor costs.	Acres	$6.63	10	$66.30
Lime application	953	Lime application performed by ground equipment. Includes equipment, power unit and labor costs.	Acres	$8.21	10	$82.10
Manure, compost, application	955	Loading, hauling and spreading manure/compost by ground equipment. Includes equipment, power unit and labor costs.	Hours	$128.88	4	$515.52
Seeding Operation, No Till/Grass Drill	960	No Till drill or grass drill for seeding. Includes equipment, power unit and labor costs.	Acres	$21.92	10	$219.20
Cultipacking	1100	Includes equipment, power unit and labor costs.	Acres	$8.68	10	$86.80
Foregone Income						
FI, Hay, General Grass	2122	General Grass Hay is Primary Land Use	Ton	$30.49	-15	($457.35)
FI, Organic, Corn Dryland	2232	Organic Dryland Corn is Primary Crop	Acres	$311.04	10	$3,110.40
Materials						
Lime, ENM	75	Fertilizer: Limestone Spread on field.	Ton	$64.87	20	$1,297.40
Manure	264	Organic matter can be used as organic fertilizer in agriculture	Ton	$18.70	50	$935.00
Potassium, Organic	268	ORGANIC Potassium	Pound	$0.15	500	$75.00
Test, Soil Test, Standard	299	Includes materials, shiping, labor, and equipment costs.	Each	$11.76	1	$11.76
Certified Organic, Perennial Grasses, Legumes and/or Forbs	2340	Perennial grasses, legumes, and/or forbs, mostly introduced but may be native, may include biennials. Used for permanent plantings such as pastures. Certified organic. Includes material and shipping only.	Acres	$65.61	10	$656.10
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	$171.94	1	$171.94

Practice: 512 - Pasture and Hay Planting

Scenario: #5 - Warm Season, Native, Establish or Reseed

Scenario Description:

Establish or reseed adapted perennial native warm season grasses. Used for either conventional or organic perennial native warm season grasses for pasture, hayland, or biomass crops. Assumes nutrients, seed, equipment and labor for seed bed prep, tillage, seeding ,and spreading.

Before Situation:

Typically installed on an overgrazed, 10 acre pasture that is a weedy mix of cool season grasses. Plant productivity is poor, weed species dominate, and low water quantity and high temperatures during the summer months suppress the growth of the cool season forages. Resource concerns include: decreased water quality from runoff of sediment and/or manure from the field, low organic matter and soil fertility, poor plant health and vigor, and invasive or noxious weeds.

After Situation:

Field is prepared for seeding, lime and nutrients are spread according to soil test results, and warm season grasses are established. Weeds are managed during establishment through mowing and chemical control. Pasture is managed for long-term grazing. Erosion is minimized and there is reduced sedimentation and nutrient runoff, and improved water and soil quality (including an increase in organic matter and fertility). Plant productivity during the "summer slump" increases and weed composition decreases. LIvestock nutrition is improved and energy is saved by producing on-farm forage crops and reducing amount of imported feed.

Feature Measure: Acres of Forage and Biomass Planti

Scenario Unit: Acres

Scenario Typical Size: 10.0

Scenario Total Cost: $4,097.90

Scenario Cost/Unit: $409.79

Cost Details:

Component Name	ID	Description	Unit	Cost	QTY	Total
Equipment Installation						
Tillage, Light	945	Includes light disking (tandem) or field cultivator. Includes equipment, power unit and labor costs.	Acres	$10.68	10	$106.80
Tillage, Primary	946	Includes heavy disking (offset) or chisel plow. Includes equipment, power unit and labor costs.	Acres	$16.30	10	$163.00
Chemical, ground application	948	Chemical application performed by ground equipment. Includes equipment, power unit and labor costs.	Acres	$5.80	10	$58.00
Fertilizer, ground application, dry bulk	950	Dry bulk fertilizer application performed by ground equipment. Includes equipment, power unit and labor costs.	Acres	$6.63	10	$66.30
Lime application	953	Lime application performed by ground equipment. Includes equipment, power unit and labor costs.	Acres	$8.21	10	$82.10
Seeding Operation, No Till/Grass Drill	960	No Till drill or grass drill for seeding. Includes equipment, power unit and labor costs.	Acres	$21.92	10	$219.20
Cultipacking	1100	Includes equipment, power unit and labor costs.	Acres	$8.68	10	$86.80
Materials						
Phosphorus, P2O5	73	Price per pound of P2O5 supplied by Superphosphate. Price is not per pound of total product applied, no conversion is needed.	Pound	$0.61	500	$305.00
Potassium, K2O	74	K2O supplied by Muriate Of Potash. Price is not per pound of total product applied, no conversion is needed.	Pound	$0.35	1000	$350.00
Lime, ENM	75	Fertilizer: Limestone Spread on field.	Ton	$64.87	20	$1,297.40
Test, Soil Test, Standard	299	Includes materials, shiping, labor, and equipment costs.	Each	$11.76	1	$11.76
Herbicide, 2,4-D	330	Broadleaf herbicide labeled for cropland and pasture. Refer to WIN-PST for product names and active ingredients. Includes materials and shipping only.	Acres	$6.63	10	$66.30
Native Perennial Grasses, Low Density	2750	Native perennial grasses, may include a small percentage of annual species for establishment purposes and/or if allowed by the CPS. Planted at lower to medium density (40 pure live seeds/sq ft and less). Includes material and shipping.	Acres	$111.33	10	$1,113.30
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	$171.94	1	$171.94

Practice: 512 - Pasture and Hay Planting

Scenario: #6 - Warm Season, Native, Establish or Reseed, Foregone Income

Scenario Description:

Establish or reseed adapted perennial native warm season grasses. Used for either conventional or organic perennial native warm season grasses for pasture, hayland, or biomass crops. Assumes nutrients, seed, equipment and labor for seed bed prep, tillage, seeding ,and spreading. Includes foregone income for conversion of cropland, typically silage corn, to native/warm season pasture or hay.

Before Situation:

Typically installed on an overgrazed, 10 acre pasture that is a weedy mix of cool season grasses. Plant productivity is poor, weed species dominate, and low water quantity and high temperatures during the summer months suppress the growth of the cool season forages. Resource concerns include: decreased water quality from runoff of sediment and/or manure from the field, low organic matter and soil fertility, poor plant health and vigor, and invasive or noxious weeds.

After Situation:

Field is prepared for seeding, lime and nutrients are spread according to soil test results, and warm season grasses are established. Weeds are managed during establishment through mowing and chemical control. Pasture is managed for long-term grazing. Erosion is minimized and there is reduced sedimentation and nutrient runoff, and improved water and soil quality (including an increase in organic matter and fertility). Plant productivity during the "summer slump" increases and weed composition decreases. LIvestock nutrition is improved and energy is saved by producing on-farm forage crops and reducing amount of imported feed.

Feature Measure: Acres of Forage and Biomass Planti

Scenario Unit: Acres

Scenario Typical Size: 10.0

Scenario Total Cost: $6,345.25

Scenario Cost/Unit: $634.53

Cost Details:

Component Name	ID	Description	Unit	Cost	QTY	Total
Equipment Installation						
Tillage, Light	945	Includes light disking (tandem) or field cultivator. Includes equipment, power unit and labor costs.	Acres	$10.68	10	$106.80
Tillage, Primary	946	Includes heavy disking (offset) or chisel plow. Includes equipment, power unit and labor costs.	Acres	$16.30	10	$163.00
Chemical, ground application	948	Chemical application performed by ground equipment. Includes equipment, power unit and labor costs.	Acres	$5.80	10	$58.00
Fertilizer, ground application, dry bulk	950	Dry bulk fertilizer application performed by ground equipment. Includes equipment, power unit and labor costs.	Acres	$6.63	10	$66.30
Lime application	953	Lime application performed by ground equipment. Includes equipment, power unit and labor costs.	Acres	$8.21	10	$82.10
Seeding Operation, No Till/Grass Drill	960	No Till drill or grass drill for seeding. Includes equipment, power unit and labor costs.	Acres	$21.92	10	$219.20
Cultipacking	1100	Includes equipment, power unit and labor costs.	Acres	$8.68	10	$86.80
Foregone Income						
FI, Corn Dryland	1959	Dryland Corn is Primary Crop	Acres	$270.47	10	$2,704.70
FI, Hay, General Grass	2122	General Grass Hay is Primary Land Use	Ton	$30.49	-15	($457.35)
Materials						
Phosphorus, P2O5	73	Price per pound of P2O5 supplied by Superphosphate. Price is not per pound of total product applied, no conversion is needed.	Pound	$0.61	500	$305.00
Potassium, K2O	74	K2O supplied by Muriate Of Potash. Price is not per pound of total product applied, no conversion is needed.	Pound	$0.35	1000	$350.00
Lime, ENM	75	Fertilizer: Limestone Spread on field.	Ton	$64.87	20	$1,297.40
Test, Soil Test, Standard	299	Includes materials, shiping, labor, and equipment costs.	Each	$11.76	1	$11.76
Herbicide, 2,4-D	330	Broadleaf herbicide labeled for cropland and pasture. Refer to WIN-PST for product names and active ingredients. Includes materials and shipping only.	Acres	$6.63	10	$66.30
Native Perennial Grasses, Low Density	2750	Native perennial grasses, may include a small percentage of annual species for establishment purposes and/or if allowed by the CPS. Planted at lower to medium density (40 pure live seeds/sq ft and less). Includes material and shipping.	Acres	$111.33	10	$1,113.30
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	$171.94	1	$171.94

Practice: 512 - Pasture and Hay Planting

Scenario: #7 - Rejuvenate

Scenario Description:

Used to rejuvenate rundown pasture or hayland by applying nutrients and overseeding/sodseeding (frost, dormant, no-till, after aerator etc) adapted legumes or grass/legume mixes. Assumes lime, potassium and seeding costs.

Before Situation:

Typical situation is a 10 acre pasture/hayfield with invasive weeds and poor legume composition. Existing stand of perennial grasses is in poor condition and percent ground cover is low. Overall plant diversity is low and is contributing to a decrease in soil quality. Biological nitrogen fixation is low and the reliance on nitrogen fertilizer is increasing.

After Situation:

Approved legumes or grass/legume mixed are established and lime and potassium is spread to soil test recommendations. Ground cover and plant diversity improves and results in lower weed pressure. Plant productivity and soil quality improves from the increase in biological nitrogen fixation. Energy is saved through the use of legume nitrogen versus Haber-Bosch nitrogen

Feature Measure: Acres of Forage and Biomass Planti

Scenario Unit: Acres

Scenario Typical Size: 10.0

Scenario Total Cost: $2,678.20

Scenario Cost/Unit: $267.82

Cost Details:

Component Name	ID	Description	Unit	Cost	QTY	Total
Equipment Installation						
Fertilizer, ground application, dry bulk	950	Dry bulk fertilizer application performed by ground equipment. Includes equipment, power unit and labor costs.	Acres	$6.63	10	$66.30
Lime application	953	Lime application performed by ground equipment. Includes equipment, power unit and labor costs.	Acres	$8.21	10	$82.10
Seeding Operation, No Till/Grass Drill	960	No Till drill or grass drill for seeding. Includes equipment, power unit and labor costs.	Acres	$21.92	10	$219.20
Materials						
Potassium, K2O	74	K2O supplied by Muriate Of Potash. Price is not per pound of total product applied, no conversion is needed.	Pound	$0.35	1000	$350.00
Lime, ENM	75	Fertilizer: Limestone Spread on field.	Ton	$64.87	20	$1,297.40
Test, Soil Test, Standard	299	Includes materials, shiping, labor, and equipment costs.	Each	$11.76	1	$11.76
Annual Grasses, Legumes or Forbs	2732	A mix of annual grasses, legumes and/or forbs, mostly introduced but may be native. Used for temporary cover or cover crops. Includes material and shipping.	Acres	$47.95	10	$479.50
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	$171.94	1	$171.94

Practice: 512 - Pasture and Hay Planting

Scenario: #8 - Rejuvenate, Organic

Scenario Description:

Used to rejuvenate rundown pasture or hayland on organic or transitioning to organic land by applying nutrients and overseeding/sodseeding (frost, dormant, no-till, after aerator etc) adapted legumes or grass/legume mixes. Assumes lime, potassium and seeding costs.

Before Situation:

Typical situation is a 10 acre organic or transitioning to organic pasture/hayfield with invasive weeds and poor legume composition. Existing stand of perennial grasses is in poor condition and percent ground cover is low. Overall plant diversity is low and is contributing to a decrease in soil quality. Biological nitrogen fixation is low.

After Situation:

Approved organic legumes or grass/legume mixed are established and lime and potassium is spread to soil test recommendations. Ground cover and plant diversity improves and results in lower weed pressure. Plant productivity and soil quality improves from the increase in biological nitrogen fixation.

Feature Measure: Acres of Forage and Biomass Planti

Scenario Unit: Acres

Scenario Typical Size: 10.0

Scenario Total Cost: $2,854.80

Scenario Cost/Unit: $285.48

Cost Details:

Component Name	ID	Description	Unit	Cost	QTY	Total
Equipment Installation						
Fertilizer, ground application, dry bulk	950	Dry bulk fertilizer application performed by ground equipment. Includes equipment, power unit and labor costs.	Acres	$6.63	10	$66.30
Lime application	953	Lime application performed by ground equipment. Includes equipment, power unit and labor costs.	Acres	$8.21	10	$82.10
Seeding Operation, No Till/Grass Drill	960	No Till drill or grass drill for seeding. Includes equipment, power unit and labor costs.	Acres	$21.92	10	$219.20
Materials						
Potassium, K2O	74	K2O supplied by Muriate Of Potash. Price is not per pound of total product applied, no conversion is needed.	Pound	$0.35	1000	$350.00
Lime, ENM	75	Fertilizer: Limestone Spread on field.	Ton	$64.87	20	$1,297.40
Test, Soil Test, Standard	299	Includes materials, shiping, labor, and equipment costs.	Each	$11.76	1	$11.76
Certified Organic, Perennial Grasses, Legumes and/or Forbs	2340	Perennial grasses, legumes, and/or forbs, mostly introduced but may be native, may include biennials. Used for permanent plantings such as pastures. Certified organic. Includes material and shipping only.	Acres	$65.61	10	$656.10
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	$171.94	1	$171.94

Practice: 512 - Pasture and Hay Planting

Scenario: #9 - Overseed

Scenario Description:

Broadcast approved cool-season forage seeds (typically red and ladino clover) into existing pasture or hayland with low legume composition and low species diversity. Typically used for frost-seeding (early spring just after snowmelt), dormant seeding (late winter just before snowfall), or when soil is prepared using an aerator. Assumes seeding costs only, and should be used when pH and soil test nutrients are within an acceptable range .

Before Situation:

5 acres of pasture/hayland that was previously established as a grass/legume mix now has less than 5-10% legume composition. Forage and plant quality is poor due to low biological N fixation and species diversity. Small areas have bare soil resulting in erosion and establishment of weeds.

After Situation:

Legume seed is broadcast in late winter or early spring. Legume composition is increased above 20% and forage and plant quality is improved due to an increase in species diversity and biological N fixation. Small bare areas of soil are covered with legumes and erosion and weed potential is reduced. Energy is saved through the use of legume nitrogen versus Haber-Bosch nitrogen.

Feature Measure: Acres of Forage and Biomass Planti

Scenario Unit: Acres

Scenario Typical Size: 5.0

Scenario Total Cost: $463.30

Scenario Cost/Unit: $92.66

Cost Details:

Component Name	ID	Description	Unit	Cost	QTY	Total
Equipment Installation						
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.	Acres	$12.00	5	$60.00
Materials						
Test, Soil Test, Standard	299	Includes materials, shiping, labor, and equipment costs.	Each	$11.76	1	$11.76
Introduced Perennial Grasses, Legumes and/or Forbs, Medium Density	2748	Introduced perennial grasses, legumes, and/or forbs, may include a small percentage of annual species for establishment purposes and/or if allowed by the CPS. Planted at medium to higher density (41-60 pure live seeds/sq ft). Includes material and shipping.	Acres	$43.92	5	$219.60
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	$171.94	1	$171.94

Practice: 512 - Pasture and Hay Planting

Scenario: #10 - Overseed, Organic

Scenario Description:

Broadcast approved, certified organc cool-season forage seeds (typically red and ladino clover) into existing organic or transitioning to organic pasture or hayland with low legume composition and low species diversity. Typically used for frost-seeding (early spring just after snowmelt), dormant seeding (late winter just before snowfall), or when soil is prepared using an aerator. Assumes seeding costs only, and should be used when pH and soil test nutrients are within an acceptable range .

Before Situation:

5 acres of organic or transitioning to organic pasture/hayland that was previously established as a grass/legume mix now has less than 5-10% legume composition. Forage and plant quality is poor due to low biological N fixation and species diversity. Small areas have bare soil resulting in erosion and establishment of weeds.

After Situation:

Certified organic legume seed is broadcast in late winter or early spring. Legume composition is increased above 20% and forage and plant quality is improved due to an increase in species diversity and biological N fixation. Small bare areas of soil are covered with legumes and erosion and weed potential is reduced.

Feature Measure: Acres of Forage and Biomass Planti

Scenario Unit: Acres

Scenario Typical Size: 5.0

Scenario Total Cost: $571.75

Scenario Cost/Unit: $114.35

Cost Details:

Component Name	ID	Description	Unit	Cost	QTY	Total
Equipment Installation						
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.	Acres	$12.00	5	$60.00
Materials						
Test, Soil Test, Standard	299	Includes materials, shiping, labor, and equipment costs.	Each	$11.76	1	$11.76
Certified Organic, Perennial Grasses, Legumes and/or Forbs	2340	Perennial grasses, legumes, and/or forbs, mostly introduced but may be native, may include biennials. Used for permanent plantings such as pastures. Certified organic. Includes material and shipping only.	Acres	$65.61	5	$328.05
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	$171.94	1	$171.94

Practice: 516 - Livestock Pipeline

Scenario: #1 - PE Pipe less than or equal to 1 in. Dia., Buried 4 ft Deep

Scenario Description:

Description: Install 1" dia. polyethylene pipe, buried below frost depth to supply water for livestock watering facility. Practice is installed in conjunction with 614 - Watering Facility. Construct 1000 FT of 1 inch, Polyethylene (PE) pipeline with appurtenances, installed below ground a minimum 4 feet of ground cover. Appurtenances include: couplings, fittings, thrust blocks, gate valves (2), air release valves (2), drain valve (1), and pressure relief valve (1), and Frost free hydrant. Revegetation is not included. Resource Concerns: Inadequate Livestock Water, Inefficient Energy Use. Associated Practices: Critical Area Planting (342), Pumping Plant (533), and Watering Facility (614).

Before Situation:

Water supplies need to be conveyed through pipelines for use by livestock or wildlife.

After Situation:

Pipeline(s) convey and/or distribute water to storage and/or watering facilities, for use by livestock or wildlife.

Feature Measure: Length of Pipe

Scenario Unit: Feet

Scenario Typical Size: 1,000.0

Scenario Total Cost: $2,577.34

Scenario Cost/Unit: $2.58

Cost Details:

Component Name	ID	Description	Unit	Cost	QTY	Total
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.	Hours	$31.96	16	$511.36
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.	Hours	$27.56	8	$220.48
Equipment Operators, Light	232	Includes: Skid Steer Loaders, Hydraulic Excavators <50 HP, Trenchers <12 in., Ag Equipment <150 HP, Pickup Trucks, Forklifts, Mulchers	Hours	$27.87	16	$445.92
Materials						
Freeze Proof Hydrant, <= 3' Bury	240	Freeze Proof Hydrant, 3 foot or less bury. Materials only.	Each	$51.57	4	$206.28
Pipe, PE, 1 in., DR 9	997	Materials: - 1 inch - PE - 160 psi - ASTM D3035 DR 9	Feet	$0.62	1100	$682.00
Mobilization						
Mobilization, medium equipment	1139	Equipment with 70-150 HP or typical weights between 14,000 and 30,000 pounds.	Each	$255.65	2	$511.30

Practice: 516 - Livestock Pipeline

Scenario: #3 - PE Pipe, greater than 1in Dia., Buried 4ft Deep

Scenario Description:

Description: Install 2" dia. polyethylene pipe, buried below frost depth to supply water for livestock watering facility. Practice is installed in conjunction with 614 - Watering Facility. Construct 1000 FT of 1 inch, Polyethylene (PE) pipeline with appurtenances, installed below ground a minimum 4 feet of ground cover. Appurtenances include: couplings, fittings, thrust blocks, gate valves (2), air release valves (2), drain valve (1), and pressure relief valve (1), and Frost free hydrant. Revegetation is not included. Resource Concerns: Inadequate Livestock Water, Inefficient Energy Use. Associated Practices: Critical Area Planting (342), Pumping Plant (533), and Watering Facility (614).

Before Situation:

Water supplies need to be conveyed through pipelines for use by livestock or wildlife.

After Situation:

Pipeline(s) convey and/or distribute water to storage and/or watering facilities, for use by livestock or wildlife.

Feature Measure: Length of Pipe

Scenario Unit: Feet

Scenario Typical Size: 1,000.0

Scenario Total Cost: $3,989.42

Scenario Cost/Unit: $3.99

Cost Details:

Component Name	ID	Description	Unit	Cost	QTY	Total
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.	Hours	$31.96	16	$511.36
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.	Hours	$27.56	8	$220.48
Equipment Operators, Light	232	Includes: Skid Steer Loaders, Hydraulic Excavators <50 HP, Trenchers <12 in., Ag Equipment <150 HP, Pickup Trucks, Forklifts, Mulchers	Hours	$27.87	16	$445.92
Materials						
Freeze Proof Hydrant, <= 3' Bury	240	Freeze Proof Hydrant, 3 foot or less bury. Materials only.	Each	$51.57	4	$206.28
Pipe, HDPE, smooth wall, weight priced	1379	High Density Polyethylene (HDPE) compound manufactured into smooth wall pipe. Materials only.	Pound	$2.56	818	$2,094.08
Mobilization						
Mobilization, medium equipment	1139	Equipment with 70-150 HP or typical weights between 14,000 and 30,000 pounds.	Each	$255.65	2	$511.30

Practice: 516 - Livestock Pipeline

Scenario: #4 - PE Pipe less than or equal to 1 in. Dia., Buried 4ft Deep w/sand bedding

Scenario Description:

Description: Install 1" dia. polyethylene pipe with sand bedding, buried below frost depth to supply water for livestock watering facility. Practice is installed in conjunction with 614 - Watering Facility. Construct 1000 FT of 1 inch, Polyethylene (PE) pipeline with appurtenances, installed below ground a minimum 4 feet of ground cover. Appurtenances include: couplings, fittings, thrust blocks, gate valves (2), air release valves (2), drain valve (1), and pressure relief valve (1), and Frost free hydrant. Revegetation is not included. Resource Concerns: Inadequate Livestock Water, Inefficient Energy Use. Associated Practices: Critical Area Planting (342), Pumping Plant (533), and Watering Facility (614).

Before Situation:

Water supplies need to be conveyed through pipelines for use by livestock or wildlife.

After Situation:

Pipeline(s) convey and/or distribute water to storage and/or watering facilities, for use by livestock or wildlife.

Feature Measure: Length of Pipe

Scenario Unit: Feet

Scenario Typical Size: 1,000.0

Scenario Total Cost: $8,521.14

Scenario Cost/Unit: $8.52

Cost Details:

Component Name	ID	Description	Unit	Cost	QTY	Total
Equipment Installation						
Trenching, Earth, 24 in. x 60 in.	1460	Trenching, earth, 24 inch wide x 60 inch depth, includes equipment and labor for trenching and backfilling.	Feet	$3.54	1000	$3,540.00
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.	Hours	$27.56	8	$220.48
Materials						
Aggregate, Gravel, Graded	46	Gravel, includes materials, equipment and labor to transport and place. Includes washed and unwashed gravel.	Cubic Yards	$45.42	74	$3,361.08
Freeze Proof Hydrant, <= 3' Bury	240	Freeze Proof Hydrant, 3 foot or less bury. Materials only.	Each	$51.57	4	$206.28
Pipe, PE, 1 in., DR 9	997	Materials: - 1 inch - PE - 160 psi - ASTM D3035 DR 9	Feet	$0.62	1100	$682.00
Mobilization						
Mobilization, medium equipment	1139	Equipment with 70-150 HP or typical weights between 14,000 and 30,000 pounds.	Each	$255.65	2	$511.30

Practice: 516 - Livestock Pipeline

Scenario: #6 - PE Pipe, greater than 1 in Dia., Buried 4ft Deep w/ sand bedding

Scenario Description:

Description: Install 2" dia. polyethylene pipe with sand bedding, buried below frost depth to supply water for livestock watering facility. Practice is installed in conjunction with 614 - Watering Facility. Construct 1000 FT of 1 inch, Polyethylene (PE) pipeline with appurtenances, installed below ground a minimum 4 feet of ground cover. Appurtenances include: couplings, fittings, thrust blocks, gate valves (2), air release valves (2), drain valve (1), and pressure relief valve (1), and Frost free hydrant. Revegetation is not included. Resource Concerns: Inadequate Livestock Water, Inefficient Energy Use. Associated Practices: Critical Area Planting (342), Pumping Plant (533), and Watering Facility (614).

Before Situation:

Water supplies need to be conveyed through pipelines for use by livestock or wildlife.

After Situation:

Pipeline(s) convey and/or distribute water to storage and/or watering facilities, for use by livestock or wildlife.

Feature Measure: Length of Pipe

Scenario Unit: Feet

Scenario Typical Size: 1,000.0

Scenario Total Cost: $9,933.22

Scenario Cost/Unit: $9.93

Cost Details:

Component Name	ID	Description	Unit	Cost	QTY	Total
Equipment Installation						
Trenching, Earth, 24 in. x 60 in.	1460	Trenching, earth, 24 inch wide x 60 inch depth, includes equipment and labor for trenching and backfilling.	Feet	$3.54	1000	$3,540.00
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.	Hours	$27.56	8	$220.48
Materials						
Aggregate, Gravel, Graded	46	Gravel, includes materials, equipment and labor to transport and place. Includes washed and unwashed gravel.	Cubic Yards	$45.42	74	$3,361.08
Freeze Proof Hydrant, <= 3' Bury	240	Freeze Proof Hydrant, 3 foot or less bury. Materials only.	Each	$51.57	4	$206.28
Pipe, HDPE, smooth wall, weight priced	1379	High Density Polyethylene (HDPE) compound manufactured into smooth wall pipe. Materials only.	Pound	$2.56	818	$2,094.08
Mobilization						
Mobilization, medium equipment	1139	Equipment with 70-150 HP or typical weights between 14,000 and 30,000 pounds.	Each	$255.65	2	$511.30

Practice: 516 - Livestock Pipeline

Scenario: #7 - PE Pipe less than or equal to 1in. Dia., Buried 2ft Deep

Scenario Description:

Description: Install 1" dia. polyethylene pipe, buried less than 2 feet below the ground surface to supply water for livestock watering facility. Practice is installed in conjunction with 614 - Watering Facility. Construct 1000 FT of 1 inch, Polyethylene (PE) pipeline with appurtenances, installed below ground with less than 2 feet of ground cover. Appurtenances include: couplings, fittings, thrust blocks, gate valves (2), air release valves (2), drain valve (1), and pressure relief valve (1), and Frost free hydrant. Revegetation is not included. Resource Concerns: Inadequate Livestock Water, Inefficient Energy Use. Associated Practices: Critical Area Planting (342), Pumping Plant (533), and Watering Facility (614).

Before Situation:

Water supplies need to be conveyed through pipelines for use by livestock or wildlife.

After Situation:

Pipeline(s) convey and/or distribute water to storage and/or watering facilities, for use by livestock or wildlife.

Feature Measure: Length of Pipe

Scenario Unit: Feet

Scenario Typical Size: 1,000.0

Scenario Total Cost: $1,836.53

Scenario Cost/Unit: $1.84

Cost Details:

Component Name	ID	Description	Unit	Cost	QTY	Total
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.	Hours	$31.96	5	$159.80
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.	Hours	$27.56	5	$137.80
Equipment Operators, Light	232	Includes: Skid Steer Loaders, Hydraulic Excavators <50 HP, Trenchers <12 in., Ag Equipment <150 HP, Pickup Trucks, Forklifts, Mulchers	Hours	$27.87	5	$139.35
Materials						
Freeze Proof Hydrant, <= 3' Bury	240	Freeze Proof Hydrant, 3 foot or less bury. Materials only.	Each	$51.57	4	$206.28
Pipe, PE, 1 in., DR 9	997	Materials: - 1 inch - PE - 160 psi - ASTM D3035 DR 9	Feet	$0.62	1100	$682.00
Mobilization						
Mobilization, medium equipment	1139	Equipment with 70-150 HP or typical weights between 14,000 and 30,000 pounds.	Each	$255.65	2	$511.30

Practice: 516 - Livestock Pipeline

Scenario: #9 - PE Pipe, greater than 1in Dia., Buried 2ft Deep

Scenario Description:

Description: Install 2" dia. polyethylene pipe, buried less than 2 feet below the ground surface to supply water for livestock watering facility. Practice is installed in conjunction with 614 - Watering Facility. Construct 1000 FT of 2 inch, Polyethylene (PE) pipeline with appurtenances, installed below ground with less than 2 feet of ground cover. Appurtenances include: couplings, fittings, thrust blocks, gate valves (2), air release valves (2), drain valve (1), and pressure relief valve (1), and Frost free hydrant. Revegetation is not included. Resource Concerns: Inadequate Livestock Water, Inefficient Energy Use. Associated Practices: Critical Area Planting (342), Pumping Plant (533), and Watering Facility (614).

Before Situation:

Water supplies need to be conveyed through pipelines for use by livestock or wildlife.

After Situation:

Pipeline(s) convey and/or distribute water to storage and/or watering facilities, for use by livestock or wildlife.

Feature Measure: Length of Pipe

Scenario Unit: Feet

Scenario Typical Size: 1,000.0

Scenario Total Cost: $3,248.61

Scenario Cost/Unit: $3.25

Cost Details:

Component Name	ID	Description	Unit	Cost	QTY	Total
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.	Hours	$31.96	5	$159.80
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.	Hours	$27.56	5	$137.80
Equipment Operators, Light	232	Includes: Skid Steer Loaders, Hydraulic Excavators <50 HP, Trenchers <12 in., Ag Equipment <150 HP, Pickup Trucks, Forklifts, Mulchers	Hours	$27.87	5	$139.35
Materials						
Freeze Proof Hydrant, <= 3' Bury	240	Freeze Proof Hydrant, 3 foot or less bury. Materials only.	Each	$51.57	4	$206.28
Pipe, HDPE, smooth wall, weight priced	1379	High Density Polyethylene (HDPE) compound manufactured into smooth wall pipe. Materials only.	Pound	$2.56	818	$2,094.08
Mobilization						
Mobilization, medium equipment	1139	Equipment with 70-150 HP or typical weights between 14,000 and 30,000 pounds.	Each	$255.65	2	$511.30

Practice: 516 - Livestock Pipeline

Scenario: #10 - PE Pipe, less than or equal to 1 in. Dia., Above Ground

Scenario Description:

Description: Install 1" dia. polyethylene pipe, above ground to supply water for livestock watering facility. Practice is installed in conjunction with 614 - Watering Facility. Construct 1000 FT of 1 inch, Polyethylene (PE) pipeline with appurtenances, installed above ground. Appurtenances include: couplings, fittings, thrust blocks, gate valves (2), air release valves (2), drain valve (1), and pressure relief valve (1), and Frost free hydrant. Revegetation is not included. Resource Concerns: Inadequate Livestock Water, Inefficient Energy Use. Associated Practices: Critical Area Planting (342), Pumping Plant (533), and Watering Facility (614).

Before Situation:

Water supplies need to be conveyed through pipelines for use by livestock or wildlife.

After Situation:

Pipeline(s) convey and/or distribute water to storage and/or watering facilities, for use by livestock or wildlife.

Feature Measure: Length of Pipe

Scenario Unit: Feet

Scenario Typical Size: 1,000.0

Scenario Total Cost: $1,281.73

Scenario Cost/Unit: $1.28

Cost Details:

Component Name	ID	Description	Unit	Cost	QTY	Total
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.	Hours	$27.56	5	$137.80
Materials						
Freeze Proof Hydrant, <= 3' Bury	240	Freeze Proof Hydrant, 3 foot or less bury. Materials only.	Each	$51.57	4	$206.28
Pipe, PE, 1 in., DR 9	997	Materials: - 1 inch - PE - 160 psi - ASTM D3035 DR 9	Feet	$0.62	1100	$682.00
Mobilization						
Mobilization, medium equipment	1139	Equipment with 70-150 HP or typical weights between 14,000 and 30,000 pounds.	Each	$255.65	1	$255.65

Practice: 516 - Livestock Pipeline

Scenario: #12 - PE Pipe, greater than 1in diam, Above Ground

Scenario Description:

Description: Install 2" dia. polyethylene pipe, above ground to supply water for livestock watering facility. Practice is installed in conjunction with 614 - Watering Facility. Construct 1000 FT of 2 inch, Polyethylene (PE) pipeline with appurtenances, installed above ground. Appurtenances include: couplings, fittings, thrust blocks, gate valves (2), air release valves (2), drain valve (1), and pressure relief valve (1), and Frost free hydrant. Revegetation is not included. Resource Concerns: Inadequate Livestock Water, Inefficient Energy Use. Associated Practices: Critical Area Planting (342), Pumping Plant (533), and Watering Facility (614).

Before Situation:

Water supplies need to be conveyed through pipelines for use by livestock or wildlife.

After Situation:

Pipeline(s) convey and/or distribute water to storage and/or watering facilities, for use by livestock or wildlife.

Feature Measure: Length of Pipe

Scenario Unit: Feet

Scenario Typical Size: 1,000.0

Scenario Total Cost: $2,949.46

Scenario Cost/Unit: $2.95

Cost Details:

Component Name	ID	Description	Unit	Cost	QTY	Total
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.	Hours	$27.56	5	$137.80
Materials						
Freeze Proof Hydrant, <= 3' Bury	240	Freeze Proof Hydrant, 3 foot or less bury. Materials only.	Each	$51.57	4	$206.28
Pipe, HDPE, smooth wall, weight priced	1379	High Density Polyethylene (HDPE) compound manufactured into smooth wall pipe. Materials only.	Pound	$2.56	818	$2,094.08
Mobilization						
Mobilization, medium equipment	1139	Equipment with 70-150 HP or typical weights between 14,000 and 30,000 pounds.	Each	$255.65	2	$511.30

Practice: 516 - Livestock Pipeline

Scenario: #77 - Horizontal Boring, 3in or less diam pipe

Scenario Description:

Install a livestock watering pipeline under a road using directional drilling or horizontal boring equipment. Road is approximately 30 feet wide and boring extends 50 feet. This scenario shall only be used if no other alignment or road crossing options are available. The only length of pipeline included in this scenario is for the road crossing. This scenario only pertains to horizontal boring through overburden material, not rock. Typical installation applies to soils with no special bedding requirements. The typical scenario costs include a 4in steel carrier pipe, 1.25in PE livestock pipeline, horizontal boring equipment, excavation and misc labor. Associated practices: 614 - Watering Facilities, 528 - Prescribed Grazing, 533 - Pumping Plant

Before Situation:

A livestock pipeline is needed to replace or supplement insufficient water supply to livestock.

After Situation:

50LF of 1.25"PE pipeline will be installed with a carrier pipe to convey water to a livestock watering system, minimizing non-beneficial water use, reducing soil erosion, and improving animal health.

Feature Measure: Foot of pipeline

Scenario Unit: Linear Feet

Scenario Typical Size: 50.0

Scenario Total Cost: $2,802.79

Scenario Cost/Unit: $56.06

Cost Details:

Component Name	ID	Description	Unit	Cost	QTY	Total
Equipment Installation						
Horizontal boring, Less Than Equal 3 Inch no setup	2675	Horizontal boring, Less Than Equal 3 Inch no setup. Includes equipment and labor but no additional setup.	Feet	$25.64	50	$1,282.00
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.	Hours	$27.56	8	$220.48
Materials						
Pipe, PE, 1 1/4 in., DR 9	998	Materials: - 1 1/4 inch - PE - 160 psi - ASTM D3035 DR 9	Feet	$0.95	50	$47.50
Pipe, CMP, 14-12 gauge, weight priced	1589	14 and 12 gauge galvanized helical corrugated metal pipe priced by the weight of the pipe materials. Materials only.	Pound	$0.99	749	$741.51
Mobilization						
Mobilization, medium equipment	1139	Equipment with 70-150 HP or typical weights between 14,000 and 30,000 pounds.	Each	$255.65	2	$511.30

Practice: 520 - Pond Sealing or Lining, Compacted Soil Treatment

Scenario: #58 - Material haul > 1 mile

Scenario Description:

Construction of a compacted soil liner, treated with compacted clay, to reduce seepage from ponds or waste storage impoundment structures. Practice implementation includes compaction of the soil liner under proper moisture conditions to the designed liner thickness, and protection of the finished liner. Material haul > 1 mile. Associated practices include PS378, PS313, & other waste water impoundments.

Before Situation:

In-place soils at site exhibit seepage rates in excess of acceptable limits. An adequate quantity of soil suitable for constructing a clay liner without amendments is available at an economical haul distance.

After Situation:

Water conservation and environmental protection provided by limiting seepage losses from ponds or waste storage impoundments.

Feature Measure: Volume of Liner Material (including

Scenario Unit: Cubic Yards

Scenario Typical Size: 2,420.0

Scenario Total Cost: $33,254.93

Scenario Cost/Unit: $13.74

Cost Details:

Component Name	ID	Description	Unit	Cost	QTY	Total
Equipment Installation						
Earthfill, Roller Compacted	49	Earthfill, roller or machine compacted, includes equipment and labor	Cubic Yards	$4.66	2420	$11,277.20
Track Loader, 95HP	935	Equipment and power unit costs. Labor not included.	Hours	$90.71	20	$1,814.20
Excavation, clay, large equipment, 1500 ft	1217	Bulk excavation of clay with scrapers with average haul distance of 1500 feet. Includes equipment and labor.	Cubic Yards	$6.49	1613	$10,468.37
Excavation, common earth, large equipment, 150 ft	1223	Bulk excavation of common earth including sand and gravel with dozer >100 HP with average push distance of 150 feet. Includes equipment and labor.	Cubic Yards	$4.06	807	$3,276.42
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	$0.31	8065	$2,500.15
Labor						
Equipment Operators, Heavy	233	Includes: Cranes, Hydraulic Excavators >=50 HP, Dozers, Paving Machines, Rock Trenchers, Trenchers >=12 in., Dump Trucks, Ag Equipment >=150 HP, Scrapers, Water Wagons.	Hours	$38.00	20	$760.00
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.	Hours	$102.76	14	$1,438.64
Mobilization						
Mobilization, medium equipment	1139	Equipment with 70-150 HP or typical weights between 14,000 and 30,000 pounds.	Each	$255.65	1	$255.65
Mobilization, large equipment	1140	Equipment >150HP or typical weights greater than 30,000 pounds or loads requiring over width or over length permits.	Each	$488.10	3	$1,464.30

Practice: 520 - Pond Sealing or Lining, Compacted Soil Treatment

Scenario: #59 - Material haul < 1 mile

Scenario Description:

Construction of a compacted soil liner, treated with compacted clay, to reduce seepage from ponds or waste storage impoundment structures. Practice implementation includes compaction of the soil liner under proper moisture conditions to the designed liner thickness, and soil cover to protect the finished liner. Material haul < 1 mile. Associated practices include PS378, PS313, & other waste water impoundments.

Before Situation:

In-place soils at site exhibit seepage rates in excess of acceptable limits. An adequate quantity of soil suitable for constructing a clay liner without amendments is available at an econical haul distance. Material haul < 1 mile.

After Situation:

Water conservation and environmental protection provided by limiting seepage losses from ponds or waste storage impoundments.

Feature Measure: Volume of Liner Material (including

Scenario Unit: Cubic Yards

Scenario Typical Size: 2,420.0

Scenario Total Cost: $28,180.58

Scenario Cost/Unit: $11.64

Cost Details:

Component Name	ID	Description	Unit	Cost	QTY	Total
Equipment Installation						
Earthfill, Roller Compacted	49	Earthfill, roller or machine compacted, includes equipment and labor	Cubic Yards	$4.66	2420	$11,277.20
Excavation, clay, large equipment, 1500 ft	1217	Bulk excavation of clay with scrapers with average haul distance of 1500 feet. Includes equipment and labor.	Cubic Yards	$6.49	1613	$10,468.37
Excavation, common earth, large equipment, 150 ft	1223	Bulk excavation of common earth including sand and gravel with dozer >100 HP with average push distance of 150 feet. Includes equipment and labor.	Cubic Yards	$4.06	807	$3,276.42
Labor						
Specialist Labor	235	Labor requiring a specialized skill set: Includes Agronomists, Foresters, Biologists, etc. to provide additional technical information during the planning and implementation of the practice. Does not include NRCS or TSP services.	Hours	$102.76	14	$1,438.64
Mobilization						
Mobilization, medium equipment	1139	Equipment with 70-150 HP or typical weights between 14,000 and 30,000 pounds.	Each	$255.65	1	$255.65
Mobilization, large equipment	1140	Equipment >150HP or typical weights greater than 30,000 pounds or loads requiring over width or over length permits.	Each	$488.10	3	$1,464.30

Practice: 521 - Pond Sealing or Lining, Geomembrane or Geosynthetic Clay Liner

Scenario: #1 - 40 mil Flexible Membrane Liner up to 15K Square Feet

Scenario Description:

Installation of a flexible geosynthetic membrane liner, uncovered, to reduce seepage from ponds or waste storage impoundment structures. Total quantity of synthetic liner <= 15,000 square feet. Cost includes all labor, materials and equipment to install a 40 mil LLDPE, HDPE, EDPM, etc. membrane liner, 8 oz non-woven geotextile underlayment, excavation and backfill of anchor trench, specialist to weld seams and install "boots", leak detection manhole. Quantity is inside surface are of the earthen waste storage facility plus an additional 10' around the inside top of berm to accommodate the anchor trench. Assumed quantity = 10,000 SF. Associated practices include 378- Pond, 313 - Waste Storage Facility, 561 - Heavy Use Area Protection, etc. Under drain system for leak detection shall be paid for under 606 - Subsurface Drain.

Before Situation:

In-place soils exhibit seepage rates in excess of acceptable limits. Ref. AWMFH Appendix 10D.

After Situation:

Water conservation and environmental protection provided by limiting seepage losses from ponds or waste storage impoundments.

Feature Measure: Surface area of Liner Material (incl

Scenario Unit: Square Feet

Scenario Typical Size: 10,000.0

Scenario Total Cost: $22,038.32

Scenario Cost/Unit: $2.20

Cost Details:

Component Name	ID	Description	Unit	Cost	QTY	Total
Equipment Installation						
Geotextile, woven	42	Woven Geotextile Fabric. Includes materials, equipment and labor	Square Yard	$1.33	1111	$1,477.63
Earthfill, Manually Compacted	50	Earthfill, manually compacted, includes equipment and labor	Cubic Yards	$6.02	53	$319.06
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.	Hours	$109.36	16	$1,749.76
Roller, static, smooth, self propelled	1392	Self propelled smooth drum static roller compactor, typically 1.5 ton with 34 inch roller. Equipment cost only. Does not include labor.	Hours	$16.20	5	$81.00
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.	Hours	$27.56	64	$1,763.84
Equipment Operators, Heavy	233	Includes: Cranes, Hydraulic Excavators >=50 HP, Dozers, Paving Machines, Rock Trenchers, Trenchers >=12 in., Dump Trucks, Ag Equipment >=150 HP, Scrapers, Water Wagons.	Hours	$38.00	21	$798.00
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.	Hours	$46.88	8	$375.04
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.	Hours	$102.76	32	$3,288.32
Materials						
Synthetic Liner, 40 mil	1387	Synthetic 40 mil HDPE, LLDPE, EPDM, etc membrane liner material. Includes materials and shipping only.	Square Yard	$6.29	1111	$6,988.19
Manhole, 4 ft x 12 ft	2290	Precast Manhole with base and top delivered. 4 feet diameter x 12 feet depth. Includes materials, equipment and labor.	Each	$3,930.53	1	$3,930.53
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.	Dollars	$1.00	500	$500.00
Mobilization, medium equipment	1139	Equipment with 70-150 HP or typical weights between 14,000 and 30,000 pounds.	Each	$255.65	3	$766.95

Practice: 521 - Pond Sealing or Lining, Geomembrane or Geosynthetic Clay Liner

Scenario: #2 - 40 mil Flexible Membrane Liner over 15K Square Feet

Scenario Description:

Installation of a flexible geosynthetic membrane liner, uncovered, to reduce seepage from ponds or waste storage impoundment structures. Total quantity of synthetic liner > 15,000 square feet. Cost includes all labor, materials and equipment to install a 40 mil LLDPE, HDPE, EDPM, etc. membrane liner, 8 oz non-woven geotextile underlayment, excavation and backfill of anchor trench, specialist to weld seams and install "boots", leak detection manhole. Quantity is inside surface area of the earthen waste storage facility plus an additional 10' around the inside top of berm to accommodate the anchor trench. Assumed quantity = 22,500 SF. Associated practices include 378- Pond, 313 - Waste Storage Facility, 561 - Heavy Use Area Protection, etc. Under drain system for leak detection shall be paid for under 606 - Subsurface Drain.

Before Situation:

In-place soils exhibit seepage rates in excess of acceptable limits. Ref. AWMFH Appendix 10D.

After Situation:

Water conservation and environmental protection provided by limiting seepage losses from ponds or waste storage impoundments.

Feature Measure: Surface area of Liner Material (incl

Scenario Unit: Square Feet

Scenario Typical Size: 22,500.0

Scenario Total Cost: $39,680.18

Scenario Cost/Unit: $1.76

Cost Details:

Component Name	ID	Description	Unit	Cost	QTY	Total
Equipment Installation						
Geotextile, woven	42	Woven Geotextile Fabric. Includes materials, equipment and labor	Square Yard	$1.33	2500	$3,325.00
Earthfill, Manually Compacted	50	Earthfill, manually compacted, includes equipment and labor	Cubic Yards	$6.02	83	$499.66
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.	Hours	$109.36	24	$2,624.64
Roller, static, smooth, self propelled	1392	Self propelled smooth drum static roller compactor, typically 1.5 ton with 34 inch roller. Equipment cost only. Does not include labor.	Hours	$16.20	10	$162.00
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.	Hours	$27.56	128	$3,527.68
Equipment Operators, Heavy	233	Includes: Cranes, Hydraulic Excavators >=50 HP, Dozers, Paving Machines, Rock Trenchers, Trenchers >=12 in., Dump Trucks, Ag Equipment >=150 HP, Scrapers, Water Wagons.	Hours	$38.00	34	$1,292.00
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.	Hours	$46.88	16	$750.08
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.	Hours	$102.76	64	$6,576.64
Materials						
Synthetic Liner, 40 mil	1387	Synthetic 40 mil HDPE, LLDPE, EPDM, etc membrane liner material. Includes materials and shipping only.	Square Yard	$6.29	2500	$15,725.00
Manhole, 4 ft x 12 ft	2290	Precast Manhole with base and top delivered. 4 feet diameter x 12 feet depth. Includes materials, equipment and labor.	Each	$3,930.53	1	$3,930.53
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.	Dollars	$1.00	500	$500.00
Mobilization, medium equipment	1139	Equipment with 70-150 HP or typical weights between 14,000 and 30,000 pounds.	Each	$255.65	3	$766.95

Practice: 521 - Pond Sealing or Lining, Geomembrane or Geosynthetic Clay Liner

Scenario: #45 - 60 Mil Flexible Membrane Liner over 15K Square Feet

Scenario Description:

Installation of a flexible geosynthetic membrane liner, uncovered, to reduce seepage from ponds or waste storage impoundment structures. Total quantity of synthetic liner > 15,000 square feet. Cost includes all labor, materials and equipment to install a 60 mil LLDPE, HDPE, EDPM, etc. membrane liner, 8 oz non-woven geotextile underlayment, excavation and backfill of anchor trench, specialist to weld seams and install "boots", leak detection manhole. Quantity is inside surface area of the earthen waste storage facility plus an additional 10' around the inside top of berm to accommodate the anchor trench. Assumed quantity = 22,500 SF. Associated practices include 378- Pond, 313 - Waste Storage Facility, 561 - Heavy Use Area Protection, etc. Under drain system for leak detection shall be paid for under 606 - Subsurface Drain.

Before Situation:

In-place soils exhibit seepage rates in excess of acceptable limits. Ref. AWMFH Appendix 10D.

After Situation:

Water conservation and environmental protection provided by limiting seepage losses from ponds or waste storage impoundments.

Feature Measure: Total Area of Liner including Ancho

Scenario Unit: Square Feet

Scenario Typical Size: 22,500.0

Scenario Total Cost: $55,390.50

Scenario Cost/Unit: $2.46

Cost Details:

Component Name	ID	Description	Unit	Cost	QTY	Total
Equipment Installation						
Geotextile, woven	42	Woven Geotextile Fabric. Includes materials, equipment and labor	Square Yard	$1.33	2500	$3,325.00
Earthfill, Manually Compacted	50	Earthfill, manually compacted, includes equipment and labor	Cubic Yards	$6.02	135	$812.70
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.	Hours	$109.36	24	$2,624.64
Roller, static, smooth, self propelled	1392	Self propelled smooth drum static roller compactor, typically 1.5 ton with 34 inch roller. Equipment cost only. Does not include labor.	Hours	$16.20	8	$129.60
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.	Hours	$27.56	160	$4,409.60
Equipment Operators, Heavy	233	Includes: Cranes, Hydraulic Excavators >=50 HP, Dozers, Paving Machines, Rock Trenchers, Trenchers >=12 in., Dump Trucks, Ag Equipment >=150 HP, Scrapers, Water Wagons.	Hours	$38.00	24	$912.00
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.	Hours	$46.88	16	$750.08
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.	Hours	$102.76	65	$6,679.40
Materials						
Synthetic Liner, 60 mil	2109	Synthetic 60 mil HDPE, LLDPE, EPDM, etc membrane liner material. Includes materials and shipping only.	Square Feet	$1.38	22500	$31,050.00
Manhole, 4 ft x 12 ft	2290	Precast Manhole with base and top delivered. 4 feet diameter x 12 feet depth. Includes materials, equipment and labor.	Each	$3,930.53	1	$3,930.53
Mobilization						
Mobilization, medium equipment	1139	Equipment with 70-150 HP or typical weights between 14,000 and 30,000 pounds.	Each	$255.65	3	$766.95

Practice: 521 - Pond Sealing or Lining, Geomembrane or Geosynthetic Clay Liner

Scenario: #46 - 60 Mil Flexible Membrane Liner up to 15K Square Feet

Scenario Description:

Installation of a flexible geosynthetic membrane liner, uncovered, to reduce seepage from ponds or waste storage impoundment structures. Total quantity of synthetic liner <= 15,000 square feet. Cost includes all labor, materials and equipment to install a 60 mil LLDPE, HDPE, EDPM, etc. membrane liner, 8 oz non-woven geotextile underlayment, excavation and backfill of anchor trench, specialist to weld seams and install "boots", leak detection manhole. Quantity is inside surface are of the earthen waste storage facility plus an additional 10' around the inside top of berm to accommodate the anchor trench. Assumed quantity = 10,000 SF. Associated practices include 378- Pond, 313 - Waste Storage Facility, 561 - Heavy Use Area Protection, etc. Under drain system for leak detection shall be paid for under 606 - Subsurface Drain.

Before Situation:

In-place soils exhibit seepage rates in excess of acceptable limits. Ref. AWMFH Appendix 10D.

After Situation:

Water conservation and environmental protection provided by limiting seepage losses from ponds or waste storage impoundments.

Feature Measure: Square Feet of Liner, including anch

Scenario Unit: Square Feet

Scenario Typical Size: 10,000.0

Scenario Total Cost: $28,601.09

Scenario Cost/Unit: $2.86

Cost Details:

Component Name	ID	Description	Unit	Cost	QTY	Total
Equipment Installation						
Geotextile, woven	42	Woven Geotextile Fabric. Includes materials, equipment and labor	Square Yard	$1.33	1111	$1,477.63
Earthfill, Manually Compacted	50	Earthfill, manually compacted, includes equipment and labor	Cubic Yards	$6.02	53	$319.06
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.	Hours	$109.36	16	$1,749.76
Roller, static, smooth, self propelled	1392	Self propelled smooth drum static roller compactor, typically 1.5 ton with 34 inch roller. Equipment cost only. Does not include labor.	Hours	$16.20	5	$81.00
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.	Hours	$27.56	80	$2,204.80
Equipment Operators, Heavy	233	Includes: Cranes, Hydraulic Excavators >=50 HP, Dozers, Paving Machines, Rock Trenchers, Trenchers >=12 in., Dump Trucks, Ag Equipment >=150 HP, Scrapers, Water Wagons.	Hours	$38.00	16	$608.00
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.	Hours	$46.88	8	$375.04
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.	Hours	$102.76	32	$3,288.32
Materials						
Synthetic Liner, 60 mil	2109	Synthetic 60 mil HDPE, LLDPE, EPDM, etc membrane liner material. Includes materials and shipping only.	Square Feet	$1.38	10000	$13,800.00
Manhole, 4 ft x 12 ft	2290	Precast Manhole with base and top delivered. 4 feet diameter x 12 feet depth. Includes materials, equipment and labor.	Each	$3,930.53	1	$3,930.53
Mobilization						
Mobilization, medium equipment	1139	Equipment with 70-150 HP or typical weights between 14,000 and 30,000 pounds.	Each	$255.65	3	$766.95

Practice: 522 - Pond Sealing or Lining - Concrete

Scenario: #13 - Concrete Liner <= 16K Square Feet

Scenario Description:

Install a water tight concrete liner inside an earthen WSF to store wastes such as manure, wastewater, and contaminated runoff as part of an agricultural waste management system. This practice will address soil and water quality by reducing the pollution potential for surface water and groundwater quality degradation. Potential Associated Practices: Fence (382), Critical Area Planting (342), Nutrient Management (590), Waste Transfer (634), Heavy Use Area Protection (561), Solid/Liquid Waste Separation Facility (632), and Pumping Plant (533).

Before Situation:

Manure and other agricultural waste by-products are not being utilized, controlled, or managed in an environmentally safe manner. In situ soils do not meet NRCS permeability requirements. The situation poses an environmental threat of excessive nutrients, organics, and pathogens being transported into surface and groundwater resources.

After Situation:

A watertight concrete liner is desired to properly store manure and other agricultural waste by-products in an environmentally safe manner. Concrete liner is desired to minimize seepage of agricultural waste into the ground water while allowing the operator to mobilize equipment into the waste storage facility so he/she can remove accumulated solids and sand bedding. This facility will also allow the operator to store waste until it can be utilized in a proper manner in accordance with a nutrient management plan. Typical design : Liner will be installed on the inside slope of an earthen waste storage facility, liner will cover the bottom and side slopes of the facility. The liner will be 5" thick with steel rebar reinforcement. 6" of drainfill material will be placed and compacted on the bottom to absorb excess water produced by rain or small seeps. Drainfill for side slopes is not needed. Watertight construction joints will have to be installed at critical locations in the liner. Typical liner size = 15,232 square feet. (WSF - 12' Deep, 60' x 60' at bottom, 2.5 to 1 side slopes)

Feature Measure: Surface Area of Concrete Liner

Scenario Unit: Square Feet

Scenario Typical Size: 15,232.0

Scenario Total Cost: $111,375.30

Scenario Cost/Unit: $7.31

Cost Details:

Component Name	ID	Description	Unit	Cost	QTY	Total
Equipment Installation						
Concrete, CIP, slab on grade, reinforced	37	Steel reinforced concrete formed and cast-in-placed as a slab on grade by chute placement. Typical strength is 3000 to 4000 psi. Includes materials, labor and equipment to transport, place and finish.	Cubic Yards	$362.36	235	$85,154.60
Earthfill, Manually Compacted	50	Earthfill, manually compacted, includes equipment and labor	Cubic Yards	$6.02	67	$403.34
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.	Hours	$72.23	12	$866.76
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.	Hours	$27.56	265	$7,303.40
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.	Hours	$46.88	20	$937.60
Materials						
Aggregate, Gravel, Graded	46	Gravel, includes materials, equipment and labor to transport and place. Includes washed and unwashed gravel.	Cubic Yards	$45.42	67	$3,043.14
Cement, Type I or II	1336	Type I or II Portland Cement (94 lb. bag), Materials only.	Each	$14.34	235	$3,369.90
Steel, rebar	1832	Steel rebar, grade 60. Materials only.	Pound	$0.69	13560	$9,356.40
Waterstop, Bentonite, half-round, 3/4 in. x 3/8 in.	2362	Flexible and expandible bentonite strip for concrete construction. Half round profile of 3/4 inch x 3/8 inch. Includes materials and shipping only.	Feet	$2.26	416	$940.16

Practice: 522 - Pond Sealing or Lining - Concrete

Scenario: #14 - Concrete Liner > 16K Square Feet

Scenario Description:

Install a water tight concrete liner inside an earthen WSF to store wastes such as manure, wastewater, and contaminated runoff as part of an agricultural waste management system. This practice will address soil and water quality by reducing the pollution potential for surface water and groundwater quality degradation. Potential Associated Practices: Fence (382), Critical Area Planting (342), Nutrient Management (590), Waste Transfer (634), Heavy Use Area Protection (561), Solid/Liquid Waste Separation Facility (632), and Pumping Plant (533).

Before Situation:

Manure and other agricultural waste by-products are not being utilized, controlled, or managed in an environmentally safe manner. In situ soils do not meet NRCS permeability requirements. The situation poses an environmental threat of excessive nutrients, organics, and pathogens being transported into surface and groundwater resources.

After Situation:

A watertight concrete liner is desired to properly store manure and other agricultural waste by-products in an environmentally safe manner. Concrete liner is desired to minimize seepage of agricultural waste into the ground water while allowing the operator to mobilize equipment into the waste storage facility so he/she can remove accumulated solids and sand bedding. This facility will also allow the operator to store waste until it can be utilized in a proper manner in accordance with a nutrient management plan. Typical design : Liner will be installed on the inside slope of an earthen waste storage facility, liner will cover the bottom and side slopes of the facility. The liner will be 5" thick with steel rebar reinforcement. 6" of drainfill material will be placed and compacted on the bottom to absorb excess water produced by rain or small seeps. Drainfill for side slopes is not needed. Watertight construction joints will have to be installed at critical locations in the liner. Typical liner size = 30,194 square feet. (WSF - 12' Deep, 110' x 110' at bottom, 2.5 to 1 side slopes)

Feature Measure: Surface Area of Concrete Liner

Scenario Unit: Square Feet

Scenario Typical Size: 30,194.0

Scenario Total Cost: $224,274.80

Scenario Cost/Unit: $7.43

Cost Details:

Component Name	ID	Description	Unit	Cost	QTY	Total
Equipment Installation						
Concrete, CIP, slab on grade, reinforced	37	Steel reinforced concrete formed and cast-in-placed as a slab on grade by chute placement. Typical strength is 3000 to 4000 psi. Includes materials, labor and equipment to transport, place and finish.	Cubic Yards	$362.36	466	$168,859.76
Earthfill, Manually Compacted	50	Earthfill, manually compacted, includes equipment and labor	Cubic Yards	$6.02	224	$1,348.48
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.	Hours	$72.23	20	$1,444.60
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.	Hours	$27.56	506	$13,945.36
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.	Hours	$46.88	40	$1,875.20
Materials						
Aggregate, Gravel, Graded	46	Gravel, includes materials, equipment and labor to transport and place. Includes washed and unwashed gravel.	Cubic Yards	$45.42	224	$10,174.08
Cement, Type I or II	1336	Type I or II Portland Cement (94 lb. bag), Materials only.	Each	$14.34	466	$6,682.44
Steel, rebar	1832	Steel rebar, grade 60. Materials only.	Pound	$0.69	26888	$18,552.72
Waterstop, Bentonite, half-round, 3/4 in. x 3/8 in.	2362	Flexible and expandible bentonite strip for concrete construction. Half round profile of 3/4 inch x 3/8 inch. Includes materials and shipping only.	Feet	$2.26	616	$1,392.16

Practice: 528 - Prescribed Grazing

Scenario: #1 - Weekly moves

Scenario Description:

Animals are moved to new ground weekly. Paddocks are designed to allow at least 30 days rest. Design and implementation of a grazing system will enhance pasture condition and ecosystem function as well as optimize efficiency.

Before Situation:

Current grazing system is continuous, without rest and rotation. Inefficient use of forage plants has a negative impact on pasture condition, as well as soil and water resources. Stocking rates are likely higher than the current level of production and efficiency of use can support without management changes. There is currently no monitoring plan in place to evaluate change on the landscape.

After Situation:

Typical scenario is a small beef or sheep producer who has adequate land base for number of livestock, has at least 5 paddocks, and moves animals at least once per week. Management is centered on maintaining desired residual forage heights. Prescribed grazing system is designed to protect the health and vigor of the plant communities that are in place. Livestock are managed in a way that enhances pasture condition and function through protection of sensitive areas, and efficient harvest of forage resources. Grazing system success will be evaluated through short term monitoring.

Feature Measure: <Unknown>

Scenario Unit: Acres

Scenario Typical Size: 20.0

Scenario Total Cost: $880.93

Scenario Cost/Unit: $44.05

Cost Details:

Component Name	ID	Description	Unit	Cost	QTY	Total
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	$109.25	1	$109.25
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.	Hours	$27.56	28	$771.68

Practice: 528 - Prescribed Grazing

Scenario: #2 - Twice weekly moves

Scenario Description:

Animals are moved to new ground at least twice weekly. Paddocks are designed to allow at least 30 days rest. Design and implementation of a grazing system will enhance pasture condition and ecosystem function as well as optimize efficiency.

Before Situation:

Current grazing system is continuous, without rest and rotation. Inefficient use of forage plants has a negative impact on pasture condition, as well as soil and water resources. Stocking rates are likely higher than the current level of production and efficiency of use can support without management changes. There is currently no monitoring plan in place to evaluate change on the landscape.

After Situation:

Typical scenario is a small beef or sheep producer who has adequate land base for number of livestock, has at least 9 paddocks, and moves animals at least twice per week. Management is centered on maintaining desired residual forage heights. Prescribed grazing system is designed to protect the health and vigor of the plant communities that are in place. Livestock are managed in a way that enhances pasture condition and function through protection of sensitive areas, and efficient harvest of forage resources. Grazing system success will be evaluated through short term monitoring.

Feature Measure: <Unknown>

Scenario Unit: Acres

Scenario Typical Size: 20.0

Scenario Total Cost: $2,244.53

Scenario Cost/Unit: $112.23

Cost Details:

Component Name	ID	Description	Unit	Cost	QTY	Total
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	$109.25	1	$109.25
Equipment Installation						
All terrain vehicles, ATV	965	Includes equipment, power unit and labor costs.	Hours	$21.14	28	$591.92
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.	Hours	$27.56	56	$1,543.36

Practice: 528 - Prescribed Grazing

Scenario: #3 - Intensive

Scenario Description:

Animals are moved to new ground daily or twice per day. Paddocks are designed to allow at least 30 days rest. Design and implementation of a grazing system will enhance pasture condition and ecosystem function as well as optimize efficiency.

Before Situation:

Current grazing system is a long rotation, without sufficient rest and rotation to acheive highest production possible. Inefficient use of forage plants has a negative impact on pasture condition, as well as soil and water resources. Stocking rates are likely higher than the current level of production and efficiency of use can support without management changes. There is currently no monitoring plan in place to evaluate change on the landscape.

After Situation:

Typical scenario is a small dairy operation, but may be any operation that moves animals daily or every other day minimum and maintains desired residual forage heights. Prescribed grazing system is designed to protect the health and vigor of the plant communities that are in place. Livestock are managed in a way that enhances pasture condition and function through proper rest and recovery periods, protection of sensitive areas, proper utilization, and efficient harvest of forage resources. Grazing system success will be evaluated through long term monitoring.

Feature Measure: <Unknown>

Scenario Unit: Acres

Scenario Typical Size: 50.0

Scenario Total Cost: $6,694.85

Scenario Cost/Unit: $133.90

Cost Details:

Component Name	ID	Description	Unit	Cost	QTY	Total
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	$109.25	1	$109.25
Equipment Installation						
All terrain vehicles, ATV	965	Includes equipment, power unit and labor costs.	Hours	$21.14	56	$1,183.84
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.	Hours	$27.56	196	$5,401.76

Practice: 528 - Prescribed Grazing

Scenario: #4 - Deferred grazing

Scenario Description:

Defer the pasture for 90 days and up to a growing season to manage for invasive weeds when necessary, to improve the health of the plants and/or provide nesting habitat for wildlife species. Keep records of dates out and monitor to determine when desired objectives of deferment are met. Associated Practices: Brush Management (314), Herbaceous Weed Control (315) Fence (382), Acess Control (472), Forage and Biomass Planting (512), Nutrient Management (590), Feed Management (592), Upland Wildlife Habitat Management (645).

Before Situation:

Over-grazed pasture, a pasture with a low condition score, or a newly established pasture converted from cropland with a need for proper grazing management.

After Situation:

Improve the health and vigor of the sward, through deferment of grazing and improve the nesting habitat for wildlife.

Feature Measure: <Unknown>

Scenario Unit: Acres

Scenario Typical Size: 20.0

Scenario Total Cost: $857.13

Scenario Cost/Unit: $42.86

Cost Details:

Component Name	ID	Description	Unit	Cost	QTY	Total
Equipment Installation						
Truck, Pickup	939	Equipment and power unit costs. Labor not included.	Hours	$24.18	1	$24.18
Trucking, moving livestock to new paddock	961	Livestock transportation costs to implement a grazing rotation using a gooseneck trailer 6 ft. 8 inch x 24 feet. Includes equipment, power unit and labor costs.	Mile	$5.13	2	$10.26
Foregone Income						
FI, Grazing AUMs	2079	Grazing is the Primary Land Use	Animal Unit Month	$19.19	26	$498.94
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.	Hours	$37.19	5	$185.95
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.	Hours	$27.56	5	$137.80

Practice: 528 - Prescribed Grazing

Scenario: #18 - Targeted Grazing

Scenario Description:

Management of woody non-herbaceous plant species through the use of off farm rented livestock (goats, sheep, llamas, etc.) that are closely herded by off farm livestock owner to concentrate grazing on targeted shrubs. Typical area is moderate rolling to gentle sloping, moderately deep to deep soils that have dense stands of woody non-herbaceous species that exceed the desirable ecological site condition. This scenario is an alternative for organic producers.

Before Situation:

Area consist of dense stands of woody non-herbaceous species that exceed the desirable ecological site condition degrading forage quality, promoting noxious and invasive species, increasing risk of soil erosion and degrading wildlife habitat.

After Situation:

Woody species are grazed to limit the regrowth of shrubs and achieve a desirable plant community based on species composition, structure, density, and canopy cover or height. Ecological site condition is progressing in an upward trend, hydrology and plant health and vigor is returning to near normal levels.

Feature Measure: Acres Treated

Scenario Unit: Acres

Scenario Typical Size: 40.0

Scenario Total Cost: $1,114.92

Scenario Cost/Unit: $27.87

Cost Details:

Component Name	ID	Description	Unit	Cost	QTY	Total
Equipment Installation						
Truck, Pickup	939	Equipment and power unit costs. Labor not included.	Hours	$24.18	5	$120.90
Trucking, moving livestock to new paddock	961	Livestock transportation costs to implement a grazing rotation using a gooseneck trailer 6 ft. 8 inch x 24 feet. Includes equipment, power unit and labor costs.	Mile	$5.13	2	$10.26
All terrain vehicles, ATV	965	Includes equipment, power unit and labor costs.	Hours	$21.14	4	$84.56
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.	Hours	$27.56	20	$551.20
Materials						
Animals used for biological weed control	1130	Goats, Llamas, Sheep - Includes all support: fence, water, dog, mob, etc. Includes materials and shipping only.	Head per day	$6.96	50	$348.00

Practice: 533 - Pumping Plant

Scenario: #1 - Electric Powered Pump less than 3 Hp

Scenario Description:

A 1 Hp submersible electric-powered pump is installed in a well or structure; or a close-coupled 1 Hp electric-powered centrifugal pump is mounted on a platform. It is used for watering livestock as part of a prescribed grazing system; or for pressurizing a small irrigation system; or for transferring liquid waste in a waste transfer system. Resource Concerns: Livestock Production Limitation - Inadequate livestock water; Water Quality degradation - Excess nutrients in surface and ground waters; Insufficient water - Inefficient use of irrigation water. Associated Practices include: 374 - Farmstead Energy Improvement; 430 - Irrigation Pipeline; 441 - Irrigation System, Microirrigation; 449 - Irrigation Water Management; 516 - Livestock Pipeline; 313 - Waste Storage Facility; 634 - Waste Transfer; and 614 - Watering Facility.

Before Situation:

Livestock: The present gravity flow system is inadequate to provide the proper flow rate for a prescribed grazing system. Irrigation: Available water is at an insufficient pressure to allow for even distribution of water. Waste Transfer: Contaminated water needs to be moved to a containment facility.

After Situation:

Livestock: Water is transferred at a sufficient rate and pressure to meet the requirements of a prescribed grazing system. Irrigation: A properly designed pump is installed to improve irrigation efficiency and reduce energy usage. Waste Transfer: Liquid wastes that have been collected through a waste transfer system are now efficiently transferred to an appropriate treatment or storage facility.

Feature Measure: Pump Power Requirement

Scenario Unit: Brake Horse Power

Scenario Typical Size: 1.0

Scenario Total Cost: $2,230.75

Scenario Cost/Unit: $2,230.75

Cost Details:

Component Name	ID	Description	Unit	Cost	QTY	Total
Equipment Installation						
Concrete, CIP, slab on grade, reinforced	37	Steel reinforced concrete formed and cast-in-placed as a slab on grade by chute placement. Typical strength is 3000 to 4000 psi. Includes materials, labor and equipment to transport, place and finish.	Cubic Yards	$362.36	1	$362.36
Truck, Pickup	939	Equipment and power unit costs. Labor not included.	Hours	$24.18	2	$48.36
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.	Hours	$27.56	6	$165.36
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.	Hours	$46.88	6	$281.28
Materials						
Pump, <= 5 HP, pump and motor, fixed cost portion	1009	Fixed cost portion of a pump less than or equal to 5 HP pump and motor. This portion is a base cost and is not dependant on horsepower. The total cost of any pump will include this fixed cost plus a variable cost portion. The completed pump and motor will include the motor and controls. Includes material and shipping only.	Each	$1,019.47	1	$1,019.47
Pump, <= 5 HP, pump and motor, variable cost portion	1010	Variable cost portion of a pump less than or equal to 5 HP pump and motor. This portion IS dependent on the total horsepower for the pump. The total cost of any pump will include this variable cost plus the fixed cost portion. The completed pump and motor will include the motor and controls. Includes material and shipping only.	Horsepower	$353.92	1	$353.92

Practice: 533 - Pumping Plant

Scenario: #2 - Electric Powered Pump Less Than 3 HP with Adequate Pump Controls

Scenario Description:

A 1 Hp submersible electric-powered pump is installed in a well or structure; or a close-coupled 1 Hp electric-powered centrifugal pump is mounted on a platform. Practice includes installation of necessary pump controls which could consist of, but is not limited to: level float switches, pump controllers, check valves, pressure gages, pressure tank, etc.. This practice does not include provisions for a variable frequency drive. It is used for watering livestock as part of a prescribed grazing system; or for pressurizing a small irrigation system. Resource Concerns: Livestock Production Limitation - Inadequate livestock water; Insufficient water - Inefficient use of irrigation water. Associated Practices include: 374 - Farmstead Energy Improvement; 430 - Irrigation Pipeline; 441 - Irrigation System, Microirrigation; 449 - Irrigation Water Management; 516 - Livestock Pipeline.

Before Situation:

Livestock: The present gravity flow system is inadequate to provide the proper flow rate for a prescribed grazing system. Irrigation: Available water is at an insufficient pressure to allow for even distribution of water.

After Situation:

Livestock: Water is transferred at a sufficient rate and pressure to meet the requirements of a prescribed grazing system. Irrigation: A properly designed pump is installed to improve irrigation efficiency and reduce energy usage.

Feature Measure: Pump Power Requirement

Scenario Unit: Brake Horse Power

Scenario Typical Size: 1.0

Scenario Total Cost: $2,579.42

Scenario Cost/Unit: $2,579.42

Cost Details:

Component Name	ID	Description	Unit	Cost	QTY	Total
Equipment Installation						
Concrete, CIP, slab on grade, reinforced	37	Steel reinforced concrete formed and cast-in-placed as a slab on grade by chute placement. Typical strength is 3000 to 4000 psi. Includes materials, labor and equipment to transport, place and finish.	Cubic Yards	$362.36	1	$362.36
Truck, Pickup	939	Equipment and power unit costs. Labor not included.	Hours	$24.18	2	$48.36
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.	Hours	$27.56	6	$165.36
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.	Hours	$46.88	6	$281.28
Materials						
Pump, <= 5 HP, pump and motor, fixed cost portion	1009	Fixed cost portion of a pump less than or equal to 5 HP pump and motor. This portion is a base cost and is not dependant on horsepower. The total cost of any pump will include this fixed cost plus a variable cost portion. The completed pump and motor will include the motor and controls. Includes material and shipping only.	Each	$1,019.47	1	$1,019.47
Pump, <= 5 HP, pump and motor, variable cost portion	1010	Variable cost portion of a pump less than or equal to 5 HP pump and motor. This portion IS dependent on the total horsepower for the pump. The total cost of any pump will include this variable cost plus the fixed cost portion. The completed pump and motor will include the motor and controls. Includes material and shipping only.	Horsepower	$353.92	1	$353.92
Pressure Tank, 40 gallon	1038	Pressure Tank, 40 gallon. Includes materials and shipping only.	Each	$348.67	1	$348.67

Practice: 533 - Pumping Plant

Scenario: #3 - Electric-Powered Pump 3 up to less than 10 HP

Scenario Description:

A 7.5 Hp submersible electric-powered pump is installed in a well or structure; or a close-coupled 7.5 Hp electric-powered centrifugal pump is mounted on a platform. It is used for a large, high-pressure (200psi) livestock pipeline as part of a prescribed grazing system; or for pressurizing a medium-sized (200gpm at 40psi) irrigation system; or a medium-sized (400gpm at 20 psi) waste transfer system. Resource Concerns: Livestock Production Limitation - Inadequate livestock water; Water Quality degradation - Excess nutrients in surface and ground waters; Insufficient water - Inefficient use of irrigation water. Associated Practices include: 374 - Farmstead Energy Improvement; 430 - Irrigation Pipeline; 441 - Irrigation System, Microirrigation; 449 - Irrigation Water Management; 516 - Livestock Pipeline; 313 - Waste Storage Facility; 634 - Waste Transfer; and 614 - Watering Facility.

Before Situation:

Livestock: Current system consists of a series of medium pressure and inefficient pump stations to transport water to a distant and higher-elevation watering facility. Irrigation: An existing irrigation system employs an inefficient, improperly sized pump, that prevents efficient water application resulting in water loss and high energy use. Waste Transfer: Various types of semi-solid or liquid waste are uncollected causing surface and ground water issues. Due to topography, gravity transfer is not possible and a properly sized pump is needed to transfer waste as part of a waste transfer system.

After Situation:

Livestock: A single, efficient, high-pressure pumping plant is installed, eliminating intermediate pump stations, reducing energy use and enabling better system management. Irrigation: A properly designed and efficient pumping plant is installed, reducing energy use and improving irrigation efficiency. Waste Transfer: Collected wastes are now efficiently transferred to an appropriate treatment or storage facility.

Feature Measure: Pump Power Requirement

Scenario Unit: Brake Horse Power

Scenario Typical Size: 7.5

Scenario Total Cost: $7,371.60

Scenario Cost/Unit: $982.88

Cost Details:

Component Name	ID	Description	Unit	Cost	QTY	Total
Equipment Installation						
Concrete, CIP, slab on grade, reinforced	37	Steel reinforced concrete formed and cast-in-placed as a slab on grade by chute placement. Typical strength is 3000 to 4000 psi. Includes materials, labor and equipment to transport, place and finish.	Cubic Yards	$362.36	2	$724.72
Truck, Pickup	939	Equipment and power unit costs. Labor not included.	Hours	$24.18	24	$580.32
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.	Hours	$27.56	24	$661.44
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.	Hours	$46.88	24	$1,125.12
Materials						
Pump, > 5 HP to 30 HP, pump and motor, fixed cost portion	1011	Fixed cost portion of a pump between 5 and 30 HP, including the pump and motor. This portion is a base cost for the pump and is not dependant on horsepower. The total cost will include this fixed cost plus a variable cost portion. Includes material and shipping only.	Each	$2,367.02	1	$2,367.02
Pump, > 5 HP to 30 HP, pump and motor, variable cost portion	1012	Variable cost portion of a pump between 5 and 30 HP, including the pump and motor. This portion is dependent on the total horsepower for the pump. The total cost will include this variable cost plus a fixed cost portion. Includes material and shipping only.	Horsepower	$186.89	7.5	$1,401.68
Mobilization						
Mobilization, medium equipment	1139	Equipment with 70-150 HP or typical weights between 14,000 and 30,000 pounds.	Each	$255.65	2	$511.30

Practice: 533 - Pumping Plant

Scenario: #4 - Electric-Powered Pump 3 up to less than 10 HP with Adequate Pump Controls

Scenario Description:

A 7.5 Hp submersible electric-powered pump is installed in a well or structure; or a close-coupled 7.5 Hp electric-powered centrifugal pump is mounted on a platform. Practice includes installation of necessary pump controls which could consist of, but is not limited to: level float switches, pump controllers, check valves, pressure gages, pressure tank, etc.. This practice does not include provisions for a variable frequency drive. It is used for a large, high-pressure (200psi) livestock pipeline as part of a prescribed grazing system; or for pressurizing a medium-sized (200gpm at 40psi) irrigation system; or a medium-sized (400gpm at 20 psi) waste transfer system. Resource Concerns: Livestock Production Limitation - Inadequate livestock water; Water Quality degradation - Excess nutrients in surface and ground waters; Insufficient water - Inefficient use of irrigation water. Associated Practices include: 374 - Farmstead Energy Improvement; 430 - Irrigation Pipeline; 441 - Irrigation System, Microirrigation; 449 - Irrigation Water Management; 516 - Livestock Pipeline; 313 - Waste Storage Facility; 634 - Waste Transfer; and 614 - Watering Facility.

Before Situation:

Livestock: Current system consists of a series of medium pressure and inefficient pump stations to transport water to a distant and higher-elevation watering facility. Irrigation: An existing irrigation system employs an inefficient, improperly sized pump, that prevents efficient water application resulting in water loss and high energy use. Waste Transfer: Various types of semi-solid or liquid waste are uncollected causing surface and ground water issues. Due to topography, gravity transfer is not possible and a properly sized pump is needed to transfer waste as part of a waste transfer system.

After Situation:

Livestock: A single, efficient, high-pressure pumping plant is installed, eliminating intermediate pump stations, reducing energy use and enabling better system management. Irrigation: A properly designed and efficient pumping plant is installed, reducing energy use and improving irrigation efficiency. Waste Transfer: Collected wastes are now efficiently transferred to an appropriate treatment or storage facility.

Feature Measure: Pump Power Requirement

Scenario Unit: Brake Horse Power

Scenario Typical Size: 7.5

Scenario Total Cost: $7,851.68

Scenario Cost/Unit: $1,046.89

Cost Details:

Component Name	ID	Description	Unit	Cost	QTY	Total
Equipment Installation						
Concrete, CIP, slab on grade, reinforced	37	Steel reinforced concrete formed and cast-in-placed as a slab on grade by chute placement. Typical strength is 3000 to 4000 psi. Includes materials, labor and equipment to transport, place and finish.	Cubic Yards	$362.36	2	$724.72
Truck, Pickup	939	Equipment and power unit costs. Labor not included.	Hours	$24.18	24	$580.32
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.	Hours	$27.56	24	$661.44
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.	Hours	$46.88	24	$1,125.12
Materials						
Pump, > 5 HP to 30 HP, pump and motor, fixed cost portion	1011	Fixed cost portion of a pump between 5 and 30 HP, including the pump and motor. This portion is a base cost for the pump and is not dependant on horsepower. The total cost will include this fixed cost plus a variable cost portion. Includes material and shipping only.	Each	$2,367.02	1	$2,367.02
Pump, > 5 HP to 30 HP, pump and motor, variable cost portion	1012	Variable cost portion of a pump between 5 and 30 HP, including the pump and motor. This portion is dependent on the total horsepower for the pump. The total cost will include this variable cost plus a fixed cost portion. Includes material and shipping only.	Horsepower	$186.89	7.5	$1,401.68
Pressure Tank, 80 gallon	1039	Pressure Tank, 80 gallon. Includes materials and shipping only.	Each	$480.08	1	$480.08
Mobilization						
Mobilization, medium equipment	1139	Equipment with 70-150 HP or typical weights between 14,000 and 30,000 pounds.	Each	$255.65	2	$511.30

Practice: 533 - Pumping Plant

Scenario: #5 - Electric-Powered Pump 10 to 40 HP

Scenario Description:

This is a close-coupled, 3-phase, 20 Hp electric-powered centrifugal pump mounted on a platform for pressurizing a medium-sized (500 gpm and 50 psi) sprinkler or large microirrigation (1,000 gpm and 30 psi) system or a large-sized surface irrigation system (1,500 gpm) or a large-sized (1,200 gpm and 25 psi) waste transfer system. Resource Concerns: Water Quality degradation - Excess nutrients in surface and ground waters; Insufficient water - Inefficient use of irrigation water. Associated Practices include: 374 - Farmstead Energy Improvement; 430 - Irrigation Pipeline; 441 - Irrigation System, Microirrigation; 449 - Irrigation Water Management; 313 - Waste Storage Facility; 634 - Waste Transfer; and 614 - Watering Facility.

Before Situation:

Irrigation: An existing irrigation system employs an inefficient, improperly sized pump that prevents efficient water application resulting in water loss and high energy use. Waste Transfer: Various types of semi-solid or liquid waste are uncollected causing surface and ground water issues. Due to topography, gravity transfer is not possible and a properly sized pump is needed to transfer waste as part of a waste transfer system.

After Situation:

Irrigation: A properly designed and efficient pumping plant is installed, reducing energy use and improving irrigation efficiency. Waste Transfer: Collected wastes are now efficiently transferred to an appropriate treatment or storage facility or to a distribution system.

Feature Measure: Pump Power Requirement

Scenario Unit: Brake Horse Power

Scenario Typical Size: 20.0

Scenario Total Cost: $13,720.76

Scenario Cost/Unit: $686.04

Cost Details:

Component Name	ID	Description	Unit	Cost	QTY	Total
Equipment Installation						
Concrete, CIP, slab on grade, reinforced	37	Steel reinforced concrete formed and cast-in-placed as a slab on grade by chute placement. Typical strength is 3000 to 4000 psi. Includes materials, labor and equipment to transport, place and finish.	Cubic Yards	$362.36	2	$724.72
Backhoe, 80 HP	926	Wheel mounted backhoe excavator with horsepower range of 60 to 90. Equipment and power unit costs. Labor not included.	Hours	$31.96	8	$255.68
Truck, Pickup	939	Equipment and power unit costs. Labor not included.	Hours	$24.18	56	$1,354.08
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.	Hours	$37.19	8	$297.52
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.	Hours	$27.56	56	$1,543.36
Equipment Operators, Heavy	233	Includes: Cranes, Hydraulic Excavators >=50 HP, Dozers, Paving Machines, Rock Trenchers, Trenchers >=12 in., Dump Trucks, Ag Equipment >=150 HP, Scrapers, Water Wagons.	Hours	$38.00	8	$304.00
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.	Hours	$46.88	56	$2,625.28
Materials						
Pump, > 5 HP to 30 HP, pump and motor, fixed cost portion	1011	Fixed cost portion of a pump between 5 and 30 HP, including the pump and motor. This portion is a base cost for the pump and is not dependant on horsepower. The total cost will include this fixed cost plus a variable cost portion. Includes material and shipping only.	Each	$2,367.02	1	$2,367.02
Pump, > 5 HP to 30 HP, pump and motor, variable cost portion	1012	Variable cost portion of a pump between 5 and 30 HP, including the pump and motor. This portion is dependent on the total horsepower for the pump. The total cost will include this variable cost plus a fixed cost portion. Includes material and shipping only.	Horsepower	$186.89	20	$3,737.80
Mobilization						
Mobilization, medium equipment	1139	Equipment with 70-150 HP or typical weights between 14,000 and 30,000 pounds.	Each	$255.65	2	$511.30

Practice: 533 - Pumping Plant

Scenario: #6 - Electric-Powered Pump over 40 HP

Scenario Description:

This is a close-coupled, 3-phase, 50 Hp electric-powered centrifugal pump mounted on a platform for pressurizing a large-sized (1,200 gpm and 50 psi) sprinkler or very large microirrigation (1,700 gpm and 35 psi) system or a very large-sized surface irrigation system (2,800 gpm) or a very large-sized (2,400 gpm and 25 psi) waste transfer system. Resource Concerns: Water Quality degradation - Excess nutrients in surface and ground waters; Insufficient water - Inefficient use of irrigation water. Associated Practices include: 374 - Farmstead Energy Improvement; 430 - Irrigation Pipeline; 441 - Irrigation System, Microirrigation; 442 - Irrigation System, Sprinkler; 449 - Irrigation Water Management; 313 - Waste Storage Facility; and 634 - Waste Transfer.

Before Situation:

Irrigation: An existing irrigation system employs an inefficient, improperly sized pump that prevents efficient water application resulting in water loss and high energy use.

After Situation:

Irrigation: A properly designed and efficient pumping plant is installed, reducing energy use and improving irrigation efficiency.

Feature Measure: Pump Power Requirement

Scenario Unit: Brake Horse Power

Scenario Typical Size: 50.0

Scenario Total Cost: $22,918.32

Scenario Cost/Unit: $458.37

Cost Details:

Component Name	ID	Description	Unit	Cost	QTY	Total
Equipment Installation						
Concrete, CIP, slab on grade, reinforced	37	Steel reinforced concrete formed and cast-in-placed as a slab on grade by chute placement. Typical strength is 3000 to 4000 psi. Includes materials, labor and equipment to transport, place and finish.	Cubic Yards	$362.36	2	$724.72
Backhoe, 80 HP	926	Wheel mounted backhoe excavator with horsepower range of 60 to 90. Equipment and power unit costs. Labor not included.	Hours	$31.96	16	$511.36
Truck, Pickup	939	Equipment and power unit costs. Labor not included.	Hours	$24.18	56	$1,354.08
Portable Welder	1407	Portable field welder. Equipment only. Labor not included.	Hours	$20.22	16	$323.52
Crane, truck mounted, hydraulic, 12 ton	1734	12 ton capacity truck mounted hydraulic crane. Equipment cost only.	Hours	$64.76	16	$1,036.16
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.	Hours	$37.19	56	$2,082.64
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.	Hours	$27.56	16	$440.96
Equipment Operators, Heavy	233	Includes: Cranes, Hydraulic Excavators >=50 HP, Dozers, Paving Machines, Rock Trenchers, Trenchers >=12 in., Dump Trucks, Ag Equipment >=150 HP, Scrapers, Water Wagons.	Hours	$38.00	24	$912.00
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.	Hours	$46.88	56	$2,625.28
Materials						
Pump, > 30 HP, pump and motor, fixed cost portion	1013	Fixed cost portion of a pump greater than 30 HP, including the pump and motor. This portion is a base cost for the pump and is not dependant on horsepower. The total cost will include this fixed cost plus a variable cost portion. Includes material and shipping only.	Each	$3,141.30	1	$3,141.30
Pump, >30 HP, Pump and motor, variable cost portion	1014	Variable cost portion of a pump greater than 30 HP, including the pump and motor. This portion is dependent on the total horsepower for the pump. The total cost will include this variable cost plus a fixed cost portion. IIncludes material and shipping only.	Horsepower	$185.10	50	$9,255.00
Mobilization						
Mobilization, medium equipment	1139	Equipment with 70-150 HP or typical weights between 14,000 and 30,000 pounds.	Each	$255.65	2	$511.30

Practice: 533 - Pumping Plant

Scenario: #7 - Variable Frequency Drive Less Than 10HP

Scenario Description:

This is an installation of electrical and electronic components designed to vary the frequency of the voltage to an electric motor and thus the ability to vary the speed of the motor. This directly affects pressure and flowrate. This also could give the operator the flexibility to operate several systems separately or at the same time. Resource concerns: Insufficient water - Inefficient use of irrigation water; Inefficient energy use - Equipment and facilities and Farming/ranching practices and field operations. Associated Practices: 374 - Farmstead Energy Improvement; 430 - Irrigation Pipeline; 441 - Irrigation System, Microirrigation; 449 - Irrigation Water Management; 516 - Livestock Pipeline; and 614 - Watering Facility.

Before Situation:

Standard electrical connection from electrical utility to pump motor. No capability to match pump output pressure and/or flowrate to field(s) need(s). Result is over/under pressure(s) and/or flow rate(s), possible hydraulic anomalies, energy loss, and or inefficient water application in the irrigation system.

After Situation:

VFD Modifications are implemented on an existing pumping plant meeting Nebraska performance criteria to allow for varying the speed of a 1.5 Hp electric motor to match the pressure and flow requirements for small microirrigation system.

Feature Measure: Pump Power Requirement

Scenario Unit: Horsepower

Scenario Typical Size: 1.5

Scenario Total Cost: $381.38

Scenario Cost/Unit: $254.25

Cost Details:

Component Name	ID	Description	Unit	Cost	QTY	Total
Materials						
Variable Speed Drive, 5 HP	2348	Variable speed drive for 5 Horsepower electric motor. Does not include motor. Materials only.	Horsepower	$254.25	1.5	$381.38

Practice: 533 - Pumping Plant

Scenario: #8 - Variable Frequency Drive over 10HP

Scenario Description:

This is an installation of electrical and electronic components designed to vary the frequency of the voltage to an electric motor and thus the ability to vary the speed of the motor. This directly affects pressure and flowrate. This also could give the operator the flexibility to operate several systems separately or at the same time. Resource concerns: Insufficient water - Inefficient use of irrigation water; Inefficient energy use - Equipment and facilities and Farming/ranching practices and field operations. Associated Practices: 374 - Farmstead Energy Improvement; 430 - Irrigation Pipeline; 441 - Irrigation System, Microirrigation; 449 - Irrigation Water Management; 516 - Livestock Pipeline; and 614 - Watering Facility.

Before Situation:

Standard electrical connection from electrical utility to pump motor. No capability to match pump output pressure and/or flowrate to field(s) need(s). Result is over/under pressure(s) and/or flow rate(s), possible hydraulic anomalies, energy loss, and or inefficient water application in the irrigation system.

After Situation:

VFD Modifications are implemented on an existing pumping plant meeting Nebraska performance criteria to allow for varying the speed of a 10 Hp electric motor to match the pressure and flow requirements for an irrigation system.

Feature Measure: Pump Power Requirement

Scenario Unit: Horsepower

Scenario Typical Size: 10.0

Scenario Total Cost: $1,281.60

Scenario Cost/Unit: $128.16

Cost Details:

Component Name	ID	Description	Unit	Cost	QTY	Total
Materials						
Variable Speed Drive, 25 HP	2557	Variable speed drive for 25 Horsepower electric motor. Does not include motor. Materials only.	Horsepower	$128.16	10	$1,281.60

Practice: 533 - Pumping Plant

Scenario: #9 - Internal Combustion Powered Pump less than 7.5 HP

Scenario Description:

The typical scenario supports replacement of a pump in an existing irrigation system on cropland with a 5 HP pump. Size of pump is determined by required GPM and pressure derived from a design for specific irrigation system on cropland. Scenario could also be used for a 5 HP pump for silage leachate, barnyard runoff, and milk house waste (as part of a waste transfer system) at farm headquarters. The combination of higher solids content and volume require a larger horse power pump. This liquid manure pump is used to transfer semi-solid manure from a small reception pit located either below a barnyard or at the end of a free-stall barn or scrape alley. Resource Concerns: Livestock Production Limitation - Inadequate livestock water; Water Quality degradation - Excess nutrients in surface and ground waters; Insufficient water - Inefficient use of irrigation water. Associated Practices include: 374 - Farmstead Energy Improvement; 430 - Irrigation Pipeline; 441 - Irrigation System, Microirrigation; 442 - Irrigation System, Sprinkler; 449 - Irrigation Water Management; 516 - Livestock Pipeline; 313 - Waste Storage Facility; 634 - Waste Transfer; and 614 - Watering Facility.

Before Situation:

Irrigation: Either an existing irrigation system employs an inefficient, improperly-sized pump that leads to inefficient water delivery resulting in high energy costs, or Waste Transfer: various types of semi-solid or liquid waste at the headquarters is uncollected causing surface and ground water issues.

After Situation:

Irrigation Setting: For irrigation system, a properly designed pump is installed, reducing water and energy usage. Waste Transfer Setting: For semi-solid or liquid waste, wastes that have been collected through a waste transfer system are now efficiently transferred to appropriate treatment or storage facilities or crop application. Due to topography, gravity transfer is not possible and a properly sized pump is needed to transfer waste as part of a waste transfer system.

Feature Measure: Pump Power Requirement

Scenario Unit: Brake Horse Power

Scenario Typical Size: 5.0

Scenario Total Cost: $4,268.28

Scenario Cost/Unit: $853.66

Cost Details:

Component Name	ID	Description	Unit	Cost	QTY	Total
Equipment Installation						
Concrete, CIP, slab on grade, reinforced	37	Steel reinforced concrete formed and cast-in-placed as a slab on grade by chute placement. Typical strength is 3000 to 4000 psi. Includes materials, labor and equipment to transport, place and finish.	Cubic Yards	$362.36	1	$362.36
Truck, Pickup	939	Equipment and power unit costs. Labor not included.	Hours	$24.18	2	$48.36
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.	Hours	$27.56	4	$110.24
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.	Hours	$46.88	4	$187.52
Materials						
Pump, < 50 HP, Pump & ICE power unit	1027	Materials, labor, controls: < 50 HP Pump & ICE power unit	Horsepower	$609.70	5	$3,048.50
Mobilization						
Mobilization, medium equipment	1139	Equipment with 70-150 HP or typical weights between 14,000 and 30,000 pounds.	Each	$255.65	2	$511.30

Practice: 533 - Pumping Plant

Scenario: #10 - Internal Combustion-Powered Pump 7.5 to 75 HP

Scenario Description:

The typical scenario supports installation of a pump in an existing irrigation system or installation of a new pump on cropland with a 45 BHP pump. Size of pump is determined by required GPM and pressure derived from a design for specific irrigation system on cropland. The combination of higher solids content and volume require a larger horse power pump. This liquid manure pump is used to transfer semi-solid manure from a small reception pit located either below a barnyard or at the end of a free-stall barn or scrape alley. Resource Concerns: Water Quality degradation - Excess nutrients in surface and ground waters; Insufficient water - Inefficient use of irrigation water. Associated Practices include: 374 - Farmstead Energy Improvement; 430 - Irrigation Pipeline; 441 - Irrigation System, Microirrigation; 449 - Irrigation Water Management; 313 - Waste Storage Facility; 634 - Waste Transfer; 436 - Irrigation Reservoir; and 447 - Irrigation System, Tailwater Recovery; and 614 - Watering Facility.

Before Situation:

Irrigation: Either an existing irrigation system employs an inefficient, improperly-sized pump that leads to inefficient water delivery resulting in high energy costs, or Waste Transfer: various types of semi-solid or liquid waste at the headquarters is uncollected causing surface and ground water issues.

After Situation:

Irrigation Setting: For irrigation system, a properly designed pump is installed, reducing water and energy usage. Waste Transfer Setting: For semi-solid or liquid waste, wastes that have been collected through a waste transfer system are now efficiently transferred to appropriate treatment or storage facilities or crop application. Due to topography, gravity transfer is not possible and a properly sized pump is needed to transfer waste as part of a waste transfer system.

Feature Measure: Pump Power Requirement

Scenario Unit: Brake Horse Power

Scenario Typical Size: 45.0

Scenario Total Cost: $30,896.08

Scenario Cost/Unit: $686.58

Cost Details:

Component Name	ID	Description	Unit	Cost	QTY	Total
Equipment Installation						
Concrete, CIP, slab on grade, reinforced	37	Steel reinforced concrete formed and cast-in-placed as a slab on grade by chute placement. Typical strength is 3000 to 4000 psi. Includes materials, labor and equipment to transport, place and finish.	Cubic Yards	$362.36	1	$362.36
Backhoe, 80 HP	926	Wheel mounted backhoe excavator with horsepower range of 60 to 90. Equipment and power unit costs. Labor not included.	Hours	$31.96	8	$255.68
Truck, Pickup	939	Equipment and power unit costs. Labor not included.	Hours	$24.18	4	$96.72
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.	Hours	$37.19	8	$297.52
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.	Hours	$27.56	32	$881.92
Equipment Operators, Heavy	233	Includes: Cranes, Hydraulic Excavators >=50 HP, Dozers, Paving Machines, Rock Trenchers, Trenchers >=12 in., Dump Trucks, Ag Equipment >=150 HP, Scrapers, Water Wagons.	Hours	$38.00	8	$304.00
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.	Hours	$46.88	16	$750.08
Materials						
Pump, < 50 HP, Pump & ICE power unit	1027	Materials, labor, controls: < 50 HP Pump & ICE power unit	Horsepower	$609.70	45	$27,436.50
Mobilization						
Mobilization, medium equipment	1139	Equipment with 70-150 HP or typical weights between 14,000 and 30,000 pounds.	Each	$255.65	2	$511.30

Practice: 533 - Pumping Plant

Scenario: #11 - Internal Combustion-Powered Pump over 75 HP

Scenario Description:

The typical scenario supports replacement of a pump in an existing irrigation system or installation of a new pump on cropland that is 75 break HP pump or larger. Size of pump is determined by required GPM and pressure derived from a design for specific irrigation system on cropland. Scenario could also be used for a pump for silage leachate, barnyard runoff, and milk house waste (as part of a waste transfer system) at farm headquarters. Resource Concerns: Water Quality degradation - Excess nutrients in surface and ground waters; Insufficient water - Inefficient use of irrigation water. Associated Practices include: 374 - Farmstead Energy Improvement; 430 - Irrigation Pipeline; 441 - Irrigation System, Microirrigation; 449 - Irrigation Water Management; 313 - Waste Storage Facility; 634 - Waste Transfer; and 614 - Watering Facility.

Before Situation:

Irrigation: Either an existing irrigation system employs an inefficient, improperly-sized pump that leads to inefficient water delivery resulting in high energy costs, or Waste Transfer: various types of semi-solid or liquid waste at the headquarters is uncollected causing surface and ground water issues.

After Situation:

Irrigation Setting: For irrigation system, a properly designed pump is installed, reducing water and energy usage. Waste Transfer Setting: For semi-solid or liquid waste, wastes that have been collected through a waste transfer system are now efficiently transferred to appropriate treatment or storage facilities or crop application. Due to topography, gravity transfer is not possible and a properly sized pump is needed to transfer waste as part of a waste transfer system.

Feature Measure: Pump Power Requirement

Scenario Unit: Brake Horse Power

Scenario Typical Size: 100.0

Scenario Total Cost: $64,708.30

Scenario Cost/Unit: $647.08

Cost Details:

Component Name	ID	Description	Unit	Cost	QTY	Total
Equipment Installation						
Concrete, CIP, slab on grade, reinforced	37	Steel reinforced concrete formed and cast-in-placed as a slab on grade by chute placement. Typical strength is 3000 to 4000 psi. Includes materials, labor and equipment to transport, place and finish.	Cubic Yards	$362.36	2	$724.72
Backhoe, 80 HP	926	Wheel mounted backhoe excavator with horsepower range of 60 to 90. Equipment and power unit costs. Labor not included.	Hours	$31.96	8	$255.68
Truck, Pickup	939	Equipment and power unit costs. Labor not included.	Hours	$24.18	6	$145.08
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.	Hours	$37.19	8	$297.52
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.	Hours	$27.56	48	$1,322.88
Equipment Operators, Heavy	233	Includes: Cranes, Hydraulic Excavators >=50 HP, Dozers, Paving Machines, Rock Trenchers, Trenchers >=12 in., Dump Trucks, Ag Equipment >=150 HP, Scrapers, Water Wagons.	Hours	$38.00	8	$304.00
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.	Hours	$46.88	24	$1,125.12
Materials						
Pump, > 70 HP, Pump & ICE power unit	1029	Materials, labor, controls: > 70 HP Pump & ICE power unit	Horsepower	$600.22	100	$60,022.00
Mobilization						
Mobilization, medium equipment	1139	Equipment with 70-150 HP or typical weights between 14,000 and 30,000 pounds.	Each	$255.65	2	$511.30

Practice: 533 - Pumping Plant

Scenario: #12 - Tractor Power Take Off (PTO) Pump

Scenario Description:

This scenario involves a PTO driven pump to either transfer water for an irrigation system from a Pond - 378 (includes backflow prevention as appropriate) to cropland or; to transfer semi-solid/ liquid manure (as part of a waste transfer system) at the farm headquarters from a Waste Storage Facility - 313, to an irrigation system or waste treatment facility. In both cases, a PTO driven pump is selected because the landowner has equipment available to supply power to the pump. Electricity is not readily available and/or a stationary engine is not a practical alternative. Resource Concerns: Water Quality degradation - Excess nutrients in surface and ground waters; Insufficient water - Inefficient use of irrigation water. Associated Practices include: 430 - Irrigation Pipeline; 442 - Irrigation System, Sprinkler; 449 - Irrigation Water Management; 590 - Nutrient Management; 378 - Pond; 313 - Waste Storage Facility; and 634 - Waste Transfer.

Before Situation:

Irrigation Setting: An existing surface irrigation system employs an inefficient, improperly sized pump that leads to inefficient water delivery resulting in high energy costs; Waste Transfer Setting: various types of semi-solid or liquid waste at the headquarters are uncollected causing surface and ground water issues. A transfer method for waste is needed. Due to topography, gravity transfer is not possible and a properly sized pump is needed to transfer waste as part of a waste transfer system.

After Situation:

Irrigation Setting: A properly designed PTO-driven pump is installed, to transfer water to an Irrigation Pipeline (430) or Irrigation Canal or Lateral (320). Waste Transfer Setting: Wastes that have been collected through a waste transfer system are now efficiently transferred from a Waste Storage Facility (313) to an appropriate treatment facility or to an irrigation system. The pump typically will move 2,000 gallons per minute and is portable so that it can be used at several locations.

Feature Measure: Pump Power Requirement

Scenario Unit: Brake Horse Power

Scenario Typical Size: 60.0

Scenario Total Cost: $10,249.94

Scenario Cost/Unit: $170.83

Cost Details:

Component Name	ID	Description	Unit	Cost	QTY	Total
Equipment Installation						
Concrete, CIP, slab on grade, reinforced	37	Steel reinforced concrete formed and cast-in-placed as a slab on grade by chute placement. Typical strength is 3000 to 4000 psi. Includes materials, labor and equipment to transport, place and finish.	Cubic Yards	$362.36	2	$724.72
Truck, Pickup	939	Equipment and power unit costs. Labor not included.	Hours	$24.18	16	$386.88
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.	Hours	$27.56	16	$440.96
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.	Hours	$46.88	16	$750.08
Materials						
Pump, Ag Water PTO, 1,000 GPM	1923	Materials, labor, controls: Ag Water PTO Pump 1,000 GPM - 8 in.	Each	$7,947.30	1	$7,947.30

Practice: 533 - Pumping Plant

Scenario: #13 - Photovoltaic-Powered Pump 0.25 HP to less than 0.5 HP

Scenario Description:

The typical scenario assumes installation of a photovoltaic-powered pumping plant with a design operating total head on pump less than 250 feet in a well, pond or a live stream. The installation includes the pump, wiring, drop pipe, solar panels, mounts, inverter, and all appurtenances. Note: It is generally not advisable to use a storage battery for a number of reasons. A storage tank is generally the most efficient method to store energy. Grazing - Livestock exclusion from surface water will result in improved surface water quality and reduced erosion. Irrigation - energy consumption will be reduced and the increased pressure and flow rates will improve irrigation efficiency. Resource Concerns: Insufficient stockwater. Associated Practices include: 374 - Farmstead Energy Improvement; 382 - Fence; 430 - Irrigation Pipeline; 436 - Irrigation Reservoir; 516 - Livestock Pipeline; 561 - Heavy Use Area Protection; and, 614 - Watering Facility.

Before Situation:

Livestock: Inadequate supply or location of water for a prescribed grazing system. Eroded stream banks and degraded water quality due to livestock access to stream. Cattle are not well-distributed because of remote water location. Irrigation: Pressure and flow rate is insufficient for uniform irrigation.

After Situation:

The typical scenario assumes installation of a 230-watt photovoltaic (PV) panel, capable of operating a 1/4 Hp (0.25 Hp) solar-powered submersible pump in a well or other water source (Notes: 1) A PV panel is rated under standard and ideal conditions which will most likely not be replicated in the field; 2) 1 Hp is defined as 746 watts; 3) It is reasonable to expect a 1/4 Hp solar-powered submersible pump to deliver about 1.5 gpm and develop a pressure at the pump outlet of about 60 psi. 4) The installation includes the pump, wiring, pipeline in the well, solar panels, frame mounts, inverter, and all appurtenances. Water will be pumped to an existing storage tank at a higher elevation from which it will be used to pressurize the Livestock Pipeline (516) or Irrigation Pipeline (430). Grazing - Livestock exclusion from surface water will result in improved surface water quality and reduced erosion. Grazing has potential to be well distributed. Irrigation: Improved pressure and flow rate will improve irrigation efficiency.

Feature Measure: Each Pumping Plant

Scenario Unit: Each

Scenario Typical Size: 1.0

Scenario Total Cost: $3,517.99

Scenario Cost/Unit: $3,517.99

Cost Details:

Component Name	ID	Description	Unit	Cost	QTY	Total
Equipment Installation						
Truck, Pickup	939	Equipment and power unit costs. Labor not included.	Hours	$24.18	16	$386.88
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.	Hours	$27.56	16	$440.96
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.	Hours	$46.88	16	$750.08
Materials						
Pump, <= 5 HP, pump and motor, fixed cost portion	1009	Fixed cost portion of a pump less than or equal to 5 HP pump and motor. This portion is a base cost and is not dependant on horsepower. The total cost of any pump will include this fixed cost plus a variable cost portion. The completed pump and motor will include the motor and controls. Includes material and shipping only.	Each	$1,019.47	1	$1,019.47
Pump, <= 5 HP, pump and motor, variable cost portion	1010	Variable cost portion of a pump less than or equal to 5 HP pump and motor. This portion IS dependent on the total horsepower for the pump. The total cost of any pump will include this variable cost plus the fixed cost portion. The completed pump and motor will include the motor and controls. Includes material and shipping only.	Horsepower	$353.92	0.25	$88.48
Solar Panels, fixed cost portion	1031	Fixed cost portion of the Solar Panels. This portion is a base cost for all Solar Panels and is not dependant on KiloWatt. The total cost of any Solar Panels will include this fixed cost plus a variable cost portion. The completed Solar Panels will include all materials (electrical, controllers, service drops and etc). This cost will include material, labor and equipment.	Each	$273.31	1	$273.31
Solar Panels, variable cost portion	1135	Variable cost portion of the Solar Panels. This portion IS dependent on the total Kilowatt for the Solar Panels. The total cost of any Solar Panels will include this variable cost plus the fixed cost portion. The completed Solar Panels will include all materials (electrical, controllers, and service drop, etc). This cost will include material, labor and equipment.	Kilowatt	$2,429.59	0.23	$558.81

Practice: 533 - Pumping Plant

Scenario: #14 - Photovoltaic-Powered Pump 0.5 HP up to and including 1.0 HP

Scenario Description:

The typical scenario assumes installation of a photovoltaic-powered pumping plant with a design operating total head on pump greater between 251 and 400 feet in a well, pond or a live stream. The installation includes the pump, wiring, drop pipe, solar panels, mounts, inverter, and all appurtenances. Note: It is generally not advisable to use a storage battery for a number of reasons. A storage tank is generally the most efficient method to store energy. Grazing - Livestock exclusion from surface water will result in improved surface water quality and reduced erosion. Irrigation - energy consumption will be reduced and the increased pressure and flow rates will improve irrigation efficiency. Resource Concerns: Insufficient stockwater. Associated Practices include: 374 - Farmstead Energy Improvement; 382 - Fence; 430 - Irrigation Pipeline; 436 - Irrigation Reservoir; 516 - Livestock Pipeline; 561 - Heavy Use Area Protection; and, 614 - Watering Facility.

Before Situation:

Livestock: Inadequate supply or location of water for a prescribed grazing system. Eroded stream banks and degraded water quality due to livestock access to stream. Cattle are not well-distributed because of remote water location. Irrigation: Pressure and flow rate is insufficient for uniform irrigation.

After Situation:

The typical scenario assumes installation of a 930-watt photovoltaic (PV) panel, capable of operating a 1 Hp solar-powered submersible pump in a well or other water source (Notes: 1) A PV panel is rated under standard and ideal conditions which will most likely not be replicated in the field; 2) 1 Hp is defined as 746 watts; 3) It is reasonable to expect a 1 Hp solar-powered submersible pump to deliver about 7 gpm and develop a pressure at the pump outlet of about 60 psi. 4) The installation includes the pump, wiring, pipeline in the well, solar panels, frame mounts, inverter, and all appurtenances. Water will be pumped to an existing storage tank at a higher elevation from which it will be used to pressurize the Livestock Pipeline (516) or Irrigation Pipeline (430). Grazing - Livestock exclusion from surface water will result in improved surface water quality and reduced erosion. Grazing has potential to be well distributed. Irrigation: Improved pressure and flow rate will improve irrigation efficiency.

Feature Measure: Each Pumping Plant

Scenario Unit: Each

Scenario Typical Size: 1.0

Scenario Total Cost: $5,484.14

Scenario Cost/Unit: $5,484.14

Cost Details:

Component Name	ID	Description	Unit	Cost	QTY	Total
Equipment Installation						
Truck, Pickup	939	Equipment and power unit costs. Labor not included.	Hours	$24.18	16	$386.88
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.	Hours	$27.56	16	$440.96
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.	Hours	$46.88	16	$750.08
Materials						
Pump, <= 5 HP, pump and motor, fixed cost portion	1009	Fixed cost portion of a pump less than or equal to 5 HP pump and motor. This portion is a base cost and is not dependant on horsepower. The total cost of any pump will include this fixed cost plus a variable cost portion. The completed pump and motor will include the motor and controls. Includes material and shipping only.	Each	$1,019.47	1	$1,019.47
Pump, <= 5 HP, pump and motor, variable cost portion	1010	Variable cost portion of a pump less than or equal to 5 HP pump and motor. This portion IS dependent on the total horsepower for the pump. The total cost of any pump will include this variable cost plus the fixed cost portion. The completed pump and motor will include the motor and controls. Includes material and shipping only.	Horsepower	$353.92	1	$353.92
Solar Panels, fixed cost portion	1031	Fixed cost portion of the Solar Panels. This portion is a base cost for all Solar Panels and is not dependant on KiloWatt. The total cost of any Solar Panels will include this fixed cost plus a variable cost portion. The completed Solar Panels will include all materials (electrical, controllers, service drops and etc). This cost will include material, labor and equipment.	Each	$273.31	1	$273.31
Solar Panels, variable cost portion	1135	Variable cost portion of the Solar Panels. This portion IS dependent on the total Kilowatt for the Solar Panels. The total cost of any Solar Panels will include this variable cost plus the fixed cost portion. The completed Solar Panels will include all materials (electrical, controllers, and service drop, etc). This cost will include material, labor and equipment.	Kilowatt	$2,429.59	0.93	$2,259.52

Practice: 533 - Pumping Plant

Scenario: #15 - Photovoltaic-Powered Pump greater than 1 HP

Scenario Description:

The typical scenario assumes installation of a photovoltaic-powered pumping plant with a design operating total head on pump greater than 400 feet in a well, pond or a live stream. The installation includes the pump, wiring, drop pipe, solar panels, mounts, inverter, and all appurtenances. Note: It is generally not advisable to use a storage battery for a number of reasons. A storage tank is generally the most efficient method to store energy. Grazing - Livestock exclusion from surface water will result in improved surface water quality and reduced erosion. Irrigation - energy consumption will be reduced and the increased pressure and flow rates will improve irrigation efficiency. Resource Concerns: Insufficient stockwater. Associated Practices include: 374 - Farmstead Energy Improvement; 382 - Fence; 430 - Irrigation Pipeline; 436 - Irrigation Reservoir; 516 - Livestock Pipeline; 561 - Heavy Use Area Protection; and, 614 - Watering Facility.

Before Situation:

Livestock: Inadequate supply or location of water for a prescribed grazing system. Eroded stream banks and degraded water quality due to livestock access to stream. Cattle are not well-distributed because of remote water location. Irrigation: Pressure and flow rate is insufficient for uniform irrigation.

After Situation:

The typical scenario assumes installation of a 1.4 Kwatt photovoltaic (PV) panel, capable of operating a 1.5 Hp solar-powered submersible pump in a well or other water source (Notes: 1) A PV panel is rated under standard and ideal conditions which will most likely not be replicated in the field; 2) 1 Hp is defined as 746 watts; 3) It is reasonable to expect a 1.5 Hp solar-powered submersible pump to deliver about 10 gpm and develop a pressure at the pump outlet of about 60 psi. 4) The installation includes the pump, wiring, pipeline in the well, solar panels, frame mounts, inverter, and all appurtenances. Water will be pumped to an existing storage tank at a higher elevation from which it will be used to pressurize the Livestock Pipeline (516) or Irrigation Pipeline (430). Grazing - Livestock exclusion from surface water will result in improved surface water quality and reduced erosion. Grazing has potential to be well distributed. Irrigation: Improved pressure and flow rate will improve irrigation efficiency.

Feature Measure: Each Pumping Plant

Scenario Unit: Each

Scenario Typical Size: 1.0

Scenario Total Cost: $6,803.01

Scenario Cost/Unit: $6,803.01

Cost Details:

Component Name	ID	Description	Unit	Cost	QTY	Total
Equipment Installation						
Truck, Pickup	939	Equipment and power unit costs. Labor not included.	Hours	$24.18	16	$386.88
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.	Hours	$27.56	16	$440.96
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.	Hours	$46.88	16	$750.08
Materials						
Pump, <= 5 HP, pump and motor, fixed cost portion	1009	Fixed cost portion of a pump less than or equal to 5 HP pump and motor. This portion is a base cost and is not dependant on horsepower. The total cost of any pump will include this fixed cost plus a variable cost portion. The completed pump and motor will include the motor and controls. Includes material and shipping only.	Each	$1,019.47	1	$1,019.47
Pump, <= 5 HP, pump and motor, variable cost portion	1010	Variable cost portion of a pump less than or equal to 5 HP pump and motor. This portion IS dependent on the total horsepower for the pump. The total cost of any pump will include this variable cost plus the fixed cost portion. The completed pump and motor will include the motor and controls. Includes material and shipping only.	Horsepower	$353.92	1.5	$530.88
Solar Panels, fixed cost portion	1031	Fixed cost portion of the Solar Panels. This portion is a base cost for all Solar Panels and is not dependant on KiloWatt. The total cost of any Solar Panels will include this fixed cost plus a variable cost portion. The completed Solar Panels will include all materials (electrical, controllers, service drops and etc). This cost will include material, labor and equipment.	Each	$273.31	1	$273.31
Solar Panels, variable cost portion	1135	Variable cost portion of the Solar Panels. This portion IS dependent on the total Kilowatt for the Solar Panels. The total cost of any Solar Panels will include this variable cost plus the fixed cost portion. The completed Solar Panels will include all materials (electrical, controllers, and service drop, etc). This cost will include material, labor and equipment.	Kilowatt	$2,429.59	1.4	$3,401.43

Practice: 533 - Pumping Plant

Scenario: #16 - Livestock Nose Pump

Scenario Description:

A Nose Pump is a diaphragm pump located in a pasture for the purpose of providing water to cattle. For a permanent installation, it is typical to also install Heavy Use Area Protection (561) (separate contract item) where the cattle congregate around the pump. It is powered and operated by cattle to transfer water from a stream to a drinking bowl. The objective is to provide water to the cattle outside of a live stream or other natural water source thereby eliminating a significant erosion situation and while also improving water quality. The cattle thus have access to drinking water without having to enter the stream. Generally one nose pump is adequate for 20 cattle. Resource Concerns: Insufficient stockwater; Inefficient energy use - Equipment and facilities. Associated Practices include: 374 - Farmstead Energy Improvement; 382 - Fence; 516 - Livestock Pipeline; 561 - Heavy Use Area Protection; and, 614 - Watering Facility.

Before Situation:

Livestock have open access to a live stream or other existing natural water supply. Water supply is contaminated due to animal activity and stream banks are eroded on a daily basis. Improper cattle distribution results in poor water quality, poor grazing distribution, over grazing, and soil erosion.

After Situation:

One nose pump is installed with all appurtenances anchored to concrete pad with 6"x6"x10 Gauge reinforcement wire (9 ft x 4 ft x 5 in) or other appropriate secure base to supply water to cattle for improved livestock herd management. Additional Heavy Use Area Protection (561) in the form of crushed rock and at least 5 feet wide, may be installed (separate contract item) surrounding the concrete pad. Improved: water quality, soil quality, grazing management, plant diversity, and animal health.

Feature Measure: Number of Pumps

Scenario Unit: Each

Scenario Typical Size: 1.0

Scenario Total Cost: $1,382.38

Scenario Cost/Unit: $1,382.38

Cost Details:

Component Name	ID	Description	Unit	Cost	QTY	Total
Equipment Installation						
Concrete, CIP, slab on grade, reinforced	37	Steel reinforced concrete formed and cast-in-placed as a slab on grade by chute placement. Typical strength is 3000 to 4000 psi. Includes materials, labor and equipment to transport, place and finish.	Cubic Yards	$362.36	0.5	$181.18
Truck, Pickup	939	Equipment and power unit costs. Labor not included.	Hours	$24.18	8	$193.44
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.	Hours	$27.56	8	$220.48
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.	Hours	$46.88	8	$375.04
Materials						
Nose Pump	1052	Materials and delivery.	Each	$412.24	1	$412.24

Practice: 533 - Pumping Plant

Scenario: #17 - Solid Piston Manure Pump

Scenario Description:

Install a 16" solid piston manure pump to transfer manure from a barn to a waste storage facility. Costs include pump, delivery, appurtenances, and installation. Associated practices include: Waste Transfer (634), Waste Storage Facility (313), Roofs and Covers (367)

Before Situation:

Manure from the barn and barnyard is not collected or contained and is allowed to flow into nearby surface and subsurface water resources.

After Situation:

A solid piston manure pump, hydraulically actuated, 12" or greater discharge, 7.5 HP w/ accessories is installed in conjunction with a manure transfer pipe (634-Waste Transfer) to convey manure from the barn to the waste storage facility. The transferred waste is disposed of in accordance with the CNMP.

Feature Measure: Number of Pumps

Scenario Unit: Each

Scenario Typical Size: 1.0

Scenario Total Cost: $49,210.81

Scenario Cost/Unit: $49,210.81

Cost Details:

Component Name	ID	Description	Unit	Cost	QTY	Total
Equipment Installation						
Concrete, CIP, slab on grade, reinforced	37	Steel reinforced concrete formed and cast-in-placed as a slab on grade by chute placement. Typical strength is 3000 to 4000 psi. Includes materials, labor and equipment to transport, place and finish.	Cubic Yards	$362.36	4	$1,449.44
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 Yards	$481.12	26	$12,509.12
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.	Hours	$109.36	20	$2,187.20
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.	Hours	$72.23	10	$722.30
Plate compactor	1915	Manually guided vibratroy plate compactor. Equipment only.	Hours	$4.33	4	$17.32
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.	Hours	$37.19	20	$743.80
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.	Hours	$27.56	40	$1,102.40
Equipment Operators, Heavy	233	Includes: Cranes, Hydraulic Excavators >=50 HP, Dozers, Paving Machines, Rock Trenchers, Trenchers >=12 in., Dump Trucks, Ag Equipment >=150 HP, Scrapers, Water Wagons.	Hours	$38.00	20	$760.00
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.	Hours	$46.88	10	$468.80
Materials						
Pump, Manure, Solid Piston	2157	Pump, Manure, Solid Piston, Hydraulically Actuated, 12 in. or greater discharge, 7.5 HP w/ accessories. Includes delivery.	Each	$29,058.33	1	$29,058.33
Waterstop, Bentonite, half-round, 3/4 in. x 3/8 in.	2362	Flexible and expandible bentonite strip for concrete construction. Half round profile of 3/4 inch x 3/8 inch. Includes materials and shipping only.	Feet	$2.26	85	$192.10

Practice: 533 - Pumping Plant

Scenario: #19 - Manure PTO Vertical Shaft Pump

Scenario Description:

Install a PTO manure pump to transfer manure from a barn to a waste storage facility. Costs include pump, delivery, appurtenances, installation, and a small insulated pump house installed to protect pump and apputanences from freezing and wet weather. Associated practices include: Waste Transfer (634), Waste Storage Facility (313)

Before Situation:

Manure from the barn and barnyard is not collected or contained and is allowed to flow into nearby surface and subsurface water resources.

After Situation:

A vertical shaft PTO manure pump, 6" discharge, HP 70 to 110 (540 RPM) or HP 125 to 140 (1000 RPM), with agitating nozzle and propeller is installed to convey manure from the barn to the waste storage facility. The transferred waste is disposed of in accordance with the CNMP.

Feature Measure: Number of Pumps

Scenario Unit: Each

Scenario Typical Size: 1.0

Scenario Total Cost: $29,631.24

Scenario Cost/Unit: $29,631.24

Cost Details:

Component Name	ID	Description	Unit	Cost	QTY	Total
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.	Hours	$37.19	4	$148.76
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.	Hours	$27.56	4	$110.24
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.	Hours	$46.88	2	$93.76
Materials						
Pump, Manure, PTO, Vertical Shaft	2159	Pump, Manure, PTO, Vertical Shaft, 6 in. discharge, HP 70 to 110 (540 RPM) or HP 125 to 140 (1000 RPM), with agitating nozzle and propeller. Includes delivery.	Each	$29,278.48	1	$29,278.48

Practice: 533 - Pumping Plant

Scenario: #21 - PTO Side Mounted Manure Pump

Scenario Description:

Install a PTO driven side mounted unloading pump to unload manure from an above ground waste storage facility. Costs include pump, delivery, appurtenances, and installation. Associated practices include: Waste Transfer (634), Waste Storage Facility (313)

Before Situation:

Manure from the barn and barnyard is not collected or contained and is allowed to flow into nearby surface and subsurface water resources.

After Situation:

Side mounted pump allows manure to be unloaded from an above ground waste storage facility into a manure spreader or irrigation system so manure can be properly transported and field applied in accordance with an approved the CNMP.

Feature Measure: Number of Pumps

Scenario Unit: Each

Scenario Typical Size: 1.0

Scenario Total Cost: $45,500.00

Scenario Cost/Unit: $45,500.00

Cost Details:

Component Name	ID	Description	Unit	Cost	QTY	Total
Materials						
Pump, Manure, PTO, Side Mounted Unloading Pump for WSF between 50,000 and 200,000 CF "Strike Full" Capacity	2421	Side mounted manure unloading pump for above ground waste storage facility structures between 50,000 and 200,000 CF capacity. Costs include side mounted pump, center agitation unit, and "S-Tube Riser". Includes materials and shipping only.	Each	$45,500.00	1	$45,500.00

Practice: 533 - Pumping Plant

Scenario: #23 - Solids Handling Wastewater Pump up to 2Hp

Scenario Description:

Install a solids handling wastewater pump <or= 2 Hp to transfer wastewater to a storage or treatment area. Costs include pump, delivery, appurtenances, installation. Associated practices include: Waste Transfer (634), Waste Storage Facility (313)

Before Situation:

Wastewater is not collected or contained and is allowed to flow into nearby surface and subsurface water resources.

After Situation:

A submersible 2" solids handling pump with 2" to 3" Discharge, 0.5 to 2 HP is installed.

Feature Measure: Number of Pumps

Scenario Unit: Each

Scenario Typical Size: 1.0

Scenario Total Cost: $3,786.05

Scenario Cost/Unit: $3,786.05

Cost Details:

Component Name	ID	Description	Unit	Cost	QTY	Total
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.	Hours	$37.19	4	$148.76
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.	Hours	$27.56	4	$110.24
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.	Hours	$46.88	2	$93.76
Materials						
Pump, Wastewater, Solids Handling, 1 to 5 HP	2515	Wastewater solid handling pump with 1 to 5 horsepower. Pumping capacity of 100 gallons per minute at 30 feet of Total Dynamic Head. Includes materials and shipping only.	Each	$3,433.29	1	$3,433.29

Practice: 533 - Pumping Plant

Scenario: #24 - Solids Handling Wastewater Pump over 2Hp

Scenario Description:

Install a solids handling wastewater pump > 2Hp to transfer wastewater to a storage or treatment area. Costs include pump, delivery, appurtenances, installation. Associated practices include: Waste Transfer (634), Waste Storage Facility (313)

Before Situation:

Wastewater is not collected or contained and is allowed to flow into nearby surface and subsurface water resources.

After Situation:

A submersible 2" solids handling pump, ressed impeller, with 2" to 3" Discharge, > 2 HP is installed.

Feature Measure: Number of Pumps

Scenario Unit: Each

Scenario Typical Size: 1.0

Scenario Total Cost: $7,693.34

Scenario Cost/Unit: $7,693.34

Cost Details:

Component Name	ID	Description	Unit	Cost	QTY	Total
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.	Hours	$37.19	4	$148.76
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.	Hours	$27.56	4	$110.24
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.	Hours	$46.88	2	$93.76
Materials						
Pump, Wastewater, Solids Handling, > 5 HP	2516	Wastewater solid handling pump greater than 5 horsepower. Pumping capacity of 400 gallons per minute at 40 feet of Total Dynamic Head. Includes materials and shipping only.	Each	$7,340.58	1	$7,340.58

Practice: 548 - Grazing Land Mechanical Treatment

Scenario: #4 - Pastureland Mechanical Treatment

Scenario Description:
This also applies to organic operations as well. Chisel plowing or subsoiling will be used to break the restrictive layers that will increase water infiltration,break up sod and thatch on introduced forages. Depth of treatment will be 1" deeper than the restictive layer.

Before Situation:
Forage growth on pastureland is limited by compacted soils layers and /or dense sod with a thatch build up.

After Situation:
Forage growth is increased due to greater rooting depths and water infiltration.

Feature Measure: area of treatmnent

Scenario Unit: Acres

Scenario Typical Size: 50.0

Scenario Total Cost: $1,511.63

Scenario Cost/Unit: $30.23

Cost Details:

Component Name	ID	Description	Unit	Cost	QTY	Total
Equipment Installation						
Ripper or subsoiler, 16 to 36 inch depth	1235	Deep ripper or subsoiler, (16-36 inches depth) includes tillage implement, power unit and labor.	Acres	$20.71	50	$1,035.50
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.	Hours	$27.56	8	$220.48
Mobilization						
Mobilization, medium equipment	1139	Equipment with 70-150 HP or typical weights between 14,000 and 30,000 pounds.	Each	$255.65	1	$255.65

Practice: 548 - Grazing Land Mechanical Treatment

Scenario: #5 - Range - mechanical less than 5 percent slope

Scenario Description:
Using heavy modified plow or combinations of equipment that modifies physical soil layer or plant conditions on rangelands.

Before Situation:
Desired Ecological plant community is limited by a plant or soil layer that physically restricts change over a threshold.

After Situation:
Desired Ecological plant community has changed by overcoming the threshold or the seeded vegetaion establishes and sustains its function and ecological processes for the life of the practice.

Feature Measure: area of treatment

Scenario Unit: Acres

Scenario Typical Size: 250.0

Scenario Total Cost: $4,703.05

Scenario Cost/Unit: $18.81

Cost Details:

Component Name	ID	Description	Unit	Cost	QTY	Total
Equipment Installation						
Grazingland Renovation, Chiseling	2027	Chiseling on existing grazingland including tillage implement, power unit and labor.	Acres	$13.38	250	$3,345.00
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.	Hours	$27.56	40	$1,102.40
Mobilization						
Mobilization, medium equipment	1139	Equipment with 70-150 HP or typical weights between 14,000 and 30,000 pounds.	Each	$255.65	1	$255.65

Practice: 548 - Grazing Land Mechanical Treatment

Scenario: #7 - Range mechanical more than 5 percent slope

Scenario Description:
On the contour, using mechanical equipment or combinations of equipment that modifies physical soil layer or plant conditions on rangeland.

Before Situation:
Desired Ecological plant community is limited by a plant or soil layer that physically restricts change over a threshold.

After Situation:
Desired Ecological plant community has changed by overcoming the threshold or the seeded vegetation establishes and sustains its function and ecological processes for the life of the practice and geomorphology of the site.

Feature Measure: area of treatment

Scenario Unit: Acres

Scenario Typical Size: 25.0

Scenario Total Cost: $1,864.35

Scenario Cost/Unit: $74.57

Cost Details:

Component Name	ID	Description	Unit	Cost	QTY	Total
Equipment Installation						
Grazingland Renovation, Furrowing	2024	Contour furrowing on existing grazingland including tillage implement, power unit and labor.	Acres	$33.32	25	$833.00
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.	Hours	$27.56	10	$275.60
Materials						
Wire flags	1586	Small vinyl flags attached to wire stakes, typically, 36 in. in length, for marking tree rows	Each	$0.12	100	$12.00
Mobilization						
Mobilization, medium equipment	1139	Equipment with 70-150 HP or typical weights between 14,000 and 30,000 pounds.	Each	$255.65	1	$255.65
Mobilization, large equipment	1140	Equipment >150HP or typical weights greater than 30,000 pounds or loads requiring over width or over length permits.	Each	$488.10	1	$488.10

Practice: 554 - Drainage Water Management

Scenario: #5 - Drainage Water Management (DWM)

Scenario Description:

This scenario is the process of managing water discharges from surface and/or subsurface agricultural drainage systems by reducing nutrient loading into surface waters. Typical systems consist of a 75 acre field with existing drainage tile lines and installed water control structures. The operator goes to the field in order to adjust water control structures (riser boards). While on site the date and adjustment information is recorded/logged. The number of yearly adjustments is based on 6 trips to a field 5 miles from headquarters. The field time to make and record each adjustment is 0.5 hours per structure (including travel time). The typical field will contain 5 water control structures; 3 structures control field water levels and 2 structures control a single denitrifying bioreactor. Resource Concern: Water Quality - Excess Nutrients in surface and ground waters. Associated Practices: 606-Subsurface Drain; 607-Surface Drain, Field Ditch; 608-Surface Drain, Main or Lateral; 587-Structure for Water Control; 590-Nutrient Management .

Before Situation:

Existing drainage systems are in place and water flows uncontrolled.

After Situation:

Existing drainage systems are managed to reduce flow of field drainage waters from the site and reduce nitrate loading by denitrification.

Feature Measure: Number of Control Structures

Scenario Unit: Each

Scenario Typical Size: 5.0

Scenario Total Cost: $593.90

Scenario Cost/Unit: $118.78

Cost Details:

Component Name	ID	Description	Unit	Cost	QTY	Total
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	$109.25	0.33	$36.05
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.	Hours	$37.19	15	$557.85

Practice: 557 - Row Arrangement

Scenario: #1 - Establishing Row Direction, Grade, & Length.

Scenario Description:

Row Arrangement establishes the direction, grade and length for crop rows by setting a baseline by ground survey, GPS, GIS, or other appropriate methods that will provide the planned results to provide drainage, erosion control. Used as part of drainage system, control runoff, reduces soil erosion. Crop rows will be on planned grades and lengths. Direction and length of rows will vary according to local situation. Planner will consider crop, exposure, aspect, flow of water, and use of additional practices. May be used on dryland areas to fully and effectively utilize rainfall. This scenario addresses the resource concern of Soil Erosion / irrigation induced soil erosion / sheet & rill.

Before Situation:

This practice applies to all crop land areas where there is a need for reducing soil erosion ,improving irrigation efficiency, improving drainage and improving production practices which improve energy efficiency and minimize the application of chemicals and nutrients overlapping (Parallel System) while improving the water quality to receiving water bodies. Row arrangement is applied as part of a surface drainage system for a field where the rows are planned to carry runoff to main or lateral drains; to facilitate optimum use of water in graded furrow irrigation systems; in dryland areas where it is necessary to control the grade of rows to more fully utilize available rainfall; on sloping land where control of the length, grade and direction of the rows can help reduce soil erosion, as a stand-alone practice or in conjunction with other conservation practices

After Situation:

Crop rows are established in direction, grade and length by setting a baseline by ground survey, GPS, GIS, or other appropriate methods on approximately 25 acres that will provide the planned results. To remove irregularities on land surface with special equipment, that may require a needed change of length, direction, or slope of crop rows and slope, the field will need to be smoothed or leveled to correct irregularities and address drainage or Irrigation Issues, then other Conservation Practices should be used to address these concerns by using Land Smoothing (466), Precision Land Leveling (462), Irrigation Land Leveling (464), Other associated practices that maybe used are Grassed Waterway (412), Sediment Basin (350), Terrace (600), Filter Strip (393), Irrigation Water Management (449), Grade Stabilization (410), Conservation Cover (327), and Cover Crop (340)

Feature Measure: Area to Set Row Direction, Grade,

Scenario Unit: Acres

Scenario Typical Size: 25.0

Scenario Total Cost: $224.68

Scenario Cost/Unit: $8.99

Cost Details:

Component Name	ID	Description	Unit	Cost	QTY	Total
Equipment Installation						
Truck, Pickup	939	Equipment and power unit costs. Labor not included.	Hours	$24.18	2	$48.36
Tractor, agricultural, 60 HP	963	Agricultural tractor with horsepower range of 50 to 90. Equipment and power unit costs. Labor not included.	Hours	$23.10	2	$46.20
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.	Hours	$37.19	2	$74.38
Equipment Operators, Light	232	Includes: Skid Steer Loaders, Hydraulic Excavators <50 HP, Trenchers <12 in., Ag Equipment <150 HP, Pickup Trucks, Forklifts, Mulchers	Hours	$27.87	2	$55.74

Practice: 558 - Roof Runoff Structure

Scenario: #1 - Roof Gutter, Small

Scenario Description:

A roof runoff structure, consisting of gutter(s) <=6", 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), 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 and downspout 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 aluminum gutter and 6 aluminum downspouts. Cost include aluminum gutter, aluminum downspout, hangers and miscellaneous hardware. Cost also include heavy duty PVC pipe to protect downspout damage by livestock. Underground pipe outlet shall be included with 620 - Underground Outlet.

Feature Measure: Length of Gutter

Scenario Unit: Feet

Scenario Typical Size: 200.0

Scenario Total Cost: $1,876.64

Scenario Cost/Unit: $9.38

Cost Details:

Component Name	ID	Description	Unit	Cost	QTY	Total
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.	Hours	$27.56	16	$440.96
Materials						
Pipe, PVC, 6 in., SCH 40	980	Materials: - 6 inch - PVC - SCH 40 - ASTM D1785	Feet	$6.74	40	$269.60
Gutter, Aluminum, Small	1689	Aluminum gutter (4" to 6") in width with hangers. Materials only.	Feet	$3.34	200	$668.00
Downspout, Aluminum	1700	Aluminum downspout 3 to 5 inch width with hangers. Materials only.	Feet	$2.57	60	$154.20
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	$171.94	2	$343.88

Practice: 558 - Roof Runoff Structure

Scenario: #2 - Roof Gutter, Large

Scenario Description:

A roof runoff structure, consisting of gutter(s) >=6", downspout(s), measures for snow protection (is needed), 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), 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; and/or (4) where a heavy duty gutter system is needed for snow protection.

After Situation:

A gutter and downspout 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 aluminum gutter, snow protection measures, and aluminum downspouts. Cost include aluminum gutter, aluminum downspout, hangers and miscellaneous hardware. Underground pipe outlet shall be included with 620 - Underground Outlet.

Feature Measure: Length of Gutter

Scenario Unit: Feet

Scenario Typical Size: 200.0

Scenario Total Cost: $3,070.06

Scenario Cost/Unit: $15.35

Cost Details:

Component Name	ID	Description	Unit	Cost	QTY	Total
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.	Hours	$27.56	16	$440.96
Materials						
Gutter, Aluminum, Medium	1690	Aluminum gutter (7" to 9") in width with hangers. Materials only.	Feet	$9.63	200	$1,926.00
Downspout, Aluminum	1700	Aluminum downspout 3 to 5 inch width with hangers. Materials only.	Feet	$2.57	60	$154.20
Gutter, Wrap-around Straps	2176	Roof gutter snow and Ice supports, 28 gauge. Materials only.	Each	$4.02	51	$205.02
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	$171.94	2	$343.88

Practice: 558 - Roof Runoff Structure

Scenario: #3 - Concrete Swale

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), 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 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 channel with curbs constructed to divert roof runoff. Concrete curb is 6" high amd extends the length roof (200'). Typically installed to divert "clean" roof runoff away from waste management systems or to stop erosion caused by concentrated roof runoff.

Feature Measure: Length of Swale

Scenario Unit: Feet

Scenario Typical Size: 200.0

Scenario Total Cost: $4,146.18

Scenario Cost/Unit: $20.73

Cost Details:

Component Name	ID	Description	Unit	Cost	QTY	Total
Equipment Installation						
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 Yards	$179.94	15	$2,699.10
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 Yards	$2.31	30	$69.30
Demolition, concrete	1498	Demolition and disposal of reinforced concrete structures including slabs and walls. Includes labor and equipment.	Cubic Yards	$12.29	7.5	$92.18
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	$0.31	300	$93.00
Materials						
Aggregate, Gravel, Graded	46	Gravel, includes materials, equipment and labor to transport and place. Includes washed and unwashed gravel.	Cubic Yards	$45.42	15	$681.30
Mobilization						
Mobilization, medium equipment	1139	Equipment with 70-150 HP or typical weights between 14,000 and 30,000 pounds.	Each	$255.65	2	$511.30

Practice: 558 - Roof Runoff Structure

Scenario: #4 - Trench Drain, 4 in.

Scenario Description:

A roof runoff structure, consisting of a trench filled with rock, with 4 inch 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), 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 tench filled with clean stone w/ 4-8" tile drained. Trench drain typically installed at ground level under the eave of a roof. Outlet from "Trench Drain" to stable outlet shall be covered under 620 - Underground Outlet. Typically installed to divert "clean" roof runoff away from waste management systems or to stop erosion caused by concentrated roof runoff.

Feature Measure: Length of Trench Drained

Scenario Unit: Feet

Scenario Typical Size: 200.0

Scenario Total Cost: $3,129.02

Scenario Cost/Unit: $15.65

Cost Details:

Component Name	ID	Description	Unit	Cost	QTY	Total
Equipment Installation						
Geotextile, woven	42	Woven Geotextile Fabric. Includes materials, equipment and labor	Square Yard	$1.33	222	$295.26
Excavation, Common Earth, side cast, small equipment	48	Bulk excavation and side casting of common earth with hydraulic excavator with less than 1 CY capacity. Includes equipment and labor.	Cubic Yards	$2.31	44	$101.64
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	$0.31	440	$136.40
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.	Hours	$27.56	6	$165.36
Materials						
Aggregate, Gravel, Graded	46	Gravel, includes materials, equipment and labor to transport and place. Includes washed and unwashed gravel.	Cubic Yards	$45.42	44	$1,998.48
Pipe, HDPE, 4 in., PCPT, Single Wall	1270	Pipe, Corrugated Plastic Tubing, Single Wall, Perforated, 4 inch diameter - ASTM F405. Material cost only.	Feet	$0.44	200	$88.00
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	$171.94	2	$343.88

Practice: 558 - Roof Runoff Structure

Scenario: #5 - Trench Drain, 6 in.

Scenario Description:

A roof runoff structure, consisting of a trench filled with rock, with 6 inch 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), 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 tench filled with clean stone w/ 4-8" tile drained. Trench drain typically installed at ground level under the eave of a roof. Outlet from "Trench Drain" to stable outlet shall be covered under 620 - Underground Outlet. Typically installed to divert "clean" roof runoff away from waste management systems or to stop erosion caused by concentrated roof runoff.

Feature Measure: Length of Trench Drained

Scenario Unit: Feet

Scenario Typical Size: 200.0

Scenario Total Cost: $3,275.02

Scenario Cost/Unit: $16.38

Cost Details:

Component Name	ID	Description	Unit	Cost	QTY	Total
Equipment Installation						
Geotextile, woven	42	Woven Geotextile Fabric. Includes materials, equipment and labor	Square Yard	$1.33	222	$295.26
Excavation, Common Earth, side cast, small equipment	48	Bulk excavation and side casting of common earth with hydraulic excavator with less than 1 CY capacity. Includes equipment and labor.	Cubic Yards	$2.31	44	$101.64
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	$0.31	440	$136.40
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.	Hours	$27.56	6	$165.36
Materials						
Aggregate, Gravel, Graded	46	Gravel, includes materials, equipment and labor to transport and place. Includes washed and unwashed gravel.	Cubic Yards	$45.42	44	$1,998.48
Pipe, HDPE, 6 in., PCPT, Single Wall	2548	Pipe, Corrugated Plastic Tubing, Single Wall, Perforated, 6 inch diameter - ASTM F405. Includes material cost only.	Feet	$1.17	200	$234.00
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	$171.94	2	$343.88

Practice: 558 - Roof Runoff Structure

Scenario: #6 - Trench Drain, 8 in.

Scenario Description:

A roof runoff structure, consisting of a trench filled with rock, with 8 inch 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), 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 tench filled with clean stone w/ 4-8" tile drained. Trench drain typically installed at ground level under the eave of a roof. Outlet from "Trench Drain" to stable outlet shall be covered under 620 - Underground Outlet. Typically installed to divert "clean" roof runoff away from waste management systems or to stop erosion caused by concentrated roof runoff.

Feature Measure: Length of Trench Drained

Scenario Unit: Feet

Scenario Typical Size: 200.0

Scenario Total Cost: $3,399.02

Scenario Cost/Unit: $17.00

Cost Details:

Component Name	ID	Description	Unit	Cost	QTY	Total
Equipment Installation						
Geotextile, woven	42	Woven Geotextile Fabric. Includes materials, equipment and labor	Square Yard	$1.33	222	$295.26
Excavation, Common Earth, side cast, small equipment	48	Bulk excavation and side casting of common earth with hydraulic excavator with less than 1 CY capacity. Includes equipment and labor.	Cubic Yards	$2.31	44	$101.64
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	$0.31	440	$136.40
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.	Hours	$27.56	6	$165.36
Materials						
Aggregate, Gravel, Graded	46	Gravel, includes materials, equipment and labor to transport and place. Includes washed and unwashed gravel.	Cubic Yards	$45.42	44	$1,998.48
Pipe, HDPE, 8 in,, PCPT, Single Wall	1272	Pipe, Corrugated Plastic Tubing, Single Wall, Perforated, 8 inch diameter - ASTM F667. Material cost only.	Feet	$1.79	200	$358.00
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	$171.94	2	$343.88

Practice: 560 - Access Road

Scenario: #1 - New earth road in dry, level terrain.

Scenario Description:

Newly constructed compacted earth road in relatively level terrain and dry areas. Terrain should be considered level for slopes of 0-5%. A properly constructed, well defined access road will address resource concerns related with compaction, emissions of fugitive dust, and excessive sediment in surface water. It also improves the plant productivity, vigor and health and substantially reduces the chance of wild fire hazards. Short term air quality deterioration may result if proper dust control measures are not implemented during the practice installation. Costs include excavation, shaping, grading, surface material, vegetation of disturbed areas, and all equipment, labor and incidental materials necessary to install the practice.

Before Situation:

An agricultural enterprise which requires, but does not have, a fixed travelway for equipment and vehicles for various resource activities and where use of equipment and vehicles within the enterprise without a defined access road would result in compaction, excessive sediment and turbidity in surface water, reduced visibility, and emissions of fugitive dust. This scenario is applicable where the resource activity areas consist of relatively dry and level terrain lands.

After Situation:

The road will be 14 feet wide at the top, mostly in embankment less than 3 feet in height, (average 2 ft) typical side slopes 2:1. A properly constructed, well defined access road will greatly reduce or eliminate compaction in land use areas where it is harmful, reduce emissions of fugitive dust and also reduce excessive sediment in surface water by reducing uncontrolled sediment transport and improving drainage of irrigated lands. Planned grades will include all dips and water bars. If clearing and grubbing of land in the alignment area is required, use Land Clearing (460). Pipe culverts installed as part of access road should be covered by either Structures for Water Control (587) or Stream Crossings (578) depending on the type of structure. Earthfill embankment above the culvert structure would still be covered by this Practice. Diversions constructed as part of access road should be covered by Diversion (362). All seeding or revegetation of disturbed areas is provided. Dust control must be addressed under Dust Control on Unpaved Roads and Surfaces (373). Mulching should be addressed under Mulching (484).

Feature Measure: Length of Roadway

Scenario Unit: Feet

Scenario Typical Size: 500.0

Scenario Total Cost: $4,654.38

Scenario Cost/Unit: $9.31

Cost Details:

Component Name	ID	Description	Unit	Cost	QTY	Total
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 Yards	$2.31	210	$485.10
Earthfill, Roller Compacted	49	Earthfill, roller or machine compacted, includes equipment and labor	Cubic Yards	$4.66	670	$3,122.20
Fertilizer, ground application, dry bulk	950	Dry bulk fertilizer application performed by ground equipment. Includes equipment, power unit and labor costs.	Acres	$6.63	0.12	$0.80
Lime application	953	Lime application performed by ground equipment. Includes equipment, power unit and labor costs.	Acres	$8.21	0.12	$0.99
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.	Hours	$37.19	10	$371.90
Materials						
Native Perennial Grasses, Low Density	2750	Native perennial grasses, may include a small percentage of annual species for establishment purposes and/or if allowed by the CPS. Planted at lower to medium density (40 pure live seeds/sq ft and less). Includes material and shipping.	Acres	$111.33	0.12	$13.36
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	$171.94	1	$171.94
Mobilization, large equipment	1140	Equipment >150HP or typical weights greater than 30,000 pounds or loads requiring over width or over length permits.	Each	$488.10	1	$488.10

Practice: 560 - Access Road

Scenario: #2 - New 12 inch gravel road in soft, level terrain

Scenario Description:

Newly Constructed gravel road with min. 12 inch thick compacted gravel surface over geotextile in relatively level ground in soft areas. Terrain should be considered level for slopes of 0-5%. A properly constructed, well defined access road will address resource concerns related with compaction, emissions of fugitive dust, and excessive sediment in surface water. It also improves the plant productivity, vigor and health and substantially reduces the chance of wild fire hazards. Short term air quality deterioration may result if proper dust control measures are not implemented during the practice installation. Costs include excavation, shaping, grading, surface material, vegetation of disturbed areas, and all equipment, labor and incidental materials necessary to install the practice.

Before Situation:

An agricultural enterprise which requires, but does not have, a fixed travel way for equipment and vehicles for various resource activities and where use of equipment and vehicles within the enterprise without a defined access road would result in compaction, excessive sediment and turbidity in surface water, reduced visibility, and emissions of fugitive dust. This scenario is applicable where the resource activity areas consist of relatively wet and swampy but level terrain lands.

After Situation:

The road will be 14 feet wide with geotextile and 12 inch gravel surfacing at the top. It is mostly in embankment less than 3 feet in height, (average 2 ft) typical side slopes 2:1. A properly constructed, well defined access road will greatly reduce sheet, rill and wind erosion, eliminate compaction in land use areas where it is harmful, reduce emissions of particulate matter (PM) and PM precursors and also reduce excessive sediment in surface water by reducing uncontrolled sediment transport. Planned grades will include all dips and water bars. If clearing and grubbing of land in the alignment area is required, use Land Clearing (460). Pipe culverts installed as part of access road should be covered by either Structures for Water Control (587) or Stream Crossings (578) depending on the type of structure. Earthfill embankment above the culvert structure would still be covered by this Practice. Diversions constructed as part of access road should be covered by Diversion (362). All seeding or revegetation of disturbed areas is provided. Dust control must be addressed under Dust Control on Unpaved Roads and Surfaces (373). Mulching should be addressed under Mulching (484).

Feature Measure: Length of Roadway

Scenario Unit: Feet

Scenario Typical Size: 500.0

Scenario Total Cost: $15,033.89

Scenario Cost/Unit: $30.07

Cost Details:

Component Name	ID	Description	Unit	Cost	QTY	Total
Equipment Installation						
Geotextile, woven	42	Woven Geotextile Fabric. Includes materials, equipment and labor	Square Yard	$1.33	1000	$1,330.00
Earthfill, Roller Compacted	49	Earthfill, roller or machine compacted, includes equipment and labor	Cubic Yards	$4.66	410	$1,910.60
Fertilizer, ground application, dry bulk	950	Dry bulk fertilizer application performed by ground equipment. Includes equipment, power unit and labor costs.	Acres	$6.63	0.12	$0.80
Lime application	953	Lime application performed by ground equipment. Includes equipment, power unit and labor costs.	Acres	$8.21	0.12	$0.99
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 Yards	$4.58	210	$961.80
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.	Hours	$37.19	10	$371.90
Materials						
Aggregate, Gravel, Ungraded, Quarry Run	1099	Includes materials, equipment and labor	Cubic Yards	$34.43	275	$9,468.25
Native Perennial Grasses, Low Density	2750	Native perennial grasses, may include a small percentage of annual species for establishment purposes and/or if allowed by the CPS. Planted at lower to medium density (40 pure live seeds/sq ft and less). Includes material and shipping.	Acres	$111.33	0.12	$13.36
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	$488.10	2	$976.20

Practice: 560 - Access Road

Scenario: #3 - New geocell road in soft, level terrain

Scenario Description:

Newly Constructed geotextile, gravel, and geocell road with min. 6 inch thick compacted gravel with geocell surface in relatively level ground in soft areas. Terrain should be considered level for slopes of 0-5%. A properly constructed, well defined access road will address resource concerns related with compaction, emissions of fugitive dust, and excessive sediment in surface water. It also improves the plant productivity, vigor and health and substantially reduces the chance of wild fire hazards. Short term air quality deterioration may result if proper dust control measures are not implemented during the practice installation. Costs include excavation, shaping, grading, surface material, vegetation of disturbed areas, and all equipment, labor and incidental materials necessary to install the practice.

Before Situation:

An agricultural enterprise which requires, but does not have, a fixed travel way for equipment and vehicles for various resource activities and where use of equipment and vehicles within the enterprise without a defined access road would result in compaction, excessive sediment and turbidity in surface water, reduced visibility, and emissions of fugitive dust. This scenario is applicable where the resource activity areas consist of relatively wet and swampy but level terrain lands.

After Situation:

The road will be 14 feet wide with geotextile, 6 inch gravel, and geocell surfacing. It is mostly in embankment less than 3 feet in height, (average 2 ft) typical side slopes 2:1. A properly constructed, well defined access road will greatly reduce sheet, rill and wind erosion, eliminate compaction in land use areas where it is harmful, reduce emissions of particulate matter (PM) and PM precursors and also reduce excessive sediment in surface water by reducing uncontrolled sediment transport. Planned grades will include all dips and water bars. If clearing and grubbing of land in the alignment area is required, use Land Clearing (460). Pipe culverts installed as part of access road should be covered by either Structures for Water Control (587) or Stream Crossings (578) depending on the type of structure. Earthfill embankment above the culvert structure would still be covered by this Practice. Diversions constructed as part of access road should be covered by Diversion (362). All seeding or revegetation of disturbed areas is provided. Dust control must be addressed under Dust Control on Unpaved Roads and Surfaces (373). Mulching should be addressed under Mulching (484).

Feature Measure: Length of Roadway

Scenario Unit: Feet

Scenario Typical Size: 500.0

Scenario Total Cost: $35,086.89

Scenario Cost/Unit: $70.17

Cost Details:

Component Name	ID	Description	Unit	Cost	QTY	Total
Equipment Installation						
Geotextile, woven	42	Woven Geotextile Fabric. Includes materials, equipment and labor	Square Yard	$1.33	1000	$1,330.00
Earthfill, Roller Compacted	49	Earthfill, roller or machine compacted, includes equipment and labor	Cubic Yards	$4.66	410	$1,910.60
Fertilizer, ground application, dry bulk	950	Dry bulk fertilizer application performed by ground equipment. Includes equipment, power unit and labor costs.	Acres	$6.63	0.12	$0.80
Lime application	953	Lime application performed by ground equipment. Includes equipment, power unit and labor costs.	Acres	$8.21	0.12	$0.99
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 Yards	$4.58	210	$961.80
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.	Hours	$37.19	10	$371.90
Materials						
Aggregate, Gravel, Ungraded, Quarry Run	1099	Includes materials, equipment and labor	Cubic Yards	$34.43	175	$6,025.25
Geocell, 6 inch	1842	6-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	$29.37	800	$23,496.00
Native Perennial Grasses, Low Density	2750	Native perennial grasses, may include a small percentage of annual species for establishment purposes and/or if allowed by the CPS. Planted at lower to medium density (40 pure live seeds/sq ft and less). Includes material and shipping.	Acres	$111.33	0.12	$13.36
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	$488.10	2	$976.20

Practice: 560 - Access Road

Scenario: #4 - Rehabilitation of existing earth road in dry, level terrain

Scenario Description:

Repair and rehabilitation of compacted earth road in existing alignment in dry, level terrain. Terrain should be considered level for slopes of 0-5%. The extent of construction work over an existing alignment is assumed to average 30% of the work for a new installation. A properly constructed, well defined access road will address resource concerns related with compaction, emissions of fugitive dust, and excessive sediment in surface water. It also improves the plant productivity, vigor and health and substantially reduces the chance of wild fire hazards. Short term air quality deterioration may result if proper dust control measures are not implemented during the practice installation. Costs include excavation, shaping, grading, surface material, vegetation of disturbed areas, and all equipment, labor and incidental materials necessary to install the practice.

Before Situation:

An agricultural enterprise with an existing access road which is beyond its useful lifespan, can no longer be used as intended without rehabilitation. If left in its current condition , it will result in continued compaction, excessive sediment in surface water and emissions of fugitive dusts. This scenario is applicable where the resource activity areas with an existing but dilapidated access road consist of relatively dry and level terrain lands.

After Situation:

The damaged portions of the road will be repaired to a full 14 feet width at the top, mostly in embankment less than 3 feet in height, (average 2 ft), typical side slopes 2:1. A properly repaired access road will greatly reduce or eliminate compaction in land use areas where it is harmful, reduce emissions of fugitive dust and also reduce excessive sediment in surface water by reducing uncontrolled sediment transport and improving drainage of irrigated lands. Planned grades will include all dips and water bars. If clearing and grubbing of land in the alignment area is required, use Land Clearing (460). Pipe culverts installed as part of access road should be covered by either Structures for Water Control (587) or Stream Crossings (578) depending on the type of structure. Earthfill embankment above the culvert structure would still be covered by this Practice. Diversions constructed as part of access road should be covered by Diversion (362). All seeding or revegetation of disturbed areas is provided. Dust control must be addressed under Dust Control on Unpaved Roads and Surfaces (373). Mulching should be addressed under Mulching (484).

Feature Measure: Length of Roadway

Scenario Unit: Feet

Scenario Typical Size: 500.0

Scenario Total Cost: $2,152.53

Scenario Cost/Unit: $4.31

Cost Details:

Component Name	ID	Description	Unit	Cost	QTY	Total
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 Yards	$2.31	65	$150.15
Earthfill, Roller Compacted	49	Earthfill, roller or machine compacted, includes equipment and labor	Cubic Yards	$4.66	205	$955.30
Fertilizer, ground application, dry bulk	950	Dry bulk fertilizer application performed by ground equipment. Includes equipment, power unit and labor costs.	Acres	$6.63	0.12	$0.80
Lime application	953	Lime application performed by ground equipment. Includes equipment, power unit and labor costs.	Acres	$8.21	0.12	$0.99
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.	Hours	$37.19	10	$371.90
Materials						
Native Perennial Grasses, Low Density	2750	Native perennial grasses, may include a small percentage of annual species for establishment purposes and/or if allowed by the CPS. Planted at lower to medium density (40 pure live seeds/sq ft and less). Includes material and shipping.	Acres	$111.33	0.12	$13.36
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	$171.94	1	$171.94
Mobilization, large equipment	1140	Equipment >150HP or typical weights greater than 30,000 pounds or loads requiring over width or over length permits.	Each	$488.10	1	$488.10

Practice: 560 - Access Road

Scenario: #5 - Rehabilitation of existing road using gravel in soft, level terrain

Scenario Description:

Repair and rehabilitation of a compacted earth or gravel road where it is determined that gravel is needed for the repair with min. 12 inch thick compacted gravel surface over geotextile on existing alignment in soft, level terrain. Terrain should be considered level for slopes of 0-5%. The extent of construction work over an existing alignment is assumed to average 30% of the work for a new installation. A properly constructed, well defined access road will address resource concerns related with compaction, emissions of fugitive dust, and excessive sediment in surface water. It also improves the plant productivity, vigor and health and substantially reduces the chance of wild fire hazards. Short term air quality deterioration may result if proper dust control measures are not implemented during the practice installation. Costs include excavation, shaping, grading, surface materials, vegetation of disturbed areas, and all equipment, labor and incidental materials necessary to install the practice.

Before Situation:

An agricultural enterprise with an existing access road which is beyond its useful lifespan, can no longer be used as intended without rehabilitation. If left in its current condition , it will result in continued compaction, excessive sediment in surface water and emissions of fugitive dusts. This scenario is applicable where the resource activity areas with an existing but dilapidated access road consist of relatively wet and swampy but level terrain lands.

After Situation:

The damaged portions of the road will be repaired to a full 14 feet width with a geotextile and 12" gravel surface at the top, mostly in embankment less than 3 feet in height, (average 2 ft), typical side slopes 2:1. A properly repaired access road will greatly reduce or eliminate compaction in land use areas where it is harmful, reduce emissions of fugitive dust and also reduce excessive sediment in surface water by reducing uncontrolled sediment transport and improving drainage of irrigated lands. Planned grades will include all dips and water bars. If clearing and grubbing of land in the alignment area is required, use Land Clearing (460). Pipe culverts installed as part of access road should be covered by either Structures for Water Control (587) or Stream Crossings (578) depending on the type of structure. Earthfill embankment above the culvert structure would still be covered by this Practice. Diversions constructed as part of access road should be covered by Diversion (362). All seeding or revegetation of disturbed areas is provided.. Dust control must be addressed under Dust Control on Unpaved Roads and Surfaces (373). Mulching should be addressed under Mulching (484).

Feature Measure: Length of Roadway

Scenario Unit: Feet

Scenario Typical Size: 500.0

Scenario Total Cost: $5,568.99

Scenario Cost/Unit: $11.14

Cost Details:

Component Name	ID	Description	Unit	Cost	QTY	Total
Equipment Installation						
Geotextile, woven	42	Woven Geotextile Fabric. Includes materials, equipment and labor	Square Yard	$1.33	300	$399.00
Earthfill, Roller Compacted	49	Earthfill, roller or machine compacted, includes equipment and labor	Cubic Yards	$4.66	125	$582.50
Fertilizer, ground application, dry bulk	950	Dry bulk fertilizer application performed by ground equipment. Includes equipment, power unit and labor costs.	Acres	$6.63	0.12	$0.80
Lime application	953	Lime application performed by ground equipment. Includes equipment, power unit and labor costs.	Acres	$8.21	0.12	$0.99
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 Yards	$4.58	65	$297.70
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.	Hours	$37.19	10	$371.90
Materials						
Aggregate, Gravel, Ungraded, Quarry Run	1099	Includes materials, equipment and labor	Cubic Yards	$34.43	85	$2,926.55
Native Perennial Grasses, Low Density	2750	Native perennial grasses, may include a small percentage of annual species for establishment purposes and/or if allowed by the CPS. Planted at lower to medium density (40 pure live seeds/sq ft and less). Includes material and shipping.	Acres	$111.33	0.12	$13.36
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	$488.10	2	$976.20

Practice: 560 - Access Road

Scenario: #6 - Rehabilitation of existing road using geocell in soft, level terrain

Scenario Description:

Repair and rehabilitation of compacted earth, gravel, or geocell road where it is determined that geocell is required for the repair with min. 6 inch thick compacted gravel with geocell surface on existing alignment in soft, level terrain. Terrain should be considered level for slopes of 0-5%. The extent of construction work over an existing alignment is assumed to average 30% of the work for a new installation. A properly constructed, well defined access road will address resource concerns related with compaction, emissions of fugitive dust, and excessive sediment in surface water. It also improves the plant productivity, vigor and health and substantially reduces the chance of wild fire hazards. Short term air quality deterioration may result if proper dust control measures are not implemented during the practice installation. Costs include excavation, shaping, grading, surface material, vegetation of disturbed areas, and all equipment, labor and incidental materials necessary to install the practice.

Before Situation:

An agricultural enterprise with an existing access road which is beyond its useful lifespan, can no longer be used as intended without rehabilitation. If left in its current condition , it will result in continued compaction, excessive sediment in surface water and emissions of fugitive dusts. This scenario is applicable where the resource activity areas with an existing but dilapidated access road consist of relatively wet and swampy but level terrain lands.

After Situation:

The road will be 14 feet wide with geotextile, 6 inch gravel, and geocell surfacing. It is mostly in embankment less than 3 feet in height, (average 2 ft) typical side slopes 2:1. A properly constructed, well defined access road will greatly reduce sheet, rill and wind erosion, eliminate compaction in land use areas where it is harmful, reduce emissions of particulate matter (PM) and PM precursors and also reduce excessive sediment in surface water by reducing uncontrolled sediment transport. Planned grades will include all dips and water bars. If clearing and grubbing of land in the alignment area is required, use Land Clearing (460). Pipe culverts installed as part of access road should be covered by either Structures for Water Control (587) or Stream Crossings (578) depending on the type of structure. Earthfill embankment above the culvert structure would still be covered by this Practice. Diversions constructed as part of access road should be covered by Diversion (362). All seeding or revegetation of disturbed areas is provided. Dust control must be addressed under Dust Control on Unpaved Roads and Surfaces (373). Mulching should be addressed under Mulching (484).

Feature Measure: Length of Roadway

Scenario Unit: Feet

Scenario Typical Size: 500.0

Scenario Total Cost: $11,584.89

Scenario Cost/Unit: $23.17

Cost Details:

Component Name	ID	Description	Unit	Cost	QTY	Total
Equipment Installation						
Geotextile, woven	42	Woven Geotextile Fabric. Includes materials, equipment and labor	Square Yard	$1.33	300	$399.00
Earthfill, Roller Compacted	49	Earthfill, roller or machine compacted, includes equipment and labor	Cubic Yards	$4.66	125	$582.50
Fertilizer, ground application, dry bulk	950	Dry bulk fertilizer application performed by ground equipment. Includes equipment, power unit and labor costs.	Acres	$6.63	0.12	$0.80
Lime application	953	Lime application performed by ground equipment. Includes equipment, power unit and labor costs.	Acres	$8.21	0.12	$0.99
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 Yards	$4.58	65	$297.70
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.	Hours	$37.19	10	$371.90
Materials						
Aggregate, Gravel, Ungraded, Quarry Run	1099	Includes materials, equipment and labor	Cubic Yards	$34.43	55	$1,893.65
Geocell, 6 inch	1842	6-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	$29.37	240	$7,048.80
Native Perennial Grasses, Low Density	2750	Native perennial grasses, may include a small percentage of annual species for establishment purposes and/or if allowed by the CPS. Planted at lower to medium density (40 pure live seeds/sq ft and less). Includes material and shipping.	Acres	$111.33	0.12	$13.36
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	$488.10	2	$976.20

Practice: 560 - Access Road

Scenario: #7 - New earth road in dry, sloped terrain

Scenario Description:

Newly constructed compacted earth road in steep sloped terrain but relatively dry areas. Terrain should be considered sloped for slopes of >5%. A properly constructed, well defined access road will address resource concerns related with compaction, emissions of fugitive dust, and excessive sediment in surface water. It also improves the plant productivity, vigor and health and substantially reduces the chance of wild fire hazards. Short term air quality deterioration may result if proper dust control measures are not implemented during the practice installation. Costs include excavation, shaping, grading, surface material, vegetation of disturbed areas, and all equipment, labor and incidental materials necessary to install the practice.

Before Situation:

An agricultural enterprise which requires, but does not have, a fixed travelway for equipment and vehicles for various resource activities and where use of equipment and vehicles within the enterprise without a defined access road would result in compaction, excessive sediment and turbidity in surface water, reduced visibility, and emissions of fugitive dust. This scenario is applicable where the resource activity areas consist of relatively dry lands with steep slopes.

After Situation:

The road will be 14 feet wide at the top, 50% in embankment and 50% in excavation less than 3 feet in height, (average 2 ft) typical cut and fill side slopes 2:1. Out of total excavation, 60% is considered common earth and 40% hard dig or rocks. A properly constructed, well defined access road will greatly reduce or eliminate compaction in land use areas where it is harmful, reduce emissions of fugitive dust and also reduce excessive sediment in surface water by reducing uncontrolled sediment transport and improving drainage of irrigated lands. Planned grades will include all dips and water bars. If clearing and grubbing of land in the alignment area is required, use Land Clearing (460). Pipe culverts installed as part of access road should be covered by either Structures for Water Control (587) or Stream Crossings (578) depending on the type of structure. Earthfill embankment above the culvert structure would still be covered by this Practice. Diversions constructed as part of access road should be covered by Diversion (362). All seeding or revegetation of disturbed areas is provided. Dust control must be addressed under Dust Control on Unpaved Roads and Surfaces (373). Mulching should be addressed under Mulching (484).

Feature Measure: Length of Roadway

Scenario Unit: Feet

Scenario Typical Size: 500.0

Scenario Total Cost: $6,321.93

Scenario Cost/Unit: $12.64

Cost Details:

Component Name	ID	Description	Unit	Cost	QTY	Total
Equipment Installation						
Excavation, Rock, Ripping	47	Excavation, rock, mechanical ripping, includes equipment and labor	Cubic Yards	$4.68	265	$1,240.20
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 Yards	$2.31	395	$912.45
Earthfill, Roller Compacted	49	Earthfill, roller or machine compacted, includes equipment and labor	Cubic Yards	$4.66	670	$3,122.20
Fertilizer, ground application, dry bulk	950	Dry bulk fertilizer application performed by ground equipment. Includes equipment, power unit and labor costs.	Acres	$6.63	0.12	$0.80
Lime application	953	Lime application performed by ground equipment. Includes equipment, power unit and labor costs.	Acres	$8.21	0.12	$0.99
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.	Hours	$37.19	10	$371.90
Materials						
Native Perennial Grasses, Low Density	2750	Native perennial grasses, may include a small percentage of annual species for establishment purposes and/or if allowed by the CPS. Planted at lower to medium density (40 pure live seeds/sq ft and less). Includes material and shipping.	Acres	$111.33	0.12	$13.36
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	$171.94	1	$171.94
Mobilization, large equipment	1140	Equipment >150HP or typical weights greater than 30,000 pounds or loads requiring over width or over length permits.	Each	$488.10	1	$488.10

Practice: 560 - Access Road

Scenario: #8 - New 12 inch gravel road in soft, sloped terrain

Scenario Description:

Newly Constructed gravel road with min. 12 inch thick compacted gravel surface over geotextile in steep sloped ground in soft areas. Terrain should be considered sloped for slopes of >5%. A properly constructed, well defined access road will address resource concerns related with compaction, emissions of fugitive dust, and excessive sediment in surface water. It also improves the plant productivity, vigor and health and substantially reduces the chance of wild fire hazards. Short term air quality deterioration may result if proper dust control measures are not implemented during the practice installation. Costs include excavation, shaping, grading, surface material, vegetation of disturbed areas, and all equipment, labor and incidental materials necessary to install the practice.

Before Situation:

An agricultural enterprise which requires, but does not have, a fixed travelway for equipment and vehicles for various resource activities and where use of equipment and vehicles within the enterprise without a defined access road would result in compaction, excessive sediment and turbidity in surface water, reduced visibility, and emissions of fugitive dust. This scenario is applicable where the resource activity areas consist of wet and swampy land areas with steep sloped terrain.

After Situation:

The road will be 14 feet wide with a geotextile and 12 inch gravel surfacing at the top. It is 50% in embankment and 50% in excavation less than 3 feet in height, (average 2 ft) typical side slopes 2:1. Out of total excavation, 60% is considered common earth and 40% hard dig or rocks. A properly constructed, well defined access road will greatly reduce sheet, rill and wind erosion, eliminate compaction in land use areas where it is harmful, reduce emissions of particulate matter (PM) and PM precursors and also reduce excessive sediment in surface water by reducing uncontrolled sediment transport. Planned grades will include all dips and water bars. If clearing and grubbing of land in the alignment area is required, use Land Clearing (460). Pipe culverts installed as part of access road should be covered by either Structures for Water Control (587) or Stream Crossings (578) depending on the type of structure. Earthfill embankment above the culvert structure would still be covered by this Practice. Diversions constructed as part of access road should be covered by Diversion (362). All seeding or revegetation of disturbed areas is provided. Dust control must be addressed under Dust Control on Unpaved Roads and Surfaces (373). Mulching should be addressed under Mulching (484).

Feature Measure: Length of Roadway

Scenario Unit: Feet

Scenario Typical Size: 500.0

Scenario Total Cost: $17,121.39

Scenario Cost/Unit: $34.24

Cost Details:

Component Name	ID	Description	Unit	Cost	QTY	Total
Equipment Installation						
Geotextile, woven	42	Woven Geotextile Fabric. Includes materials, equipment and labor	Square Yard	$1.33	1000	$1,330.00
Excavation, Rock, Ripping	47	Excavation, rock, mechanical ripping, includes equipment and labor	Cubic Yards	$4.68	265	$1,240.20
Earthfill, Roller Compacted	49	Earthfill, roller or machine compacted, includes equipment and labor	Cubic Yards	$4.66	410	$1,910.60
Fertilizer, ground application, dry bulk	950	Dry bulk fertilizer application performed by ground equipment. Includes equipment, power unit and labor costs.	Acres	$6.63	0.12	$0.80
Lime application	953	Lime application performed by ground equipment. Includes equipment, power unit and labor costs.	Acres	$8.21	0.12	$0.99
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 Yards	$4.58	395	$1,809.10
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.	Hours	$37.19	10	$371.90
Materials						
Aggregate, Gravel, Ungraded, Quarry Run	1099	Includes materials, equipment and labor	Cubic Yards	$34.43	275	$9,468.25
Native Perennial Grasses, Low Density	2750	Native perennial grasses, may include a small percentage of annual species for establishment purposes and/or if allowed by the CPS. Planted at lower to medium density (40 pure live seeds/sq ft and less). Includes material and shipping.	Acres	$111.33	0.12	$13.36
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	$488.10	2	$976.20

Practice: 560 - Access Road

Scenario: #9 - New geocell road in soft, sloped terrain

Scenario Description:

Newly Constructed geotextile, gravel, and geocell road with min. 6 inch thick compacted gravel and geocell surface in steep sloped ground in soft areas. Terrain should be considered sloped for slopes of >5%. A properly constructed, well defined access road will address resource concerns related with compaction, emissions of fugitive dust, and excessive sediment in surface water. It also improves the plant productivity, vigor and health and substantially reduces the chance of wild fire hazards. Short term air quality deterioration may result if proper dust control measures are not implemented during the practice installation. Costs include excavation, shaping, grading, surface material, vegetation of disturbed areas, and all equipment, labor and incidental materials necessary to install the practice.

Before Situation:

An agricultural enterprise which requires, but does not have, a fixed travel way for equipment and vehicles for various resource activities and where use of equipment and vehicles within the enterprise without a defined access road would result in compaction, excessive sediment and turbidity in surface water, reduced visibility, and emissions of fugitive dust. This scenario is applicable where the resource activity areas consist of relatively wet and swampy but level terrain lands.

After Situation:

The road will be 14 feet wide with geotextile, 6 inch gravel, and geocell surfacing. It is mostly in embankment less than 3 feet in height, (average 2 ft) typical side slopes 2:1. Out of total excavation, 60% is considered common earth and 40% hard dig or rocks. A properly constructed, well defined access road will greatly reduce sheet, rill and wind erosion, eliminate compaction in land use areas where it is harmful, reduce emissions of particulate matter (PM) and PM precursors and also reduce excessive sediment in surface water by reducing uncontrolled sediment transport. Planned grades will include all dips and water bars. If clearing and grubbing of land in the alignment area is required, use Land Clearing (460). Pipe culverts installed as part of access road should be covered by either Structures for Water Control (587) or Stream Crossings (578) depending on the type of structure. Earthfill embankment above the culvert structure would still be covered by this Practice. Diversions constructed as part of access road should be covered by Diversion (362). All seeding or revegetation of disturbed areas is provided. Dust control must be addressed under Dust Control on Unpaved Roads and Surfaces (373). Mulching shoud be addressed under Mulching (484).

Feature Measure: Length of Roadway

Scenario Unit: Feet

Scenario Typical Size: 500.0

Scenario Total Cost: $37,174.39

Scenario Cost/Unit: $74.35

Cost Details:

Component Name	ID	Description	Unit	Cost	QTY	Total
Equipment Installation						
Geotextile, woven	42	Woven Geotextile Fabric. Includes materials, equipment and labor	Square Yard	$1.33	1000	$1,330.00
Excavation, Rock, Ripping	47	Excavation, rock, mechanical ripping, includes equipment and labor	Cubic Yards	$4.68	265	$1,240.20
Earthfill, Roller Compacted	49	Earthfill, roller or machine compacted, includes equipment and labor	Cubic Yards	$4.66	410	$1,910.60
Fertilizer, ground application, dry bulk	950	Dry bulk fertilizer application performed by ground equipment. Includes equipment, power unit and labor costs.	Acres	$6.63	0.12	$0.80
Lime application	953	Lime application performed by ground equipment. Includes equipment, power unit and labor costs.	Acres	$8.21	0.12	$0.99
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 Yards	$4.58	395	$1,809.10
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.	Hours	$37.19	10	$371.90
Materials						
Aggregate, Gravel, Ungraded, Quarry Run	1099	Includes materials, equipment and labor	Cubic Yards	$34.43	175	$6,025.25
Geocell, 6 inch	1842	6-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	$29.37	800	$23,496.00
Native Perennial Grasses, Low Density	2750	Native perennial grasses, may include a small percentage of annual species for establishment purposes and/or if allowed by the CPS. Planted at lower to medium density (40 pure live seeds/sq ft and less). Includes material and shipping.	Acres	$111.33	0.12	$13.36
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	$488.10	2	$976.20

Practice: 560 - Access Road

Scenario: #10 - Rehabilitation of existing earth road in wet, sloped terrain

Scenario Description:

Repair and rehabilitation of compacted earth road in existing alignment in relatively dry but steep sloped terrain. Terrain should be considered sloped for slopes of >5%. The extent of construction work over an existing alignment is assumed to average 30% of the work for a new installation. A properly constructed, well defined access road will address resource concerns related with compaction, emissions of fugitive dust, and excessive sediment in surface water. It also improves the plant productivity, vigor and health and substantially reduces the chance of wild fire hazards. Short term air quality deterioration may result if proper dust control measures are not implemented during the practice installation. Costs include excavation, shaping, grading, surface material, vegetation of disturbed areas, and all equipment, labor and incidental materials necessary to install the practice.

Before Situation:

An agricultural enterprise with an existing access road which is beyond its useful lifespan, can no longer be used as intended without rehabilitation. If left in its current condition , it will result in continued compaction, excessive sediment in surface water and emissions of fugitive dusts. This scenario is applicable where the resource activity areas with an existing but dilapidated access road consist of relatively dry lands with steep sloped terrain.

After Situation:

The damaged portions of the road will be repaired to a full 14 feet width at the top, 50% in embankment and 50% in excavation less than 3 feet in height, (average 2 ft), typical side slopes 2:1. Out of total excavation, 60% is considered common earth excavation and 40% hard dig or rocks. A properly repaired access road will greatly reduce or eliminate compaction in land use areas where it is harmful, reduce emissions of fugitive dust and also reduce excessive sediment in surface water by reducing uncontrolled sediment transport and improving drainage of irrigated lands. Planned grades will include all dips and water bars. If clearing and grubbing of land in the alignment area is required, use Land Clearing (460). Pipe culverts installed as part of access road should be covered by either Structures for Water Control (587) or Stream Crossings (578) depending on the type of structure. Earthfill embankment above the culvert structure would still be covered by this Practice. Diversions constructed as part of access road should be covered by Diversion (362). All seeding or revegetation of disturbed areas is provided. Dust control must be addressed under Dust Control on Unpaved Roads and Surfaces (373). Mulching should be addressed under Mulching (484).

Feature Measure: Length of Roadway

Scenario Unit: Feet

Scenario Typical Size: 500.0

Scenario Total Cost: $2,630.68

Scenario Cost/Unit: $5.26

Cost Details:

Component Name	ID	Description	Unit	Cost	QTY	Total
Equipment Installation						
Excavation, Rock, Ripping	47	Excavation, rock, mechanical ripping, includes equipment and labor	Cubic Yards	$4.68	80	$374.40
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 Yards	$2.31	120	$277.20
Earthfill, Roller Compacted	49	Earthfill, roller or machine compacted, includes equipment and labor	Cubic Yards	$4.66	200	$932.00
Fertilizer, ground application, dry bulk	950	Dry bulk fertilizer application performed by ground equipment. Includes equipment, power unit and labor costs.	Acres	$6.63	0.12	$0.80
Lime application	953	Lime application performed by ground equipment. Includes equipment, power unit and labor costs.	Acres	$8.21	0.12	$0.99
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.	Hours	$37.19	10	$371.90
Materials						
Native Perennial Grasses, Low Density	2750	Native perennial grasses, may include a small percentage of annual species for establishment purposes and/or if allowed by the CPS. Planted at lower to medium density (40 pure live seeds/sq ft and less). Includes material and shipping.	Acres	$111.33	0.12	$13.36
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	$171.94	1	$171.94
Mobilization, large equipment	1140	Equipment >150HP or typical weights greater than 30,000 pounds or loads requiring over width or over length permits.	Each	$488.10	1	$488.10

Practice: 560 - Access Road

Scenario: #11 - Rehabilitation of existing road using gravel in soft, sloped terrain

Scenario Description:

Repair and rehabilitation of compacted earth or gravel road where it is determined that gravel is needed for the repair with min. 12 inch thick compacted gravel surface over geotextile on existing alignment in soft, steep sloped terrain. Terrain should be considered sloped for slopes of >5%. The extent of construction work over an existing alignment is assumed to average 30% of the work for a new installation. A properly constructed, well defined access road will address resource concerns related with compaction, emissions of fugitive dust, and excessive sediment in surface water. It also improves the plant productivity, vigor and health and substantially reduces the chance of wild fire hazards. Short term air quality deterioration may result if proper dust control measures are not implemented during the practice installation. Costs include excavation, shaping, grading, surface material, vegetation of disturbed areas, and all equipment, labor and incidental materials necessary to install the practice.

Before Situation:

An agricultural enterprise with an existing access road which is beyond its useful lifespan, can no longer be used as intended without rehabilitation. If left in its current condition , it will result in continued compaction, excessive sediment in surface water and emissions of fugitive dust. This scenario is applicable where the resource activity areas with an existing but dilapidated access road consist of relatively wet and swampy land with steep sloped terrain.

After Situation:

The damaged portions of the road will be repaired to a full 14 feet width with a geotextile and 12" gravel surface at the top, 50% in embankment and 50% in excavation less than 3 feet in height, (average 2 ft), typical side slopes 2:1. Out of total excavation, 60% is considered common earth and 40% hard dig or rocks. A properly repaired access road will greatly reduce or eliminate compaction in land use areas where it is harmful, reduce emissions of fugitive dust and also reduce excessive sediment in surface water by reducing uncontrolled sediment transport and improving drainage of irrigated lands. Planned grades will include all dips and water bars. If clearing and grubbing of land in the alignment area is required, use Land Clearing (460). Pipe culverts installed as part of access road should be covered by either Structures for Water Control (587) or Stream Crossings (578) depending on the type of structure. Earthfill embankment above the culvert structure would still be covered by this Practice. Diversions constructed as part of access road should be covered by Diversion (362). All seeding or revegetation of disturbed areas is provided. Dust control must be addressed under Dust Control on Unpaved Roads and Surfaces (373). Mulching should be addressed under Mulching (484).

Feature Measure: Length of Raodway

Scenario Unit: Feet

Scenario Typical Size: 500.0

Scenario Total Cost: $6,195.29

Scenario Cost/Unit: $12.39

Cost Details:

Component Name	ID	Description	Unit	Cost	QTY	Total
Equipment Installation						
Geotextile, woven	42	Woven Geotextile Fabric. Includes materials, equipment and labor	Square Yard	$1.33	300	$399.00
Excavation, Rock, Ripping	47	Excavation, rock, mechanical ripping, includes equipment and labor	Cubic Yards	$4.68	80	$374.40
Earthfill, Roller Compacted	49	Earthfill, roller or machine compacted, includes equipment and labor	Cubic Yards	$4.66	125	$582.50
Fertilizer, ground application, dry bulk	950	Dry bulk fertilizer application performed by ground equipment. Includes equipment, power unit and labor costs.	Acres	$6.63	0.12	$0.80
Lime application	953	Lime application performed by ground equipment. Includes equipment, power unit and labor costs.	Acres	$8.21	0.12	$0.99
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 Yards	$4.58	120	$549.60
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.	Hours	$37.19	10	$371.90
Materials						
Aggregate, Gravel, Ungraded, Quarry Run	1099	Includes materials, equipment and labor	Cubic Yards	$34.43	85	$2,926.55
Native Perennial Grasses, Low Density	2750	Native perennial grasses, may include a small percentage of annual species for establishment purposes and/or if allowed by the CPS. Planted at lower to medium density (40 pure live seeds/sq ft and less). Includes material and shipping.	Acres	$111.33	0.12	$13.36
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	$488.10	2	$976.20

Practice: 560 - Access Road

Scenario: #12 - Rehabilitation of existing road using geocell in soft, sloped terrain

Scenario Description:

Repair and rehabilitation of compacted earth, gravel, or geocell road where it is determined that geocell is needed for the repair with min. 6 inch thick compacted gravel with geocell surface on existing alignment in soft, steep sloped terrain. Terrain should be considered sloped for slopes of >5%. The extent of construction work over an existing alignment is assumed to average 30% of the work for a new installation. A properly constructed, well defined access road will address resource concerns related with compaction, emissions of fugitive dust, and excessive sediment in surface water. It also improves the plant productivity, vigor and health and substantially reduces the chance of wild fire hazards. Short term air quality deterioration may result if proper dust control measures are not implemented during the practice installation. Costs include excavation, shaping, grading, surface material, vegetation of disturbed areas, and all equipment, labor and incidental materials necessary to install the practice.

Before Situation:

An agricultural enterprise with an existing access road which is beyond its useful lifespan, can no longer be used as intended without rehabilitation. If left in its current condition , it will result in continued compaction, excessive sediment in surface water and emissions of fugitive dusts. This scenario is applicable where the resource activity areas with an existing but dilapidated access road consist of relatively wet and swampy but level terrain lands.

After Situation:

The road will be 14 feet wide with geotextile, 6 inch gravel, and geocell surfacing. It is mostly in embankment less than 3 feet in height, (average 2 ft) typical side slopes 2:1. Out of total excavation, 60% is considered common earth and 40% hard dig or rocks. A properly constructed, well defined access road will greatly reduce sheet, rill and wind erosion, eliminate compaction in land use areas where it is harmful, reduce emissions of particulate matter (PM) and PM precursors and also reduce excessive sediment in surface water by reducing uncontrolled sediment transport. Planned grades will include all dips and water bars. If clearing and grubbing of land in the alignment area is required, use Land Clearing (460). Pipe culverts installed as part of access road should be covered by either Structures for Water Control (587) or Stream Crossings (578) depending on the type of structure. Earthfill embankment above the culvert structure would still be covered by this Practice. Diversions constructed as part of access road should be covered by Diversion (362). All seeding or revegetation of disturbed areas is provided. Dust control must be addressed under Dust Control on Unpaved Roads and Surfaces (373). Mulching should be addressed under Mulching (484).

Feature Measure: Length of Roadway

Scenario Unit: Feet

Scenario Typical Size: 500.0

Scenario Total Cost: $12,211.19

Scenario Cost/Unit: $24.42

Cost Details:

Component Name	ID	Description	Unit	Cost	QTY	Total
Equipment Installation						
Geotextile, woven	42	Woven Geotextile Fabric. Includes materials, equipment and labor	Square Yard	$1.33	300	$399.00
Excavation, Rock, Ripping	47	Excavation, rock, mechanical ripping, includes equipment and labor	Cubic Yards	$4.68	80	$374.40
Earthfill, Roller Compacted	49	Earthfill, roller or machine compacted, includes equipment and labor	Cubic Yards	$4.66	125	$582.50
Fertilizer, ground application, dry bulk	950	Dry bulk fertilizer application performed by ground equipment. Includes equipment, power unit and labor costs.	Acres	$6.63	0.12	$0.80
Lime application	953	Lime application performed by ground equipment. Includes equipment, power unit and labor costs.	Acres	$8.21	0.12	$0.99
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 Yards	$4.58	120	$549.60
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.	Hours	$37.19	10	$371.90
Materials						
Aggregate, Gravel, Ungraded, Quarry Run	1099	Includes materials, equipment and labor	Cubic Yards	$34.43	55	$1,893.65
Geocell, 6 inch	1842	6-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	$29.37	240	$7,048.80
Native Perennial Grasses, Low Density	2750	Native perennial grasses, may include a small percentage of annual species for establishment purposes and/or if allowed by the CPS. Planted at lower to medium density (40 pure live seeds/sq ft and less). Includes material and shipping.	Acres	$111.33	0.12	$13.36
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	$488.10	2	$976.20

Practice: 561 - Heavy Use Area Protection

Scenario: #1 - Gravel or Wood Chip Pad

Scenario Description:

Gravel pad installed to stabilize areas around watering troughs, barn entrances, etc. Where applicable and allowable, wood chips may be used for stabilization over a gravel foundation to collect runoff. The stabilization of an area that is frequently and intensively used by people, livestock and equipment by surfacing with rock and or gravel on a geotextile fabric foundation to provide a stable, non-eroding surface. Installation includes all materials, equipment, and labor to install this practice, The stabilized area will address the resource concerns of soil erosion and water quality degradation.

Before Situation:

This practice applies to all land uses where frequently and/or intensively used areas requiring treatment to address soil erosion and water quality degradation.

After Situation:

Typical scenario is a pad which is 25' x 25'. Typically, site is excavated below topsoil. ~12" of bankrun gravel or similar material is directly placed by dump truck on non-woven geotextile and compacted to form a hard durable surface. Practice will address soil erosion and water quality degradation. Alternatively, a similar scenario would include ~18" of gravel with perforated pipe over geotextile with ~12" to 18" 2"x2"x0.25" wood chip aggregate. Provisions to collect, store, utilize, and or treat contaminated runoff must use Sediment Basin (350), Waste Transfer (634), Waste Storage Facility (313), or Waste Treatment (629) as appropriate. Any needed treatment of stream crossings must use Stream Crossing (578). Any needed vegetation of disturbed areas must use Critical Area Planting (342). To reduce the potential for air quality problems from particulate matter associated with heavy use areas, consider the use of Windbreak/Shelterbelt Establishment (380) or Herbaceous Wind Barriers (603).

Feature Measure: Area of Gravel Pad

Scenario Unit: Square Feet

Scenario Typical Size: 625.0

Scenario Total Cost: $2,491.05

Scenario Cost/Unit: $3.99

Cost Details:

Component Name	ID	Description	Unit	Cost	QTY	Total
Equipment Installation						
Geotextile, woven	42	Woven Geotextile Fabric. Includes materials, equipment and labor	Square Yard	$1.33	70	$93.10
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 Yards	$2.31	24	$55.44
Earthfill, Manually Compacted	50	Earthfill, manually compacted, includes equipment and labor	Cubic Yards	$6.02	24	$144.48
Dozer, 140 HP	927	Track mounted Dozer with horsepower range of 125 to 160. Equipment and power unit costs. Labor not included.	Hours	$104.83	3	$314.49
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.	Hours	$27.56	3	$82.68
Equipment Operators, Heavy	233	Includes: Cranes, Hydraulic Excavators >=50 HP, Dozers, Paving Machines, Rock Trenchers, Trenchers >=12 in., Dump Trucks, Ag Equipment >=150 HP, Scrapers, Water Wagons.	Hours	$38.00	3	$114.00
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.	Hours	$46.88	1	$46.88
Materials						
Aggregate, Gravel, Graded	46	Gravel, includes materials, equipment and labor to transport and place. Includes washed and unwashed gravel.	Cubic Yards	$45.42	15	$681.30
Aggregate, Gravel, Ungraded, Quarry Run	1099	Includes materials, equipment and labor	Cubic Yards	$34.43	8	$275.44
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	$171.94	1	$171.94
Mobilization, medium equipment	1139	Equipment with 70-150 HP or typical weights between 14,000 and 30,000 pounds.	Each	$255.65	2	$511.30

Practice: 561 - Heavy Use Area Protection

Scenario: #2 - Curb with Footer

Scenario Description:

The stabilization of areas around facilities that are frequently and intensively used by people, animals or vehicles by surfacing with reinforced concrete with curb on a sand or gravel foundation to provide a stable, non-eroding surface. Curb is necessary to directly contaminated runoff to proper location. Installation includes all materials, equipment, and labor to install this practice, The stabilized area will address the resource concerns soil erosion and water quality degradation.

Before Situation:

This practice applies to all land uses where frequently and/or intensively used areas requiring treatment to address soil erosion and water quality degradation.

After Situation:

Curb is installed to direct contaminated runoff to proper location and to assist in the movement, handling and management of manure. Concrete curb is 24" tall and 8" wide and 100' long. Footing is 3' wide and 6" deep. Curbing is reinforced with rebar. Curb is underlain by 6" of drainfill. Area is frequently and intensively used by people, animals or vehicles and will address soil erosion and water quality degradation. Associated practices are Access Road (560), Stream Crossing (578), Critical Area Planting (342). Provisions to store, utilize, and/or treat contaminated runoff shall be addressed under Sediment Basin (350), Waste Storage Facility (313), or Waste Treatment (629) as appropriate. To reduce the potential for air quality problems from particulate matter associated with heavy use areas, consider the use of Windbreak/Shelterbelt Establishment (380) or Herbaceous Wind Barriers (603).

Feature Measure: Length of Curb

Scenario Unit: Feet

Scenario Typical Size: 100.0

Scenario Total Cost: $6,332.07

Scenario Cost/Unit: $63.32

Cost Details:

Component Name	ID	Description	Unit	Cost	QTY	Total
Equipment Installation						
Concrete, CIP, slab on grade, reinforced	37	Steel reinforced concrete formed and cast-in-placed as a slab on grade by chute placement. Typical strength is 3000 to 4000 psi. Includes materials, labor and equipment to transport, place and finish.	Cubic Yards	$362.36	6	$2,174.16
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 Yards	$481.12	5	$2,405.60
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 Yards	$2.31	11	$25.41
Earthfill, Manually Compacted	50	Earthfill, manually compacted, includes equipment and labor	Cubic Yards	$6.02	6	$36.12
Skidsteer, 80 HP	933	Skidsteer loader with horsepower range of 60 to 90. Equipment and power unit costs. Labor not included.	Hours	$55.01	4	$220.04
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.	Hours	$27.56	5	$137.80
Equipment Operators, Light	232	Includes: Skid Steer Loaders, Hydraulic Excavators <50 HP, Trenchers <12 in., Ag Equipment <150 HP, Pickup Trucks, Forklifts, Mulchers	Hours	$27.87	4	$111.48
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.	Hours	$46.88	2	$93.76
Materials						
Aggregate, Gravel, Graded	46	Gravel, includes materials, equipment and labor to transport and place. Includes washed and unwashed gravel.	Cubic Yards	$45.42	6	$272.52
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	$171.94	2	$343.88
Mobilization, medium equipment	1139	Equipment with 70-150 HP or typical weights between 14,000 and 30,000 pounds.	Each	$255.65	2	$511.30

Practice: 561 - Heavy Use Area Protection

Scenario: #3 - Curb without Footer

Scenario Description:

The stabilization of areas around facilities that are frequently and intensively used by people, animals or vehicles by surfacing with reinforced concrete with curb on a sand or gravel foundation to provide a stable, non-eroding surface. Curb is necessary to directly contaminated runoff to proper location. Installation includes all materials, equipment, and labor to install this practice, The stabilized area will address the resource concerns soil erosion and water quality degradation.

Before Situation:

This practice applies to all land uses where frequently and/or intensively used areas requiring treatment to address soil erosion and water quality degradation.

After Situation:

Curb is installed to direct contaminated runoff to proper location and to assist in the movement, handling and management of manure. Concrete curb is 24" tall and 8" wide and 100' long. Curb is installed on top of existing slab, no footing. Hole are drilled into existing slab to accommodate vertical rebar. Area is frequently and intensively used by people, animals or vehicles and will address soil erosion and water quality degradation. Associated practices are Access Road (560), Stream Crossing (578), Critical Area Planting (342). Provisions to store, utilize, and/or treat contaminated runoff shall be addressed under Sediment Basin (350), Waste Storage Facility (313), or Waste Treatment (629) as appropriate. To reduce the potential for air quality problems from particulate matter associated with heavy use areas, consider the use of Windbreak/Shelterbelt Establishment (380) or Herbaceous Wind Barriers (603).

Feature Measure: Length of Curb

Scenario Unit: Feet

Scenario Typical Size: 100.0

Scenario Total Cost: $3,118.84

Scenario Cost/Unit: $31.19

Cost Details:

Component Name	ID	Description	Unit	Cost	QTY	Total
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 Yards	$481.12	5	$2,405.60
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.	Hours	$27.56	10	$275.60
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.	Hours	$46.88	2	$93.76
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	$171.94	2	$343.88

Practice: 561 - Heavy Use Area Protection

Scenario: #4 - Concrete with Curb up to 1000 SF

Scenario Description:

The stabilization of areas around facilities that are frequently and intensively used by people, animals or vehicles by surfacing with reinforced concrete with curb on a sand or gravel foundation to provide a stable, non-eroding surface. Curb is necessary to directly contaminated runoff to proper location. Installation includes all materials, equipment, and labor to install this practice, The stabilized area will address the resource concerns soil erosion and water quality degradation.

Before Situation:

This practice applies to all land uses where frequently and/or intensively used areas requiring treatment to address soil erosion and water quality degradation.

After Situation:

Unstable area is surfaced with 630 square feet of concrete with curbing. Curb is installed to direct contaminated runoff to proper location and to assist in the movement, handling and management of manure. Concrete slab is 5" thick with 6" of compacted dranifill underneath. Concrete curb is 24" tall and 8" wide with 3' wide footing, with reinforcing steel. Assume seeding is equal to 50% of the HUAP size (315 sf). Area is frequently and intensively used by people, animals or vehicles and will address soil erosion and water quality degradation. Associated practices are Access Road (560), Stream Crossing (578), etc. Provisions to store, utilize, and/or treat contaminated runoff shall be addressed under Sediment Basin (350), Waste Storage Facility (313), or Waste Treatment (629) as appropriate. To reduce the potential for air quality problems from particulate matter associated with heavy use areas, consider the use of Windbreak/Shelterbelt Establishment (380) or Herbaceous Wind Barriers (603).

Feature Measure: Area of Concrete Pad

Scenario Unit: Square Feet

Scenario Typical Size: 630.0

Scenario Total Cost: $7,875.63

Scenario Cost/Unit: $12.50

Cost Details:

Component Name	ID	Description	Unit	Cost	QTY	Total
Equipment Installation						
Concrete, CIP, slab on grade, reinforced	37	Steel reinforced concrete formed and cast-in-placed as a slab on grade by chute placement. Typical strength is 3000 to 4000 psi. Includes materials, labor and equipment to transport, place and finish.	Cubic Yards	$362.36	10	$3,623.60
Concrete, CIP, formed reinforced	38	Steel reinforced concrete formed and cast-in-placed in formed structures such as walls or suspended slabs by chute placement. Typical strength is 3000 to 4000 psi. Includes materials, labor and equipment to transport, place and finish.	Cubic Yards	$481.12	5	$2,405.60
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 Yards	$2.31	47	$108.57
Earthfill, Manually Compacted	50	Earthfill, manually compacted, includes equipment and labor	Cubic Yards	$6.02	12	$72.24
Tillage, Light	945	Includes light disking (tandem) or field cultivator. Includes equipment, power unit and labor costs.	Acres	$10.68	0.1	$1.07
Fertilizer, ground application, dry bulk	950	Dry bulk fertilizer application performed by ground equipment. Includes equipment, power unit and labor costs.	Acres	$6.63	0.1	$0.66
Lime application	953	Lime application performed by ground equipment. Includes equipment, power unit and labor costs.	Acres	$8.21	0.1	$0.82
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.	Acres	$12.00	0.1	$1.20
Cultipacking	1100	Includes equipment, power unit and labor costs.	Acres	$8.68	0.1	$0.87
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.	Hours	$27.56	6	$165.36
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.	Hours	$46.88	2	$93.76
Materials						
Aggregate, Sand, Graded, Washed	45	Sand, typical ASTM C33 gradation, includes materials, equipment and labor to transport and place	Cubic Yards	$43.40	12	$520.80
Nitrogen (N), Urea	71	Price per pound of N supplied by Urea. Price is not per pound of total product applied, no conversion is needed.	Pound	$0.47	0.4	$0.19
Phosphorus, P2O5	73	Price per pound of P2O5 supplied by Superphosphate. Price is not per pound of total product applied, no conversion is needed.	Pound	$0.61	0.4	$0.24
Potassium, K2O	74	K2O supplied by Muriate Of Potash. Price is not per pound of total product applied, no conversion is needed.	Pound	$0.35	0.4	$0.14

Lime, ENM	75	Fertilizer: Limestone Spread on field.	Ton	$64.87	0.1	$6.49
Straw	1237	Small grain straw (non organic and certified organic). Includes materials only.	Ton	$65.00	0.1	$6.50
Native and Introduced Perennial Grasses, Legumes and/or Forbs, Medium Density	2756	A mix of native and introduced perennial grasses, legumes, and/or forbs, grasses typically greater than 50% of the mix, may include a small percentage of annual species for establishment purposes and/or if allowed by the CPS. Planted at medium to high density (41-60 pure live seeds/sq ft). Includes material and shipping.	Acres	$123.45	0.1	$12.35
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	$171.94	2	$343.88
Mobilization, medium equipment	1139	Equipment with 70-150 HP or typical weights between 14,000 and 30,000 pounds.	Each	$255.65	2	$511.30

Practice: 561 - Heavy Use Area Protection

Scenario: #5 - Concrete/Asphalt without Curb up to 1000 SF

Scenario Description:

The stabilization of areas around facilities that are frequently and intensively used by people, animals or vehicles by surfacing with reinforced concrete or asphalt on a sand or gravel foundation to provide a stable, non-eroding surface. Installation includes all materials, equipment, and labor to install this practice, The stabilized area will address the resource concerns soil erosion and water quality degradation.

Before Situation:

This practice applies to all land uses where frequently and/or intensively used areas requiring treatment to address soil erosion and water quality degradation.

After Situation:

Unstable area is surfaced with 630 square feet of concrete or asphalt, no curbing. Concrete/Asphalt slab is 5" thick with 6" of compacted dranifill underneath. Asphalt may require additional compacted drainfill. Assume 0.1 acres of seeding. Area is frequently and intensively used by people, animals or vehicles and will address soil erosion and water quality degradation. Associated practices are Access Road (560), Stream Crossing (578), Critical Area Planting (342). Provisions to store, utilize, and/or treat contaminated runoff shall be addressed under Sediment Basin (350), Waste Storage Facility (313), or Waste Treatment (629) as appropriate. To reduce the potential for air quality problems from particulate matter associated with heavy use areas, consider the use of Windbreak/Shelterbelt Establishment (380) or Herbaceous Wind Barriers (603).

Feature Measure: Area of Concrete Pad

Scenario Unit: Square Feet

Scenario Typical Size: 630.0

Scenario Total Cost: $5,384.39

Scenario Cost/Unit: $8.55

Cost Details:

Component Name	ID	Description	Unit	Cost	QTY	Total
Equipment Installation						
Concrete, CIP, slab on grade, reinforced	37	Steel reinforced concrete formed and cast-in-placed as a slab on grade by chute placement. Typical strength is 3000 to 4000 psi. Includes materials, labor and equipment to transport, place and finish.	Cubic Yards	$362.36	10	$3,623.60
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 Yards	$2.31	47	$108.57
Earthfill, Manually Compacted	50	Earthfill, manually compacted, includes equipment and labor	Cubic Yards	$6.02	12	$72.24
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.	Hours	$27.56	4	$110.24
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.	Hours	$46.88	2	$93.76
Materials						
Aggregate, Sand, Graded, Washed	45	Sand, typical ASTM C33 gradation, includes materials, equipment and labor to transport and place	Cubic Yards	$43.40	12	$520.80
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	$171.94	2	$343.88
Mobilization, medium equipment	1139	Equipment with 70-150 HP or typical weights between 14,000 and 30,000 pounds.	Each	$255.65	2	$511.30

Practice: 561 - Heavy Use Area Protection

Scenario: #6 - Concrete with Curb over 1000 SF

Scenario Description:

The stabilization of areas around facilities that are frequently and intensively used by people, animals or vehicles by surfacing with reinforced concrete with curb on a sand or gravel foundation to provide a stable, non-eroding surface. Curb is necessary to directly contaminated runoff to proper location. Installation includes all materials, equipment, and labor to install this practice, The stabilized area will address the resource concerns soil erosion and water quality degradation.

Before Situation:

This practice applies to all land uses where frequently and/or intensively used areas requiring treatment to address soil erosion and water quality degradation.

After Situation:

Unstable area is surfaced with 2500 square feet of concrete with curbing. Curb is installed to direct contaminated runoff to proper location and to assist in the movement, handling and management of manure. Concrete slab is 5" thick with 6" of compacted dranifill underneath. Concrete curb is 24" tall and 8" wide with 3' wide footing, with reinforcing steel. Area is frequently and intensively used by people, animals or vehicles and will address soil erosion and water quality degradation. Associated practices are Access Road (560), Stream Crossing (578), Critical Area Planting (342). Provisions to store, utilize, and/or treat contaminated runoff shall be addressed under Sediment Basin (350), Waste Storage Facility (313), or Waste Treatment (629) as appropriate. To reduce the potential for air quality problems from particulate matter associated with heavy use areas, consider the use of Windbreak/Shelterbelt Establishment (380) or Herbaceous Wind Barriers (603).

Feature Measure: Area of Concrete Pad

Scenario Unit: Square Feet

Scenario Typical Size: 2,500.0

Scenario Total Cost: $28,262.50

Scenario Cost/Unit: $11.30

Cost Details:

Component Name	ID	Description	Unit	Cost	QTY	Total
Equipment Installation						
Concrete, CIP, slab on grade, reinforced	37	Steel reinforced concrete formed and cast-in-placed as a slab on grade by chute placement. Typical strength is 3000 to 4000 psi. Includes materials, labor and equipment to transport, place and finish.	Cubic Yards	$362.36	39	$14,132.04
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 Yards	$481.12	21	$10,103.52
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 Yards	$2.31	185	$427.35
Earthfill, Manually Compacted	50	Earthfill, manually compacted, includes equipment and labor	Cubic Yards	$6.02	46	$276.92
Tillage, Light	945	Includes light disking (tandem) or field cultivator. Includes equipment, power unit and labor costs.	Acres	$10.68	0.1	$1.07
Fertilizer, ground application, dry bulk	950	Dry bulk fertilizer application performed by ground equipment. Includes equipment, power unit and labor costs.	Acres	$6.63	0.1	$0.66
Lime application	953	Lime application performed by ground equipment. Includes equipment, power unit and labor costs.	Acres	$8.21	0.1	$0.82
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.	Acres	$12.00	0.1	$1.20
Cultipacking	1100	Includes equipment, power unit and labor costs.	Acres	$8.68	0.1	$0.87
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.	Hours	$27.56	2	$55.12
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.	Hours	$27.56	6	$165.36
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.	Hours	$46.88	4	$187.52
Materials						
Aggregate, Sand, Graded, Washed	45	Sand, typical ASTM C33 gradation, includes materials, equipment and labor to transport and place	Cubic Yards	$43.40	46	$1,996.40
Nitrogen (N), Urea	71	Price per pound of N supplied by Urea. Price is not per pound of total product applied, no conversion is needed.	Pound	$0.47	5	$2.35

Phosphorus, P2O5	73	Price per pound of P2O5 supplied by Superphosphate. Price is not per pound of total product applied, no conversion is needed.	Pound	$0.61	5	$3.05
Potassium, K2O	74	K2O supplied by Muriate Of Potash. Price is not per pound of total product applied, no conversion is needed.	Pound	$0.35	5	$1.75
Lime, ENM	75	Fertilizer: Limestone Spread on field.	Ton	$64.87	0.2	$12.97
Straw	1237	Small grain straw (non organic and certified organic). Includes materials only.	Ton	$65.00	0.4	$26.00
Native and Introduced Perennial Grasses, Legumes and/or Forbs, Medium Density	2756	A mix of native and introduced perennial grasses, legumes, and/or forbs, grasses typically greater than 50% of the mix, may include a small percentage of annual species for establishment purposes and/or if allowed by the CPS. Planted at medium to high density (41-60 pure live seeds/sq ft). Includes material and shipping.	Acres	$123.45	0.1	$12.35
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	$171.94	2	$343.88
Mobilization, medium equipment	1139	Equipment with 70-150 HP or typical weights between 14,000 and 30,000 pounds.	Each	$255.65	2	$511.30

Practice: 561 - Heavy Use Area Protection

Scenario: #7 - Concrete/Asphalt without Curb over 1000 SF

Scenario Description:

The stabilization of areas around facilities that are frequently and intensively used by people, animals or vehicles by surfacing with reinforced concrete on a sand or gravel foundation to provide a stable, non-eroding surface. Installation includes all materials, equipment, and labor to install this practice, The stabilized area will address the resource concerns soil erosion and water quality degradation.

Before Situation:

This practice applies to all land uses where frequently and/or intensively used areas requiring treatment to address soil erosion and water quality degradation.

After Situation:

Unstable area is surfaced with 2500 square feet of concrete, no curbing. Concrete slab is 5" thick with 6" of compacted dranifill underneath. Assume 0.1 acres of seeding and roughly 2 c.y. of excavation to prep foundation due to existing uneven ground. Area is frequently and intensively used by people, animals or vehicles and will address soil erosion and water quality degradation. Associated practices are Access Road (560), Stream Crossing (578), Critical Area Planting (342). Provisions to store, utilize, and/or treat contaminated runoff shall be addressed under Sediment Basin (350), Waste Storage Facility (313), or Waste Treatment (629) as appropriate. To reduce the potential for air quality problems from particulate matter associated with heavy use areas, consider the use of Windbreak/Shelterbelt Establishment (380) or Herbaceous Wind Barriers (603).

Feature Measure: Area of Concrete Pad

Scenario Unit: Square Feet

Scenario Typical Size: 2,500.0

Scenario Total Cost: $18,981.91

Scenario Cost/Unit: $7.59

Cost Details:

Component Name	ID	Description	Unit	Cost	QTY	Total
Equipment Installation						
Concrete, CIP, slab on grade, reinforced	37	Steel reinforced concrete formed and cast-in-placed as a slab on grade by chute placement. Typical strength is 3000 to 4000 psi. Includes materials, labor and equipment to transport, place and finish.	Cubic Yards	$362.36	39	$14,132.04
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 Yards	$2.31	185	$427.35
Earthfill, Roller Compacted	49	Earthfill, roller or machine compacted, includes equipment and labor	Cubic Yards	$4.66	47	$219.02
Earthfill, Manually Compacted	50	Earthfill, manually compacted, includes equipment and labor	Cubic Yards	$6.02	33	$198.66
Dozer, 80 HP	929	Track mounted Dozer with horsepower range of 60 to 90. Equipment and power unit costs. Labor not included.	Hours	$55.20	8	$441.60
Tillage, Light	945	Includes light disking (tandem) or field cultivator. Includes equipment, power unit and labor costs.	Acres	$10.68	0.1	$1.07
Fertilizer, ground application, dry bulk	950	Dry bulk fertilizer application performed by ground equipment. Includes equipment, power unit and labor costs.	Acres	$6.63	0.1	$0.66
Lime application	953	Lime application performed by ground equipment. Includes equipment, power unit and labor costs.	Acres	$8.21	0.1	$0.82
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.	Acres	$12.00	0.1	$1.20
Cultipacking	1100	Includes equipment, power unit and labor costs.	Acres	$8.68	0.1	$0.87
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.	Hours	$27.56	10	$275.60
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.	Hours	$46.88	10	$468.80
Materials						
Nitrogen (N), Urea	71	Price per pound of N supplied by Urea. Price is not per pound of total product applied, no conversion is needed.	Pound	$0.47	5	$2.35
Phosphorus, P2O5	73	Price per pound of P2O5 supplied by Superphosphate. Price is not per pound of total product applied, no conversion is needed.	Pound	$0.61	5	$3.05
Potassium, K2O	74	K2O supplied by Muriate Of Potash. Price is not per pound of total product applied, no conversion is needed.	Pound	$0.35	5	$1.75
Lime, ENM	75	Fertilizer: Limestone Spread on field.	Ton	$64.87	0.2	$12.97

Aggregate, Gravel, Ungraded, Quarry Run	1099	Includes materials, equipment and labor	Cubic Yards	$34.43	47	$1,618.21
Straw	1237	Small grain straw (non organic and certified organic). Includes materials only.	Ton	$65.00	0.4	$26.00
Native and Introduced Perennial Grasses, Legumes and/or Forbs, Medium Density	2756	A mix of native and introduced perennial grasses, legumes, and/or forbs, grasses typically greater than 50% of the mix, may include a small percentage of annual species for establishment purposes and/or if allowed by the CPS. Planted at medium to high density (41-60 pure live seeds/sq ft). Includes material and shipping.	Acres	$123.45	0.1	$12.35
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	$70.59	4	$282.36
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	$171.94	2	$343.88
Mobilization, medium equipment	1139	Equipment with 70-150 HP or typical weights between 14,000 and 30,000 pounds.	Each	$255.65	2	$511.30

Practice: 561 - Heavy Use Area Protection

Scenario: #15 - Bunk Silo Slab

Scenario Description:

The stabilization of areas under a bunk silo that is frequently and intensively used by heavy equipment by surfacing with reinforced concrete over a sand or gravel foundation to provide a stable, non-eroding surface. An additional 3" of asphalt is installed over the concrete to protect it from the acidic and caustic nature of silage leachate. Installation includes all materials, equipment, and labor to install this practice. The stabilized area will address the resource concerns soil erosion and water quality degradation.

Before Situation:

This practice applies to all bunk silos where frequently and/or intensively used areas requiring treatment to address soil erosion and water quality degradation.

After Situation:

Unstable area is surfaced with 2500 square feet of concrete, no curbing. Concrete slab is 5" thick with 6" of compacted dranifill (gravel) underneath. An additional 3" of asphalt is installed over the concrete to protect it from the acidic and caustic nature of silage leachate. Assume 0.1 acres of seeding. Area is frequently and intensively used by heavy equipment used to load, compact silage and unload the silo. Practice will address soil erosion and water quality degradation. Associated practices are Access Road (560), Obstruction Removal (500), Critical Area Planting (342). Provisions to store, utilize, and/or treat silage leachate and contaminated runoff shall be addressed under Sediment Basin (350), Waste Storage Facility (313), Waste Treatment (629), or Vegetated Treatment Area (635) as appropriate. To reduce the potential for air quality problems from particulate matter associated with heavy use areas, consider the use of Windbreak/Shelterbelt Establishment (380) or Herbaceous Wind Barriers (603).

Feature Measure: Area of Slab

Scenario Unit: Square Feet

Scenario Typical Size: 2,500.0

Scenario Total Cost: $23,820.01

Scenario Cost/Unit: $9.53

Cost Details:

Component Name	ID	Description	Unit	Cost	QTY	Total
Equipment Installation						
Concrete, CIP, slab on grade, reinforced	37	Steel reinforced concrete formed and cast-in-placed as a slab on grade by chute placement. Typical strength is 3000 to 4000 psi. Includes materials, labor and equipment to transport, place and finish.	Cubic Yards	$362.36	39	$14,132.04
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 Yards	$2.31	185	$427.35
Earthfill, Roller Compacted	49	Earthfill, roller or machine compacted, includes equipment and labor	Cubic Yards	$4.66	47	$219.02
Earthfill, Manually Compacted	50	Earthfill, manually compacted, includes equipment and labor	Cubic Yards	$6.02	33	$198.66
Dozer, 80 HP	929	Track mounted Dozer with horsepower range of 60 to 90. Equipment and power unit costs. Labor not included.	Hours	$55.20	8	$441.60
Tillage, Light	945	Includes light disking (tandem) or field cultivator. Includes equipment, power unit and labor costs.	Acres	$10.68	0.1	$1.07
Fertilizer, ground application, dry bulk	950	Dry bulk fertilizer application performed by ground equipment. Includes equipment, power unit and labor costs.	Acres	$6.63	0.1	$0.66
Lime application	953	Lime application performed by ground equipment. Includes equipment, power unit and labor costs.	Acres	$8.21	0.1	$0.82
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.	Acres	$12.00	0.1	$1.20
Cultipacking	1100	Includes equipment, power unit and labor costs.	Acres	$8.68	0.1	$0.87
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.	Hours	$27.56	10	$275.60
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.	Hours	$46.88	10	$468.80
Materials						
Nitrogen (N), Urea	71	Price per pound of N supplied by Urea. Price is not per pound of total product applied, no conversion is needed.	Pound	$0.47	5	$2.35
Phosphorus, P2O5	73	Price per pound of P2O5 supplied by Superphosphate. Price is not per pound of total product applied, no conversion is needed.	Pound	$0.61	5	$3.05
Potassium, K2O	74	K2O supplied by Muriate Of Potash. Price is not per pound of total product applied, no conversion is needed.	Pound	$0.35	5	$1.75

Lime, ENM	75	Fertilizer: Limestone Spread on field.	Ton	$64.87	0.2	$12.97
Aggregate, Gravel, Ungraded, Quarry Run	1099	Includes materials, equipment and labor	Cubic Yards	$34.43	47	$1,618.21
Straw	1237	Small grain straw (non organic and certified organic). Includes materials only.	Ton	$65.00	0.4	$26.00
Asphalt, pavement	1867	Bituminous Concrete,includes materials, equipment and labor for 4 inch layer, base not included.	Square Feet	$2.32	1875	$4,350.00
Native and Introduced Perennial Grasses, Legumes and/or Forbs, Medium Density	2756	A mix of native and introduced perennial grasses, legumes, and/or forbs, grasses typically greater than 50% of the mix, may include a small percentage of annual species for establishment purposes and/or if allowed by the CPS. Planted at medium to high density (41-60 pure live seeds/sq ft). Includes material and shipping.	Acres	$123.45	0.1	$12.35
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	$70.59	4	$282.36
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	$171.94	2	$343.88
Mobilization, medium equipment	1139	Equipment with 70-150 HP or typical weights between 14,000 and 30,000 pounds.	Each	$255.65	2	$511.30
Mobilization, large equipment	1140	Equipment >150HP or typical weights greater than 30,000 pounds or loads requiring over width or over length permits.	Each	$488.10	1	$488.10

Practice: 570 - Stormwater Runoff Control

Scenario: #1 - Combination, Most common Best Management Practices

Scenario Description:

This scenario involves installation of silt fence, straw wattles, and straw bales on the construction site as part of one conservation engineering system. The combined system shall include two or more components and will address the resource concerns related with concentrated flow erosion, excessive sediment in surface waters as well as protection of existing inlets and structures depending on the combination.

Before Situation:

The combination scenario is applicable in all construction sites and watersheds including those in the urban and suburban areas. Which component would apply in a particular situation would depend on the site condition, slope etc.

After Situation:

When properly installed, the combination structures slow down runoff flow velocity and reduce high velocity erosion, detain and filter the stormwater runoff and provide a controlled release to the downstream areas. In seeded areas, straw wattles also enable seeds to settle and germinate, aiding the revegetation process. By filtering overland runoff and holding sediment on the slope, Straw Wattles also help to protect lakes, ponds, rivers and streams from sediment pollution. By filtering overland runoff and holding sediment on the slope, straw bales can also help to protect water quality. Silt fence are installed along the downstream perimeter of a construction site to prevent sediment transport off construction areas. A typical silt fence consists of a synthetic filter fabric stretched between a series of fence stakes, with the stakes installed on the downstream side of the perimeter and the fabric trenched into the soil on the upstream side and backfilled. All erosion control blankets and straw mulches will be covered under 484-Mulching. If earthen basins are warranted for water quality improvement or retention/detention purposes, use Sediment Basin (350). If seeding is warranted for water quality and erosion control purposes, all temporary and permenant vegetation will use Critical Area Planting (342).

Feature Measure: Area of construction site

Scenario Unit: Acres

Scenario Typical Size: 1.0

Scenario Total Cost: $992.94

Scenario Cost/Unit: $992.94

Cost Details:

Component Name	ID	Description	Unit	Cost	QTY	Total
Equipment Installation						
Truck, Pickup	939	Equipment and power unit costs. Labor not included.	Hours	$24.18	1.5	$36.27
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.	Hours	$27.56	10	$275.60
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.	Hours	$46.88	1.5	$70.32
Materials						
Silt Fence	43	Silt Fence with support post. Includes materials, equipment and labor	Feet	$1.61	100	$161.00
Wattles, straw, 8-9 in. x 25 ft.	1405	Tubes of rice straw, approximately 8-9 inch in diameter, 25 feet long . Includes materials and shipping only (including stakes).	Feet	$1.09	100	$109.00
Straw bales	2186	Straw bales buried at defined intervals to halt rill and gulley formation. Materials and shipping only.	Each	$8.63	25	$215.75
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.	Dollars	$1.00	125	$125.00

Practice: 570 - Stormwater Runoff Control

Scenario: #2 - Silt Fence

Scenario Description:

This scenario involves installation and removal of silt fence. Typical scenario includes the installation of 200 feet of silt fence to minimize the volume of sediment leaving the construction site. Silt fence is typically 3' high and is anchored into the ground. Stakes are installed every 10'. Silt fence shall be removed when construction is completed and vegetation has been established.

Before Situation:

Large area of vegetation is disturbed to construct and install a conservation practice. Potential for sedimentation is very high.

After Situation:

Silt fence is installed along the downstream perimeter of a construction site to prevent sediment transport off construction areas. A typical silt fence consists of a synthetic filter fabric stretched between a series of fence stakes, with the stakes installed on the downstream side of the perimeter and the fabric trenched into the soil on the upstream side and backfilled. Associated practices shall be 342 - Critical Area Seeding and 484-Mulching.

Feature Measure: Linear Feet of Silt Fence Installed

Scenario Unit: Feet

Scenario Typical Size: 200.0

Scenario Total Cost: $503.30

Scenario Cost/Unit: $2.52

Cost Details:

Component Name	ID	Description	Unit	Cost	QTY	Total
Equipment Installation						
Truck, Pickup	939	Equipment and power unit costs. Labor not included.	Hours	$24.18	1	$24.18
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.	Hours	$27.56	4	$110.24
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.	Hours	$46.88	1	$46.88
Materials						
Silt Fence	43	Silt Fence with support post. Includes materials, equipment and labor	Feet	$1.61	200	$322.00

Practice: 570 - Stormwater Runoff Control

Scenario: #9 - Rain Garden

Scenario Description:

Typical Size: 36' x 30' area, 4-8" deep. Additional Considerations from the practice standard that would be addressed by the practice are: Design stormwater control practices to fit into the visual landscape as well as to function for runoff control. If properly designed, stormwater control practices can be beneficial to wildlife.

Before Situation:

Stormwater is managed to prevent erosion from farmstead impervious surfaces and practice standard is met

After Situation:

Stormwater is managed to prevent erosion, reduce quantity of runoff, enhance visual impact and increase wildlife habitat and/or food.

Feature Measure: square feet of rain garden

Scenario Unit: Square Feet

Scenario Typical Size: 1,080.0

Scenario Total Cost: $1,048.24

Scenario Cost/Unit: $0.97

Cost Details:

Component Name	ID	Description	Unit	Cost	QTY	Total
Equipment Installation						
Skidsteer, 80 HP	933	Skidsteer loader with horsepower range of 60 to 90. Equipment and power unit costs. Labor not included.	Hours	$55.01	2	$110.02
Truck, Pickup	939	Equipment and power unit costs. Labor not included.	Hours	$24.18	3	$72.54
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.	Hours	$27.56	8	$220.48
Equipment Operators, Light	232	Includes: Skid Steer Loaders, Hydraulic Excavators <50 HP, Trenchers <12 in., Ag Equipment <150 HP, Pickup Trucks, Forklifts, Mulchers	Hours	$27.87	2	$55.74
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.	Hours	$46.88	3	$140.64
Materials						
Straw	1237	Small grain straw (non organic and certified organic). Includes materials only.	Ton	$65.00	0.3	$19.50
Native Perennial Grasses, Legumes and/or Forb Mix for Targeted Wildlife/Pollinator Habitat or Ecological Restoration, moderate commercial availability	2619	Diverse mix of native perennial grasses, legumes and forbs, less than 50% grasses, may include biennials and a small percentage of annual species for establishment purposes and/or if allowed by the CPS. This is a mix composed of species required to meet specific wildlife/pollinator habitat or ecological requirements. Seed is moderately easy to purchase commercially. Includes materials and shipping.	Acres	$458.78	0.1	$45.88
Perennial Grass, Legume, and/or Forb Liners or Plugs, each	2758	Perennial grasses, legumes and/or forbs for small areas using vegetative propagules including liners or plugs. Includes materials and shipping.	Acres	$1.41	150	$211.50
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	$171.94	1	$171.94

Practice: 572 - Spoil Disposal

Scenario: #6 - Spoil Spreading

Scenario Description:
A spoil pile is spread over a designated area according to an approved plan. The resource concerns are Soil Erosion and Water Quality Degradation.

Before Situation:
Spoil material is available from excavation of channels, drainage ditches, irrigation canals, or other construction sites.

After Situation:
Land has been shaped to the required elevations and grades. Resource concerns have been treated. Associated practices, like critical area planting or irrigation/drainage water management practices, would be contracted seperately as needed.

Feature Measure: Cubic yards of spoil spread

Scenario Unit: Cubic Yards

Scenario Typical Size: 1,000.0

Scenario Total Cost: $1,984.00

Scenario Cost/Unit: $1.98

Cost Details:

Component Name	ID	Description	Unit	Cost	QTY	Total
Equipment Installation						
Dozer, 140 HP	927	Track mounted Dozer with horsepower range of 125 to 160. Equipment and power unit costs. Labor not included.	Hours	$104.83	10	$1,048.30
Scraper, pull, 7 CY	1206	Pull type earthmoving scraper with 7 CY capacity. Does not include pulling equipment or labor. Add Tractor or Dozer, 160 HP typically required for single scraper.	Hours	$17.57	10	$175.70
Labor						
Equipment Operators, Heavy	233	Includes: Cranes, Hydraulic Excavators >=50 HP, Dozers, Paving Machines, Rock Trenchers, Trenchers >=12 in., Dump Trucks, Ag Equipment >=150 HP, Scrapers, Water Wagons.	Hours	$38.00	20	$760.00

Practice: 574 - Spring Development

Scenario: #1 - Solid Well Tile & Pipe Development

Scenario Description:

Develop a water source from a natural spring or seep (i.e., spring development) to provide water for livestock, and/or wildlife needs. 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. This typical scenario includes excavating and exposing the water source at the spring/seep (typically on a hillside) and constructing a water collection structure by installing a 100 ft long, 4 inch diameter HDPE perforated pipe enclosed in a sand/gravel envelope overlaid by 2 ft wide filter fabric (50 ft long). Water is then directed (via 20 ft long, 4 inch PVC) to a spring box (36-48 inch diameter x 8 ft long concrete well tile) that is located below the collection trench, equipped with a watertight lid and two outlets. 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/or to a watering facility (not included) for use. Resource Concern: Livestock production limitation - Inadequate livestock water. Associated Practices: 516-Livestock Pipeline; 614-Watering Facility; 382-Fence; Critical Area Planting (342).

Before 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.

Feature Measure: Number of Developments

Scenario Unit: Each

Scenario Typical Size: 1.0

Scenario Total Cost: $4,713.21

Scenario Cost/Unit: $4,713.21

Cost Details:

Component Name	ID	Description	Unit	Cost	QTY	Total
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 Yards	$481.12	1.5	$721.68
Geotextile, woven	42	Woven Geotextile Fabric. Includes materials, equipment and labor	Square Yard	$1.33	22	$29.26
Backhoe, 80 HP	926	Wheel mounted backhoe excavator with horsepower range of 60 to 90. Equipment and power unit costs. Labor not included.	Hours	$31.96	16	$511.36
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.	Hours	$27.56	32	$881.92
Equipment Operators, Light	232	Includes: Skid Steer Loaders, Hydraulic Excavators <50 HP, Trenchers <12 in., Ag Equipment <150 HP, Pickup Trucks, Forklifts, Mulchers	Hours	$27.87	16	$445.92
Materials						
Aggregate, Gravel, Graded	46	Gravel, includes materials, equipment and labor to transport and place. Includes washed and unwashed gravel.	Cubic Yards	$45.42	16	$726.72
Poly film, 6 mil.	245	6 mil, polyethylene, black	Square Feet	$0.08	1000	$80.00
Pipe, PVC, 4 in., SCH 40	978	Materials: - 4 inch - PVC - SCH 40 - ASTM D1785	Feet	$3.82	20	$76.40
Pipe, HDPE, 4 in., PCPT, Single Wall	1270	Pipe, Corrugated Plastic Tubing, Single Wall, Perforated, 4 inch diameter - ASTM F405. Material cost only.	Feet	$0.44	100	$44.00
Spring Collection Box Cover, steel, 4 ft. diameter	1281	4 foot diameter x 1/4 inch thick Steel lid with handle for spring collection box. Materials and fabrication.	Each	$206.14	1	$206.14
Well Casing, Concrete	2173	Concrete tile 3 feet diameter x 8 feet long. Materials only.	Feet	$91.77	8	$734.16
Mobilization						
Mobilization, medium equipment	1139	Equipment with 70-150 HP or typical weights between 14,000 and 30,000 pounds.	Each	$255.65	1	$255.65

Practice: 574 - Spring Development

Scenario: #2 - Perforated Well Tile Development

Scenario Description:

Develop a water source from a natural spring, seep, or other wet area to provide water for livestock and/or wildlife needs. This typical scenario includes excavating and exposing the water source at the spring/seep and installing a 3'-4' dia x 8' deep perforated concrete well tile enveloped in crushed stone, with geotextile fabric placed along the stone soil interface. Water seeps through the fabric and stone into the collection well. The perforated concrete well tile is equipped with a watertight lid and two outlets. One outlet serves as overflow pipe to account for occasions where inflow exceeds outflow. The outflow pipe (not included) from the well can be directed to buried large storage (not included), and/or to a watering facility (not included) for use. Resource Concern: Livestock production limitation - Inadequate livestock water. Associated Practices: 516-Livestock Pipeline; 614-Watering Facility; 382-Fence; Critical Area Planting (342).

Before 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.

Feature Measure: Number of Developments

Scenario Unit: Each

Scenario Typical Size: 1.0

Scenario Total Cost: $2,443.25

Scenario Cost/Unit: $2,443.25

Cost Details:

Component Name	ID	Description	Unit	Cost	QTY	Total
Equipment Installation						
Geotextile, woven	42	Woven Geotextile Fabric. Includes materials, equipment and labor	Square Yard	$1.33	56	$74.48
Backhoe, 80 HP	926	Wheel mounted backhoe excavator with horsepower range of 60 to 90. Equipment and power unit costs. Labor not included.	Hours	$31.96	4	$127.84
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.	Hours	$27.56	16	$440.96
Equipment Operators, Light	232	Includes: Skid Steer Loaders, Hydraulic Excavators <50 HP, Trenchers <12 in., Ag Equipment <150 HP, Pickup Trucks, Forklifts, Mulchers	Hours	$27.87	6	$167.22
Materials						
Aggregate, Gravel, Graded	46	Gravel, includes materials, equipment and labor to transport and place. Includes washed and unwashed gravel.	Cubic Yards	$45.42	8	$363.36
Spring Collection Box Cover, steel, 4 ft. diameter	1281	4 foot diameter x 1/4 inch thick Steel lid with handle for spring collection box. Materials and fabrication.	Each	$206.14	1	$206.14
Well Casing, Concrete, perforated	2174	Perforated concrete tile 3 feet diameter x 8 feet long. Materials only.	Feet	$100.95	8	$807.60
Mobilization						
Mobilization, medium equipment	1139	Equipment with 70-150 HP or typical weights between 14,000 and 30,000 pounds.	Each	$255.65	1	$255.65

Practice: 575 - Trails and Walkways

Scenario: #1 - Earth or Vegetated Trail

Scenario Description:

Layout and construct an earth or vegetated trail to facilitate the movement of animals, people, or off-road vehicles to provide or improve access to forage, water, working/handling facilities, and/or shelter, Improve grazing efficiency and distribution, and/or protect ecologically sensitive, erosive and/or potentially erosive sites, pedestrian or off-road vehicle access to agricultural, construction, or maintenance operations, provide trails for recreational activities or access to recreation sites and address the resource conerns of soil erosion and water quality degradation. Costs include excavation, shaping, grading, earth and or vegetated surfaces and all equipment, labor and incidental materials necessary to install the practice.

Before Situation:

This practice applies on all lands where management of animal or human movement is needed to address soil erosion and water quality resource concerns. This practice applies to a trails or walkways constructed for use by off-road vehicles, such as All-Terrain Vehicles or snowmobiles, which are not designed for use on public roads. It does not apply to roads constructed for movement of equipment or vehicles. Use NRCS Conservation Practice Standard Access Road (Code 560).

After Situation:

The typical trail will be a 8 foot wide 300 foot long, 2400 square foot lane of earth and vegetation. All excavation, grading and shaping necessary to provide a smooth permanent travel surface for livestock or people is included. Included is 15 CY. Assume 0.1 acre of seeding to stabilize disturbed areas on both sides. Consider the adequacy of natural surfacing. If the lane requires planting, the vegetation is provided. Where earth and or vegetation is not practical, adequate surface protection is provided under a different sceanrio. Stream Crossing, Code 578, will be used when the trail or lane crosses streams or shallow water areas. Consider the use of water bars to control and direct water flow in the trail. All culverts will be applied under Structure for Water Control (587). Use Access Road, Code 560 and Diversion (362) as appropriate. Fencing, Code 382, will be used when needed to control animal movement.

Feature Measure: Length of Walkway

Scenario Unit: Feet

Scenario Typical Size: 300.0

Scenario Total Cost: $1,499.54

Scenario Cost/Unit: $5.00

Cost Details:

Component Name	ID	Description	Unit	Cost	QTY	Total
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 Yards	$2.31	15	$34.65
Dozer, 80 HP	929	Track mounted Dozer with horsepower range of 60 to 90. Equipment and power unit costs. Labor not included.	Hours	$55.20	3	$165.60
Truck, Pickup	939	Equipment and power unit costs. Labor not included.	Hours	$24.18	3	$72.54
Tillage, Light	945	Includes light disking (tandem) or field cultivator. Includes equipment, power unit and labor costs.	Acres	$10.68	0.1	$1.07
Fertilizer, ground application, dry bulk	950	Dry bulk fertilizer application performed by ground equipment. Includes equipment, power unit and labor costs.	Acres	$6.63	0.1	$0.66
Lime application	953	Lime application performed by ground equipment. Includes equipment, power unit and labor costs.	Acres	$8.21	0.1	$0.82
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.	Acres	$12.00	0.1	$1.20
Cultipacking	1100	Includes equipment, power unit and labor costs.	Acres	$8.68	0.1	$0.87
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.	Hours	$37.19	4	$148.76
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.	Hours	$27.56	10	$275.60
Equipment Operators, Heavy	233	Includes: Cranes, Hydraulic Excavators >=50 HP, Dozers, Paving Machines, Rock Trenchers, Trenchers >=12 in., Dump Trucks, Ag Equipment >=150 HP, Scrapers, Water Wagons.	Hours	$38.00	6	$228.00
Materials						
Nitrogen (N), Urea	71	Price per pound of N supplied by Urea. Price is not per pound of total product applied, no conversion is needed.	Pound	$0.47	5	$2.35
Phosphorus, P2O5	73	Price per pound of P2O5 supplied by Superphosphate. Price is not per pound of total product applied, no conversion is needed.	Pound	$0.61	5	$3.05
Potassium, K2O	74	K2O supplied by Muriate Of Potash. Price is not per pound of total product applied, no conversion is needed.	Pound	$0.35	5	$1.75

Lime, ENM	75	Fertilizer: Limestone Spread on field.	Ton	$64.87	0.2	$12.97
Straw	1237	Small grain straw (non organic and certified organic). Includes materials only.	Ton	$65.00	0.4	$26.00
Native and Introduced Perennial Grasses, Legumes and/or Forbs, Medium Density	2756	A mix of native and introduced perennial grasses, legumes, and/or forbs, grasses typically greater than 50% of the mix, may include a small percentage of annual species for establishment purposes and/or if allowed by the CPS. Planted at medium to high density (41-60 pure live seeds/sq ft). Includes material and shipping.	Acres	$123.45	0.1	$12.35
Mobilization						
Mobilization, medium equipment	1139	Equipment with 70-150 HP or typical weights between 14,000 and 30,000 pounds.	Each	$255.65	2	$511.30

Practice: 575 - Trails and Walkways

Scenario: #2 - Reinforced Concrete Walkway

Scenario Description:

Layout and construct an reinforced concrete walkway on a sand foundation to facilitate the movement of animals, people, or off-road vehicles to provide or improve access to forage, water, working/handling facilities, and/or shelter, Improve grazing efficiency and distribution, and/or protect ecologically sensitive, erosive and/or potentially erosive sites, pedestrian or off-road vehicle access to agricultural, construction, or maintenance operations, provide walkways for recreational activities or access to recreation sites and address the resource concerns of soil erosion and water quality degradation. Costs include excavation, shaping, grading, reinforced concrete surfacing, vegetation of disturbed areas, all equipment, labor and incidental materials necessary to install the practice.

Before Situation:

This practice applies on all lands where management of animal or human movement is needed to address soil erosion and water quality resource concerns. This practice applies to a trails or walkways constructed for use by off-road vehicles, such as All-Terrain Vehicles or snowmobiles, which are not designed for use on public roads. It does not apply to roads constructed for movement of equipment or vehicles. Use NRCS Conservation Practice Standard Access Road (Code 560).

After Situation:

The typical walkway will be a 8 foot wide 300 foot long, 2400 square foot of reinforced concrete. All excavation, grading and shaping necessary to provide a smooth permanent travel surface for livestock or people is included. Included is reinforced concrete of 2400 square foot for surfacing. Assume 0.1 acre of seeding to stabilize disturbed areas on both sides. The walkway consist of approximately 44.5 CY of excavation, 30 CY of reinforced concrete with a 30 CY sand foundation. Stream Crossing, Code 578, will be used when the walkway crosses streams or shallow water areas. All culverts will be applied under Structure for Water Control (587). Use Access Road, Code 560 and Diversion (362) as appropriate. Fencing, Code 382, will be used when needed to control animal movement.

Feature Measure: Length of Walkway

Scenario Unit: Feet

Scenario Typical Size: 300.0

Scenario Total Cost: $13,657.80

Scenario Cost/Unit: $45.53

Cost Details:

Component Name	ID	Description	Unit	Cost	QTY	Total
Equipment Installation						
Concrete, CIP, slab on grade, reinforced	37	Steel reinforced concrete formed and cast-in-placed as a slab on grade by chute placement. Typical strength is 3000 to 4000 psi. Includes materials, labor and equipment to transport, place and finish.	Cubic Yards	$362.36	30	$10,870.80
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 Yards	$2.31	44.5	$102.80
Dozer, 80 HP	929	Track mounted Dozer with horsepower range of 60 to 90. Equipment and power unit costs. Labor not included.	Hours	$55.20	3	$165.60
Truck, Pickup	939	Equipment and power unit costs. Labor not included.	Hours	$24.18	3	$72.54
Tillage, Light	945	Includes light disking (tandem) or field cultivator. Includes equipment, power unit and labor costs.	Acres	$10.68	0.1	$1.07
Fertilizer, ground application, dry bulk	950	Dry bulk fertilizer application performed by ground equipment. Includes equipment, power unit and labor costs.	Acres	$6.63	0.1	$0.66
Lime application	953	Lime application performed by ground equipment. Includes equipment, power unit and labor costs.	Acres	$8.21	0.1	$0.82
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.	Acres	$12.00	0.1	$1.20
Cultipacking	1100	Includes equipment, power unit and labor costs.	Acres	$8.68	0.1	$0.87
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.	Hours	$37.19	4	$148.76
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.	Hours	$27.56	7	$192.92
Equipment Operators, Heavy	233	Includes: Cranes, Hydraulic Excavators >=50 HP, Dozers, Paving Machines, Rock Trenchers, Trenchers >=12 in., Dump Trucks, Ag Equipment >=150 HP, Scrapers, Water Wagons.	Hours	$38.00	6	$228.00
Materials						
Aggregate, Sand, Graded, Washed	45	Sand, typical ASTM C33 gradation, includes materials, equipment and labor to transport and place	Cubic Yards	$43.40	30	$1,302.00
Nitrogen (N), Urea	71	Price per pound of N supplied by Urea. Price is not per pound of total product applied, no conversion is needed.	Pound	$0.47	5	$2.35

Phosphorus, P2O5	73	Price per pound of P2O5 supplied by Superphosphate. Price is not per pound of total product applied, no conversion is needed.	Pound	$0.61	5	$3.05
Potassium, K2O	74	K2O supplied by Muriate Of Potash. Price is not per pound of total product applied, no conversion is needed.	Pound	$0.35	5	$1.75
Lime, ENM	75	Fertilizer: Limestone Spread on field.	Ton	$64.87	0.2	$12.97
Straw	1237	Small grain straw (non organic and certified organic). Includes materials only.	Ton	$65.00	0.4	$26.00
Native and Introduced Perennial Grasses, Legumes and/or Forbs, Medium Density	2756	A mix of native and introduced perennial grasses, legumes, and/or forbs, grasses typically greater than 50% of the mix, may include a small percentage of annual species for establishment purposes and/or if allowed by the CPS. Planted at medium to high density (41-60 pure live seeds/sq ft). Includes material and shipping.	Acres	$123.45	0.1	$12.35
Mobilization						
Mobilization, medium equipment	1139	Equipment with 70-150 HP or typical weights between 14,000 and 30,000 pounds.	Each	$255.65	2	$511.30

Practice: 575 - Trails and Walkways

Scenario: #3 - Rock/Gravel on Geotextile, Walkway

Scenario Description:

Layout and construct a walkway with rock and or gravel on a geotextile fabric foundation surface treatment, to facilitate the movement of animals, people, or off-road vehicles to provide or improve access to forage, water, working/handling facilities, and/or shelter, Improve grazing efficiency and distribution, and/or protect ecologically sensitive, erosive and/or potentially erosive sites, pedestrian or off-road vehicle access to agricultural, construction, or maintenance operations, provide walkways for recreational activities or access to recreation sites and address the resource concerns of soil erosion and water quality degradation. Costs include excavation, shaping, grading, rock and or gravel, geotextile, vegetation of disturbed areas, all equipment, labor and incidental materials necessary to install the practice.

Before Situation:

This practice applies on all lands where management of animal or human movement is needed to address soil erosion and water quality resource concerns. This practice applies to a trails or walkways constructed for use by off-road vehicles, such as All-Terrain Vehicles or snowmobiles, which are not designed for use on public roads. It does not apply to roads constructed for movement of equipment or vehicles. Use NRCS Conservation Practice Standard Access Road (Code 560).

After Situation:

The typical walkway will be a 8 foot wide 300 foot long, 2400 square foot of rock and or gravel on a geotextile fabric foundation surface treatment. All excavation, grading and shaping necessary to provide a smooth permanent travel surface for livestock or people is included. Included is aggregate gravel of 2400 square foot for surfacing. Assume 0.1 acre of seeding to stabilize disturbed areas on both sides. The walkway consist of approximately 67 CY of excavation, 67 CY of aggregate gravel on a 267 SY of geotextile fabric foundation. Stream Crossing, Code 578, will be used when the walkway crosses streams or shallow water areas. All culverts will be applied under Structure for Water Control (587). Use Access Road, Code 560 and Diversion (362) as appropriate. Fencing, Code 382, will be used when needed to control animal movement.

Feature Measure: Length of Walkway

Scenario Unit: Feet

Scenario Typical Size: 300.0

Scenario Total Cost: $5,823.01

Scenario Cost/Unit: $19.41

Cost Details:

Component Name	ID	Description	Unit	Cost	QTY	Total
Equipment Installation						
Geotextile, woven	42	Woven Geotextile Fabric. Includes materials, equipment and labor	Square Yard	$1.33	340	$452.20
Dozer, 80 HP	929	Track mounted Dozer with horsepower range of 60 to 90. Equipment and power unit costs. Labor not included.	Hours	$55.20	5	$276.00
Hydraulic Excavator, 1 CY	931	Track mounted hydraulic excavator with bucket capacity range of 0.8 to 1.5 CY. Equipment and power unit costs. Labor not included.	Hours	$109.36	5	$546.80
Truck, Pickup	939	Equipment and power unit costs. Labor not included.	Hours	$24.18	3	$72.54
Tillage, Light	945	Includes light disking (tandem) or field cultivator. Includes equipment, power unit and labor costs.	Acres	$10.68	0.1	$1.07
Fertilizer, ground application, dry bulk	950	Dry bulk fertilizer application performed by ground equipment. Includes equipment, power unit and labor costs.	Acres	$6.63	0.1	$0.66
Lime application	953	Lime application performed by ground equipment. Includes equipment, power unit and labor costs.	Acres	$8.21	0.1	$0.82
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.	Acres	$12.00	0.1	$1.20
Cultipacking	1100	Includes equipment, power unit and labor costs.	Acres	$8.68	0.1	$0.87
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.	Hours	$37.19	4	$148.76
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.	Hours	$27.56	7	$192.92
Equipment Operators, Heavy	233	Includes: Cranes, Hydraulic Excavators >=50 HP, Dozers, Paving Machines, Rock Trenchers, Trenchers >=12 in., Dump Trucks, Ag Equipment >=150 HP, Scrapers, Water Wagons.	Hours	$38.00	10	$380.00
Materials						
Aggregate, Gravel, Graded	46	Gravel, includes materials, equipment and labor to transport and place. Includes washed and unwashed gravel.	Cubic Yards	$45.42	70	$3,179.40
Nitrogen (N), Urea	71	Price per pound of N supplied by Urea. Price is not per pound of total product applied, no conversion is needed.	Pound	$0.47	5	$2.35

Phosphorus, P2O5	73	Price per pound of P2O5 supplied by Superphosphate. Price is not per pound of total product applied, no conversion is needed.	Pound	$0.61	5	$3.05
Potassium, K2O	74	K2O supplied by Muriate Of Potash. Price is not per pound of total product applied, no conversion is needed.	Pound	$0.35	5	$1.75
Lime, ENM	75	Fertilizer: Limestone Spread on field.	Ton	$64.87	0.2	$12.97
Straw	1237	Small grain straw (non organic and certified organic). Includes materials only.	Ton	$65.00	0.4	$26.00
Native and Introduced Perennial Grasses, Legumes and/or Forbs, Medium Density	2756	A mix of native and introduced perennial grasses, legumes, and/or forbs, grasses typically greater than 50% of the mix, may include a small percentage of annual species for establishment purposes and/or if allowed by the CPS. Planted at medium to high density (41-60 pure live seeds/sq ft). Includes material and shipping.	Acres	$123.45	0.1	$12.35
Mobilization						
Mobilization, medium equipment	1139	Equipment with 70-150 HP or typical weights between 14,000 and 30,000 pounds.	Each	$255.65	2	$511.30

Practice: 576 - Livestock Shelter Structure

Scenario: #15 - Prefabricated Portable Shade Structure

Scenario Description:

A flexible membrane or fabric-like roof placed on a steel or wood portable frame used to promote animal health where prescribed grazing practices have limited livestock access to shade. Cost estimate is based upon a 10 ft x 20 ft prefab portable structure. Associated practices include Fence (382), Prescribed Grazing (528), and Watering Facility (614).

Before Situation:

Livestock are being managed using a prescribed grazing plan resulting in a lack of shade during the summer months. The livestock are stressed and eat less frequently.

After Situation:

Livestock shade structures are rotated and sized according to NRCS plans and specifications. Livestock access to water, shade, and forage are dispersed to decrease animal stress and promote a better grazing and nutrient spreading.

Feature Measure: Area of Roof Frame

Scenario Unit: Square Feet

Scenario Typical Size: 200.0

Scenario Total Cost: $1,118.56

Scenario Cost/Unit: $5.59

Cost Details:

Component Name	ID	Description	Unit	Cost	QTY	Total
Equipment Installation						
Truck, Pickup	939	Equipment and power unit costs. Labor not included.	Hours	$24.18	8	$193.44
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.	Hours	$27.56	8	$220.48
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.	Hours	$46.88	3	$140.64
Materials						
Hoop House, quonset style, base package	1277	Includes the framework complete with all predrilled steel, hardware and instructions. Includes 6 mil 4-year polyethylene film to cover tunnel, and polylock for sides and ends for a quonset style (round top) hoop house. Materials and shipping only, does not include labor.	Square Feet	$2.82	200	$564.00

Practice: 578 - Stream Crossing

Scenario: #1 - Culvert Installation, greater than or equal to 30 inch diameter

Scenario Description:

Install a new culvert equal to or greater than 30" in diameter. HDPE and CMP are acceptable materials under this scenario. For culverts less than 30" use Practice Standard 587 Structure for Water Control. 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 (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 and culverts less than 30" in diameter.

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. 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.

Feature Measure: Culvert

Scenario Unit: Inch-Foot

Scenario Typical Size: 1,440.0

Scenario Total Cost: $5,999.61

Scenario Cost/Unit: $4.17

Cost Details:

Component Name	ID	Description	Unit	Cost	QTY	Total
Equipment Installation						
Earthfill, Manually Compacted	50	Earthfill, manually compacted, includes equipment and labor	Cubic Yards	$6.02	3	$18.06
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.	Hours	$109.36	10	$1,093.60
Labor						
Equipment Operators, Heavy	233	Includes: Cranes, Hydraulic Excavators >=50 HP, Dozers, Paving Machines, Rock Trenchers, Trenchers >=12 in., Dump Trucks, Ag Equipment >=150 HP, Scrapers, Water Wagons.	Hours	$38.00	10	$380.00
Materials						
Rock Riprap, Placed with geotextile	44	Rock Riprap, placed with geotextile, includes materials, equipment and labor to transport and place	Cubic Yards	$94.25	2	$188.50
Aggregate, Gravel, Graded	46	Gravel, includes materials, equipment and labor to transport and place. Includes washed and unwashed gravel.	Cubic Yards	$45.42	50	$2,271.00
Pipe, HDPE, CPT, Double Wall, Soil Tight, 36 in.	1248	Pipe, Corrugated HDPE Double Wall, 36 inch diameter with soil tight joints - AASHTO M294. Material cost only.	Feet	$44.82	40	$1,792.80
Mobilization						
Mobilization, medium equipment	1139	Equipment with 70-150 HP or typical weights between 14,000 and 30,000 pounds.	Each	$255.65	1	$255.65

Practice: 578 - Stream Crossing

Scenario: #2 - Low Water Crossing, Riprap or Rock

Scenario Description:

Stabilize the bottom and slope of a stream channel using rock or riprap. This scenario includes site preparation, dewatering, acquiring and installing gravel or geotextile with rock riprap on channel bottom and approaches. Final travel surface shall be the riprap. Typical stream has 30 foot bottom width and approaches. Width is 14 feet for a total area as 420sf. Use (396) Aquatic Organism Passage instead, when the primary intent is biological concerns, not hydrologic.

Before Situation:

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

After Situation:

Stream flow is not impeded and a stable base exists for equipment, people and/or animals to cross. Associated practices could be (342) Critical Area Planting, (560) Access Road, (575) Animal Trails and Walkways, (566) Recreational Trails and Walkways, (500) Obstruction Removal, or (584) Channel Stabilization.

Feature Measure: Square feet of Rock or Riprap Instal

Scenario Unit: Square Feet

Scenario Typical Size: 420.0

Scenario Total Cost: $2,033.06

Scenario Cost/Unit: $4.84

Cost Details:

Component Name	ID	Description	Unit	Cost	QTY	Total
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 Yards	$2.31	16	$36.96
Materials						
Rock Riprap, Placed with geotextile	44	Rock Riprap, placed with geotextile, includes materials, equipment and labor to transport and place	Cubic Yards	$94.25	16	$1,508.00
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	$488.10	1	$488.10

Practice: 578 - Stream Crossing

Scenario: #3 - Low water crossing using prefabricated products

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 14 feet for a total area as 420sf. Use (396) Aquatic Organism Passage instead, when the primary intent is biological concerns, not hydrologic.

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. 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.

Feature Measure: low water crossing

Scenario Unit: Square Feet

Scenario Typical Size: 420.0

Scenario Total Cost: $8,762.94

Scenario Cost/Unit: $20.86

Cost Details:

Component Name	ID	Description	Unit	Cost	QTY	Total
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.	Hours	$109.36	24	$2,624.64
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.	Hours	$27.56	24	$661.44
Equipment Operators, Heavy	233	Includes: Cranes, Hydraulic Excavators >=50 HP, Dozers, Paving Machines, Rock Trenchers, Trenchers >=12 in., Dump Trucks, Ag Equipment >=150 HP, Scrapers, Water Wagons.	Hours	$38.00	24	$912.00
Materials						
Aggregate, Gravel, Graded	46	Gravel, includes materials, equipment and labor to transport and place. Includes washed and unwashed gravel.	Cubic Yards	$45.42	18	$817.56
Articulated precast concrete planking, 5 Foot Wide block	1906	Articulated precast concrete blocks with a typical thickness of 4.5 inches. Includes materials only.	Square Feet	$7.76	420	$3,259.20
Mobilization						
Mobilization, large equipment	1140	Equipment >150HP or typical weights greater than 30,000 pounds or loads requiring over width or over length permits.	Each	$488.10	1	$488.10

Practice: 578 - Stream Crossing

Scenario: #5 - Timber Bridge with Block Abutments

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 less than 14 feet. Load is H-20. Abutments are <= 6 feet. Typical Bridge is 16' wide and 20' long

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. 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.

Feature Measure: square footage of bridge deck

Scenario Unit: Square Feet

Scenario Typical Size: 320.0

Scenario Total Cost: $24,028.95

Scenario Cost/Unit: $75.09

Cost Details:

Component Name	ID	Description	Unit	Cost	QTY	Total
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.	Hours	$130.80	24	$3,139.20
Skidsteer, 80 HP	933	Skidsteer loader with horsepower range of 60 to 90. Equipment and power unit costs. Labor not included.	Hours	$55.01	24	$1,320.24
Truck, dump, 18 CY	1400	Dump truck for moving bulk material. Typically capacity is 25 ton or 18 cubic yards. Includes equipment only.	Hours	$98.15	24	$2,355.60
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.	Hours	$27.56	48	$1,322.88
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.	Hours	$27.56	8	$220.48
Equipment Operators, Heavy	233	Includes: Cranes, Hydraulic Excavators >=50 HP, Dozers, Paving Machines, Rock Trenchers, Trenchers >=12 in., Dump Trucks, Ag Equipment >=150 HP, Scrapers, Water Wagons.	Hours	$38.00	24	$912.00
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.	Hours	$46.88	24	$1,125.12
Materials						
Aggregate, Gravel, Ungraded, Quarry Run	1099	Includes materials, equipment and labor	Cubic Yards	$34.43	57	$1,962.51
Block, pre-cast concrete, modular	1496	Pre-cast concrete blocks, typically 2ft x 2ft x 6ft , includes installation and delivery.	Cubic Yards	$109.95	13	$1,429.35
Lumber, planks, posts and timbers, untreated	1623	Untreated dimension lumber with nominal thickness greater than 2". Includes lumber and fasteners. Does not include labor.	Board Feet	$1.87	2586	$4,835.82
Steel, structural steel members	1779	Structural steel, includes materials and fabrication.	Pound	$1.26	3700	$4,662.00
Mobilization						
Mobilization, medium equipment	1139	Equipment with 70-150 HP or typical weights between 14,000 and 30,000 pounds.	Each	$255.65	1	$255.65
Mobilization, large equipment	1140	Equipment >150HP or typical weights greater than 30,000 pounds or loads requiring over width or over length permits.	Each	$488.10	1	$488.10

Practice: 578 - Stream Crossing

Scenario: #6 - Bridge with cast in place abutments, span > 14 feet

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 greater than 14 feet. Load is H-20. Width is 15 feet including curbs. Abutment height as needed from design. Use (396) Aquatic Organism Passage instead, when the primary intent is biological concerns, not hydrologic. Bridge used to build scenario 15' wide, 30' long, 450 sq ft.

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 water flow 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. 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.

Feature Measure: Area of bridge deck

Scenario Unit: Square Feet

Scenario Typical Size: 450.0

Scenario Total Cost: $69,610.86

Scenario Cost/Unit: $154.69

Cost Details:

Component Name	ID	Description	Unit	Cost	QTY	Total
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 Yards	$481.12	32	$15,395.84
Backhoe, 80 HP	926	Wheel mounted backhoe excavator with horsepower range of 60 to 90. Equipment and power unit costs. Labor not included.	Hours	$31.96	40	$1,278.40
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.	Hours	$130.80	60	$7,848.00
Skidsteer, 80 HP	933	Skidsteer loader with horsepower range of 60 to 90. Equipment and power unit costs. Labor not included.	Hours	$55.01	40	$2,200.40
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.	Hours	$72.23	8	$577.84
Truck, dump, 18 CY	1400	Dump truck for moving bulk material. Typically capacity is 25 ton or 18 cubic yards. Includes equipment only.	Hours	$98.15	40	$3,926.00
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.	Hours	$37.19	40	$1,487.60
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.	Hours	$27.56	60	$1,653.60
Equipment Operators, Heavy	233	Includes: Cranes, Hydraulic Excavators >=50 HP, Dozers, Paving Machines, Rock Trenchers, Trenchers >=12 in., Dump Trucks, Ag Equipment >=150 HP, Scrapers, Water Wagons.	Hours	$38.00	140	$5,320.00
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.	Hours	$46.88	40	$1,875.20
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.	Hours	$102.76	120	$12,331.20
Materials						
Rock Riprap, Placed with geotextile	44	Rock Riprap, placed with geotextile, includes materials, equipment and labor to transport and place	Cubic Yards	$94.25	40	$3,770.00
Dimension Lumber, Treated	1044	Treated dimension lumber with nominal thickness equal or less than 2". Includes lumber and fasteners	Board Feet	$1.10	2500	$2,750.00

Epoxy anchor	1599	Galvanized bolts anchored into concrete or stone using epoxy adhesive. Includes materials and labor to drill and install.	Each	$18.05	12	$216.60
Steel, structural steel members	1779	Structural steel, includes materials and fabrication.	Pound	$1.26	5360	$6,753.60
Pipe, PE, 4 in., DR 9, perforated	2140	Materials: - 4 inch - Perforated PE- 160 psi - ASTM D3035 DR 9	Feet	$10.53	60	$631.80
Galvanized Bolts, large	2166	5/8" x 12" galvanized timber bolts. Materials only.	Each	$4.47	24	$107.28
Mobilization						
Mobilization, medium equipment	1139	Equipment with 70-150 HP or typical weights between 14,000 and 30,000 pounds.	Each	$255.65	2	$511.30
Mobilization, large equipment	1140	Equipment >150HP or typical weights greater than 30,000 pounds or loads requiring over width or over length permits.	Each	$488.10	2	$976.20

Practice: 578 - Stream Crossing

Scenario: #7 - Bridge with precast abutments

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 precast 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 greater than 14 feet. Load is H-20. Width is 15 feet including curbs. Abutment height as needed from design. Use (396) Aquatic Organism Passage instead, when the primary intent is biological concerns, not hydrologic.

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 water flow 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. 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.

Feature Measure: Area of bridge deck

Scenario Unit: Square Feet

Scenario Typical Size: 450.0

Scenario Total Cost: $54,711.90

Scenario Cost/Unit: $121.58

Cost Details:

Component Name	ID	Description	Unit	Cost	QTY	Total
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.	Hours	$31.96	40	$1,278.40
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.	Hours	$130.80	60	$7,848.00
Skidsteer, 80 HP	933	Skidsteer loader with horsepower range of 60 to 90. Equipment and power unit costs. Labor not included.	Hours	$55.01	40	$2,200.40
Truck, dump, 18 CY	1400	Dump truck for moving bulk material. Typically capacity is 25 ton or 18 cubic yards. Includes equipment only.	Hours	$98.15	40	$3,926.00
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.	Hours	$27.56	60	$1,653.60
Equipment Operators, Heavy	233	Includes: Cranes, Hydraulic Excavators >=50 HP, Dozers, Paving Machines, Rock Trenchers, Trenchers >=12 in., Dump Trucks, Ag Equipment >=150 HP, Scrapers, Water Wagons.	Hours	$38.00	140	$5,320.00
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.	Hours	$46.88	40	$1,875.20
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.	Hours	$102.76	120	$12,331.20
Materials						
Rock Riprap, Placed with geotextile	44	Rock Riprap, placed with geotextile, includes materials, equipment and labor to transport and place	Cubic Yards	$94.25	40	$3,770.00
Dimension Lumber, Treated	1044	Treated dimension lumber with nominal thickness equal or less than 2". Includes lumber and fasteners	Board Feet	$1.10	2500	$2,750.00
Epoxy anchor	1599	Galvanized bolts anchored into concrete or stone using epoxy adhesive. Includes materials and labor to drill and install.	Each	$18.05	12	$216.60
Steel, structural steel members	1779	Structural steel, includes materials and fabrication.	Pound	$1.26	5360	$6,753.60
Footing, concrete, precast	1836	Precast spread footing with stemwall, T-shaped, with channel built to accept arched culvert leg. Includes materials only.	Feet	$66.74	40	$2,669.60
Pipe, PE, 4 in., DR 9, perforated	2140	Materials: - 4 inch - Perforated PE- 160 psi - ASTM D3035 DR 9	Feet	$10.53	60	$631.80
Mobilization						

Mobilization, medium equipment	1139	Equipment with 70-150 HP or typical weights between 14,000 and 30,000 pounds.	Each	$255.65	2	$511.30
Mobilization, large equipment	1140	Equipment >150HP or typical weights greater than 30,000 pounds or loads requiring over width or over length permits.	Each	$488.10	2	$976.20

Practice: 578 - Stream Crossing

Scenario: #8 - Bridge, prefabricated

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 installed as a prefabricated unit. Work consists of site preparation, dewatering, acquiring and installing the prefabricated unit with necessary hardware, backfilling abuttments, and armoring with geotextile and riprap. Riprap and geotextile are used to stabilize and protect abutments as needed. Scenario based on prefabricated bridge structure. Travel surface shall be part of the prefabricated bridge structure. If a different travel surface is needed, refer to another appropriate standard for the surfacing. Load is HS-25. Width is 16 feet including curbs. Abutment height as needed from design. Use (396) Aquatic Organism Passage instead, when the primary intent is biological concerns, not hydrologic. Scenario is based on a typical bridge 16x30

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. 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.

Feature Measure: Area of Bridge Deck

Scenario Unit: Square Feet

Scenario Typical Size: 480.0

Scenario Total Cost: $70,004.77

Scenario Cost/Unit: $145.84

Cost Details:

Component Name	ID	Description	Unit	Cost	QTY	Total
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 Yards	$481.12	18	$8,660.16
Backhoe, 80 HP	926	Wheel mounted backhoe excavator with horsepower range of 60 to 90. Equipment and power unit costs. Labor not included.	Hours	$31.96	40	$1,278.40
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.	Hours	$130.80	20	$2,616.00
Water management, Flooding & dewatering	969	Includes equipment and power unit. Labor not included.	Acre Feet	$272.03	50	$13,601.50
Truck, dump, 18 CY	1400	Dump truck for moving bulk material. Typically capacity is 25 ton or 18 cubic yards. Includes equipment only.	Hours	$98.15	10	$981.50
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.	Hours	$37.19	34	$1,264.46
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.	Hours	$27.56	60	$1,653.60
Equipment Operators, Heavy	233	Includes: Cranes, Hydraulic Excavators >=50 HP, Dozers, Paving Machines, Rock Trenchers, Trenchers >=12 in., Dump Trucks, Ag Equipment >=150 HP, Scrapers, Water Wagons.	Hours	$38.00	70	$2,660.00
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.	Hours	$46.88	20	$937.60
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.	Hours	$102.76	80	$8,220.80
Materials						
Painting, steel surface, Impermeable	2165	Painting of steel surface with an impermeable coating. Includes materials and application	Square Feet	$0.90	1260	$1,134.00
Bridge, steel or concrete, pre-Manufactured Bridge	2193	A premanufactured steel or precast prestressed concrete bridge rated for an HS 25 highway loading. Typical width is 14', length is variable. Includes railing system. Includes materials and shipping only.	Square Feet	$58.34	450	$26,253.00
Mobilization						

Mobilization, medium equipment	1139	Equipment with 70-150 HP or typical weights between 14,000 and 30,000 pounds.	Each	$255.65	1	$255.65
Mobilization, large equipment	1140	Equipment >150HP or typical weights greater than 30,000 pounds or loads requiring over width or over length permits.	Each	$488.10	1	$488.10

Practice: 578 - Stream Crossing

Scenario: #9 - Stream Simulation Culvert, with Headwalls

Scenario Description:

Install a stream simulation culvert with a headwall where a particular culvert geometry is needed even though aquatic organism passage may not be the primary concern. For culverts less than 30" use Practice Standard 587 Structure for Water Control. 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. Pipe is 20 feet long and headwalls are included. Typical arch size may be 14' X 5'3" X 38' arch with 2'X3' precast footings 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 and culverts less than 30" in diameter.

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 water flow 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. 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.

Feature Measure: horizontal surface area (span x leng

Scenario Unit: Square Feet

Scenario Typical Size: 532.0

Scenario Total Cost: $54,156.04

Scenario Cost/Unit: $101.80

Cost Details:

Component Name	ID	Description	Unit	Cost	QTY	Total
Equipment Installation						
Geotextile, woven	42	Woven Geotextile Fabric. Includes materials, equipment and labor	Square Yard	$1.33	100	$133.00
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.	Hours	$130.80	64	$8,371.20
Truck, dump, 12 CY	1215	Dump truck for moving bulk material. Typically capacity is 16 ton or 12 cubic yards. Includes equipment only.	Hours	$78.77	32	$2,520.64
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.	Hours	$27.56	64	$1,763.84
Equipment Operators, Heavy	233	Includes: Cranes, Hydraulic Excavators >=50 HP, Dozers, Paving Machines, Rock Trenchers, Trenchers >=12 in., Dump Trucks, Ag Equipment >=150 HP, Scrapers, Water Wagons.	Hours	$38.00	64	$2,432.00
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.	Hours	$46.88	32	$1,500.16
Materials						
Aggregate, river rock	1834	Well graded, rounded mineral substrates derived from local riverine settings. Includes materials and local delivery	Ton	$36.99	100	$3,699.00
Culvert, Multi-Plate arch	1979	Multi-plate arch culvert, typically 7 Gauge corrugated plate. Includes metal arch materials only, does not include footings.	Pound	$1.56	21000	$32,760.00
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	$488.10	2	$976.20

Practice: 578 - Stream Crossing

Scenario: #10 - Stream Simulation Culvert, without Headwalls

Scenario Description:

Install a stream simulation culvert without a headwall where a particular culvert geometry is needed even though aquatic organism passage may not be the primary concern. For culverts less than 30" use Practice Standard 587 Structure for Water Control. Work includes dewatering, site preparation and removing any old crossing, acquiring and installing culvert pipe with gravel bedding and fill (compacted). If a different travel surface is needed, refer to another appropriate standard for the surfacing. Pipe is 40 feet long and therefore headwalls are not included. Typical arch size may be 12' X 5'3" X 48' arch with 2'X3' precast footings 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 and culverts less than 30" in diameter.

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 water flow 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. 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.

Feature Measure: Horizonatal surface area (length x s

Scenario Unit: Square Feet

Scenario Typical Size: 576.0

Scenario Total Cost: $43,120.73

Scenario Cost/Unit: $74.86

Cost Details:

Component Name	ID	Description	Unit	Cost	QTY	Total
Equipment Installation						
Geotextile, woven	42	Woven Geotextile Fabric. Includes materials, equipment and labor	Square Yard	$1.33	200	$266.00
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.	Hours	$130.80	24	$3,139.20
Water management, Flooding & dewatering	969	Includes equipment and power unit. Labor not included.	Acre Feet	$272.03	25	$6,800.75
Truck, dump, 12 CY	1215	Dump truck for moving bulk material. Typically capacity is 16 ton or 12 cubic yards. Includes equipment only.	Hours	$78.77	24	$1,890.48
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.	Hours	$27.56	24	$661.44
Equipment Operators, Heavy	233	Includes: Cranes, Hydraulic Excavators >=50 HP, Dozers, Paving Machines, Rock Trenchers, Trenchers >=12 in., Dump Trucks, Ag Equipment >=150 HP, Scrapers, Water Wagons.	Hours	$38.00	24	$912.00
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.	Hours	$46.88	24	$1,125.12
Materials						
Aggregate, Gravel, Ungraded, Quarry Run	1099	Includes materials, equipment and labor	Cubic Yards	$34.43	50	$1,721.50
Aggregate, river rock	1834	Well graded, rounded mineral substrates derived from local riverine settings. Includes materials and local delivery	Ton	$36.99	90	$3,329.10
Footing, concrete, precast	1836	Precast spread footing with stemwall, T-shaped, with channel built to accept arched culvert leg. Includes materials only.	Feet	$66.74	96	$6,407.04
Culvert, Multi-Plate arch	1979	Multi-plate arch culvert, typically 7 Gauge corrugated plate. Includes metal arch materials only, does not include footings.	Pound	$1.56	10500	$16,380.00
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	$488.10	1	$488.10

Practice: 578 - Stream Crossing

Scenario: #11 - Concrete Box Culvert

Scenario Description:

Install a concrete box culvert where a particular culvert geometry is needed even though aquatic organism passage may not be the primary concern. For culverts less than 30" use Practice Standard 587 Structure for Water Control. Work includes dewatering, site preparation and removing any old crossing, acquiring and installing concrete box culvert with gravel bedding and fill (compacted). If a different travel surface is needed, refer to another appropriate standard for the surfacing. Concrete box culvert is a 6' by 8' box and is 20 feet long. Headwalls are not included. Typical concrete box culvert size is 6' by 8' by 20'. 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 and culverts less than 30" in diameter.

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 water flow 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. 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.

Feature Measure: Horizontal Area (length x span)

Scenario Unit: Square Feet

Scenario Typical Size: 160.0

Scenario Total Cost: $21,297.96

Scenario Cost/Unit: $133.11

Cost Details:

Component Name	ID	Description	Unit	Cost	QTY	Total
Equipment Installation						
Geotextile, woven	42	Woven Geotextile Fabric. Includes materials, equipment and labor	Square Yard	$1.33	100	$133.00
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.	Hours	$130.80	16	$2,092.80
Water management, Flooding & dewatering	969	Includes equipment and power unit. Labor not included.	Acre Feet	$272.03	25	$6,800.75
Truck, dump, 12 CY	1215	Dump truck for moving bulk material. Typically capacity is 16 ton or 12 cubic yards. Includes equipment only.	Hours	$78.77	16	$1,260.32
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.	Hours	$27.56	16	$440.96
Equipment Operators, Heavy	233	Includes: Cranes, Hydraulic Excavators >=50 HP, Dozers, Paving Machines, Rock Trenchers, Trenchers >=12 in., Dump Trucks, Ag Equipment >=150 HP, Scrapers, Water Wagons.	Hours	$38.00	16	$608.00
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.	Hours	$46.88	16	$750.08
Materials						
Aggregate, river rock	1834	Well graded, rounded mineral substrates derived from local riverine settings. Includes materials and local delivery	Ton	$36.99	45	$1,664.55
Culvert, box, 6 ft x 8 ft	2175	Precast concrete box culvert, 6 feet x 8 feet length. Typically in 4 foot sections. Materials only.	Feet	$352.97	20	$7,059.40
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	$488.10	1	$488.10

Practice: 578 - Stream Crossing

Scenario: #12 - Bridge, Light Weight Timber

Scenario Description:

Light Weight Timber bridge is constructed of 6" x 10" timbers side by side bolted together by ASTM A307 Bolts to provide a deck for animal traffic and light weight equipment such as ATV's. Deck is fabricated into 3 - 4'x20' panels which are moved into position by an excavator. Bridge is placed accross a narrow incised stream where installing a ford or other type of crossing is not practical. Bridge deck is mounted on precast concrete blocks which are buried 1/2 to 3/4 into the ground. Approaches to both ends of the bridge are graded to meet the contour of the existing or proposed animal trail. Bridge opening determined by sizing for storm event dictated in standard. Streambanks and bed at crossing location are generally stable. Work consists of furnishing and installing four precast blocks to mount bridge, furnishing 24 - 6" x 10" timbers and assembling the bridge on site, necessary hardware, and lifting bridge panels into place by hydraulic excavator. Span is less than 14 feet. Bridge is intended for cattle passage and not for heavy weight equpment. Bridge width is 12 feet. Use (396) Aquatic Organism Passage instead, when the primary intent is biological concerns, not hydrologic.

Before Situation:

Access to pasture is not possible without causing excessive erosion and other water quality water concerns.

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 light weight equipment, people and/or animals to cross. Associated practices could be (342) Critical Area Planting, (560) Access Road, (575) Animal Trails and Walkways, (566) Recreational Trails and Walkways, (500) Obstruction Removal, or (584) Channel Stabilization.

Feature Measure: Area of Bridge Deck in Square Feet

Scenario Unit: Square Feet

Scenario Typical Size: 240.0

Scenario Total Cost: $9,046.61

Scenario Cost/Unit: $37.69

Cost Details:

Component Name	ID	Description	Unit	Cost	QTY	Total
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.	Hours	$109.36	8	$874.88
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.	Hours	$27.56	16	$440.96
Equipment Operators, Heavy	233	Includes: Cranes, Hydraulic Excavators >=50 HP, Dozers, Paving Machines, Rock Trenchers, Trenchers >=12 in., Dump Trucks, Ag Equipment >=150 HP, Scrapers, Water Wagons.	Hours	$38.00	8	$304.00
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.	Hours	$46.88	2	$93.76
Materials						
Block, pre-cast concrete, modular	1496	Pre-cast concrete blocks, typically 2ft x 2ft x 6ft , includes installation and delivery.	Cubic Yards	$109.95	3.6	$395.82
Lumber, planks, posts and timbers, untreated	1623	Untreated dimension lumber with nominal thickness greater than 2". Includes lumber and fasteners. Does not include labor.	Board Feet	$1.87	2400	$4,488.00
Bolt, All Thread Rod, ASTM A307, 1 inch Dia. x 4'	2528	Hot Dipped Galvanized All Thread Rod, ASTM A307, 1 inch Dia. X 4' Long with two - nuts and flat washers. Includes materials and shipping only.	Each	$114.02	18	$2,052.36
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	$70.59	2	$141.18
Mobilization, medium equipment	1139	Equipment with 70-150 HP or typical weights between 14,000 and 30,000 pounds.	Each	$255.65	1	$255.65

Practice: 580 - Streambank and Shoreline Protection

Scenario: #1 - Riprap

Scenario Description:

Protection of streambanks using riprap to stabilize and protect banks of streams against scour and erosion. The purpose of this practice is to maintain, improve, or restore physical, chemical, and biological functions of a stream to provide diverse aquatic communities to improve habitat for desired aquatic species. Payment cost include shaping bank, geotextile, and furnishing and placing rock rip rap. Typical scenario is a 2.0 feet thick blanket of rock riprap, placed on a 1.5 to 1 slope, installed on an eroded streambank which is 200 feet long. Streambank is typically 6 feet high. Riprap toe is excavated 3 feet into stream bottom. 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-Stromwater 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.

Feature Measure: Volume of Riprap

Scenario Unit: Cubic Yards

Scenario Typical Size: 240.0

Scenario Total Cost: $24,816.10

Scenario Cost/Unit: $103.40

Cost Details:

Component Name	ID	Description	Unit	Cost	QTY	Total
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.	Hours	$109.36	10	$1,093.60
Labor						
Equipment Operators, Heavy	233	Includes: Cranes, Hydraulic Excavators >=50 HP, Dozers, Paving Machines, Rock Trenchers, Trenchers >=12 in., Dump Trucks, Ag Equipment >=150 HP, Scrapers, Water Wagons.	Hours	$38.00	10	$380.00
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.	Hours	$46.88	5	$234.40
Materials						
Rock Riprap, Placed with geotextile	44	Rock Riprap, placed with geotextile, includes materials, equipment and labor to transport and place	Cubic Yards	$94.25	240	$22,620.00
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	$488.10	1	$488.10

Practice: 580 - Streambank and Shoreline Protection

Scenario: #2 - Bioengineered

Scenario Description:

Bioengineering consist of non-structural measures such as facines, wattles, woody cuttings, revetments and other non-structural measures to stabilize and protect the streambank against scour and erosion. Soil bioengineering is a system of living plant materials that are installed to provide immediate protection and reinforcement of the soil along the streambank. Bioengineering is generally installed on the streambank above structural measures or toe protection such as rock riprap. Vegetation in the form of trees, bushes, grass re-establishment is covered under 342 - Critical Area Planting. 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 bioengineering materials include diverse and productive riparian habitats, shade, organic additions to the stream, cover for fish, and improvements in aesthetic value and water quality. Soil bioengineering installations work best in conjunction with structural measures such as rock riprap 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. Typical bioengineering scenario is a plot of land which is 200' long by 10' wide (2000 sf) installed on the upper part of the streambank. 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-Stromwater 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 upper part of the streambank is degraded, unstable and show signs of active erosion. Generally installed above more permanent structual measures such as rock riprap. 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.

Feature Measure: Area of Bio-Engineering Applied

Scenario Unit: Square Feet

Scenario Typical Size: 2,000.0

Scenario Total Cost: $7,688.00

Scenario Cost/Unit: $3.84

Cost Details:

Component Name	ID	Description	Unit	Cost	QTY	Total
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.	Hours	$31.96	10	$319.60
Tractor, agricultural, 120 HP	962	Agricultural tractor with horsepower range of 90 to 140. Equipment and power unit costs. Labor not included.	Hours	$50.84	10	$508.40
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.	Hours	$27.56	20	$551.20
Equipment Operators, Light	232	Includes: Skid Steer Loaders, Hydraulic Excavators <50 HP, Trenchers <12 in., Ag Equipment <150 HP, Pickup Trucks, Forklifts, Mulchers	Hours	$27.87	10	$278.70
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.	Hours	$46.88	10	$468.80
Materials						
Tree & Shrub, Woody, Cuttings, Medium	1308	Woody cuttings, live stakes or whips typically 1/4 to 1 inch diameter and 24 to 48 inches long. Includes materials and shipping only.	Each	$0.89	200	$178.00
Wattles or facines, 4 to 5 inch diameter	1903	Facines, or wattles: bundles of live tree stems of species that sprout roots, bound together. 4"-5" diameter. Includes materials and shipping only.	Feet	$4.62	200	$924.00
Wattles or facines, 6 to 8 inch diameter	1904	Facines, or wattles: bundles of live tree stems of species that sprout roots, bound together. 6"-8" diameter. Includes materials and shipping only.	Feet	$7.61	200	$1,522.00
Wattles or facines, 9 to 12 inch diameter	1905	Facines, or wattles: bundles of live tree stems of species that sprout roots, bound together. 9"- 12" diameter. Includes materials and shipping only.	Feet	$12.13	200	$2,426.00

Mobilization

Mobilization, medium equipment	1139	Equipment with 70-150 HP or typical weights between 14,000 and 30,000 pounds.	Each	$255.65	2	$511.30

Practice: 580 - Streambank and Shoreline Protection

Scenario: #29 - 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

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.

Feature Measure: Linear Feet of Streambank/Shorelin

Scenario Unit: Feet

Scenario Typical Size: 1,000.0

Scenario Total Cost: $23,882.48

Scenario Cost/Unit: $23.88

Cost Details:

Component Name	ID	Description	Unit	Cost	QTY	Total
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 Yards	$2.31	2500	$5,775.00
Dozer, 80 HP	929	Track mounted Dozer with horsepower range of 60 to 90. Equipment and power unit costs. Labor not included.	Hours	$55.20	16	$883.20
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.	Acres	$12.00	0.46	$5.52
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.	Hours	$27.56	252	$6,945.12
Equipment Operators, Light	232	Includes: Skid Steer Loaders, Hydraulic Excavators <50 HP, Trenchers <12 in., Ag Equipment <150 HP, Pickup Trucks, Forklifts, Mulchers	Hours	$27.87	16	$445.92
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.	Hours	$46.88	63	$2,953.44
Materials						
Erosion Control Blanket, biodegradable	1213	Biodegradable erosion control blanket, typically a composite of natural fibers with reinforcing polymer netting. Materials and shipping only.	Square Yard	$1.32	2222	$2,933.04
Annual Grasses	2730	Annual grasses, one or more species, mostly introduced but may be native. Used for temporary cover or cover crops. Includes material and shipping.	Acres	$32.58	100	$3,258.00
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	$171.94	1	$171.94
Mobilization, medium equipment	1139	Equipment with 70-150 HP or typical weights between 14,000 and 30,000 pounds.	Each	$255.65	2	$511.30

Practice: 580 - Streambank and Shoreline Protection

Scenario: #30 - Structural

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

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.

Feature Measure: Linear Feet of Streambank/Shorelin

Scenario Unit: Feet

Scenario Typical Size: 1,000.0

Scenario Total Cost: $198,150.22

Scenario Cost/Unit: $198.15

Cost Details:

Component Name	ID	Description	Unit	Cost	QTY	Total
Equipment Installation						
Earthfill, Roller Compacted	49	Earthfill, roller or machine compacted, includes equipment and labor	Cubic Yards	$4.66	2500	$11,650.00
Dozer, 80 HP	929	Track mounted Dozer with horsepower range of 60 to 90. Equipment and power unit costs. Labor not included.	Hours	$55.20	16	$883.20
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.	Acres	$12.00	0.12	$1.44
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 Yards	$4.58	2500	$11,450.00
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.	Hours	$27.56	360	$9,921.60
Equipment Operators, Light	232	Includes: Skid Steer Loaders, Hydraulic Excavators <50 HP, Trenchers <12 in., Ag Equipment <150 HP, Pickup Trucks, Forklifts, Mulchers	Hours	$27.87	16	$445.92
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.	Hours	$46.88	90	$4,219.20
Materials						
Rock Riprap, Placed with geotextile	44	Rock Riprap, placed with geotextile, includes materials, equipment and labor to transport and place	Cubic Yards	$94.25	1667	$157,114.75
Erosion Control Blanket, biodegradable	1213	Biodegradable erosion control blanket, typically a composite of natural fibers with reinforcing polymer netting. Materials and shipping only.	Square Yard	$1.32	556	$733.92
Annual Grasses	2730	Annual grasses, one or more species, mostly introduced but may be native. Used for temporary cover or cover crops. Includes material and shipping.	Acres	$32.58	25	$814.50
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	$171.94	1	$171.94
Mobilization, medium equipment	1139	Equipment with 70-150 HP or typical weights between 14,000 and 30,000 pounds.	Each	$255.65	1	$255.65
Mobilization, large equipment	1140	Equipment >150HP or typical weights greater than 30,000 pounds or loads requiring over width or over length permits.	Each	$488.10	1	$488.10

Practice: 582 - Open Channel

Scenario: #5 - Cranberry By-Pass Channel

Scenario Description:

This scenario is the construction or improvement of a channel in which water flows with a free surface. Typical construction dimensions are 5' deep x 6' wide bottom x 750' length with a side slope of 2:1. Excavation and earth fill is required. The practice is used to create or improve channels to convey low frequency storm flows by-passing cranberry bogs during chemigation. Normal conditions include: a location easily accessible from a main road, soils without large rock or difficult clay to excavate, and/or other aspects that are average compared to excavation work in the area. This scenario assists in addressing the resource concerns: water pollution, streambank erosion, sediment deposition, excessive flooding or ponding. Conservation practices that may be associated are: 356-Dike, 587-Structure For Water Control, 533-Pumping Plant, 580 Streambank and Shoreline Protection, 584 Channel Stabilization, 578 Stream Crossing.

Before Situation:

No drainage channels exist to convey flows outside of chemigated bogs or a channel with inadequate capacity needs improvements to handle the flow needed for flood prevention, drainage or erosion prevention.

After Situation:

A cranberry by-pass earthen channel was excavated to allow unrestricted flow of water and to stabilize the bottom and side slopes. Some fill was used to complete the channel shape. Water pollution, flooding and erosion are no longer resource concerns.

Feature Measure: <Unknown>

Scenario Unit: Cubic Yards

Scenario Typical Size: 2,250.0

Scenario Total Cost: $16,193.80

Scenario Cost/Unit: $7.20

Cost Details:

Component Name	ID	Description	Unit	Cost	QTY	Total
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 Yards	$2.31	2250	$5,197.50
Earthfill, Roller Compacted	49	Earthfill, roller or machine compacted, includes equipment and labor	Cubic Yards	$4.66	2250	$10,485.00
Mobilization						
Mobilization, medium equipment	1139	Equipment with 70-150 HP or typical weights between 14,000 and 30,000 pounds.	Each	$255.65	2	$511.30

Practice: 582 - Open Channel

Scenario: #6 - Cranberry By-Pass Channel with Rock

Scenario Description:

This scenario is the construction or improvement of a channel in which water flows with a free surface. Typical construction dimensions are 5' deep x 6' wide bottom x 750' length with a side slope of 2:1. Excavation and earth fill is required. The practice is used to create channels to convey low frequency storm flows by-passing cranberry bogs during chemigation. Normal conditions include: a location easily accessible from a main road, soils without large rock or difficult clay to excavate, and/or other aspects that are average compared to excavation work in the area. This scenario assists in addressing the resource concerns: water pollution, streambank erosion, sediment deposition, excessive flooding or ponding. Conservation practices that may be associated are: 356-Dike, 587-Structure For Water Control, 533-Pumping Plant, 580 Streambank and Shoreline Protection, 584 Channel Stabilization, 578 Stream Crossing.

Before Situation:

No drainage channel exist to convey flows outside of chemigated bogs or a channel with inadequate capacity needs improvements to handle the flow needed for flood prevention, drainage or erosion prevention.

After Situation:

A cranberry by-pass earthen channel was excavated to allow unrestricted flow of water and to stabilize the bottom and side slopes. Some fill was used to complete the channel shape and 0.5ft of rock was installed in the flow area to prevent damage from excessive velocities. Water pollution, flooding and erosion are no longer resource concerns.

Feature Measure: Volume of earth excavated in CY's

Scenario Unit: Cubic Yards

Scenario Typical Size: 2,400.0

Scenario Total Cost: $22,612.50

Scenario Cost/Unit: $9.42

Cost Details:

Component Name	ID	Description	Unit	Cost	QTY	Total
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 Yards	$2.31	2400	$5,544.00
Earthfill, Roller Compacted	49	Earthfill, roller or machine compacted, includes equipment and labor	Cubic Yards	$4.66	2400	$11,184.00
Materials						
Rock Riprap, graded, angular, material and shipping	1200	Graded Rock Riprap for all gradation ranges. Includes materials and delivery only.	Ton	$35.35	152	$5,373.20
Mobilization						
Mobilization, medium equipment	1139	Equipment with 70-150 HP or typical weights between 14,000 and 30,000 pounds.	Each	$255.65	2	$511.30

Practice: 582 - Open Channel

Scenario: #8 - Two Stage Ditch

Scenario Description:

This scenario is the improvement of a channel in which water flows with a free surface. The practice is used for the restoration of a natural or artificial channel to improve nutrient (phosphorus and nitrate) reduction and ecological function by creating a floodplain bench. Installation conditions are normal which means the location is easily accessible from a main road, soils are without large rock or difficult clay to excavate, and/or other aspects are average compared to excavation work in the area.

Before Situation:

A stream or channel with active streambank erosion and excess nutrient load from upstream or tile entry sources. This scenario assists in addressing the resource concerns: water quality, streambank erosion, sediment deposition.

After Situation:

An earthen floobplain bench is excavated above low channel flow to create floodplain flow area and to stabilize the bottom and side slopes. Nutrients are reduced in the water through bench saturation. Erosion is no longer a resource concern. Typical construction dimensions are similar to Fig. 10-9 in Stream Restoration Design handbook with 10 ft wide benchs excavated on either side of 6 ft deep ditch. Total excavation = 5' x 10' X 2 sides = 100 cubic feet per foot. Cool season grasses are established on the bench and slope areas using 342 Critical Area Planting. Need for mulching (straw or erosion control blanket) would be accomplished through 484-Mulching as necessary. Associated practices: 356-Dike, 393-Filter Strip, 484-Mulching 587-Structure For Water Control, 533-Pumping Plant, 580 Streambank and Shoreline Protection, 584 Channel Stabilization, 578 Stream Crossing.

Feature Measure: Length of Ditch

Scenario Unit: Linear Feet

Scenario Typical Size: 1,000.0

Scenario Total Cost: $12,486.22

Scenario Cost/Unit: $12.49

Cost Details:

Component Name	ID	Description	Unit	Cost	QTY	Total
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 Yards	$2.31	3700	$8,547.00
Dozer, 140 HP	927	Track mounted Dozer with horsepower range of 125 to 160. Equipment and power unit costs. Labor not included.	Hours	$104.83	24	$2,515.92
Labor						
Equipment Operators, Heavy	233	Includes: Cranes, Hydraulic Excavators >=50 HP, Dozers, Paving Machines, Rock Trenchers, Trenchers >=12 in., Dump Trucks, Ag Equipment >=150 HP, Scrapers, Water Wagons.	Hours	$38.00	24	$912.00
Mobilization						
Mobilization, medium equipment	1139	Equipment with 70-150 HP or typical weights between 14,000 and 30,000 pounds.	Each	$255.65	2	$511.30

Practice: 584 - Channel Bed Stabilization

Scenario: #8 - Bio-engineering

Scenario Description:

Stabilize the bottom and slope of a stream channel using bioengineering methods. Bio-engineering methods include live stakes, fascines, plantings, bare root stock, willow waddles, and live stakes. Re-vegetation of exposed surfaces will be completed using 342 - Critical Area Planting. Typical stream has 50 foot bottom width and 6 foot banks. Length of area 100 feet. Planting entire area at a 2x2 grid with live stakes, potted plants, and bare root mix

Before Situation:

Bed of an existing or newly constructed alluvial or threshold channel is undergoing damaging aggradation or degradation. Stream cannot be feasibly controlled with clearing and snagging, vegetation, bank protection or upstream water control. Soil Erosion: The stream is unstable. Water Quality Degradation: The sediment load has increased in the stream resulting in elevated water temperatures. Excess/Insufficient Water: The excessive sediment load has reduced the water conveyance capacity, storage capacity and flow within the stream. Inadequate Habitat for Fish and Wildlife: The deficiencies in the stream's habitat limit survival, growth, reproduction, and/or diversity of aquatic organisms within the stream.

After Situation:

Stream channel is stable and vegetated. Other associated practices could be (326) Clearing and Snagging, (396) Aquatic Organism Passage, (395) Stream Habitat Improvement and Management, (580) Streambank and Shoreline Protection, or (587) Structure for Water Control. For Soil Erosion: The streambank is stable. For Water Quality Degradation: The sediment load has decreased in the stream resulting in improved aquatic habitat. For Excess/Insufficient Water: The water conveyance capacity, storage capacity and flow within the stream has been stabilized. For Inadequate Habitat for Fish and Wildlife: The reduction in the sediment load promotes survival, growth, reproduction, and/or diversity of aquatic organisms within the stream's habitat.

Feature Measure: Area of planting

Scenario Unit: Square Feet

Scenario Typical Size: 2,500.0

Scenario Total Cost: $12,681.68

Scenario Cost/Unit: $5.07

Cost Details:

Component Name	ID	Description	Unit	Cost	QTY	Total
Equipment Installation						
Tractor, agricultural, 60 HP	963	Agricultural tractor with horsepower range of 50 to 90. Equipment and power unit costs. Labor not included.	Hours	$23.10	40	$924.00
Stripping and stockpiling, topsoil	1199	Stripping and stockpiling of topsoil adjacent to stripping area. Includes equipment and labor.	Cubic Yards	$0.97	200	$194.00
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.	Hours	$27.56	123	$3,389.88
Equipment Operators, Light	232	Includes: Skid Steer Loaders, Hydraulic Excavators <50 HP, Trenchers <12 in., Ag Equipment <150 HP, Pickup Trucks, Forklifts, Mulchers	Hours	$27.87	40	$1,114.80
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.	Hours	$46.88	40	$1,875.20
Materials						
Erosion Control Blanket, biodegradable	1213	Biodegradable erosion control blanket, typically a composite of natural fibers with reinforcing polymer netting. Materials and shipping only.	Square Yard	$1.32	800	$1,056.00
Tree, Hardwood, Seedling, Medium	1510	Bare root hardwood seedlings 18 to 36 inches tall; includes tropical containerized seedlings of 10 to 20 cubic inches. Includes materials and shipping only.	Each	$1.52	1500	$2,280.00
Wattles or facines, 6 to 8 inch diameter	1904	Facines, or wattles: bundles of live tree stems of species that sprout roots, bound together. 6"-8" diameter. Includes materials and shipping only.	Feet	$7.61	200	$1,522.00
Annual Grasses	2730	Annual grasses, one or more species, mostly introduced but may be native. Used for temporary cover or cover crops. Includes material and shipping.	Acres	$32.58	10	$325.80

Practice: 584 - Channel Bed Stabilization

Scenario: #9 - Rock structures

Scenario Description:

Stabilize the bottom and slope of a stream channel using rock riprap or engineered products that consist primarily of rock or concrete. This includes but not limited to gabions, rock veins, rock weirs, concrete blocks,etc. Typical stream has 50 foot bottom width and 6 foot banks. Length of area 100 feet. Based on degrading channel that needs to be riprapped its entire wetted perimeter.

Before Situation:

Bed of an existing or newly constructed alluvial or threshold channel is undergoing damaging aggradation or degradation. Changes cannot be controlled feasibly with clearing and snagging, vegetation, bank protection or upstream water control. Soil Erosion: The stream is unstable. Water Quality Degradation: The sediment load has increased in the stream resulting in elevated water temperatures. Excess/Insufficient Water: The excessive sediment load has reduced the water conveyance capacity, storage capacity and flow within the stream. Inadequate Habitat for Fish and Wildlife: The deficiencies in the stream's habitat limit survival, growth, reproduction, and/or diversity of aquatic organisms within the stream.

After Situation:

Stream channel is stable. Re-vegetation of exposed surfaces will be completed using 342 - Critical Area Planting. Other associated practices could be (326) Clearing and Snagging, (396) Aquatic Organism Passage, (395) Stream Habitat Improvement and Management, (580) Streambank and Shoreline Protection, or (587) Structure for Water Control. For Soil Erosion: The streambank is stable. For Water Quality Degradation: The sediment load has decreased in the stream resulting in improved aquatic habitat. For Excess/Insufficient Water: The water conveyance capacity, storage capacity and flow within the stream has been stabilized. For Inadequate Habitat for Fish and Wildlife: The reduction in the sediment load promotes survival, growth, reproduction, and/or diversity of aquatic organisms within the stream's habitat.

Feature Measure: Area to be stabilized.

Scenario Unit: Cubic Yards

Scenario Typical Size: 575.0

Scenario Total Cost: $57,724.04

Scenario Cost/Unit: $100.39

Cost Details:

Component Name	ID	Description	Unit	Cost	QTY	Total
Equipment Installation						
Clearing and Grubbing	40	Clearing and Grubbing, includes materials, equipment and labor	Acres	$315.96	0.2	$63.19
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.	Hours	$27.56	20	$551.20
Materials						
Rock Riprap, Placed with geotextile	44	Rock Riprap, placed with geotextile, includes materials, equipment and labor to transport and place	Cubic Yards	$94.25	600	$56,550.00
Tree, Hardwood, Seedling, Medium	1510	Bare root hardwood seedlings 18 to 36 inches tall; includes tropical containerized seedlings of 10 to 20 cubic inches. Includes materials and shipping only.	Each	$1.52	200	$304.00
Mobilization						
Mobilization, medium equipment	1139	Equipment with 70-150 HP or typical weights between 14,000 and 30,000 pounds.	Each	$255.65	1	$255.65

Practice: 584 - Channel Bed Stabilization

Scenario: #10 - Wood structures

Scenario Description:

Stabilize the bottom and slope of a stream channel using engineered structures consisting primarily of wood. This includes but not limited to toe wood, log weirs, log vanes, root wads, log step pools, etc. Re-vegetation of exposed surfaces will be completed using 342 - Critical Area Planting. Typical stream has 50 foot bottom width and 6 foot banks. Length of area 100 feet. Structures spaced at 50 foot intervals.

Before Situation:

Bed of an existing or newly constructed alluvial or threshold channel is undergoing damaging aggradation or degradation. Changes cannot be controlled feasibly with clearing and snagging, vegetation, bank protection or upstream water control. Soil Erosion: The stream is unstable. Water Quality Degradation: The sediment load has increased in the stream resulting in elevated water temperatures. Excess/Insufficient Water: The excessive sediment load has reduced the water conveyance capacity, storage capacity and flow within the stream. Inadequate Habitat for Fish and Wildlife: The deficiencies in the stream's habitat limit survival, growth, reproduction, and/or diversity of aquatic organisms within the stream.

After Situation:

Stream channel is stable. Re-vegetation of exposed surfaces will be completed using 342 - Critical Area Planting. Other associated practices could be (326) Clearing and Snagging, (396) Aquatic Organism Passage, (395) Stream Habitat Improvement and Management, (580) Streambank and Shoreline Protection, or (587) Structure for Water Control. For Soil Erosion: The streambank is stable. For Water Quality Degradation: The sediment load has decreased in the stream resulting in improved aquatic habitat. For Excess/Insufficient Water: The water conveyance capacity, storage capacity and flow within the stream has been stabilized. For Inadequate Habitat for Fish and Wildlife: The reduction in the sediment load promotes survival, growth, reproduction, and/or diversity of aquatic organisms within the stream's habitat.

Feature Measure: Number of structures

Scenario Unit: Each

Scenario Typical Size: 3.0

Scenario Total Cost: $10,138.17

Scenario Cost/Unit: $3,379.39

Cost Details:

Component Name	ID	Description	Unit	Cost	QTY	Total
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 Yards	$2.31	40	$92.40
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.	Hours	$27.56	42	$1,157.52
Materials						
Rock Riprap, Placed with geotextile	44	Rock Riprap, placed with geotextile, includes materials, equipment and labor to transport and place	Cubic Yards	$94.25	75	$7,068.75
Wattles or facines, 9 to 12 inch diameter	1905	Facines, or wattles: bundles of live tree stems of species that sprout roots, bound together. 9"- 12" diameter. Includes materials and shipping only.	Feet	$12.13	150	$1,819.50

Practice: 585 - Stripcropping

Scenario: #1 - Stripcropping - wind and water erosion

Scenario Description:

This scenario describes the implementation of a strip cropping system that is designed specifically for the control of wind and water erosion or minimizing the transport of sediments or other water borne contaminants originating from runoff on cropland. The planned strip cropping system will meet the current 585 standard. Implementation will result in alternating strips of erosion susceptible crops with erosion resistant crops that are oriented as close to perpendicular to water flows as possible. The designed system will reduce erosion/sediment/contaminants to desired objectives. The scenario includes the costs of designing the system, installing the strips on the landscape appropriately, and integrating a crop rotation that includes water erosion resistant species.

Before Situation:

In this geographic area, excessive water erosion is caused by raising crops in a manner that allows sheet water flows to travel down the slope causing sheet and rill erosion or concentrated flow conditions, degradation of soil health through loss of topsoil and organic matter, along with offsite negative impacts to water quality and aquatic wildlife habitat.

After Situation:

A strip cropping system that includes at least two or more strips within the planning slope will be designed to include parallel strips of approximately equal widths of water erosion resistant crop species with non-water erosion resistant crop species. Widths will be determined using current water erosion prediction technology to meet objectives. The design and implementation of a stripcropping system will minimize wind, sheet and rill erosion, protect soil quality, reduce offsite sedimentation, and benefit offsite aquatic wildlife habitat. Erosion prediction before and after practice application will be recorded showing the design and benefits of the practice. Erosion resistant strips in rotation must be managed to maintain the planned vegetative cover and surface roughness.

Feature Measure: area of strips

Scenario Unit: Acres

Scenario Typical Size: 80.0

Scenario Total Cost: $155.22

Scenario Cost/Unit: $1.94

Cost Details:

Component Name	ID	Description	Unit	Cost	QTY	Total
Equipment Installation						
Truck, Pickup	939	Equipment and power unit costs. Labor not included.	Hours	$24.18	3	$72.54
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.	Hours	$27.56	3	$82.68

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.

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). Other associated practices such as; Irrigation Water Management (449), Irrigation Land Leveling (464), Irrigation Canal or Lateral (320), Irrigation System, Tailwater Recovery (447), Dike (356), and Grade Stabilization Structure (410) will use the corresponding Standard(s) as appropriate.

Feature Measure: Flashboard Weir Length (in) x barre

Scenario Unit: Inch-Foot

Scenario Typical Size: 1,800.0

Scenario Total Cost: $7,727.51

Scenario Cost/Unit: $4.29

Cost Details:

Component Name	ID	Description	Unit	Cost	QTY	Total
Equipment Installation						
Earthfill, Roller Compacted	49	Earthfill, roller or machine compacted, includes equipment and labor	Cubic Yards	$4.66	190	$885.40
Earthfill, Manually Compacted	50	Earthfill, manually compacted, includes equipment and labor	Cubic Yards	$6.02	10	$60.20
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.	Hours	$62.17	2	$124.34
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.	Hours	$37.19	5	$185.95
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.	Hours	$27.56	6	$165.36
Equipment Operators, Heavy	233	Includes: Cranes, Hydraulic Excavators >=50 HP, Dozers, Paving Machines, Rock Trenchers, Trenchers >=12 in., Dump Trucks, Ag Equipment >=150 HP, Scrapers, Water Wagons.	Hours	$38.00	5	$190.00
Materials						
Pipe, Steel, 30 in., Std Wt, USED	1361	Materials: - USED - 30 inch - Steel Std Wt	Feet	$95.51	50	$4,775.50
Pipe, Steel, 36 in., Std Wt, USED	1362	Materials: - USED - 36 inch - Steel Std Wt	Feet	$135.12	6	$810.72
Steel, Angle, 2 1/2 in. x 2 1/2 in. x 1/4 in.	1372	Materials: Angle, 2 1/2 inch x 2 1/2 inch x 1/4 inch. Meets ASTM A36	Feet	$3.96	24	$95.04
Steel, Plate, 3/8 in.	1375	Flat steel plate, 3/8 inch thickness. Materials only.	Square Feet	$12.07	4	$48.28
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 Feet	$1.89	32	$60.48
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	$70.59	1	$70.59
Mobilization, medium equipment	1139	Equipment with 70-150 HP or typical weights between 14,000 and 30,000 pounds.	Each	$255.65	1	$255.65

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.

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). Other associated practices such as; Irrigation Water Management (449), Irrigation Land Leveling (464), Irrigation Canal or Lateral (320), Irrigation System, Tailwater Recovery (447), Dike (356), and Grade Stabilization Structure (410) will use the corresponding Standard(s) as appropriate.

Feature Measure: Flashboard Weir Length (in) x Barre

Scenario Unit: Inch-Foot

Scenario Typical Size: 1,800.0

Scenario Total Cost: $8,048.07

Scenario Cost/Unit: $4.47

Cost Details:

Component Name	ID	Description	Unit	Cost	QTY	Total
Equipment Installation						
Earthfill, Roller Compacted	49	Earthfill, roller or machine compacted, includes equipment and labor	Cubic Yards	$4.66	190	$885.40
Earthfill, Manually Compacted	50	Earthfill, manually compacted, includes equipment and labor	Cubic Yards	$6.02	15	$90.30
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.	Hours	$62.17	4	$248.68
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.	Hours	$37.19	7	$260.33
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.	Hours	$27.56	10	$275.60
Equipment Operators, Heavy	233	Includes: Cranes, Hydraulic Excavators >=50 HP, Dozers, Paving Machines, Rock Trenchers, Trenchers >=12 in., Dump Trucks, Ag Equipment >=150 HP, Scrapers, Water Wagons.	Hours	$38.00	4	$152.00
Materials						
Pipe, Steel, 30 in., Std Wt, USED	1361	Materials: - USED - 30 inch - Steel Std Wt	Feet	$95.51	50	$4,775.50
Pipe, Steel, 36 in., Std Wt, USED	1362	Materials: - USED - 36 inch - Steel Std Wt	Feet	$135.12	6	$810.72
Steel, Angle, 2 1/2 in. x 2 1/2 in. x 1/4 in.	1372	Materials: Angle, 2 1/2 inch x 2 1/2 inch x 1/4 inch. Meets ASTM A36	Feet	$3.96	24	$95.04
Steel, Plate, 3/8 in.	1375	Flat steel plate, 3/8 inch thickness. Materials only.	Square Feet	$12.07	10	$120.70
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 Feet	$1.89	4	$7.56
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	$70.59	1	$70.59
Mobilization, medium equipment	1139	Equipment with 70-150 HP or typical weights between 14,000 and 30,000 pounds.	Each	$255.65	1	$255.65

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).

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). Other associated practices such as; Wetland Creation (658), Wetland Enhancement (659) Wetland Wildlife Habitat Management (644), Dike (356), and Grade Stabilization Structure (410) will use the corresponding Standard(s) as appropriate.

Feature Measure: Flashboard Weir Length (in) x Barre

Scenario Unit: Inch-Foot

Scenario Typical Size: 1,000.0

Scenario Total Cost: $6,023.35

Scenario Cost/Unit: $6.02

Cost Details:

Component Name	ID	Description	Unit	Cost	QTY	Total
Equipment Installation						
Earthfill, Roller Compacted	49	Earthfill, roller or machine compacted, includes equipment and labor	Cubic Yards	$4.66	190	$885.40
Earthfill, Manually Compacted	50	Earthfill, manually compacted, includes equipment and labor	Cubic Yards	$6.02	15	$90.30
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.	Hours	$62.17	2	$124.34
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.	Hours	$37.19	3	$111.57
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.	Hours	$27.56	8	$220.48
Equipment Operators, Heavy	233	Includes: Cranes, Hydraulic Excavators >=50 HP, Dozers, Paving Machines, Rock Trenchers, Trenchers >=12 in., Dump Trucks, Ag Equipment >=150 HP, Scrapers, Water Wagons.	Hours	$38.00	2	$76.00
Materials						
Pipe, PVC, 16 in., SCH 80	1353	Materials: - 16 inch - PVC - SCH 80 - ASTM D1785	Feet	$47.88	50	$2,394.00
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	$310.62	1	$310.62
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	$12.37	120	$1,484.40
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	$70.59	1	$70.59
Mobilization, medium equipment	1139	Equipment with 70-150 HP or typical weights between 14,000 and 30,000 pounds.	Each	$255.65	1	$255.65

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.

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. Associated practices could be Access Road (560), Animal Trails and Walkways (575), Critical Area Planting (342), Drainage Water Management (554), Irrigation Canal or Lateral (320), Irrigation Pipeline (430), Irrigation Reservoir (436), Irrigation System, Surface and Subsurface (443), Irrigation System, Tailwater Recovery (447), Irrigation Water Management (449), Lined Waterway or Outlet (468), Obstruction Removal (500), Pond (378), Stormwater Runoff Control (570), Surface Drain, Field Ditch (607), Surface Drain, Main or Lateral (608), and Trails and Walkways (568).

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

Scenario Unit: Inch-Foot

Scenario Typical Size: 960.0

Scenario Total Cost: $2,480.55

Scenario Cost/Unit: $2.58

Cost Details:

Component Name	ID	Description	Unit	Cost	QTY	Total
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 Yards	$2.31	5	$11.55
Earthfill, Manually Compacted	50	Earthfill, manually compacted, includes equipment and labor	Cubic Yards	$6.02	45	$270.90
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.	Hours	$27.56	10	$275.60
Materials						
Rock Riprap, Placed with geotextile	44	Rock Riprap, placed with geotextile, includes materials, equipment and labor to transport and place	Cubic Yards	$94.25	2	$188.50
Aggregate, Gravel, Graded	46	Gravel, includes materials, equipment and labor to transport and place. Includes washed and unwashed gravel.	Cubic Yards	$45.42	5	$227.10
Pipe, HDPE, CPT, Double Wall, Soil Tight, 24 in.	1246	Pipe, Corrugated HDPE Double Wall, 24 inch diameter with soil tight joints - AASHTO M294. Material cost only.	Feet	$24.89	40	$995.60
Mobilization						
Mobilization, medium equipment	1139	Equipment with 70-150 HP or typical weights between 14,000 and 30,000 pounds.	Each	$255.65	2	$511.30

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.

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. Associated practices could be Access Road (560), Animal Trails and Walkways (575), Critical Area Planting (342), Drainage Water Management (554), Irrigation Canal or Lateral (320), Irrigation Pipeline (430), Irrigation Reservoir (436), Irrigation System, Surface and Subsurface (443), Irrigation System, Tailwater Recovery (447), Irrigation Water Management (449), Lined Waterway or Outlet (468), Obstruction Removal (500), Pond (378), Stormwater Runoff Control (570), Surface Drain, Field Ditch (607), Surface Drain, Main or Lateral (608), and Trails and Walkways (568).

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

Scenario Unit: Inch-Foot

Scenario Typical Size: 960.0

Scenario Total Cost: $2,789.35

Scenario Cost/Unit: $2.91

Cost Details:

Component Name	ID	Description	Unit	Cost	QTY	Total
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 Yards	$2.31	5	$11.55
Earthfill, Manually Compacted	50	Earthfill, manually compacted, includes equipment and labor	Cubic Yards	$6.02	45	$270.90
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.	Hours	$27.56	10	$275.60
Materials						
Rock Riprap, Placed with geotextile	44	Rock Riprap, placed with geotextile, includes materials, equipment and labor to transport and place	Cubic Yards	$94.25	2	$188.50
Aggregate, Gravel, Graded	46	Gravel, includes materials, equipment and labor to transport and place. Includes washed and unwashed gravel.	Cubic Yards	$45.42	5	$227.10
Pipe, CMP, 24 in., 12 Gauge	1417	24 inch Corrugated Metal Pipe, Galvanized, Uncoated, 12 gage. Material cost only.	Feet	$32.61	40	$1,304.40
Mobilization						
Mobilization, medium equipment	1139	Equipment with 70-150 HP or typical weights between 14,000 and 30,000 pounds.	Each	$255.65	2	$511.30

Practice: 587 - Structure for Water Control

Scenario: #6 - 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, pipeline, or aquaculture pond. 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. Conservation practices that may be associated are: 533-Pumping Plant.

Before Situation:

A channel, aquaculture pond, 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.

Feature Measure: diameter

Scenario Unit: Feet

Scenario Typical Size: 4.0

Scenario Total Cost: $7,908.16

Scenario Cost/Unit: $1,977.04

Cost Details:

Component Name	ID	Description	Unit	Cost	QTY	Total
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.	Hours	$31.96	6	$191.76
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.	Hours	$37.19	12	$446.28
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.	Hours	$27.56	12	$330.72
Equipment Operators, Heavy	233	Includes: Cranes, Hydraulic Excavators >=50 HP, Dozers, Paving Machines, Rock Trenchers, Trenchers >=12 in., Dump Trucks, Ag Equipment >=150 HP, Scrapers, Water Wagons.	Hours	$38.00	6	$228.00
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	$6,455.75	1	$6,455.75
Mobilization						
Mobilization, medium equipment	1139	Equipment with 70-150 HP or typical weights between 14,000 and 30,000 pounds.	Each	$255.65	1	$255.65

Practice: 587 - Structure for Water Control

Scenario: #7 - 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. Conservation practices that may be associated are:

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.

Feature Measure: Feet Diameter (of Gate)

Scenario Unit: Feet

Scenario Typical Size: 4.0

Scenario Total Cost: $7,702.83

Scenario Cost/Unit: $1,925.71

Cost Details:

Component Name	ID	Description	Unit	Cost	QTY	Total
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.	Hours	$31.96	6	$191.76
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.	Hours	$37.19	12	$446.28
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.	Hours	$27.56	12	$330.72
Equipment Operators, Heavy	233	Includes: Cranes, Hydraulic Excavators >=50 HP, Dozers, Paving Machines, Rock Trenchers, Trenchers >=12 in., Dump Trucks, Ag Equipment >=150 HP, Scrapers, Water Wagons.	Hours	$38.00	6	$228.00
Materials						
Flap Gate, cast iron, 4' diameter	1745	4' diameter cast iron flap gate. Materials only.	Each	$6,250.42	1	$6,250.42
Mobilization						
Mobilization, medium equipment	1139	Equipment with 70-150 HP or typical weights between 14,000 and 30,000 pounds.	Each	$255.65	1	$255.65

Practice: 587 - Structure for Water Control

Scenario: #8 - 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).

Feature Measure: Cubic Yards of Concrete

Scenario Unit: Cubic Yards

Scenario Typical Size: 10.0

Scenario Total Cost: $13,195.64

Scenario Cost/Unit: $1,319.56

Cost Details:

Component Name	ID	Description	Unit	Cost	QTY	Total
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 Yards	$481.12	10	$4,811.20
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 Yards	$2.31	200	$462.00
Earthfill, Roller Compacted	49	Earthfill, roller or machine compacted, includes equipment and labor	Cubic Yards	$4.66	200	$932.00
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.	Hours	$27.56	2	$55.12
Materials						
Aggregate, Sand, Graded, Washed	45	Sand, typical ASTM C33 gradation, includes materials, equipment and labor to transport and place	Cubic Yards	$43.40	4	$173.60
Flap Gate, cast iron, 4' diameter	1745	4' diameter cast iron flap gate. Materials only.	Each	$6,250.42	1	$6,250.42
Mobilization						
Mobilization, medium equipment	1139	Equipment with 70-150 HP or typical weights between 14,000 and 30,000 pounds.	Each	$255.65	2	$511.30

Practice: 587 - Structure for Water Control

Scenario: #10 - 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.

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). Other associated practices such as; 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.

Feature Measure: Streambed Width

Scenario Unit: Feet

Scenario Typical Size: 36.0

Scenario Total Cost: $10,617.34

Scenario Cost/Unit: $294.93

Cost Details:

Component Name	ID	Description	Unit	Cost	QTY	Total
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 Yards	$481.12	19	$9,141.28
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 Yards	$2.31	18	$41.58
Water management, Flooding & dewatering	969	Includes equipment and power unit. Labor not included.	Acre Feet	$272.03	1	$272.03
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.	Hours	$27.56	10	$275.60
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.	Hours	$46.88	7	$328.16
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	$70.59	1	$70.59
Mobilization, large equipment	1140	Equipment >150HP or typical weights greater than 30,000 pounds or loads requiring over width or over length permits.	Each	$488.10	1	$488.10

Practice: 587 - Structure for Water Control

Scenario: #12 - 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, field ditch, or aquaculture facility. This scenario is for a four ft tall, two foot wide, and five foot long turnout structure.

Before Situation:

A ditch or canal exists, but a means to move water from the ditch into a smaller ditch, field, or aquaculture pond 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.

Feature Measure: Each

Scenario Unit: Each

Scenario Typical Size: 1.0

Scenario Total Cost: $1,305.59

Scenario Cost/Unit: $1,305.59

Cost Details:

Component Name	ID	Description	Unit	Cost	QTY	Total
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 Yards	$481.12	2	$962.24
Backhoe, 80 HP	926	Wheel mounted backhoe excavator with horsepower range of 60 to 90. Equipment and power unit costs. Labor not included.	Hours	$31.96	1	$31.96
Labor						
Equipment Operators, Light	232	Includes: Skid Steer Loaders, Hydraulic Excavators <50 HP, Trenchers <12 in., Ag Equipment <150 HP, Pickup Trucks, Forklifts, Mulchers	Hours	$27.87	2	$55.74
Mobilization						
Mobilization, medium equipment	1139	Equipment with 70-150 HP or typical weights between 14,000 and 30,000 pounds.	Each	$255.65	1	$255.65

Practice: 587 - Structure for Water Control

Scenario: #14 - 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.

Feature Measure: Nominal Diameter of Meter

Scenario Unit: Inch

Scenario Typical Size: 10.0

Scenario Total Cost: $1,663.09

Scenario Cost/Unit: $166.31

Cost Details:

Component Name	ID	Description	Unit	Cost	QTY	Total
Materials						
Flow Meter, with mechanical Index	1450	10 inch, Turbine Type Flow Meter with Mechanical Index, permanently installed. Includes material, labor and installation.	Each	$1,521.91	1	$1,521.91
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	$70.59	2	$141.18

Practice: 587 - Structure for Water Control

Scenario: #15 - 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.

Feature Measure: Nominal Diameter of Meter

Scenario Unit: Inch

Scenario Typical Size: 10.0

Scenario Total Cost: $2,954.87

Scenario Cost/Unit: $295.49

Cost Details:

Component Name	ID	Description	Unit	Cost	QTY	Total
Materials						
Flow Meter, with Electronic Index	1452	10 inch Turbine Irrigation flow meter, with Electronic Index, Rate and Volume, permanently installed. Materials only.	Each	$2,813.69	1	$2,813.69
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	$70.59	2	$141.18

Practice: 587 - Structure for Water Control

Scenario: #16 - 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.

Feature Measure: Nominal Diameter of Meter

Scenario Unit: Inch

Scenario Typical Size: 10.0

Scenario Total Cost: $4,233.14

Scenario Cost/Unit: $423.31

Cost Details:

Component Name	ID	Description	Unit	Cost	QTY	Total
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	$4,091.96	1	$4,091.96
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	$70.59	2	$141.18

Practice: 587 - Structure for Water Control

Scenario: #17 - Fish Screens <= 400 gpm

Scenario Description:

An inline intake screens assembly is designed according to applicable Federal and State guidelines, to avoid entrainment or trapping of aquatic organisms. This practice can also be used at the inlet and/or outlet of an aquaculture facility to prevent the emigration of cultured organisms or the entrainment of native aquatic organisms into the influent water supply. Typical scenario is a screen assembly rated for 250gpm including the clamp, screen body, rings and adapaters.

Before Situation:

The intake pipe of an irrigation system or aquaculture facility is not properly screened resulting in excessive velocities prejudicial to T&E fish species or other aquatic organisms, or the outlet of a fish culture facility is not properly screened resulting in the unintentional emigration of cultured species.

After Situation:

A fish screen is installed on a pipe inlet to prevent the entrainment or trapping of aquatic organisms, or a fish screen is installed on the outlet of an aquaculture facility to prevent the unintentional emigration of cultured species.

Feature Measure: Number of screens

Scenario Unit: Each

Scenario Typical Size: 1.0

Scenario Total Cost: $1,658.71

Scenario Cost/Unit: $1,658.71

Cost Details:

Component Name	ID	Description	Unit	Cost	QTY	Total
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.	Hours	$27.56	4	$110.24
Materials						
Pump intake screen, Linear, fixed cost portion	2069	Fixed cost portion of linear fish intake pump screen including all adapters, o-rings, mounting tabs, and other accessories. This is the base cost for the system. Includes materials and shipping only.	Each	$593.47	1	$593.47
Pump intake screen, Linear, variable cost portion	2070	Variable cost portion of linear fish intake pump screen including all adapters, o-rings, mounting tabs, and other accessories. Includes materials and shipping only.	Gallons per Minute	$3.82	250	$955.00

Practice: 587 - Structure for Water Control

Scenario: #18 - Fish Screen > 400gpm

Scenario Description:

An inline intake screens assembly is designed according to applicable Federal and State guidelines, to avoid entrainment or trapping of aquatic organisms. This practice can also be used at the inlet and/or outlet of an aquaculture facility to prevent the emigration of cultured organisms or the entrainment of native aquatic orcansithms into the influent water supply. Typical scenario is a screen assembly rated for 600gpm including the clamp, screen body, rings and adapters.

Before Situation:

The intake pipe of an irrigation system or an aquaculture facility is not properly screened resulting in excessive velocities detrimental to aqautic organisms, or the outlet of an fish culture facility is not properly screen resulting in the unintential emigration of cultured species.

After Situation:

A fish screen is installed on a pipe inlet to prevent the entrainment or trapping of aquatic organisms, or a fish screen is installed on the outlet of an aquaculture facility to prevent the unintentional emmigration of cultured species.

Feature Measure: Number of screens

Scenario Unit: Each

Scenario Typical Size: 1.0

Scenario Total Cost: $2,995.71

Scenario Cost/Unit: $2,995.71

Cost Details:

Component Name	ID	Description	Unit	Cost	QTY	Total
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.	Hours	$27.56	4	$110.24
Materials						
Pump intake screen, Linear, fixed cost portion	2069	Fixed cost portion of linear fish intake pump screen including all adapters, o-rings, mounting tabs, and other accessories. This is the base cost for the system. Includes materials and shipping only.	Each	$593.47	1	$593.47
Pump intake screen, Linear, variable cost portion	2070	Variable cost portion of linear fish intake pump screen including all adapters, o-rings, mounting tabs, and other accessories. Includes materials and shipping only.	Gallons per Minute	$3.82	600	$2,292.00

Practice: 587 - Structure for Water Control

Scenario: #19 - Catch Basin, 3 ft width

Scenario Description:

This scenario involves installation of a small catch basin to control surface water or overflow water and provide a safe outlet for the water. Catch basin is precast concrete with a typical size of 3 feet (sqare or round) and 6 feet deep. Catch basin is placed on firm bedding and is backfilled using aggregate and/or earthfill.

Before Situation:

Prior to installation of the practice surface runoff is causing erosion. No safe outlet exists for surface water.

After Situation:

Water is collected in a controlled manner and a safe outlet is provided significatnly reducing or eliminating erosion in the area. Associated practices may include: Waste Storage Facility (313), Diversion (362), Grade Stabilizaton Structure (410), Livestock Pipeline (516), Underground Outlet (620), Waste Transfer (634), or others.

Feature Measure: Vertical Foot of Catch Basin

Scenario Unit: Vertical Feet

Scenario Typical Size: 6.0

Scenario Total Cost: $2,257.61

Scenario Cost/Unit: $376.27

Cost Details:

Component Name	ID	Description	Unit	Cost	QTY	Total
Equipment Installation						
Geotextile, woven	42	Woven Geotextile Fabric. Includes materials, equipment and labor	Square Yard	$1.33	2	$2.66
Earthfill, Manually Compacted	50	Earthfill, manually compacted, includes equipment and labor	Cubic Yards	$6.02	37.5	$225.75
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 Yards	$1.53	43	$65.79
Materials						
Aggregate, Gravel, Graded	46	Gravel, includes materials, equipment and labor to transport and place. Includes washed and unwashed gravel.	Cubic Yards	$45.42	3.9	$177.14
Catch Basin, concrete, 3 ft. x 3 ft. x 6 ft.	1258	Catch Basin, Precast Concrete, 3 feet square or round, cast grate, 6 feet deep. Includes materials, equipment and labor.	Each	$1,298.17	1	$1,298.17
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	$488.10	1	$488.10

Practice: 587 - Structure for Water Control

Scenario: #20 - Catch Basin, 5 ft diameter

Scenario Description:

This scenario involves installation of a large catch basin to control surface water or overflow water and provide a safe outlet for the water. Catch basin is precast concrete with a typical size of 60 inches in diameter and 6 feet deep. Catch basin is placed on firm bedding and is backfilled using aggregate and/or earthfill.

Before Situation:

Prior to installation of the practice surface runoff is causing erosion. No safe outlet exists for surface water.

After Situation:

Water is collected in a controlled manner and a safe outlet is provided significatnly reducing or eliminating erosion in the area. Associated practices may include: Waste Storage Facility (313), Diversion (362), Grade Stabilizaton Structure (410), Livestock Pipeline (516), Underground Outlet (620), Waste Transfer (634), or others.

Feature Measure: Vertical Foot of Catch Basin

Scenario Unit: Vertical Feet

Scenario Typical Size: 6.0

Scenario Total Cost: $3,501.46

Scenario Cost/Unit: $583.58

Cost Details:

Component Name	ID	Description	Unit	Cost	QTY	Total
Equipment Installation						
Geotextile, woven	42	Woven Geotextile Fabric. Includes materials, equipment and labor	Square Yard	$1.33	5.5	$7.32
Earthfill, Manually Compacted	50	Earthfill, manually compacted, includes equipment and labor	Cubic Yards	$6.02	49.5	$297.99
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 Yards	$1.53	56.7	$86.75
Materials						
Aggregate, Gravel, Graded	46	Gravel, includes materials, equipment and labor to transport and place. Includes washed and unwashed gravel.	Cubic Yards	$45.42	7.2	$327.02
Catch Basin, concrete, 60 in dia.	1754	Precast 60-in diameter catch basin, 6 feet deep, with collar and grate cover. Materials only.	Each	$2,294.28	1	$2,294.28
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	$488.10	1	$488.10

Practice: 589C - Cross Wind Trap Strips

Scenario: #5 - Cross Wind Trap Strips, Native Perennials

Scenario Description:

This scenario describes the implementation of cross wind trap strips with native perennial grasses and/or legumes for one or more of the following purposes: 1) to reduce soil erosion by wind, 2) reduce wind-borne sediment deposition, 3) induce snow deposition to improve soil moisture, 4) protect sensitive crops from wind-borne soil particulate damage, and 5) improve air quality by reducing airborne particulate matter. In this resource setting, cropland fields are unprotected against the erosive forces of wind that cause soil loss, damage to crop seedlings, sediment deposition and/or poor air quality. The scenario is based on the acres of strips established.

Before Situation:

Typically, cropland fields 80 acres in size and larger, have excessive soil disturbance and unsheltered distances that result in excessive wind erosion that damage soil quality as well as reduce air quality. Depending on the time of year, soil condition, and stage of crop growth, wind velocities may cause sandblasting or covering up of newly planted seedlings, increase off-site damage due to soil deposition, or reduce air quality by the generation of airborne particulate matter. The cropping system coupled with intensive tillage provide an environment where wind erosion occurs at rates over tolerable soil and/or sensitive crop limits as outlined in the National Agronomy Manual. Typically the strips occupy about 7-10% of the area.

After Situation:

Implementation Requirements will be prepared for the site and implemented according the Cross Wind Trap Strips (589C) standard. Appropriate orientation and width of trap strips will be determined using current WEPS (Wind Erosion Prediction System) technology. The planned trap strip system will meet appropriate criteria for the resource concern (i.e. stand erect during the design critical period, be placed upwind for snow accumulation or protection of sensitive crops, meet the minimum height criteria, etc.). For this scenario, the strips will consist of native perennial species, generally placed across an entire field. Implementation will reduce soil loss to a tolerable level. The scenario includes costs associated with the establishment of the trap strips.

Feature Measure: Acres of trap strips

Scenario Unit: Acres

Scenario Typical Size: 1.0

Scenario Total Cost: $241.52

Scenario Cost/Unit: $241.52

Cost Details:

Component Name	ID	Description	Unit	Cost	QTY	Total
Equipment Installation						
Site Preparation, Mechanical	944	Aerator, rolling drum chopper, etc. Includes equipment, power unit and labor costs.	Acres	$64.17	1	$64.17
Seeding Operation, No Till/Grass Drill	960	No Till drill or grass drill for seeding. Includes equipment, power unit and labor costs.	Acres	$21.92	1	$21.92
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.	Hours	$27.56	1.6	$44.10
Materials						
Native Perennial Grasses, Low Density	2750	Native perennial grasses, may include a small percentage of annual species for establishment purposes and/or if allowed by the CPS. Planted at lower to medium density (40 pure live seeds/sq ft and less). Includes material and shipping.	Acres	$111.33	1	$111.33

Practice: 589C - Cross Wind Trap Strips

Scenario: #6 - Cross Wind Trap Strips, Introduced Perennials

Scenario Description:

This scenario describes the implementation of cross wind trap strips with introduced perennial grasses and/or legumes for one or more of the following purposes: 1) to reduce soil erosion by wind, 2) reduce wind-borne sediment deposition, 3) induce snow deposition to improve soil moisture, 4) protect sensitive crops from wind-borne soil particulate damage, and 5) improve air quality by reducing airborne particulate matter. In this resource setting, cropland fields are unprotected against the erosive forces of wind that cause soil loss, damage to crop seedlings, sediment deposition and/or poor air quality. The scenario is based on the acres of strips established.

Before Situation:

Typically, cropland fields 80 acres in size and larger, have excessive soil disturbance and unsheltered distances that result in excessive wind erosion that damage soil quality as well as reduce air quality. Depending on the time of year, soil condition, and stage of crop growth, wind velocities may cause sandblasting or covering up of newly planted seedlings, increase off-site damage due to soil deposition, or reduce air quality by the generation of airborne particulate matter. The cropping system coupled with intensive tillage provide an environment where wind erosion occurs at rates over tolerable soil and/or sensitive crop limits as outlined in the National Agronomy Manual. Typically the strips occupy about 7-10 % of the area.

After Situation:

Implementation Requirements will be prepared for the site and implemented according the Cross Wind Trap Strips (589C) standard. Appropriate orientation and width of trap strips will be determined using current WEPS (wind erosion prediction system) technology. The planned trap strip system will meet appropriate criteria for the resource concern (i.e. stand erect during the design critical period, be placed upwind for snow accumulation or protection of sensitive crops, meet the minimum height criteria, etc.). For this scenario, the strips will consist of introduced perennial species, generally placed across an entire field. Implementation will reduce soil loss to a tolerable level. The scenario includes costs associated with the establishment of the trap strips.

Feature Measure: Acres of trap strips

Scenario Unit: Acres

Scenario Typical Size: 1.0

Scenario Total Cost: $216.51

Scenario Cost/Unit: $216.51

Cost Details:

Component Name	ID	Description	Unit	Cost	QTY	Total
Equipment Installation						
Site Preparation, Mechanical	944	Aerator, rolling drum chopper, etc. Includes equipment, power unit and labor costs.	Acres	$64.17	1	$64.17
Seeding Operation, No Till/Grass Drill	960	No Till drill or grass drill for seeding. Includes equipment, power unit and labor costs.	Acres	$21.92	1	$21.92
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.	Hours	$27.56	1.2	$33.07
Materials						
Nitrogen (N), Urea	71	Price per pound of N supplied by Urea. Price is not per pound of total product applied, no conversion is needed.	Pound	$0.47	60	$28.20
Phosphorus, P2O5	73	Price per pound of P2O5 supplied by Superphosphate. Price is not per pound of total product applied, no conversion is needed.	Pound	$0.61	40	$24.40
Potassium, K2O	74	K2O supplied by Muriate Of Potash. Price is not per pound of total product applied, no conversion is needed.	Pound	$0.35	40	$14.00
Introduced Perennial Grasses, Legumes and/or Forbs, Low Density	2747	Introduced perennial grasses, legumes, and/or forbs, may include a small percentage of annual species for establishment purposes and/or if allowed by the CPS. Planted at lower to medium density (40 pure live seeds/sq ft and less). Includes material and shipping.	Acres	$30.75	1	$30.75

Practice: 590 - Nutrient Management

Scenario: #2 - Basic NM with Manure Injection or Incorporation

Scenario Description:

This scenario describes the implementation of a basic nutrient management system on > = 40 acres of cropland or hayland where all applied nutrient sources (nitrogen, phosphorus, and potassium) are either incorporated using tillage at least 3-4 inches deep or injected into the soil at least 3-6 inches deep (Exceptions for incorporation or injection include: established close grown crops such as wheat or perennial crops such as hay or pasture). This scenario is applicable on non-organic and organic land for all nutrient sources (manure, compost, commercial fertilizers, and organic sources of nutrients). Micro-nutrients may be surface applied. The planned NM system will meet the current Nutrient Management (590) CPS. Implementation will result in the proper rate, source, method of placement (incorporation or injection), and timing of nutrient application. Payment for implementation is to defray the costs of soil testing, manure analysis, incorporation or injection of all nutrients, and the implementation of the nutrient management plan and recordkeeping. Records demonstrating implementation of the 4 R's of NM will be required. Scenario is designed to address the Nutrient Management (590) purposes for nitrogen losses via N2O emissions, nitrogen leaching, and nitrogen and phosphorus surface runoff. The basis for nutrient applications will be recommendations based on soil tests; and when applicable, plant tissue, manure, and compost analyses. Soil loss is controlled to the soil loss tolerance criteria or less for the significant soil map unit.

Before Situation:

In this geographic area, a fertility program is not properly managed to supply the proper rate, timing, method of application, and source to address air and water quality. Application of fertilizers, including manures, composts, and amendments, are surface applied and completed annually based upon tradition that does not specifically consider the detrimental effects of improper timing or rates of all nutrient sources, or excess nutrient buildup in the soil, emissions of N2O, surface runoff, or the leaching of nitrogen to ground or surface water via subsurface drainage. Fields are overwintered with little or no erosion protection often times resulting in sheet, rill, and ephemeral erosion by spring. Soil testing is not completed on a regular basis and applications of all nutrient sources are not based on land grant university recommendations or a nutrient budget. An environmental evaluation or risk assessment is not completed. Nutrients are transported to surface waters through runoff, drainage tile, soil erosion, or to ground water from leaching in quantities that degrade air and water quality. Soil quality may be degraded by excess or inadequate nutrients and erosion. Fields have little or no erosion protection during critical periods often times resulting in sheet, rill, and ephemeral erosion in excess of the planning criteria.

After Situation:

A nutrient management system is developed with the producer to meet the current Nutrient Management (590) CPS; and when applicable, the system will also meet NOP regulations. All nutrient sources will be incorporated with tillage at least 3-4 inches deep or injected at least 4-6 inches deep into the soil (Exceptions for incorporation or injection include: established close grown crops such as wheat or perennial crops such as hay or pasture). Implementation of the nutrient management plan (NMP) will benefit plant productivity while also reducing the potential for off-site degradation. A nutrient management budget will be developed for each field based on soil test analysis and land grant university recommendations or crop removal rates. On planning units typically 40 acres or larger, soil testing (and where applicable manure analyses, plant tissue analyses, etc.) is completed according to LGU recommendations. Applications of all phosphorus and nitrogen sources are based on risk assessments (PI - phosphorus index and leaching index). Records will be provided annually documenting current soil tests and other plant or manure analyses, date and rate of applications, form and placement of nutrients for each field, including post-harvest yields. Nutrient applications will be completed according to the NMP that minimizes nutrient runoff, nitrogen leaching, nitrogen emissions, or buildup of excess nutrient concentrations in the soil.

Feature Measure: <Unknown>

Scenario Unit: Acres

Scenario Typical Size: 40.0

Scenario Total Cost: $1,416.74

Scenario Cost/Unit: $35.42

Cost Details:

Component Name	ID	Description	Unit	Cost	QTY	Total
Equipment Installation						
Truck, Pickup	939	Equipment and power unit costs. Labor not included.	Hours	$24.18	1	$24.18
Tillage, Primary	946	Includes heavy disking (offset) or chisel plow. Includes equipment, power unit and labor costs.	Acres	$16.30	40	$652.00
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.	Hours	$27.56	8	$220.48
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.	Hours	$102.76	4	$411.04
Materials						
Test, Soil Test, Standard	299	Includes materials, shiping, labor, and equipment costs.	Each	$11.76	2	$23.52
Test, Manure Analysis	306	Moisture, Total N, P, K. Includes materials and shipping only.	Each	$40.16	1	$40.16
Test, Compost Analysis	307	Moisture, Total N, P, K. Includes materials and shipping only.	Each	$45.36	1	$45.36

Practice: 590 - Nutrient Management

Scenario: #5 - Basic Precision NM (Non-Organic/Organic)

Scenario Description:

This scenario takes a conventional cropping system where either no nutrient management or only a basic level of nutrient management is being practiced and improves it to address air quality (reduce emissions for N fertilizer) and/or minimize agricultural nonpoint source pollution of surface and groundwater. The planned NM system will meet the current Nutrient Management (590) CPS general and additional criteria. Precision nutrient management system includes such items as split applications, variable rate applications, nitrification or urease inhibitors, additional nutrient tests including PSNT (pre-side dress nitrogen test), CSNT (corn stalk nitrate test), and PPSN (pre-plant soil nitrate test), chlorophyll meters, and/or spectral analysis may be used to further refine nutrient applications. Payment for implementation is to defray the costs of grid or zone soil testing, additional testing and analysis, equipment, implementation of the NMP and recordkeeping. Typical treatment area is 40 acres.

Before Situation:

In this geographic area, conventional fertility programs involve very little or no soil or manure testing. Application of fertilizers, including manures and amendments, are completed annually based upon tradition that does not specifically consider the detrimental affects of improper timing or rates of nutrients, nitrous oxide emissions or excess nutrient build-up in the soil. Fields are overwintered with little or no erosion protection often times resulting in sheet, rill, and ephemeral erosion by spring. Runoff flows into adjacent streams, water courses, tile drains, field surface drains, or other water courses causing degradation to receiving waters or leaching of nutrients to shallow ground water sources. There is typically no environmental evaluation of the potential for off-site movement. Soil quality may also be detrimentally affected.

After Situation:

A precision nutrient management system will be developed to meet the current Nutrient Management (590) CPS general and additional criteria, when applicable the system will also meet NOP regulations. Development and implementation of a Nutrient Management Plan (NMP) based on the 4Rs will benefit plant productivity while reducing potential of off-site movement of nutrients, including reducing nitrogen emissions. NMP may include practices such as use of split applications, slow release nutrients, nitrification inhibitors, urease inhibitors, proper timing of application, more appropriate formulations, banding, etc. Additional nutrient tests including PSNT (pre-side dress nitrogen test), CSNT (corn stalk nitrate test), and PPSN (pre-plant soil nitrate test), chlorophyll meters, spectral analysis, etc., may also be used to further refine nutrient applications. Use of a post-harvest soil test or tissue tests will help establish the adequacy of the plan in meeting crop needs while minimizing P application rate and residual N, thus reducing the potential for off-site impacts. Potential for offsite movement of nutrient may be further reduced by identifying variability across the field(s) by using soil survey maps or other simple techniques to establish management zones, along with grid or zone soil testing. Nutrients are applied at rates based on soil test zone analyses. Nitrogen and Phosphorus risk assessment tools are completed and results included in the nutrient management system specifications as required by current NRCS 590 CPS criteria and any mitigation measures are included in the conservation plan if determined needed by risk assessment results. Soil testing is completed according to LGU recommendations. Analysis are completed at least once every three years for N-P-K, and for N annually. A nutrient budget is developed for each field or management zone annually. Records will be provided annually of the current soil test, analysis, application rates, forms and rates of nutrients for each field, including crop yields.

Feature Measure: <Unknown>

Scenario Unit: Acres

Scenario Typical Size: 40.0

Scenario Total Cost: $2,089.37

Scenario Cost/Unit: $52.23

Cost Details:

Component Name	ID	Description	Unit	Cost	QTY	Total
Equipment Installation						
Truck, Pickup	939	Equipment and power unit costs. Labor not included.	Hours	$24.18	2	$48.36
All terrain vehicles, ATV	965	Includes equipment, power unit and labor costs.	Hours	$21.14	2	$42.28
Satellite imagery, aerial photography, infrared	966	Infrared imagery	Acres	$0.20	40	$8.00
Chlorophyll Reader	1125	Applicator and chlorophyll sensor includes labor. No materials	Acres	$10.40	40	$416.00
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.	Hours	$27.56	8	$220.48
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.	Hours	$102.76	6	$616.56
Materials						
Test, Soil Test, Standard	299	Includes materials, shiping, labor, and equipment costs.	Each	$11.76	60	$705.60
Test, Plant Tissue Test	301	Tissue analysis for crops. Includes materials and shipping only.	Each	$22.74	1	$22.74
Test, Soil Nitrogen Testing	311	Pre-Side Dress/Deep Soil Testing. Includes materials and shipping only.	Each	$9.35	1	$9.35

Practice: 590 - Nutrient Management

Scenario: #261 - Basic NM (Non-Organic/Organic)

Scenario Description:

This scenario describes the implementation of a basic nutrient management system on > = 40 acres of cropland or hayland where there is no manure application. Scenario is applicable on non-organic and organic land. The planned NM system will meet the current Nutrient Management (590) CPS. Implementation will result in the proper rate, source, method of placement, and timing of nutrient application. Payment for implementation is to defray the costs of soil testing, analysis, and implementation of the nutrient management plan and recordkeeping. Records demonstrating implementation of the 4 R's of NM will be required.

Before Situation:

In this geographic area, a fertility program is either nonexistent or does not meet the Nutrient Management (590) CPS. Soil testing is not completed on a regular basis and applications of fertilizers are not based on land grant university recommendations or a nutrient budget. An environmental evaluation or risk assessment is not completed. Nutrients are transported to surface waters through runoff, drainage tile, or soil erosion, or to ground water from leaching in quantities that degrade water quality and limit use of intended purposes. Soil quality may be degraded by excess or inadequate nutrients. Fields have little or no erosion protection during critical periods often times resulting in sheet, rill, and ephemeral erosion.

After Situation:

A nutrient management system will be developed to meet the current Nutrient Management (590) CPS, when applicable system will also meet NOP regulations. Development and implementation of a nutrient management plan (NMP) will benefit plant productivity while also reducing potential for off-site degradation. A nutrient management budget will be developed for each field(s) based on soil test analysis and land grant university recommendations or crop removal rates. On planning units typically 40 acres or larger, soil testing is completed according to LGU recommendations. Records will be provided annually of the current soil test, analysis, application rates, forms and rates of nutrients for each field, including crop yields. Nutrient applications will be completed according to the Nutrient Management Plan that minimizes nutrient runoff and leaching or buildup of excess nutrient concentrations.

Feature Measure: <Unknown>

Scenario Unit: Acres

Scenario Typical Size: 40.0

Scenario Total Cost: $363.46

Scenario Cost/Unit: $9.09

Cost Details:

Component Name	ID	Description	Unit	Cost	QTY	Total
Equipment Installation						
Truck, Pickup	939	Equipment and power unit costs. Labor not included.	Hours	$24.18	1	$24.18
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.	Hours	$27.56	4	$110.24
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.	Hours	$102.76	2	$205.52
Materials						
Test, Soil Test, Standard	299	Includes materials, shiping, labor, and equipment costs.	Each	$11.76	2	$23.52

Practice: 590 - Nutrient Management

Scenario: #262 - Basic NM with Manure Injection

Scenario Description:

This scenario describes the implementation of a basic nutrient management system on > = 40 acres of cropland or hayland where manure is injected (below soil surface 4-6 inches). Scenario is applicable on non-organic and organic land. The planned NM system will meet the current Nutrient Management (590) CPS. Implementation will result in the proper rate, source, method of placement, and timing of nutrient application. Payment for implementation is to defray the costs of soil testing, manure analysis, and implementation of the nutrient management plan and recordkeeping. Records demonstrating implementation of the 4 R's of NM will be required. Scenario is designed to encourage producers to effectively utilize commercial fertilizers, organic fertilizers, manure, and/or compost appropriately improving soil quality and minimizing runoff of nutrients from fields to surface waters. The basis for nutrient applications will be recommendations based on soil, manure, and compost analyses.

Before Situation:

In this geographic area, a fertility program is either nonexistent or at a basic level. Application of fertilizers, including manures, composts, and amendments, are completed annually based upon tradition that does not specifically consider the detrimental effects of improper timing or rates of nutrients, or excess nutrient buildup in the soil. Fields are overwintered with little or no erosion protection often times resulting in sheet, rill, and ephemeral erosion by spring. Soil testing is not completed on a regular basis and applications of fertilizers are not based on land grant university recommendations or a nutrient budget. An environmental evaluation or risk assessment is not completed. Nutrients are transported to surface waters through runoff, drainage tile, or soil erosion, or to ground water from leaching in quantities that degrade water quality and limit use of intended purposes. Soil quality may be degraded by excess or inadequate nutrients. Fields have little or no erosion protection during critical periods often times resulting in sheet, rill, and ephemeral erosion.

After Situation:

A nutrient management system will be developed to meet the current Nutrient Management (590) CPS, when applicable system will also meet NOP regulations. Development and implementation of a nutrient management plan (NMP) will benefit plant productivity while also reducing potential for off-site degradation. A nutrient management budget will be developed for each field(s) based on soil test analysis and land grant university recommendations or crop removal rates. On planning units typically 40 acres or larger, soil testing is completed according to LGU recommendations. Applications of manure are based on risk assessments (PI - phosphorus index). Records will be provided annually documenting current soil tests and manure tests analyses, date and rate of application, form and placement of nutrients for each field, including post-harvest yields. Manure applications are injected 4-6' below the soil surface to minimize nutrient runoff and to capture ammonia-N that otherwise might be lost to volatilization. Nutrient applications will be completed according to the Nutrient Management Plan that minimizes nutrient runoff and leaching or buildup of excess nutrient concentrations.

Feature Measure: <Unknown>

Scenario Unit: Acres

Scenario Typical Size: 40.0

Scenario Total Cost: $2,016.58

Scenario Cost/Unit: $50.41

Cost Details:

Component Name	ID	Description	Unit	Cost	QTY	Total
Equipment Installation						
Truck, Pickup	939	Equipment and power unit costs. Labor not included.	Hours	$24.18	1	$24.18
Manure, compost, injection	956	Loading, hauling and injecting manure/compost by ground equipment. Includes equipment, power unit and labor costs.	Gallons	$0.01	184000	$1,840.00
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.	Hours	$27.56	2	$55.12
Materials						
Test, Soil Test, Standard	299	Includes materials, shiping, labor, and equipment costs.	Each	$11.76	1	$11.76
Test, Manure Analysis	306	Moisture, Total N, P, K. Includes materials and shipping only.	Each	$40.16	1	$40.16
Test, Compost Analysis	307	Moisture, Total N, P, K. Includes materials and shipping only.	Each	$45.36	1	$45.36

Practice: 590 - Nutrient Management

Scenario: #263 - Small Farm NM (Non-Organic/Organic)

Scenario Description:

Scenario is applicable on non-organic and organic land. Scenario implementation of a basic nutrient management system on small, often diversified farm systems typically between 0.5-10 acres where manure and/or compost may be utilized either alone or in conjunction with commercial fertilizer. The planned NM system will meet the current Nutrient Management (590) CPS. Implementation will result in the proper rate, source, method of placement, and timing of nutrient application. Payment for implementation is to defray the costs of soil testing, manure and/or compost analysis, and implementation of the nutrient management plan and recordkeeping. Records demonstrating implementation of the 4 R's of NM will be required. Scenario is designed to encourage producers to effectively utilize commercial fertilizers, organic fertilizers, manure, and/or compost appropriately improving soil quality and minimizing runoff of nutrients from fields to surface waters. The basis for nutrient applications will be recommendations based on soil, manure, and compost analyses.

Before Situation:

In this geographic area, a fertility program is either nonexistent or does not meet the Nutrient Management (590). Soil testing is not completed on a regular basis and applications of fertilizers are not based on land grant university recommendations or a nutrient budget. An environmental evaluation or risk assessment is not completed. Nutrients are transported to surface waters through runoff, drainage tile, or soil erosion, or to ground water from leaching in quantities that degrade water quality and limit use of intended purposes. Soil quality may be degraded by excess or inadequate nutrients. Fields have little or no erosion protection during critical periods often times resulting in sheet, rill, and ephemeral erosion.

After Situation:

A nutrient management system will be developed to meet the current Nutrient Management (590), when applicable system will also meet NOP regulations. Development and implementation of a nutrient management plan (NMP) will benefit plant productivity while also reducing potential for off-site degradation. A nutrient management budget will be developed for each field, crop block, or crop rotation within a block/field based on soil test analysis and land grant university recommendations or crop removal rates. Application of nutrients will be completed at the proper rate, timing, and methods, and sources per the NMP. Records will be provided annually of current soil test, analysis, application timing, nutrient source, application method, application rate, and crop yields for each block. Nutrient applications will be completed according to the NMP that minimizes nutrient runoff and leaching or buildup of excess nutrient concentrations.

Feature Measure: <Unknown>

Scenario Unit: Each

Scenario Typical Size: 1.0

Scenario Total Cost: $294.48

Scenario Cost/Unit: $294.48

Cost Details:

Component Name	ID	Description	Unit	Cost	QTY	Total
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.	Hours	$27.56	3	$82.68
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.	Hours	$102.76	1	$102.76
Materials						
Test, Soil Test, Standard	299	Includes materials, shiping, labor, and equipment costs.	Each	$11.76	2	$23.52
Test, Manure Analysis	306	Moisture, Total N, P, K. Includes materials and shipping only.	Each	$40.16	1	$40.16
Test, Compost Analysis	307	Moisture, Total N, P, K. Includes materials and shipping only.	Each	$45.36	1	$45.36

Practice: 590 - Nutrient Management

Scenario: #264 - Basic NM with Manure and/or Compost (Non-Organic/Organic)

Scenario Description:

This scenario describes the implementation of a basic nutrient management system on > = 40 acres of cropland or hayland where manure and/or compost is utilized either alone or in conjunction with commercial fertilizer. Scenario is applicable on non-organic and organic land. The planned NM system will meet the current Nutrient Management (590) CPS. Implementation will result in the proper rate, source, method of placement, and timing of nutrient application. Payment for implementation is to defray the costs of soil testing, manure and/or compost analysis, and implementation of the nutrient management plan and recordkeeping. Records demonstrating implementation of the 4 R's of NM will be required. Scenario is designed to encourage producers to effectively utilize commercial fertilizers, organic fertilizers, manure, and/or compost appropriately improving soil quality and minimizing runoff of nutrients from fields to surface waters. The basis for nutrient applications will be recommendations based on soil, manure, and compost analyses.

Before Situation:

In this geographic area, a fertility program is either nonexistent or at a basic level. Application of fertilizers, including manures, composts, and amendments, are completed annually based upon tradition that does not specifically consider the detrimental effects of improper timing or rates of nutrients, or excess nutrient buildup in the soil. Fields are overwintered with little or no erosion protection often times resulting in sheet, rill, and ephemeral erosion by spring. Soil testing is not completed on a regular basis and applications of fertilizers are not based on land grant university recommendations or a nutrient budget. An environmental evaluation or risk assessment is not completed. Nutrients are transported to surface waters through runoff, drainage tile, or soil erosion, or to ground water from leaching in quantities that degrade water quality and limit use of intended purposes. Soil quality may be degraded by excess or inadequate nutrients. Fields have little or no erosion protection during critical periods often times resulting in sheet, rill, and ephemeral erosion.

After Situation:

A nutrient management system will be developed to meet the current Nutrient Management (590) CPS, when applicable system will also meet NOP regulations. Development and implementation of a nutrient management plan (NMP) will benefit plant productivity while also reducing potential for off-site degradation. A nutrient management budget will be developed for each field(s) based on soil test analysis and land grant university recommendations or crop removal rates. On planning units typically 40 acres or larger, soil testing is completed according to LGU recommendations. Records will be provided annually of the current soil test, analysis, application rate, forms and rates of nutrients for each field, including crop yields. Nutrient applications will be completed according to the Nutrient Management Plan that minimizes nutrient runoff and leaching or buildup of excess nutrient concentrations.

Feature Measure: <Unknown>

Scenario Unit: Acres

Scenario Typical Size: 40.0

Scenario Total Cost: $764.74

Scenario Cost/Unit: $19.12

Cost Details:

Component Name	ID	Description	Unit	Cost	QTY	Total
Equipment Installation						
Truck, Pickup	939	Equipment and power unit costs. Labor not included.	Hours	$24.18	1	$24.18
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.	Hours	$27.56	8	$220.48
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.	Hours	$102.76	4	$411.04
Materials						
Test, Soil Test, Standard	299	Includes materials, shiping, labor, and equipment costs.	Each	$11.76	2	$23.52
Test, Manure Analysis	306	Moisture, Total N, P, K. Includes materials and shipping only.	Each	$40.16	1	$40.16
Test, Compost Analysis	307	Moisture, Total N, P, K. Includes materials and shipping only.	Each	$45.36	1	$45.36

Practice: 590 - Nutrient Management

Scenario: #265 - NM with Nitrification or Urease Inhibitor (Non-Organic/Organic)

Scenario Description:

This scenario takes a conventional cropping system where either no nutrient management or only a very basic level of nutrient management is being practiced and improves it to address air quality (reduce emissions for N fertilizer) and/or minimize agricultural nonpoint source pollution of surface and groundwater. The planned NM system will meet the current Nutrient Management (590) CPS general and additional criteria. Nutrient management system includes such items as split applications, nitrification or urease inhibitors, additional nutrient tests including PSNT (pre-side dress nitrogen test), CSNT (corn stalk nitrate test), and PPSN (pre-plant soil nitrate test), chlorophyll meters, and/or spectral analysis may be used to further refine nutrient applications. Payment for implementation is to defray the costs of grid or zone soil testing, additional testing and analysis, nitrification or urease inhibitors, equipment, implementation of the NMP and recordkeeping. Typical treatment area is 40 acres.

Before Situation:

In this geographic area, conventional fertility programs involve very little or no soil or manure testing. Application of fertilizers, including manures and amendments, are completed annually based upon tradition that does not specifically consider the detrimental affects of improper timing or rates of nutrients, nitrous oxide emissions or excess nutrient build-up in the soil. Fields are overwintered with little or no erosion protection often times resulting in sheet, rill, and ephemeral erosion by spring. Runoff flows into adjacent streams, water courses, tile drains, field surface drains, or other water courses causing degradation to receiving waters or leaching of nutrients to shallow ground water sources. There is typically no environmental evaluation of the potential for off-site movement. Soil quality may also be detrimentally affected.

After Situation:

A nutrient management system will be developed to meet the current Nutrient Management (590) CPS general and additional criteria, when applicable system will also meet NOP regulations. Development and implementation of a Nutrient Management Plan (NMP) base on the 4Rs will benefit plant productivity while reducing potential of off-site movement of nutrients, including the use of nitrification or urease inhibitors to reduce nitrogen emissions. NMP may include practices such as use of split applications, slow release nutrients, nitrification inhibitors, urease inhibitors, proper timing of application, more appropriate formulations, banding, etc. Additional nutrient tests including PSNT (pre-side dress nitrogen test), CSNT (corn stalk nitrate test), and PPSN (pre-plant soil nitrate test), chlorophyll meters, spectral analysis, etc., may also be used to further refine nutrient applications. Use of a post-harvest soil test or tissue tests will help establish the adequacy of the plan in meeting crop needs while minimizing P application rate and residual N, thus reducing the potential for off-site impacts. Potential for offsite movement of nutrient may be further reduced by identifying variability across the field(s) by using soil survey maps or other simple techniques to establish management zones, along with grid or zone soil testing. Nutrients are applied at rates based on soil test zone analyses. Nitrogen and Phosphorus risk assessment tools are completed and results included in the nutrient management system specifications as required by current NRCS 590 CPS criteria and any mitigation measures are included in the conservation plan if determined needed by risk assessment results. Soil testing is completed according to LGU recommendations. Analysis are completed at least once every three years for N-P-K, and for N annually. A nutrient budget is developed for each field or management zone annually. Records will be provided annually of the current soil test, analysis, application rates, forms and rates of nutrients for each field, including crop yields.

Feature Measure: <Unknown>

Scenario Unit: Acres

Scenario Typical Size: 40.0

Scenario Total Cost: $1,672.85

Scenario Cost/Unit: $41.82

Cost Details:

Component Name	ID	Description	Unit	Cost	QTY	Total
Equipment Installation						
Truck, Pickup	939	Equipment and power unit costs. Labor not included.	Hours	$24.18	2	$48.36
All terrain vehicles, ATV	965	Includes equipment, power unit and labor costs.	Hours	$21.14	2	$42.28
Chlorophyll Reader	1125	Applicator and chlorophyll sensor includes labor. No materials	Acres	$10.40	40	$416.00
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.	Hours	$27.56	2	$55.12
Materials						
Nitrogen-Urease inhibitor	260	Nitrogen-Urease inhibitor	Acres	$24.14	40	$965.60
Test, Soil Test, Precision, Grid or Zone DELETION SCHEDULED for PS FY 2018 , USE CID 299	300	Includes materials, shipping, labor, and equipment costs. DELETION SCHEDULED for PS FY 2018 , USE CID 299	Each	$7.56	15	$113.40
Test, Plant Tissue Test	301	Tissue analysis for crops. Includes materials and shipping only.	Each	$22.74	1	$22.74
Test, Soil Nitrogen Testing	311	Pre-Side Dress/Deep Soil Testing. Includes materials and shipping only.	Each	$9.35	1	$9.35

Practice: 590 - Nutrient Management

Scenario: #266 - NM with grid/zone soil sampling, soil nitrate/plant tissue test (Non-Organic/Organic)

Scenario Description:

This scenario takes a conventional cropping system where either no nutrient management or only a very basic level of nutrient management is being practiced and improves it to minimize agricultural nonpoint source pollution of surface and groundwater. The planned NM system will meet the current Nutrient Management (590) CPS general and additional criteria. Nutrient management system includes such items as split applications, additional nutrient tests including PSNT (pre-side dress nitrogen test), CSNT (corn stalk nitrate test), and PPSN (pre-plant soil nitrate test), chlorophyll meters, and/or spectral analysis may be used to further refine nutrient applications. Payment for implementation is to defray the costs of grid or zone soil testing, additional testing and analysis, equipment, implementation of the NMP and recordkeeping. Typical treatment area is 40 acres.

Before Situation:

In this geographic area, conventional fertility programs involve very little or no soil or manure testing. Application of fertilizers, including manures and amendments, are completed annually based upon tradition that does not specifically consider the detrimental affects of improper timing or rates of nutrients or excess nutrient build-up in the soil. Fields are overwintered with little or no erosion protection often times resulting in sheet, rill, and ephemeral erosion by spring. Runoff flows into adjacent streams, water courses, tile drains, field surface drains, or other water courses causing degradation to receiving waters or leaching of nutrients to shallow ground water sources. There is typically no environmental evaluation of the potential for off-site movement. Soil quality may also be detrimentally affected.

After Situation:

A nutrient management system will be developed to meet the current Nutrient Management (590) CPS general and additional criteria, when applicable system will also meet NOP regulations. Development and implementation of a Nutrient Management Plan (NMP) base on the 4Rs will benefit plant productivity while reducing potential of off-site movement of nutrients. NMP may include practices such as use of split applications, slow release nutrients, proper timing of application, more appropriate formulations, banding, etc. Additional nutrient tests including PSNT (pre-side dress nitrogen test), CSNT (corn stalk nitrate test), and PPSN (pre-plant soil nitrate test), chlorophyll meters, spectral analysis, etc., may also be used to further refine nutrient applications. Use of a post-harvest soil test or tissue tests will help establish the adequacy of the plan in meeting crop needs while minimizing P application rate and residual N, thus reducing the potential for off-site impacts. Potential for offsite movement of nutrient may be further reduced by identifying variability across the field(s) by using soil survey maps or other simple techniques to establish management zones, along with grid or zone soil testing. Nutrients are applied at rates based on soil test zone analyses. Nitrogen and Phosphorus risk assessment tools are completed and results included in the nutrient management system specifications as required by current NRCS 590 CPS criteria and any mitigation measures are included in the conservation plan if determined needed by risk assessment results. Soil testing is completed according to LGU recommendations. Analysis are completed at least once every three years for N-P-K, and for N annually. A nutrient budget is developed for each field or management zone annually. Records will be provided annually of the current soil test, analysis, application rates, forms and rates of nutrients for each field, including crop yields.

Feature Measure: <Unknown>

Scenario Unit: Acres

Scenario Typical Size: 40.0

Scenario Total Cost: $683.07

Scenario Cost/Unit: $17.08

Cost Details:

Component Name	ID	Description	Unit	Cost	QTY	Total
Equipment Installation						
Truck, Pickup	939	Equipment and power unit costs. Labor not included.	Hours	$24.18	1	$24.18
All terrain vehicles, ATV	965	Includes equipment, power unit and labor costs.	Hours	$21.14	2	$42.28
Chlorophyll Reader	1125	Applicator and chlorophyll sensor includes labor. No materials	Acres	$10.40	40	$416.00
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.	Hours	$27.56	2	$55.12
Materials						
Test, Soil Test, Precision, Grid or Zone DELETION SCHEDULED for PS FY 2018 , USE CID 299	300	Includes materials, shipping, labor, and equipment costs. DELETION SCHEDULED for PS FY 2018 , USE CID 299	Each	$7.56	15	$113.40
Test, Plant Tissue Test	301	Tissue analysis for crops. Includes materials and shipping only.	Each	$22.74	1	$22.74
Test, Soil Nitrogen Testing	311	Pre-Side Dress/Deep Soil Testing. Includes materials and shipping only.	Each	$9.35	1	$9.35

Practice: 590 - Nutrient Management

Scenario: #267 - Adaptive NM

Scenario Description:

The practice scenario is for the implementation of nutrient management on a small plot, as detailed in outlined in Agronomy Technical Note 7 - Adaptive Nutrient Management. Scenario includes implementing replicated strip trials on a field plot to evaluate, identify and implement various nutrient use efficiency improvement methods for timing, rate, method of application, or source of nutrients.

Before Situation:

The practice will be installed on cropland (small grain rotation or typical corn-soybean rotation) to address water quality degradation, air quality degradation and energy concerns. The scenario applies to non-organic and organic operations.

After Situation:

Installation of this scenario will result in adopting the four R's of nutrient management following the procedures outlined in Agronomy Technical Note 7 - Adaptive Nutrient Management. Implementation involves establishing the replicated plots to evaluate one or more of the 4 R's. The plot will consist of at least 4 replicated plots designed, laid out, managed and evaluated with the assistance of a consultant or extension professional knowledgeable in nutrient management and experimental design and data collection. Results are used to make nutrient application decisions to address water quality degradation issues and nutrient use efficiencies. Yields will be measured and statistically analyzed and summarized following the procedures in Agronomy Technical Note 7. The yields for each plot will be adjusted to the appropriate moisture content.

Feature Measure: <Unknown>

Scenario Unit: Each

Scenario Typical Size: 1.0

Scenario Total Cost: $2,703.38

Scenario Cost/Unit: $2,703.38

Cost Details:

Component Name	ID	Description	Unit	Cost	QTY	Total
Equipment Installation						
Satellite imagery, aerial photography, infrared	966	Infrared imagery	Acres	$0.20	1	$0.20
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.	Hours	$27.56	25	$689.00
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.	Hours	$102.76	15	$1,541.40
Materials						
Test, Soil Test, Standard	299	Includes materials, shiping, labor, and equipment costs.	Each	$11.76	2	$23.52
Test, Plant Tissue Test	301	Tissue analysis for crops. Includes materials and shipping only.	Each	$22.74	14	$318.36
Test, Soil Nitrogen Testing	311	Pre-Side Dress/Deep Soil Testing. Includes materials and shipping only.	Each	$9.35	14	$130.90

Practice: 595 - Pest Management Conservation System

Scenario: #53 - Plant Health PAMS (acs) Low Labor and Materials

Scenario Description:

PAMS activities with low labor and material costs will be implemented on a large scale crop production area.

Before Situation:

Before practice conditions vary widely. Conditions range from the client is not using any PAMS techniques to the client is using many different PAMS techniques for many different pests. In all cases at least one planned PAMS technique has risk to an identified resource concern (Plant Pest Pressure).

After Situation:

Planned Prevention (resistant cultivar selection, etc.), Avoidance (IWM for disease avoidance, change in rotation to avoid problem spots, etc.), and Monitoring (Degree day monitoring, field scouting, etc.) activities have been implemented to help meet the minimum criteria for the identified resource concerns (i.e. Plant Pest Pressure).

Feature Measure: Acres of Management Applied

Scenario Unit: Acres

Scenario Typical Size: 40.0

Scenario Total Cost: $890.01

Scenario Cost/Unit: $22.25

Cost Details:

Component Name	ID	Description	Unit	Cost	QTY	Total
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	$109.25	1	$109.25
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.	Hours	$37.19	2	$74.38
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.	Hours	$27.56	8	$220.48
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.	Hours	$102.76	2	$205.52
Materials						
Miscellaneous, containers, traps, etc.	298	Pheromone Traps, Culture container with lid. Includes materials and shipping only.	Each	$4.84	10	$48.40
Weather Station, Basic	314	Basic Weather Station which collects and records recording rainfall, humidity, barometric pressure, wind speed, and temperature to a home weather console. Includes materials only.	Each	$231.98	1	$231.98

Practice: 595 - Pest Management Conservation System

Scenario: #54 - Plant Health PAMS (acs) Low labor only

Scenario Description:
PAMS activities with low labor costs will be implemented on a large scale crop production area.

Before Situation:
Before practice conditions vary widely. Conditions range from the client is not using any PAMS techniques to the client is using many different PAMS techniques for many different pests. In all cases at least one planned PAMS technique has risk to an identified resource concern (Plant Pest Pressure).

After Situation:
Planned Prevention (resistant cultivar selection, pest habitat removal, etc.), Avoidance (IWM for disease avoidance, change in rotation to avoid problem spots, etc.), and Monitoring (field scouting, etc.) activities have been implemented to help meet the minimum criteria for the identified resource concerns (i.e. Plant Pest Pressure).

Feature Measure: Acres of management applied

Scenario Unit: Acres

Scenario Typical Size: 40.0

Scenario Total Cost: $609.63

Scenario Cost/Unit: $15.24

Cost Details:

Component Name	ID	Description	Unit	Cost	QTY	Total
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	$109.25	1	$109.25
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.	Hours	$37.19	2	$74.38
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.	Hours	$27.56	8	$220.48
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.	Hours	$102.76	2	$205.52

Practice: 595 - Pest Management Conservation System

Scenario: #55 - Pest Management Precision Ag

Scenario Description:

This scenario takes a conventional cropping system where either no pest management or only a basic level of pest management is being practiced and improves it to address air quality and/or minimize agricultural nonpoint sources pollution of surface and groundwater. The planned Pest Management system will meet the current Pest Management Conservation System (595) CPS general and additional criteria. Precision pest management system includes such items as pest monitoring, targeted applications, eliminates overlap, tissue testing, specialized nozzles etc. to further refine pesticide applications. Payment for implementation is to defray the costs of tissue testing, additional testing and analysis, equipment implementation of the PMCS and recordkeeping. Typical treatment area is 40 acres.

Before Situation:

Conventional pest management programs involve little or no monitoring and testing. Application of pesticides are completed annually based upon product salesmen recommendations that do not specifically consider the detrimental affects of inexact application methods. Fields are overwintered with little or no erosion protection often resulting in sheet, rill and ephemeral erosion. Runoff flows into adjacent streams, water courses, tile drains, field surface drains or other water courses causing degradation to receiving waters or leaching of pesticides to shallow ground water sources. There is typically no environmental evaluation of the potential for off-site movement. Soil health may also be detrimentally affected.

After Situation:

A precision pest management system will be developed to meet the current Pest Management Conservation System (595) CPS general and additional criteria, when applicable the system will also meet NOP regulations. Development and implementation of a PMCS will benefit plant productivity while reducing potential of off-site movement of pesticides. PMCS may include practices such as use of spot applications, proper timing of applications, more appropriate formulations etc. Additional monitoring and tissue testing may also be used to further refine pesticide applications. Smart sprayer and advanced nozzle technology may also be employed. Records will be provided annually of the current monitoring, test analysis, application rates, formulations for each field including crop yields.

Feature Measure: Acres of management applied

Scenario Unit: Acres

Scenario Typical Size: 40.0

Scenario Total Cost: $2,382.82

Scenario Cost/Unit: $59.57

Cost Details:

Component Name	ID	Description	Unit	Cost	QTY	Total
Equipment Installation						
Truck, Pickup	939	Equipment and power unit costs. Labor not included.	Hours	$24.18	4	$96.72
All terrain vehicles, ATV	965	Includes equipment, power unit and labor costs.	Hours	$21.14	8	$169.12
Satellite imagery, aerial photography, infrared	966	Infrared imagery	Acres	$0.20	40	$8.00
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.	Hours	$37.19	8	$297.52
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.	Hours	$27.56	12	$330.72
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.	Hours	$102.76	14	$1,438.64
Materials						
Miscellaneous, containers, traps, etc.	298	Pheromone Traps, Culture container with lid. Includes materials and shipping only.	Each	$4.84	4	$19.36
Test, Plant Tissue Test	301	Tissue analysis for crops. Includes materials and shipping only.	Each	$22.74	1	$22.74

Practice: 595 - Pest Management Conservation System

Scenario: #56 - Plant Health PAMS activities (Small Farm - each) labor, materials and mitigation.

Scenario Description:
PAMS activities with labor and material costs plus mitigation will be implemented on a small scale crop production area.

Before Situation:
Before practice conditions vary widely. Conditions range from the client is not using any PAMS techniques to the client is using many different PAMS techniques for many different pests. In all cases at least one planned PAMS technique has risk to an identified resource concern (Plant Pest Pressure). Mitigation over 30 points.

After Situation:
Planned Prevention (Netting to exclude insect or birds, resistant cultivar selection, etc.), Avoidance (IWM for disease avoidance, change in rotation to avoid problem spots, etc.), and Monitoring (Degree day monitoring, field scouting, etc.) activities have been implemented to help meet the minimum criteria for the identified resource concerns (i.e. Plant Pest Pressure). Mitigation over 30 points.

Feature Measure: Small farm, typically = 5Ac

Scenario Unit: Each

Scenario Typical Size: 1.0

Scenario Total Cost: $7,683.28

Scenario Cost/Unit: $7,683.28

Cost Details:

Component Name	ID	Description	Unit	Cost	QTY	Total
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	$109.25	1	$109.25
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.	Hours	$37.19	27	$1,004.13
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.	Hours	$27.56	8	$220.48
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.	Hours	$102.76	17	$1,746.92
Materials						
Miscellaneous, containers, traps, etc.	298	Pheromone Traps, Culture container with lid. Includes materials and shipping only.	Each	$4.84	3	$14.52
Weather Station, Basic	314	Basic Weather Station which collects and records recording rainfall, humidity, barometric pressure, wind speed, and temperature to a home weather console. Includes materials only.	Each	$231.98	1	$231.98
Netting, Crop Protection, Large Mesh	2762	Synthetic netting, large mesh to exclude birds and small animals. Approximately 6 t0 7 inch mesh. Includes materials and shipping only.	Square Feet	$0.05	87120	$4,356.00

Practice: 595 - Pest Management Conservation System

Scenario: #57 - Plant Health PAMS (acs) High labor only (intensive scouting etc.)

Scenario Description:
Plant Health PAMS (acs) High labor only (intensive scouting etc.)

Before Situation:
Before practice conditions vary widely. Conditions range from the client is not using any PAMS techniques to the client is using many different PAMS techniques for many different pests. In all cases at least one planned PAMS technique has risk to an identified resource concern (Plant Pest Pressure).

After Situation:
Planned Prevention (resistant cultivar selection, pest habitat removal, etc.), Avoidance (IWM for disease avoidance, change in rotation to avoid problem spots, etc.), and Monitoring (field scouting, etc.) activities have been implemented to help meet the minimum criteria for the identified resource concerns (i.e. Plant Pest Pressure).

Feature Measure: Acres of Management Applied

Scenario Unit: Acres

Scenario Typical Size: 40.0

Scenario Total Cost: $1,887.63

Scenario Cost/Unit: $47.19

Cost Details:

Component Name	ID	Description	Unit	Cost	QTY	Total
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	$109.25	1	$109.25
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.	Hours	$37.19	2	$74.38
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.	Hours	$27.56	32	$881.92
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.	Hours	$102.76	8	$822.08

Practice: 595 - Pest Management Conservation System

Scenario: #58 - Plant health PAMS (Small Farm - each) labor and mitigation.

Scenario Description:

PAMS activities with labor costs will be implemented plus mitigation on a small scale crop production area.

Before Situation:

Before practice conditions vary widely. Conditions range from the client is not using any PAMS techniques to the client is using many different PAMS techniques for many different pests. In all cases at least one planned PAMS technique has risk to an identified resource concern (Plant Pest Pressure). Mitigation up to 30 points.

After Situation:

Planned Prevention (resistant cultivar selection, pest habitat removal, etc.), Avoidance (IWM for disease avoidance, change in rotation to avoid problem spots, etc.), and Monitoring (field scouting, etc.) activities have been implemented to help meet the minimum criteria for the identified resource concerns (i.e. Plant Pest Pressure). Mitigation up to 30 points.

Feature Measure: Small farm, typically = 5Ac

Scenario Unit: Each

Scenario Typical Size: 1.0

Scenario Total Cost: $1,775.23

Scenario Cost/Unit: $1,775.23

Cost Details:

Component Name	ID	Description	Unit	Cost	QTY	Total
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	$109.25	1	$109.25
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.	Hours	$37.19	14	$520.66
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.	Hours	$27.56	8	$220.48
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.	Hours	$102.76	9	$924.84

Practice: 595 - Pest Management Conservation System

Scenario: #59 - Plant Health PAMS (acs) High Labor, materials and mitigation.

Scenario Description:

PAMS activities with high labor and material costs (weather station, netting, field sanitation, mating disruption) plus mitigation will be implemented on a large scale crop production area.

Before Situation:

Before practice conditions vary widely. Conditions range from the client is not using any PAMS techniques to the client is using many different PAMS techniques for many different pests. In all cases at least one planned PAMS technique has risk to an identified resource concern (Plant Pest Pressure). Mitigation over 30 points.

After Situation:

Planned Prevention (Netting to exclude insect or birds, resistant cultivar selection, etc.), Avoidance (IWM for disease avoidance, change in rotation to avoid problem spots, etc.), and Monitoring (Degree day monitoring, field scouting, etc.) activities have been implemented to help meet the minimum criteria for the identified resource concerns (i.e. Plant Pest Pressure). Mitigation over 30 points.

Feature Measure: Acres of management applied

Scenario Unit: Acres

Scenario Typical Size: 40.0

Scenario Total Cost: $16,905.35

Scenario Cost/Unit: $422.63

Cost Details:

Component Name	ID	Description	Unit	Cost	QTY	Total
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	$109.25	1	$109.25
Equipment Installation						
Tractor, agricultural, 120 HP	962	Agricultural tractor with horsepower range of 90 to 140. Equipment and power unit costs. Labor not included.	Hours	$50.84	150	$7,626.00
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.	Hours	$37.19	15	$557.85
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.	Hours	$27.56	150	$4,134.00
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.	Hours	$46.88	30	$1,406.40
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.	Hours	$102.76	22	$2,260.72
Materials						
Weather Station, Advanced	2550	Advance Weather Station which collects and records recording rainfall, humidity, barometric pressure, wind speed, temperature, and solar radiation from a solar powered self-standing tripod to an advance weather recording console. Used for both 449 advance irrigation water management and for Activity 202 water quality monitoring .	Each	$811.13	1	$811.13

Practice: 595 - Pest Management Conservation System

Scenario: #60 - Plant Health PAMS (acs) Low Labor, materials and mitigation.

Scenario Description:
PAMS activities with low labor and material costs will be implemented plus mitigation on a large scale crop production area.

Before Situation:
Before practice conditions vary widely. Conditions range from the client is not using any PAMS techniques to the client is using many different PAMS techniques for many different pests. In all cases at least one planned PAMS technique has risk to an identified resource concern (Plant Pest Pressure). Mitigation up to 30 points.

After Situation:
Planned Prevention (Netting to exclude insect or birds, resistant cultivar selection, etc.), Avoidance (IWM for disease avoidance, change in rotation to avoid problem spots, etc.), and Monitoring (Degree day monitoring, field scouting, etc.) activities have been implemented to help meet the minimum criteria for the identified resource concerns (i.e. Plant Pest Pressure). Mitigation up to 30 points.

Feature Measure: Acres of Management Applied

Scenario Unit: Acres

Scenario Typical Size: 40.0

Scenario Total Cost: $2,346.27

Scenario Cost/Unit: $58.66

Cost Details:

Component Name	ID	Description	Unit	Cost	QTY	Total
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	$109.25	1	$109.25
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.	Hours	$37.19	8	$297.52
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.	Hours	$27.56	8	$220.48
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.	Hours	$102.76	14	$1,438.64
Materials						
Miscellaneous, containers, traps, etc.	298	Pheromone Traps, Culture container with lid. Includes materials and shipping only.	Each	$4.84	10	$48.40
Weather Station, Basic	314	Basic Weather Station which collects and records recording rainfall, humidity, barometric pressure, wind speed, and temperature to a home weather console. Includes materials only.	Each	$231.98	1	$231.98

Practice: 595 - Pest Management Conservation System

Scenario: #61 - Water Quality Pesticide Mitigation > 30 Point AND/OR Beneficial Insect Pesticide Mitigation - Small Farm

Scenario Description:

The minimum amount of planned IPM mitigation techniques needed to reduce water quality pesticide-related resource concerns is > 30 mitigation index score. An IPM plan will be developed in accordance with this standard and the CPS 595 Implementation Requirement will document how specific pesticide hazards will be prevented or mitigated AND/OR impacts to wildlife-beneficial insects including pollinators.

Before Situation:

Before practice conditions vary widely. Conditions range from the client is not using many pest suppression techniques (pesticides, tillage for weed control, burning, etc.) to the client is using many different pest suppression techniques for many different pests, but in all cases at least one planned pest suppression technique has risk to an identified resource concern (e.g. Water Quality - Impacts to Human Drinking Water AND/OR Wildlife-beneficial insects including pollinators).

After Situation:

An IPM system with planned. Mitigation techniques (>30 points) have been implemented to meet the minimum criteria for the identified resource concerns (i.e. Water Quality - Impacts to Human Drinking Water or Fish) AND 10 points of mitigation for Wildlife (beneficial insects including pollinators) with either risk prevention (i.e. planned pesticides have no risk to the identified resource concern) or risk mitigation (i.e. planned pesticides have appropriate mitigation planned from Agronomy Technical Note 5 AND Agronomy Technical Note 9).

Feature Measure: Small Farm, typically <= 5 acs

Scenario Unit: Each

Scenario Typical Size: 1.0

Scenario Total Cost: $1,874.16

Scenario Cost/Unit: $1,874.16

Cost Details:

Component Name	ID	Description	Unit	Cost	QTY	Total
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.	Hours	$37.19	20	$743.80
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.	Hours	$102.76	11	$1,130.36

Practice: 595 - Pest Management Conservation System

Scenario: #62 - Plant Health PAMS (acs) High Labor and materials

Scenario Description:

PAMS activities with high labor and material costs will be implemented on a large scale crop production area (weather station, netting, field sanitation, mating disruption etc.).

Before Situation:

Before practice conditions vary widely. Conditions range from the client is not using any PAMS techniques to the client is using many different PAMS techniques for many different pests. In all cases at least one planned PAMS technique has risk to an identified resource concern (Plant Pest Pressure).

After Situation:

Planned Prevention (Netting to exclude insect or birds, resistant cultivar selection, etc.), Avoidance (IWM for disease avoidance, change in rotation to avoid problem spots, etc.), and Monitoring (Degree day monitoring, field scouting, etc.) activities have been implemented to help meet the minimum criteria for the identified resource concerns (i.e. Plant Pest Pressure).

Feature Measure: Acres of Management Applied

Scenario Unit: Acres

Scenario Typical Size: 40.0

Scenario Total Cost: $14,908.86

Scenario Cost/Unit: $372.72

Cost Details:

Component Name	ID	Description	Unit	Cost	QTY	Total
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	$109.25	1	$109.25
Equipment Installation						
Tractor, agricultural, 120 HP	962	Agricultural tractor with horsepower range of 90 to 140. Equipment and power unit costs. Labor not included.	Hours	$50.84	150	$7,626.00
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.	Hours	$27.56	150	$4,134.00
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.	Hours	$46.88	30	$1,406.40
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.	Hours	$102.76	8	$822.08
Materials						
Weather Station, Advanced	2550	Advance Weather Station which collects and records recording rainfall, humidity, barometric pressure, wind speed, temperature, and solar radiation from a solar powered self-standing tripod to an advance weather recording console. Used for both 449 advance irrigation water management and for Activity 202 water quality monitoring .	Each	$811.13	1	$811.13

Practice: 595 - Pest Management Conservation System

Scenario: #63 - Water Quality Pesticide Mitigation = 30 Point AND/OR Beneficial Insect Pesticide Mitigation - Small Farm

Scenario Description:

The minimum amount of planned IPM mitigation techniques needed to reduce water quality pesticide-related resource concerns is = 30 mitigation index score. An IPM plan will be developed in accordance with this standard and the CPS 595 Implementation Requirement will document how specific pesticide hazards will be prevented or mitigated AND/OR impacts to wildlife-beneficial insects including pollinators.

Before Situation:

Before practice conditions vary widely. Conditions range from the client is not using many pest suppression techniques (pesticides, tillage for weed control, burning, etc.) to the client is using many different pest suppression techniques for many different pests, but in all cases at least one planned pest suppression technique has risk to an identified resource concern (e.g. Water Quality - Impacts to Human Drinking Water AND/OR Wildlife-beneficial insects including pollinators).

After Situation:

An IPM system with planned. Mitigation techniques (=30 points) have been implemented to meet the minimum criteria for the identified resource concerns (i.e. Water Quality - Impacts to Human Drinking Water or Fish) AND/OR 10 points of mitigation for Wildlife (beneficial insects including pollinators) with either risk prevention (i.e. planned pesticides have no risk to the identified resource concern) or risk mitigation (i.e. planned pesticides have appropriate mitigation planned from Agronomy Technical Note 5 AND/OR Agronomy Technical Note 9).

Feature Measure: Small Farm, typically <= 5 acres

Scenario Unit: Each

Scenario Typical Size: 1.0

Scenario Total Cost: $1,137.22

Scenario Cost/Unit: $1,137.22

Cost Details:

Component Name	ID	Description	Unit	Cost	QTY	Total
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.	Hours	$37.19	14	$520.66
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.	Hours	$102.76	6	$616.56

Practice: 595 - Pest Management Conservation System

Scenario: #64 - Water Quality Pesticide Mitigation > 30 Point AND/OR Beneficial Insect Pesticide Mitigation

Scenario Description:

The minimum amount of planned IPM mitigation techniques needed to reduce water quality pesticide-related resource concerns is > 30 mitigation index score. An IPM plan will be developed in accordance with this standard and the CPS 595 Implementation Requirement will document how specific pesticide hazards will be prevented or mitigated AND/OR impacts to wildlife-beneficial insects including pollinators.

Before Situation:

Before practice conditions vary widely. Conditions range from the client is not using many pest suppression techniques (pesticides, tillage for weed control, burning, etc.) to the client is using many different pest suppression techniques for many different pests, but in all cases at least one planned pest suppression technique has risk to an identified resource concern (e.g. Water Quality - Impacts to Human Drinking Water AND/OR Wildlife-beneficial insects including pollinators).

After Situation:

An IPM system with planned. Mitigation techniques (>30 points) have been implemented to meet the minimum criteria for the identified resource concerns (i.e. Water Quality - Impacts to Human Drinking Water or Fish) AND/OR 10 points of mitigation for Wildlife (beneficial insects including pollinators) with either risk prevention (i.e. planned pesticides have no risk to the identified resource concern) or risk mitigation (i.e. planned pesticides have appropriate mitigation planned from Agronomy Technical Note 5 AND/OR Agronomy Technical Note 9).

Feature Measure: Acres of Management Applied

Scenario Unit: Acres

Scenario Typical Size: 40.0

Scenario Total Cost: $2,613.05

Scenario Cost/Unit: $65.33

Cost Details:

Component Name	ID	Description	Unit	Cost	QTY	Total
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.	Hours	$37.19	15	$557.85
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.	Hours	$102.76	20	$2,055.20

Practice: 595 - Pest Management Conservation System

Scenario: #66 - Water Quality Pesticide Mitigation = 30 Point AND/OR Beneficial Insect Pesticide Mitigation

Scenario Description:

The minimum amount of planned IPM mitigation techniques needed to reduce water quality pesticide-related resource concerns is = 30 mitigation index score. An IPM plan will be developed in accordance with this standard and the CPS 595 Implementation Requirement will document how specific pesticide hazards will be prevented or mitigated AND/OR impacts to wildlife-beneficial insects including pollinators.

Before Situation:

Before practice conditions vary widely. Conditions range from the client is not using many pest suppression techniques (pesticides, tillage for weed control, burning, etc.) to the client is using many different pest suppression techniques for many different pests, but in all cases at least one planned pest suppression technique has risk to an identified resource concern (e.g. Water Quality - Impacts to Human Drinking Water AND/OR Wildlife-beneficial insects including pollinators).

After Situation:

An IPM system with planned. Mitigation techniques (=30 points) have been implemented to meet the minimum criteria for the identified resource concerns (i.e. Water Quality - Impacts to Human Drinking Water or Fish) AND/OR 10 points of mitigation for Wildlife (beneficial insects including pollinators) with either risk prevention (i.e. planned pesticides have no risk to the identified resource concern) or risk mitigation (i.e. planned pesticides have appropriate mitigation planned from Agronomy Technical Note 5 AND Agronomy Technical Note 9).

Feature Measure: Acres of Management Applied

Scenario Unit: Acres

Scenario Typical Size: 40.0

Scenario Total Cost: $1,493.45

Scenario Cost/Unit: $37.34

Cost Details:

Component Name	ID	Description	Unit	Cost	QTY	Total
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.	Hours	$37.19	7	$260.33
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.	Hours	$102.76	12	$1,233.12

Practice: 595 - Pest Management Conservation System

Scenario: #67 - Plant health PAMS (Small Farm - each) labor only

Scenario Description:
PAMS activities with labor costs will be implemented on a small scale crop production area.

Before Situation:
Before practice conditions vary widely. Conditions range from the client is not using any PAMS techniques to the client is using many different PAMS techniques for many different pests. In all cases at least one planned PAMS technique has risk to an identified resource concern (Plant Pest Pressure).

After Situation:
Planned Prevention (resistant cultivar selection, pest habitat removal, etc.), Avoidance (IWM for disease avoidance, change in rotation to avoid problem spots, etc.), and Monitoring (field scouting, etc.) activities have been implemented to help meet the minimum criteria for the identified resource concerns (i.e. Plant Pest Pressure).

Feature Measure: Small farm, typically <= 5 ac

Scenario Unit: Each

Scenario Typical Size: 1.0

Scenario Total Cost: $572.44

Scenario Cost/Unit: $572.44

Cost Details:

Component Name	ID	Description	Unit	Cost	QTY	Total
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	$109.25	1	$109.25
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.	Hours	$37.19	1	$37.19
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.	Hours	$27.56	8	$220.48
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.	Hours	$102.76	2	$205.52

Practice: 595 - Pest Management Conservation System

Scenario: #68 - Plant Health PAMS activities (Small Farm - each) labor and materials

Scenario Description:

PAMS activities with labor and material costs will be implemented on a small scale crop production area.

Before Situation:

Before practice conditions vary widely. Conditions range from the client is not using any PAMS techniques to the client is using many different PAMS techniques for many different pests. In all cases at least one planned PAMS technique has risk to an identified resource concern (Plant Pest Pressure).

After Situation:

Planned Prevention (Netting to exclude insect or birds, resistant cultivar selection, etc.), Avoidance (IWM for disease avoidance, change in rotation to avoid problem spots, etc.), and Monitoring (Degree day monitoring, field scouting, etc.) activities have been implemented to help meet the minimum criteria for the identified resource concerns (i.e. Plant Pest Pressure).

Feature Measure: Small Farm, typically <= 5 ac

Scenario Unit: Each

Scenario Typical Size: 1.0

Scenario Total Cost: $5,174.94

Scenario Cost/Unit: $5,174.94

Cost Details:

Component Name	ID	Description	Unit	Cost	QTY	Total
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	$109.25	1	$109.25
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.	Hours	$37.19	1	$37.19
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.	Hours	$27.56	8	$220.48
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.	Hours	$102.76	2	$205.52
Materials						
Miscellaneous, containers, traps, etc.	298	Pheromone Traps, Culture container with lid. Includes materials and shipping only.	Each	$4.84	3	$14.52
Weather Station, Basic	314	Basic Weather Station which collects and records recording rainfall, humidity, barometric pressure, wind speed, and temperature to a home weather console. Includes materials only.	Each	$231.98	1	$231.98
Netting, Crop Protection, Large Mesh	2762	Synthetic netting, large mesh to exclude birds and small animals. Approximately 6 t0 7 inch mesh. Includes materials and shipping only.	Square Feet	$0.05	87120	$4,356.00

Practice: 600 - Terrace

Scenario: #1 - Broadbased

Scenario Description:

An earthen embankment with channel constructed across the field slope as part of a system to shorten slope lengths and reduce sheet, rill, and gully erosion in a cropped field. The typical installation is a broadbased terrace having 5:1 upstream and 5:1 downstream slopes measuring 1,000 feet in a field with slopes from 2% to 8% constructed in loam soils or similar in regards to workability. Channel and berm are farmed. A stable outlet is provided in the form of a Grassed Waterway or Underground Outlet. Costs include all equipment and forces necessary to excavate, shape, and compact terrace. This practice addresses Concentrated Flow Erosion and Excessive Sediment in surface waters.

Before Situation:

Long slope lengths contribute to excessive sedimentation and soil erosion in cropped fields as a result of gully, rill, and sheet erosion. The excessive erosion may lead to deterioration of receiving waters due to excessive sedimentation and nutrient transport.

After Situation:

A system of broadbased terraces measuring 1,000 feet in length, 2.5 height, and 5:1 front and back slopes is installed with spacing designed to intercept flow of water and shorten slope length to reduce erosion to acceptable levels. Work is done with dozer, scraper, or road grader. The installed terrace is typically farmed. Associated practices are Critical Area Planting (342), Grassed Waterway (412), and Underground Outlet (620).

Feature Measure: Length of Terrace

Scenario Unit: Feet

Scenario Typical Size: 1,000.0

Scenario Total Cost: $3,964.85

Scenario Cost/Unit: $3.96

Cost Details:

Component Name	ID	Description	Unit	Cost	QTY	Total
Equipment Installation						
Dozer, 140 HP	927	Track mounted Dozer with horsepower range of 125 to 160. Equipment and power unit costs. Labor not included.	Hours	$104.83	24	$2,515.92
Labor						
Equipment Operators, Heavy	233	Includes: Cranes, Hydraulic Excavators >=50 HP, Dozers, Paving Machines, Rock Trenchers, Trenchers >=12 in., Dump Trucks, Ag Equipment >=150 HP, Scrapers, Water Wagons.	Hours	$38.00	24	$912.00
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.	Hours	$46.88	6	$281.28
Mobilization						
Mobilization, medium equipment	1139	Equipment with 70-150 HP or typical weights between 14,000 and 30,000 pounds.	Each	$255.65	1	$255.65

Practice: 601 - Vegetative Barrier

Scenario: #2 - Seeded Barrier

Scenario Description:
Permanent strips of stiff, dense vegetation established along the general contour of slopes.

Before Situation:
Significant erosion is occurring resulting in substantial transport of sediment across the slope. A large amount of sediment is subsequently delivered to the edge of the field and/or waterways.

After Situation:
Implementation Requirements are prepared and implemented for the site according to the Vegetative Barrier (601) standard. A strip or strips of stiff, dense vegetation is established by seeding along the general contour of the slope that effectively settles a significant amount of sediment above the leading edge of the vegetative barrier. Barrier may also help to connect green areas to provide shelter for wildlife.

Feature Measure: Per 1000 Linear feet of practice inst

Scenario Unit: Feet

Scenario Typical Size: 1,000.0

Scenario Total Cost: $185.67

Scenario Cost/Unit: $0.19

Cost Details:

Component Name	ID	Description	Unit	Cost	QTY	Total
Equipment Installation						
Tillage, Light	945	Includes light disking (tandem) or field cultivator. Includes equipment, power unit and labor costs.	Acres	$10.68	0.09	$0.96
Seeding Operation, No Till/Grass Drill	960	No Till drill or grass drill for seeding. Includes equipment, power unit and labor costs.	Acres	$21.92	0.09	$1.97
Cultipacking	1100	Includes equipment, power unit and labor costs.	Acres	$8.68	0.09	$0.78
Materials						
Native Perennial Grasses, Low Density	2750	Native perennial grasses, may include a small percentage of annual species for establishment purposes and/or if allowed by the CPS. Planted at lower to medium density (40 pure live seeds/sq ft and less). Includes material and shipping.	Acres	$111.33	0.09	$10.02
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	$171.94	1	$171.94

Practice: 601 - Vegetative Barrier

Scenario: #3 - Vegetative Planting

Scenario Description:
Permanent strips of stiff, dense vegetation established along the general contour of slopes.

Before Situation:
Significant erosion is occurring resulting in substantial transport of sediment across the slope. A large amount of sediment is subsequently delivered to the edge of the field and/or waterways.

After Situation:
Implementation Requirements are prepared and implemented for the site according to the Vegetative Barrier (601) standard. A strip or strips of stiff, dense vegetation such as Vetiver Grass is/are established along the general contour of the slope that effectively settles a significant amount of sediment above the leading edge of the vegetative barrier. Barrier may also help to connect green areas to provide shelter for wildlife.

Feature Measure: Per 100 foot Linear feet of practice

Scenario Unit: Feet

Scenario Typical Size: 100.0

Scenario Total Cost: $105.58

Scenario Cost/Unit: $1.06

Cost Details:

Component Name	ID	Description	Unit	Cost	QTY	Total
Equipment Installation						
Chemical, ground application	948	Chemical application performed by ground equipment. Includes equipment, power unit and labor costs.	Acres	$5.80	0.01	$0.06
Fertilizer, ground application, dry bulk	950	Dry bulk fertilizer application performed by ground equipment. Includes equipment, power unit and labor costs.	Acres	$6.63	0.01	$0.07
Ground sprigging	1101	Includes costs for equipment, power unit and labor.	Acres	$62.59	0.01	$0.63
Materials						
Nitrogen (N), Ammonium Sulfate	70	Price per pound of N supplied by Ammonium Sulfate. Price is not per pound of total product applied, no conversion is needed.	Pound	$0.78	0.46	$0.36
Herbicide, Glyphosate	334	A broad-spectrum, non-selective systemic herbicide. Refer to WIN-PST for product names and active ingredients. Includes materials and shipping only.	Acres	$9.21	0.01	$0.09
Perennial Grass, Legume, and/or Forb Culms, Stems, Liners, or Plugs, linear planting	2324	Perennial grasses, legumes and/or forbs established in a row using vegetative propagules including culms, stems, liners, or plugs. Cost is for 100 linear feet. Includes materials and shipping.	100 Foot	$104.38	1	$104.38

Practice: 603 - Herbaceous Wind Barriers

Scenario: #1 - Cool Season Annual/Perennial Species

Scenario Description:

This scenario describes the implementation of herbaceous barriers to reduce wind velocities and wind-borne particulate matter. In this scenario barriers are composed of cool season annual or perennial vegetation. Plant materials shall be selected for local adaptation and climatic conditions and are resistant to lodging and are non-spreading in their habit. Barriers will be designed as close to perpendicular to prevailing winds as practical. Barrier direction, spacing, and composition needed to achieve the desired purpose shall be designed using the currently approved wind erosion technology.

Before Situation:

Typically cropland has excessive soil disturbance and unsheltered distance that results in excessive wind erosion that affect soil resources. Seedling development and wildlife habitat are negatively affected by wind-borne sediment and sediment-borne contaminants travelling offsite.

After Situation:

Implementation Requirements will be prepared and implemented for the site according to the Herbaceous Wind Barrier (603) standard. Implementation of herbaceous wind barriers will modify the flow and velocity of air dependent upon barrier height, porosity, spacing and wind speed. Orientation is generally placed across an entire field perpendicular to applicable prevailing wind direction. Implementation will reduce soil loss, protect growing plants from damage by wind-blown soil particles, and provide food and cover for wildlife. The scenario includes the design and implementation of annual barriers and required reestablishment.

Feature Measure: linear feet of barrier planted

Scenario Unit: Linear Feet

Scenario Typical Size: 1,320.0

Scenario Total Cost: $128.33

Scenario Cost/Unit: $0.10

Cost Details:

Component Name	ID	Description	Unit	Cost	QTY	Total
Equipment Installation						
Truck, Pickup	939	Equipment and power unit costs. Labor not included.	Hours	$24.18	2	$48.36
Seeding Operation, No Till/Grass Drill	960	No Till drill or grass drill for seeding. Includes equipment, power unit and labor costs.	Acres	$21.92	1	$21.92
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.	Hours	$27.56	2	$55.12
Materials						
Annual Grasses	2730	Annual grasses, one or more species, mostly introduced but may be native. Used for temporary cover or cover crops. Includes material and shipping.	Acres	$32.58	0.09	$2.93

Practice: 603 - Herbaceous Wind Barriers

Scenario: #6 - Small Farm Herbaceous Barrier

Scenario Description:

This scenario describes the annual implementation of herbaceous barriers to reduce wind velocities and wind-borne particulate matter. In this scenario barriers are composed of annual living vegetation. Plant materials shall be selected for local adaptation and climatic conditions and are resistant to lodging and are non-spreading in their habit. Barriers will be designed as close to perpendicular to prevailing winds as practical. Barrier direction, spacing, and composition needed to achieve the desired purpose shall be designed using the currently approved wind erosion technology. Establishment is done either by using light tillage or chemical application and no till drill.

Before Situation:

Typically cropland has excessive soil disturbance and un-sheltered distance that results in excessive wind erosion that affect soil resources. Seedling development and wildlife habitat are negatively affected by wind-borne sediment and sediment-borne contaminants travelling offsite.

After Situation:

Implementation Requirements will be prepared for the site according to the 603 Herbaceous Wind Barrier Standard and implemented. Implementation of herbaceous wind barriers will modify the flow and velocity of air dependent upon barrier height, porosity, spacing and wind speed. Orientation is generally placed across an entire field perpendicular to applicable prevailing wind direction. Implementation will reduce soil loss; protect growing plants from damage by wind blown soil particles, provide food and cover for wildlife. Payment is for the design and implementation of annual barriers and required reestablishment.

Feature Measure: Linear Feet Planted

Scenario Unit: Feet

Scenario Typical Size: 1,000.0

Scenario Total Cost: $282.83

Scenario Cost/Unit: $0.28

Cost Details:

Component Name	ID	Description	Unit	Cost	QTY	Total
Equipment Installation						
Tillage, Light	945	Includes light disking (tandem) or field cultivator. Includes equipment, power unit and labor costs.	Acres	$10.68	1	$10.68
Seeding Operation, No Till/Grass Drill	960	No Till drill or grass drill for seeding. Includes equipment, power unit and labor costs.	Acres	$21.92	0.5	$10.96
Labor						
Specialist Labor	235	Labor requiring a specialized skill set: Includes Agronomists, Foresters, Biologists, etc. to provide additional technical information during the planning and implementation of the practice. Does not include NRCS or TSP services.	Hours	$102.76	2	$205.52
Materials						
Native Perennial Grasses, Low Density	2750	Native perennial grasses, may include a small percentage of annual species for establishment purposes and/or if allowed by the CPS. Planted at lower to medium density (40 pure live seeds/sq ft and less). Includes material and shipping.	Acres	$111.33	0.5	$55.67

Practice: 605 - Denitrifying Bioreactor

Scenario: #9 - Denitrifying Bioreactor

Scenario Description:

"Scenario describes a structure containing a carbon source installed to intercept subsurface drain (tile) flow or ground water, and reduce the concentration of nitrate-nitrogen. Woodchips serve as the carbon source necessary to the denitrification process. This bioreactor has geotextile fabric (or polyethylene - PE) between the wood chips and the surrounding soil plus the following components: woodchip filled pit, two water control structures (to allow management of the flow rate and and free water elevation within the bioreactor), and piping to convey water to and from the bioreactor. Woodchips serve as the carbon source necessary to the denitrification process. Associated practices: Subsurface Drain (606), Structure for Water Control (587), Drainage Water Management (554). Resource concern: Water Quality Degradation - Excess nutrients in surface and ground waters. Management and maintenance of the bioreactor (including chip replenishment), as well as monitoring and reporting to demonstrate the performance of the practice are not included in this scenario."

Before Situation:

Before the installation, the subsurface drainage system is contributing nitrates to a surface water source (ditch or stream), high nitrates are a resource concern to the receiving water, and it is feasible to install a bioreactor to reduce the nitrate load from drainage outflows.

After Situation:

Bioreactor has geotextile fabric (or polyethylene - PE) between the wood chips and the surrounding soil plus the following components: woodchip filled pit, two water control structures (to allow management of the flow rate and free water elevation within the bioreactor), and piping to convey water to and from the bioreactor. The approximate bioreactor excavated pit volume is 333 cubic yards (e.g. 6 feet deep, 15 feet wide and 100 feet long). Woodchips occupy the 6 feet of the pit plus 10% crowned (366 cu. yd.) and will be mounded above ground level to shed precipitation. A geotextile fabric (or PE material) surrounds the chips to prevent migration of soil into the pit. Water control structures should be installed using practice standard (587) Structure for Water Control. Two inline water control structures are in place. Upper WCS connected to the upper 6" diameter single-wall CPT manifold pipe (15' each, note that 6' HDPE dual wall is the only type available and used in the scenario components) by 6" diameter dual wall pipe (20' each). 20' of 6" dual wall pipe connects the downstream manifold to the lower WCS which is connected back to the main with additional 20' of 6" dual wall pipe. Flow rates are dependent upon the availability of drainage water from the 10' drainage mainline. 40' of mainline is replaced with non-perforated 10' above and below the upper WCS. The soil excavated from the pit is spoiled onto the nearby field. Associated practices: Subsurface Drain (606), Structure for Water Control (587), Drainage Water Management (554).

Feature Measure: Volume of Pit excavation

Scenario Unit: Cubic Yards

Scenario Typical Size: 333.0

Scenario Total Cost: $25,592.14

Scenario Cost/Unit: $76.85

Cost Details:

Component Name	ID	Description	Unit	Cost	QTY	Total
Equipment Installation						
Geotextile, woven	42	Woven Geotextile Fabric. Includes materials, equipment and labor	Square Yard	$1.33	807	$1,073.31
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 Yards	$2.31	333	$769.23
Earthfill, Dumped and Spread	51	Earthfill, dumped and spread without compaction effort, includes equipment and labor	Cubic Yards	$3.81	333	$1,268.73
Skidsteer, 80 HP	933	Skidsteer loader with horsepower range of 60 to 90. Equipment and power unit costs. Labor not included.	Hours	$55.01	8	$440.08
Aggregate, Wood Chips	1098	Includes materials, equipment and labor	Cubic Yards	$48.86	366	$17,882.76
Trenching, Earth, 24 in. x 60 in.	1460	Trenching, earth, 24 inch wide x 60 inch depth, includes equipment and labor for trenching and backfilling.	Feet	$3.54	50	$177.00
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.	Hours	$27.56	16	$440.96
Materials						
Pipe, HDPE, 6 in., CPT, Single Wall	1242	Pipe, Corrugated Plastic Tubing, Single Wall, 6 inch diameter - ASTM F405. Material cost only.	Feet	$1.17	90	$105.30
Water Level Control Structure, Inline, 2 Baffle, 10 in. diameter	2021	Inline Inlet WCS 6' High x 10 in. Dia.connections , 2 baffle (3 compartments)	Each	$1,412.71	1	$1,412.71
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	$310.62	1	$310.62
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	$12.37	60	$742.20
Pipe, HDPE, CPT, Double Wall, Water Tight, 10 in.	2204	Pipe, Corrugated HDPE Double Wall 10 inch diameter with water tight joints meeting ASTM F477. Material cost only.	Feet	$7.15	40	$286.00

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	$171.94	1	$171.94
Mobilization, medium equipment	1139	Equipment with 70-150 HP or typical weights between 14,000 and 30,000 pounds.	Each	$255.65	2	$511.30

Practice: 605 - Denitrifying Bioreactor

Scenario: #10 - Denitrifying Bioreactor, No Liner

Scenario Description:

"Scenario describes a structure containing a carbon source installed to intercept subsurface drain (tile) flow or ground water, and reduce the concentration of nitrate-nitrogen. Woodchips serve as the carbon source necessary to the denitrification process. This bioreactor has the following components: woodchip filled pit, a soil cover, two water control structures (to allow management of the flow rate and free water elevation within the bioreactor), and piping to convey water to and from the bioreactor. Woodchips serve as the carbon source necessary to the denitrification process. Associated practices: Subsurface Drain (606), Structure for Water Control (587), Drainage Water Management (554). Resource concern: Water Quality Degradation - Excess nutrients in surface and ground waters. Management and maintenance of the bioreactor (including chip replenishment), as well as monitoring and reporting to demonstrate the performance of the practice are not included in this scenario.

Before Situation:

Before the installation, the subsurface drainage system is contributing nitrates to a surface water source (ditch or stream), high nitrates are a resource concern to the receiving water, and it is feasible to install a bioreactor to reduce the nitrate load from drainage outflows.

After Situation:

Bioreactor has the following components: woodchip filled pit, a soil cover, two water control structures (to allow management of the flow rate and free water elevation within the bioreactor), and piping to convey water to and from the bioreactor. The approximate bioreactor excavated pit volume is 333 cubic yards (e.g. 6 feet deep, 15 feet wide and 100 feet long). Woodchips occupy the lower 4 feet of the pit (222 cu. yd.) and a soil blanket over the woodchips is 2.0 ft. and will be mounded above ground level to shed precipitation. A geotextile fabric (or PE material) surrounds the chips to prevent migration of soil into the pit. Water control structures should be installed using practice standard (587) Structure for Water Control. Two inline water control structures are in place. Upper WCS connected to the upper 6' diameter single-wall CPT manifold pipe (15' each, note that 6' HDPE dual wall is the only type available and used in the scenario components) by 6' diameter dual wall pipe (20' each). 20' of 6' dual wall pipe connects the downstream manifold to the lower WCS which is connected back to the main with additional 20' of 6' dual wall pipe. Flow rates are dependent upon the availability of drainage water from the 10' drainage mainline. 40' of mainline is replaced with non-perforated 10' above and below the upper WCS. The soil excavated from the pit is spoiled onto the nearby field. Associated practices: Subsurface Drain (606), Structure for Water Control (587), Drainage Water Management (554).

Feature Measure: Volume of Carbon Source

Scenario Unit: Cubic Yards

Scenario Typical Size: 222.0

Scenario Total Cost: $16,536.18

Scenario Cost/Unit: $74.49

Cost Details:

Component Name	ID	Description	Unit	Cost	QTY	Total
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 Yards	$2.31	333	$769.23
Earthfill, Dumped and Spread	51	Earthfill, dumped and spread without compaction effort, includes equipment and labor	Cubic Yards	$3.81	200	$762.00
Aggregate, Wood Chips	1098	Includes materials, equipment and labor	Cubic Yards	$48.86	222	$10,846.92
Trenching, Earth, 24 in. x 60 in.	1460	Trenching, earth, 24 inch wide x 60 inch depth, includes equipment and labor for trenching and backfilling.	Feet	$3.54	50	$177.00
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.	Hours	$27.56	16	$440.96
Materials						
Pipe, HDPE, 6 in., CPT, Single Wall	1242	Pipe, Corrugated Plastic Tubing, Single Wall, 6 inch diameter - ASTM F405. Material cost only.	Feet	$1.17	90	$105.30
Water Level Control Structure, Inline, 2 Baffle, 10 in. diameter	2021	Inline Inlet WCS 6' High x 10 in. Dia.connections , 2 baffle (3 compartments)	Each	$1,412.71	1	$1,412.71
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	$310.62	1	$310.62
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	$12.37	60	$742.20
Pipe, HDPE, CPT, Double Wall, Water Tight, 10 in.	2204	Pipe, Corrugated HDPE Double Wall 10 inch diameter with water tight joints meeting ASTM F477. Material cost only.	Feet	$7.15	40	$286.00
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	$171.94	1	$171.94
Mobilization, medium equipment	1139	Equipment with 70-150 HP or typical weights between 14,000 and 30,000 pounds.	Each	$255.65	2	$511.30

Practice: 606 - Subsurface Drain

Scenario: #1 - Corrugated Plastic Pipe (CPP), Single-Wall, <= 6 inch (No Gravel)

Scenario Description:

Description: Below ground installation of perforated HDPE (Corrugated Plastic Pipe) pipeline, using a backhoe. HDPE (CPP) Single-Wall is manufactured in sizes (nominal diameter) from 3-inch to 24-inch; typical practice sizes range from 3-inch to 12-inch; and typical scenario size is 6-inch. Construct 1,000 feet of 6-inch, Single-Wall, perforated HDPE Corrugated Plastic Pipe (CPP), installed below ground to a minimum depth 5 feet. The unit is in length of pipe. The typical number of mainline connections for 1,000 feet of subsurface drainline is ~ 2 each. Resource Concerns: Excess Water (Seasonal High Water Table); Degraded Plant Condition; Water Quality Degradation (Nutrients). Associated Practices: 608 - Surface Drain, Main or Lateral; 587 - Structure for Water Control, 533 - Pumping Plant; 606- Underground Outlet, and 554 - Drainage Water Management.

Before Situation:

Before installation 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 (seed bed preparation, planting, etc.).

After Situation:

The drainage modifications result in reduced plant stress due to excessive wetness caused by a seasonal high water table, or improved drainage water quality due to system retrofit enabling drainage water management.

Feature Measure: Length of pipe

Scenario Unit: Feet

Scenario Typical Size: 1,000.0

Scenario Total Cost: $4,060.21

Scenario Cost/Unit: $4.06

Cost Details:

Component Name	ID	Description	Unit	Cost	QTY	Total
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 Yards	$2.31	703	$1,623.93
Compaction, earthfill, vibratory plate	1260	Compaction of earthfill with a walk behind vibratory plate compactor in typical 6-8 inch thick lifts, 2 passes. Includes equipment and labor.	Cubic Yards	$2.21	333	$735.93
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.	Hours	$27.56	8	$220.48
Materials						
Pipe, HDPE, 6 in., CPT, Single Wall	1242	Pipe, Corrugated Plastic Tubing, Single Wall, 6 inch diameter - ASTM F405. Material cost only.	Feet	$1.17	1000	$1,170.00
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	$27.11	2	$54.22
Mobilization						
Mobilization, medium equipment	1139	Equipment with 70-150 HP or typical weights between 14,000 and 30,000 pounds.	Each	$255.65	1	$255.65

Practice: 606 - Subsurface Drain

Scenario: #2 - Corrugated Plastic Pipe (CPP), Single-Wall, <= 6 inch (with 1'x2' Env.of Gravel)

Scenario Description:

Description: Below ground installation of perforated HDPE (Corrugated Plastic Pipe) pipeline with Sand-Gravel envelope, using a or backhoe. HDPE (CPP) Single-Wall is manufactured in sizes (nominal diameter) from 3-inch to 24-inch; typical practice sizes range from 3-inch to 12-inch; and typical scenario size is 6-inch. Construct 1,000 feet of 6-inch, Single-Wall, perforated HDPE Corrugated Plastic Pipe (CPP), installed below ground to a minimum depth of 5 feet, and surrounded with a sand-gravel envelope lined with geotextile. The unit is in length of pipe. The typical volume sand-gravel for 1,000 feet of 2'wide x 12" high envelope is 74 cubic yards. The typical number of mainline connections for 1,000 feet of subsurface drainline is a total of 2 each. Resource Concerns: Excess Water (seasonal High Water Table); Degraded Plant Condition; Water Quality Degradation (Nutrients). Associated Practices: 608 - Surface Drain, Main or Lateral; 587 - Structure for Water Control, 533 - Pumping Plant; 606-Underground Outlet, and 554 - Drainage Water Management.

Before Situation:

Before installation 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 (seed bed preparation, planting, etc.).

After Situation:

The drainage modifications result in reduced plant stress due to excessive wetness caused by a seasonal high water table, or improved drainage water quality due to system retrofit enabling drainage water management.

Feature Measure: length of pipe

Scenario Unit: Feet

Scenario Typical Size: 1,000.0

Scenario Total Cost: $8,373.15

Scenario Cost/Unit: $8.37

Cost Details:

Component Name	ID	Description	Unit	Cost	QTY	Total
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 Yards	$2.31	666	$1,538.46
Compaction, earthfill, vibratory plate	1260	Compaction of earthfill with a walk behind vibratory plate compactor in typical 6-8 inch thick lifts, 2 passes. Includes equipment and labor.	Cubic Yards	$2.21	296	$654.16
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.	Hours	$27.56	8	$220.48
Materials						
Aggregate, Gravel, Graded	46	Gravel, includes materials, equipment and labor to transport and place. Includes washed and unwashed gravel.	Cubic Yards	$45.42	74	$3,361.08
Geotextile, non-woven, heavy weight	1210	Non-woven greater than 8 ounce/square yard geotextile with staple anchoring. Materials and shipping only.	Square Yard	$1.55	722	$1,119.10
Pipe, HDPE, 6 in., CPT, Single Wall	1242	Pipe, Corrugated Plastic Tubing, Single Wall, 6 inch diameter - ASTM F405. Material cost only.	Feet	$1.17	1000	$1,170.00
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	$27.11	2	$54.22
Mobilization						
Mobilization, medium equipment	1139	Equipment with 70-150 HP or typical weights between 14,000 and 30,000 pounds.	Each	$255.65	1	$255.65

Practice: 606 - Subsurface Drain

Scenario: #3 - Corrugated Plastic Pipe (CPP), Single-Wall, <= 6 inch, 10 feet deep (with 1'x2' Env. of Gravel)

Scenario Description:

Description: Below ground installation of perforated HDPE (Corrugated Plastic Pipe) pipeline with Sand-Gravel envelope, using a backhoe. HDPE (CPP) Single-Wall is manufactured in sizes (nominal diameter) from 3-inch to 24-inch; typical practice sizes range from 3-inch to 12-inch; and typical scenario size is 6-inch. Construct 1,000 feet of 6-inch, Single-Wall, perforated HDPE Corrugated Plastic Pipe (CPP), installed below ground to a depth of 10 feet, and surrounded with a sand-gravel envelope. The unit is in length of pipe. The typical volume sand-gravel for 1,000 feet of 2'wide x 12" high envelope is 74 cubic yards. The typical number of mainline connections for 1,000 feet of subsurface drainline is a total of 2 each. Resource Concerns: Excess Water (seasonal High Water Table); Degraded Plant Condition; Water Quality Degradation (Nutrients). Associated Practices: 608 - Surface Drain, Main or Lateral; 587 - Structure for Water Control, 533 - Pumping Plant; 606-Underground Outlet, and 554 - Drainage Water Management.

Before Situation:

Before installation 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 (seed bed preparation, planting, etc.).

After Situation:

The drainage modifications result in reduced plant stress due to excessive wetness caused by a seasonal high water table, or improved drainage water quality due to system retrofit enabling drainage water management.

Feature Measure: length of pipe

Scenario Unit: Feet

Scenario Typical Size: 1,000.0

Scenario Total Cost: $13,377.18

Scenario Cost/Unit: $13.38

Cost Details:

Component Name	ID	Description	Unit	Cost	QTY	Total
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 Yards	$2.31	2111	$4,876.41
Compaction, earthfill, vibratory plate	1260	Compaction of earthfill with a walk behind vibratory plate compactor in typical 6-8 inch thick lifts, 2 passes. Includes equipment and labor.	Cubic Yards	$2.21	1000	$2,210.00
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.	Hours	$27.56	12	$330.72
Materials						
Aggregate, Gravel, Graded	46	Gravel, includes materials, equipment and labor to transport and place. Includes washed and unwashed gravel.	Cubic Yards	$45.42	74	$3,361.08
Geotextile, non-woven, heavy weight	1210	Non-woven greater than 8 ounce/square yard geotextile with staple anchoring. Materials and shipping only.	Square Yard	$1.55	722	$1,119.10
Pipe, HDPE, 6 in., CPT, Single Wall	1242	Pipe, Corrugated Plastic Tubing, Single Wall, 6 inch diameter - ASTM F405. Material cost only.	Feet	$1.17	1000	$1,170.00
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	$27.11	2	$54.22
Mobilization						
Mobilization, medium equipment	1139	Equipment with 70-150 HP or typical weights between 14,000 and 30,000 pounds.	Each	$255.65	1	$255.65

Practice: 606 - Subsurface Drain

Scenario: #4 - Corrugated Plastic Pipe (CPP), Single-Wall, >= 8 inch (No Gravel)

Scenario Description:

Description: Below ground installation of HDPE (Corrugated Plastic Pipe) pipeline, using a backhoe. HDPE (CPP) Single-Wall is manufactured in sizes (nominal diameter) from 3-inch to 24-inch; typical practice sizes range from 3-inch to 12-inch; and typical scenario size is 10-inch. Construct 1,000 feet of 10-inch, Single-Wall, HDPE Corrugated Plastic Pipe (CPP), installed below ground to a minimum depth 5 feet. The unit is in length of pipe of pipe in feet. Resource Concerns: Excess Water (Seasonal High Water Table); Degraded Plant Condition; Water Quality Degradation (Nutrients). Associated Practices: 607 - Surface Drain, Field Ditch; 608 - Surface Drain, Main or Lateral; 587 - Structure for Water Control, 533 - Pumping Plant; and 554 - Drainage Water Management.

Before Situation:

Before installation 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 (seed bed preparation, planting, etc.).

After Situation:

The drainage modifications result in reduced plant stress due to excessive wetness caused by a seasonal high water table, or improved drainage water quality due to system retrofit enabling drainage water management.

Feature Measure: Length of Pipe

Scenario Unit: Feet

Scenario Typical Size: 1,000.0

Scenario Total Cost: $14,422.61

Scenario Cost/Unit: $14.42

Cost Details:

Component Name	ID	Description	Unit	Cost	QTY	Total
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 Yards	$2.31	740	$1,709.40
Compaction, earthfill, vibratory plate	1260	Compaction of earthfill with a walk behind vibratory plate compactor in typical 6-8 inch thick lifts, 2 passes. Includes equipment and labor.	Cubic Yards	$2.21	278	$614.38
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.	Hours	$27.56	8	$220.48
Materials						
Aggregate, Gravel, Graded	46	Gravel, includes materials, equipment and labor to transport and place. Includes washed and unwashed gravel.	Cubic Yards	$45.42	185	$8,402.70
Pipe, HDPE, 10 in., PCPT, Single Wall	1273	Pipe, Corrugated Plastic Tubing, Single Wall, Perforated, 10 inch diameter - ASTM F667. Material cost only.	Feet	$3.22	1000	$3,220.00
Mobilization						
Mobilization, medium equipment	1139	Equipment with 70-150 HP or typical weights between 14,000 and 30,000 pounds.	Each	$255.65	1	$255.65

Practice: 606 - Subsurface Drain

Scenario: #5 - Corrugated Plastic Pipe (CPP), Twin-Wall, >= 8 inch (with 2'x3' Env. of Gravel)

Scenario Description:

Description: Below ground installation of HDPE (Corrugated Plastic Pipe) pipeline, using a backhoe. HDPE (CPP) Twin-Wall is manufactured in sizes (nominal diameter) from 4-inch to 60-inch; typical practice sizes range from 8-inch to 15-inch; and typical scenario size is 12-inch. Construct 1,000 feet of 12-inch, Twin-Wall, HDPE Corrugated Plastic Pipe (CPP), installed below ground to a minimum depth 5 feet. The unit is in length of pipe in feet. Resource Concerns: Excess Water (Seasonal High Water Table); Degraded Plant Condition; Water Quality Degradation (Nutrients). Associated Practices: 607 - Surface Drain, Field Ditch; 608 - Surface Drain, Main or Lateral; 587 - Structure for Water Control, 533 - Pumping Plant; and 554 - Drainage Water Management.

Before Situation:

Before installation 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 (seed bed preparation, planting, etc.).

After Situation:

The drainage modifications result in reduced plant stress due to excessive wetness caused by a seasonal high water table, or improved drainage water quality due to system retrofit enabling drainage water management.

Feature Measure: length of pipe

Scenario Unit: Feet

Scenario Typical Size: 1,000.0

Scenario Total Cost: $21,954.58

Scenario Cost/Unit: $21.95

Cost Details:

Component Name	ID	Description	Unit	Cost	QTY	Total
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 Yards	$2.31	888	$2,051.28
Compaction, earthfill, vibratory plate	1260	Compaction of earthfill with a walk behind vibratory plate compactor in typical 6-8 inch thick lifts, 2 passes. Includes equipment and labor.	Cubic Yards	$2.21	333	$735.93
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.	Hours	$27.56	8	$220.48
Materials						
Aggregate, Gravel, Graded	46	Gravel, includes materials, equipment and labor to transport and place. Includes washed and unwashed gravel.	Cubic Yards	$45.42	222	$10,083.24
Pipe, HDPE, corrugated double wall, LTE-12 in., soil tight, weight priced	1587	High Density Polyethylene (HDPE) compound manufactured into double wall corrugated pipe LTE-12 inch diameter. Materials only.	Pound	$2.69	3200	$8,608.00
Mobilization						
Mobilization, medium equipment	1139	Equipment with 70-150 HP or typical weights between 14,000 and 30,000 pounds.	Each	$255.65	1	$255.65

Practice: 606 - Subsurface Drain

Scenario: #8 - 6 inch Footing Drain w/ Geotextile Fabric

Scenario Description:

Description: Below ground installation of 4" Perf PVC or 6 inch Perf corrugated plastic pipe to improve soil drainage. PVC installed where greater strength is needed under high traffic areas; in locations where replacement may be difficult; both installed in conjunction with other structural conservation practices to remove excess water and ensure proper function of that practice. Pipe usually installed in a crushed stone envelope, w/ geotextile around base of structure. All excavation is included in other associated practice(s). Resource Concerns: Excess Water (Seasonal High Water Table); Water Quality Degradation (Nutrients). Per practice it supports. Associated Practices: 607 - Surface Drain, Field Ditch; 608 - Surface Drain, Main or Lateral; 587 - Structure for Water Control, 533 - Pumping Plant; 606 Underground Outlet, 313 Waste Storage Facility, and 554 - Drainage Water Management.

Before Situation:

Before installation soil conditions are excessively wet due to poor internal soil drainage. Excess soil water threatens stability/functionality of proposed conservation practice.

After Situation:

The drainage modifications result in improved drainage of groundwater to ensure function and longevity of supporting practice.

Feature Measure: length of pipe

Scenario Unit: Feet

Scenario Typical Size: 100.0

Scenario Total Cost: $1,036.46

Scenario Cost/Unit: $10.36

Cost Details:

Component Name	ID	Description	Unit	Cost	QTY	Total
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.	Hours	$27.56	4	$110.24
Materials						
Aggregate, Gravel, Graded	46	Gravel, includes materials, equipment and labor to transport and place. Includes washed and unwashed gravel.	Cubic Yards	$45.42	15	$681.30
Geotextile, non-woven, light weight	1209	Non-woven less than 8 ounce/square yard geotextile with staple anchoring. Materials and shipping only.	Square Yard	$1.64	78	$127.92
Pipe, HDPE, 6 in., CPT, Single Wall	1242	Pipe, Corrugated Plastic Tubing, Single Wall, 6 inch diameter - ASTM F405. Material cost only.	Feet	$1.17	100	$117.00

Practice: 606 - Subsurface Drain

Scenario: #13 - Curtain Drain <= 4 Feet Deep

Scenario Description:

This scenario consist of the installation of a curtain drain. Typical scenario is a 6 inch HDPE Perforated Corrugated Plastic Pipe is installed in a trench 4 feet deep by 3 feet wide by 200 feet long. The trench is backfilled with clean stone or gravel over the pipe. The volume of trench excavation and clean gravel is 90 CY (neat line volume). Resource Concerns: Excess Water (Seasonal High Water Table); Degraded Plant Conditions; Water Quality Degradation (Nutrients) Associated Practices: 608- Surface Drain, Main or Lateral; 587 - Structure for Water Control; 533 - Pumping Plant; 620 - Underground Outlet; and 554 - Drainage Water Management

Before Situation:

Before installation 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 (seed bed preparation, planting, etc.). Also, excess ground water and saturated soils impedes the installation and proper function of other conservation practices, i.e. waste storage facility, grassed waterway, etc.

After Situation:

The drainage modifications results in reduced plant stress due to excessive wetness caused by seasonal high water table, or improved drainage water quality due to the system retrofit enabling drainage water management. Also allows other conservation practices such as waste storage facility, grassed waterway, etc. to operate and function properly.

Feature Measure: Length of Pipe

Scenario Unit: Linear Feet

Scenario Typical Size: 200.0

Scenario Total Cost: $6,470.40

Scenario Cost/Unit: $32.35

Cost Details:

Component Name	ID	Description	Unit	Cost	QTY	Total
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.	Hours	$109.36	4	$437.44
Track Loader, 95HP	935	Equipment and power unit costs. Labor not included.	Hours	$90.71	6	$544.26
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.	Hours	$27.56	10	$275.60
Equipment Operators, Heavy	233	Includes: Cranes, Hydraulic Excavators >=50 HP, Dozers, Paving Machines, Rock Trenchers, Trenchers >=12 in., Dump Trucks, Ag Equipment >=150 HP, Scrapers, Water Wagons.	Hours	$38.00	10	$380.00
Materials						
Aggregate, Gravel, Graded	46	Gravel, includes materials, equipment and labor to transport and place. Includes washed and unwashed gravel.	Cubic Yards	$45.42	90	$4,087.80
Pipe, HDPE, 6 in., CPT, Single Wall	1242	Pipe, Corrugated Plastic Tubing, Single Wall, 6 inch diameter - ASTM F405. Material cost only.	Feet	$1.17	200	$234.00
Mobilization						
Mobilization, medium equipment	1139	Equipment with 70-150 HP or typical weights between 14,000 and 30,000 pounds.	Each	$255.65	2	$511.30

Practice: 606 - Subsurface Drain

Scenario: #14 - Curtain Drain > 4 Feet Deep

Scenario Description:

This scenario consist of the installation of a curtain drain. Typical scenario is a 6 inch HDPE Perforated Corrugated Plastic Pipe (Optional) is installed in a trench 8 feet deep by 3 feet wide by 200 feet long. The trench is backfilled with clean stone or gravel over the pipe. The volume of trench excavation and clean gravel is 180 CY (neat line volume). This scenario assumes that trench access by laborers is not necessary. NO additional cost is included for shoring, trench box, benching or sloping of trench side slopes, etc. Resource Concerns: Excess Water (Seasonal High Water Table); Degraded Plant Conditions; Water Quality Degradation (Nutrients) Associated Practices: 608-Surface Drain, Main or Lateral; 587 - Structure for Water Control; 533 - Pumping Plant; 620 - Underground Outlet; and 554 - Drainage Water Management

Before Situation:

Before installation 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 (seed bed preparation, planting, etc.). Also, excess ground water and saturated soils impedes the installation and proper function of other conservation practices, ie. waste storage facility, grassed water way, etc.

After Situation:

The drainage modifications results in reduced plant stress due to excessive wetness caused by seasonal high water table, or improved drainage water quality due to the system retrofit enabling drainage water management. Also allows other conservation practices such as waste storage facility, grassed waterway, etc. to operate and function properly.

Feature Measure: Length of Pipe

Scenario Unit: Linear Feet

Scenario Typical Size: 200.0

Scenario Total Cost: $12,545.34

Scenario Cost/Unit: $62.73

Cost Details:

Component Name	ID	Description	Unit	Cost	QTY	Total
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.	Hours	$109.36	10	$1,093.60
Track Loader, 95HP	935	Equipment and power unit costs. Labor not included.	Hours	$90.71	12	$1,088.52
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.	Hours	$27.56	22	$606.32
Equipment Operators, Heavy	233	Includes: Cranes, Hydraulic Excavators >=50 HP, Dozers, Paving Machines, Rock Trenchers, Trenchers >=12 in., Dump Trucks, Ag Equipment >=150 HP, Scrapers, Water Wagons.	Hours	$38.00	22	$836.00
Materials						
Aggregate, Gravel, Graded	46	Gravel, includes materials, equipment and labor to transport and place. Includes washed and unwashed gravel.	Cubic Yards	$45.42	180	$8,175.60
Pipe, HDPE, 6 in., CPT, Single Wall	1242	Pipe, Corrugated Plastic Tubing, Single Wall, 6 inch diameter - ASTM F405. Material cost only.	Feet	$1.17	200	$234.00
Mobilization						
Mobilization, medium equipment	1139	Equipment with 70-150 HP or typical weights between 14,000 and 30,000 pounds.	Each	$255.65	2	$511.30

Practice: 607 - Surface Drain, Field Ditch

Scenario: #3 - Field Drainage Ditch

Scenario Description:

This scenario is the construction of a surface drain, field ditch. Typical construction dimensions are 4' bottom x 2.5' deep x 1320' length with a side slope of 3:1. Excess water is either reused in an Irrigation System, Tailwater Recovery (447) system, or conveyed to a receiving water body. Resource concerns: Excess/Insufficient Water - Inefficient Use of Irrigation Water and Water Quality Degradation - Excessive Sediment in Surface Waters. Associated Conservation Practices: 608-Surface Drain, Main or Lateral; 587 -Structure For Water Control; 554 - Drainage Water Management

Before Situation:

Excess water has no outlet and backs up into the fields causing damage or loss of the crop.

After Situation:

An earthen ditch that follows the natural slope of the land at the low end of the field will be constructed to carry excess water to an outlet.

Feature Measure: Volume of Earth Excavated

Scenario Unit: Cubic Yards

Scenario Typical Size: 1,406.0

Scenario Total Cost: $3,591.74

Scenario Cost/Unit: $2.55

Cost Details:

Component Name	ID	Description	Unit	Cost	QTY	Total
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 Yards	$2.31	1406	$3,247.86
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	$171.94	2	$343.88

Practice: 612 - Tree/Shrub Establishment

Scenario: #1 - Hardwood Hand Planting-bare root-protected

Scenario Description:

Improving the hardwood forest setting by hand planting hardwood tree seedlings. Seedlings are protected from deer browsing. The number of trees to plant is lower than establishing a new forest. Resource concerns are degraded plant condition - undesireable productivity and health, and Inadequate structure and composition; inadequate habitat for fish and wildlife - habitat degradation.

Before Situation:

In an existing upland forest the present trees are poor quality, at low stocking levels, or are undesirable species. Existing conditions do not meet landonwer objectives of growing high quality trees. Wildlife habitat is poor due to the above described conditions. Resource concerns are degrade plant condition - undesireable productivity and health, and Inadequate structure and composition; inadequate habitat for fish and wildlife - habitat degradation. Prior to planting any needed vegetation control will be conducted first.

After Situation:

The area of treatment is 10 acres. Bare root hardwood seedlings are planted by hand in the best locations for seedling survival. Solid tree tubes are installed to protect seedlings from animal browsing damage. Post planting vegetation control is planned to ensure seedling survival.

Feature Measure: Area of Treatment

Scenario Unit: Acres

Scenario Typical Size: 10.0

Scenario Total Cost: $6,352.21

Scenario Cost/Unit: $635.22

Cost Details:

Component Name	ID	Description	Unit	Cost	QTY	Total
Equipment Installation						
Truck, Pickup	939	Equipment and power unit costs. Labor not included.	Hours	$24.18	25	$604.50
All terrain vehicles, ATV	965	Includes equipment, power unit and labor costs.	Hours	$21.14	25	$528.50
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.	Hours	$8.19	25	$204.75
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.	Hours	$11.47	50	$573.50
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.	Hours	$14.01	25	$350.25
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.	Hours	$27.56	50	$1,378.00
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.	Hours	$46.88	4	$187.52
Materials						
Shrub, Seedling, Large	1508	Bare root shrub seedling, 36 to 60 inches tall; includes tropical containerized seedlings larger than 20 cubic inches. Includes materials and shipping only.	Each	$2.82	300	$846.00
Tree shelter, solid tube type, 4 in. x 48 in.	1566	4 inch x 48 inch tree tube for protection from animal damage. Materials only.	Each	$4.22	300	$1,266.00
Planting gel, polymer	1576	Polymer planting gel that retains water around seedling roots. Materials only.	Pound	$10.25	1	$10.25
Stakes, wood, 3/4 in. x 3/4 in. x 36 in.	1581	3/4 in. x 3/4 in. x 36 in. wood stakes to fasten items in place. Includes materials only.	Each	$0.77	300	$231.00
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	$171.94	1	$171.94

Practice: 612 - Tree/Shrub Establishment

Scenario: #2 - Hardwood Planting 1 gal pots

Scenario Description:

Hardwood seedlings (potted) to be planted to restablish an upland hardwood forest. Planting will be by hand. The resource setting is an area that historically was an upland hardwood forest. Resource concerns are degrade plant condition - undesireable productivity and health, and Inadequate structure and composition; inadequate habitat for fish and wildlife.

Before Situation:

The native forest that has been removed and the land is either row cropped, grazed or hayed or brushy forest. If any upland trees exist they are poor quality tree or undesirable species. Terrain is gently to moderately sloping with soil erosion-sheet and rill ocurring.

After Situation:

The area of treatment is 2 acres. Potted/containerized hardwood seedlings are planted by hand. Post vegetation control should be evaluated and conducted it necessary.

Feature Measure: Area of Treatment

Scenario Unit: Acres

Scenario Typical Size: 2.0

Scenario Total Cost: $12,831.72

Scenario Cost/Unit: $6,415.86

Cost Details:

Component Name	ID	Description	Unit	Cost	QTY	Total
Equipment Installation						
Truck, Pickup	939	Equipment and power unit costs. Labor not included.	Hours	$24.18	50	$1,209.00
All terrain vehicles, ATV	965	Includes equipment, power unit and labor costs.	Hours	$21.14	50	$1,057.00
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.	Hours	$8.19	50	$409.50
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.	Hours	$11.47	100	$1,147.00
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.	Hours	$27.56	100	$2,756.00
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.	Hours	$46.88	6	$281.28
Materials						
Tree, Hardwood, Potted, Small	1529	Potted hardwood seedling, 1 quart to 1 gallon. Includes materials and shipping only.	Each	$7.78	600	$4,668.00
Tree shelter, solid tube type, 3-1/4 in. x 30 in.	1560	3-1/4 inch x 30 inch tree tube for protection from animal damage. Materials only.	Each	$1.72	600	$1,032.00
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.	Dollars	$1.00	100	$100.00
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	$171.94	1	$171.94

Practice: 612 - Tree/Shrub Establishment

Scenario: #3 - Hardwood Est.-Direct Seeding

Scenario Description:

Native seed (acorns, nuts, etc) from natvie tree species are directly planted in the soil. Site preparation is completed (discing to eliminate competing vegetation). The native seed are collected/purchased locally so as to get trees known to be adapted to local conditions. Resource concerns are degraded plant condition, inadequate habitat for fish and widllife.

Before Situation:

The hardwood forest is degrading. High value species, lumber and widlife habitat, are not regenerating due to changes in the natural disturbance regime or past harvesting. Unwanted shade tolerant tree species have regenerated and are in the overstory competing with desirable species as well as in the mid and understory where they will eventually out-compete with desirable species.

After Situation:

Seed from native species are collected or purchased and planted at prescribed rates. Site preparation is done prior to direct seeding. Degraded plant condition is on an upward trend and habitat for wildlife will improve.

Feature Measure: Area of Treatment

Scenario Unit: Acres

Scenario Typical Size: 2.0

Scenario Total Cost: $1,633.78

Scenario Cost/Unit: $816.89

Cost Details:

Component Name	ID	Description	Unit	Cost	QTY	Total
Equipment Installation						
Truck, Pickup	939	Equipment and power unit costs. Labor not included.	Hours	$24.18	12	$290.16
All terrain vehicles, ATV	965	Includes equipment, power unit and labor costs.	Hours	$21.14	12	$253.68
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.	Hours	$8.19	12	$98.28
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.	Hours	$11.47	12	$137.64
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.	Hours	$27.56	12	$330.72
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.	Hours	$46.88	3	$140.64
Materials						
Trees and shrubs, seed	1871	Tree or shrub seed, e.g., acorns, to establish trees. Includes materials and shipping only.	Pound	$8.78	24	$210.72
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	$171.94	1	$171.94

Practice: 612 - Tree/Shrub Establishment

Scenario: #4 - Plant Small Areas/Quantities

Scenario Description:

Trees and shrubs are planted to improve habitat and the successional process. Trees and shrubs are planted in an upland or wetland setting. The resource concerns are insufficient cover/shelter and insufficient food for wildlife. Small quantities of trees and shrubs are needed to plant portions of fields to meet habitat and food needs.

Before Situation:

Old fields or other open areas lack sufficient cover/shelter and food for species of concern. There is a lack of native woody cover and the open areas are dominated by forbs and grass.

After Situation:

A 5 acre field will have portions planted to trees and shrubs in a scattered pattern equalling about an acre of planting. Small quantities of trees and shrubs, 200 stems, will need to be ordered. Larger trees and shrubs will be planted to compete better with idle area forbs and tall grasses.

Feature Measure: Area of Treatment

Scenario Unit: Acres

Scenario Typical Size: 1.0

Scenario Total Cost: $2,706.19

Scenario Cost/Unit: $2,706.19

Cost Details:

Component Name	ID	Description	Unit	Cost	QTY	Total
Equipment Installation						
Truck, Pickup	939	Equipment and power unit costs. Labor not included.	Hours	$24.18	12	$290.16
All terrain vehicles, ATV	965	Includes equipment, power unit and labor costs.	Hours	$21.14	12	$253.68
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.	Hours	$8.19	12	$98.28
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.	Hours	$11.47	12	$137.64
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.	Hours	$27.56	12	$330.72
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.	Hours	$46.88	4	$187.52
Materials						
Shrub, Seedling, Large	1508	Bare root shrub seedling, 36 to 60 inches tall; includes tropical containerized seedlings larger than 20 cubic inches. Includes materials and shipping only.	Each	$2.82	200	$564.00
Tree, Hardwood, Seedling, Large	1511	Bare root hardwood seedlings 36 to 60 inches tall; includes tropical containerized seedlings larger than 20 cubic inches. Includes materials and shipping only.	Each	$2.81	200	$562.00
Planting gel, polymer	1576	Polymer planting gel that retains water around seedling roots. Materials only.	Pound	$10.25	1	$10.25
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.	Dollars	$1.00	100	$100.00
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	$171.94	1	$171.94

Practice: 612 - Tree/Shrub Establishment

Scenario: #5 - Shrub Planting - Each

Scenario Description:

Shrubs are selected, arranged, and planted on farms to provide a more diverse habitat and to enhance cover, food (fruit, nectar, pollen, nesting sites) for pollinators that are beneficial to the crops, and other shrub-dependent wildlife. Shrub planting density is variable depending on the objective (e.g., protective cover, fruit, nectar, pollen). A typical planting footprint will be approximately half an acre, and is rectangular in shape. It will provide benefits to a much broader area than the footprint (i.e., a 25 acre field). Resource concerns are: inadequate structure and composition; inadequate habitat for fish and wildlife - habitat degradation, inadequate habitat for fish and wildlife - cover, inadequate habitat for fish and wildlife – food.

Before Situation:

On existing farm, there is insufficient food, cover and nesting opportunity for species that use shrublands for all or a significant portion of their life cycle. Existing conditions do not meet landowner objectives of creating cover, food, or nesting sites for desired pollinators and other wildlife. Resource concerns are: inadequate structure and composition; inadequate habitat for fish and wildlife - habitat degradation, inadequate habitat for fish and wildlife - cover, inadequate habitat for fish and wildlife – food.

After Situation:

On existing farm, there is now sufficient food, cover and nesting opportunity for pollinators, birds, and other species that use shrubs for all or a significant portion of their life cycle. Existing conditions now meet the landowner's objectives of creating cover, food, or nesting sites for pollinators and desired wildlife. Resource concerns are now addressed for: inadequate structure and composition; inadequate habitat for fish and wildlife - habitat degradation, inadequate habitat for fish and wildlife - cover, inadequate habitat for fish and wildlife – food.

Feature Measure: Area of Treatment

Scenario Unit: Each

Scenario Typical Size: 200.0

Scenario Total Cost: $3,785.93

Scenario Cost/Unit: $18.93

Cost Details:

Component Name	ID	Description	Unit	Cost	QTY	Total
Equipment Installation						
Truck, Pickup	939	Equipment and power unit costs. Labor not included.	Hours	$24.18	6	$145.08
All terrain vehicles, ATV	965	Includes equipment, power unit and labor costs.	Hours	$21.14	17	$359.38
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.	Hours	$8.19	17	$139.23
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.	Hours	$11.47	34	$389.98
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.	Hours	$27.56	34	$937.04
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.	Hours	$46.88	6	$281.28
Materials						
Shrub, Potted, Small	1524	Potted shrub seedling, 1 quart to 1 gallon. Includes materials and shipping only.	Each	$6.41	200	$1,282.00
Tree shelter, mesh tree tube, 24 in.	1555	24 inch tall vexar or other open weave tubular tree shelter to protect from animal damage. Materials only.	Each	$0.40	200	$80.00
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	$171.94	1	$171.94

Practice: 612 - Tree/Shrub Establishment

Scenario: #6 - Shrub Bare Root Hand Planting In Sod Grasses

Scenario Description:

This scenario is to enhance cover, food (fruit, nectar, pollen, nesting sites) for specific wildlife needs on land converted to agrigulture and currently in grass sod for shrub dependent wildlife. Shrub planting density is variable depending on the objective (e.g., protective cover, food (e.g., fruit, nectar, pollen). Resource concerns are Inadequate structure and composition; inadequate habitat for fish and wildlife - habitat degradation, inadequate habitat for fish and wildlife - cover, inadequate habitat for fish and wildlife - food. This scenario is only to be used for hand planting in sod where sod will choke out bare root seedlings; this scenario is not to be used for dibble- or mechanical-planting of shrubs in grassland, or woodland or existing cropland where grass groundcover is not a problem.

Before Situation:

In existing open grassland, there is insufficient food, cover and nesting opportunity for species that use shrublands for all or a significant portion of their life cyle. Existing conditions do not meet landonwer objectives of creating cover, food, or nesting sites for desired shrubland wildlife. Resource concerns are Inadequate structure and composition; inadequate habitat for fish and wildlife - habitat degradation, inadequate habitat for fish and wildlife - cover, inadequate habitat for fish and wildlife - food.

After Situation:

The area of treatment is 1 acre. Bare root hardwood shrub seedlings are planted by hand on a 6 x 6 spacing in a sod grass field by hand. Will require removal of sod in a 2-foot circle prior to planting bareroot seedlings to achieve adequate survival. Installationi of post-planting practice mulching or other vegetation control is needed to enhance seedling survival.

Feature Measure: <Unknown>

Scenario Unit: Each

Scenario Typical Size: 1,200.0

Scenario Total Cost: $8,236.48

Scenario Cost/Unit: $6.86

Cost Details:

Component Name	ID	Description	Unit	Cost	QTY	Total
Equipment Installation						
Truck, Pickup	939	Equipment and power unit costs. Labor not included.	Hours	$24.18	40	$967.20
All terrain vehicles, ATV	965	Includes equipment, power unit and labor costs.	Hours	$21.14	40	$845.60
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.	Hours	$8.19	40	$327.60
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.	Hours	$11.47	120	$1,376.40
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.	Hours	$27.56	120	$3,307.20
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.	Hours	$46.88	8	$375.04
Materials						
Shrub, Seedling, Small	1506	Bare root shrub seedling, 6 to 18 inches tall, includes tropical containerized seedlings less than 10 cubic inches. Includes materials and shipping only.	Each	$0.67	1200	$804.00
Planting gel, polymer	1576	Polymer planting gel that retains water around seedling roots. Materials only.	Pound	$10.25	6	$61.50
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	$171.94	1	$171.94

Practice: 612 - Tree/Shrub Establishment

Scenario: #7 - Shrub Planting

Scenario Description:

Shrubs are planted to provide a more diverse habitat. Plantings are in either uplands or bottomlands. The site lacks ground level habitat structure and diversity for widlife. Resource concern is inadequate habitat for fish and wildife - habitat fragmentation.

Before Situation:

No shrubbery vegetation, or very little, is present under the forest overstory. Wildlife species that need shrub cover are not present. An adequate stand of overstory trees is present, but it is a single level, not multi-level.

After Situation:

A 10 acre area is planted with suitable shrubs based upon shade tolerance requirements. Shrubs are not planted over the entire 10 acres. They are planted in groups or motts. The motts, more or less circular in shape, are 50 feet in diameter, with 50 shrubs planted within each mott. 4 motts are planted per acre for a total of 200 shrubs per acre. Motts are randomly established to take advantage of site conditions and shrub species being planted.

Feature Measure: Area of Treatment

Scenario Unit: Acres

Scenario Typical Size: 10.0

Scenario Total Cost: $3,993.94

Scenario Cost/Unit: $399.39

Cost Details:

Component Name	ID	Description	Unit	Cost	QTY	Total
Equipment Installation						
Truck, Pickup	939	Equipment and power unit costs. Labor not included.	Hours	$24.18	6	$145.08
All terrain vehicles, ATV	965	Includes equipment, power unit and labor costs.	Hours	$21.14	6	$126.84
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.	Hours	$8.19	6	$49.14
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.	Hours	$11.47	12	$137.64
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.	Hours	$27.56	12	$330.72
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.	Hours	$46.88	6	$281.28
Materials						
Shrub, Seedling, Small	1506	Bare root shrub seedling, 6 to 18 inches tall, includes tropical containerized seedlings less than 10 cubic inches. Includes materials and shipping only.	Each	$0.67	2000	$1,340.00
Tree shelter, mesh tree tube, 24 in.	1555	24 inch tall vexar or other open weave tubular tree shelter to protect from animal damage. Materials only.	Each	$0.40	2000	$800.00
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.	Dollars	$1.00	100	$100.00
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	$171.94	1	$171.94
Mobilization, medium equipment	1139	Equipment with 70-150 HP or typical weights between 14,000 and 30,000 pounds.	Each	$255.65	2	$511.30

Practice: 612 - Tree/Shrub Establishment

Scenario: #8 - Mostly Hardwood Hand Planting-bare root-protected

Scenario Description:

Improving a highly degraded site by hand planting tree seedlings, appropriate to the site. Seedlings are protected from deer browsing. The number of trees to plant is a minimum of 200 plants/ac. Resource concerns are degraded plant condition - undesireable productivity and health, and Inadequate structure and composition; inadequate habitat for fish and wildlife - habitat degradation.

Before Situation:

In an existing upland forest the present overstory trees are poor quality, at low stocking levels, or are undesirable species. Dense invasive species in the understory have prevented natural regeneration of native tree and shrub species. Existing conditions do not meet landowner objectives of growing high quality trees for the future. Wildlife habitat is poor due to the above described conditions. Resource concerns are degrade plant condition - undesirable productivity and health, and Inadequate structure and composition; inadequate habitat for fish and wildlife - habitat degradation. Prior to planting any needed vegetation control will be conducted first.

After Situation:

The area of treatment is 10 acres. First, the invasive species are adequately controlled under a different conservation practice. The existing overstory canopy is also treated per the forester's recommendation in order to create the optimal light conditions for the new tree seedlings. Bare root hardwood and/or softwood seedlings are planted by hand at a minimum of 200 plants/ac. The species and planting rate are recommended by a forester in the forest management plan. Solid tree tubes are installed to protect seedlings from animal browsing damage. Post planting vegetation control is planned to ensure seedling survival.

Feature Measure: Area of Treatment

Scenario Unit: Acres

Scenario Typical Size: 10.0

Scenario Total Cost: $20,197.74

Scenario Cost/Unit: $2,019.77

Cost Details:

Component Name	ID	Description	Unit	Cost	QTY	Total
Equipment Installation						
Truck, Pickup	939	Equipment and power unit costs. Labor not included.	Hours	$24.18	20	$483.60
All terrain vehicles, ATV	965	Includes equipment, power unit and labor costs.	Hours	$21.14	5	$105.70
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.	Hours	$8.19	20	$163.80
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.	Hours	$11.47	80	$917.60
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.	Hours	$27.56	80	$2,204.80
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.	Hours	$46.88	10	$468.80
Materials						
Shrub, Seedling, Large	1508	Bare root shrub seedling, 36 to 60 inches tall; includes tropical containerized seedlings larger than 20 cubic inches. Includes materials and shipping only.	Each	$2.82	2000	$5,640.00
Tree shelter, solid tube type, 4 in. x 48 in.	1566	4 inch x 48 inch tree tube for protection from animal damage. Materials only.	Each	$4.22	2000	$8,440.00
Planting gel, polymer	1576	Polymer planting gel that retains water around seedling roots. Materials only.	Pound	$10.25	6	$61.50
Stakes, wood, 3/4 in. x 3/4 in. x 36 in.	1581	3/4 in. x 3/4 in. x 36 in. wood stakes to fasten items in place. Includes materials only.	Each	$0.77	2000	$1,540.00
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	$171.94	1	$171.94

Practice: 612 - Tree/Shrub Establishment

Scenario: #78 - Individual tree - hand planting

Scenario Description:

Tree seedlings will be hand planted in the forested area where few or no forest trees are growing, the existing stand of trees needs underplanting, or the previously planted seedling tree stocking level is below desirable conditions. Wildlife habitat is degraded by loss of forest conditions. This resource concern addressed is degraded plant condition -- and inadequate structure and composition, and inadequate wildlife & fish habitat.

Before Situation:

The stocking level of the forest does not meet the minimum recommended number of trees per acre. The existing condition of the forest stand does not meet the landowners objectives. To be a viable forest additional seedlings need planting. Wildlife habitat is rated poor.

After Situation:

The prescribed number of trees are hand planted on 20 acres, and the objectives of the landowner are met. The forest will provide wildlife habitat, provide a long term ground cover, and capture atmospheric carbon.

Feature Measure: Area Planted

Scenario Unit: Each

Scenario Typical Size: 6,000.0

Scenario Total Cost: $6,086.38

Scenario Cost/Unit: $1.01

Cost Details:

Component Name	ID	Description	Unit	Cost	QTY	Total
Equipment Installation						
Truck, Pickup	939	Equipment and power unit costs. Labor not included.	Hours	$24.18	8	$193.44
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.	Hours	$11.47	10	$114.70
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.	Hours	$27.56	12	$330.72
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.	Hours	$46.88	4	$187.52
Materials						
Tree, Conifer, Seedling, Medium	1514	Containerized conifer seedlings, 8 or 10 cubic inches; or bare root conifer seedlings 1+1 (two-year old seedlings that grew one year in the original seedbed and another year in a transplant bed), or bare root seedlings 2+0 (two-year old seedlings grown in their original seedbed). Includes materials and shipping only.	Each	$0.86	6000	$5,160.00
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.	Dollars	$1.00	100	$100.00

Practice: 612 - Tree/Shrub Establishment

Scenario: #79 - Conifer seedling - hand planting - tree protection

Scenario Description:

Conifer tree seedlings will be hand planted in an area where forest is the objective. The area either lacks the desired number and species of forest trees, the existing stand will benefit from underplanting, and/or the previously planted seedling tree stocking level is below desirable conditions. Wildlife habitat will be improved by establishment of new trees. Standard forestry methods will be used to protect planted seedlings from environmental conditions. Resource concerns addressed are: Degraded Plant Condition - Inadequate structure and composition, and Inadequate wildlife & fish habitat.

Before Situation:

The stocking level does not meet the minimum recommended number of trees per acre and does not meet landowner objectives. Wildlife habitat is inadequate. Plant condition will not improve unless tree seedlings are planted. Environmental conditions are adverse to seedling survival and protection will be needed.

After Situation:

The prescribed number of trees are hand planted on 20 acres, and the objectives of the landowner are met. Seedlings are protected by tree shelters to improve survival rates. The future forest will provide wildlife habitat, long-term ground cover, and carbon sequestration/storage.

Feature Measure: Each Planted Seedling

Scenario Unit: Each

Scenario Typical Size: 6,000.0

Scenario Total Cost: $13,171.16

Scenario Cost/Unit: $2.20

Cost Details:

Component Name	ID	Description	Unit	Cost	QTY	Total
Equipment Installation						
Truck, Pickup	939	Equipment and power unit costs. Labor not included.	Hours	$24.18	4	$96.72
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.	Hours	$11.47	12	$137.64
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.	Hours	$27.56	112	$3,086.72
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.	Hours	$46.88	16	$750.08
Materials						
Tree, Conifer, Seedling, Medium	1514	Containerized conifer seedlings, 8 or 10 cubic inches; or bare root conifer seedlings 1+1 (two-year old seedlings that grew one year in the original seedbed and another year in a transplant bed), or bare root seedlings 2+0 (two-year old seedlings grown in their original seedbed). Includes materials and shipping only.	Each	$0.86	6000	$5,160.00
Tree shelter, mesh tree tube, 24 in.	1555	24 inch tall vexar or other open weave tubular tree shelter to protect from animal damage. Materials only.	Each	$0.40	6000	$2,400.00
Stake, bamboo, 3/8 in. x 36 in.	1584	3/8 in. x 36 in. bamboo stakes to anchor items in place. Inlcudes materials and shipping only.	Each	$0.12	12000	$1,440.00
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.	Dollars	$1.00	100	$100.00

Practice: 612 - Tree/Shrub Establishment

Scenario: #86 - Tree/shrub Planted Area with Protection

Scenario Description:

Tree seedlings will be hand planted in a forested area where few or no forest trees are currently growing. When implemeted with the guidance of a professional forester, a well-stocked stand of a predetermined species composition will result. Standard forestry measures are used to provide temporary protection for planted trees, to improve the liklihood of successful establishment and achieve landowner objectives for future forest stand composition. Seedlings are protected by temporary 8' high fencing materials or poly netting, designed to be moved when regeneration is established. Resource concerns include: Degraded Plant Condition - Inadequate structure and composition, Undesirable plant productivity and health, and/or Inadequate wildlife & fish habitat; and/or Water Quality Degradation - Excessive sediment in surface waters.

Before Situation:

Forest stands lack the desired species composition and/or structure, and/or have been impacted by environmental stressors and are unhealthy. Wildlife habitat is inadequate. Forest conditions do not meet landowner objectives. Environmental conditions are limiting to natural forest regeneration and establishment, and tree planting along with temporary protection will be needed. Primary resource concerns are Degraded Plant Condition - Inadequate structure and composition and Inadequate wildlife & fish habitat.

After Situation:

Trees have been successfully established on 20 acres of forest land. The regrowing forest exhibits the planned mix of diverse native tree species. The future forest will improve degraded plant condition, reduce soil erosion, establish wildlife habitat, and sequester carbon.

Feature Measure: area

Scenario Unit: Acres

Scenario Typical Size: 20.0

Scenario Total Cost: $17,524.79

Scenario Cost/Unit: $876.24

Cost Details:

Component Name	ID	Description	Unit	Cost	QTY	Total
Equipment Installation						
Truck, Pickup	939	Equipment and power unit costs. Labor not included.	Hours	$24.18	30	$725.40
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.	Hours	$10.75	30	$322.50
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.	Hours	$27.56	60	$1,653.60
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.	Hours	$27.56	8	$220.48
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.	Hours	$46.88	30	$1,406.40
Materials						
Wire, Woven, Wildlife, 96 in.	6	High Tensile 12.5 gauge, 96 inch - 330 foot roll. Includes materials and shipping only.	Each	$534.69	12	$6,416.28
Post, Wood, CCA treated, 6 in. x 12-14 ft.	13	Wood Post, Line/End 6 inch dia. X 12-14 ft., CCA Treated. Includes materials and shipping only.	Each	$31.76	30	$952.80
Post, Steel T, 1.33 lbs, 10 ft.	17	Steel Post, Studded 10 ft. - 1.33 lb. Includes materials and shipping only.	Each	$11.14	30	$334.20
Fence, Wire Assembly, Woven Wire	35	Brace pins, twist sticks, staples. Includes materials and shipping only.	Feet	$0.10	3750	$375.00
Property/Safety Signs	293	Plastic Fence safety or property sign - Printed on both sides 6 pre-drilled holes for hanging or nailing. 7.5 x 4.75 inch. Includes materials and shipping only.	Each	$1.36	38	$51.68
Gate, Game, 8 ft. High X 4 ft. Length	1082	4 Foot wide game gate (8 feet tall). Includes materials and shipping only.	Each	$214.51	1	$214.51
Tree, Hardwood, Seedling, Small	1509	Bare root hardwood seedlings 6 to 18 inches tall; includes tropical containerized seedlings of 8 cubic inches or smaller. Includes materials and shipping only.	Each	$0.78	6000	$4,680.00
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	$171.94	1	$171.94

Practice: 612 - Tree/Shrub Establishment

Scenario: #87 - Tree/Shrub Regeneration Area with Protection

Scenario Description:

Naturally regenerate a forest stand using properly timed even-aged overstory harvesting methods and necessary site preparation. When implemented with the guidance of a professional forester, such silvicultural activities result in well stocked stands representative of the natural community. Standard forestry measures are used to provide temporary protection for regenerating trees, to improve the likelihood of successful regeneration and achieve landowner objectives for future forest stand composition. Seedlings are protected by temporary 8' high fencing materials or poly netting, designed to be moved when regeneration is established. Clearing of brush and undesirable trees is not necessary. Resource concerns include: Degraded Plant Condition - Inadequate structure and composition, Undesirable plant productivity and health, and/or Inadequate wildlife & fish habitat; and/or Water Quality Degradation - Excessive sediment in surface waters.

Before Situation:

Forest stands lack the desired species composition and/or structure, and/or have been impacted by environmental stressors and are unhealthy. Wildlife habitat is inadequate. Forest conditions do not meet landowner objectives. Environmental conditions are limiting to natural forest regeneration and establishment, and temporary protection will be needed. Primary resource concerns are Degraded Plant Condition - Inadequate structure and composition and Inadequate wildlife & fish habitat.

After Situation:

Natural forest regeneration has been accomplished on 20 acres of forest land. Trees are successfully established and the forest exhibits the planned mix of diverse native tree species. The future forest will improve degraded plant condition, reduce soil erosion, establish wildlife habitat, and sequester carbon.

Feature Measure: Area of Treatment

Scenario Unit: Acres

Scenario Typical Size: 20.0

Scenario Total Cost: $8,930.33

Scenario Cost/Unit: $446.52

Cost Details:

Component Name	ID	Description	Unit	Cost	QTY	Total
Equipment Installation						
Truck, Pickup	939	Equipment and power unit costs. Labor not included.	Hours	$24.18	8	$193.44
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.	Hours	$27.56	8	$220.48
Materials						
Wire, Woven, Wildlife, 96 in.	6	High Tensile 12.5 gauge, 96 inch - 330 foot roll. Includes materials and shipping only.	Each	$534.69	12	$6,416.28
Post, Wood, CCA treated, 6 in. x 12-14 ft.	13	Wood Post, Line/End 6 inch dia. X 12-14 ft., CCA Treated. Includes materials and shipping only.	Each	$31.76	30	$952.80
Post, Steel T, 1.33 lbs, 10 ft.	17	Steel Post, Studded 10 ft. - 1.33 lb. Includes materials and shipping only.	Each	$11.14	30	$334.20
Fence, Wire Assembly, Woven Wire	35	Brace pins, twist sticks, staples. Includes materials and shipping only.	Feet	$0.10	3750	$375.00
Property/Safety Signs	293	Plastic Fence safety or property sign - Printed on both sides 6 pre-drilled holes for hanging or nailing. 7.5 x 4.75 inch. Includes materials and shipping only.	Each	$1.36	38	$51.68
Gate, Game, 8 ft. High X 4 ft. Length	1082	4 Foot wide game gate (8 feet tall). Includes materials and shipping only.	Each	$214.51	1	$214.51
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	$171.94	1	$171.94

Practice: 614 - Watering Facility

Scenario: #1 - Permanent Drinking and/or Storage up to 500 Gallons

Scenario Description:

A permanent watering facility as a means for providing controlled access to drinking water for livestock or wildlife constructed of approved materials with less than 500 gallons of capacity that stores adequate quantity and quality of water for storage or direct drinking access. The watering facility will be constructed from approved durable materials that have a life expectancy that meets or exceeds the planned useful life of the installation. The watering facility will address the resource concerns of inadequate supply of water for livestock or wildlife, habitat degradation, water quality, and undesirable plant productivity and health.

Before Situation:

This practice applies to all land uses where there is a need for a watering facility for livestock or wildlife, where there is a source of water that is adequate in quantity and quality for the purpose, and where soils and topography are suitable for a facility to provide controlled access to drinking water for livestock or wildlife to provide daily water requirements, improve animal distribution to better utilize grazing resources, provide a water source that is an alternative to a sensitive resource.

After Situation:

A permanent watering facility as a means for providing controlled access to drinking water for livestock or wildlife constructed of approved materials with less than 500 gallons of capacity, installed with all tank materials, tank plumbing and float valve, that stores adequate quantity and quality of water for storage or direct drinking access. The watering facility will be constructed from approved durable materials that have a life expectancy that meets or exceeds the planned useful life of the installation. The watering facility will address the resource concerns of inadequate supply of water for livestock or wildlife, habitat degradation, water quality, and undesirable plant productivity and health. The watering facility is placed on a properly prepared foundation with all required materials, plumbing and vegetation for stabilizing disturbed areas. All needed pipelines are installed using Livestock Pipeline (516). All collectors or catchments for collecting precipitation will be addressed by using Water Harvesting Catchment (636). Any needed water source installation will use Water Well (642), Pumping Plant (533), Spring Development (574), or Livestock Pipeline (516) as appropriate. Areas around watering facilities where animal concentrations or overflow from the watering facility will cause resource concerns will be protected by using Heavy Use Area Protection (561) as appropriate. All fencing will use Fence (382).

Feature Measure: Capacity in Gallons

Scenario Unit: Gallons

Scenario Typical Size: 250.0

Scenario Total Cost: $1,032.43

Scenario Cost/Unit: $4.13

Cost Details:

Component Name	ID	Description	Unit	Cost	QTY	Total
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 Yards	$2.31	4	$9.24
Backhoe, 80 HP	926	Wheel mounted backhoe excavator with horsepower range of 60 to 90. Equipment and power unit costs. Labor not included.	Hours	$31.96	2	$63.92
Truck, Pickup	939	Equipment and power unit costs. Labor not included.	Hours	$24.18	2	$48.36
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.	Hours	$27.56	3	$82.68
Equipment Operators, Light	232	Includes: Skid Steer Loaders, Hydraulic Excavators <50 HP, Trenchers <12 in., Ag Equipment <150 HP, Pickup Trucks, Forklifts, Mulchers	Hours	$27.87	2	$55.74
Materials						
Wildlife Escape Ramp	242	Pool size 15' x 30', for small mammals less than one pound	Each	$63.01	1	$63.01
Tank, Galvanized Steel Livestock, >75 - 300 gallon	1067	Includes tank materials and float valve	Gallons	$1.26	250	$315.00
Aggregate, Gravel, Ungraded, Quarry Run	1099	Includes materials, equipment and labor	Cubic Yards	$34.43	4	$137.72
Native Perennial Grasses, Low Density	2750	Native perennial grasses, may include a small percentage of annual species for establishment purposes and/or if allowed by the CPS. Planted at lower to medium density (40 pure live seeds/sq ft and less). Includes material and shipping.	Acres	$111.33	0.01	$1.11
Mobilization						
Mobilization, medium equipment	1139	Equipment with 70-150 HP or typical weights between 14,000 and 30,000 pounds.	Each	$255.65	1	$255.65

Practice: 614 - Watering Facility

Scenario: #2 - Permanent Drinking and/or Storage 500 to 1000 Gallons

Scenario Description:

A permanent watering facility for livestock and or wildlife with a capacity of 500 to 1,000 gallons that stores adequate quantity and quality of water for storage and or direct drinking access. All watering facilities will be constructed from approved durable materials that have a life expectancy that meets or exceeds the planned useful life of the installation. This watering facility will address the resource concerns of inadequate supply of water for livestock and or wildlife, habitat degradation, water quality, and undesirable plant productivity and health.

Before Situation:

This practice applies to all land uses where there is a need for a watering facility for livestock or wildlife, where there is a source of water that is adequate in quantity and quality for the purpose, and where soils and topography are suitable for a facility to provide controlled access to drinking water for livestock or wildlife to provide daily water requirements, improve animal distribution to better utilize grazing resources, provide a water source that is an alternative to a sensitive resource.

After Situation:

A permanent watering facility as a means for providing controlled access to drinking water for livestock or wildlife constructed of approved materials with a capacity of 500 to 1,000 gallons of capacity, installed with all tank materials, tank plumbing and float valve, that stores adequate quantity and quality of water for storage or direct drinking access. The watering facility will be constructed from approved durable materials that have a life expectancy that meets or exceeds the planned useful life of the installation. The watering facility will address the resource concerns of inadequate supply of water for livestock or wildlife, habitat degradation, water quality, and undesirable plant productivity and health. The watering facility is placed on a properly prepared foundation with all required materials, plumbing and vegetation for stabilizing disturbed areas. All needed pipelines are installed using Livestock Pipeline (516). All collectors or catchments for collecting precipitation will be addressed by using Water Harvesting Catchment (636). Any needed water source installation will use Water Well (642), Pumping Plant (533), Spring Development (574), or Livestock Pipeline (516) as appropriate. Areas around watering facilities where animal concentrations or overflow from the watering facility will cause resource concerns will be protected by using Heavy Use Area Protection (561) as appropriate. All fencing will use Fence (382).

Feature Measure: Capacity in Gallons

Scenario Unit: Gallons

Scenario Typical Size: 750.0

Scenario Total Cost: $1,701.20

Scenario Cost/Unit: $2.27

Cost Details:

Component Name	ID	Description	Unit	Cost	QTY	Total
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 Yards	$2.31	4	$9.24
Backhoe, 80 HP	926	Wheel mounted backhoe excavator with horsepower range of 60 to 90. Equipment and power unit costs. Labor not included.	Hours	$31.96	6	$191.76
Truck, Pickup	939	Equipment and power unit costs. Labor not included.	Hours	$24.18	6	$145.08
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.	Hours	$37.19	6	$223.14
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.	Hours	$27.56	7	$192.92
Equipment Operators, Light	232	Includes: Skid Steer Loaders, Hydraulic Excavators <50 HP, Trenchers <12 in., Ag Equipment <150 HP, Pickup Trucks, Forklifts, Mulchers	Hours	$27.87	6	$167.22
Materials						
Wildlife Escape Ramp	242	Pool size 15' x 30', for small mammals less than one pound	Each	$63.01	1	$63.01
Tank, Galvanized Steel Livestock, > 300 - 1,000 gallon	1068	Includes tank materials and float valve	Gallons	$0.76	750	$570.00
Aggregate, Gravel, Ungraded, Quarry Run	1099	Includes materials, equipment and labor	Cubic Yards	$34.43	4	$137.72
Native Perennial Grasses, Low Density	2750	Native perennial grasses, may include a small percentage of annual species for establishment purposes and/or if allowed by the CPS. Planted at lower to medium density (40 pure live seeds/sq ft and less). Includes material and shipping.	Acres	$111.33	0.01	$1.11

Practice: 614 - Watering Facility

Scenario: #3 - Permanent Drinking and/or Storage 1000 to 5000 Gallons

Scenario Description:

A permanent watering facility as a means for providing controlled access to drinking water for livestock or wildlife constructed of approved materials with greater than 1,000 to 5,000 gallons of capacity that stores adequate quantity and quality of water for storage or direct drinking access. The watering facility will be constructed from approved durable materials that have a life expectancy that meets or exceeds the planned useful life of the installation. The watering facility will address the resource concerns of inadequate supply of water for livestock or wildlife, habitat degradation, water quality, and undesirable plant productivity and health.

Before Situation:

This practice applies to all land uses where there is a need for a watering facility for livestock or wildlife, where there is a source of water that is adequate in quantity and quality for the purpose, and where soils and topography are suitable for a facility to provide controlled access to drinking water for livestock or wildlife to provide daily water requirements, improve animal distribution to better utilize grazing resources, provide a water source that is an alternative to a sensitive resource.

After Situation:

A permanent watering facility as a means for providing controlled access to drinking water for livestock or wildlife constructed of approved materials with a capacity of greater than 1,000 to 5,000 gallons of capacity, installed with all tank materials, tank plumbing and float valve, that stores adequate quantity and quality of water for storage or direct drinking access. The watering facility will be constructed from approved durable materials that have a life expectancy that meets or exceeds the planned useful life of the installation. The watering facility will address the resource concerns of inadequate supply of water for livestock or wildlife, habitat degradation, water quality, and undesirable plant productivity and health. The watering facility is placed on a properly prepared foundation with all required materials, plumbing and vegetation for stabilizing disturbed areas. All needed pipelines are installed using Livestock Pipeline (516). All collectors or catchments for collecting precipitation will be addressed by using Water Harvesting Catchment (636). Any needed water source installation will use Water Well (642), Pumping Plant (533), Spring Development (574), or Livestock Pipeline (516) as appropriate. Areas around watering facilities where animal concentrations or overflow from the watering facility will cause resource concerns will be protected by using Heavy Use Area Protection (561) as appropriate. All fencing will use Fence (382).

Feature Measure: Capacity in Gallons

Scenario Unit: Gallons

Scenario Typical Size: 2,000.0

Scenario Total Cost: $3,671.17

Scenario Cost/Unit: $1.84

Cost Details:

Component Name	ID	Description	Unit	Cost	QTY	Total
Equipment Installation						
Concrete, CIP, slab on grade, reinforced	37	Steel reinforced concrete formed and cast-in-placed as a slab on grade by chute placement. Typical strength is 3000 to 4000 psi. Includes materials, labor and equipment to transport, place and finish.	Cubic Yards	$362.36	4	$1,449.44
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 Yards	$2.31	7	$16.17
Backhoe, 80 HP	926	Wheel mounted backhoe excavator with horsepower range of 60 to 90. Equipment and power unit costs. Labor not included.	Hours	$31.96	8	$255.68
Truck, Pickup	939	Equipment and power unit costs. Labor not included.	Hours	$24.18	8	$193.44
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.	Hours	$37.19	8	$297.52
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.	Hours	$27.56	9	$248.04
Equipment Operators, Light	232	Includes: Skid Steer Loaders, Hydraulic Excavators <50 HP, Trenchers <12 in., Ag Equipment <150 HP, Pickup Trucks, Forklifts, Mulchers	Hours	$27.87	8	$222.96
Materials						
Aggregate, Sand, Graded, Washed	45	Sand, typical ASTM C33 gradation, includes materials, equipment and labor to transport and place	Cubic Yards	$43.40	7	$303.80
Wildlife Escape Ramp	242	Pool size 15' x 30', for small mammals less than one pound	Each	$63.01	1	$63.01
Tank, Galvanized Steel Bottomless Livestock, <= 6,000 gallon	1069	Includes tank materials, shipping, and float valve, no liner	Gallons	$0.31	2000	$620.00
Native Perennial Grasses, Low Density	2750	Native perennial grasses, may include a small percentage of annual species for establishment purposes and/or if allowed by the CPS. Planted at lower to medium density (40 pure live seeds/sq ft and less). Includes material and shipping.	Acres	$111.33	0.01	$1.11

Practice: 614 - Watering Facility

Scenario: #4 - Permanent Drinking and/or Storage over 5000 Gallons

Scenario Description:

A permanent watering facility as a means for providing controlled access to drinking water for livestock or wildlife constructed of approved materials with greater than 5,000 gallons of capacity that stores adequate quantity and quality of water for storage or direct drinking access. The watering facility will be constructed from approved durable materials that have a life expectancy that meets or exceeds the planned useful life of the installation. The watering facility will address the resource concerns of inadequate supply of water for livestock or wildlife, habitat degradation, water quality, and undesirable plant productivity and health.

Before Situation:

This practice applies to all land uses where there is a need for a watering facility for livestock or wildlife, where there is a source of water that is adequate in quantity and quality for the purpose, and where soils and topography are suitable for a facility to provide controlled access to drinking water for livestock or wildlife to provide daily water requirements, improve animal distribution to better utilize grazing resources, provide a water source that is an alternative to a sensitive resource.

After Situation:

A permanent watering facility as a means for providing controlled access to drinking water for livestock or wildlife constructed of approved materials with a capacity of greater than 5,000 gallons of capacity, installed with all tank materials, tank plumbing and float valve, that stores adequate quantity and quality of water for storage or direct drinking access. The watering facility will be constructed from approved durable materials that have a life expectancy that meets or exceeds the planned useful life of the installation. The watering facility will address the resource concerns of inadequate supply of water for livestock or wildlife, habitat degradation, water quality, and undesirable plant productivity and health. The watering facility is placed on a properly prepared foundation with all required materials, plumbing and vegetation for stabilizing disturbed areas. All needed pipelines are installed using Livestock Pipeline (516). All collectors or catchments for collecting precipitation will be addressed by using Water Harvesting Catchment (636). Any needed water source installation will use Water Well (642), Pumping Plant (533), Spring Development (574), or Livestock Pipeline (516) as appropriate. Areas around watering facilities where animal concentrations or overflow from the watering facility will cause resource concerns will be protected by using Heavy Use Area Protection (561) as appropriate. All fencing will use Fence (382).

Feature Measure: Capacity in Gallons

Scenario Unit: Gallons

Scenario Typical Size: 10,000.0

Scenario Total Cost: $7,470.11

Scenario Cost/Unit: $0.75

Cost Details:

Component Name	ID	Description	Unit	Cost	QTY	Total
Equipment Installation						
Concrete, CIP, slab on grade, reinforced	37	Steel reinforced concrete formed and cast-in-placed as a slab on grade by chute placement. Typical strength is 3000 to 4000 psi. Includes materials, labor and equipment to transport, place and finish.	Cubic Yards	$362.36	7	$2,536.52
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 Yards	$2.31	13	$30.03
Backhoe, 80 HP	926	Wheel mounted backhoe excavator with horsepower range of 60 to 90. Equipment and power unit costs. Labor not included.	Hours	$31.96	12	$383.52
Truck, Pickup	939	Equipment and power unit costs. Labor not included.	Hours	$24.18	12	$290.16
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.	Hours	$37.19	12	$446.28
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.	Hours	$27.56	13	$358.28
Equipment Operators, Light	232	Includes: Skid Steer Loaders, Hydraulic Excavators <50 HP, Trenchers <12 in., Ag Equipment <150 HP, Pickup Trucks, Forklifts, Mulchers	Hours	$27.87	12	$334.44
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.	Hours	$46.88	12	$562.56
Materials						
Aggregate, Sand, Graded, Washed	45	Sand, typical ASTM C33 gradation, includes materials, equipment and labor to transport and place	Cubic Yards	$43.40	13	$564.20
Wildlife Escape Ramp	242	Pool size 15' x 30', for small mammals less than one pound	Each	$63.01	1	$63.01
Tank, Galvanized Steel Bottomless Livestock, > 6,000 gallon	1070	Includes tank materials, shipping, and float valve, no liner	Gallons	$0.19	10000	$1,900.00
Native Perennial Grasses, Low Density	2750	Native perennial grasses, may include a small percentage of annual species for establishment purposes and/or if allowed by the CPS. Planted at lower to medium density (40 pure live seeds/sq ft and less). Includes material and shipping.	Acres	$111.33	0.01	$1.11

Practice: 614 - Watering Facility

Scenario: #5 - Portable Drinking and/or Storage

Scenario Description:

A portable watering facility as a means for providing controlled access to drinking water for livestock or wildlife constructed of approved materials with less than 100 gallons of capacity. Watering facilities are used in rotational grazing systems and are moved from paddock to paddock to provide an adequate source of water for livestock. All watering facilities will be constructed from approved durable materials that have a life expectancy that meets or exceeds the planned useful life of the installation. This watering facility will address the resource concerns of inadequate supply of water for livestock and or wildlife, habitat degradation, water quality, and undesirable plant productivity and health.

Before Situation:

This practice applies to all land uses where there is a need for a watering facility for livestock or wildlife, where there is a source of water that is adequate in quantity and quality for the purpose, and where soils and topography are suitable for a facility to provide controlled access to drinking water for livestock or wildlife to provide daily water requirements, improve animal distribution to better utilize grazing resources, provide a water source that is an alternative to a sensitive resource.

After Situation:

A portable watering facility as a means for providing controlled access to drinking water for livestock or wildlife constructed of approved materials with less than 100 gallons of capacity, installed with all tank materials, tank plumbing and float valve, that stores adequate quantity and quality of water for storage or direct drinking access. The watering facility will be constructed from approved durable materials that have a life expectancy that meets or exceeds the planned useful life of the installation. The watering facility will address the resource concerns of inadequate supply of water for livestock or wildlife, habitat degradation, water quality, and undesirable plant productivity and health. The watering facility is placed on a properly prepared foundation with all required materials, plumbing and vegetation for stabilizing disturbed areas. All needed pipelines are installed using Livestock Pipeline (516). All collectors or catchments for collecting precipitation will be addressed by using Water Harvesting Catchment (636). Any needed water source installation will use Water Well (642), Pumping Plant (533), Spring Development (574), or Livestock Pipeline (516) as appropriate. Areas around watering facilities where animal concentrations or overflow from the watering facility will cause resource concerns will be protected by using Heavy Use Area Protection (561) as appropriate. All fencing will use Fence (382).

Feature Measure: Trough Capacity in Gallons

Scenario Unit: Gallons

Scenario Typical Size: 100.0

Scenario Total Cost: $207.34

Scenario Cost/Unit: $2.07

Cost Details:

Component Name	ID	Description	Unit	Cost	QTY	Total
Equipment Installation						
Truck, Pickup	939	Equipment and power unit costs. Labor not included.	Hours	$24.18	0.25	$6.05
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.	Hours	$27.56	0.25	$6.89
Materials						
Tank, Polyethylene, 100 gallon	290	Portable heavy duty rubber stock tank.	Each	$113.19	1	$113.19
Tank, Float Valve Assembly	1077	Float Valve, Stem, Swivel, Float Ball	Each	$81.21	1	$81.21

Practice: 614 - Watering Facility

Scenario: #6 - Frost Free Trough

Scenario Description:

A permanent watering facility as a means for providing controlled access to drinking water for livestock or wildlife during all weather conditions, including sub-freezing temperatures. Facility will provide an adequate quantity and quality of water for storage or direct drinking access. The watering facility will be constructed from approved durable materials that have a life expectancy that meets or exceeds the planned useful life of the installation. The watering facility will address the resource concerns of inadequate supply of water for livestock or wildlife, habitat degradation, water quality, and undesirable plant productivity and health.

Before Situation:

This practice applies to all land uses where there is a need for a watering facility for livestock or wildlife, where there is a source of water that is adequate in quantity and quality for the purpose, and where soils and topography are suitable for a facility to provide controlled access to drinking water for livestock or wildlife to provide daily water requirements, improve animal distribution to better utilize grazing resources, provide a water source that is an alternative to a sensitive resource.

After Situation:

A permanent watering facility as a means for providing controlled access to drinking water for livestock or wildlife constructed for all weather conditions, including sub-freezing conditions. Costs include all tank materials, tank plumbing and float valve, that stores adequate quantity and quality of water for storage or direct drinking access. The watering facility will be constructed from approved durable materials that have a life expectancy that meets or exceeds the planned useful life of the installation. The watering facility will address the resource concerns of inadequate supply of water for livestock or wildlife, habitat degradation, water quality, and undesirable plant productivity and health. The watering facility is placed on a properly prepared foundation with all required materials, plumbing and vegetation for stabilizing disturbed areas. All needed pipelines are installed using Livestock Pipeline (516). All collectors or catchments for collecting precipitation will be addressed by using Water Harvesting Catchment (636). Any needed water source installation will use Water Well (642), Pumping Plant (533), Spring Development (574), or Livestock Pipeline (516) as appropriate. Areas around watering facilities where animal concentrations or overflow from the watering facility will cause resource concerns will be protected by using Heavy Use Area Protection (561) as appropriate. All fencing will use Fence (382).

Feature Measure: Number of Frost Free Watering Tro

Scenario Unit: Each

Scenario Typical Size: 1.0

Scenario Total Cost: $864.97

Scenario Cost/Unit: $864.97

Cost Details:

Component Name	ID	Description	Unit	Cost	QTY	Total
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.	Hours	$31.96	1	$31.96
Truck, Pickup	939	Equipment and power unit costs. Labor not included.	Hours	$24.18	2	$48.36
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.	Hours	$27.56	3	$82.68
Equipment Operators, Light	232	Includes: Skid Steer Loaders, Hydraulic Excavators <50 HP, Trenchers <12 in., Ag Equipment <150 HP, Pickup Trucks, Forklifts, Mulchers	Hours	$27.87	1	$27.87
Materials						
Tank, Freeze Proof, 2 hole	280	Tank, Freeze Proof with 2 drinking holes. Includes materials and shipping.	Each	$672.99	1	$672.99
Native Perennial Grasses, Low Density	2750	Native perennial grasses, may include a small percentage of annual species for establishment purposes and/or if allowed by the CPS. Planted at lower to medium density (40 pure live seeds/sq ft and less). Includes material and shipping.	Acres	$111.33	0.01	$1.11

Practice: 614 - Watering Facility

Scenario: #7 - Permanent Storage Tank

Scenario Description:

A permanent storage tank as a means of supplying water which will assist to provide controlled access to drinking water for livestock or wildlife. Tank will be less than 1500 gallons of capacity that stores adequate quantity and quality of water for direct drinking access. The storage tank will be constructed from approved durable materials that have a life expectancy that meets or exceeds the planned useful life of the installation. The storage tank will be installed in conjuction with watering facilit(ies) that will address the resource concerns of inadequate supply of water for livestock or wildlife, habitat degradation, water quality, and undesirable plant productivity and health.

Before Situation:

This practice applies to all land uses where there is a need for a watering facility for livestock or wildlife. However, the exisiting source of water does not provide adquate quantity of water for grazing livestock during certain times of the year, making the grazing system unfeasible. Livestock gather at unprotected wetlands and streams to gain access to water which causing resource degradation. Impacts to water quality are apparent, plant condition is impacted and soil erosion is occuring. Adequate water is available if it can be stored and delivered to the livestock when they need it.

After Situation:

A permanent 1500 gallon polyethelyne storage tank will provide adquate water supply for watering facilities as a means for providing controlled access to drinking water for livestock or wildlife. Cost include furnishing and installing all tank materials, tank plumbing, float valve, etc. that stores adequate quantity and quality of water. Tank will be constructed from approved durable materials that have a life expectancy that meets or exceeds the planned useful life of the installation. The storage tank in conjunction with a watering facility will address the resource concerns of inadequate supply of water for livestock or wildlife, habitat degradation, water quality, and undesirable plant productivity and health. The tank will be placed on a properly prepared foundation with all required materials, plumbing and vegetation for stabilizing disturbed areas. All needed pipelines are installed using Livestock Pipeline (516). All collectors or catchments for collecting precipitation will be addressed by using Water Harvesting Catchment (636). Any needed water source installation will use Water Well (642), Pumping Plant (533), Spring Development (574), or Livestock Pipeline (516) as appropriate. Areas around watering facilities where animal concentrations or overflow from the watering facility will cause resource concerns will be protected by using Heavy Use Area Protection (561) as appropriate. All fencing will use Fence (382).

Feature Measure: Capacity in Gallons

Scenario Unit: Gallons

Scenario Typical Size: 1,500.0

Scenario Total Cost: $1,394.53

Scenario Cost/Unit: $0.93

Cost Details:

Component Name	ID	Description	Unit	Cost	QTY	Total
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.	Hours	$31.96	2	$63.92
Truck, Pickup	939	Equipment and power unit costs. Labor not included.	Hours	$24.18	2	$48.36
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.	Hours	$27.56	3	$82.68
Equipment Operators, Light	232	Includes: Skid Steer Loaders, Hydraulic Excavators <50 HP, Trenchers <12 in., Ag Equipment <150 HP, Pickup Trucks, Forklifts, Mulchers	Hours	$27.87	2	$55.74
Materials						
Tank, Poly Enclosed Storage, >1,000	1075	Water storage tanks. Includes materials and shipping only.	Gallons	$0.67	1500	$1,005.00
Aggregate, Gravel, Ungraded, Quarry Run	1099	Includes materials, equipment and labor	Cubic Yards	$34.43	4	$137.72
Native Perennial Grasses, Low Density	2750	Native perennial grasses, may include a small percentage of annual species for establishment purposes and/or if allowed by the CPS. Planted at lower to medium density (40 pure live seeds/sq ft and less). Includes material and shipping.	Acres	$111.33	0.01	$1.11

Practice: 620 - Underground Outlet

Scenario: #1 - 4 inch Corrugated Plastic Pipe (CPP) only

Scenario Description:

Install 150 feet of 4" approved plastic pipe to convey stormwater from one location to a suitable and stable outlet. Trench is excavated 52" deep and 24" wide by hydraulic track excavator. Costs include 4" CPT or PVC pipe, trench excavation, pipe bedding, trench backfill, rodent guard and laid up stone headwall at outlet. This practice is often installed in conjunction with roof runoff practices.

Before Situation:

Roof runoff or surface runoff that becomes contaminated with agricultural wastes that significantly contributes to the amount of runoff that has to be stored or treated.

After Situation:

"Clean" storm water runoff is diverted away from an agricultural waste management system to minimize the volume of runoff that is contaminated by agricultural waste. Associated practices are Critical Area Planting (342) and Roof Runoff Structure (558).

Feature Measure: Length of Conduit

Scenario Unit: Feet

Scenario Typical Size: 150.0

Scenario Total Cost: $1,090.26

Scenario Cost/Unit: $7.27

Cost Details:

Component Name	ID	Description	Unit	Cost	QTY	Total
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 Yards	$2.31	88	$203.28
Compaction, earthfill, vibratory plate	1260	Compaction of earthfill with a walk behind vibratory plate compactor in typical 6-8 inch thick lifts, 2 passes. Includes equipment and labor.	Cubic Yards	$2.21	40	$88.40
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.	Hours	$27.56	3	$82.68
Materials						
Rock Riprap, Placed with geotextile	44	Rock Riprap, placed with geotextile, includes materials, equipment and labor to transport and place	Cubic Yards	$94.25	0.25	$23.56
Aggregate, Sand, Graded, Washed	45	Sand, typical ASTM C33 gradation, includes materials, equipment and labor to transport and place	Cubic Yards	$43.40	8	$347.20
Pipe, PVC, 4 in., SDR 35	992	Materials: - 4 inch - PVC - SDR 35 - ASTM D3034	Feet	$1.97	10	$19.70
Pipe, HDPE, 4 in., PCPT, Single Wall	1270	Pipe, Corrugated Plastic Tubing, Single Wall, Perforated, 4 inch diameter - ASTM F405. Material cost only.	Feet	$0.44	140	$61.60
Rat Guard, 6 in. diameter	2529	Mild steel prong type rodent guard, 6 inch diameter. Attaches to the top of outlet pipe. Includes materials and shipping only.	Each	$8.19	1	$8.19
Mobilization						
Mobilization, medium equipment	1139	Equipment with 70-150 HP or typical weights between 14,000 and 30,000 pounds.	Each	$255.65	1	$255.65

Practice: 620 - Underground Outlet

Scenario: #2 - 6 inch Corrugated Plastic Pipe (CPP) only

Scenario Description:

Install 150 feet of 6" approved plastic pipe to convey stormwater from one location to a suitable and stable outlet. Trench is excavated approximately 54"deep and 24" wide by excavator. Costs include 6" HDPE corrugated single wall plastic tubing, trench excavation, trench backfill and compaction, rodent guard and laid up stone headwall at outlet. This practice is often installed in conjunction with terraces, diversions, sediment control basins, waterways or simlar practices.

Before Situation:

Excessive sedimentation and soil erosion as a result of gully, rill or sheet erosion which exceeds "T" from farm fields and other locations. Also, roof runoff or surface runoff that becomes contminated with agricultural wastes that significantly contributes to the amount of runoff that has to be stored or treated.

After Situation:

Field system meets "T" or "clean" storm water runoff is diverted away from an agricultural waste management system to minimize the volume of runoff that is contaminated by agricultural waste. Associated practices are Critical Area Planting (342), Grassed Waterway (412), Terrace (600), Diversion (342), Water and Sediment Control Basin (638), and Subsurface Drainage (606)

Feature Measure: Length of Conduit

Scenario Unit: Feet

Scenario Typical Size: 150.0

Scenario Total Cost: $1,801.13

Scenario Cost/Unit: $12.01

Cost Details:

Component Name	ID	Description	Unit	Cost	QTY	Total
Equipment Installation						
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 Yards	$1.53	89	$136.17
Compaction, earthfill, vibratory plate	1260	Compaction of earthfill with a walk behind vibratory plate compactor in typical 6-8 inch thick lifts, 2 passes. Includes equipment and labor.	Cubic Yards	$2.21	39	$86.19
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.	Hours	$27.56	2	$55.12
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.	Hours	$46.88	2	$93.76
Materials						
Rock Riprap, Placed with geotextile	44	Rock Riprap, placed with geotextile, includes materials, equipment and labor to transport and place	Cubic Yards	$94.25	1	$94.25
Aggregate, Sand, Graded, Washed	45	Sand, typical ASTM C33 gradation, includes materials, equipment and labor to transport and place	Cubic Yards	$43.40	11	$477.40
Pipe, PVC, 6 in., SDR 35	993	Materials: - 6 inch - PVC - SDR 35 - ASTM D3034	Feet	$4.43	10	$44.30
Pipe, HDPE, 6 in., CPT, Single Wall	1242	Pipe, Corrugated Plastic Tubing, Single Wall, 6 inch diameter - ASTM F405. Material cost only.	Feet	$1.17	140	$163.80
Headwall, stone or concrete bag	1418	Laid up stone or concrete bag headwall for a pipe inlet. Square Foot unit is a vertical area measurement of the headwall cross-section. Includes materials, equipment and labor.	Square Feet	$38.63	10	$386.30
Rat Guard, 6 in. diameter	2529	Mild steel prong type rodent guard, 6 inch diameter. Attaches to the top of outlet pipe. Includes materials and shipping only.	Each	$8.19	1	$8.19
Mobilization						
Mobilization, medium equipment	1139	Equipment with 70-150 HP or typical weights between 14,000 and 30,000 pounds.	Each	$255.65	1	$255.65

Practice: 620 - Underground Outlet

Scenario: #3 - 8 inch Corrugated Plastic Pipe (CPP) only

Scenario Description:

Install 150 feet of 8" approved plastic pipe to convey stormwater from one location to a suitable and stable outlet. Trench is excavated approximately 54"deep and 24" wide by excavator. Costs include 8" HDPE corrugated single wall plastic tubing, trench excavation, trench backfill and compaction, rodent guard and laid up stone headwall at outlet. This practice is often installed in conjunction with terraces, diversions, sediment control basins, waterways or simlar practices.

Before Situation:

Excessive sedimentation and soil erosion as a result of gully, rill or sheet erosion which exceeds "T" from farm fields and other locations. Also, roof runoff or surface runoff that becomes contminated with agricultural wastes that significantly contributes to the amount of runoff that has to be stored or treated.

After Situation:

Field system meets "T" or "clean" storm water runoff is diverted away from an agricultural waste management system to minimize the volume of runoff that is contaminated by agricultural waste. Associated practices are Critical Area Planting (342), Grassed Waterway (412), Terrace (600), Diversion (342), Water and Sediment Control Basin (638), and Subsurface Drainage (606)

Feature Measure: Length of Conduit

Scenario Unit: Feet

Scenario Typical Size: 150.0

Scenario Total Cost: $2,218.22

Scenario Cost/Unit: $14.79

Cost Details:

Component Name	ID	Description	Unit	Cost	QTY	Total
Equipment Installation						
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 Yards	$1.53	83	$126.99
Compaction, earthfill, vibratory plate	1260	Compaction of earthfill with a walk behind vibratory plate compactor in typical 6-8 inch thick lifts, 2 passes. Includes equipment and labor.	Cubic Yards	$2.21	33	$72.93
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.	Hours	$27.56	4	$110.24
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.	Hours	$46.88	2	$93.76
Materials						
Rock Riprap, Placed with geotextile	44	Rock Riprap, placed with geotextile, includes materials, equipment and labor to transport and place	Cubic Yards	$94.25	1	$94.25
Aggregate, Sand, Graded, Washed	45	Sand, typical ASTM C33 gradation, includes materials, equipment and labor to transport and place	Cubic Yards	$43.40	17	$737.80
Pipe, PVC, 8 in., SDR 35	994	Materials: - 8 inch - PVC - SDR 35 - ASTM D3034	Feet	$7.96	10	$79.60
Pipe, HDPE, 8 in,, PCPT, Single Wall	1272	Pipe, Corrugated Plastic Tubing, Single Wall, Perforated, 8 inch diameter - ASTM F667. Material cost only.	Feet	$1.79	140	$250.60
Headwall, stone or concrete bag	1418	Laid up stone or concrete bag headwall for a pipe inlet. Square Foot unit is a vertical area measurement of the headwall cross-section. Includes materials, equipment and labor.	Square Feet	$38.63	10	$386.30
Rat Guard, 8 in. diameter	2530	Mild steel prong type rodent guard, 8 inch diameter. Attaches to the top of outlet pipe. Includes materials and shipping only.	Each	$10.10	1	$10.10
Mobilization						
Mobilization, medium equipment	1139	Equipment with 70-150 HP or typical weights between 14,000 and 30,000 pounds.	Each	$255.65	1	$255.65

Practice: 620 - Underground Outlet

Scenario: #4 - 10 inch High Density Polyethylene (HDPE) Pipe only

Scenario Description:

Install 150 feet of 10" approved plastic pipe to convey stormwater from one location to a suitable and stable outlet. Trench Excavation is 58" deep and 28" wide. Costs include 10" HDPE pipe, trench excavation, trench backfill, rodent guard and laid up stone headwall at outlet. This practice is often installed in conjunction with terraces, diversions, sediment control basins, waterways or simlar practices.

Before Situation:

Excessive sedimentation and soil erosion as a result of gully, rill or sheet erosion which exceeds "T" from farm fields and other locations. Also, roof runoff or surface runoff that becomes contminated with agricultural wastes that significantly contributes to the amount of runoff that has to be stored or treated.

After Situation:

Field system meets "T" or "clean" storm water runoff is diverted away from an agricultural waste management system to minimize the volume of runoff that is contaminated by agricultural waste. Associated practices are Critical Area Planting (342), Grassed Waterway (412), Terrace (600), Diversion (342), Water and Sediment Control Basin (638), and Subsurface Drainage (606)

Feature Measure: Length of Conduit

Scenario Unit: Feet

Scenario Typical Size: 150.0

Scenario Total Cost: $3,085.17

Scenario Cost/Unit: $20.57

Cost Details:

Component Name	ID	Description	Unit	Cost	QTY	Total
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 Yards	$2.31	78	$180.18
Compaction, earthfill, vibratory plate	1260	Compaction of earthfill with a walk behind vibratory plate compactor in typical 6-8 inch thick lifts, 2 passes. Includes equipment and labor.	Cubic Yards	$2.21	28	$61.88
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.	Hours	$27.56	4	$110.24
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.	Hours	$46.88	2	$93.76
Materials						
Rock Riprap, Placed with geotextile	44	Rock Riprap, placed with geotextile, includes materials, equipment and labor to transport and place	Cubic Yards	$94.25	1	$94.25
Aggregate, Sand, Graded, Washed	45	Sand, typical ASTM C33 gradation, includes materials, equipment and labor to transport and place	Cubic Yards	$43.40	22	$954.80
Pipe, HDPE, CPT, Double Wall, Soil Tight, 10 in.	1243	Pipe, Corrugated HDPE Double Wall, 10 inch diameter with soil tight joints - AASHTO M252. Material cost only.	Feet	$6.22	150	$933.00
Headwall, stone or concrete bag	1418	Laid up stone or concrete bag headwall for a pipe inlet. Square Foot unit is a vertical area measurement of the headwall cross-section. Includes materials, equipment and labor.	Square Feet	$38.63	10	$386.30
Rat Guard, 10 in. diameter	2531	Mild steel prong type rodend guard, 10 inch diameter. Attaches to the top of outlet pipe. Includes materials and shipping only.	Each	$15.11	1	$15.11
Mobilization						
Mobilization, medium equipment	1139	Equipment with 70-150 HP or typical weights between 14,000 and 30,000 pounds.	Each	$255.65	1	$255.65

Practice: 620 - Underground Outlet

Scenario: #5 - 4 to 6 inch Corrugated Plastic Pipe (CPP) with Riser

Scenario Description:

Install 150 feet of 6" approved plastic pipe to convey stormwater from one location to a suitable and stable outlet. Trench is excavated approximately 54"deep and 24" wide by excavator. Costs include 6" HDPE corrugated single wall plastic tubing, 8" Perforated PVC Riser Inlet, trench excavation, trench backfill, rodent guard and laid up stone headwall at outlet. This practice is often installed in conjunction with terraces, diversions, sediment control basins, waterways or simlar practices.

Before Situation:

Excessive sedimentation and soil erosion as a result of gully, rill or sheet erosion which exceeds "T" from farm fields and other locations. Also, roof runoff or surface runoff that becomes contminated with agricultural wastes that significantly contributes to the amount of runoff that has to be stored or treated.

After Situation:

Field system meets "T" or "clean" storm water runoff is diverted away from an agricultural waste management system to minimize the volume of runoff that is contaminated by agricultural waste. Associated practices are Critical Area Planting (342), Grassed Waterway (412), Terrace (600), Diversion (342), Water and Sediment Control Basin (638), and Subsurface Drainage (606)

Feature Measure: Length of Conduit

Scenario Unit: Feet

Scenario Typical Size: 150.0

Scenario Total Cost: $2,031.09

Scenario Cost/Unit: $13.54

Cost Details:

Component Name	ID	Description	Unit	Cost	QTY	Total
Equipment Installation						
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 Yards	$1.53	88	$134.64
Compaction, earthfill, vibratory plate	1260	Compaction of earthfill with a walk behind vibratory plate compactor in typical 6-8 inch thick lifts, 2 passes. Includes equipment and labor.	Cubic Yards	$2.21	38	$83.98
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.	Hours	$27.56	2	$55.12
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.	Hours	$46.88	2	$93.76
Materials						
Rock Riprap, Placed with geotextile	44	Rock Riprap, placed with geotextile, includes materials, equipment and labor to transport and place	Cubic Yards	$94.25	1	$94.25
Aggregate, Sand, Graded, Washed	45	Sand, typical ASTM C33 gradation, includes materials, equipment and labor to transport and place	Cubic Yards	$43.40	11	$477.40
Pipe, PVC, 6 in., SDR 35	993	Materials: - 6 inch - PVC - SDR 35 - ASTM D3034	Feet	$4.43	10	$44.30
Pipe, HDPE, 6 in., CPT, Single Wall	1242	Pipe, Corrugated Plastic Tubing, Single Wall, 6 inch diameter - ASTM F405. Material cost only.	Feet	$1.17	140	$163.80
Inlet, riser, 8 in.	1262	Riser, polymer, complete vertical perforated UGO inlet with Tee, orifice plate if needed, 8 inch diameter. Materials only.	Each	$116.85	2	$233.70
Headwall, stone or concrete bag	1418	Laid up stone or concrete bag headwall for a pipe inlet. Square Foot unit is a vertical area measurement of the headwall cross-section. Includes materials, equipment and labor.	Square Feet	$38.63	10	$386.30
Rat Guard, 6 in. diameter	2529	Mild steel prong type rodent guard, 6 inch diameter. Attaches to the top of outlet pipe. Includes materials and shipping only.	Each	$8.19	1	$8.19
Mobilization						
Mobilization, medium equipment	1139	Equipment with 70-150 HP or typical weights between 14,000 and 30,000 pounds.	Each	$255.65	1	$255.65

Practice: 620 - Underground Outlet

Scenario: #6 - 4 to 6 inch Polyvinyl Chloride (PVC) Pipe with Catch Basin up to 50 feet in length

Scenario Description:

Install 50 feet of 6" approved plastic pipe to convey stormwater from one location to a suitable and stable outlet. Trench is excavated 52" deep and 24" wide by hydraulic track excavator. Costs include 6" SDR-35 pipe, Precast concrete drop inlet with steel grate, trench excavation, trench backfill, rodent guard and laid up stone headwall at outlet. This practice is often installed in conjunction with terraces, diversions, sediment control basins, waterways, roof runoff structures, or simlar practices.

Before Situation:

Excessive sedimentation and soil erosion as a result of gully, rill or sheet erosion which exceeds "T" from farm fields and other locations. Also, roof runoff or surface runoff that becomes contaminated with agricultural wastes significantly contributes to the amount of runoff that has to be stored or treated.

After Situation:

Field system meets "T" or "clean" storm water runoff is diverted away from an agricultural waste management system to minimize the volume of runoff that is contaminated by agricultural waste. Associated practices are Critical Area Planting (342), Grassed Waterway (412), Terrace (600), Diversion (342), Water and Sediment Control Basin (638), Roof Runoff Structure (558), and Subsurface Drainage (606)

Feature Measure: Length of Conduit

Scenario Unit: Feet

Scenario Typical Size: 50.0

Scenario Total Cost: $2,125.32

Scenario Cost/Unit: $42.51

Cost Details:

Component Name	ID	Description	Unit	Cost	QTY	Total
Equipment Installation						
Earthfill, Manually Compacted	50	Earthfill, manually compacted, includes equipment and labor	Cubic Yards	$6.02	6	$36.12
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 Yards	$1.53	25	$38.25
Compaction, earthfill, vibratory plate	1260	Compaction of earthfill with a walk behind vibratory plate compactor in typical 6-8 inch thick lifts, 2 passes. Includes equipment and labor.	Cubic Yards	$2.21	11	$24.31
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.	Hours	$27.56	2	$55.12
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.	Hours	$46.88	2	$93.76
Materials						
Rock Riprap, Placed with geotextile	44	Rock Riprap, placed with geotextile, includes materials, equipment and labor to transport and place	Cubic Yards	$94.25	1	$94.25
Pipe, PVC, 6 in., SDR 35	993	Materials: - 6 inch - PVC - SDR 35 - ASTM D3034	Feet	$4.43	50	$221.50
Catch Basin, concrete, 3 ft. x 3 ft. x 6 ft.	1258	Catch Basin, Precast Concrete, 3 feet square or round, cast grate, 6 feet deep. Includes materials, equipment and labor.	Each	$1,298.17	1	$1,298.17
Rat Guard, 6 in. diameter	2529	Mild steel prong type rodent guard, 6 inch diameter. Attaches to the top of outlet pipe. Includes materials and shipping only.	Each	$8.19	1	$8.19
Mobilization						
Mobilization, medium equipment	1139	Equipment with 70-150 HP or typical weights between 14,000 and 30,000 pounds.	Each	$255.65	1	$255.65

Practice: 620 - Underground Outlet

Scenario: #7 - 4 to 6 inch Polyvinyl Chloride (PVC)Pipe with Catch Basin over 50 feet in length

Scenario Description:

Install 150 feet of 6" approved plastic pipe to convey stormwater from one location to a suitable and stable outlet. Trench is excavated 52" deep and 24" wide by hydraulic track excavator. Costs include 6" SDR-35 pipe, Precast concrete drop inlet with steel grate, trench excavation, trench backfill, rodent guard and laid up stone headwall at outlet. This practice is often installed in conjunction with terraces, diversions, sediment control basins, waterways, roof runoff structures, or simlar practices.

Before Situation:

Excessive sedimentation and soil erosion as a result of gully, rill or sheet erosion which exceeds "T" from farm fields and other locations. Also, roof runoff or surface runoff that becomes contaminated with agricultural wastes significantly contributes to the amount of runoff that has to be stored or treated.

After Situation:

Field system meets "T" or "clean" storm water runoff is diverted away from an agricultural waste management system to minimize the volume of runoff that is contaminated by agricultural waste. Associated practices are Critical Area Planting (342), Grassed Waterway (412), Terrace (600), Diversion (342), Water and Sediment Control Basin (638), Roof Runoff Structure (558), and Subsurface Drainage (606)

Feature Measure: Length of Conduit

Scenario Unit: Feet

Scenario Typical Size: 150.0

Scenario Total Cost: $2,715.39

Scenario Cost/Unit: $18.10

Cost Details:

Component Name	ID	Description	Unit	Cost	QTY	Total
Equipment Installation						
Earthfill, Manually Compacted	50	Earthfill, manually compacted, includes equipment and labor	Cubic Yards	$6.02	16	$96.32
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 Yards	$1.53	50	$76.50
Compaction, earthfill, vibratory plate	1260	Compaction of earthfill with a walk behind vibratory plate compactor in typical 6-8 inch thick lifts, 2 passes. Includes equipment and labor.	Cubic Yards	$2.21	33	$72.93
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.	Hours	$27.56	2	$55.12
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.	Hours	$46.88	2	$93.76
Materials						
Rock Riprap, Placed with geotextile	44	Rock Riprap, placed with geotextile, includes materials, equipment and labor to transport and place	Cubic Yards	$94.25	1	$94.25
Pipe, PVC, 6 in., SDR 35	993	Materials: - 6 inch - PVC - SDR 35 - ASTM D3034	Feet	$4.43	150	$664.50
Catch Basin, concrete, 3 ft. x 3 ft. x 6 ft.	1258	Catch Basin, Precast Concrete, 3 feet square or round, cast grate, 6 feet deep. Includes materials, equipment and labor.	Each	$1,298.17	1	$1,298.17
Rat Guard, 6 in. diameter	2529	Mild steel prong type rodent guard, 6 inch diameter. Attaches to the top of outlet pipe. Includes materials and shipping only.	Each	$8.19	1	$8.19
Mobilization						
Mobilization, medium equipment	1139	Equipment with 70-150 HP or typical weights between 14,000 and 30,000 pounds.	Each	$255.65	1	$255.65

Practice: 620 - Underground Outlet

Scenario: #8 - 8 to 12 inch High Density Polyethylene (HDPE) Pipe with Riser

Scenario Description:

Install 150 feet of 10" approved plastic pipe to convey stormwater from one location to a suitable and stable outlet. Trench Excavation is 58" deep and 28" wide. Costs include 10" HDPE pipe, 12" Perforated PVC Riser Inlet, trench excavation, trench backfill, rodent guard and laid up stone headwall at outlet. This practice is often installed in conjunction with terraces, diversions, sediment control basins, waterways or simlar practices.

Before Situation:

Excessive sedimentation and soil erosion as a result of gully, rill or sheet erosion which exceeds "T" from farm fields and other locations. Also, roof runoff or surface runoff that becomes contminated with agricultural wastes that significantly contributes to the amount of runoff that has to be stored or treated.

After Situation:

Field system meets "T" or "clean" storm water runoff is diverted away from an agricultural waste management system to minimize the volume of runoff that is contaminated by agricultural waste. Associated practices are Critical Area Planting (342), Grassed Waterway (412), Terrace (600), Diversion (342), Water and Sediment Control Basin (638), and Subsurface Drainage (606)

Feature Measure: Length of Conduit

Scenario Unit: Feet

Scenario Typical Size: 150.0

Scenario Total Cost: $3,408.93

Scenario Cost/Unit: $22.73

Cost Details:

Component Name	ID	Description	Unit	Cost	QTY	Total
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 Yards	$2.31	78	$180.18
Compaction, earthfill, vibratory plate	1260	Compaction of earthfill with a walk behind vibratory plate compactor in typical 6-8 inch thick lifts, 2 passes. Includes equipment and labor.	Cubic Yards	$2.21	28	$61.88
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.	Hours	$27.56	4	$110.24
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.	Hours	$46.88	2	$93.76
Materials						
Rock Riprap, Placed with geotextile	44	Rock Riprap, placed with geotextile, includes materials, equipment and labor to transport and place	Cubic Yards	$94.25	1	$94.25
Aggregate, Sand, Graded, Washed	45	Sand, typical ASTM C33 gradation, includes materials, equipment and labor to transport and place	Cubic Yards	$43.40	22	$954.80
Pipe, HDPE, CPT, Double Wall, Soil Tight, 10 in.	1243	Pipe, Corrugated HDPE Double Wall, 10 inch diameter with soil tight joints - AASHTO M252. Material cost only.	Feet	$6.22	150	$933.00
Inlet, riser, 10 in.	1263	Riser, polymer, complete vertical perforated UGO inlet with Tee, orifice plate if needed, 10 inch diameter. Materials only.	Each	$161.88	2	$323.76
Headwall, stone or concrete bag	1418	Laid up stone or concrete bag headwall for a pipe inlet. Square Foot unit is a vertical area measurement of the headwall cross-section. Includes materials, equipment and labor.	Square Feet	$38.63	10	$386.30
Rat Guard, 10 in. diameter	2531	Mild steel prong type rodend guard, 10 inch diameter. Attaches to the top of outlet pipe. Includes materials and shipping only.	Each	$15.11	1	$15.11
Mobilization						
Mobilization, medium equipment	1139	Equipment with 70-150 HP or typical weights between 14,000 and 30,000 pounds.	Each	$255.65	1	$255.65

Practice: 620 - Underground Outlet

Scenario: #9 - 8 to 12 inch High Density Polyethylene (HDPE) Pipe with Catch Basin up to 50 feet in length

Scenario Description:

Install 50 feet of 10" approved plastic pipe to convey stormwater from one location to a suitable and stable outlet. Trench Excavation is 58" deep and 28" wide. Costs include 10" HDPE pipe, Precast concrete drop inlet with steel grate, trench excavation, trench backfill, rodent guard and laid up stone headwall at outlet. This practice is often installed in conjunction with terraces, diversions, sediment control basins, waterways or simlar practices.

Before Situation:

Excessive sedimentation and soil erosion as a result of gully, rill or sheet erosion which exceeds "T" from farm fields and other locations. Also, roof runoff or surface runoff that becomes contminated with agricultural wastes that significantly contributes to the amount of runoff that has to be stored or treated.

After Situation:

Field system meets "T" or "clean" storm water runoff is diverted away from an agricultural waste management system to minimize the volume of runoff that is contaminated by agricultural waste. Associated practices are Critical Area Planting (342), Grassed Waterway (412), Terrace (600), Diversion (342), Water and Sediment Control Basin (638), and Subsurface Drainage (606)

Feature Measure: Length of Conduit

Scenario Unit: Feet

Scenario Typical Size: 50.0

Scenario Total Cost: $3,000.40

Scenario Cost/Unit: $60.01

Cost Details:

Component Name	ID	Description	Unit	Cost	QTY	Total
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 Yards	$2.31	32	$73.92
Compaction, earthfill, vibratory plate	1260	Compaction of earthfill with a walk behind vibratory plate compactor in typical 6-8 inch thick lifts, 2 passes. Includes equipment and labor.	Cubic Yards	$2.21	12	$26.52
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.	Hours	$27.56	2	$55.12
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.	Hours	$46.88	2	$93.76
Materials						
Rock Riprap, Placed with geotextile	44	Rock Riprap, placed with geotextile, includes materials, equipment and labor to transport and place	Cubic Yards	$94.25	1	$94.25
Aggregate, Sand, Graded, Washed	45	Sand, typical ASTM C33 gradation, includes materials, equipment and labor to transport and place	Cubic Yards	$43.40	9	$390.60
Pipe, HDPE, CPT, Double Wall, Soil Tight, 10 in.	1243	Pipe, Corrugated HDPE Double Wall, 10 inch diameter with soil tight joints - AASHTO M252. Material cost only.	Feet	$6.22	50	$311.00
Catch Basin, concrete, 3 ft. x 3 ft. x 6 ft.	1258	Catch Basin, Precast Concrete, 3 feet square or round, cast grate, 6 feet deep. Includes materials, equipment and labor.	Each	$1,298.17	1	$1,298.17
Headwall, stone or concrete bag	1418	Laid up stone or concrete bag headwall for a pipe inlet. Square Foot unit is a vertical area measurement of the headwall cross-section. Includes materials, equipment and labor.	Square Feet	$38.63	10	$386.30
Rat Guard, 10 in. diameter	2531	Mild steel prong type rodend guard, 10 inch diameter. Attaches to the top of outlet pipe. Includes materials and shipping only.	Each	$15.11	1	$15.11
Mobilization						
Mobilization, medium equipment	1139	Equipment with 70-150 HP or typical weights between 14,000 and 30,000 pounds.	Each	$255.65	1	$255.65

Practice: 620 - Underground Outlet

Scenario: #10 - 8 to 12 inch High Density Polyethylene (HDPE) Pipe with Catch Basin over 50 feet in length

Scenario Description:

Install 150 feet of 10" approved plastic pipe to convey stormwater from one location to a suitable and stable outlet. Trench Excavation is 58" deep and 28" wide. Costs include 10" HDPE pipe, Precast concrete drop inlet with steel grate, trench excavation, trench backfill, rodent guard and laid up stone headwall at outlet. This practice is often installed in conjunction with terraces, diversions, sediment control basins, waterways or simlar practices.

Before Situation:

Excessive sedimentation and soil erosion as a result of gully, rill or sheet erosion which exceeds "T" from farm fields and other locations. Also, roof runoff or surface runoff that becomes contminated with agricultural wastes that significantly contributes to the amount of runoff that has to be stored or treated.

After Situation:

Field system meets "T" or "clean" storm water runoff is diverted away from an agricultural waste management system to minimize the volume of runoff that is contaminated by agricultural waste. Associated practices are Critical Area Planting (342), Grassed Waterway (412), Terrace (600), Diversion (342), Water and Sediment Control Basin (638), and Subsurface Drainage (606)

Feature Measure: Length of Conduit

Scenario Unit: Feet

Scenario Typical Size: 150.0

Scenario Total Cost: $4,618.51

Scenario Cost/Unit: $30.79

Cost Details:

Component Name	ID	Description	Unit	Cost	QTY	Total
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 Yards	$2.31	97	$224.07
Compaction, earthfill, vibratory plate	1260	Compaction of earthfill with a walk behind vibratory plate compactor in typical 6-8 inch thick lifts, 2 passes. Includes equipment and labor.	Cubic Yards	$2.21	36	$79.56
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.	Hours	$27.56	4	$110.24
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.	Hours	$46.88	2	$93.76
Materials						
Rock Riprap, Placed with geotextile	44	Rock Riprap, placed with geotextile, includes materials, equipment and labor to transport and place	Cubic Yards	$94.25	1	$94.25
Aggregate, Sand, Graded, Washed	45	Sand, typical ASTM C33 gradation, includes materials, equipment and labor to transport and place	Cubic Yards	$43.40	26	$1,128.40
Pipe, HDPE, CPT, Double Wall, Soil Tight, 10 in.	1243	Pipe, Corrugated HDPE Double Wall, 10 inch diameter with soil tight joints - AASHTO M252. Material cost only.	Feet	$6.22	150	$933.00
Catch Basin, concrete, 3 ft. x 3 ft. x 6 ft.	1258	Catch Basin, Precast Concrete, 3 feet square or round, cast grate, 6 feet deep. Includes materials, equipment and labor.	Each	$1,298.17	1	$1,298.17
Headwall, stone or concrete bag	1418	Laid up stone or concrete bag headwall for a pipe inlet. Square Foot unit is a vertical area measurement of the headwall cross-section. Includes materials, equipment and labor.	Square Feet	$38.63	10	$386.30
Rat Guard, 10 in. diameter	2531	Mild steel prong type rodend guard, 10 inch diameter. Attaches to the top of outlet pipe. Includes materials and shipping only.	Each	$15.11	1	$15.11
Mobilization						
Mobilization, medium equipment	1139	Equipment with 70-150 HP or typical weights between 14,000 and 30,000 pounds.	Each	$255.65	1	$255.65

Practice: 620 - Underground Outlet

Scenario: #11 - 14 to 18 inch High Density Polyethylene (HDPE) Pipe with Catch Basin

Scenario Description:

Install 150 feet of 18" approved plastic pipe to convey stormwater from one location to a suitable and stable outlet. Trench excavation is 66" deep x 39" wide. Costs include 18" HDPE pipe, Precast concrete drop inlet with steel grate, trench excavation, bedding material, trench backfill, rodent guard and laid up stone headwall at outlet. This practice is often is installed in conjunction with terraces, diversions, sediment control basins, waterways or simlar practices.

Before Situation:

Excessive sedimentation and soil erosion as a result of gully, rill or sheet erosion which exceeds "T" from farm fields and other locations. Also, roof runoff or surface runoff that becomes contaminated with agricultural wastes that significantly contributes to the amount of runoff that has to be stored or treated.

After Situation:

Field system meets "T" or "clean" storm water runoff is diverted away from an agricultural waste management system to minimize the volume of runoff that is contaminated by agricultural waste. Associated practices are Critical Area Planting (342), Grassed Waterway (412), Terrace (600), Diversion (342), Water and Sediment Control Basin (638), and Subsurface Drainage (606)

Feature Measure: Length of Conduit

Scenario Unit: Feet

Scenario Typical Size: 150.0

Scenario Total Cost: $6,321.98

Scenario Cost/Unit: $42.15

Cost Details:

Component Name	ID	Description	Unit	Cost	QTY	Total
Equipment Installation						
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 Yards	$1.53	171	$261.63
Compaction, earthfill, vibratory plate	1260	Compaction of earthfill with a walk behind vibratory plate compactor in typical 6-8 inch thick lifts, 2 passes. Includes equipment and labor.	Cubic Yards	$2.21	72	$159.12
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.	Hours	$27.56	4	$110.24
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.	Hours	$46.88	2	$93.76
Materials						
Rock Riprap, Placed with geotextile	44	Rock Riprap, placed with geotextile, includes materials, equipment and labor to transport and place	Cubic Yards	$94.25	1	$94.25
Aggregate, Gravel, Graded	46	Gravel, includes materials, equipment and labor to transport and place. Includes washed and unwashed gravel.	Cubic Yards	$45.42	26	$1,180.92
Pipe, HDPE, CPT, Double Wall, Soil Tight, 18 in.	1245	Pipe, Corrugated HDPE Double Wall, 18 inch diameter with soil tight joints - AASHTO M294. Material cost only.	Feet	$14.52	150	$2,178.00
Catch Basin, concrete, 3 ft. x 3 ft. x 6 ft.	1258	Catch Basin, Precast Concrete, 3 feet square or round, cast grate, 6 feet deep. Includes materials, equipment and labor.	Each	$1,298.17	1	$1,298.17
Headwall, stone or concrete bag	1418	Laid up stone or concrete bag headwall for a pipe inlet. Square Foot unit is a vertical area measurement of the headwall cross-section. Includes materials, equipment and labor.	Square Feet	$38.63	10	$386.30
Rat Guard, 18 in. diameter	2534	Mild steel prong type rodent guard, 18 inch diameter. Attaches to the top of outlet pipe. Includes materials and shipping only.	Each	$71.49	1	$71.49
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	$488.10	1	$488.10

Practice: 620 - Underground Outlet

Scenario: #12 - 20 to 24 inch High Density Polyethylene (HDPE) Pipe with Catch Basin

Scenario Description:

Install 150 feet of 24" approved plastic pipe to convey stormwater from one location to a suitable and stable outlet. Trench excavation is 72" x 48" wide. Costs include 24" HDPE pipe, Precast concrete drop inlet with steel grate, 24" HDPE pipe, trench excavation, bedding material, trench backfill, rodent guard and laid up stone headwall at outlet. Practice is often installed in conjunction with terraces, diversions, sediment control basins, waterways or simlar practices.

Before Situation:

Excessive sedimentation and soil erosion as a result of gully, rill or sheet erosion which exceeds "T" from farm fields and other locations. Also, roof runoff or surface runoff that becomes contminated with agricultural wastes that significantly contributes to the amount of runoff that has to be stored or treated.

After Situation:

Field system meets "T" or "clean" storm water runoff is diverted away from an agricultural waste management system to minimize the volume of runoff that is contaminated by agricultural waste. Associated practices are Critical Area Planting (342), Grassed Waterway (412), Terrace (600), Diversion (342), Water and Sediment Control Basin (638), and Subsurface Drainage (606)

Feature Measure: Length of Conduit

Scenario Unit: Feet

Scenario Typical Size: 150.0

Scenario Total Cost: $8,921.01

Scenario Cost/Unit: $59.47

Cost Details:

Component Name	ID	Description	Unit	Cost	QTY	Total
Equipment Installation						
Excavation, common earth, small equipment, 50 ft	1220	Bulk excavation of common earth with dozer <100 HP with average push distance of 50 feet. Includes equipment and labor.	Cubic Yards	$2.37	89	$210.93
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 Yards	$1.53	134	$205.02
Compaction, earthfill, vibratory plate	1260	Compaction of earthfill with a walk behind vibratory plate compactor in typical 6-8 inch thick lifts, 2 passes. Includes equipment and labor.	Cubic Yards	$2.21	89	$196.69
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.	Hours	$27.56	4	$110.24
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.	Hours	$46.88	2.5	$117.20
Materials						
Rock Riprap, Placed with geotextile	44	Rock Riprap, placed with geotextile, includes materials, equipment and labor to transport and place	Cubic Yards	$94.25	1	$94.25
Aggregate, Gravel, Graded	46	Gravel, includes materials, equipment and labor to transport and place. Includes washed and unwashed gravel.	Cubic Yards	$45.42	38	$1,725.96
Pipe, HDPE, CPT, Double Wall, Soil Tight, 24 in.	1246	Pipe, Corrugated HDPE Double Wall, 24 inch diameter with soil tight joints - AASHTO M294. Material cost only.	Feet	$24.89	150	$3,733.50
Catch Basin, concrete, 3 ft. x 3 ft. x 6 ft.	1258	Catch Basin, Precast Concrete, 3 feet square or round, cast grate, 6 feet deep. Includes materials, equipment and labor.	Each	$1,298.17	1	$1,298.17
Headwall, stone or concrete bag	1418	Laid up stone or concrete bag headwall for a pipe inlet. Square Foot unit is a vertical area measurement of the headwall cross-section. Includes materials, equipment and labor.	Square Feet	$38.63	10	$386.30
Rat Guard, 24 in. diameter	2536	Mild steel prong type rodent guard, 24 inch diameter. Attaches to the top of outlet pipe. Includes materials and shipping only.	Each	$99.00	1	$99.00
Mobilization						
Mobilization, medium equipment	1139	Equipment with 70-150 HP or typical weights between 14,000 and 30,000 pounds.	Each	$255.65	1	$255.65
Mobilization, large equipment	1140	Equipment >150HP or typical weights greater than 30,000 pounds or loads requiring over width or over length permits.	Each	$488.10	1	$488.10

Practice: 620 - Underground Outlet

Scenario: #13 - 26 to 30 inch High Density Polyethylene (HDPE) Pipe with Catch Basin

Scenario Description:

Install 200 feet of 30" approved plastic pipe to convey stormwater from one location to a suitable and stable outlet. Trench excavation is 78" deep x 56" wide. Costs include 30" HDPE pipe, Precast concrete drop inlet with steel grate, trench excavation, bedding material, trench backfill, rodent guard and laid up stone headwall at outlet. This practices is often installed in conjunction with terraces, diversions, sediment control basins, waterways or simlar practices.

Before Situation:

Excessive sedimentation and soil erosion as a result of gully, rill or sheet erosion which exceeds "T" from farm fields and other locations. Also, roof runoff or surface runoff that becomes contminated with agricultural wastes that significantly contributes to the amount of runoff that has to be stored or treated.

After Situation:

Field system meets "T" or "clean" storm water runoff is diverted away from an agricultural waste management system to minimize the volume of runoff that is contaminated by agricultural waste. Associated practices are Critical Area Planting (342), Grassed Waterway (412), Terrace (600), Diversion (342), Water and Sediment Control Basin (638), and Subsurface Drainage (606)

Feature Measure: Length of Conduit

Scenario Unit: Feet

Scenario Typical Size: 200.0

Scenario Total Cost: $14,021.31

Scenario Cost/Unit: $70.11

Cost Details:

Component Name	ID	Description	Unit	Cost	QTY	Total
Equipment Installation						
Excavation, common earth, small equipment, 50 ft	1220	Bulk excavation of common earth with dozer <100 HP with average push distance of 50 feet. Includes equipment and labor.	Cubic Yards	$2.37	122	$289.14
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 Yards	$1.53	226	$345.78
Compaction, earthfill, vibratory plate	1260	Compaction of earthfill with a walk behind vibratory plate compactor in typical 6-8 inch thick lifts, 2 passes. Includes equipment and labor.	Cubic Yards	$2.21	122	$269.62
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.	Hours	$27.56	5	$137.80
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.	Hours	$46.88	3	$140.64
Materials						
Rock Riprap, Placed with geotextile	44	Rock Riprap, placed with geotextile, includes materials, equipment and labor to transport and place	Cubic Yards	$94.25	3	$282.75
Aggregate, Gravel, Graded	46	Gravel, includes materials, equipment and labor to transport and place. Includes washed and unwashed gravel.	Cubic Yards	$45.42	67	$3,043.14
Manhole, 4 ft x 4 ft	1053	Precast Manhole with base and top delivered. 4 feet diameter x 4 feet. Includes materials only.	Each	$1,290.85	1	$1,290.85
Pipe, HDPE, CPT, Double Wall, Soil Tight, 30 in.	1247	Pipe, Corrugated HDPE Double Wall, 30 inch diameter with soil tight joints - AASHTO M294. Material cost only.	Feet	$34.85	200	$6,970.00
Headwall, stone or concrete bag	1418	Laid up stone or concrete bag headwall for a pipe inlet. Square Foot unit is a vertical area measurement of the headwall cross-section. Includes materials, equipment and labor.	Square Feet	$38.63	10	$386.30
Rat Guard, 30 in. diameter	2537	Mild steel prong type rodent guard, 30 inch diameter. Attaches to the top of outlet pipe. Includes materials and shipping only.	Each	$121.54	1	$121.54
Mobilization						
Mobilization, medium equipment	1139	Equipment with 70-150 HP or typical weights between 14,000 and 30,000 pounds.	Each	$255.65	1	$255.65
Mobilization, large equipment	1140	Equipment >150HP or typical weights greater than 30,000 pounds or loads requiring over width or over length permits.	Each	$488.10	1	$488.10

Practice: 620 - Underground Outlet

Scenario: #14 - Over 30 inch High Density Polyethylene (HDPE) Pipe with Catch Basin

Scenario Description:

Install 200 feet of 36" approved plastic pipe to convey stormwater from one location to a suitable and stable outlet. Trench excavation is 84" deep x 64" wide. Costs include 36" HDPE pipe, Precast concrete drop inlet with steel grate, trench excavation, bedding material, trench backfill, rodent guard and laid up stone headwall at outlet. This practice is often installed in conjunction with terraces, diversions, sediment control basins, waterways or simlar practices.

Before Situation:

Excessive sedimentation and soil erosion as a result of gully, rill or sheet erosion which exceeds "T" from farm fields and other locations. Also, roof runoff or surface runoff that becomes contminated with agricultural wastes that significantly contributes to the amount of runoff that has to be stored or treated.

After Situation:

Field system meets "T" or "clean" storm water runoff is diverted away from an agricultural waste management system to minimize the volume of runoff that is contaminated by agricultural waste. Associated practices are Critical Area Planting (342), Grassed Waterway (412), Terrace (600), Diversion (342), Water and Sediment Control Basin (638), and Subsurface Drainage (606)

Feature Measure: Length of Conduit

Scenario Unit: Feet

Scenario Typical Size: 200.0

Scenario Total Cost: $19,506.94

Scenario Cost/Unit: $97.53

Cost Details:

Component Name	ID	Description	Unit	Cost	QTY	Total
Equipment Installation						
Excavation, common earth, small equipment, 50 ft	1220	Bulk excavation of common earth with dozer <100 HP with average push distance of 50 feet. Includes equipment and labor.	Cubic Yards	$2.37	157	$372.09
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 Yards	$1.53	275	$420.75
Compaction, earthfill, vibratory plate	1260	Compaction of earthfill with a walk behind vibratory plate compactor in typical 6-8 inch thick lifts, 2 passes. Includes equipment and labor.	Cubic Yards	$2.21	157	$346.97
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.	Hours	$27.56	5	$137.80
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.	Hours	$46.88	4	$187.52
Materials						
Rock Riprap, Placed with geotextile	44	Rock Riprap, placed with geotextile, includes materials, equipment and labor to transport and place	Cubic Yards	$94.25	4	$377.00
Aggregate, Gravel, Graded	46	Gravel, includes materials, equipment and labor to transport and place. Includes washed and unwashed gravel.	Cubic Yards	$45.42	135	$6,131.70
Manhole, 4 ft x 4 ft	1053	Precast Manhole with base and top delivered. 4 feet diameter x 4 feet. Includes materials only.	Each	$1,290.85	1	$1,290.85
Pipe, HDPE, CPT, Double Wall, Soil Tight, 36 in.	1248	Pipe, Corrugated HDPE Double Wall, 36 inch diameter with soil tight joints - AASHTO M294. Material cost only.	Feet	$44.82	200	$8,964.00
Headwall, stone or concrete bag	1418	Laid up stone or concrete bag headwall for a pipe inlet. Square Foot unit is a vertical area measurement of the headwall cross-section. Includes materials, equipment and labor.	Square Feet	$38.63	10	$386.30
Rat Guard, 36 in. diameter	2538	Mild steel prong type rodent guard, 36 inch diameter. Attaches to the top of outlet pipe. Includes materials and shipping only.	Each	$148.21	1	$148.21
Mobilization						
Mobilization, medium equipment	1139	Equipment with 70-150 HP or typical weights between 14,000 and 30,000 pounds.	Each	$255.65	1	$255.65
Mobilization, large equipment	1140	Equipment >150HP or typical weights greater than 30,000 pounds or loads requiring over width or over length permits.	Each	$488.10	1	$488.10

Practice: 620 - Underground Outlet

Scenario: #15 - 4 to 6 inch Polyvinyl Chloride (PVC) Pipe with Catch Basin w/ Horizontal Boring

Scenario Description:

Install 150 feet of 6" approved plastic pipe to convey stormwater from one location to a suitable and stable outlet. Trench is excavated 52" deep and 24" wide by hydraulic track excavator. 50' of pipe installed under road with horizontal boring equipment. Costs include 6" SDR-35 pipe, Precast concrete drop inlet with steel grate, trench excavation, trench backfill, hor. boring equipment, rodent guard and laid up stone headwall at outlet. This practice is often installed in conjunction with terraces, diversions, sediment control basins, waterways, roof runoff structures, or simlar practices.

Before Situation:

Excessive sedimentation and soil erosion as a result of gully, rill or sheet erosion which exceeds "T" from farm fields and other locations. Also, roof runoff or surface runoff that becomes contaminated with agricultural wastes significantly contributes to the amount of runoff that has to be stored or treated.

After Situation:

Field system meets "T" or "clean" storm water runoff is diverted away from an agricultural waste management system to minimize the volume of runoff that is contaminated by agricultural waste. Associated practices are Critical Area Planting (342), Grassed Waterway (412), Terrace (600), Diversion (342), Water and Sediment Control Basin (638), Roof Runoff Structure (558), and Subsurface Drainage (606)

Feature Measure: Length of Conduit

Scenario Unit: Feet

Scenario Typical Size: 150.0

Scenario Total Cost: $9,767.63

Scenario Cost/Unit: $65.12

Cost Details:

Component Name	ID	Description	Unit	Cost	QTY	Total
Equipment Installation						
Earthfill, Manually Compacted	50	Earthfill, manually compacted, includes equipment and labor	Cubic Yards	$6.02	11	$66.22
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.	Hours	$109.36	4	$437.44
Horizontal Boring, Greater Than 3 in. diameter	1132	Includes equipment, labor and setup.	Feet	$111.55	50	$5,577.50
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 Yards	$1.53	50	$76.50
Compaction, earthfill, vibratory plate	1260	Compaction of earthfill with a walk behind vibratory plate compactor in typical 6-8 inch thick lifts, 2 passes. Includes equipment and labor.	Cubic Yards	$2.21	22	$48.62
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.	Hours	$27.56	6	$165.36
Equipment Operators, Heavy	233	Includes: Cranes, Hydraulic Excavators >=50 HP, Dozers, Paving Machines, Rock Trenchers, Trenchers >=12 in., Dump Trucks, Ag Equipment >=150 HP, Scrapers, Water Wagons.	Hours	$38.00	4	$152.00
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.	Hours	$46.88	6	$281.28
Materials						
Rock Riprap, Placed with geotextile	44	Rock Riprap, placed with geotextile, includes materials, equipment and labor to transport and place	Cubic Yards	$94.25	1	$94.25
Pipe, PVC, 6 in., SDR 35	993	Materials: - 6 inch - PVC - SDR 35 - ASTM D3034	Feet	$4.43	150	$664.50
Catch Basin, concrete, 3 ft. x 3 ft. x 6 ft.	1258	Catch Basin, Precast Concrete, 3 feet square or round, cast grate, 6 feet deep. Includes materials, equipment and labor.	Each	$1,298.17	1	$1,298.17
Headwall, stone or concrete bag	1418	Laid up stone or concrete bag headwall for a pipe inlet. Square Foot unit is a vertical area measurement of the headwall cross-section. Includes materials, equipment and labor.	Square Feet	$38.63	10	$386.30
Rat Guard, 6 in. diameter	2529	Mild steel prong type rodent guard, 6 inch diameter. Attaches to the top of outlet pipe. Includes materials and shipping only.	Each	$8.19	1	$8.19
Mobilization						
Mobilization, medium equipment	1139	Equipment with 70-150 HP or typical weights between 14,000 and 30,000 pounds.	Each	$255.65	2	$511.30

Practice: 620 - Underground Outlet

Scenario: #16 - 8 to 12 inch High Density Polyethylene (HDPE) Pipe with Catch Basin w/ Horizontal Boring

Scenario Description:

Install 150 feet of 10" approved plastic pipe to convey stormwater from one location to a suitable and stable outlet. Trench Excavation is 58" deep and 28" wide. 50' of pipe installed under road with horizontal boring equipment. Costs include 10" HDPE pipe, Precast concrete drop inlet with steel grate, trench excavation, trench backfill, hor. boring equipment, rodent guard and laid up stone headwall at outlet. This practice is often installed in conjunction with terraces, diversions, sediment control basins, waterways, roof runoff structures, or simlar practices.

Before Situation:

Excessive sedimentation and soil erosion as a result of gully, rill or sheet erosion which exceeds "T" from farm fields and other locations. Also, roof runoff or surface runoff that becomes contminated with agricultural wastes that significantly contributes to the amount of runoff that has to be stored or treated.

After Situation:

Field system meets "T" or "clean" storm water runoff is diverted away from an agricultural waste management system to minimize the volume of runoff that is contaminated by agricultural waste. Associated practices are Critical Area Planting (342), Grassed Waterway (412), Terrace (600), Diversion (342), Water and Sediment Control Basin (638), and Subsurface Drainage (606)

Feature Measure: Length of Conduit

Scenario Unit: Feet

Scenario Typical Size: 150.0

Scenario Total Cost: $10,840.57

Scenario Cost/Unit: $72.27

Cost Details:

Component Name	ID	Description	Unit	Cost	QTY	Total
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 Yards	$2.31	97	$224.07
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.	Hours	$109.36	4	$437.44
Horizontal Boring, Greater Than 3 in. diameter	1132	Includes equipment, labor and setup.	Feet	$111.55	50	$5,577.50
Compaction, earthfill, vibratory plate	1260	Compaction of earthfill with a walk behind vibratory plate compactor in typical 6-8 inch thick lifts, 2 passes. Includes equipment and labor.	Cubic Yards	$2.21	36	$79.56
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.	Hours	$27.56	6	$165.36
Equipment Operators, Heavy	233	Includes: Cranes, Hydraulic Excavators >=50 HP, Dozers, Paving Machines, Rock Trenchers, Trenchers >=12 in., Dump Trucks, Ag Equipment >=150 HP, Scrapers, Water Wagons.	Hours	$38.00	4	$152.00
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.	Hours	$46.88	2	$93.76
Materials						
Rock Riprap, Placed with geotextile	44	Rock Riprap, placed with geotextile, includes materials, equipment and labor to transport and place	Cubic Yards	$94.25	1	$94.25
Aggregate, Sand, Graded, Washed	45	Sand, typical ASTM C33 gradation, includes materials, equipment and labor to transport and place	Cubic Yards	$43.40	26	$1,128.40
Pipe, HDPE, CPT, Double Wall, Soil Tight, 10 in.	1243	Pipe, Corrugated HDPE Double Wall, 10 inch diameter with soil tight joints - AASHTO M252. Material cost only.	Feet	$6.22	150	$933.00
Catch Basin, concrete, 3 ft. x 3 ft. x 6 ft.	1258	Catch Basin, Precast Concrete, 3 feet square or round, cast grate, 6 feet deep. Includes materials, equipment and labor.	Each	$1,298.17	1	$1,298.17
Headwall, stone or concrete bag	1418	Laid up stone or concrete bag headwall for a pipe inlet. Square Foot unit is a vertical area measurement of the headwall cross-section. Includes materials, equipment and labor.	Square Feet	$38.63	10	$386.30
Rat Guard, 10 in. diameter	2531	Mild steel prong type rodend guard, 10 inch diameter. Attaches to the top of outlet pipe. Includes materials and shipping only.	Each	$15.11	1	$15.11
Mobilization						
Mobilization, medium equipment	1139	Equipment with 70-150 HP or typical weights between 14,000 and 30,000 pounds.	Each	$255.65	1	$255.65

Practice: 629 - Waste Treatment

Scenario: #2 - Milking Parlor Waste Treatment System with Dosing System and Bark Beds

Scenario Description:

This practice scenario includes a dosed treatment system with bark bed for milking parlor wastewater. Bark beds may be used where the following minimum separations can be achieved to the bottom of the treatment area after grading: two feet to seasonal groundwater and three feet to bedrock. Bark beds rely on the soil profile to reduce BOD5 levels in the wastewater. Bark materials provide some aeration of the soil surface and insulate the infiltration area in the winter and allows for evaporation in the summer.The purpose of the practice is to address resource concerns related to water quality degradation due to (excess nutrient, salts and pathogens). Associated practices: Nutrient Management (590), Pumping Plant (533), Fence (382), Waste Storage Facility (313), Diversion (362), Critical Area Seeding (342), Waste Transfer (634)

Before Situation:

Milkhouse waste water currently outlets in an untreated manner which presents potential soil, water and air quality concerns.

After Situation:

This scenario assumes that the treatment system is designed for 500 gal/day of wastewater from the milking parlor. It assumes pre-treatment in two tanks. The pumping tank is under PS 634-Waste Transfer and the 2" solid handling sewage pump is under PS 533-Pumping Plant. The grease trap acts as the primary settling basin. The settling tanks are equiped with effluent filters. The wastewater is pressure dosed from the pumping tank to the treatment bed (bark bed or leaching gallery). This treatment method relies primarily on the soil profile to reduce BOD5 levels. This scenario assumes that the treatment bed is dosed at 0.16 gal/square ft (3125 sq ft). To maintain bark bed performance, bark needs to be replaced or added every 3 to 5 years as an O&M task. This practice scenario reduces nutrient content, organic strength, or pathogen levels of agricultural waste; improve air quality by reducing odors and gaseous emissions (methane or ammonia).

Feature Measure: Bark Bed Treatment Area (SF)

Scenario Unit: Square Feet

Scenario Typical Size: 3,125.0

Scenario Total Cost: $39,806.88

Scenario Cost/Unit: $12.74

Cost Details:

Component Name	ID	Description	Unit	Cost	QTY	Total
Equipment Installation						
Earthfill, Manually Compacted	50	Earthfill, manually compacted, includes equipment and labor	Cubic Yards	$6.02	250	$1,505.00
Trenching, Earth, 12 in. x 48 in.	53	Trenching, earth, 12 inch wide x 48 inch depth, includes equipment and labor for trenching and backfilling	Feet	$1.38	460	$634.80
Aggregate, Wood Chips	1098	Includes materials, equipment and labor	Cubic Yards	$48.86	350	$17,101.00
Stripping and stockpiling, topsoil	1199	Stripping and stockpiling of topsoil adjacent to stripping area. Includes equipment and labor.	Cubic Yards	$0.97	116	$112.52
Excavation, common earth, large equipment, 150 ft	1223	Bulk excavation of common earth including sand and gravel with dozer >100 HP with average push distance of 150 feet. Includes equipment and labor.	Cubic Yards	$4.06	402	$1,632.12
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.	Hours	$37.19	80	$2,975.20
Materials						
Pipe, PVC, 2 in., SCH 40	976	Materials: - 2 inch - PVC - SCH 40 - ASTM D1785	Feet	$1.29	290	$374.10
Pipe, PVC, 4 in., SCH 40	978	Materials: - 4 inch - PVC - SCH 40 - ASTM D1785	Feet	$3.82	260	$993.20
Pipe, PVC, 6 in., SCH 40	980	Materials: - 6 inch - PVC - SCH 40 - ASTM D1785	Feet	$6.74	200	$1,348.00
Aggregate, Gravel, Ungraded, Quarry Run	1099	Includes materials, equipment and labor	Cubic Yards	$34.43	130	$4,475.90
Geotextile, non-woven, light weight	1209	Non-woven less than 8 ounce/square yard geotextile with staple anchoring. Materials and shipping only.	Square Yard	$1.64	400	$656.00
Prefabricated concrete septic tank, 1500 gal	1738	Precast concrete septic tank, 1,500 gal. Materials only.	Each	$1,815.25	2	$3,630.50
Filter, effluent, municipal grade	2063	Effluent filter rated 8,000 to 10,000 gallons per day with 1/16" to 1/32" filtration. Includes materials and shipping only.	Each	$354.58	2	$709.16
Riser, Septic Tank	2067	24 inch HDPE riser with cover. Materials only.	Each	$219.51	4	$878.04
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	$70.59	2	$141.18

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	$171.94	4	$687.76
Mobilization, large equipment	1140	Equipment >150HP or typical weights greater than 30,000 pounds or loads requiring over width or over length permits.	Each	$488.10	4	$1,952.40

Practice: 629 - Waste Treatment

Scenario: #3 - Milkhouse Wastewater Treatment with Dosing System and Bark Mounds

Scenario Description:

This practice scenario includes a dosed treatment system with bark mounds for milking parlor wastewater. The unit refers to the square footage of the organic filter mound foot print. Bark mounds may be used on level area requiring no grading where the following minimum separations can be achieved to the bottom of the mound: two feet to seasonal groundwater and three feet to bedrock. This treatment method relies primarily on the bark media to reduce BOD5 levels. Treatment takes place primarily in the above-ground mounds and at the mound/soil interface. The purpose of the practice is to address resource concerns related to water quality degradation due to (excess nutrient, salts and pathogens). Associated practices: Nutrient Management (590), Pumping Plant (533), Fence (382), Waste Storage Facility (313), Diversion (362), Critical Area Seeding (342), Waste Transfer (634)

Before Situation:

Milkhouse waste water currently outlets in an untreated manner which presents potential soil, water and air quality concerns.

After Situation:

This scenario assumes that the treatment system is designed for 500 gal/day of wastewater from the milking parlor. It assumes pre-treatment in two tanks. The pumping tank is under PS 634-Waste Transfer and the 2" solid handling sewage pump is under PS 533-Pumping Plant. The grease trap acts as the primary settling basin. The settling tanks are equiped with effluent filters. The wastewater is then pressure dosed from the pumping tank to the treatment filter. Effluent is directed to separate bark mound(s) with a sequencing valve and manifold. The bark filter mounds are typically trapezoidal in shape with a 23ft base, 5ft depth and 8ft top width, 50ft long. The wastewater distribution pipe is placed in the mound on top of 3ft of compacted shredded bark. A spray chamber is placed over the distribution pipe to promote effluent distribution across the bark mound and enhance aeration for treatment. The spray chambers are then covered with 1ft of shredded bark to minimize oders and provide insulation during cold weather operation. This scenario for a 500gpd system assumes that the treatment area is dosed at 0.16 gal/square ft (3125 sq ft). To maintain bark mound performance, bark needs o be replaced or added every 3 to 5 years as an O&M task. This practice scenario reduces nutrient content, organic strength, or pathogen levels of agricultural waste; improve air quality by reducing odors and gaseous emissions (methane or ammonia).

Feature Measure: Bark Bed Treatment Area (SF)

Scenario Unit: Square Feet

Scenario Typical Size: 3,125.0

Scenario Total Cost: $45,010.54

Scenario Cost/Unit: $14.40

Cost Details:

Component Name	ID	Description	Unit	Cost	QTY	Total
Equipment Installation						
Earthfill, Manually Compacted	50	Earthfill, manually compacted, includes equipment and labor	Cubic Yards	$6.02	250	$1,505.00
Trenching, Earth, 12 in. x 48 in.	53	Trenching, earth, 12 inch wide x 48 inch depth, includes equipment and labor for trenching and backfilling	Feet	$1.38	450	$621.00
Skidsteer, 80 HP	933	Skidsteer loader with horsepower range of 60 to 90. Equipment and power unit costs. Labor not included.	Hours	$55.01	10	$550.10
Aggregate, Wood Chips	1098	Includes materials, equipment and labor	Cubic Yards	$48.86	550	$26,873.00
Excavation, common earth, large equipment, 150 ft	1223	Bulk excavation of common earth including sand and gravel with dozer >100 HP with average push distance of 150 feet. Includes equipment and labor.	Cubic Yards	$4.06	316	$1,282.96
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.	Hours	$37.19	48	$1,785.12
Materials						
Pipe, PVC, 1 in., SCH 40	973	Materials: - 1 inch - PVC - SCH 40 - ASTM D1785	Feet	$0.61	640	$390.40
Pipe, PVC, 2 in., SCH 40	976	Materials: - 2 inch - PVC - SCH 40 - ASTM D1785	Feet	$1.29	100	$129.00
Pipe, PVC, 4 in., SCH 40	978	Materials: - 4 inch - PVC - SCH 40 - ASTM D1785	Feet	$3.82	250	$955.00
Pipe, PE, 2 in., DR 9	1000	Materials: - 2 inch - PE - 160 psi - ASTM D3035 DR 9	Feet	$1.93	250	$482.50
Aggregate, Gravel, Ungraded, Quarry Run	1099	Includes materials, equipment and labor	Cubic Yards	$34.43	12	$413.16
Aggregate, gravel, washed, pea gravel	1331	Washed and graded pea gravel river stone. Includes materials and local delivery within 20 miles of quarry.	Cubic Yards	$48.83	17	$830.11
Prefabricated concrete septic tank, 1500 gal	1738	Precast concrete septic tank, 1,500 gal. Materials only.	Each	$1,815.25	2	$3,630.50
Filter, effluent, municipal grade	2063	Effluent filter rated 8,000 to 10,000 gallons per day with 1/16" to 1/32" filtration. Includes materials and shipping only.	Each	$354.58	2	$709.16

Valve, distribution	2064	Sequencing valve, 4 or 6 way, for pressure dosing wastewater. Includes materials and shipping only.	Each	$146.09	1	$146.09
Arch septic leaching chamber, HDPE	2066	HDPE leaching galley, 2.5 to 3 feet wide x 6 to 8 feet long. Materials only.	Feet	$6.78	270	$1,830.60
Riser, Septic Tank	2067	24 inch HDPE riser with cover. Materials only.	Each	$219.51	4	$878.04
Mobilization						
Mobilization, medium equipment	1139	Equipment with 70-150 HP or typical weights between 14,000 and 30,000 pounds.	Each	$255.65	4	$1,022.60
Mobilization, large equipment	1140	Equipment >150HP or typical weights greater than 30,000 pounds or loads requiring over width or over length permits.	Each	$488.10	2	$976.20

Practice: 629 - Waste Treatment

Scenario: #9 - Dairy - MHMP STS Leaching Galleries

Scenario Description:

This practice scenario consists of a subsurface treatment system using leaching galleries to treat wastewater from a small milk house and milking parlor. This system would apply to small dairy farms (up to 25 cows). This system assumes manure is scraped and removed. Raw milk also should not be allowed into this treatment system. Scraped manure and raw milk should be handled using other practices such as 313 Waste Storage Facility. Leaching galleries may be used where the following minimum separations can be achieved to the bottom of the gallery: two feet to seasonal high groundwater and four feet to bedrock. Possible associated practices include but are not limited to 533 Pumping Plant, 342 Critical Area Planting, 634 Waste Transfer. 313 Waste Storage Facility, or 362 Diversion.

Before Situation:

Milkhouse waste water currently outlets in an untreated manner which presents potential soil, water and air quality concerns..

After Situation:

This scenario assumes that the treatment system has a design flow of 200 gal/day of wastewater from the milkhouse and milking parlor. Using typical soil conditions and typical waste characteristics this equates to approximately 750 sf of leaching area necessary. It assumes pre-treatment in two tanks. The grease trap acts as the primary settling basin. The secondary settling tank is equiped with an effluent filter. The wastewater then goes to a distribution box that apportions the wastewater to the subsurface treatment system consisting of leaching galleries with 1 foot of 1"stone either side. The combination of leaching gallery and stone treats 8.8 sf of leaching area per linear foot. This practice scenario reduces nutrient content, organic strength, or pathogen levels of agricultural waste; improves air quality by reducing odors and gaseous emissions (methane or ammonia).

Feature Measure: Design Flow in Gallons per Day

Scenario Unit: Gallons per Day

Scenario Typical Size: 200.0

Scenario Total Cost: $18,462.15

Scenario Cost/Unit: $92.31

Cost Details:

Component Name	ID	Description	Unit	Cost	QTY	Total
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 Yards	$481.12	0.2	$96.22
Earthfill, Manually Compacted	50	Earthfill, manually compacted, includes equipment and labor	Cubic Yards	$6.02	130	$782.60
Trenching, Earth, 12 in. x 48 in.	53	Trenching, earth, 12 inch wide x 48 inch depth, includes equipment and labor for trenching and backfilling	Feet	$1.38	150	$207.00
Stripping and stockpiling, topsoil	1199	Stripping and stockpiling of topsoil adjacent to stripping area. Includes equipment and labor.	Cubic Yards	$0.97	48	$46.56
Excavation, common earth, large equipment, 150 ft	1223	Bulk excavation of common earth including sand and gravel with dozer >100 HP with average push distance of 150 feet. Includes equipment and labor.	Cubic Yards	$4.06	200	$812.00
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.	Hours	$37.19	64	$2,380.16
Materials						
Aggregate, Sand, Graded, Washed	45	Sand, typical ASTM C33 gradation, includes materials, equipment and labor to transport and place	Cubic Yards	$43.40	16	$694.40
Aggregate, Gravel, Graded	46	Gravel, includes materials, equipment and labor to transport and place. Includes washed and unwashed gravel.	Cubic Yards	$45.42	5	$227.10
Pipe, PVC, 4 in., SCH 40	978	Materials: - 4 inch - PVC - SCH 40 - ASTM D1785	Feet	$3.82	150	$573.00
Aggregate, Gravel, Ungraded, Quarry Run	1099	Includes materials, equipment and labor	Cubic Yards	$34.43	8	$275.44
Geotextile, non-woven, light weight	1209	Non-woven less than 8 ounce/square yard geotextile with staple anchoring. Materials and shipping only.	Square Yard	$1.64	60	$98.40
Prefabricated concrete septic tank, 1500 gal	1738	Precast concrete septic tank, 1,500 gal. Materials only.	Each	$1,815.25	2	$3,630.50
Filter, effluent, municipal grade	2063	Effluent filter rated 8,000 to 10,000 gallons per day with 1/16" to 1/32" filtration. Includes materials and shipping only.	Each	$354.58	1	$354.58
Riser, Septic Tank	2067	24 inch HDPE riser with cover. Materials only.	Each	$219.51	5	$1,097.55
Leaching Galley, 4 ft. X 4 ft. X 3 ft.	2575	Leaching galley, precast concrete 4 feet X 4 feet X 3 feet. Materials only.	Each	$233.25	22	$5,131.50

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.	Dollars	$1.00	250	$250.00
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	$70.59	2	$141.18
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	$171.94	4	$687.76
Mobilization, large equipment	1140	Equipment >150HP or typical weights greater than 30,000 pounds or loads requiring over width or over length permits.	Each	$488.10	2	$976.20

Practice: 629 - Waste Treatment

Scenario: #18 - Milking Parlor Waste Treatment System with Dosing System

Scenario Description:

This practice scenario includes a dosed treatment system for milking parlor wastewater that will outlet to a constructed wetland and/or vegetated treatment area and/or other acceptable treatment. The purpose of the practice is to address resource concerns related to water quality degradation due to (excess nutrient, salts and pathogens). Associated practices: Constructed Wetland (656), Vegetated Treatment Area (635), Waste Transfer (634), Nutrient Management (590), Pumping Plant (533), Fence (382), & Waste Storage Facility (313)

Before Situation:

Milkhouse waste water currently outlets in an untreated manner which presents potential soil, water and air quality concerns.

After Situation:

This scenario assumes that the treatment system is designed for 500 gal/day of wastewater from the milking parlor. It assumes a two tank scenario. The grease trap acts as the primary settling basin. The wastewater overflows into the septic tank, which is then dosed to a treatment area (constructed wetland and/or vegetated treatment area and/or other acceptable treatment). This practice scenario reduces nutrient content, organic strength, or pathogen levels of agricultural waste; improve air quality by reducing odors and gaseous emissions (methane or ammonia).

Feature Measure: Design Flow

Scenario Unit: Gallons per Day

Scenario Typical Size: 500.0

Scenario Total Cost: $11,261.00

Scenario Cost/Unit: $22.52

Cost Details:

Component Name	ID	Description	Unit	Cost	QTY	Total
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	$109.25	1	$109.25
Equipment Installation						
Earthfill, Manually Compacted	50	Earthfill, manually compacted, includes equipment and labor	Cubic Yards	$6.02	118	$710.36
Trenching, Earth, 12 in. x 48 in.	53	Trenching, earth, 12 inch wide x 48 inch depth, includes equipment and labor for trenching and backfilling	Feet	$1.38	450	$621.00
Excavation, common earth, large equipment, 150 ft	1223	Bulk excavation of common earth including sand and gravel with dozer >100 HP with average push distance of 150 feet. Includes equipment and labor.	Cubic Yards	$4.06	138	$560.28
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.	Hours	$37.19	18	$669.42
Materials						
Pipe, PVC, 6 in., SCH 40	980	Materials: - 6 inch - PVC - SCH 40 - ASTM D1785	Feet	$6.74	200	$1,348.00
Pipe, PE, 2 in., DR 9	1000	Materials: - 2 inch - PE - 160 psi - ASTM D3035 DR 9	Feet	$1.93	250	$482.50
Aggregate, Gravel, Ungraded, Quarry Run	1099	Includes materials, equipment and labor	Cubic Yards	$34.43	3	$103.29
Prefabricated concrete septic tank, 1500 gal	1738	Precast concrete septic tank, 1,500 gal. Materials only.	Each	$1,815.25	2	$3,630.50
Dosing System, siphon	1763	Dosing system siphon with typical 3 inch diameter and 12 inch drawdown. Includes materials and shipping only.	Each	$245.06	1	$245.06
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	$70.59	2	$141.18
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	$171.94	4	$687.76
Mobilization, large equipment	1140	Equipment >150HP or typical weights greater than 30,000 pounds or loads requiring over width or over length permits.	Each	$488.10	4	$1,952.40

Practice: 632 - Waste Separation Facility

Scenario: #1 - Mechanical Separation Facility--Large Screw or Roller Press (greater than 300 Animal Units)

Scenario Description:

A large mechanical separation facility to partition solids, liquids, and/or associated nutrients from animal waste streams typically used on facilities with greater than 300 animal units (AUs) . The partitioning of the previously mentioned components facilitates the protection of air and water quality, protects animal health, and improves the management of an animal waste management system. Mechanical separators may include, but are not limited to: static inclined screens , vibratory screens, rotating screens, screw or roller presses, or other systems. Associated practices include Nutrient Management (590), Composting Facility (317), Anaerobic Digester (366), Waste Storage Facility (313), Waste Recycling (633), Waste Transfer (634), Amendments for the Treatment of Agricultural Waste (591), Pumping Plant (533), Vegetated Treatment Area (635), Pond Lining or Sealing (521A-D), and Waste Treatment (629).

Before Situation:

Applicable to situations where partitioning solids, liquids, and nutrients will facilitate the management of an animal waste management system, improve air quality (reduce odors), and address water quality concerns.

After Situation:

One large mechanical separation facility (a screw press) installed at livestock facility before storage or treatment or after treatment, for example, after an anaerobic digester. Part of an animal waste management system.

Feature Measure: Item

Scenario Unit: Each

Scenario Typical Size: 1.0

Scenario Total Cost: $69,826.99

Scenario Cost/Unit: $69,826.99

Cost Details:

Component Name	ID	Description	Unit	Cost	QTY	Total
Equipment Installation						
Concrete, CIP, slab on grade, reinforced	37	Steel reinforced concrete formed and cast-in-placed as a slab on grade by chute placement. Typical strength is 3000 to 4000 psi. Includes materials, labor and equipment to transport, place and finish.	Cubic Yards	$362.36	10	$3,623.60
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.	Hours	$37.19	16	$595.04
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.	Hours	$27.56	32	$881.92
Materials						
Screw or Roller Press - Large	1951	Screw or Roller Press with a capacity of => 100 GPM. Includes materials and equipment.	Each	$63,871.25	1	$63,871.25
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	$171.94	2	$343.88
Mobilization, medium equipment	1139	Equipment with 70-150 HP or typical weights between 14,000 and 30,000 pounds.	Each	$255.65	2	$511.30

Practice: 632 - Waste Separation Facility

Scenario: #2 - Earthen Settling Structure

Scenario Description:

An earthen structure, such as a basin or a terrace or dike like structure, used to capture and separate a portion of the solids from a liquid stream from a feedlot or confinement facility. A concrete pad should be installed on the bottom of the basin and around outlet structures to facilitate cleanout. Removes as portion of the solids to facilitate waste handling and to address water quality concerns. Associated practices include Nutrient Management (590), Composting Facility (317), Anaerobic Digester (366), Waste Storage Facility (313), Waste Recycling (633), Waste Transfer (634), Vegetated Treatment Area (635), Pond Lining or Sealing (521A-D), and Waste Treatment (629).

Before Situation:

Applicable to situations where partitioning solids, liquids, and nutrients will facilitate the management of an animal waste management system, improve air quality (reduce odors), and address water quality concerns.

After Situation:

Earthen settling basin structure is 60 ft wide by 200 ft long average with 2:1 inside slopes. Basin is 3 ft deep, total with three screening outlet structures) constructed around or at a livestock feeding operation. Removes a portion of the solids that otherwise would leave with the runoff from an animal feeding operation. Part of an animal waste management system. Strike Full Volume includes freeboard, normal precipitation, solids build up, etc.

Feature Measure: "Strike Full" Volume

Scenario Unit: Cubic Feet

Scenario Typical Size: 36,000.0

Scenario Total Cost: $15,663.76

Scenario Cost/Unit: $0.44

Cost Details:

Component Name	ID	Description	Unit	Cost	QTY	Total
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 Yards	$481.12	12	$5,773.44
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 Yards	$2.31	1000	$2,310.00
Earthfill, Roller Compacted	49	Earthfill, roller or machine compacted, includes equipment and labor	Cubic Yards	$4.66	1000	$4,660.00
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.	Hours	$27.56	8	$220.48
Materials						
Aggregate, Gravel, Graded	46	Gravel, includes materials, equipment and labor to transport and place. Includes washed and unwashed gravel.	Cubic Yards	$45.42	15	$681.30
Weeping Wall	1765	Weeping wall or picket screen structure for solid settling basin. Materials only.	Feet	$22.80	24	$547.20
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	$70.59	3	$211.77
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	$171.94	3	$515.82
Mobilization, medium equipment	1139	Equipment with 70-150 HP or typical weights between 14,000 and 30,000 pounds.	Each	$255.65	1	$255.65
Mobilization, large equipment	1140	Equipment >150HP or typical weights greater than 30,000 pounds or loads requiring over width or over length permits.	Each	$488.10	1	$488.10

Practice: 632 - Waste Separation Facility

Scenario: #3 - Concrete Basin

Scenario Description:

A concrete structure, such as a basin with concrete walls and floor, used to capture and separate a portion of the solids from a liquid stream from a feedlot or confinement facility. Removes a portion of the solids to facilitate waste handling and to address water quality concerns. Typical scenario consist of a concrete basin which iw 20' wide x 30' long with 3' high concrete walls. A weeping/picket wall is located along one end to retain solids and to allow the liquid to pass through to another practice. Associated practices include Nutrient Management (590), Composting Facility (317), Anaerobic Digester (366), Waste Storage Facility (313), Waste Recycling (633), Waste Transfer (634), Pumping Plant (533), Vegetated Treatment Area (635), Pond Lining or Sealing (521A-D), and Waste Treatment (629).

Before Situation:

Applicable to situations where partitioning solids, liquids, and nutrients will facilitate the management of an animal waste management system, improve air quality (reduce odors), and address water quality concerns.

After Situation:

Practice helps to alleviate the wastewater from leaving the farm and improve surface and subsurface water resources. Also, the removal of liquid from the solid portion of the waste stream will alleviate air quality concerns.

Feature Measure: "Strike" Full Volume

Scenario Unit: Cubic Feet

Scenario Typical Size: 1,800.0

Scenario Total Cost: $12,900.98

Scenario Cost/Unit: $7.17

Cost Details:

Component Name	ID	Description	Unit	Cost	QTY	Total
Equipment Installation						
Concrete, CIP, slab on grade, reinforced	37	Steel reinforced concrete formed and cast-in-placed as a slab on grade by chute placement. Typical strength is 3000 to 4000 psi. Includes materials, labor and equipment to transport, place and finish.	Cubic Yards	$362.36	9	$3,261.24
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 Yards	$481.12	13	$6,254.56
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 Yards	$1.72	290	$498.80
Compaction, earthfill, vibratory plate	1260	Compaction of earthfill with a walk behind vibratory plate compactor in typical 6-8 inch thick lifts, 2 passes. Includes equipment and labor.	Cubic Yards	$2.21	70	$154.70
Materials						
Aggregate, Gravel, Graded	46	Gravel, includes materials, equipment and labor to transport and place. Includes washed and unwashed gravel.	Cubic Yards	$45.42	28	$1,271.76
Weeping Wall	1765	Weeping wall or picket screen structure for solid settling basin. Materials only.	Feet	$22.80	20	$456.00
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	$171.94	3	$515.82
Mobilization, large equipment	1140	Equipment >150HP or typical weights greater than 30,000 pounds or loads requiring over width or over length permits.	Each	$488.10	1	$488.10

Practice: 632 - Waste Separation Facility

Scenario: #4 - Concrete Sand Settling Lane

Scenario Description:

A concrete structure, a concrete lane with curbs, used to capture and separate a portion of the solids, mainly sand, from a liquid stream from a confinement facility. Removes as portion of the solids to facilitate waste handling and to address water quality concerns. Associated practices include Nutrient Management (590), Composting Facility (317), Anaerobic Digester (366), Waste Storage Facility (313), Waste Recycling (633), Waste Transfer (634), Pumping Plant (533), Vegetated Treatment Area (635), Pond Lining or Sealing (521A-D), and Waste Treatment (629).

Before Situation:

Applicable to situations where partitioning solids, liquids, and nutrients will facilitate the management of an animal waste management system, improve air quality (reduce odors), and address water quality concerns.

After Situation:

One concrete settling lane structure (25 ft wide by 200 ft long by 0.5 ft thick) constructed around or at a livestock feeding operation. Removes a portion of the solids (sand) that otherwise would leave with the runoff from an animal feeding operation. Part of an animal waste management system.

Feature Measure: Square Foot of Settling Lane Footpr

Scenario Unit: Square Feet

Scenario Typical Size: 5,000.0

Scenario Total Cost: $48,012.98

Scenario Cost/Unit: $9.60

Cost Details:

Component Name	ID	Description	Unit	Cost	QTY	Total
Equipment Installation						
Concrete, CIP, slab on grade, reinforced	37	Steel reinforced concrete formed and cast-in-placed as a slab on grade by chute placement. Typical strength is 3000 to 4000 psi. Includes materials, labor and equipment to transport, place and finish.	Cubic Yards	$362.36	90	$32,612.40
Concrete, CIP, formed reinforced	38	Steel reinforced concrete formed and cast-in-placed in formed structures such as walls or suspended slabs by chute placement. Typical strength is 3000 to 4000 psi. Includes materials, labor and equipment to transport, place and finish.	Cubic Yards	$481.12	20	$9,622.40
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 Yards	$2.31	180	$415.80
Earthfill, Roller Compacted	49	Earthfill, roller or machine compacted, includes equipment and labor	Cubic Yards	$4.66	90	$419.40
Materials						
Aggregate, Gravel, Graded	46	Gravel, includes materials, equipment and labor to transport and place. Includes washed and unwashed gravel.	Cubic Yards	$45.42	90	$4,087.80
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	$171.94	2	$343.88
Mobilization, medium equipment	1139	Equipment with 70-150 HP or typical weights between 14,000 and 30,000 pounds.	Each	$255.65	2	$511.30

Practice: 632 - Waste Separation Facility

Scenario: #13 - Mechanical Separation Facility

Scenario Description:

A small mechanical separation facility to partition solids, liquids, and/or associated nutrients from animal waste streams. The partitioning of the previously mentioned components facilitates the protection of air and water quality, protects animal health, and improves the management of an animal waste management system. Mechanical separators may include, but are not limited to: static inclined screens, vibratory screens, rotating screens, centrifuges, screw or roller presses, or other systems. Associated practices include Nutrient Management (590), Composting Facility (317), Anaerobic Digester (366), Waste Storage Facility (313), Waste Recycling (633), Waste Transfer (634), Amendments for the Treatment of Agricultural Waste (591), Pumping Plant (533), Vegetated Treatment Area (635), Pond Lining or Sealing (521A-D), and Waste Treatment (629).

Before Situation:

Applicable to situations where partitioning solids, liquids, and nutrients will facilitate the management of an animal waste management system, improve air quality (reduce odors), and address water quality concerns.

After Situation:

One small mechanical separation facility (a vibratory or rotating screen) installed at livestock facility before storage or treatment or after treatment, for example, after an anaerobic digester. Part of an animal waste management system.

Feature Measure: Item

Scenario Unit: Each

Scenario Typical Size: 1.0

Scenario Total Cost: $43,078.51

Scenario Cost/Unit: $43,078.51

Cost Details:

Component Name	ID	Description	Unit	Cost	QTY	Total
Equipment Installation						
Concrete, CIP, slab on grade, reinforced	37	Steel reinforced concrete formed and cast-in-placed as a slab on grade by chute placement. Typical strength is 3000 to 4000 psi. Includes materials, labor and equipment to transport, place and finish.	Cubic Yards	$362.36	10	$3,623.60
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.	Hours	$37.19	16	$595.04
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.	Hours	$27.56	32	$881.92
Materials						
Vibratory or Rotating Screen	1948	Vibratory or Rotating Screen, includes materials, shipping and equipment.	Each	$36,911.00	1	$36,911.00
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	$70.59	3	$211.77
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	$171.94	2	$343.88
Mobilization, medium equipment	1139	Equipment with 70-150 HP or typical weights between 14,000 and 30,000 pounds.	Each	$255.65	2	$511.30

Practice: 633 - Waste Recycling

Scenario: #1 - Export Ag Waste By-products Recycled for Use Off Farm

Scenario Description:

Agricultural by-products on the farm are in excess of the ability of the farm and limited crop landbase to utilize. These waste materials are accumulating in such a manner that the water, soil and/or air quality have resource concerns. The application of a waste management plan will recycle these by-products such that the quality of the natural resources will be improved and the environment protected. The agricultural by-products are tested and exported off the farm operation for external uses. Records are kept detailing disposition of the waste, including date, amount, and receiver of the waste. Results of the agricultural by-product laboratory analysis is also provided to the receiver. Associated practices: 313-Waste Storage Facility, 317-Composting Facility, 590-Nutrient Management

Before Situation:

Agricultural by-products are produced or accumulated on the farm in amounts that cannot be utilized by the farm without causing resource concerns such as degradation of water quality, soil health and/or air quality.

After Situation:

Twice a year the excess agricultural by-products that have been collected at the farm are sampled and laboratory tested to determine the characteristics of the waste material that is recycled. The results of this analysis will determine the basis of its use. The agricultural by-products are then handled according to the waste management system plan. The intended off-farm use of the recycled agricultural waste by-products will refer to the laboratory analysis. Records shall be kept of the analysis, dates and quantities of recycled waste exported.

Feature Measure: Farm

Scenario Unit: Each

Scenario Typical Size: 1.0

Scenario Total Cost: $473.36

Scenario Cost/Unit: $473.36

Cost Details:

Component Name	ID	Description	Unit	Cost	QTY	Total
Labor						
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.	Hours	$46.88	4	$187.52
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.	Hours	$102.76	2	$205.52
Materials						
Test, Manure Analysis	306	Moisture, Total N, P, K. Includes materials and shipping only.	Each	$40.16	2	$80.32

Practice: 633 - Waste Recycling

Scenario: #2 - Import Non-Ag Waste By-products, Compost with Manure for Use On Farm

Scenario Description:

A farm has soil quality reasource concerns. The farm also has an energy goal to reduce their use of transportation fuels and is interested in utilizing locally available material. The farm is located near a food processor that has excess waste available for recycling. The farm has agreed to receive an amount of waste material which it plans to mix with animal manure solids. This blended waste material will be composted. The finished compost product will be used both for animal bedding and land applied as a soil amendment and nutrient source. The land applied material will comply with the nutrient management plan for agronomic crop nutrient utilization. Records are kept to document the methods and utilization of the non-agricultural products for agricultural purposes. Associated practices: 313-Waste Storage Facility, 317-Composting Facility, 590-Nutrient Management

Before Situation:

A farm has a soil quality reasource concerns. The operator also has an energy goal to reduce the farm associated transportation fuels. Additional soil amendments could improve their soil quality but the local fertilizer dealer imports all their material by truck from out of state. Other non-agricultural by-products are locally available but cannot be applied directly on the land. The farm may be able to generate beneficial soil amendments by composting the non-agricultural by-products but does not know the best recipe to use for a compost mix, the time and temperatures required to break down the material or recommended rate of land application .

After Situation:

A dairy farm has soil quality resource concerns and plans to improve their soil by utilizing non-agricultural waste materials available locally. The dairy is located near an oyster producer that needs to dispose of excess oyster shells. The calcium in oyster shells can be used to buffer the pH of their soils. The dairy has agreed to receive excess oyster shells which are blended with dairy manure solids and composted. The finished product is laboratory tested to determine the characteristics such as pH and nutrient content. The composted product is used both for dairy bedding and land applied as a soil amendment and nutrient source. Recordkeeping is done for the quantity of non-agricultural material received, ratio blended with manure solids, composting temperatures and times with the corresponding tested sample analysis. Records of the recycled non-agricultural by-products applied to the land is maintained as part of their dairy nutrient management plan.

Feature Measure: Cubic Foot

Scenario Unit: Cubic Feet

Scenario Typical Size: 400.0

Scenario Total Cost: $1,451.28

Scenario Cost/Unit: $3.63

Cost Details:

Component Name	ID	Description	Unit	Cost	QTY	Total
Labor						
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.	Hours	$46.88	12	$562.56
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.	Hours	$102.76	6	$616.56
Materials						
Test, Compost Analysis	307	Moisture, Total N, P, K. Includes materials and shipping only.	Each	$45.36	6	$272.16

Practice: 633 - Waste Recycling

Scenario: #3 - Import Non-Agricultural By-Products, Land Applied

Scenario Description:

A farm has resource concerns about the low soil organic matter content on several fields. The fields are located where a source of municipal green waste may be available. The green, municipal waste could contain material such as food waste, green yard waste and waste from local processing facilities. The farmer agrees to recieve waste materials in bulk two times a year, once in the spring and once in the fall. A blended sample of the waste is tested for nutrients and any potential chemicals of concern. It is then land applied in such a manner that soil organic matter is enhanced, crop nutrents are available and soil compaction is minimized. Records of the tested samples and rates of land application are maintained and accounted for in the nutrient management plan. Associated practices: 590-Nutrient Management, (Temporary Field) Waste Storage

Before Situation:

A farm has several fields with low soil organic matter and is located near a community where the local municipality collects green waste. The farmer is concerned about land applying the green waste directly to the fields and that the applied material may tie-up nutrients as well as possible soil compaction issues from equipment the municipality may use for spreading. The farmer wants to make sure the waste material that may be applied is safe and existing soil quality conditions are protected before agreeing to recycle any imported green waste.

After Situation:

A farm has low soil organic matter content on several fields and can import non-agricultural green waste material. The farm imports the green waste material that has been chopped and screened for land application. The imported material is briefly stock piled, for no more than 7 days while a blended sample is tested. The sample is tested for nutrient content and any potential chemcials of concern. Based on results of the tested sample and in consultation with an agronomist the waste material is land applied on the agricultural fields. Soil is protected from compaction by applying the waste in an appropiate manner. Records of the sample test and rate of land application in the field are maintained. The sampled test information is used to adjust fertilizer application rates and to prevent crop nutrient tie-up resulting from increased carbon in the soil. The green waste recycling activity on the farm is documented and included in the nutrient management plan records.

Feature Measure: Ton

Scenario Unit: Ton

Scenario Typical Size: 20.0

Scenario Total Cost: $473.36

Scenario Cost/Unit: $23.67

Cost Details:

Component Name	ID	Description	Unit	Cost	QTY	Total
Labor						
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.	Hours	$46.88	4	$187.52
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.	Hours	$102.76	2	$205.52
Materials						
Test, Manure Analysis	306	Moisture, Total N, P, K. Includes materials and shipping only.	Each	$40.16	2	$80.32

Practice: 634 - Waste Transfer

Scenario: #1 - Agitator-small used for mixing a basin or pit no more than 10 ft. deep.

Scenario Description:

This scenario is for a manure and wastewater agitator associated with an agricultural production operation to transfer agricultural waste product from the production source to a storage facility for proper utilization. This agitator is typically no more than 15 HP and is used for smaller waste storage facilities that are less than 10 feet deep. This scenario does not include a pump. Associated practices may include: PS 313 Waste Storage Facility for storage structures; PS 533, Pumping Plant; PS 430, Irrigation Pipeline; PS 632, Solid/Liquid Waste Separation Facility; PS 468, Lined Waterway or Outlet; PS 590 Nutrient Management for waste application; PS 633, Waste Recycling The waste transfer equipment is installed to address water quality concerns by facilitating timely land application of waste at agronomic rates according to the nutrient management plan. This scenario addresses the potential for surface water and groundwater quality degradation.

Before Situation:

In this typical setting, the operator has a small waste storage structure from a confined animal feeding operation without an effective waste handling and transfer system to manage the waste stream departing from the facility.

After Situation:

The typical installation would be for a small manure 10 HP agitator to put settled manure solids into suspension for removal from an animal waste storage structure and transfer to the next step of waste treatment, utilization or storage. Part of an animal waste management system to address water quality concerns. If required a wastewater reception pit, concrete channel or transfer conduit scenario may need to be contracted to support the operation of this waste transfer system equipment.

Feature Measure: Agitator for wastewater, installed

Scenario Unit: Each

Scenario Typical Size: 1.0

Scenario Total Cost: $8,526.94

Scenario Cost/Unit: $8,526.94

Cost Details:

Component Name	ID	Description	Unit	Cost	QTY	Total
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.	Hours	$37.19	11	$409.09
Materials						
Manure agitator, mixing depth less than 10 feet.	1768	Agitator to move put settled manure solids into suspension for removal from an animal waste storage structure. Materials only.	Each	$7,976.67	1	$7,976.67
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	$70.59	2	$141.18

Practice: 634 - Waste Transfer

Scenario: #4 - Stacker (Manure Elevator)

Scenario Description:

Install 60' elevator to transfer solid or semi-solid manure from the barn to a waste storage facilty. Cost include elavator chute, drive unit, electric motor, chain w/ paddles, support system, freight, and labor to install the system.

Before Situation:

An area of waste production is separated from the waste storage facility and current operations may cause water quality concerns as it is not efficient in transporting the waste to the storage. Manure is heavily bedded and transferring manure via pump or gravility flow is not a viable option.

After Situation:

Install a 60 foot long elevator to transfer solid or semi-solid manure from the barn to a waste storage facility. This scenario includes the elevator chute, drive unit, electric motor, chains w/ paddles, support system, freight, and labor to assemble and install.

Feature Measure: Feet of Stacker Elevator

Scenario Unit: Feet

Scenario Typical Size: 60.0

Scenario Total Cost: $1,479.41

Scenario Cost/Unit: $24.66

Cost Details:

Component Name	ID	Description	Unit	Cost	QTY	Total
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.	Hours	$37.19	8	$297.52
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.	Hours	$27.56	20	$551.20
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.	Hours	$46.88	8	$375.04
Materials						
Deactivated. Manure Transfer, Elevator stacker	1774	60' manure elevator - Cost includes elevator chute, drive unit, electric motor, chain w/ paddles, and support system. Includes shipping.	Each	$0.00	1	$0.00
Mobilization						
Mobilization, medium equipment	1139	Equipment with 70-150 HP or typical weights between 14,000 and 30,000 pounds.	Each	$255.65	1	$255.65

Practice: 634 - Waste Transfer

Scenario: #7 - 6 inch PVC Gravity Pipe

Scenario Description:

6" Gravity flow conduit is typically a water tight PVC sanitary sewer pipe used to transfer wastewater by gravity from one location to another. The pipe conveys the waste liquid or wastewater between the waste collection point and a waste storage facility or waste treatment area. Adequate head on the pipe must be available for the gravity system to function. This practice includes transfer pipe plus all other fittings, trench excavation and backfill, labor and equipment for installation. The inlet structure or hopper is covered under a different scenario under 634 - Waste Transfer. This conduit is part of a manure transfer system for a planned waste management or comprehensive nutrient management plan. This scenario addresses the transport of liquid waste to a waste storage or treatment facility to prevent a water quality resource concern of excessive nutrients/organics and harmful levels of pathogens in surface water and/or excessive nutrients/organics in ground water. Associated practices may include: 313 - Waste Storage Facility; 561 - Heavy Use Area Protection; 533 - Pumping Plant; 430 - Irrigation Pipeline; 632 - Waste Separation Facility; 590 Nutrient Management

Before Situation:

An area of waste production is separated from the waste storage facility and current operations may cause water quality concerns as it is not efficient in transporting the waste to the storage. The site has a change in elevation between production area and treatment or storage structure that is adequate to provide sufficient head for a gravity flow conduit to transport the slurry waste liquid stream.

After Situation:

Install a 100 feet long gravity transfer pipe to collect and contain liquid waste, wastewater, and contaminated runoff to protect water quality resources. Pipe shall be 6" diameter PVC with a smooth interior and water tight joints. 6" diameter PVC sanitary sewer grade pipe that will flow to an outlet at the site of manure treatment or storage. This scenario includes the pipe, couplers and all other fittings, trench excavation, pipe bedding and elbows and backfill. Adequate head on the pipe must be available for the gravity system to function.

Feature Measure: Length of 6" PVC Pipe

Scenario Unit: Feet

Scenario Typical Size: 100.0

Scenario Total Cost: $1,612.37

Scenario Cost/Unit: $16.12

Cost Details:

Component Name	ID	Description	Unit	Cost	QTY	Total
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.	Hours	$62.17	6	$373.02
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.	Hours	$27.56	3	$82.68
Equipment Operators, Heavy	233	Includes: Cranes, Hydraulic Excavators >=50 HP, Dozers, Paving Machines, Rock Trenchers, Trenchers >=12 in., Dump Trucks, Ag Equipment >=150 HP, Scrapers, Water Wagons.	Hours	$38.00	6	$228.00
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.	Hours	$46.88	2	$93.76
Materials						
Aggregate, Gravel, Graded	46	Gravel, includes materials, equipment and labor to transport and place. Includes washed and unwashed gravel.	Cubic Yards	$45.42	3	$136.26
Pipe, PVC, 6 in., SDR 35	993	Materials: - 6 inch - PVC - SDR 35 - ASTM D3034	Feet	$4.43	100	$443.00
Mobilization						
Mobilization, medium equipment	1139	Equipment with 70-150 HP or typical weights between 14,000 and 30,000 pounds.	Each	$255.65	1	$255.65

Practice: 634 - Waste Transfer

Scenario: #8 - 12 inch HDPE Gravity Pipe

Scenario Description:

12" Gravity flow conduit is typically a large diameter water tight HDPE or PVC sanitary sewer pipe used to transfer manure by gravity from one location to another. The pipe conveys the slurry waste liquid or wastewater between the waste collection point and a waste storage facility or waste treatment area. Adequate head on the pipe must be available for the gravity system to function. This practice includes transfer pipe plus all other fittings, trench excavation and backfill, labor and equipment for installation. The inlet structure or hopper is covered under a different scenario under 634 - Waste Transfer. This conduit is part of a manure transfer system for a planned waste management or comprehensive nutrient management plan. This scenario addresses the transport of liquid waste to a waste storage or treatment facility to prevent a water quality resource concern of excessive nutrients/organics and harmful levels of pathogens in surface water and/or excessive nutrients/organics in ground water. Associated practices may include: 313 - Waste Storage Facility; 561 - Heavy Use Area Protection; 533 - Pumping Plant; 430 - Irrigation Pipeline; 632 - Waste Separation Facility; 590 Nutrient Management.

Before Situation:

An area of waste production is separated from the waste storage facility and current operations may cause water quality concerns as it is not efficient in transporting the waste to the storage. The site has a change in elevation between production area and treatment or storage structure that is adequate to provide sufficient head for a gravity flow conduit to transport the slurry waste liquid stream.

After Situation:

Install a 100 feet long gravity transfer pipe to collect and contain manure slurry, wastewater, contaminated runoff to protect water quality resources. Pipe shall be 6" diameter PVC with a smooth interior and water tight joints. 12" diameter water tight HDPE pipe that will flow to an outlet at the site of manure treatment or storage. This scenario includes the pipe, couplers and all other fittings, trench excavation, pipe bedding and elbows and backfill. Adequate head on the pipe must be available for the gravity system to function.

Feature Measure: Length of 12" HDPE Pipe

Scenario Unit: Feet

Scenario Typical Size: 100.0

Scenario Total Cost: $2,137.21

Scenario Cost/Unit: $21.37

Cost Details:

Component Name	ID	Description	Unit	Cost	QTY	Total
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.	Hours	$62.17	6	$373.02
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.	Hours	$27.56	3	$82.68
Equipment Operators, Heavy	233	Includes: Cranes, Hydraulic Excavators >=50 HP, Dozers, Paving Machines, Rock Trenchers, Trenchers >=12 in., Dump Trucks, Ag Equipment >=150 HP, Scrapers, Water Wagons.	Hours	$38.00	6	$228.00
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.	Hours	$46.88	2	$93.76
Materials						
Aggregate, Gravel, Graded	46	Gravel, includes materials, equipment and labor to transport and place. Includes washed and unwashed gravel.	Cubic Yards	$45.42	5	$227.10
Pipe, HDPE, CPT, Double Wall, Soil Tight, 12 in.	1244	Pipe, Corrugated HDPE Double Wall, 12 inch diameter with soil tight joints - AASHTO M294. Material cost only.	Feet	$8.77	100	$877.00
Mobilization						
Mobilization, medium equipment	1139	Equipment with 70-150 HP or typical weights between 14,000 and 30,000 pounds.	Each	$255.65	1	$255.65

Practice: 634 - Waste Transfer

Scenario: #9 - 18 inch HDPE Gravity Pipe

Scenario Description:

18" Gravity flow conduit is typically a large diameter water tight HDPE or PVC sanitary sewer pipe used to transfer manure by gravity from one location to another. The pipe conveys the slurry waste liquid or wastewater between the waste collection point and a waste storage facility or waste treatment area. Adequate head on the pipe must be available for the gravity system to function. This practice includes transfer pipe plus all other fittings, trench excavation and backfill, labor and equipment for installation. The inlet structure or hopper is covered under a different scenario under 634 - Waste Transfer. This conduit is part of a manure transfer system for a planned waste management or comprehensive nutrient management plan. This scenario addresses the transport of liquid waste to a waste storage or treatment facility to prevent a water quality resource concern of excessive nutrients/organics and harmful levels of pathogens in surface water and/or excessive nutrients/organics in ground water. Associated practices may include: 313 - Waste Storage Facility; 561 - Heavy Use Area Protection; 533 - Pumping Plant; 430 - Irrigation Pipeline; 632 - Waste Separation Facility; 590 Nutrient Management.

Before Situation:

An area of waste production is separated from the waste storage facility and current operations may cause water quality concerns as it is not efficient in transporting the waste to the storage. The site has a change in elevation between production area and treatment or storage structure that is adequate to provide sufficient head for a gravity flow conduit to transport the slurry waste liquid stream.

After Situation:

Install a 100 feet long gravity transfer pipe to collect and contain manure slurry, wastewater, contaminated runoff to protect water quality resources. Pipe shall be 15" diameter HDPE with a smooth interior and water tight joints. 18" diameter HDPE pipe that will flow to an outlet at the site of manure treatment or storage. This scenario includes the pipe, couplers and all other fittings, trench excavation, pipe bedding and elbows and backfill. Adequate head on the pipe must be available for the gravity system to function.

Feature Measure: Length of 18" HDPE Pipe

Scenario Unit: Feet

Scenario Typical Size: 100.0

Scenario Total Cost: $3,476.11

Scenario Cost/Unit: $34.76

Cost Details:

Component Name	ID	Description	Unit	Cost	QTY	Total
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.	Hours	$109.36	7	$765.52
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.	Hours	$27.56	4	$110.24
Equipment Operators, Heavy	233	Includes: Cranes, Hydraulic Excavators >=50 HP, Dozers, Paving Machines, Rock Trenchers, Trenchers >=12 in., Dump Trucks, Ag Equipment >=150 HP, Scrapers, Water Wagons.	Hours	$38.00	7	$266.00
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.	Hours	$46.88	2	$93.76
Materials						
Aggregate, Gravel, Graded	46	Gravel, includes materials, equipment and labor to transport and place. Includes washed and unwashed gravel.	Cubic Yards	$45.42	7	$317.94
Pipe, HDPE, CPT, Double Wall, Water Tight, 18 in.	2207	Pipe, Corrugated HDPE Double Wall 18 inch diameter with water tight joints meeting ASTM F477. Material cost only.	Feet	$16.67	100	$1,667.00
Mobilization						
Mobilization, medium equipment	1139	Equipment with 70-150 HP or typical weights between 14,000 and 30,000 pounds.	Each	$255.65	1	$255.65

Practice: 634 - Waste Transfer

Scenario: #10 - 24 inch HDPE Gravity Pipe

Scenario Description:

24" Gravity flow conduit is typically a large diameter water tight HDPE or PVC sanitary sewer pipe used to transfer manure by gravity from one location to another. The pipe conveys the slurry waste liquid or wastewater between the waste collection point and a waste storage facility or waste treatment area. Adequate head on the pipe must be available for the gravity system to function. This practice includes transfer pipe plus all other fittings, trench excavation and backfill, labor and equipment for installation. The inlet structure or hopper is covered under a different scenario under 634 - Waste Transfer. This conduit is part of a manure transfer system for a planned waste management or comprehensive nutrient management plan. This scenario addresses the transport of liquid waste to a waste storage or treatment facility to prevent a water quality resource concern of excessive nutrients/organics and harmful levels of pathogens in surface water and/or excessive nutrients/organics in ground water. Associated practices may include: 313 - Waste Storage Facility; 561 - Heavy Use Area Protection; 533 - Pumping Plant; 430 - Irrigation Pipeline; 632 - Waste Separation Facility; 590 Nutrient Management.

Before Situation:

An area of waste production is separated from the waste storage facility and current operations may cause water quality concerns as it is not efficient in transporting the waste to the storage. The site has a change in elevation between production area and treatment or storage structure that is adequate to provide sufficient head for a gravity flow conduit to transport the slurry waste liquid stream.

After Situation:

Install a 100 feet long gravity transfer pipe to collect and contain manure slurry, wastewater, contaminated runoff to protect water quality resources. Pipe shall be 24" diameter HDPE with a smooth interior and water tight joints. 24" diameter pipe will flow to an outlet at the site of manure treatment or storage. This scenario includes the pipe, couplers and all other fittings, trench excavation, pipe bedding and elbows and backfill. Adequate head on the pipe must be available for the gravity system to function.

Feature Measure: Length of 24" HDPE Pipe

Scenario Unit: Feet

Scenario Typical Size: 100.0

Scenario Total Cost: $4,703.05

Scenario Cost/Unit: $47.03

Cost Details:

Component Name	ID	Description	Unit	Cost	QTY	Total
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.	Hours	$109.36	8	$874.88
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.	Hours	$27.56	5	$137.80
Equipment Operators, Heavy	233	Includes: Cranes, Hydraulic Excavators >=50 HP, Dozers, Paving Machines, Rock Trenchers, Trenchers >=12 in., Dump Trucks, Ag Equipment >=150 HP, Scrapers, Water Wagons.	Hours	$38.00	8	$304.00
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.	Hours	$46.88	4	$187.52
Materials						
Aggregate, Gravel, Graded	46	Gravel, includes materials, equipment and labor to transport and place. Includes washed and unwashed gravel.	Cubic Yards	$45.42	10	$454.20
Pipe, HDPE, CPT, Double Wall, Soil Tight, 24 in.	1246	Pipe, Corrugated HDPE Double Wall, 24 inch diameter with soil tight joints - AASHTO M294. Material cost only.	Feet	$24.89	100	$2,489.00
Mobilization						
Mobilization, medium equipment	1139	Equipment with 70-150 HP or typical weights between 14,000 and 30,000 pounds.	Each	$255.65	1	$255.65

Practice: 634 - Waste Transfer

Scenario: #11 - 30 inch HDPE Gravity Pipe

Scenario Description:

30" Gravity flow conduit is typically a large diameter water tight HDPE or PVC sanitary sewer pipe used to transfer manure by gravity from one location to another. The pipe conveys the slurry waste liquid or wastewater between the waste collection point and a waste storage facility or waste treatment area. Adequate head on the pipe must be available for the gravity system to function. This practice includes transfer pipe plus all other fittings, trench excavation and backfill, labor and equipment for installation. The inlet structure or hopper is covered under a different scenario under 634 - Waste Transfer. This conduit is part of a manure transfer system for a planned waste management or comprehensive nutrient management plan. This scenario addresses the transport of liquid waste to a waste storage or treatment facility to prevent a water quality resource concern of excessive nutrients/organics and harmful levels of pathogens in surface water and/or excessive nutrients/organics in ground water. Associated practices may include: 313 - Waste Storage Facility; 561 - Heavy Use Area Protection; 533 - Pumping Plant; 430 - Irrigation Pipeline; 632 - Waste Separation Facility; 590 Nutrient Management.

Before Situation:

An area of waste production is separated from the waste storage facility and current operations may cause water quality concerns as it is not efficient in transporting the waste to the storage. The site has a change in elevation between production area and treatment or storage structure that is adequate to provide sufficient head for a gravity flow conduit to transport the slurry waste liquid stream.

After Situation:

Install a 100 feet long gravity transfer pipe to collect and contain manure slurry, wastewater, contaminated runoff to protect water quality resources. Pipe shall be 30" diameter HDPE with a smooth interior and water tight joints. 30" diameter pipe will flow to an outlet at the site of manure treatment or storage. This scenario includes the pipe, couplers and all other fittings, trench excavation, pipe bedding and elbows and backfill. Adequate head on the pipe must be available for the gravity system to function.

Feature Measure: Length of 30" HPDE Pipe

Scenario Unit: Feet

Scenario Typical Size: 100.0

Scenario Total Cost: $6,248.43

Scenario Cost/Unit: $62.48

Cost Details:

Component Name	ID	Description	Unit	Cost	QTY	Total
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.	Hours	$109.36	10	$1,093.60
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.	Hours	$27.56	6	$165.36
Equipment Operators, Heavy	233	Includes: Cranes, Hydraulic Excavators >=50 HP, Dozers, Paving Machines, Rock Trenchers, Trenchers >=12 in., Dump Trucks, Ag Equipment >=150 HP, Scrapers, Water Wagons.	Hours	$38.00	10	$380.00
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.	Hours	$46.88	4	$187.52
Materials						
Aggregate, Gravel, Graded	46	Gravel, includes materials, equipment and labor to transport and place. Includes washed and unwashed gravel.	Cubic Yards	$45.42	15	$681.30
Pipe, HDPE, CPT, Double Wall, Soil Tight, 30 in.	1247	Pipe, Corrugated HDPE Double Wall, 30 inch diameter with soil tight joints - AASHTO M294. Material cost only.	Feet	$34.85	100	$3,485.00
Mobilization						
Mobilization, medium equipment	1139	Equipment with 70-150 HP or typical weights between 14,000 and 30,000 pounds.	Each	$255.65	1	$255.65

Practice: 634 - Waste Transfer

Scenario: #12 - 3 inch PVC Pressure Pipe

Scenario Description:

3" PVC pipe conduit is typically a pressure rated water tight PVC pipe used to transfer manure from one location to another. Costs include pipe materials and assembly, trench excavation, pipe installation, bedding, and proper backfill. Pipe is typically installed 4 feet below grade. The pipe conveys the slurry waste liquid and wastewater between the waste collection point and a waste storage facility or waste treatment area. Transfer pump is covered under PS 533 - Pumping Plant. This conduit is part of a manure transfer system for a planned waste management or comprehensive nutrient management plan. This scenario addresses the transport of liquid waste to a waste storage or treatment facility to prevent a water quality resource concern of excessive nutrients/organics and harmful levels of pathogens in surface water and/or excessive nutrients/organics in ground water. Associated practices may include: PS 313 Waste Storage Facility for storage structures; PS 533, Pumping Plant; PS 430, Irrigation Pipeline; PS 632, Solid/Liquid Waste Separation Facility; PS 468, Lined Waterway or Outlet; PS 590 Nutrient Management for waste application; PS 633, Waste Recycling.

Before Situation:

An area of waste production is separated from the waste storage facility and current operations may cause water quality concerns as it is not efficient in transporting the waste to the storage. The site DOES NOT have sufficient change in elevation or head pressure between production area and treatment or storage structure that is adequate to transfer wastes via gravity flow conduit.

After Situation:

Install a 100 foot long pressure rated water tight PVC pipe. Pipe shall be 3" diameter pressure rated PVC pipe with water tight joints. 3" diameter PVC pipe will direct flow of manure and wastewater to manure treatment or storage facility. This scenario includes the pipe, couplers and all other fittings, trench excavation, pipe bedding and backfill. The transfer conduit will provide collection and containment of the manure slurry, thereby protecting water quality resources.

Feature Measure: Length of 3" PVC Pipe

Scenario Unit: Feet

Scenario Typical Size: 100.0

Scenario Total Cost: $1,380.91

Scenario Cost/Unit: $13.81

Cost Details:

Component Name	ID	Description	Unit	Cost	QTY	Total
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.	Hours	$62.17	6	$373.02
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.	Hours	$27.56	8	$220.48
Equipment Operators, Heavy	233	Includes: Cranes, Hydraulic Excavators >=50 HP, Dozers, Paving Machines, Rock Trenchers, Trenchers >=12 in., Dump Trucks, Ag Equipment >=150 HP, Scrapers, Water Wagons.	Hours	$38.00	6	$228.00
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.	Hours	$46.88	2	$93.76
Materials						
Pipe, PVC, 3 in., SDR 21	1721	Materials: - 3 inch - PVC - SDR 21 - ASTM D2241	Feet	$2.10	100	$210.00
Mobilization						
Mobilization, medium equipment	1139	Equipment with 70-150 HP or typical weights between 14,000 and 30,000 pounds.	Each	$255.65	1	$255.65

Practice: 634 - Waste Transfer

Scenario: #13 - 4 inch PVC Pressure Pipe

Scenario Description:

4" PVC pipe conduit is typically a pressure rated water tight PVC pipe used to transfer manure from one location to another. Costs include pipe materials and assembly, trench excavation, pipe installation, bedding, and proper backfill. Pipe is typically installed 4 feet below grade. The pipe conveys the slurry waste liquid and wastewater between the waste collection point and a waste storage facility or waste treatment area. Transfer pump is covered under PS 533 - Pumping Plant. This conduit is part of a manure transfer system for a planned waste management or comprehensive nutrient management plan. This scenario addresses the transport of liquid waste to a waste storage or treatment facility to prevent a water quality resource concern of excessive nutrients/organics and harmful levels of pathogens in surface water and/or excessive nutrients/organics in ground water. Associated practices may include: PS 313 Waste Storage Facility for storage structures; PS 533, Pumping Plant; PS 430, Irrigation Pipeline; PS 632, Solid/Liquid Waste Separation Facility; PS 468, Lined Waterway or Outlet; PS 590 Nutrient Management for waste application; PS 633, Waste Recycling.

Before Situation:

An area of waste production is separated from the waste storage facility and current operations may cause water quality concerns as it is not efficient in transporting the waste to the storage. The site DOES NOT have sufficient change in elevation or head pressure between production area and treatment or storage structure that is adequate to transfer wastes via gravity flow conduit.

After Situation:

Install a 100 foot long pressure rated water tight PVC pipe. Pipe shall be 4" diameter pressure rated PVC pipe with water tight joints. 4" diameter PVC pipe will direct flow of manure and wastewater to manure treatment or storage facility. This scenario includes the pipe, couplers and all other fittings, trench excavation, pipe bedding and backfill. The transfer conduit will provide collection and containment of the manure slurry, thereby protecting water quality resources.

Feature Measure: Length of 4" PVC Pipe

Scenario Unit: Feet

Scenario Typical Size: 100.0

Scenario Total Cost: $1,517.91

Scenario Cost/Unit: $15.18

Cost Details:

Component Name	ID	Description	Unit	Cost	QTY	Total
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.	Hours	$62.17	6	$373.02
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.	Hours	$27.56	8	$220.48
Equipment Operators, Heavy	233	Includes: Cranes, Hydraulic Excavators >=50 HP, Dozers, Paving Machines, Rock Trenchers, Trenchers >=12 in., Dump Trucks, Ag Equipment >=150 HP, Scrapers, Water Wagons.	Hours	$38.00	6	$228.00
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.	Hours	$46.88	2	$93.76
Materials						
Pipe, PVC, 4 in., SDR 21	986	Materials: - 4 inch - PVC - SDR 21 200 psi - ASTM D2241	Feet	$3.47	100	$347.00
Mobilization						
Mobilization, medium equipment	1139	Equipment with 70-150 HP or typical weights between 14,000 and 30,000 pounds.	Each	$255.65	1	$255.65

Practice: 634 - Waste Transfer

Scenario: #14 - 6 inch PVC Pressure Pipe

Scenario Description:

6" PVC pipe conduit is typically a pressure rated water tight PVC pipe used to transfer manure from one location to another. Costs include pipe materials and assembly, trench excavation, pipe installation, bedding, and proper backfill. Pipe is typically installed 4 feet below grade. The pipe conveys the slurry waste liquid and wastewater between the waste collection point and a waste storage facility or waste treatment area. Transfer pump is covered under PS 533 - Pumping Plant. This conduit is part of a manure transfer system for a planned waste management or comprehensive nutrient management plan. This scenario addresses the transport of liquid waste to a waste storage or treatment facility to prevent a water quality resource concern of excessive nutrients/organics and harmful levels of pathogens in surface water and/or excessive nutrients/organics in ground water. Associated practices may include: PS 313 Waste Storage Facility for storage structures; PS 533, Pumping Plant; PS 430, Irrigation Pipeline; PS 632, Solid/Liquid Waste Separation Facility; PS 468, Lined Waterway or Outlet; PS 590 Nutrient Management for waste application; PS 633, Waste Recycling.

Before Situation:

An area of waste production is separated from the waste storage facility and current operations may cause water quality concerns as it is not efficient in transporting the waste to the storage. The site DOES NOT have sufficient change in elevation or head pressure between production area and treatment or storage structure that is adequate to transfer wastes via gravity flow conduit.

After Situation:

Install a 100 foot long pressure rated water tight PVC pipe. Pipe shall be 6" diameter pressure rated PVC pipe with water tight joints. 6" diameter PVC pipe will direct flow of manure and wastewater to manure treatment or storage facility. This scenario includes the pipe, couplers and all other fittings, trench excavation, pipe bedding and backfill. The transfer conduit will provide collection and containment of the manure slurry, thereby protecting water quality resources.

Feature Measure: Length of 6" PVC Pipe

Scenario Unit: Feet

Scenario Typical Size: 100.0

Scenario Total Cost: $1,924.91

Scenario Cost/Unit: $19.25

Cost Details:

Component Name	ID	Description	Unit	Cost	QTY	Total
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.	Hours	$62.17	6	$373.02
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.	Hours	$27.56	8	$220.48
Equipment Operators, Heavy	233	Includes: Cranes, Hydraulic Excavators >=50 HP, Dozers, Paving Machines, Rock Trenchers, Trenchers >=12 in., Dump Trucks, Ag Equipment >=150 HP, Scrapers, Water Wagons.	Hours	$38.00	6	$228.00
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.	Hours	$46.88	2	$93.76
Materials						
Pipe, PVC, 6 in., SDR 21	987	Materials: - 6 inch - PVC - SDR 21 200 psi - ASTM D2241	Feet	$7.54	100	$754.00
Mobilization						
Mobilization, medium equipment	1139	Equipment with 70-150 HP or typical weights between 14,000 and 30,000 pounds.	Each	$255.65	1	$255.65

Practice: 634 - Waste Transfer

Scenario: #15 - 8 inch PVC Pressure Pipe

Scenario Description:

8" PVC pipe conduit is typically a pressure rated water tight PVC pipe used to transfer manure from one location to another. Costs include pipe materials and assembly, trench excavation, pipe installation, bedding, and proper backfill. Pipe is typically installed 4 feet below grade. The pipe conveys the slurry waste liquid and wastewater between the waste collection point and a waste storage facility or waste treatment area. Transfer pump is covered under PS 533 - Pumping Plant. This conduit is part of a manure transfer system for a planned waste management or comprehensive nutrient management plan. This scenario addresses the transport of liquid waste to a waste storage or treatment facility to prevent a water quality resource concern of excessive nutrients/organics and harmful levels of pathogens in surface water and/or excessive nutrients/organics in ground water. Associated practices may include: PS 313 Waste Storage Facility for storage structures; PS 533, Pumping Plant; PS 430, Irrigation Pipeline; PS 632, Solid/Liquid Waste Separation Facility; PS 468, Lined Waterway or Outlet; PS 590 Nutrient Management for waste application; PS 633, Waste Recycling.

Before Situation:

An area of waste production is separated from the waste storage facility and current operations may cause water quality concerns as it is not efficient in transporting the waste to the storage. The site DOES NOT have sufficient change in elevation or head pressure between production area and treatment or storage structure that is adequate to transfer wastes via gravity flow conduit.

After Situation:

Install a 100 foot long pressure rated water tight PVC pipe. Pipe shall be 8" diameter pressure rated PVC pipe with water tight joints. 8" diameter PVC pipe will direct flow of manure and wastewater to manure treatment or storage facility. This scenario includes the pipe, couplers and all other fittings, trench excavation, pipe bedding and backfill. The transfer conduit will provide collection and containment of the manure slurry, thereby protecting water quality resources.

Feature Measure: Length of 8" PVC Pipe

Scenario Unit: Feet

Scenario Typical Size: 100.0

Scenario Total Cost: $2,747.25

Scenario Cost/Unit: $27.47

Cost Details:

Component Name	ID	Description	Unit	Cost	QTY	Total
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.	Hours	$62.17	8	$497.36
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.	Hours	$27.56	10	$275.60
Equipment Operators, Heavy	233	Includes: Cranes, Hydraulic Excavators >=50 HP, Dozers, Paving Machines, Rock Trenchers, Trenchers >=12 in., Dump Trucks, Ag Equipment >=150 HP, Scrapers, Water Wagons.	Hours	$38.00	8	$304.00
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.	Hours	$46.88	3	$140.64
Materials						
Pipe, PVC, 8 in., SDR 21	988	Materials: - 8 inch - PVC - SDR 21 200 psi - ASTM D2241	Feet	$12.74	100	$1,274.00
Mobilization						
Mobilization, medium equipment	1139	Equipment with 70-150 HP or typical weights between 14,000 and 30,000 pounds.	Each	$255.65	1	$255.65

Practice: 634 - Waste Transfer

Scenario: #16 - 12 inch PVC Pressure Pipe

Scenario Description:

12" PVC pipe conduit is typically a pressure rated water tight PVC pipe used to transfer manure from one location to another. Costs include pipe materials and assembly, trench excavation, pipe installation, bedding, and proper backfill. Pipe is typically installed 4 feet below grade. The pipe conveys the slurry waste liquid and wastewater between the waste collection point and a waste storage facility or waste treatment area. Transfer pump is covered under PS 533 - Pumping Plant. This conduit is part of a manure transfer system for a planned waste management or comprehensive nutrient management plan. This scenario addresses the transport of liquid waste to a waste storage or treatment facility to prevent a water quality resource concern of excessive nutrients/organics and harmful levels of pathogens in surface water and/or excessive nutrients/organics in ground water. Associated practices may include: PS 313 Waste Storage Facility for storage structures; PS 533, Pumping Plant; PS 430, Irrigation Pipeline; PS 632, Solid/Liquid Waste Separation Facility; PS 468, Lined Waterway or Outlet; PS 590 Nutrient Management for waste application; PS 633, Waste Recycling.

Before Situation:

An area of waste production is separated from the waste storage facility and current operations may cause water quality concerns as it is not efficient in transporting the waste to the storage. The site DOES NOT have sufficient change in elevation or head pressure between production area and treatment or storage structure that is adequate to transfer wastes via gravity flow conduit.

After Situation:

Install a 100 foot long pressure rated water tight PVC pipe. Pipe shall be 12" diameter pressure rated PVC pipe with water tight joints. 12" diameter PVC pipe will direct flow of manure and wastewater to manure treatment or storage facility. This scenario includes the pipe, couplers and all other fittings, trench excavation, pipe bedding and backfill. The transfer conduit will provide collection and containment of the manure slurry, thereby protecting water quality resources.

Feature Measure: Length of 12" PVC Pipe

Scenario Unit: Feet

Scenario Typical Size: 100.0

Scenario Total Cost: $3,791.13

Scenario Cost/Unit: $37.91

Cost Details:

Component Name	ID	Description	Unit	Cost	QTY	Total
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.	Hours	$62.17	8	$497.36
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.	Hours	$27.56	10	$275.60
Equipment Operators, Heavy	233	Includes: Cranes, Hydraulic Excavators >=50 HP, Dozers, Paving Machines, Rock Trenchers, Trenchers >=12 in., Dump Trucks, Ag Equipment >=150 HP, Scrapers, Water Wagons.	Hours	$38.00	8	$304.00
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.	Hours	$46.88	4	$187.52
Materials						
Pipe, PVC, 12 in., ASTM-2241, SDR 26	1943	Materials: - 12 inch - PVC - ASTM 2241, SDR 26	Feet	$22.71	100	$2,271.00
Mobilization						
Mobilization, medium equipment	1139	Equipment with 70-150 HP or typical weights between 14,000 and 30,000 pounds.	Each	$255.65	1	$255.65

Practice: 634 - Waste Transfer

Scenario: #17 - 15 inch PVC Pressure Pipe

Scenario Description:

15" PVC pipe conduit is typically a pressure rated water tight PVC pipe used to transfer manure from one location to another. Costs include pipe materials and assembly, trench excavation, pipe installation, bedding, and proper backfill. Pipe is typically installed 4 feet below grade. The pipe conveys the slurry waste liquid and wastewater between the waste collection point and a waste storage facility or waste treatment area. Transfer pump is covered under PS 533 - Pumping Plant. This conduit is part of a manure transfer system for a planned waste management or comprehensive nutrient management plan. This scenario addresses the transport of liquid waste to a waste storage or treatment facility to prevent a water quality resource concern of excessive nutrients/organics and harmful levels of pathogens in surface water and/or excessive nutrients/organics in ground water. Associated practices may include: PS 313 Waste Storage Facility for storage structures; PS 533, Pumping Plant; PS 430, Irrigation Pipeline; PS 632, Solid/Liquid Waste Separation Facility; PS 468, Lined Waterway or Outlet; PS 590 Nutrient Management for waste application; PS 633, Waste Recycling.

Before Situation:

An area of waste production is separated from the waste storage facility and current operations may cause water quality concerns as it is not efficient in transporting the waste to the storage. The site DOES NOT have sufficient change in elevation or head pressure between production area and treatment or storage structure that is adequate to transfer wastes via gravity flow conduit.

After Situation:

Install a 100 foot long pressure rated water tight PVC pipe. Pipe shall be 15" diameter pressure rated PVC pipe with water tight joints. 15" diameter PVC pipe will direct flow of manure and wastewater to manure treatment or storage facility. This scenario includes the pipe, couplers and all other fittings, trench excavation, pipe bedding and backfill. The transfer conduit will provide collection and containment of the manure slurry, thereby protecting water quality resources.

Feature Measure: Length of 15" PVC Pipe

Scenario Unit: Feet

Scenario Typical Size: 100.0

Scenario Total Cost: $4,326.44

Scenario Cost/Unit: $43.26

Cost Details:

Component Name	ID	Description	Unit	Cost	QTY	Total
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.	Hours	$62.17	10	$621.70
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.	Hours	$27.56	13	$358.28
Equipment Operators, Heavy	233	Includes: Cranes, Hydraulic Excavators >=50 HP, Dozers, Paving Machines, Rock Trenchers, Trenchers >=12 in., Dump Trucks, Ag Equipment >=150 HP, Scrapers, Water Wagons.	Hours	$38.00	10	$380.00
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.	Hours	$46.88	7	$328.16
Materials						
Pipe, PVC, 15 in., SDR 41, PIP	1718	Materials: - 15 inch - PVC - SDR 41 100 psi - gasketed PIP ASTM D2241	Feet	$21.27	100	$2,127.00
Mobilization						
Mobilization, medium equipment	1139	Equipment with 70-150 HP or typical weights between 14,000 and 30,000 pounds.	Each	$255.65	2	$511.30

Practice: 634 - Waste Transfer

Scenario: #18 - Push-Off Ramp w/ Safety Gate

Scenario Description:

Installation of a three-sided vertical concrete push off ramp in an earthen WSF. Ramp is designed to be installed on the side slope of an earthen WSF so manure and wastewater can be pushed directly into the WSF via skid steer load or other type of scraping equipment. Scenario consist of a three-sided 10' vertical wall that is approximately 20' long by 15' wide (VT Drawing # VT031212SD). Scenario also includes a safety gate at the end of the ramp to prevent scraping equipment from accidentally falling into the WSF. Push off ramps are particularly effective with manure laden with sand or heavy straw/hay bedding. Associated practices may include: PS 313 Waste Storage Facility for storage structures; PS 533, Pumping Plant; PS 430, Irrigation Pipeline; PS 632, Solid/Liquid Waste Separation Facility; PS 468, Lined Waterway or Outlet; PS 590 Nutrient Management for waste application; PS 633, Waste Recycling.

Before Situation:

Current facility operations are allowing liquid waste to flow uncontrolled during periods of precipitation events or cleaning operations such that water resources can be contaminated.

After Situation:

Water quality concerns will be addressed by preventing liquid waste from entering surface waters, and to facilitate timely land application of manure and wastewater at agronomic rates according to the CNMP. This scenario addresses the potential for surface water and groundwater quality degradation.

Feature Measure: Number of Push-Off Ramps

Scenario Unit: Each

Scenario Typical Size: 1.0

Scenario Total Cost: $24,240.11

Scenario Cost/Unit: $24,240.11

Cost Details:

Component Name	ID	Description	Unit	Cost	QTY	Total
Equipment Installation						
Concrete, CIP, slab on grade, reinforced	37	Steel reinforced concrete formed and cast-in-placed as a slab on grade by chute placement. Typical strength is 3000 to 4000 psi. Includes materials, labor and equipment to transport, place and finish.	Cubic Yards	$362.36	6	$2,174.16
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 Yards	$481.12	25	$12,028.00
Earthfill, Manually Compacted	50	Earthfill, manually compacted, includes equipment and labor	Cubic Yards	$6.02	100	$602.00
Hydraulic Excavator, 1 CY	931	Track mounted hydraulic excavator with bucket capacity range of 0.8 to 1.5 CY. Equipment and power unit costs. Labor not included.	Hours	$109.36	16	$1,749.76
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.	Hours	$72.23	8	$577.84
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.	Hours	$27.56	10	$275.60
Equipment Operators, Heavy	233	Includes: Cranes, Hydraulic Excavators >=50 HP, Dozers, Paving Machines, Rock Trenchers, Trenchers >=12 in., Dump Trucks, Ag Equipment >=150 HP, Scrapers, Water Wagons.	Hours	$38.00	16	$608.00
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.	Hours	$46.88	10	$468.80
Materials						
Aggregate, Gravel, Graded	46	Gravel, includes materials, equipment and labor to transport and place. Includes washed and unwashed gravel.	Cubic Yards	$45.42	7	$317.94
Safety Guard, pipe fence and tractor guard	1953	Pipe fence and tractor guard 4' tall with working loads expected from equipment and livestock. Materials and shipping only.	Feet	$350.00	14	$4,900.00
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	$70.59	4	$282.36
Mobilization, medium equipment	1139	Equipment with 70-150 HP or typical weights between 14,000 and 30,000 pounds.	Each	$255.65	1	$255.65

Practice: 634 - Waste Transfer

Scenario: #19 - Concrete Channel

Scenario Description:

Installation of a concrete channel to convey silage leachate, barnyard runoff and other wastewater from the source to a waste storage and/or treatment facility. Typical scenario includes the installation of a parabolic concrete channel which is 6' wide by 100' long. Concrete is 5" thick and reinfoced with rebar. Concrete is underlain by 6" of clean drainfill material. Livestock are generally excluded. Concrete channel is used in areas where the topography or geology does not allow the installation of an underground pipe system. Concrete channel allows for easy and frequent maintenance and cleanout. Concrete channel shall NOT be used to convey manure. Associated practices may include: PS 313 Waste Storage Facility for storage structures; PS 533, Pumping Plant; PS 430, Irrigation Pipeline; PS 632, Solid/Liquid Waste Separation Facility; PS 468, Lined Waterway or Outlet; PS 590 Nutrient Management for waste application; PS 633, Waste Recycling.

Before Situation:

Current facility operations are allowing liquid waste to flow uncontrolled during periods of precipitation events or cleaning operations such that water resources can be contaminated.

After Situation:

Water quality concerns will be addressed by preventing liquid waste from entering surface waters, and to facilitate timely land application of manure and wastewater at agronomic rates according to the CNMP. This scenario addresses the potential for surface water and groundwater quality degradation.

Feature Measure: Surface Area of Concrete Channel

Scenario Unit: Square Feet

Scenario Typical Size: 600.0

Scenario Total Cost: $4,937.08

Scenario Cost/Unit: $8.23

Cost Details:

Component Name	ID	Description	Unit	Cost	QTY	Total
Equipment Installation						
Concrete, CIP, slab on grade, reinforced	37	Steel reinforced concrete formed and cast-in-placed as a slab on grade by chute placement. Typical strength is 3000 to 4000 psi. Includes materials, labor and equipment to transport, place and finish.	Cubic Yards	$362.36	9	$3,261.24
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 Yards	$2.31	22	$50.82
Earthfill, Manually Compacted	50	Earthfill, manually compacted, includes equipment and labor	Cubic Yards	$6.02	11	$66.22
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.	Hours	$27.56	4	$110.24
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.	Hours	$46.88	2	$93.76
Materials						
Aggregate, Gravel, Graded	46	Gravel, includes materials, equipment and labor to transport and place. Includes washed and unwashed gravel.	Cubic Yards	$45.42	11	$499.62
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	$171.94	2	$343.88
Mobilization, medium equipment	1139	Equipment with 70-150 HP or typical weights between 14,000 and 30,000 pounds.	Each	$255.65	2	$511.30

Practice: 634 - Waste Transfer

Scenario: #20 - Concrete Scrape Alley

Scenario Description:

Installation of a concrete scrape alley which is 10' wide to collect, contain and transfer manure and/or wastewater from the barn or barnyard to a waste storage facility or waste transfer system. Manure will be conveyed by a skid steer loader or other type of scraping equipment. Typical scenario includes a 6" concrete slab which is 10' wide by 100' long with 24" tall curbs on both sides. Concrete slab is reinforced with rebar and underlain by 6" of clean drainfill material. Associated practices may include: PS 313 Waste Storage Facility for storage structures; PS 533, Pumping Plant; PS 430, Irrigation Pipeline; PS 632, Solid/Liquid Waste Separation Facility; PS 468, Lined Waterway or Outlet; PS 590 Nutrient Management for waste application; PS 633, Waste Recycling.

Before Situation:

Current facility operations are allowing liquid waste to flow uncontrolled during periods of precipitation events or cleaning operations such that water resources can be contaminated.

After Situation:

Water quality concerns will be addressed by preventing liquid waste from entering surface waters, and to facilitate timely land application of manure and wastewater at agronomic rates according to the CNMP. This scenario addresses the potential for surface water and groundwater quality degradation.

Feature Measure: Surface Area of Scrape Alley

Scenario Unit: Square Feet

Scenario Typical Size: 1,000.0

Scenario Total Cost: $13,911.81

Scenario Cost/Unit: $13.91

Cost Details:

Component Name	ID	Description	Unit	Cost	QTY	Total
Equipment Installation						
Concrete, CIP, slab on grade, reinforced	37	Steel reinforced concrete formed and cast-in-placed as a slab on grade by chute placement. Typical strength is 3000 to 4000 psi. Includes materials, labor and equipment to transport, place and finish.	Cubic Yards	$362.36	19	$6,884.84
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 Yards	$481.12	10	$4,811.20
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 Yards	$2.31	37	$85.47
Earthfill, Manually Compacted	50	Earthfill, manually compacted, includes equipment and labor	Cubic Yards	$6.02	19	$114.38
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.	Hours	$27.56	4	$110.24
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.	Hours	$46.88	4	$187.52
Materials						
Aggregate, Gravel, Graded	46	Gravel, includes materials, equipment and labor to transport and place. Includes washed and unwashed gravel.	Cubic Yards	$45.42	19	$862.98
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	$171.94	2	$343.88
Mobilization, medium equipment	1139	Equipment with 70-150 HP or typical weights between 14,000 and 30,000 pounds.	Each	$255.65	2	$511.30

Practice: 634 - Waste Transfer

Scenario: #21 - Horizontal Boring

Scenario Description:

Install pressure or gravity pipe waste transfer system under a road using directional drilling or horizontal boring equipment. Scenario generally pertains to smaller diameter pipes less than 12" in diameter. Boring is done approximately 50" below the road surface. Road is approximatley 30' wide and length of boring is 50'. This scenario shall only be used if there is no other option or location is available. Scenario only pertains to horizontal boring through overburden material, not rock. Costs include oversized sleeve, 6" PVC pipe, horizontal boring equipment, excavator and misc. labor. This practice is often installed in conjunction with 533 - Pumping Plant, 313 - Waste Storage Facility, 632 - Waste Separation Facility, 590 - Nutrient Management, etc.

Before Situation:

An area of waste production is separated from the waste storage facility and current operations may cause water quality concerns as it is not efficient in transporting the waste to the storage. Existing road or highway is in the way that impedes the installation of pipe and pipe has to be installed under the road. Local rules and regulations require the pipe be installed under the road by horizontal boring methods. Pipe can be gravilty flow or pump pipe.

After Situation:

Installation of a gravity or pump transfer conduit will provide the collection and containment of manure and wastewater, thereby protecting surface and ground water resources.

Feature Measure: Each Road Crossing

Scenario Unit: Each

Scenario Typical Size: 1.0

Scenario Total Cost: $8,215.00

Scenario Cost/Unit: $8,215.00

Cost Details:

Component Name	ID	Description	Unit	Cost	QTY	Total
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.	Hours	$109.36	10	$1,093.60
Horizontal Boring, Greater Than 3 in. diameter	1132	Includes equipment, labor and setup.	Feet	$111.55	50	$5,577.50
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.	Hours	$27.56	10	$275.60
Equipment Operators, Heavy	233	Includes: Cranes, Hydraulic Excavators >=50 HP, Dozers, Paving Machines, Rock Trenchers, Trenchers >=12 in., Dump Trucks, Ag Equipment >=150 HP, Scrapers, Water Wagons.	Hours	$38.00	10	$380.00
Materials						
Pipe, PVC, 6 in., SDR 21	987	Materials: - 6 inch - PVC - SDR 21 200 psi - ASTM D2241	Feet	$7.54	50	$377.00
Mobilization						
Mobilization, medium equipment	1139	Equipment with 70-150 HP or typical weights between 14,000 and 30,000 pounds.	Each	$255.65	2	$511.30

Practice: 634 - Waste Transfer

Scenario: #50 - Drag Hose Transfer

Scenario Description:
Installation of a flexible hose to transfer waste from storage to field for waste application.

Before Situation:
Liquid waste is applied with a tanker. The application is not energy efficient, it causes excessive soil compaction, and often doesn't coincide with optimal application time.

After Situation:
The installation of a drag hose allows the transfer of waste from storage to field where it can be directly injected or applied through a hard hose reel irrigation system. Tanker traffic is reduced on road and in field, increasing energy efficiency, reducing soil compaction, and increasing opportunities for optimal application method and timing.

Feature Measure: Feet of Drag Hose

Scenario Unit: Feet

Scenario Typical Size: 5,000.0

Scenario Total Cost: $49,377.56

Scenario Cost/Unit: $9.88

Cost Details:

Component Name	ID	Description	Unit	Cost	QTY	Total
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.	Hours	$27.56	1	$27.56
Materials						
Drag Hose	2645	Soft, flexible 5 inch thermoplastic polyurethane hose, resistant to soil abrasion when moved on top of ground. Used to transfer separated liquid waste for field application. Includes materials and shipping only.	Linear Feet	$9.87	5000	$49,350.00

Practice: 635 - Vegetated Treatment Area

Scenario: #1 - VTA-surface application-gravity flow

Scenario Description:

This is a permanent herbaceous vegetative area or channel installed down slope from a livestock production area. Wastewater (runoff or milking parlor wastewater) is properly collected and released with a controlled gravity outflow into the VTA. The VTA vegetation is harvested to removed nutrients on a regular basis. This practice addresses water quality degradation due to uncontrolled nutrient rich wastewater that can flow into surface waters or leach into ground water. Associated practices: Waste Storage Facility (313), Fence (382), Solid/Liquid Waste Separation Facility (632), Manure Transfer (634), Roof runoff Management (558), Pumping Plant (533), Subsurface Drain (606), Critical Area Planting (342), Terrace (600), Nutrient Management (590), Diversion (362), Pipeline (516), Land Smoothing (466), Precision Land Forming (462), Waste Treatment (629), Heavy Use Area (561)

Before Situation:

Nutrient rich wastewater is running off from an animal operation that has the potential to pollute surface waters or ponding and leaching into groundwater.

After Situation:

Typical VTA is 75'x150' (11250 SF) in size, includes a perforated pipe manifold at the top of the VTA for distribution flow (sheet flow). Typically requires grading and shaping, gravel spreader trenches at top of VTA below manifold pipe, at 50ft spacing along the VTA, and at the bottom of the VTA. A settling basin for wastewater collection is contracted using Solid/Liquid Waste Separation Facility (632). For milkhouse waste, Waste Treatment (629) could be contracted to provide pre-treatment prior to being released into the VTA. Seeding is contracted under Critical Area Planting (342). The VTA practice will provide a controlled release of nutrient rich wastewater into a designed vegetative area for nutrient uptake. This system will improve water quality by treating nutrient rich wastewater and prevent contamination of surface and ground water resources.

Feature Measure: Amount of VTA installed

Scenario Unit: Square Feet

Scenario Typical Size: 11,250.0

Scenario Total Cost: $8,364.46

Scenario Cost/Unit: $0.74

Cost Details:

Component Name	ID	Description	Unit	Cost	QTY	Total
Equipment Installation						
Geotextile, woven	42	Woven Geotextile Fabric. Includes materials, equipment and labor	Square Yard	$1.33	270	$359.10
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 Yards	$2.31	45	$103.95
Earthfill, Dumped and Spread	51	Earthfill, dumped and spread without compaction effort, includes equipment and labor	Cubic Yards	$3.81	417	$1,588.77
Trenching, Earth, 12 in. x 48 in.	53	Trenching, earth, 12 inch wide x 48 inch depth, includes equipment and labor for trenching and backfilling	Feet	$1.38	200	$276.00
Dozer, 80 HP	929	Track mounted Dozer with horsepower range of 60 to 90. Equipment and power unit costs. Labor not included.	Hours	$55.20	8	$441.60
Stripping and stockpiling, topsoil	1199	Stripping and stockpiling of topsoil adjacent to stripping area. Includes equipment and labor.	Cubic Yards	$0.97	417	$404.49
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.	Hours	$27.56	16	$440.96
Equipment Operators, Heavy	233	Includes: Cranes, Hydraulic Excavators >=50 HP, Dozers, Paving Machines, Rock Trenchers, Trenchers >=12 in., Dump Trucks, Ag Equipment >=150 HP, Scrapers, Water Wagons.	Hours	$38.00	8	$304.00
Materials						
Aggregate, Gravel, Graded	46	Gravel, includes materials, equipment and labor to transport and place. Includes washed and unwashed gravel.	Cubic Yards	$45.42	45	$2,043.90
Pipe, PVC, 6 in., SCH 40	980	Materials: - 6 inch - PVC - SCH 40 - ASTM D1785	Feet	$6.74	270	$1,819.80
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	$70.59	1	$70.59
Mobilization, medium equipment	1139	Equipment with 70-150 HP or typical weights between 14,000 and 30,000 pounds.	Each	$255.65	2	$511.30

Practice: 635 - Vegetated Treatment Area

Scenario: #2 - VTA Direct Flow - Surface Apply

Scenario Description:

This is a permanent herbaceous vegetative area or channel installed down slope from a compost pad. Wastewater is conveyed in sheet flow onto the VTA. The VTA vegetation is harvested to removed nutrients on a regular basis. This practice addresses water quality degradation due to uncontrolled nutrient rich wastewater that can flow into surface waters or leach into ground water. Associated practices: Waste Storage Facility (313), Fence (382), Solid/Liquid Waste Separation Facility (632), Manure Transfer (634), Roof runoff Management (558), Pumping Plant (533), Subsurface Drain (606), Critical Area Planting (342), Terrace (600), Nutrient Management (590), Diversion (362), Pipeline (516), Land Smoothing (466), Precision Land Forming (462), Waste Treatment (629), Heavy Use Area (561), Composting Facility (317)

Before Situation:

Nutrient rich wastewater is running off from an animal operation that has the potential to pollute surface waters or ponding and leaching into groundwater.

After Situation:

Typical VTA is 75'x150' (11250 SF) in size. Typically requires grading and shaping, gravel spreader trenches at top of VTA, at 50ft spacing along the VTA, and at the bottom of the VTA. If needed, a settling basin for wastewater collection may be contracted using Solid/Liquid Waste Separation Facility (632). Seeding is contracted under Critical Area Planting (342). The VTA practice will provide a controlled release of nutrient rich wastewater into a designed vegetative area for nutrient uptake. This system will improve water quality by treating nutrient rich wastewater and prevent contamination of surface and ground water resources.

Feature Measure: Amount of VTA installed

Scenario Unit: Square Feet

Scenario Typical Size: 11,250.0

Scenario Total Cost: $5,977.59

Scenario Cost/Unit: $0.53

Cost Details:

Component Name	ID	Description	Unit	Cost	QTY	Total
Equipment Installation						
Geotextile, woven	42	Woven Geotextile Fabric. Includes materials, equipment and labor	Square Yard	$1.33	270	$359.10
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 Yards	$2.31	45	$103.95
Earthfill, Dumped and Spread	51	Earthfill, dumped and spread without compaction effort, includes equipment and labor	Cubic Yards	$3.81	417	$1,588.77
Dozer, 80 HP	929	Track mounted Dozer with horsepower range of 60 to 90. Equipment and power unit costs. Labor not included.	Hours	$55.20	8	$441.60
Stripping and stockpiling, topsoil	1199	Stripping and stockpiling of topsoil adjacent to stripping area. Includes equipment and labor.	Cubic Yards	$0.97	417	$404.49
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.	Hours	$27.56	8	$220.48
Equipment Operators, Heavy	233	Includes: Cranes, Hydraulic Excavators >=50 HP, Dozers, Paving Machines, Rock Trenchers, Trenchers >=12 in., Dump Trucks, Ag Equipment >=150 HP, Scrapers, Water Wagons.	Hours	$38.00	8	$304.00
Materials						
Aggregate, Gravel, Graded	46	Gravel, includes materials, equipment and labor to transport and place. Includes washed and unwashed gravel.	Cubic Yards	$45.42	45	$2,043.90
Mobilization						
Mobilization, medium equipment	1139	Equipment with 70-150 HP or typical weights between 14,000 and 30,000 pounds.	Each	$255.65	2	$511.30

Practice: 635 - Vegetated Treatment Area

Scenario: #3 - VTA New with Spreader Curb

Scenario Description:

This is a permanent herbaceous vegetative area or channel installed down slope from a livestock production area. Nutrient rich runoff is treated with overland flow through the VTA. A flow distribution component is installed to achieve sheet flow at the start of the VTA. Clean runoff is diverted where possible. The VTA vegetation is harvested to removed nutrients on a regular basis. This practice addresses water quality degradation due to uncontrolled nutrient rich runoff that can flow into surface waters or leach into ground water. Associated practices: Waste Storage Facility (313), Fence (382), Solid/Liquid Waste Separation Facility (632), Manure Transfer (634), Irrigation System, Sprinkler (442), Roof runoff Management (558), Pumping Plant (533), Subsurface Drain (606), Critical Area Planting (342), Terrace (600), Nutrient Management (590), Diversion (362), Pipeline (516), Land Smoothing (466), Precision Land Forming (462), Waste Treatment Area (629)

Before Situation:

Nutrient rich wastewater is running off from an animal operation that has the potential to pollute surface waters or ponding and leaching into groundwater.

After Situation:

Typical VTA is 75'x150' (11250 SF) in size, includes grading, distribution pipes from the collection area, a concrete curb, and gravel trenches to establish sheet flow onto and along the VTA where an existing permanent herbaceouse vegetated area meets the requirements for a VTA. Seeding is contracted under Critical Area Planting (342). The VTA practice will provide a controlled release of nutrient rich runoff into an existing vegetative area for nutrient uptake. This system will improve water quality by treating nutrient rich runoff and prevent contamination of surface and ground water resources.

Feature Measure: Amount of VTA treating wastewate

Scenario Unit: Square Feet

Scenario Typical Size: 11,250.0

Scenario Total Cost: $9,976.12

Scenario Cost/Unit: $0.89

Cost Details:

Component Name	ID	Description	Unit	Cost	QTY	Total
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 Yards	$481.12	5	$2,405.60
Geotextile, woven	42	Woven Geotextile Fabric. Includes materials, equipment and labor	Square Yard	$1.33	270	$359.10
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 Yards	$2.31	45	$103.95
Earthfill, Dumped and Spread	51	Earthfill, dumped and spread without compaction effort, includes equipment and labor	Cubic Yards	$3.81	417	$1,588.77
Dozer, 80 HP	929	Track mounted Dozer with horsepower range of 60 to 90. Equipment and power unit costs. Labor not included.	Hours	$55.20	8	$441.60
Stripping and stockpiling, topsoil	1199	Stripping and stockpiling of topsoil adjacent to stripping area. Includes equipment and labor.	Cubic Yards	$0.97	417	$404.49
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.	Hours	$27.56	8	$220.48
Materials						
Aggregate, Gravel, Graded	46	Gravel, includes materials, equipment and labor to transport and place. Includes washed and unwashed gravel.	Cubic Yards	$45.42	45	$2,043.90
Pipe, PVC, 2 in., SCH 40	976	Materials: - 2 inch - PVC - SCH 40 - ASTM D1785	Feet	$1.29	30	$38.70
Coupling, PVC, endcap, 2 in., SCH 20	1727	2 inch - PVC- SCH 40- ASTM D1785 pipe endcaps. Materials only.	Each	$0.57	15	$8.55
Pipe, PE, 6 in., DR 9, perforated	1728	Materials: - 6 inch - Perforated PE- 160 psi - ASTM D3035 DR 9	Feet	$22.78	75	$1,708.50
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	$70.59	2	$141.18
Mobilization, medium equipment	1139	Equipment with 70-150 HP or typical weights between 14,000 and 30,000 pounds.	Each	$255.65	2	$511.30

Practice: 635 - Vegetated Treatment Area

Scenario: #4 - VTA Existing with Spreader Curb

Scenario Description:

An existing permanent herbaceous vegetated area that meets the requirements for a VTA and is used as an overland flow area for nutrient rich runoff treatment. A flow distribution component is installed to achieve sheet flow at the start of the VTA. Clean runoff is diverted where possible. The VTA vegetation is harvested to removed nutrients on a regular basis. This practice addresses water quality degradation due to uncontrolled nutrient rich runoff that can flow into surface waters or leach into ground water. Associated practices: Waste Storage Facility (313), Fence (382), Solid/Liquid Waste Separation Facility (632), Manure Transfer (634), Irrigation System, Sprinkler (442), Roof runoff Management (558), Pumping Plant (533), Subsurface Drain (606), Critical Area Planting (342), Terrace (600), Nutrient Management (590), Diversion (362), Pipeline (516), Land Smoothing (466), Precision Land Forming (462), Waste Treatment Area (629)

Before Situation:

Nutrient rich wastewater is running off from an animal operation that has the potential to pollute surface waters or ponding and leaching into groundwater.

After Situation:

Typical VTA is 75'x150' (11250 SF) in size, includes distribution pipes from the collection area, a concrete curb, and gravel trenches to establish sheet flow onto and along the VTA where an existing permanent herbaceouse vegetated area meets the requirements for a VTA. Does not include any grading or seeding. The VTA practice will provide a controlled release of nutrient rich runoff into an existing vegetative area for nutrient uptake. This system will improve water quality by treating nutrient rich runoff and prevent contamination of surface and ground water resources.

Feature Measure: Amount of VTA treating wastewate

Scenario Unit: Square Feet

Scenario Typical Size: 11,250.0

Scenario Total Cost: $7,285.61

Scenario Cost/Unit: $0.65

Cost Details:

Component Name	ID	Description	Unit	Cost	QTY	Total
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 Yards	$481.12	5	$2,405.60
Geotextile, woven	42	Woven Geotextile Fabric. Includes materials, equipment and labor	Square Yard	$1.33	270	$359.10
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 Yards	$2.31	45	$103.95
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.	Hours	$27.56	8	$220.48
Materials						
Aggregate, Gravel, Graded	46	Gravel, includes materials, equipment and labor to transport and place. Includes washed and unwashed gravel.	Cubic Yards	$45.42	45	$2,043.90
Pipe, PVC, 2 in., SCH 40	976	Materials: - 2 inch - PVC - SCH 40 - ASTM D1785	Feet	$1.29	30	$38.70
Coupling, PVC, endcap, 2 in., SCH 20	1727	2 inch - PVC- SCH 40- ASTM D1785 pipe endcaps. Materials only.	Each	$0.57	15	$8.55
Pipe, PE, 6 in., DR 9, perforated	1728	Materials: - 6 inch - Perforated PE- 160 psi - ASTM D3035 DR 9	Feet	$22.78	75	$1,708.50
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	$70.59	2	$141.18
Mobilization, medium equipment	1139	Equipment with 70-150 HP or typical weights between 14,000 and 30,000 pounds.	Each	$255.65	1	$255.65

Practice: 635 - Vegetated Treatment Area

Scenario: #5 - Graded Area, Pumped Into A Basin, Gravity Flow Surface Application

Scenario Description:

This is a permanent herbaceous vegetative area or channel located upslope from the livestock production area. The topography of the site requires wastewater to be pumped uphill to the VTA designed system. Wastewater (runoff or milking parlor wastewater) is properly collected at the production area and pumped uphill to a shallow tank or basin where it has a controlled gravity outflow into the VTA. The VTA vegetation is harvested to removed nutrients on a regular basis. This practice addresses water quality degradation due to uncontrolled nutrient rich wastewater that can flow into surface waters or leach into ground water. Associated practices: Waste Storage Facility (313), Fence (382), Solid/Liquid Waste Separation Facility (632), Manure Transfer (634), Irrigation System, Sprinkler (442), Roof runoff Management (558), Pumping Plant (533), Subsurface Drain (606), Critical Area Planting (342), Terrace (600), Nutrient Management (590), Diversion (362), Pipeline (516), Land Smoothing (466), Precision Land Forming (462), Waste Treatment (629).

Before Situation:

Nutrient rich wastewater is running off from an animal operation that has the potential to pollute surface waters or ponding and leaching into groundwater.

After Situation:

Typical VTA is 1 ac (43560 SF) in size, includes the installation site to be upslope from the production area with a shallow tank or basin that provides a controlled gravity outflow into the VTA. Typically requires grading and shaping, gravel spreader trenches and perforated pipe to maintain sheet flow throughout the VTA. A settling basin for wastewater collection is contracted using Solid/Liquid Waste Separation Facility (632) and Pumping Plant (533) to get the wastewater upslope to the VTA distrubution point. For milkhouse waste, Waste Treatment (629) could be contracted to provide pretreatment prior to being released into the VTA. Seeding is contracted under Critical Area Planting (342). The VTA practice will provide a controlled release of nutrient rich wastewater into a designed vegetative area for nutrient uptake. This system will improve water quality by treating nutrient rich wastewater and prevent contamination of surface and ground water resources.

Feature Measure: Amount of VTA installed

Scenario Unit: Square Feet

Scenario Typical Size: 43,560.0

Scenario Total Cost: $15,014.12

Scenario Cost/Unit: $0.34

Cost Details:

Component Name	ID	Description	Unit	Cost	QTY	Total
Equipment Installation						
Concrete, CIP, slab on grade, reinforced	37	Steel reinforced concrete formed and cast-in-placed as a slab on grade by chute placement. Typical strength is 3000 to 4000 psi. Includes materials, labor and equipment to transport, place and finish.	Cubic Yards	$362.36	2	$724.72
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 Yards	$481.12	12	$5,773.44
Geotextile, woven	42	Woven Geotextile Fabric. Includes materials, equipment and labor	Square Yard	$1.33	400	$532.00
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 Yards	$2.31	100	$231.00
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.	Hours	$27.56	40	$1,102.40
Materials						
Aggregate, Sand, Graded, Washed	45	Sand, typical ASTM C33 gradation, includes materials, equipment and labor to transport and place	Cubic Yards	$43.40	6	$260.40
Aggregate, Gravel, Graded	46	Gravel, includes materials, equipment and labor to transport and place. Includes washed and unwashed gravel.	Cubic Yards	$45.42	70	$3,179.40
Pipe, PVC, 2 in., SCH 40	976	Materials: - 2 inch - PVC - SCH 40 - ASTM D1785	Feet	$1.29	45	$58.05
Ball Valve, 4 in.	1726	4 inch ball valve, metal body. Materials only.	Each	$334.64	2	$669.28
Coupling, PVC, endcap, 2 in., SCH 20	1727	2 inch - PVC- SCH 40- ASTM D1785 pipe endcaps. Materials only.	Each	$0.57	15	$8.55
Pipe, PE, 6 in., DR 9, perforated	1728	Materials: - 6 inch - Perforated PE- 160 psi - ASTM D3035 DR 9	Feet	$22.78	80	$1,822.40
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	$70.59	2	$141.18
Mobilization, medium equipment	1139	Equipment with 70-150 HP or typical weights between 14,000 and 30,000 pounds.	Each	$255.65	2	$511.30

Practice: 635 - Vegetated Treatment Area

Scenario: #6 - Graded Area, Mechanical Distribution

Scenario Description:

This is a permanent herbaceous vegetative area located adjacent to a livestock production area. Wastewater (runoff or milking parlor wastewater) is properly collected at the production area and pumped to mechanically distribute wastewater onto the VTA. The VTA vegetation is harvested to removed nutrients on a regular basis. This practice addresses water quality degradation due to uncontrolled nutrient rich wastewater that can flow into surface waters or leach into ground water. Associated practices: Waste Storage Facility (313), Fence (382), Solid/Liquid Waste Separation Facility (632), Manure Transfer (634), Irrigation System, Sprinkler (442), Roof runoff Management (558), Pumping Plant (533), Subsurface Drain (606), Critical Area Planting (342), Terrace (600), Nutrient Management (590), Diversion (362), Pipeline (516), Land Smoothing (466), Precision Land Forming (462), Waste Treatment (629)

Before Situation:

Nutrient rich wastewater is running off from an animal operation that has the potential to pollute surface waters or ponding and leaching into groundwater.

After Situation:

Typical VTA is 1.0 ac in size, includes the sizing, grading and shaping of the VTA area. Typically requires grading and shaping to maintain sheet flow onto the VTA. A settling basin for wastewater collection is contracted using Solid/Liquid Waste Separation Facility (632) and Pumping Plant (533) to get the wastewater to the VTA mechanical distribution component that is contracted using Irrigation System, Sprinkler (442). For milkhouse waste, Waste Treatment (629) could be contracted to provide pretreatment prior to being pumped and distributed onto the VTA. Seeding is contracted under Critical Area Planting (342). The VTA practice will provide a controlled release of nutrient rich wastewater into a designed vegetative area for nutrient uptake. This system will improve water quality by treating nutrient rich wastewater and prevent contamination of surface and ground water resources.

Feature Measure: Amount of VTA installed

Scenario Unit: Acres

Scenario Typical Size: 1.0

Scenario Total Cost: $2,187.81

Scenario Cost/Unit: $2,187.81

Cost Details:

Component Name	ID	Description	Unit	Cost	QTY	Total
Equipment Installation						
Dozer, 80 HP	929	Track mounted Dozer with horsepower range of 60 to 90. Equipment and power unit costs. Labor not included.	Hours	$55.20	16	$883.20
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.	Hours	$27.56	16	$440.96
Equipment Operators, Heavy	233	Includes: Cranes, Hydraulic Excavators >=50 HP, Dozers, Paving Machines, Rock Trenchers, Trenchers >=12 in., Dump Trucks, Ag Equipment >=150 HP, Scrapers, Water Wagons.	Hours	$38.00	16	$608.00
Mobilization						
Mobilization, medium equipment	1139	Equipment with 70-150 HP or typical weights between 14,000 and 30,000 pounds.	Each	$255.65	1	$255.65

Practice: 635 - Vegetated Treatment Area

Scenario: #16 - New VTA with added fill

Scenario Description:

This is a permanent herbaceous vegetative area or channel installed down slope from a livestock production area. Wastewater (runoff or milking parlor wastewater) is properly collected and released with a controlled gravity outflow into the VTA. The VTA vegetation is harvested to removed nutrients on a regular basis. This practice addresses water quality degradation due to uncontrolled nutrient rich wastewater that can flow into surface waters or leach into ground water. Associated practices: Waste Storage Facility (313), Fence (382), Solid/Liquid Waste Separation Facility (632), Manure Transfer (634), Roof runoff Management (558), Pumping Plant (533), Subsurface Drain (606), Critical Area Planting (342), Terrace (600), Nutrient Management (590), Diversion (362), Pipeline (516), Land Smoothing (466), Precision Land Forming (462), Waste Treatment (629), Heavy Use Area (561)

Before Situation:

Nutrient rich wastewater is running off from an animal operation that has the potential to pollute surface waters or ponding and leaching into groundwater.

After Situation:

Typical VTA is 60'x100' (6000 SF) in size, includes a trench and rock spreader at the top of the VTA for distribution flow (sheet flow). Typically requires grading and shaping. A settling basin for wastewater collection is contracted using Solid/Liquid Waste Separation Facility (632) if needed. Due to permeability of existing soil, additional soil needs to be added to modify soil profile to meet standard requirements. Up to 6 inches of fine sandy loam or finer material will be added. Erosion control blanket will be used to prevent erosion until vegetation is established. The VTA practice will provide a controlled release of nutrient rich wastewater into a designed vegetative area for nutrient uptake. This system will improve water quality by treating nutrient rich wastewater and prevent contamination of surface and ground water resources.

Feature Measure: Area of treatment area

Scenario Unit: Square Feet

Scenario Typical Size: 6,000.0

Scenario Total Cost: $9,171.41

Scenario Cost/Unit: $1.53

Cost Details:

Component Name	ID	Description	Unit	Cost	QTY	Total
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.	Hours	$31.96	24	$767.04
Dozer, 80 HP	929	Track mounted Dozer with horsepower range of 60 to 90. Equipment and power unit costs. Labor not included.	Hours	$55.20	24	$1,324.80
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.	Hours	$27.56	24	$661.44
Equipment Operators, Light	232	Includes: Skid Steer Loaders, Hydraulic Excavators <50 HP, Trenchers <12 in., Ag Equipment <150 HP, Pickup Trucks, Forklifts, Mulchers	Hours	$27.87	48	$1,337.76
Materials						
Rock Riprap, graded, angular, material and shipping	1200	Graded Rock Riprap for all gradation ranges. Includes materials and delivery only.	Ton	$35.35	12.5	$441.88
Erosion Control Blanket, biodegradable	1213	Biodegradable erosion control blanket, typically a composite of natural fibers with reinforcing polymer netting. Materials and shipping only.	Square Yard	$1.32	667	$880.44
Earthfill Material, purchased, topsoil	2745	Purchased topsoil or screened loam. Material only.	Cubic Yards	$29.25	111	$3,246.75
Mobilization						
Mobilization, medium equipment	1139	Equipment with 70-150 HP or typical weights between 14,000 and 30,000 pounds.	Each	$255.65	2	$511.30

Practice: 636 - Water Harvesting Catchment

Scenario: #11 - Surface Catchment

Scenario Description:

Construct an apron, approximately 50 feet wide by 90 feet long, utilizing: a plastic or rubber membrane laid on a prepared ground surface; or an asphalt or concrete surface with curbing; to collect rain water. Divert collected water from the surface catchment by gravity through an 8" diameter, PVC SDR-35 pipe to an existing tank or plastic-lined earthen reservoir. Exclusion of animals is required, so conservation practice 382 - Fencing, may be needed to protect the catchment. Resource Concern: Livestock production limitation - Inadequate livestock water. Associated Practices: 382 - Fencing; 614 - Watering Facility; 436 - Irrigation Reservoir; and 521A - Pond Sealing or Lining, Flexible Membrane.

Before Situation:

Inadequate water available to address resource concerns. Client hauls water to supply needs.

After Situation:

Design and construct an impervious surface as the primary collection component, and a pipe to convey the water to create a reliable water supply for livestock.

Feature Measure: Surface Area of Catchment

Scenario Unit: Square Yard

Scenario Typical Size: 500.0

Scenario Total Cost: $7,420.01

Scenario Cost/Unit: $14.84

Cost Details:

Component Name	ID	Description	Unit	Cost	QTY	Total
Equipment Installation						
Dozer, 80 HP	929	Track mounted Dozer with horsepower range of 60 to 90. Equipment and power unit costs. Labor not included.	Hours	$55.20	12	$662.40
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.	Hours	$27.56	24	$661.44
Equipment Operators, Heavy	233	Includes: Cranes, Hydraulic Excavators >=50 HP, Dozers, Paving Machines, Rock Trenchers, Trenchers >=12 in., Dump Trucks, Ag Equipment >=150 HP, Scrapers, Water Wagons.	Hours	$38.00	12	$456.00
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.	Hours	$46.88	24	$1,125.12
Materials						
Pipe, PVC, 8 in., SDR 35	994	Materials: - 8 inch - PVC - SDR 35 - ASTM D3034	Feet	$7.96	140	$1,114.40
Synthetic Liner, 40 mil	1387	Synthetic 40 mil HDPE, LLDPE, EPDM, etc membrane liner material. Includes materials and shipping only.	Square Yard	$6.29	500	$3,145.00
Mobilization						
Mobilization, medium equipment	1139	Equipment with 70-150 HP or typical weights between 14,000 and 30,000 pounds.	Each	$255.65	1	$255.65

Practice: 636 - Water Harvesting Catchment

Scenario: #12 - Elevated Catchment

Scenario Description:

Build a wooden frame, "post-and-pier" structure, with a corrugated metal roof (dimensions are 24 feet wide by 20 feet long), to collect rain water. The structure is supported by 9-each, "poured-in-place", concrete footings (dimensions are 2'x2' square x1' thick), 8 feet on-center, with tie-down straps. Divert collected water from catchment area with guttering and downspout through a 4" diameter PVC Schedule 40 pipe, to a tank (not included)for a reliable storage and subsequent use. Resource concerns: Livestock production limitation - Inadequate livestock water; Insufficient water - Inefficient use of irrigation water. Associated practices: 382 - Fence; 614 - Watering Facility; or 436 - Irrigation Reservoir.

Before Situation:

Inadequate water available to address resource concerns. Client hauls water to supply needs.

After Situation:

The guttering and downspouts collects the roof runoff and the water is conveyed through a pipe, by gravity, to a storage tank for use by livestock or a very small irrigation system. This system is the primary collection component of a Water Harvesting Catchment (CPS 636) facility. Divert collected water from roof with guttering and downspout through a 4" diameter PVC Sch-40 pipe,

Feature Measure: Surface Area of Catchment

Scenario Unit: Square Yard

Scenario Typical Size: 53.0

Scenario Total Cost: $8,482.37

Scenario Cost/Unit: $160.04

Cost Details:

Component Name	ID	Description	Unit	Cost	QTY	Total
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 Yards	$481.12	1.5	$721.68
Backhoe, 80 HP	926	Wheel mounted backhoe excavator with horsepower range of 60 to 90. Equipment and power unit costs. Labor not included.	Hours	$31.96	4	$127.84
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.	Hours	$37.19	120	$4,462.80
Equipment Operators, Heavy	233	Includes: Cranes, Hydraulic Excavators >=50 HP, Dozers, Paving Machines, Rock Trenchers, Trenchers >=12 in., Dump Trucks, Ag Equipment >=150 HP, Scrapers, Water Wagons.	Hours	$38.00	1	$38.00
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.	Hours	$46.88	40	$1,875.20
Materials						
Pipe, PVC, 6 in., SCH 40	980	Materials: - 6 inch - PVC - SCH 40 - ASTM D1785	Feet	$6.74	60	$404.40
Dimension Lumber, Treated	1044	Treated dimension lumber with nominal thickness equal or less than 2". Includes lumber and fasteners	Board Feet	$1.10	512	$563.20
Gutter, Downspout, PVC, 5 in.	1388	5 inch PVC guttering. Materials only.	Feet	$1.40	24	$33.60
Mobilization						
Mobilization, medium equipment	1139	Equipment with 70-150 HP or typical weights between 14,000 and 30,000 pounds.	Each	$255.65	1	$255.65

Practice: 638 - Water and Sediment Control Basin

Scenario: #1 - WASCOB less than 350 CY

Scenario Description:

Typical scenario is for excavating 100 CY to create an earthen WASCOB. The excavated material is used to build up an earthen embankment or combination ridge and channel generally constructed across the slope and minor watercourses to form a sediment trap and water detention basin. Outlet is typically an underground outlet. Work is done with excavator and/ or dozer. Costs include all equipment necessary to excavate, shape, grade and compact the Water and Sediment Control Basin and mobilization of equipment. This practice is utilized to reduce watercourse and gully erosion, trap sediment, reduce and manage onsite and downstream runoff. Sheet and rill erosion will be controlled by other conservation practices.

Before Situation:

Farming fields with excessive slope length has resulted in multiple rills and/or ephemeral gullies that will continue to worsen over time. The excessive erosion may lead to deterioration of receiving waters due to excessive sedimentation and nutrient transport. Resource concern addressed includes soil erosion and water quality by trapping sediment and/or reduce erosion in a field to protect riparian areas and water bodies from sediment deposition. Surface water causes erosion and the sediment (and potentially pesticides) to be transported into the riparian areas and water bodies downstream.

After Situation:

Water and Sediment Control Basin is constructed with 100 CY of excavation/earthfill with dozer, scraper and/or road grader. Rill and/or gully erosion is reduced. If riser and underground outlet are needed, then include Underground Outlet (620). Include Critical Area Planting (342) where necessary to prevent erosion following construction activities.

Feature Measure: Cubic Yard of WASCOB excavation

Scenario Unit: Cubic Yards

Scenario Typical Size: 100.0

Scenario Total Cost: $858.76

Scenario Cost/Unit: $8.59

Cost Details:

Component Name	ID	Description	Unit	Cost	QTY	Total
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 Yards	$2.31	100	$231.00
Excavation, common earth, small equipment, 50 ft	1220	Bulk excavation of common earth with dozer <100 HP with average push distance of 50 feet. Includes equipment and labor.	Cubic Yards	$2.37	100	$237.00
Labor						
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.	Hours	$46.88	1	$46.88
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	$171.94	2	$343.88

Practice: 638 - Water and Sediment Control Basin

Scenario: #2 - WASCOB less than 350 CY-Topsoil

Scenario Description:

Typical scenarios is for excavating 100 CY to create an earthen WASCOB. Prior to building the embankment, 6 inches of topsoil is removed and stockpiled. The excavated material is used to build up an earthen embankment or combination ridge and channel generally constructed across the slope and minor watercourses to form a sediment trap and water detention basin. Topsoil is replaced following construction of the embankment. Outlet is typically an underground outlet. Costs include all equipment necessary to strip and stock pile topsoil, excavate, shape, grade and compact the Water and Sediment Control Basin, spread and replace topsoil after construction and mobilization of equipment. Seeding not included. This practice is utilized to reduce watercourse and gully erosion, trap sediment, reduce and manage onsite and downstream runoff. Sheet and rill erosion will be controlled by other conservation practices. Work is done with dozer, scraper, or road grader.

Before Situation:

Site has shallow topsoil which if removed by earthwork for construction of embankment will significantly impact yields. Farming fields with excessive slope length has resulted in multiple rills and/or ephemeral gullies that will continue to worsen over time. The excessive erosion may lead to deterioration of receiving waters due to excessive sedimentation and nutrient transport. Resource concern addressed includes soil erosion and water quality by trapping sediment and/or reduce erosion in a field to protect riparian areas and water bodies from sediment deposition. Surface water causes erosion and the sediment (and potentially pesticides) is being transported into the riparian areas and water bodies downstream.

After Situation:

Water and Sediment Control Basis is constructed with 100 CY of excavation/earthfill with dozer, scraper and/or road grader. Rill and/or gully erosion is reduced. If riser and underground outlet are needed, then include Underground Outlet (620). Include Critical Area Planting (342) where necessary to prevent erosion following construction activities.

Feature Measure: Cubic Yard of WASCOB Excavation

Scenario Unit: Cubic Yards

Scenario Typical Size: 100.0

Scenario Total Cost: $985.98

Scenario Cost/Unit: $9.86

Cost Details:

Component Name	ID	Description	Unit	Cost	QTY	Total
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 Yards	$2.31	70	$161.70
Stripping and stockpiling, topsoil	1199	Stripping and stockpiling of topsoil adjacent to stripping area. Includes equipment and labor.	Cubic Yards	$0.97	30	$29.10
Excavation, common earth, small equipment, 50 ft	1220	Bulk excavation of common earth with dozer <100 HP with average push distance of 50 feet. Includes equipment and labor.	Cubic Yards	$2.37	100	$237.00
Labor						
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.	Hours	$46.88	1	$46.88
Mobilization						
Mobilization, medium equipment	1139	Equipment with 70-150 HP or typical weights between 14,000 and 30,000 pounds.	Each	$255.65	2	$511.30

Practice: 638 - Water and Sediment Control Basin

Scenario: #3 - WASCOB greater than or equal to 350 CY

Scenario Description:

Typical scenario is for excavating 700 CY to create an earthen WASCOB. Outlet is typically an underground outlet. The excavated material is used to build up an earthen embankment or combination ridge and channel generally constructed across the slope and minor watercourses to form a sediment trap and water detention basin. Work is done with excavator and/or dozer. Costs include all equipment necessary to excavate, shape, grade and compact the Water and Sediment Control Basin and mobilization of equipment. This practice is utilized to reduce watercourse and gully erosion, trap sediment, reduce and manage onsite and downstream runoff. Sheet and rill erosion will be controlled by other conservation practices.

Before Situation:

Farming fields with excessive slope length has resulted in multiple rills and/or ephemeral gullies that will continue to worsen over time. The excessive erosion may lead to deterioration of receiving waters due to excessive sedimentation and nutrient transport. Resource concern addressed includes soil erosion and water quality by trapping sediment and/or reduce erosion in a field to protect riparian areas and water bodies from sediment deposition. Surface water causes erosion and the sediment (and potentially pesticides) to be transported into the riparian areas and water bodies downstream.

After Situation:

Water and Sediment Control Basin is constructed with 700 CY of excavation/earthfill with dozer, scraper and/or road grader. Rill and/or gully erosion is reduced. If riser and underground outlet are needed, then include Underground Outlet (620). Include Critical Area Planting (342) where necessary to prevent erosion following construction activities.

Feature Measure: Cubic Yard of WASCOB Excavation

Scenario Unit: Cubic Yards

Scenario Typical Size: 700.0

Scenario Total Cost: $3,881.06

Scenario Cost/Unit: $5.54

Cost Details:

Component Name	ID	Description	Unit	Cost	QTY	Total
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 Yards	$2.31	700	$1,617.00
Excavation, common earth, small equipment, 50 ft	1220	Bulk excavation of common earth with dozer <100 HP with average push distance of 50 feet. Includes equipment and labor.	Cubic Yards	$2.37	700	$1,659.00
Labor						
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.	Hours	$46.88	2	$93.76
Mobilization						
Mobilization, medium equipment	1139	Equipment with 70-150 HP or typical weights between 14,000 and 30,000 pounds.	Each	$255.65	2	$511.30

Practice: 642 - Water Well

Scenario: #1 - Dug Well

Scenario Description:

Typical construction is for the excavation of a shallow dug well. The purpose of the practice is to provide water for livestock. A typical dug well is 4 foot in diameter and 12 feet in depth. The well is excavated using a backhoe. Excavate to a depth where the water recharge is greater than the equipment can remove. Washed gravel is placed in the base of the dug opening. Concrete manhole risers are installed to hold the water. Pea gravel is placed above the washed gravel to transition to the earth backfill. The hole is backfilled and sloped to direct surface water away from entering the manhole cover.

Before Situation:

Livestock have insufficient water or are fenced from their water source. There is insufficient water for use in micro-irrigation.

After Situation:

Sufficient water is available for livestock or micro-irrigation. Utilize Pumping Plant (533), Pipeline (516), Irrigation Pipeline (430) as associated practices. Use Critical Area Seeding (342) where necessary to prevent erosion following construciton activities.

Feature Measure: No.

Scenario Unit: Each

Scenario Typical Size: 1.0

Scenario Total Cost: $7,858.44

Scenario Cost/Unit: $7,858.44

Cost Details:

Component Name	ID	Description	Unit	Cost	QTY	Total
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.	Hours	$31.96	6	$191.76
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.	Hours	$27.56	8	$220.48
Equipment Operators, Heavy	233	Includes: Cranes, Hydraulic Excavators >=50 HP, Dozers, Paving Machines, Rock Trenchers, Trenchers >=12 in., Dump Trucks, Ag Equipment >=150 HP, Scrapers, Water Wagons.	Hours	$38.00	6	$228.00
Materials						
Aggregate, Gravel, Graded	46	Gravel, includes materials, equipment and labor to transport and place. Includes washed and unwashed gravel.	Cubic Yards	$45.42	3	$136.26
Test, Standard Water Test, Well Water	309	Well Water Suitability test. Includes materials and shipping only.	Each	$47.11	1	$47.11
Manhole, 4 ft x 4 ft	1053	Precast Manhole with base and top delivered. 4 feet diameter x 4 feet. Includes materials only.	Each	$1,290.85	3	$3,872.55
Aggregate, gravel, washed, pea gravel	1331	Washed and graded pea gravel river stone. Includes materials and local delivery within 20 miles of quarry.	Cubic Yards	$48.83	1	$48.83
Grout, cement	1333	Cement grout meeting ASTM specifications for well sealing. Includes both neat-cement grout and bentonite gout mixtures. Includes materials, equipment and labor to place.	Cubic Yards	$567.19	5	$2,835.95
Chlorine	1335	Liquid chlorine bleach. Includes materials only.	Gallons	$4.37	5	$21.85
Mobilization						
Mobilization, medium equipment	1139	Equipment with 70-150 HP or typical weights between 14,000 and 30,000 pounds.	Each	$255.65	1	$255.65

Practice: 642 - Water Well

Scenario: #2 - Shallow Well

Scenario Description:

Typical construction is for the installation of a well, in areas where sufficient water is known to occur within 100 feet of the ground surface. The well shall be drilled, dug, driven, bored, jetted or otherwise constructed to an aquifer for water supply. The purpose of the practice is to provide water for livestock or irrigation. An average well depth is 50 feet. Well casings is 4" in diameter. Steel casing is installed to a depth of 30 feet.

Before Situation:

Livestock have insufficient water or are fenced from their water source. There is insufficient water for use in micro-irrigation.

After Situation:

Sufficient water is available for livestock or irrigation. Utilize Pumping Plant (533), Irrigation Pipeline (430), Pipeline (516) as associated practices. Use Critical Area Seeding (342) where necessary to prevent erosion following construciton activities.

Feature Measure: No.

Scenario Unit: Each

Scenario Typical Size: 1.0

Scenario Total Cost: $3,356.53

Scenario Cost/Unit: $3,356.53

Cost Details:

Component Name	ID	Description	Unit	Cost	QTY	Total
Equipment Installation						
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 Yards	$179.94	0.16	$28.79
Rotary Drill Rig	1595	Rotary drill rig including equipment and power unit costs. Labor not included.	Hours	$338.22	4	$1,352.88
Materials						
Test, Standard Water Test, Well Water	309	Well Water Suitability test. Includes materials and shipping only.	Each	$47.11	1	$47.11
Grout, cement	1333	Cement grout meeting ASTM specifications for well sealing. Includes both neat-cement grout and bentonite gout mixtures. Includes materials, equipment and labor to place.	Cubic Yards	$567.19	2	$1,134.38
Chlorine	1335	Liquid chlorine bleach. Includes materials only.	Gallons	$4.37	1	$4.37
Well Cap, 4 in.	1785	Well cap, 4 inch. Materials only.	Each	$28.95	1	$28.95
Well Casing, Metal, 4 in.	1809	Steel well casing, 4 inch. Materials only.	Feet	$13.72	30	$411.60
Well Screen, plastic, 4 in.	1998	4 inch PVC well screen. Materials only.	Feet	$9.28	10	$92.80
Mobilization						
Mobilization, medium equipment	1139	Equipment with 70-150 HP or typical weights between 14,000 and 30,000 pounds.	Each	$255.65	1	$255.65

Practice: 642 - Water Well

Scenario: #3 - Typical Well

Scenario Description:

Typical construction is for the installation of a well, in areas where sufficient water is known to occur 100 - 600 feet of the ground surface. The well shall be drilled, driven, bored, jetted or otherwise constructed to an aquifer for water supply. The purpose of the practice is to provide water for livestock or micro-irrigation. An average well depth is 400 feet. Well casings are 4-6" in diameter. Steel casing is installed to a depth of 100 feet.

Before Situation:

Livestock have insufficient water or are fenced from their water source. There is insufficient water for use in micro-irrigation.

After Situation:

Sufficient water is available for livestock or micro-irrigation. Utilize Pumping Plant (533), Irrigation Pipeline (430), and Pipeline (516) as associated practices. Use Critical Area Seeding (342) where necessary to prevent erosion following construciton activities.

Feature Measure: No.

Scenario Unit: Each

Scenario Typical Size: 1.0

Scenario Total Cost: $7,114.63

Scenario Cost/Unit: $7,114.63

Cost Details:

Component Name	ID	Description	Unit	Cost	QTY	Total
Equipment Installation						
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 Yards	$179.94	0.2	$35.99
Rotary Drill Rig	1595	Rotary drill rig including equipment and power unit costs. Labor not included.	Hours	$338.22	8	$2,705.76
Materials						
Test, Standard Water Test, Well Water	309	Well Water Suitability test. Includes materials and shipping only.	Each	$47.11	1	$47.11
Grout, cement	1333	Cement grout meeting ASTM specifications for well sealing. Includes both neat-cement grout and bentonite gout mixtures. Includes materials, equipment and labor to place.	Cubic Yards	$567.19	2	$1,134.38
Chlorine	1335	Liquid chlorine bleach. Includes materials only.	Gallons	$4.37	1	$4.37
Well Cap, 6 in.	1786	Well cap, 6 inch. Materials only.	Each	$38.27	1	$38.27
Well Casing, Metal, 6 in.	1810	Steel well casing, 6 inch. Materials only.	Feet	$20.66	100	$2,066.00
Well Screen, stainless steel, 6 in.	1995	6 inch Stainless steel well screen. Materials only.	Feet	$82.71	10	$827.10
Mobilization						
Mobilization, medium equipment	1139	Equipment with 70-150 HP or typical weights between 14,000 and 30,000 pounds.	Each	$255.65	1	$255.65

Practice: 642 - Water Well

Scenario: #4 - Deep Well

Scenario Description:

Typical construction is for the installation of a well, in areas where sufficient water is known to occur > 600 feet of the ground surface. The well shall be drilled, driven, bored, jetted or otherwise constructed to an aquifer for water supply. The purpose of the practice is to provide water for livestock or micro-irrigation. An average well depth is 800 feet. Well casings are 4-6" in diameter. Steel casing is installed to a depth of 100 feet.

Before Situation:

Livestock have insufficient water or are fenced from their water source. There is insufficient water for use in micro-irrigation.

After Situation:

Sufficient water is available for livestock or micro-irrigation. Utilize Pumping Plant (533), Irrigation Pipeline (430), and Pipeline (516) as associated practices. Use Critical Area Seeding (342) where necessary to prevent erosion following construciton activities.

Feature Measure: No.

Scenario Unit: Each

Scenario Typical Size: 1.0

Scenario Total Cost: $15,838.92

Scenario Cost/Unit: $15,838.92

Cost Details:

Component Name	ID	Description	Unit	Cost	QTY	Total
Equipment Installation						
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 Yards	$179.94	0.2	$35.99
Rotary Drill Rig	1595	Rotary drill rig including equipment and power unit costs. Labor not included.	Hours	$338.22	24	$8,117.28
Materials						
Test, Standard Water Test, Well Water	309	Well Water Suitability test. Includes materials and shipping only.	Each	$47.11	1	$47.11
Grout, cement	1333	Cement grout meeting ASTM specifications for well sealing. Includes both neat-cement grout and bentonite gout mixtures. Includes materials, equipment and labor to place.	Cubic Yards	$567.19	2	$1,134.38
Chlorine	1335	Liquid chlorine bleach. Includes materials only.	Gallons	$4.37	2	$8.74
Well Cap, 6 in.	1786	Well cap, 6 inch. Materials only.	Each	$38.27	1	$38.27
Well Casing, Metal, 6 in.	1810	Steel well casing, 6 inch. Materials only.	Feet	$20.66	100	$2,066.00
Well Screen, stainless steel, 6 in.	1995	6 inch Stainless steel well screen. Materials only.	Feet	$82.71	50	$4,135.50
Mobilization						
Mobilization, medium equipment	1139	Equipment with 70-150 HP or typical weights between 14,000 and 30,000 pounds.	Each	$255.65	1	$255.65

Practice: 642 - Water Well

Scenario: #5 - High Volume Shallow Well

Scenario Description:

Typical construction is for the installation of a well, in areas where sufficient water is known to occur within 100 feet of the ground surface. The well shall be drilled, dug, driven, bored, jetted or otherwise constructed to an aquifer for water supply. The purpose of the practice is to provide water for overhead irrigation. An average well depth is 75 feet. Well casings are ≥ 8" in diameter. Steel casing is installed to a depth of 30 feet.

Before Situation:

There is insufficient water for use in irrigation.

After Situation:

Sufficient water is available for irrigation. Utilize Pumping Plant (533) and Irrigation Pipeline (430) as associated practices. Use Critical Area Seeding (342) where necessary to prevent erosion following construciton activities.

Feature Measure: No.

Scenario Unit: Each

Scenario Typical Size: 1.0

Scenario Total Cost: $6,314.78

Scenario Cost/Unit: $6,314.78

Cost Details:

Component Name	ID	Description	Unit	Cost	QTY	Total
Equipment Installation						
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 Yards	$179.94	0.2	$35.99
Rotary Drill Rig	1595	Rotary drill rig including equipment and power unit costs. Labor not included.	Hours	$338.22	8	$2,705.76
Materials						
Test, Standard Water Test, Well Water	309	Well Water Suitability test. Includes materials and shipping only.	Each	$47.11	1	$47.11
Grout, cement	1333	Cement grout meeting ASTM specifications for well sealing. Includes both neat-cement grout and bentonite gout mixtures. Includes materials, equipment and labor to place.	Cubic Yards	$567.19	2	$1,134.38
Chlorine	1335	Liquid chlorine bleach. Includes materials only.	Gallons	$4.37	1	$4.37
Well Cap, 8 in.	1787	Well cap, 8 inch. Materials only.	Each	$59.12	1	$59.12
Well Casing, Metal, 8 in.	1811	Steel well casing, 8 inch. Materials only.	Feet	$26.66	30	$799.80
Well Screen, stainless steel, 8 in.	1819	8 inch Stainless steel well screen. Materials only.	Feet	$127.26	10	$1,272.60
Mobilization						
Mobilization, medium equipment	1139	Equipment with 70-150 HP or typical weights between 14,000 and 30,000 pounds.	Each	$255.65	1	$255.65

Practice: 642 - Water Well

Scenario: #6 - High Volume Typical Well

Scenario Description:

Typical construction is for the installation of a well, in areas where sufficient water is known to occur 100 - 600 feet of the ground surface. The well shall be drilled, driven, bored, jetted or otherwise constructed to an aquifer for water supply. The purpose of the practice is to provide water for livestock or micro-irrigation. An average well depth is 400 feet. Well casings are ≥ 8" in diameter. Steel casing is installed to a depth of 100 feet.

Before Situation:

There is insufficient water for use in irrigation.

After Situation:

Sufficient water is available for irrigation. Utilize Pumping Plant (533) and Irrigation Pipeline (430) as associated practices. Use Critical Area Seeding (342) where necessary to prevent erosion following construciton activities.

Feature Measure: No.

Scenario Unit: Each

Scenario Typical Size: 1.0

Scenario Total Cost: $10,886.74

Scenario Cost/Unit: $10,886.74

Cost Details:

Component Name	ID	Description	Unit	Cost	QTY	Total
Equipment Installation						
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 Yards	$179.94	0.2	$35.99
Rotary Drill Rig	1595	Rotary drill rig including equipment and power unit costs. Labor not included.	Hours	$338.22	16	$5,411.52
Materials						
Test, Standard Water Test, Well Water	309	Well Water Suitability test. Includes materials and shipping only.	Each	$47.11	1	$47.11
Grout, cement	1333	Cement grout meeting ASTM specifications for well sealing. Includes both neat-cement grout and bentonite gout mixtures. Includes materials, equipment and labor to place.	Cubic Yards	$567.19	2	$1,134.38
Chlorine	1335	Liquid chlorine bleach. Includes materials only.	Gallons	$4.37	1	$4.37
Well Cap, 8 in.	1787	Well cap, 8 inch. Materials only.	Each	$59.12	1	$59.12
Well Casing, Metal, 8 in.	1811	Steel well casing, 8 inch. Materials only.	Feet	$26.66	100	$2,666.00
Well Screen, stainless steel, 8 in.	1819	8 inch Stainless steel well screen. Materials only.	Feet	$127.26	10	$1,272.60
Mobilization						
Mobilization, medium equipment	1139	Equipment with 70-150 HP or typical weights between 14,000 and 30,000 pounds.	Each	$255.65	1	$255.65

Practice: 642 - Water Well

Scenario: #7 - High Volume Deep Well

Scenario Description:

Typical construction is for the installation of a well, in areas where sufficient water is known to occur > 600 feet of the ground surface. The well shall be drilled, driven, bored, jetted or otherwise constructed to an aquifer for water supply. The purpose of the practice is to provide water for livestock or micro-irrigation. An average well depth is 800 feet. Well casings are ≥ 8" in diameter. Steel casing is installed to a depth of 100 feet.

Before Situation:

There is insufficient water for use in irrigation.

After Situation:

Sufficient water is available for irrigation. Utilize Pumping Plant (533) and Irrigation Pipeline (430) as associated practices. Use Critical Area Seeding (342) where necessary to prevent erosion following construciton activities.

Feature Measure: No.

Scenario Unit: Each

Scenario Typical Size: 1.0

Scenario Total Cost: $24,094.42

Scenario Cost/Unit: $24,094.42

Cost Details:

Component Name	ID	Description	Unit	Cost	QTY	Total
Equipment Installation						
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 Yards	$179.94	0.2	$35.99
Rotary Drill Rig	1595	Rotary drill rig including equipment and power unit costs. Labor not included.	Hours	$338.22	40	$13,528.80
Materials						
Test, Standard Water Test, Well Water	309	Well Water Suitability test. Includes materials and shipping only.	Each	$47.11	1	$47.11
Grout, cement	1333	Cement grout meeting ASTM specifications for well sealing. Includes both neat-cement grout and bentonite gout mixtures. Includes materials, equipment and labor to place.	Cubic Yards	$567.19	2	$1,134.38
Chlorine	1335	Liquid chlorine bleach. Includes materials only.	Gallons	$4.37	1	$4.37
Well Cap, 8 in.	1787	Well cap, 8 inch. Materials only.	Each	$59.12	1	$59.12
Well Casing, Metal, 8 in.	1811	Steel well casing, 8 inch. Materials only.	Feet	$26.66	100	$2,666.00
Well Screen, stainless steel, 8 in.	1819	8 inch Stainless steel well screen. Materials only.	Feet	$127.26	50	$6,363.00
Mobilization						
Mobilization, medium equipment	1139	Equipment with 70-150 HP or typical weights between 14,000 and 30,000 pounds.	Each	$255.65	1	$255.65

Practice: 642 - Water Well

Scenario: #64 - 4 inch cased

Scenario Description:

Typical construction is for the installation of a well, in areas where sufficient water is known to occur within 100 feet of the ground surface. The well shall be drilled, dug, driven, bored, jetted or otherwise constructed to an aquifer for water supply. The purpose of the practice is to provide water for livestock or irrigation. An average well depth is 250 feet. Well casings are 4" in diameter. Steel casing is installed to a depth of 110 feet.

Before Situation:

Livestock have insufficient water or are fenced from their water source. There is insufficient water for use in micro-irrigation.

After Situation:

Install a 250' deep well with 110' of 4" casing. Casing grouted to seal out surface water. Sufficient water is available for livestock or irrigation. Utilize Pumping Plant (533) and Pipeline (516) as associated practices. Use Critical Area Seeding (342) where necessary to prevent erosion following construction activities.

Feature Measure: Total depth of well

Scenario Unit: Linear Feet

Scenario Typical Size: 250.0

Scenario Total Cost: $5,576.17

Scenario Cost/Unit: $22.30

Cost Details:

Component Name	ID	Description	Unit	Cost	QTY	Total
Equipment Installation						
Rotary Drill Rig	1595	Rotary drill rig including equipment and power unit costs. Labor not included.	Hours	$338.22	6	$2,029.32
Materials						
Test, Standard Water Test, Well Water	309	Well Water Suitability test. Includes materials and shipping only.	Each	$47.11	1	$47.11
Grout, cement	1333	Cement grout meeting ASTM specifications for well sealing. Includes both neat-cement grout and bentonite gout mixtures. Includes materials, equipment and labor to place.	Cubic Yards	$567.19	3	$1,701.57
Chlorine	1335	Liquid chlorine bleach. Includes materials only.	Gallons	$4.37	1	$4.37
Well Cap, 4 in.	1785	Well cap, 4 inch. Materials only.	Each	$28.95	1	$28.95
Well Casing, Metal, 4 in.	1809	Steel well casing, 4 inch. Materials only.	Feet	$13.72	110	$1,509.20
Mobilization						
Mobilization, medium equipment	1139	Equipment with 70-150 HP or typical weights between 14,000 and 30,000 pounds.	Each	$255.65	1	$255.65

Practice: 642 - Water Well

Scenario: #65 - Typical Well, 6 inch

Scenario Description:

Typical construction is for the installation of a well, in areas where sufficient water is known to occur 100 - 600 feet of the ground surface. The well shall be drilled, dug, driven, bored, jetted or otherwise constructed to an aquifer for water supply. The purpose of the practice is to provide water for livestock or micro- irrigation. An average well depth is 400 feet. Well casings are 4-6" in diameter. Steel casing is installed to a depth of 150 feet.

Before Situation:

Livestock have insufficient water or are fenced from their water source. There is insufficient water for use in micro-irrigation.

After Situation:

Install a 400' deep well with 150' of 6" casing. Casing grouted to seal out surface water. Sufficient water is available for livestock or micro-irrigation. Utilize Pumping Plant (533) and Pipeline (516) as associated practices. Use Critical Area Seeding (342) where necessary to prevent erosion following construction activities

Feature Measure: Total depth of well

Scenario Unit: Linear Feet

Scenario Typical Size: 400.0

Scenario Total Cost: $9,068.82

Scenario Cost/Unit: $22.67

Cost Details:

Component Name	ID	Description	Unit	Cost	QTY	Total
Equipment Installation						
Rotary Drill Rig	1595	Rotary drill rig including equipment and power unit costs. Labor not included.	Hours	$338.22	8	$2,705.76
Materials						
Test, Standard Water Test, Well Water	309	Well Water Suitability test. Includes materials and shipping only.	Each	$47.11	1	$47.11
Grout, cement	1333	Cement grout meeting ASTM specifications for well sealing. Includes both neat-cement grout and bentonite gout mixtures. Includes materials, equipment and labor to place.	Cubic Yards	$567.19	5	$2,835.95
Chlorine	1335	Liquid chlorine bleach. Includes materials only.	Gallons	$4.37	1	$4.37
Well Cap, 6 in.	1786	Well cap, 6 inch. Materials only.	Each	$38.27	1	$38.27
Well Casing, Metal, 6 in.	1810	Steel well casing, 6 inch. Materials only.	Feet	$20.66	150	$3,099.00
Well Screen, stainless steel, 6 in.	1995	6 inch Stainless steel well screen. Materials only.	Feet	$82.71	1	$82.71
Mobilization						
Mobilization, medium equipment	1139	Equipment with 70-150 HP or typical weights between 14,000 and 30,000 pounds.	Each	$255.65	1	$255.65

Practice: 642 - Water Well

Scenario: #66 - 4 inch limited casing

Scenario Description:

Typical construction is for the installation of a well, in areas where sufficient water is known to occur within 100 feet of the ground surface. The well shall be drilled, dug, driven, bored, jetted or otherwise constructed to an aquifer for water supply. The purpose of the practice is to provide water for livestock or irrigation. The area is known for swallow wells and minimal depth to bedrock. An average well depth is 150 feet. Well casings are 4-6" in diameter. Steel casing is installed to a depth of 30 feet.

Before Situation:

Livestock have insufficient water or are fenced from their water source. There is insufficient water for use in micro-irrigation.

After Situation:

Install a 150' deep well with 30' of 4" casing. Casing grouted to seal out surface water. Sufficient water is available for livestock or irrigation. Utilize Pumping Plant (533) and Pipeline (516) as associated practices. Use Critical Area Seeding (342) where necessary to prevent erosion following construction activities.

Feature Measure: Total depth of well

Scenario Unit: Feet

Scenario Typical Size: 150.0

Scenario Total Cost: $2,667.75

Scenario Cost/Unit: $17.79

Cost Details:

Component Name	ID	Description	Unit	Cost	QTY	Total
Equipment Installation						
Rotary Drill Rig	1595	Rotary drill rig including equipment and power unit costs. Labor not included.	Hours	$338.22	4	$1,352.88
Materials						
Test, Standard Water Test, Well Water	309	Well Water Suitability test. Includes materials and shipping only.	Each	$47.11	1	$47.11
Grout, cement	1333	Cement grout meeting ASTM specifications for well sealing. Includes both neat-cement grout and bentonite gout mixtures. Includes materials, equipment and labor to place.	Cubic Yards	$567.19	1	$567.19
Chlorine	1335	Liquid chlorine bleach. Includes materials only.	Gallons	$4.37	1	$4.37
Well Cap, 4 in.	1785	Well cap, 4 inch. Materials only.	Each	$28.95	1	$28.95
Well Casing, Metal, 4 in.	1809	Steel well casing, 4 inch. Materials only.	Feet	$13.72	30	$411.60
Mobilization						
Mobilization, medium equipment	1139	Equipment with 70-150 HP or typical weights between 14,000 and 30,000 pounds.	Each	$255.65	1	$255.65

Practice: 642 - Water Well

Scenario: #67 - High Volume Typical Well, 8 inch or greater

Scenario Description:

Typical construction is for the installation of a well, in areas where sufficient water is known to occur 100 - 600 feet of the ground surface. The well shall be drilled, dug, driven, bored, jetted or otherwise constructed to an aquifer for water supply. The purpose of the practice is to provide water for livestock or micro- irrigation.

Before Situation:

There is insufficient water for use in irrigation.

After Situation:

A well is drilled with 150' feet of 8" casing and a total depth of 500'. Sufficient water is available for livestock or micro-irrigation. Utilize Pumping Plant (533) and Pipeline (516) as associated practices. Use Critical Area Seeding (342) where necessary to prevent erosion following construction activities.

Feature Measure: Total depth of well

Scenario Unit: Linear Feet

Scenario Typical Size: 500.0

Scenario Total Cost: $19,158.62

Scenario Cost/Unit: $38.32

Cost Details:

Component Name	ID	Description	Unit	Cost	QTY	Total
Equipment Installation						
Rotary Drill Rig	1595	Rotary drill rig including equipment and power unit costs. Labor not included.	Hours	$338.22	32	$10,823.04
Materials						
Test, Standard Water Test, Well Water	309	Well Water Suitability test. Includes materials and shipping only.	Each	$47.11	1	$47.11
Grout, cement	1333	Cement grout meeting ASTM specifications for well sealing. Includes both neat-cement grout and bentonite gout mixtures. Includes materials, equipment and labor to place.	Cubic Yards	$567.19	7	$3,970.33
Chlorine	1335	Liquid chlorine bleach. Includes materials only.	Gallons	$4.37	1	$4.37
Well Cap, 8 in.	1787	Well cap, 8 inch. Materials only.	Each	$59.12	1	$59.12
Well Casing, Metal, 8 in.	1811	Steel well casing, 8 inch. Materials only.	Feet	$26.66	150	$3,999.00
Mobilization						
Mobilization, medium equipment	1139	Equipment with 70-150 HP or typical weights between 14,000 and 30,000 pounds.	Each	$255.65	1	$255.65

Practice: 642 - Water Well

Scenario: #68 - Well Yield Test

Scenario Description:

A well yield test is required for an existing or planned well for irrigation or livestock watering. The well yield and drawdown under continuous pumping conditions are unknown. A well yield test will be conducted to determine the safe well yield and drawdown. Resource Concerns: insufficient water for livestock or irrigation, inefficient energy use.

Before Situation:

Livestock have insufficient water or are fenced from their water source. There is insufficient water for use in micro-irrigation.

After Situation:

Sufficient water is available for livestock or micro-irrigation. Utilize Pumping Plant (533), Irrigation Pipeline (430), and Livestock Pipeline (516), and Watering Facilities (614) as associated practices.

Feature Measure: Hours of Testing

Scenario Unit: Hours

Scenario Typical Size: 8.0

Scenario Total Cost: $1,561.28

Scenario Cost/Unit: $195.16

Cost Details:

Component Name	ID	Description	Unit	Cost	QTY	Total
Materials						
Aquifer Flow Test	1817	High-volume aquifer flow test. Includes labor and equipment.	Hours	$195.16	8	$1,561.28

Practice: 643 - Restoration of Rare or Declining Natural Communities

Scenario: #2 - Habitat Monitoring and Management, High Intensity and Complexity-Year 1

Scenario Description:

This scenario is for monitoring the progress of native oyster reef restoration to make recccomendations on adaptive management to improved the restoreed habitat. This is for Year 1 after 0.025 acres is restored. Monitoring will include temperature, salinity, disolved oxygen, substrate type, submerged vegetation, oyster survival rates and othyer data listed in Conservation Practice Job Sheet -Oyster Monitoring. Additional disease monitoring will be completed annually to determine if specific diseases are impacting the reef organisms .Reef habitats will be monitored twice per season (Disease monitoring only once). A boat will be required to gain access to the site and diving may be required to collect the required data. Alll infomnation will be doucmanted on the data collection sheets provided.

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.

Feature Measure: Monitoring efforts and adaptive m

Scenario Unit: Each

Scenario Typical Size: 1.0

Scenario Total Cost: $4,848.08

Scenario Cost/Unit: $4,848.08

Cost Details:

Component Name	ID	Description	Unit	Cost	QTY	Total
Equipment Installation						
Boat, 150 HP	2407	22 foot boat with 150hp motor used to place cultch to create reef habitat.	Hours	$146.28	8	$1,170.24
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.	Hours	$37.19	16	$595.04
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.	Hours	$102.76	30	$3,082.80

Practice: 643 - Restoration of Rare or Declining Natural Communities

Scenario: #3 - 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 it 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.

Feature Measure: hours of tractor use

Scenario Unit: Acres

Scenario Typical Size: 20.0

Scenario Total Cost: $798.26

Scenario Cost/Unit: $39.91

Cost Details:

Component Name	ID	Description	Unit	Cost	QTY	Total
Equipment Installation						
Tillage, Primary	946	Includes heavy disking (offset) or chisel plow. Includes equipment, power unit and labor costs.	Acres	$16.30	20	$326.00
Tractor, agricultural, 120 HP	962	Agricultural tractor with horsepower range of 90 to 140. Equipment and power unit costs. Labor not included.	Hours	$50.84	6	$305.04
Labor						
Equipment Operators, Light	232	Includes: Skid Steer Loaders, Hydraulic Excavators <50 HP, Trenchers <12 in., Ag Equipment <150 HP, Pickup Trucks, Forklifts, Mulchers	Hours	$27.87	6	$167.22

Practice: 643 - Restoration of Rare or Declining Natural Communities

Scenario: #4 - 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.

Feature Measure: Hours

Scenario Unit: Acres

Scenario Typical Size: 20.0

Scenario Total Cost: $2,358.72

Scenario Cost/Unit: $117.94

Cost Details:

Component Name	ID	Description	Unit	Cost	QTY	Total
Equipment Installation						
Dozer, 200 HP	928	Track mounted Dozer with horsepower range of 160 to 250. Equipment and power unit costs. Labor not included.	Hours	$206.77	6	$1,240.62
Tillage, Primary	946	Includes heavy disking (offset) or chisel plow. Includes equipment, power unit and labor costs.	Acres	$16.30	20	$326.00
Labor						
Equipment Operators, Heavy	233	Includes: Cranes, Hydraulic Excavators >=50 HP, Dozers, Paving Machines, Rock Trenchers, Trenchers >=12 in., Dump Trucks, Ag Equipment >=150 HP, Scrapers, Water Wagons.	Hours	$38.00	8	$304.00
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	$488.10	1	$488.10

Practice: 643 - Restoration of Rare or Declining Natural Communities

Scenario: #5 - Vernal Pool Creation

Scenario Description:

Creation of vernal pools to provide breeding habitats for anphibian species that are in decline. Vernal pools are usuallly located in forested landscapes. Vernal pools are usually 0.1-0.5 acres in size. Woody debris may be added to the vernal pools to improve the habitat. Resource concerns include Inadequate Cover/Shelter. Practcie 643 is being used in lieu of Wetland Creation because a vernal pool may not support permanant wetland vegetation. Associated practices include: 390 Riparian Herbaceous Cove, 460 Land Clearing.

Before Situation:

Forested landscape has limited number of vernal pools. Surrounding lands have been developed resulting in a decrease number of sites for anphibian breeding. Lack of breeding has caused a decrease in anphibian populations.

After Situation:

A vernal pool is create which provides additional cover/shelter fior breeding anphibians. The anphibian popultation increase in the area of the vernal pool.

Feature Measure: <Unknown>

Scenario Unit: Acres

Scenario Typical Size: 0.3

Scenario Total Cost: $2,443.12

Scenario Cost/Unit: $9,772.48

Cost Details:

Component Name	ID	Description	Unit	Cost	QTY	Total
Equipment Installation						
Dozer, 140 HP	927	Track mounted Dozer with horsepower range of 125 to 160. Equipment and power unit costs. Labor not included.	Hours	$104.83	9	$943.47
Chainsaw	937	Equipment and power unit costs. Labor not included.	Hours	$7.15	5	$35.75
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.	Hours	$37.19	12	$446.28
Equipment Operators, Heavy	233	Includes: Cranes, Hydraulic Excavators >=50 HP, Dozers, Paving Machines, Rock Trenchers, Trenchers >=12 in., Dump Trucks, Ag Equipment >=150 HP, Scrapers, Water Wagons.	Hours	$38.00	9	$342.00
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.	Hours	$46.88	4	$187.52
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	$488.10	1	$488.10

Practice: 643 - Restoration of Rare or Declining Natural Communities

Scenario: #6 - Flash Grazing for Bog Turtle Habitat Restoration

Scenario Description:

Landowners with habitat for Bog Turtles complete flash grazing to promote restoration and management of these habitats. This is usually carried out annually. Livestock are temporarly allowed to graze the habitat area. Stocking is 0.75 AU/Acre. A Biologist is required to locate all existing bog turtles and relocate during the flash grazing. Livestock are transported to the site for the grazing. Normally use cattle, sheep or goats depending on the availabitily of the livestock for grazing and the type of vegetation being grazed. Associated practices include: 472 Access Control. Resource Conserns include inadequate fish and wildlife habitat.

Before Situation:

Bog Turtle habitat is degraded due to an overgrowth of woody vegetation. The areas do not provide the necessary habitat to fully support the Bog Turtle.

After Situation:

After flash grazing the habitat regenerate to vegetation and a structure that is beneficial to the Bog Turtle.

Feature Measure: <Unknown>

Scenario Unit: Acres

Scenario Typical Size: 2.0

Scenario Total Cost: $1,580.24

Scenario Cost/Unit: $790.12

Cost Details:

Component Name	ID	Description	Unit	Cost	QTY	Total
Equipment Installation						
Truck, Pickup	939	Equipment and power unit costs. Labor not included.	Hours	$24.18	4	$96.72
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.	Hours	$27.56	24	$661.44
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.	Hours	$102.76	8	$822.08

Practice: 643 - Restoration of Rare or Declining Natural Communities

Scenario: #7 - Reef Creation-Live Oysters and Cultch

Scenario Description:

Spat on Shell: 1 million oyster larvae are grown in an aquaculture facility on shell which are then placed on top of shell to improve the amount of living animals in order to improve regeneration of the developed or restored reef. Each setting will require 45 fish totes (0.11 cubic yards per tote). Shell will be placed in bags and transported to the aquaculture facility. Approximately 1 million larvae are added to the tank and they set on the shells. The oysters are set in the tanks for 7-10 days. The bags are then place in the coastal ponds or estuaries until oysters grow to greater than or equal to 1 ".. The oysters are placed on beds created from clean shell (45 totes 5 yards of clean shell average of 2"). The following process is used: 1. Collect shell for bagging-2 people for 2 days, 300 bags. (16 hours) 2. Spat on Shell icludes setting, and transpotation. ARC sets oysters goal is to plant ½ million at 1 inch or greater. In tank for 7-10 days. 3. Go back and pick up oysters. 1 day trucking 2 persons. Then bring out to area to grow out. 4 hours boat time plus 3 workers. 4. Oysters are grown out over June-October, normally 8 hours per week, 2 people. Boat time would be approximately 4 hours per week. 5. Place cultch on bottom. 5 yards or 3.5 tons of cultch (45 totes). 9 totes in a yard. 8 hours with boat, 4 laborers(32 hours) (3.5 tons of cultch are used to build the reef base prior to deployment of live oysters. 6. Oysters placed on cultch. 8 hours with boat, 4 aborers(32 hours) 7. Additional gear to grow out. Additional grow out bags 500-600. $5.50 per bag, each cage holds 5-6 bags, $12,000. 3 years is $4,000 per year. 8. Oyster shell, $1,500 per 300 bags. Scenrion id based on 90 fish totes.

Before Situation:

Coastal estuaries and coastal ponds are lacking beneficial oyster beds. The oyster beds have been degraded or eliminated due to poor water quality, weather events, or disease. Beds have limited population of oysters or lack any oysters. This limits the natural regeneration of the beds. The lack of or decrease in oyster beds limits wildlife food and cover. Water quality is decrease due to a lack of filtering by the oysters.

After Situation:

The biological and structural components of the oyster beds are restored. These populated oysters can continue to re-seed the bed, as well as, surrounding beds. Native wildlife habitat is increased. There is an increase in both food and cover for native wildlife. Oysters that set on the beds provide increased water quality by additional filtering of the water.

Feature Measure: Totes

Scenario Unit: Each

Scenario Typical Size: 90.0

Scenario Total Cost: $45,120.91

Scenario Cost/Unit: $501.34

Cost Details:

Component Name	ID	Description	Unit	Cost	QTY	Total
Equipment Installation						
Truck, Pickup	939	Equipment and power unit costs. Labor not included.	Hours	$24.18	8	$193.44
Boat, 150 HP	2407	22 foot boat with 150hp motor used to place cultch to create reef habitat.	Hours	$146.28	96	$14,042.88
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.	Hours	$27.56	220	$6,063.20
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.	Hours	$102.76	48	$4,932.48
Materials						
Cultch	2409	Cultch material (used and/or slightly crushed, cleaned, medium to large sized shells). Includes materials only.	Ton	$64.13	7	$448.91
Hatchery Seed Oysters	2635	Hatchery produced oyster seed with spat grown to 1 to 2 inch for Oyster Reef Restoration. Component unit 'Each' refers to 1,000 count. Includes materials and shipping from hatchery to dockside.	Each	$19.44	1000	$19,440.00

Practice: 643 - Restoration of Rare or Declining Natural Communities

Scenario: #8 - Creation of Oyster Reef Coastal Pond

Scenario Description:

Oyster reef are restored in shallow coastal pond or bays. These areas have limited access. Oyster reefs are created using clean cultch that is purchased from local shellfish processing plants. The typical unit size is 1100 square feet. Clean shell is placed in totes and loaded on boats to be taken to the reef restoration location. Shell is place using manual labor on pre-selected sites. Volume of shell is usually 40 yards per 1/10 acre or 10 yards per 1100 square feet. Shell is place in linear or concentric piles.

Before Situation:

Coastal estuaries and coastal ponds are lacking beneficial oyster beds. The oyster beds have been degraded or eliminated due to poor water quality, weather events, or disease. Beds have limited population of oysters or lack any oysters. This limits the natural regeneration of the beds. The lack of or decrease in oyster beds limits wildlife food and cover. Water quality is decrease due to a lack of filtering by the oysters.

After Situation:

The biological and structural components of the oyster beds are restored. These populated oysters can continue to re-seed the bed, as well as, surrounding beds. Native wildlife habitat is increased. There is an increase in both food and cover for native wildlife. Oysters that set on the beds provide increased water quality by additional filtering of the water.

Feature Measure: Totes

Scenario Unit: Each

Scenario Typical Size: 90.0

Scenario Total Cost: $6,255.44

Scenario Cost/Unit: $69.50

Cost Details:

Component Name	ID	Description	Unit	Cost	QTY	Total
Equipment Installation						
Truck, Pickup	939	Equipment and power unit costs. Labor not included.	Hours	$24.18	4.5	$108.81
Boat, 150 HP	2407	22 foot boat with 150hp motor used to place cultch to create reef habitat.	Hours	$146.28	12	$1,755.36
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.	Hours	$37.19	4	$148.76
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.	Hours	$27.56	56	$1,543.36
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.	Hours	$46.88	48	$2,250.24
Materials						
Cultch	2409	Cultch material (used and/or slightly crushed, cleaned, medium to large sized shells). Includes materials only.	Ton	$64.13	7	$448.91

Practice: 643 - Restoration of Rare or Declining Natural Communities

Scenario: #9 - Oyster Reef Barge Crane

Scenario Description:

Restoration of native oyster beds by placing oyster shells to form beds in coastal estuaries or coastal ponds. Typically requires 100 tons of shells placed on the bottom of the coastal estuary. The shell is transported to the site via a barge. The transportation and placement of the shell usually takes three days. Normally 100 tons of oyster or clam shell is dried over winter to remove disease and placed on the bottom in strategic locations based on bathymetric positions in the estuary. The shell creates habitat for both the oysters and other native wildlife.

Before Situation:

Coastal estuaries and coastal ponds are lacking beneficial oyster beds. The oyster beds have been degraded or eliminated due to poor water quality, weather events, or disease. The lack of or decrease in oyster beds limits wildlife food and cover. Water quality is decrease due to a lack of filtering by the oysters

After Situation:

The structural components of the oyster beds are restored. These beds can be seeded by native oyster population. Native wildlife habitat is increased. There is an increase in both food and cover for native wildlife. Oysters that set on the beds provide increased water quality by additional filtering of the water.

Feature Measure: <Unknown>

Scenario Unit: Acres

Scenario Typical Size: 1.0

Scenario Total Cost: $18,526.63

Scenario Cost/Unit: $18,526.63

Cost Details:

Component Name	ID	Description	Unit	Cost	QTY	Total
Equipment Installation						
Track Loader, 95HP	935	Equipment and power unit costs. Labor not included.	Hours	$90.71	8	$725.68
Barge with crane and operator	2408	Barge to transport and place 1 ton bags of cultch to form oyster reef habitat.	Hours	$339.17	27	$9,157.59
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.	Hours	$27.56	35	$964.60
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.	Hours	$46.88	27	$1,265.76
Materials						
Cultch	2409	Cultch material (used and/or slightly crushed, cleaned, medium to large sized shells). Includes materials only.	Ton	$64.13	100	$6,413.00

Practice: 643 - Restoration of Rare or Declining Natural Communities

Scenario: #14 - Reef Monitoring Reef Year 3

Scenario Description:

This scenario is for Year 3 for monitoring the progress of native oyster reef restoration to make recommendations on adaptive management to improved the restored habitat. Monitoring will require the collection of 80 quadrats of data on the reef. The year 3 will be used once 4300 square feet of reef are restored. Monitoring will include temperature, salinity, dissolved oxygen, substrate type, submerged vegetation, oyster survival rates, disease testing (annually) and other data listed in Conservation Practice Job Sheet -Oyster Monitoring. Disease monitoring will be completed annually to determine if specific diseases are impacting the reef organisms .Reef habitats will be monitored twice per season. A boat will be required to gain access to the site and diving may be required to collect the required data. All information will be documented on the data collection sheets provided.

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.

Feature Measure: Monitoring efforts and adaptive m

Scenario Unit: Each

Scenario Typical Size: 1.0

Scenario Total Cost: $9,048.16

Scenario Cost/Unit: $9,048.16

Cost Details:

Component Name	ID	Description	Unit	Cost	QTY	Total
Equipment Installation						
Boat, 150 HP	2407	22 foot boat with 150hp motor used to place cultch to create reef habitat.	Hours	$146.28	20	$2,925.60
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.	Hours	$37.19	32	$1,190.08
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.	Hours	$102.76	48	$4,932.48

Practice: 643 - Restoration of Rare or Declining Natural Communities

Scenario: #18 - Oyster Reef Monitoring Year 1

Scenario Description:

This scenario is for monitoring the progress of native oyster reef restoration after year 1. This will assists to make recommendations on adaptive management to improved the restored habitat. This will be used after 1100 square feet of reef is restored. This will require collecting 20 quadrats of data on the reef. Monitoring will include temperature, salinity, dissolved oxygen, substrate type, submerged vegetation, oyster survival rates and other data listed in Conservation Practice Job Sheet -Oyster Monitoring. Reef habitats will be monitored twice per season. A boat will be required to gain access to the site and diving may be required to collect the required data. All information will be documented on the data collection sheets provided.

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.

Feature Measure: Monitoring efforts and adaptive m

Scenario Unit: Each

Scenario Typical Size: 1.0

Scenario Total Cost: $2,587.36

Scenario Cost/Unit: $2,587.36

Cost Details:

Component Name	ID	Description	Unit	Cost	QTY	Total
Equipment Installation						
Boat, 150 HP	2407	22 foot boat with 150hp motor used to place cultch to create reef habitat.	Hours	$146.28	8	$1,170.24
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.	Hours	$37.19	16	$595.04
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.	Hours	$102.76	8	$822.08

Practice: 643 - Restoration of Rare or Declining Natural Communities

Scenario: #19 - Reef Monitoring-Year 2

Scenario Description:

This scenario is for Year 2 for monitoring the progress of native oyster reef restoration to make recommendations on adaptive management to improved the restored habitat. At this time 4300 square feet of reef should be restored. It will be required to collect 40 quadrats of data on the restored reefs. Monitoring will include temperature, salinity, dissolved oxygen, substrate type, submerged vegetation, oyster survival rates, disease testing (annually) and other data listed in Conservation Practice Job Sheet -Oyster Monitoring. Disease monitoring will be completed annually to determine if specific diseases are impacting the reef organisms .Reef habitats will be monitored twice per season. A boat will be required to gain access to the site and diving may be required to collect the required data. All information will be documented on the data collection sheets provided.

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.

Feature Measure: Monitoring efforts and adaptive m

Scenario Unit: Each

Scenario Typical Size: 1.0

Scenario Total Cost: $5,235.28

Scenario Cost/Unit: $5,235.28

Cost Details:

Component Name	ID	Description	Unit	Cost	QTY	Total
Equipment Installation						
Boat, 150 HP	2407	22 foot boat with 150hp motor used to place cultch to create reef habitat.	Hours	$146.28	20	$2,925.60
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.	Hours	$37.19	40	$1,487.60
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.	Hours	$102.76	8	$822.08

Practice: 643 - Restoration of Rare or Declining Natural Communities

Scenario: #44 - Vernal Pool Creation with liner

Scenario Description:

Creation of vernal pool with liner to provide breeding habitats for amphibian species that are in decline. The liner is a critical component to ensure that water is retained in the pools we create until the tadpoles reach metamorph stage and leave the pool. Vernal pools are usuallly located in forested landscapes. Vernal pools are usually 0.1-0.5 acres in size. Woody debris may be added to the vernal pools to improve the habitat. Resource concerns include Inadequate Cover/Shelter. Practcie 643 is being used in lieu of Wetland Creation because a vernal pool may not support permanant wetland vegetation. Associated practices include: 390 Riparian Herbaceous Cover, 460 Land Clearing.

Before Situation:

Forested landscape has limited number of vernal pools. Surrounding lands have been developed resulting in a decrease number of sites for amphibian breeding. Lack of breeding has caused a decrease in amphibian populations.

After Situation:

A vernal pool with liner to create which provides additional cover/shelter fior breeding anphibians. The amphibian population will increase in the area of the vernal pool.

Feature Measure: <Unknown>

Scenario Unit: Acres

Scenario Typical Size: 0.3

Scenario Total Cost: $17,623.12

Scenario Cost/Unit: $70,492.48

Cost Details:

Component Name	ID	Description	Unit	Cost	QTY	Total
Equipment Installation						
Dozer, 140 HP	927	Track mounted Dozer with horsepower range of 125 to 160. Equipment and power unit costs. Labor not included.	Hours	$104.83	9	$943.47
Chainsaw	937	Equipment and power unit costs. Labor not included.	Hours	$7.15	5	$35.75
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.	Hours	$37.19	12	$446.28
Equipment Operators, Heavy	233	Includes: Cranes, Hydraulic Excavators >=50 HP, Dozers, Paving Machines, Rock Trenchers, Trenchers >=12 in., Dump Trucks, Ag Equipment >=150 HP, Scrapers, Water Wagons.	Hours	$38.00	9	$342.00
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.	Hours	$46.88	4	$187.52
Materials						
Synthetic Liner, 60 mil	2109	Synthetic 60 mil HDPE, LLDPE, EPDM, etc membrane liner material. Includes materials and shipping only.	Square Feet	$1.38	11000	$15,180.00
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	$488.10	1	$488.10

Practice: 643 - Restoration of Rare or Declining Natural Communities

Scenario: #47 - Beetle Bank

Scenario Description:

Beetle banks are berms planted in dense stands of native bunch grasses designed to provide shelter and overwintering habitat for beetles, spiders and other beneficial insects that attack crop pests and weeds. They are generally 3ft to 6ft in width, and positioned in the center of, or at regular intervals throughout, crop fields. Resource concerns include Undesirable Plant Productivity and health; Wildlife habitat degradation.

Before Situation:

The tilled crop fields lack sufficient overall habitat conditions to support viable populations of targeted species including beetles, spiders and beneficial insects. The distances from areas on the edges of the fields able to support these species are too great for the species to benefit the entire field.

After Situation:

The installation of a beetle bank supports the habitat requirements of beetles, spiders, and other beneficial insects that attack crop pests in agricultural fields.

Feature Measure: Linear feet of bank across the field

Scenario Unit: Linear Feet

Scenario Typical Size: 200.0

Scenario Total Cost: $1,228.69

Scenario Cost/Unit: $6.14

Cost Details:

Component Name	ID	Description	Unit	Cost	QTY	Total
Equipment Installation						
Tillage, Primary	946	Includes heavy disking (offset) or chisel plow. Includes equipment, power unit and labor costs.	Acres	$16.30	0.03	$0.49
Mechanical weed control, Vegetation termination	957	Mechanical operations, Includes: Roller/crimper, mower, shredder, etc. Includes equipment, power unit and labor costs.	Acres	$20.46	0.12	$2.46
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.	Acres	$12.00	0.06	$0.72
Tractor, agricultural, 60 HP	963	Agricultural tractor with horsepower range of 50 to 90. Equipment and power unit costs. Labor not included.	Hours	$23.10	1	$23.10
Chemical, spot treatment, single stem application	964	Ground applied chemical to individual plants or group of plants, e.g., backpack sprayer treatment. Equipment and labor cost included.	Hours	$71.67	5	$358.35
Foregone Income						
FI, Organic, Vegetables	2252	Vegetables is Primary Crop	Acres	$1,408.00	0.03	$42.24
Labor						
Equipment Operators, Light	232	Includes: Skid Steer Loaders, Hydraulic Excavators <50 HP, Trenchers <12 in., Ag Equipment <150 HP, Pickup Trucks, Forklifts, Mulchers	Hours	$27.87	1	$27.87
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.	Hours	$46.88	7	$328.16
Materials						
Herbicide, 2,4-D	330	Broadleaf herbicide labeled for cropland and pasture. Refer to WIN-PST for product names and active ingredients. Includes materials and shipping only.	Acres	$6.63	0.06	$0.40
Herbicide, Glyphosate	334	A broad-spectrum, non-selective systemic herbicide. Refer to WIN-PST for product names and active ingredients. Includes materials and shipping only.	Acres	$9.21	0.1	$0.92
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.	Acres	$3,407.79	0.03	$102.23
Native Perennial Grasses, Legumes and/or Forbs, Medium Density	2754	A mix of native perennial grasses, legumes, and/or forbs, grasses typically greater than 50% of the mix, mmay include a small percentage of annual species for establishment purposes and/or if allowed by the CPS. Planted at medium to higher density (41-60 pure live seeds/sq ft). Species typically easy to purchase. Includes material and shipping.	Acres	$258.50	0.06	$15.51
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	$70.59	1	$70.59
Mobilization, medium equipment	1139	Equipment with 70-150 HP or typical weights between 14,000 and 30,000 pounds.	Each	$255.65	1	$255.65

Practice: 644 - Wetland Wildlife Habitat Management

Scenario: #2 - Creation of Turtle Nesting Habitat

Scenario Description:

The creation of turtle nesting habitat through a combination of the following activities: clearing vegetation, stripping loam, and scarifying the soil.. Usually in Upland areas (suitable for turtle nesting habitat) that are adjacent to wetlands, rivers, lakes and streams. This provides benefits for Fish and Wildlihe: Inadequest Space.

Before Situation:

Areaes adjacent to wetland, rivers, lakes and streams do not have adequest turtle nesting habitat. Turtles have to travel excessive distances to find nesting sites. This situation can increse the mortality of the local population and impact the repopulation of the species.

After Situation:

Turtle nesting habits is created adjacent to wetland, rivers, lakes and streams. Turtles are less likley to be killed crossing roads and by predation. The typical sixe of the installed practice is 1.0 acres.

Feature Measure: <Unknown>

Scenario Unit: Acres

Scenario Typical Size: 0.5

Scenario Total Cost: $2,446.26

Scenario Cost/Unit: $4,892.52

Cost Details:

Component Name	ID	Description	Unit	Cost	QTY	Total
Equipment Installation						
Dozer, 200 HP	928	Track mounted Dozer with horsepower range of 160 to 250. Equipment and power unit costs. Labor not included.	Hours	$206.77	8	$1,654.16
Labor						
Equipment Operators, Heavy	233	Includes: Cranes, Hydraulic Excavators >=50 HP, Dozers, Paving Machines, Rock Trenchers, Trenchers >=12 in., Dump Trucks, Ag Equipment >=150 HP, Scrapers, Water Wagons.	Hours	$38.00	8	$304.00
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	$488.10	1	$488.10

Practice: 645 - Upland Wildlife Habitat Management

Scenario: #1 - Mast/Apple Tree Release

Scenario Description:

Releasing individual Hardwood/Apple trees for mast, by reducing stocking and cutting undesirable competing species.

Before Situation:

Apple trees are being overtopped by other trees and plant productivity, health and vigor are negatively effected which limits flowering and fruit production. Food resources on the property are not meeting client's objectives for wildlife habitat. Healthy but suppressed trees will be retained while competing trees (with competing canopies) will be removed giving free growing space and full sunlight to the apple trees. There is limited herbaceous and woody seedlings/saplings regenerating under the apple trees further limiting food and cover.

After Situation:

Typical approach is to release individual trees from competition on 1 acre of land. Tools include chainsaw, brush saws, and bow saws. Trees competing with apple trees have been cut down so that there is sunlight on the apple tree for most of the day. The increase in sunlight will increase productivity, health and vigor of the apple tree stimulating future flowering and fruiting potential. Where larger trees are removed, there is also a flush of understory and forb/grass growth in the opening providing food and cover.

Feature Measure: Number of Trees Released

Scenario Unit: Each

Scenario Typical Size: 20.0

Scenario Total Cost: $484.90

Scenario Cost/Unit: $24.25

Cost Details:

Component Name	ID	Description	Unit	Cost	QTY	Total
Equipment Installation						
Chainsaw	937	Equipment and power unit costs. Labor not included.	Hours	$7.15	10	$71.50
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.	Hours	$27.56	15	$413.40

Practice: 645 - Upland Wildlife Habitat Management

Scenario: #2 - Snags

Scenario Description:
Create 8 snags by double girdling selected trees. Poor quality or deformed trees, such as those with broken tops or large branches, will be chosen for snags when available.

Before Situation:
Forest stands do not have a mix of dead wood among the growing trees. Cavity nesting birds and other wildlife species that use standing dead trees for shelter are declining in the vicinity due to insufficient cover.

After Situation:
8 snags per acre are created by double-girdling the selected trees in the stand. Snags provide habitat to innumerable organisms including fungi, insects and other invertebrates, and land animals such as amphibians, reptiles, birds, and mammals. Resource concerns for Widllife-Insufficient nesting habitat is addressed.

Feature Measure: Number of snags

Scenario Unit: Each

Scenario Typical Size: 8.0

Scenario Total Cost: $96.98

Scenario Cost/Unit: $12.12

Cost Details:

Component Name	ID	Description	Unit	Cost	QTY	Total
Equipment Installation						
Chainsaw	937	Equipment and power unit costs. Labor not included.	Hours	$7.15	2	$14.30
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.	Hours	$27.56	3	$82.68

Practice: 645 - Upland Wildlife Habitat Management

Scenario: #4 - Grassland Bird Management

Scenario Description:

This scenario involves the monitoring and adaptive management related to a change in the mowing regime on productive hayland by ensuring an early hay cut in mid to late May followed by a delay in the second cut of 65 days. Transects are walked to observe ground nesting birds. Three transects will be run per 20 acres. Monitoring efforts (n=3) are conducted two weeks apart. Observation of nesting are documented on a job-sheet. Haying is delayed until no nest are observed during the monitoring efforts. A third cut is allowed. Research has shown that implementing this management on intensely managed hayfields will provide nearly the same productivity for grassland songbirds as a hayfield not mowed until August 1st. Facilitating practice include 315 Herbaceous Weed Control and 511 Forage Harvest Management. Resource concerns include Wildlife: food and cover.

Before Situation:

Typical setting for this practice is agricultural dominated landscapes with large fields. These agricultural landscapes, and other large grass areas such as airports or preserves, are often the most desirable areas for grassland birds in the Northeast. Breeding success for grassland songbirds on intensively managed hayfields (3-4 cuts per summer) is nearly non-existent as the time period between mowings is too short for successful nesting. Through mowing the nests are destroyed or cover is removed making them vulnerable to predation by crows, ring-billed gulls and other predators. The reduction in nesting sites and nest success treduces the population of grassland nesting birds.

After Situation:

Providing this 65 day period without cutting the field provides grassland birds with good nesting habitat to breed and successfully fledge young.

Feature Measure: <Unknown>

Scenario Unit: Acres

Scenario Typical Size: 20.0

Scenario Total Cost: $1,534.64

Scenario Cost/Unit: $76.73

Cost Details:

Component Name	ID	Description	Unit	Cost	QTY	Total
Foregone Income						
FI, Hay, General Grass	2122	General Grass Hay is Primary Land Use	Ton	$30.49	20	$609.80
Labor						
Specialist Labor	235	Labor requiring a specialized skill set: Includes Agronomists, Foresters, Biologists, etc. to provide additional technical information during the planning and implementation of the practice. Does not include NRCS or TSP services.	Hours	$102.76	9	$924.84

Practice: 645 - Upland Wildlife Habitat Management

Scenario: #324 - Downed Large Wood

Scenario Description:

Large tree is felled on the upland or riparian forest floor to provide cover, denning, thermal regulation, and/or forage sites for wildlife species such as small mammals, amphibians, and birds. Large wood is defined as a minimum tree diameter of 14 inches and 20 feet in length with some bark and limbs attached. Installation of downed trees deemed necessary following a Wildlife Habitat Evaluation score below planning criteria level. Primary resource concern is Inadequate Habitat for Fish or Wildlife-habitat degradation. This practice may be installed alone or in combination with facilitating practices. Facilitating practices may include 666 and 655.

Before Situation:

A habitat assessment (using State Office approved habitat assessment method, protocol or tool) has indicated a need for increased structural complexity in the forest understory to bring one or more habitat limiting factors under Inadequate Habitat for Fish or Wildlife, up to planning criteria. Upland habitat limiting factors include quality, quantity and continuity of forage, cover, shelter, and space availability.

After Situation:

Installation of downed large wood brings the identified deficient habitat limiting factors up to planning criteria. The practice is installed using specialized labor with the use of common hand tools and small equipment.

Feature Measure: Large Wood

Scenario Unit: Each

Scenario Typical Size: 1.0

Scenario Total Cost: $511.82

Scenario Cost/Unit: $511.82

Cost Details:

Component Name	ID	Description	Unit	Cost	QTY	Total
Equipment Installation						
Skidsteer, 80 HP	933	Skidsteer loader with horsepower range of 60 to 90. Equipment and power unit costs. Labor not included.	Hours	$55.01	1	$55.01
Chainsaw	937	Equipment and power unit costs. Labor not included.	Hours	$7.15	0.5	$3.58
Truck, Pickup	939	Equipment and power unit costs. Labor not included.	Hours	$24.18	2	$48.36
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.	Hours	$37.19	0.5	$18.60
Equipment Operators, Light	232	Includes: Skid Steer Loaders, Hydraulic Excavators <50 HP, Trenchers <12 in., Ag Equipment <150 HP, Pickup Trucks, Forklifts, Mulchers	Hours	$27.87	1	$27.87
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.	Hours	$102.76	1	$102.76
Mobilization						
Mobilization, medium equipment	1139	Equipment with 70-150 HP or typical weights between 14,000 and 30,000 pounds.	Each	$255.65	1	$255.65

Practice: 645 - Upland Wildlife Habitat Management

Scenario: #333 - Delayed Mowing on Hay Fields to Meet Life History Requirements

Scenario Description:

This scenario is applied on currently well-maintained hay fields (cropland) to protect field-nesting birds and other wildlife from mowing equipment and subsequent loss of cover. Maintained hay fields contain high quality forage grasses including orchard grass, timothy, and fescue. Some hay fields may also contain legumes, such as alfalfa or clover. Hay fields are mowed using a sickle bar or disc mower. When hay fields are mowed during critical seasons (e.g. primary nesting season), wildlife (e.g. birds, bees, and turtles) can be injured from mowing equipment or nests are exposed to predation. A wildlife habitat evaluation (WHEG) indicates that the timing and/or method of mowing is detrimental to the habitat for target species. This practice scenario involves delaying mowing to avoid those critical seasons. Examples include (1) delayed mowing until August 1 or (2) in suitable areas a 65-day delayed second cut following a first cut that occurs before the primary nesting season. When mowing is delayed the nutritional content and digestibility of forage is significantly reduced and often the crop loses most value as livestock feed resulting in a loss of income for the agricultural producer. Over time, this management strategy will degrade agricultural crop (hay) value of the plant community mildly to significantly. However, it will provide valuable food and cover for wildlife.

Before Situation:

The site is a productive hay field dominated by cool or warm season forage grasses. The producer receives income from harvesting and selling quality hay. Wildlife (e.g. birds, bees, and turtles) are injured or killed during mowing operations and cover habitat is removed during critical seasons.

After Situation:

A wildlife habitat evaluation (WHEG) indicates that habitat degradation is addressed by the altered timing and method of harvest. Wildlife injury is reduced, and suitable cover is maintained because mowing operations are delayed. The hay field vegetative species composition transforms resulting in a greater variety of species. This change creates more structural diversity and provides valuable cover and forage for wildlife. The delay in mowing operations results in a loss of forage production quantity and quality as the field transitions towards more perennial broad leaf plants that are less valuable for hay production. The agricultural producer incurs a loss in income due to the delayed harvest beyond what is optimum for the forage.

Feature Measure: acres

Scenario Unit: Acres

Scenario Typical Size: 10.0

Scenario Total Cost: $1,320.30

Scenario Cost/Unit: $132.03

Cost Details:

Component Name	ID	Description	Unit	Cost	QTY	Total
Equipment Installation						
Mower, Bush Hog	940	Equipment and power unit costs. Labor not included.	Hours	$50.43	4	$201.72
Tractor, agricultural, 60 HP	963	Agricultural tractor with horsepower range of 50 to 90. Equipment and power unit costs. Labor not included.	Hours	$23.10	4	$92.40
Foregone Income						
FI, Hay, General Grass	2122	General Grass Hay is Primary Land Use	Ton	$30.49	30	$914.70
Labor						
Equipment Operators, Light	232	Includes: Skid Steer Loaders, Hydraulic Excavators <50 HP, Trenchers <12 in., Ag Equipment <150 HP, Pickup Trucks, Forklifts, Mulchers	Hours	$27.87	4	$111.48

Practice: 646 - Shallow Water Development and Management

Scenario: #3 - 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.

Feature Measure: Acre of shallow water

Scenario Unit: Acres

Scenario Typical Size: 1.0

Scenario Total Cost: $136.81

Scenario Cost/Unit: $136.81

Cost Details:

Component Name	ID	Description	Unit	Cost	QTY	Total
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	$109.25	1	$109.25
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.	Hours	$27.56	1	$27.56

Practice: 647 - Early Successional Habitat Development-Mgt

Scenario: #1 - Mowing

Scenario Description:

This scenario address inadequate habitat for fish and wildlife where setting back succession by mowing incoming woody species will improve habitat for the target species. Mowing can be used to increase structural diversity by creating areas of shorter vegetation preferred by some species or certain life stages of species. The typical setting for this scenario is woodlands and shrublands at the edge of crop fields, in pastures, hayland, at the edge of woodlands or brushy areas, and in odd areas such as pivot corners. Where chemical control of weeds, including invasives, is required to reduce competition for the desired plant community conservation practice 315 herbaceous weed control should be used. Where the seedbank is inadequate for natural regeneration and seeding is required use conservation practice 327 Conservation Cover.

Before Situation:

The site is static or trending to later successional plant community. The disturbance regime to maintain an earlier successional plant community is lacking. Pastures are often monotypic, lacking in diversity. Competition for sunlight from dense grass stands prevents seedling establishment. Stands are often dense and inhibit the movements of young wildlife such as game bird chicks. Area lacks diversity in the height of vegetation.

After Situation:

Early successsional habitat maintained. Mowing has provided more sun light for forb establishment. The heterogeneity of the habitat structure has been increased.

Feature Measure: width and length of treated area

Scenario Unit: Acres

Scenario Typical Size: 5.0

Scenario Total Cost: $563.44

Scenario Cost/Unit: $112.69

Cost Details:

Component Name	ID	Description	Unit	Cost	QTY	Total
Equipment Installation						
Mower, Bush Hog	940	Equipment and power unit costs. Labor not included.	Hours	$50.43	5	$252.15
Labor						
Equipment Operators, Light	232	Includes: Skid Steer Loaders, Hydraulic Excavators <50 HP, Trenchers <12 in., Ag Equipment <150 HP, Pickup Trucks, Forklifts, Mulchers	Hours	$27.87	5	$139.35
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	$171.94	1	$171.94

Practice: 647 - Early Successional Habitat Development-Mgt

Scenario: #2 - Light Brush hogging

Scenario Description:

This scenario address inadequate habitat for wildlife where setting back succession by mowing incoming woody species will improve habitat for the target species. Brush hogging can be used to increase structural diversity by creating areas of shorter vegetation while maintaining brushy beneficial areas preferred by some species or certain life stages of species. The typical setting for this scenario is old fields.

Before Situation:

Describe the setting where the practice will be installed. The site is lacking vertical and horizontal diversity and trending to later successional plant community. The disturbance regeme to maintain an earlier successional plant community is lacking or is being implemented improperly or during the prime nesting period.

After Situation:

The field has been improved through better timed and implemented managmeent to create a vertically and horizontally diverse habitat for species of concern providing necessary cover and nesting/rearing habitat.

Feature Measure: Acre

Scenario Unit: Acres

Scenario Typical Size: 5.0

Scenario Total Cost: $759.19

Scenario Cost/Unit: $151.84

Cost Details:

Component Name	ID	Description	Unit	Cost	QTY	Total
Equipment Installation						
Mower, Bush Hog	940	Equipment and power unit costs. Labor not included.	Hours	$50.43	7.5	$378.23
Labor						
Equipment Operators, Light	232	Includes: Skid Steer Loaders, Hydraulic Excavators <50 HP, Trenchers <12 in., Ag Equipment <150 HP, Pickup Trucks, Forklifts, Mulchers	Hours	$27.87	7.5	$209.03
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	$171.94	1	$171.94

Practice: 647 - Early Successional Habitat Development-Mgt

Scenario: #3 - Hand Cutting with Chainsaw

Scenario Description:

Using a brush saw and/or chainsaw to clear woody vegetation on pasture or wildlife openings that is 1 to 3" or less in diameter on ground with poor access and/or that is too steep or rocky for rotary mowing. Typical rate 1 acre per day.

Before Situation:

The site is static or trending to later successional plant community. The disturbance regeme to maintain an earlier successional plant community is lacking. Area lacks diversity in the height of vegetation. Early successional wildlife are leaving the area.

After Situation:

Early successsional habitat maintained. Colearing has provided more light for early successional vetetation reestablishment. The heterogeneity of the habitat structure has been increased. The early successional wildlife are returning.

Feature Measure: width and length of treated area

Scenario Unit: Acres

Scenario Typical Size: 2.0

Scenario Total Cost: $2,054.50

Scenario Cost/Unit: $1,027.25

Cost Details:

Component Name	ID	Description	Unit	Cost	QTY	Total
Equipment Installation						
Chainsaw	937	Equipment and power unit costs. Labor not included.	Hours	$7.15	32	$228.80
Brush Chipper, 6 in. capacity	938	Brush Chipper, 6 inch capacity, typically 35 HP. Includes chipper and power unit. Labor not included.	Hours	$30.40	8	$243.20
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.	Hours	$37.19	32	$1,190.08
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.	Hours	$27.56	8	$220.48
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	$171.94	1	$171.94

Practice: 647 - Early Successional Habitat Development-Mgt

Scenario: #5 - Light Mechanical

Scenario Description:
Practice to be used in old fields and forests where size class is 2 inches DBH or less. Control is achieved with a brontosaurus, Davco mower, gyrotrac or other mechanical means.

Before Situation:
Area is reverting to forest from early successional. Mechanical treatment is needed to control woody vegetation. Wildlife needing early successional habitat is leaving the area.

After Situation:
Appropriate habitat is restored and wildlife needing early successional habitat is able to return.

Feature Measure: acre

Scenario Unit: Acres

Scenario Typical Size: 20.0

Scenario Total Cost: $8,205.90

Scenario Cost/Unit: $410.30

Cost Details:

Component Name	ID	Description	Unit	Cost	QTY	Total
Equipment Installation						
Mechanical cutter, chopper	943	Forestry mulcher, flail shredder, hydro axe, brush cutter, etc. Equipment and power unit costs. Labor not included.	Hours	$90.63	60	$5,437.80
Labor						
Equipment Operators, Heavy	233	Includes: Cranes, Hydraulic Excavators >=50 HP, Dozers, Paving Machines, Rock Trenchers, Trenchers >=12 in., Dump Trucks, Ag Equipment >=150 HP, Scrapers, Water Wagons.	Hours	$38.00	60	$2,280.00
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	$488.10	1	$488.10

Practice: 647 - Early Successional Habitat Development-Mgt

Scenario: #6 - Medium Mechanical

Scenario Description:

Practice to be used in old fields and forests where size class is between 2 inches and 4 inches DBH. Control is achieved with a brontosaurus, Davco mower, gyrotrac or other mechanical means and takes more time per acre.

Before Situation:

Area is reverting to pole sized forest from early successional. Mechanical treatment is needed to control woody vegetation. Wildlife needing early successional habitat is leaving the area.

After Situation:

Appropriate habitat is restored and wildlife needing early successional habitat is able to return. For New England Cottontail projects - Sufficient amounts of course and fine woody debris will be left behind as protection for wildlife and regeneration.

Feature Measure: acre of treatment

Scenario Unit: Acres

Scenario Typical Size: 10.0

Scenario Total Cost: $7,499.20

Scenario Cost/Unit: $749.92

Cost Details:

Component Name	ID	Description	Unit	Cost	QTY	Total
Equipment Installation						
Brush Chipper, 6 in. capacity	938	Brush Chipper, 6 inch capacity, typically 35 HP. Includes chipper and power unit. Labor not included.	Hours	$30.40	10	$304.00
Mechanical cutter, chopper	943	Forestry mulcher, flail shredder, hydro axe, brush cutter, etc. Equipment and power unit costs. Labor not included.	Hours	$90.63	50	$4,531.50
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.	Hours	$27.56	10	$275.60
Equipment Operators, Heavy	233	Includes: Cranes, Hydraulic Excavators >=50 HP, Dozers, Paving Machines, Rock Trenchers, Trenchers >=12 in., Dump Trucks, Ag Equipment >=150 HP, Scrapers, Water Wagons.	Hours	$38.00	50	$1,900.00
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	$488.10	1	$488.10

Practice: 647 - Early Successional Habitat Development-Mgt

Scenario: #7 - Heavy Mechanical low intensity cut (Lg Patch Cut)

Scenario Description:

The implementation of early successional habitat in a moderately to heavily forested area consisting of trees with an average stand DBH of less than 6 inches. The size and density of vegetation to be removed requires mechanized forestry equipment such as a log skidder, feller buncher, forwarder, etc. Multiple pieces of equipment may be needed to complete the practice. The boundary of the cut, as well as any trees to be retained within the project area are to be marked in the field. Implementation is done in accordance with a site specific cutting plan developed by a licensed forester. The existing standing timber typically has adequate acceptable growing stock, as identified in the site specific management plan. Stand and site conditions allow for typical operation of equipment.

Before Situation:

Area is completely forested. Mechanical treatment is needed to control woody vegetation. Wildlife needing early successional habitat has left the area.

After Situation:

Appropriate habitat is restored and wildlife needing early successional habitat is able to return. For New England Cottontail projects - Sufficient amounts of course and fine woody debris will be left behind as protection for wildlife and regeneration.

Feature Measure: acrea treated

Scenario Unit: Acres

Scenario Typical Size: 10.0

Scenario Total Cost: $10,108.50

Scenario Cost/Unit: $1,010.85

Cost Details:

Component Name	ID	Description	Unit	Cost	QTY	Total
Equipment Installation						
Chainsaw	937	Equipment and power unit costs. Labor not included.	Hours	$7.15	20	$143.00
Feller buncher	941	Equipment and power unit costs. Labor not included.	Hours	$80.94	30	$2,428.20
Log skidder	942	Equipment and power unit costs. Labor not included.	Hours	$124.33	30	$3,729.90
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.	Hours	$27.56	20	$551.20
Equipment Operators, Heavy	233	Includes: Cranes, Hydraulic Excavators >=50 HP, Dozers, Paving Machines, Rock Trenchers, Trenchers >=12 in., Dump Trucks, Ag Equipment >=150 HP, Scrapers, Water Wagons.	Hours	$38.00	60	$2,280.00
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	$488.10	2	$976.20

Practice: 647 - Early Successional Habitat Development-Mgt

Scenario: #8 - Heavy Mechanical High intensity cut

Scenario Description:

The implementation of early successional habitat in a moderately to heavily forested area consisting of trees with an average stand DBH of 6 inches or greater. The size and density of vegetation to be removed requires mechanized forestry equipment such as a log skidder, feller buncher, forwarder, etc. Multiple pieces of equipment may be needed to complete the practice. The boundary of the cut, as well as any trees to be retained in the cut are to be marked in the field. Implementation is done in accordance with a site specific cutting plan developed by a licensed forester. The existing forest stands typically have minimal acceptable growing stock, as identified in the site specific management plan. Stand or site conditions will reduce operating efficiency resulting in increased cost

Before Situation:

Area is completely forested. Mechanical treatment is needed to control woody vegetation. Wildlife needing early successional habitat has left the area.

After Situation:

Appropriate habitat is restored and wildlife needing early successional habitat is able to return. For New England Cottontail projects - Sufficient amounts of course and fine woody debris will be left behind as protection for wildlife and regeneration.

Feature Measure: acrea treated

Scenario Unit: Acres

Scenario Typical Size: 10.0

Scenario Total Cost: $17,457.92

Scenario Cost/Unit: $1,745.79

Cost Details:

Component Name	ID	Description	Unit	Cost	QTY	Total
Equipment Installation						
Chainsaw	937	Equipment and power unit costs. Labor not included.	Hours	$7.15	30	$214.50
Feller buncher	941	Equipment and power unit costs. Labor not included.	Hours	$80.94	60	$4,856.40
Log skidder	942	Equipment and power unit costs. Labor not included.	Hours	$124.33	50	$6,216.50
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.	Hours	$27.56	30	$826.80
Equipment Operators, Heavy	233	Includes: Cranes, Hydraulic Excavators >=50 HP, Dozers, Paving Machines, Rock Trenchers, Trenchers >=12 in., Dump Trucks, Ag Equipment >=150 HP, Scrapers, Water Wagons.	Hours	$38.00	110	$4,180.00
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.	Hours	$46.88	4	$187.52
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	$488.10	2	$976.20

Practice: 649 - Structures for Wildlife

Scenario: #1 - Nesting Box, Small no pole

Scenario Description:

A structure is provided to support the nesting and rearing of smaller targeted species, such as bees and small birds, and is directly mounted to a tree, building or other structure. Addresses resource concern for wildlife of inadequate cover/shelter

Before Situation:

The area lacks sufficient nesting habitat sites (natural cavities). A suitable location to mount the box is available.

After Situation:

The installation of nesting and rearing boxes support the life-cycle needs of targeted speces, such as small birds. These structures/features enhance habitat, cover, and improve species survivability.

Feature Measure: Number of structures

Scenario Unit: Each

Scenario Typical Size: 1.0

Scenario Total Cost: $43.64

Scenario Cost/Unit: $43.64

Cost Details:

Component Name	ID	Description	Unit	Cost	QTY	Total
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.	Hours	$27.56	0.5	$13.78
Materials						
Habitat Box, Bird	251	Bluebird nesting box to increase nesting success. Each is 1-1/2 x 6 x 12-1/2 Inch with a 1-1/2 inch diameter opening. Includes materials and shipping.	Each	$29.86	1	$29.86

Practice: 649 - Structures for Wildlife

Scenario: #2 - Nesting Box, Small, with wood pole

Scenario Description:

Constructing a small nest box and mounting on a pole. A structure is provided to support the nesting and rearing of targeted species, such as blue birds. Trees, buildings or other structures are not available. These structures are designed to meet targeted species biology and life history needs. Addresses Resource Concern: Inadequate Cover/Shelter.

Before Situation:

This area lacked sufficient nesting sites to support viable populations of targeted species. Location and conditions suggest that predator guards are not needed.

After Situation:

The installation nesting and rearing boxes support the life-cycle needs of targeted species, such as blue birds. Location and conditions suggest that predator guards are not needed. These structures/features enhance habitat, cover, and improve species survivability.

Feature Measure: Number of structures with poles.

Scenario Unit: Number

Scenario Typical Size: 1.0

Scenario Total Cost: $69.44

Scenario Cost/Unit: $69.44

Cost Details:

Component Name	ID	Description	Unit	Cost	QTY	Total
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.	Hours	$27.56	0.75	$20.67
Materials						
Post, Wood, CCA treated, 6 in. x 8 ft.	12	Wood Post, End 6 inch dia. X 8 ft., CCA Treated. Includes materials and shipping only.	Each	$18.91	1	$18.91
Habitat Box, Bird	251	Bluebird nesting box to increase nesting success. Each is 1-1/2 x 6 x 12-1/2 Inch with a 1-1/2 inch diameter opening. Includes materials and shipping.	Each	$29.86	1	$29.86

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 or owls. The box 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. Predator guards not 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.

Feature Measure: Number of structures.

Scenario Unit: Each

Scenario Typical Size: 1.0

Scenario Total Cost: $94.55

Scenario Cost/Unit: $94.55

Cost Details:

Component Name	ID	Description	Unit	Cost	QTY	Total
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.	Hours	$27.56	0.5	$13.78
Materials						
Habitat Box, waterfowl	1449	Wood Duck Box, typically 24x11x12 inch with 4 inch wide oval entrance, single. Includes material and shipping only.	Each	$80.77	1	$80.77

Practice: 649 - Structures for Wildlife

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

Scenario Description:

Constructing a nest box or rapture perch 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 wood ducks, bats, barn owls or to provide needed perches or nesting structures for raptures. 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.

Feature Measure: Number of structures

Scenario Unit: Each

Scenario Typical Size: 1.0

Scenario Total Cost: $406.07

Scenario Cost/Unit: $406.07

Cost Details:

Component Name	ID	Description	Unit	Cost	QTY	Total
Equipment Installation						
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 Yards	$179.94	0.1	$17.99
All terrain vehicles, ATV	965	Includes equipment, power unit and labor costs.	Hours	$21.14	0.5	$10.57
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.	Hours	$27.56	1.5	$41.34
Materials						
Pipe, steel, galvanized, threaded, 1 1/4 inch, schedule 40	256	Spec. A-53, includes coupling and clevis hanger assembly sized for covering, 10' OC	Feet	$21.90	10	$219.00
Habitat Box, waterfowl	1449	Wood Duck Box, typically 24x11x12 inch with 4 inch wide oval entrance, single. Includes material and shipping only.	Each	$80.77	1	$80.77
Predator Guard	1461	Predator guards (i.e. stove pipes, cone, hole guard, etc.) for habitat boxes. Materials only. Includes material and shipping only.	Each	$36.40	1	$36.40

Practice: 649 - Structures for Wildlife

Scenario: #5 - Brush Pile - Large

Scenario Description:

Downed tree structures are created to provide shrubby/woody escape cover for wildlife. Existing sod will be killed prior to placement of tree structures. Felling of select trees and placement in selected locations to provide wildlife cover. Typical scenario of 30' x 50' area for structure covered by interlocking limbs of trees at least 12" in diameter.

Before Situation:

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

After Situation:

Large brush piles provide needed escape, ground nesting and safe loafing cover for targeted wildlife species.

Feature Measure: brush piles

Scenario Unit: Each

Scenario Typical Size: 1.0

Scenario Total Cost: $172.71

Scenario Cost/Unit: $172.71

Cost Details:

Component Name	ID	Description	Unit	Cost	QTY	Total
Equipment Installation						
Skidsteer, 80 HP	933	Skidsteer loader with horsepower range of 60 to 90. Equipment and power unit costs. Labor not included.	Hours	$55.01	1	$55.01
Chainsaw	937	Equipment and power unit costs. Labor not included.	Hours	$7.15	1	$7.15
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.	Hours	$27.56	3	$82.68
Equipment Operators, Light	232	Includes: Skid Steer Loaders, Hydraulic Excavators <50 HP, Trenchers <12 in., Ag Equipment <150 HP, Pickup Trucks, Forklifts, Mulchers	Hours	$27.87	1	$27.87

Practice: 649 - Structures for Wildlife

Scenario: #6 - Bat House - Large, Single Chamber

Scenario Description:

A single chamber large bat hourse (preferably built to Bat Conservation International's design standards) to support the roosting and rearing of approximately 50 colonial roosting bats and is directly mounted to a tree, building or other structure. Typically boxes are placed 12 to 15 feet from the ground with a south or southeast aspect and within 1/4 mile of water. Addresses resource concern for wildlife of inadequate cover/shelter.

Before Situation:

The area lacks sufficient summer roosting habitat (smags, cavity trees, trees with cracks or exfolliating bark) for bats, and a suitable location to mount the box is available.

After Situation:

The installation of such structures supports the life-cycle needs of many bat species. These structures/features enhance habitat, cover, and improve species survivability.

Feature Measure: Number of structures

Scenario Unit: Each

Scenario Typical Size: 1.0

Scenario Total Cost: $151.94

Scenario Cost/Unit: $151.94

Cost Details:

Component Name	ID	Description	Unit	Cost	QTY	Total
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.	Hours	$27.56	2.5	$68.90
Materials						
Post, Wood, CCA treated, 6 in. x 12-14 ft.	13	Wood Post, Line/End 6 inch dia. X 12-14 ft., CCA Treated. Includes materials and shipping only.	Each	$31.76	1	$31.76
Habitat Box, Bat	246	BAT-1 Bat House Single. Includes materials and shipping.	Each	$51.28	1	$51.28

Practice: 649 - Structures for Wildlife

Scenario: #7 - 3-Chamber Bat House

Scenario Description:

A 3-chamber bat hourse (preferably built to Bat Conservation International's design standards) to support the roosting and rearing of approximately 200 colonial roosting bats and is directly mounted to a tree, building or other structure. Typically boxes are placed 12 to 15 feet from the ground with a south or southeast aspect and within 1/4 mile of water. Addresses resource concern for wildlife of inadequate cover/shelter.

Before Situation:

The area lacks sufficient summer roosting habitat (smags, cavity trees, trees with cracks or exfolliating bark) for bats, and a suitable location to mount the box is available.

After Situation:

The installation of such structures supports the life-cycle needs of many bat species. These structures/features enhance habitat, cover, and improve species survivability.

Feature Measure: Number of Structures

Scenario Unit: Each

Scenario Typical Size: 1.0

Scenario Total Cost: $213.19

Scenario Cost/Unit: $213.19

Cost Details:

Component Name	ID	Description	Unit	Cost	QTY	Total
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.	Hours	$27.56	2.5	$68.90
Materials						
Post, Wood, CCA treated, 6 in. x 12-14 ft.	13	Wood Post, Line/End 6 inch dia. X 12-14 ft., CCA Treated. Includes materials and shipping only.	Each	$31.76	2	$63.52
Habitat Box, waterfowl	1449	Wood Duck Box, typically 24x11x12 inch with 4 inch wide oval entrance, single. Includes material and shipping only.	Each	$80.77	1	$80.77

Practice: 649 - Structures for Wildlife

Scenario: #8 - Osprey/Eagle Nesting Platform

Scenario Description:

A structure is provided to support the nesting and rearing of targeted species such as Ospreys found nesting in coastal areas. These structures are designed to meet targeted species biology and life history needs.

Before Situation:

These structures are targeted for areas that lack sufficient nesting sites to support viable populations of targeted species that nest along coastal estuaries and large water bodies or utilize nesting site such as poles that support high voltage lines that can be a hazard to these birds.

After Situation:

The installation of pole and nesting platform supports the life-cycle needs of targeted speces, such as Ospreys and other types of raptors that nest along coastal estuaries and large water bodies. These structures/features enhance habitat, cover, and reduce predation. .

Feature Measure: <Unknown>

Scenario Unit: Each

Scenario Typical Size: 1.0

Scenario Total Cost: $1,058.70

Scenario Cost/Unit: $1,058.70

Cost Details:

Component Name	ID	Description	Unit	Cost	QTY	Total
Materials						
Pole, Utility, Nesting Platform	2048	Fabrication and installation of avian nesting platform. Includes all equipment, labor and material needed to install utility pole with a nesting platform.	Feet	$35.29	30	$1,058.70

Practice: 649 - Structures for Wildlife

Scenario: #28 - 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.

Feature Measure: brush piles

Scenario Unit: Each

Scenario Typical Size: 1.0

Scenario Total Cost: $41.44

Scenario Cost/Unit: $41.44

Cost Details:

Component Name	ID	Description	Unit	Cost	QTY	Total
Equipment Installation						
Skidsteer, 80 HP	933	Skidsteer loader with horsepower range of 60 to 90. Equipment and power unit costs. Labor not included.	Hours	$55.01	0.5	$27.51
Labor						
Equipment Operators, Light	232	Includes: Skid Steer Loaders, Hydraulic Excavators <50 HP, Trenchers <12 in., Ag Equipment <150 HP, Pickup Trucks, Forklifts, Mulchers	Hours	$27.87	0.5	$13.94

Practice: 654 - Road/Trail/Landing Closure and Treatment

Scenario: #1 - Road/Trail Abandonment/Rehabilitation (Light)

Scenario Description:

Reshaping a 12' wide trail to natural conditions. This scenario includes using light equipment such as a backhoe for the installation of water control devices such as water bars, rolling dips, controlling access, use of woody residue and pulling drainages on 500 feet of road on 35% hill slopes and a moderate grade. Cool season Native grasses are re-established by seeding. Some light hand work may be needed to clear site for the equipment. This practice addresses one or more resource concerns: Excessive sediment in surface waters, Habitat degradation, and Concentrated flow erosion. Since not all segments of the road/trail system may require this level of treatment, this scenario applies only to those segments that are causing the resource concerns.

Before Situation:

The legacy trail/roads are severely affecting wetland/riparian areas, slope stability, and water quality. The trail/roads can no longer serve it's intended use and is incapable of handling needed equipment and traffic. Alternative access is possible. Therefore abandonment and rehabilitation is the best way to address the resource concerns and problems that are being created.

After Situation:

The resource concerns are addressed by the abandonment of the road and its drainage elements, and by re-seeding to native grasses.

Feature Measure: length

Scenario Unit: Feet

Scenario Typical Size: 500.0

Scenario Total Cost: $1,098.42

Scenario Cost/Unit: $2.20

Cost Details:

Component Name	ID	Description	Unit	Cost	QTY	Total
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.	Hours	$31.96	6	$191.76
Chainsaw	937	Equipment and power unit costs. Labor not included.	Hours	$7.15	3	$21.45
Tillage, Light	945	Includes light disking (tandem) or field cultivator. Includes equipment, power unit and labor costs.	Acres	$10.68	1	$10.68
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.	Acres	$12.00	1	$12.00
Water Bars	1500	Installation of graded trail water controlling structures such as water bars, broad based dips for erosion control. Typical cross section is 1.5 feet high with 4:1 side slopes yielding about 0.33 CY/ft of length.	Feet	$2.89	85	$245.65
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.	Hours	$27.56	3	$82.68
Equipment Operators, Light	232	Includes: Skid Steer Loaders, Hydraulic Excavators <50 HP, Trenchers <12 in., Ag Equipment <150 HP, Pickup Trucks, Forklifts, Mulchers	Hours	$27.87	6	$167.22
Materials						
Native Perennial Grasses, Low Density	2750	Native perennial grasses, may include a small percentage of annual species for establishment purposes and/or if allowed by the CPS. Planted at lower to medium density (40 pure live seeds/sq ft and less). Includes material and shipping.	Acres	$111.33	1	$111.33
Mobilization						
Mobilization, medium equipment	1139	Equipment with 70-150 HP or typical weights between 14,000 and 30,000 pounds.	Each	$255.65	1	$255.65

Practice: 654 - Road/Trail/Landing Closure and Treatment

Scenario: #2 - Road/Trail/Landing Closure and Treatment, <35% hillslope

Scenario Description:

The practice includes permanent road/trail/landing closure, treatment, or removal and to hydrologically reconnect the hillslope to applicable drainage networks. The treatment will prohibit future access. The typical scenario includes decommissioning a 500 ft of an 18-foot wide trail/road with a landing on 30% forest slopes, using heavy equipment such as a bulldozer or similar equipment (excavator or road grader with ripper) to re-shape and obliterate the road base and landings in order to re-establish native cool season vegetation. It also includes restoring hydrology with the removal of culverts and drainage fills. Necessary erosion control measures such as water bars are installed. Some hand-work may be necessary to clear the site for the equipment. The work will be supervised by a consultant forester, land manager, or other resource professional. Tree/Shrub Site Prep is not included, however, Tree/Shrub Planting is recommended. When completed, there is no additional maintenance with heavy equipment needed. This practice addresses one or more resource concerns: Excessive sediment in surface waters and Concentrated flow erosion. Since not all segments of the road/trail system may require this level of treatment, this scenario applies only to those segments that are causing the resource concerns.

Before Situation:

The legacy trail/road is severely affecting wetlands, riparian areas, slope stability, water quality and possibly T&E species. The trail/road can no longer serve it's intended use and is incapable of handling needed equipment and traffic. Alternative access is possible. Therefore abandonment and site restoation are the best approaches to address the resource concerns and problems that are being created.

After Situation:

The resource concerns are addressed by the abandonment of the road and its drainage elements, and by re-seeding to native grasses.

Feature Measure: length

Scenario Unit: Feet

Scenario Typical Size: 500.0

Scenario Total Cost: $2,990.58

Scenario Cost/Unit: $5.98

Cost Details:

Component Name	ID	Description	Unit	Cost	QTY	Total
Equipment Installation						
Dozer, 80 HP	929	Track mounted Dozer with horsepower range of 60 to 90. Equipment and power unit costs. Labor not included.	Hours	$55.20	6	$331.20
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.	Hours	$109.36	3	$328.08
Chainsaw	937	Equipment and power unit costs. Labor not included.	Hours	$7.15	4	$28.60
Tillage, Light	945	Includes light disking (tandem) or field cultivator. Includes equipment, power unit and labor costs.	Acres	$10.68	1	$10.68
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.	Acres	$12.00	1	$12.00
Water Bars	1500	Installation of graded trail water controlling structures such as water bars, broad based dips for erosion control. Typical cross section is 1.5 feet high with 4:1 side slopes yielding about 0.33 CY/ft of length.	Feet	$2.89	225	$650.25
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.	Hours	$27.56	8	$220.48
Equipment Operators, Heavy	233	Includes: Cranes, Hydraulic Excavators >=50 HP, Dozers, Paving Machines, Rock Trenchers, Trenchers >=12 in., Dump Trucks, Ag Equipment >=150 HP, Scrapers, Water Wagons.	Hours	$38.00	6	$228.00
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.	Hours	$46.88	2	$93.76
Materials						
Native Perennial Grasses, Low Density	2750	Native perennial grasses, may include a small percentage of annual species for establishment purposes and/or if allowed by the CPS. Planted at lower to medium density (40 pure live seeds/sq ft and less). Includes material and shipping.	Acres	$111.33	1	$111.33
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	$488.10	2	$976.20

Practice: 654 - Road/Trail/Landing Closure and Treatment

Scenario: #3 - Road/Trail/Landing Closure and Treatment, >35% hillslope

Scenario Description:

The practice includes permanent road/trail/landing closure and treatment, and the hydrologically reconnection of the hillslope to applicable drainage networks. The treatment will limit future access. The typical scenario includes decommissioning a 24-foot wide, earthen road with landings on forest slopes over 35%, using a bulldozer or other heavy equipment such as an excavator or road grader with ripper to re-shape and obliterate the road base and landings in order to re-establish native vegetation. It also includes restoring hydrology with the removal of culverts and drainage fills. Necessary erosion control measures such as water bars are installed. The steep slopes makes this scenario costly due to the increased time needed to apply the measures and the need for additional water control devices. Some hand-work may be necessary to clear the site for the equipment. The work will be supervised by a consultant forester, land manager, or other resource professional. Tree/Shrub Site Prep is not included. However, Tree/Shrub Planting is recommended. When completed, there is no additional maintenance with heavy equipment needed. This practice addresses one or more resource concerns: Excessive sediment in surface waters and Concentrated flow erosion. Since not all segments of the road/trail system may require this level of treatment, this scenario applies only to those segments that are causing the resource concerns.

Before Situation:

The legacy trail/road is severely affecting wetlands, riparian areas, unstable slopes, water quality, and possibly T&E species. The trail/road can no longer serve it's intended use and is incapable of handling needed equipment and traffic. Alternative access was possible. Therefore abandonment and site restoration are the best approaches to address the resource concerns and problems that are being created.

After Situation:

The resource concerns are addressed by the abandonment of the road and its drainage elements, and by re-seeding to native grasses.

Feature Measure: length

Scenario Unit: Feet

Scenario Typical Size: 500.0

Scenario Total Cost: $4,731.73

Scenario Cost/Unit: $9.46

Cost Details:

Component Name	ID	Description	Unit	Cost	QTY	Total
Equipment Installation						
Dozer, 80 HP	929	Track mounted Dozer with horsepower range of 60 to 90. Equipment and power unit costs. Labor not included.	Hours	$55.20	8	$441.60
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.	Hours	$130.80	6	$784.80
Chainsaw	937	Equipment and power unit costs. Labor not included.	Hours	$7.15	2	$14.30
Truck, Pickup	939	Equipment and power unit costs. Labor not included.	Hours	$24.18	8	$193.44
Tillage, Light	945	Includes light disking (tandem) or field cultivator. Includes equipment, power unit and labor costs.	Acres	$10.68	1	$10.68
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.	Acres	$12.00	1	$12.00
Water Bars	1500	Installation of graded trail water controlling structures such as water bars, broad based dips for erosion control. Typical cross section is 1.5 feet high with 4:1 side slopes yielding about 0.33 CY/ft of length.	Feet	$2.89	500	$1,445.00
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.	Hours	$27.56	8	$220.48
Equipment Operators, Heavy	233	Includes: Cranes, Hydraulic Excavators >=50 HP, Dozers, Paving Machines, Rock Trenchers, Trenchers >=12 in., Dump Trucks, Ag Equipment >=150 HP, Scrapers, Water Wagons.	Hours	$38.00	8	$304.00
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.	Hours	$46.88	6	$281.28
Materials						
Annual Grasses, Legumes or Forbs	2732	A mix of annual grasses, legumes and/or forbs, mostly introduced but may be native. Used for temporary cover or cover crops. Includes material and shipping.	Acres	$47.95	1	$47.95
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	$488.10	2	$976.20

Practice: 654 - Road/Trail/Landing Closure and Treatment

Scenario: #4 - Road/Trail removal and restoration (Vegetative)

Scenario Description:

Minimal re-shaping to natural conditions using light equipment and the establishment of permanent vegetation. This scenario includes using smaller equipment (ag tractor/skidsteer/small dozer/backhoe/) for the installation of water control devices such as water bars and rolling dips, controlling access, and pulling drainages on 500 feet of 12' wide road on 5%-35% hill slopes and little grade. The site is re-vegetated to permanent improved grass and temporarily protected with a thin layer of hay mulch. Soil amendments are applied as per the FOTG guidance. This practice addresses one or more resource concerns: Excessive sediment in surface waters, Wildlife habitat degradation, and Concentrated flow erosion. Since not all segments of the road/trail system may require this level of treatment, this scenario applies only to those segments that are causing the resource concerns.

Before Situation:

Legacy trail/road is not necessary and is affecting wetlands, riparian areas, water quality, and possibly T&E species. The trail/road can no longer serve it's intended use and is incapable of handling needed equipment and traffic. Alternative access was possible. Therefore abandonment and site restoration are the best approaches to address the resource concerns and problems that are being created.

After Situation:

The re-vegetated, eliminated road addressed the resource concern.

Feature Measure: length of landing/trail(s)

Scenario Unit: Feet

Scenario Typical Size: 500.0

Scenario Total Cost: $1,390.48

Scenario Cost/Unit: $2.78

Cost Details:

Component Name	ID	Description	Unit	Cost	QTY	Total
Equipment Installation						
Skidsteer, 80 HP	933	Skidsteer loader with horsepower range of 60 to 90. Equipment and power unit costs. Labor not included.	Hours	$55.01	1	$55.01
Tillage, Light	945	Includes light disking (tandem) or field cultivator. Includes equipment, power unit and labor costs.	Acres	$10.68	1	$10.68
Tillage, Primary	946	Includes heavy disking (offset) or chisel plow. Includes equipment, power unit and labor costs.	Acres	$16.30	1	$16.30
Fertilizer, ground application, dry bulk	950	Dry bulk fertilizer application performed by ground equipment. Includes equipment, power unit and labor costs.	Acres	$6.63	1	$6.63
Lime application	953	Lime application performed by ground equipment. Includes equipment, power unit and labor costs.	Acres	$8.21	1	$8.21
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.	Acres	$12.00	1	$12.00
Water Bars	1500	Installation of graded trail water controlling structures such as water bars, broad based dips for erosion control. Typical cross section is 1.5 feet high with 4:1 side slopes yielding about 0.33 CY/ft of length.	Feet	$2.89	100	$289.00
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.	Hours	$27.56	6	$165.36
Equipment Operators, Light	232	Includes: Skid Steer Loaders, Hydraulic Excavators <50 HP, Trenchers <12 in., Ag Equipment <150 HP, Pickup Trucks, Forklifts, Mulchers	Hours	$27.87	2	$55.74
Materials						
Nitrogen (N), Ammonium Nitrate	69	Price per pound of N supplied by Ammonium Nitrate. Price is not per pound of total product applied, no conversion is needed.	Pound	$0.63	15	$9.45
Phosphorus, P2O5	73	Price per pound of P2O5 supplied by Superphosphate. Price is not per pound of total product applied, no conversion is needed.	Pound	$0.61	10	$6.10
Potassium, K2O	74	K2O supplied by Muriate Of Potash. Price is not per pound of total product applied, no conversion is needed.	Pound	$0.35	10	$3.50
Lime, ENM	75	Fertilizer: Limestone Spread on field.	Ton	$64.87	1	$64.87
Straw	1237	Small grain straw (non organic and certified organic). Includes materials only.	Ton	$65.00	1	$65.00
Native Perennial Grasses, Low Density	2750	Native perennial grasses, may include a small percentage of annual species for establishment purposes and/or if allowed by the CPS. Planted at lower to medium density (40 pure live seeds/sq ft and less). Includes material and shipping.	Acres	$111.33	1	$111.33

Mobilization

Mobilization, medium equipment	1139	Equipment with 70-150 HP or typical weights between 14,000 and 30,000 pounds.	Each	$255.65	2	$511.30

Practice: 655 - Forest Trails and Landings

Scenario: #1 - Re-Route Sections

Scenario Description:

A professional forester, or qualified NRCS staff will layout a new trail location to re-route an existing trail. Problem sections of existing forest trails will be re-routed to avoid sensitive areas or to avoid continued use of problem steep sections with erosion. This scenario may also address fixing existing road sections that are severely eroding but that don't require the extensive work and gravel existing in other scenarios. This will primarily consist of earthwork. The resource concerns include but are not limited to soil erosion, water quality - sedimentation, and in some cases insufficient cover/shelter (when sensitive areas are avoided).

Before Situation:

Existing skid trails sections are located at low topographic areas running through wetlands, riparian areas or vernal pools damaging habitat for species of concern. Or, trail sections are located such that slopes are excessive and erosion is difficult to address with minor earthwork.

After Situation:

Problem sections of existing forest trails will be relocated to minimize negative impacts and to reduce or eliminate soil erosion and sedimentation. New sections will avoid problem areas and tie in with existing skid trails through the forest. In some cases extra earthwork and equipment time will address erosion problems and not require re-routing the skid trail section. Typical lenght of application is 300 feet.

Feature Measure: Foot

Scenario Unit: Feet

Scenario Typical Size: 300.0

Scenario Total Cost: $2,529.14

Scenario Cost/Unit: $8.43

Cost Details:

Component Name	ID	Description	Unit	Cost	QTY	Total
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.	Hours	$109.36	10	$1,093.60
Chainsaw	937	Equipment and power unit costs. Labor not included.	Hours	$7.15	6	$42.90
Truck, Pickup	939	Equipment and power unit costs. Labor not included.	Hours	$24.18	2	$48.36
Water Bars	1500	Installation of graded trail water controlling structures such as water bars, broad based dips for erosion control. Typical cross section is 1.5 feet high with 4:1 side slopes yielding about 0.33 CY/ft of length.	Feet	$2.89	52	$150.28
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.	Hours	$37.19	6	$223.14
Equipment Operators, Heavy	233	Includes: Cranes, Hydraulic Excavators >=50 HP, Dozers, Paving Machines, Rock Trenchers, Trenchers >=12 in., Dump Trucks, Ag Equipment >=150 HP, Scrapers, Water Wagons.	Hours	$38.00	10	$380.00
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.	Hours	$102.76	1	$102.76
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	$488.10	1	$488.10

Practice: 655 - Forest Trails and Landings

Scenario: #2 - Trail and Landing Installation

Scenario Description:

A professional/consulting forester, or qualified NRCS staff will layout a new trail location. Construction of forest trails and landings for the purpose of providing access to a gently sloping forested tract, Access will allow the application of other conservation practices, monitoring and the removal of forest products. It is not, however, to be used if the installation is done as part of a commercial operation such as timber harvesting. In such a case, the Scenario 1 should be used. Installation will include removal of trees and brush as needed, a minimum amount of blading and soil disturbance, and the installing of water control measures such as water bars, broad-based dips, wing ditches, etc. It will not include measures more common to access roads such as gravelling or ditching. Installation will be supervised by a consultant forester, land manager, or other resource professional. Resource concerns include Excessive sediment in surface waters, Sheet & rill erosion, and Concentrated flow erosion

Before Situation:

Access to the tract is not available for occasional travel by the landowner or manager for the purposes of monitoring, installing conservation practices and/or the removal of forest products. Improperly installed trails and landings will cause soil erosion and water quality problems.

After Situation:

A trail system is installed that provides access to the forested tract and does not cause excessive erosion or water quality concerns.

Feature Measure: Length of trail treated

Scenario Unit: Feet

Scenario Typical Size: 1,000.0

Scenario Total Cost: $4,245.42

Scenario Cost/Unit: $4.25

Cost Details:

Component Name	ID	Description	Unit	Cost	QTY	Total
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.	Hours	$109.36	14	$1,531.04
Chainsaw	937	Equipment and power unit costs. Labor not included.	Hours	$7.15	20	$143.00
Truck, Pickup	939	Equipment and power unit costs. Labor not included.	Hours	$24.18	2	$48.36
Water Bars	1500	Installation of graded trail water controlling structures such as water bars, broad based dips for erosion control. Typical cross section is 1.5 feet high with 4:1 side slopes yielding about 0.33 CY/ft of length.	Feet	$2.89	156	$450.84
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.	Hours	$37.19	20	$743.80
Equipment Operators, Heavy	233	Includes: Cranes, Hydraulic Excavators >=50 HP, Dozers, Paving Machines, Rock Trenchers, Trenchers >=12 in., Dump Trucks, Ag Equipment >=150 HP, Scrapers, Water Wagons.	Hours	$38.00	14	$532.00
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.	Hours	$102.76	3	$308.28
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	$488.10	1	$488.10

Practice: 655 - Forest Trails and Landings

Scenario: #3 - Trail Erosion Control w/o Vegetation, Slopes < 35%

Scenario Description:

Rehabilitation of existing forest access trail segments on a 20% slope and a 4% grade by addressing legacy resource issues for long-term use. Typically the trail is a single lane (16-18-foot wide, including cut and fill), seasonal prism requiring sustained erosion control measures installed by using heavy equipment such as dozers, graders, backhoes, and/or excavators. The purpose is to hydrologically disconnect the existing trail/landing system from streams and natural drainages. This scenario includes designing and installing measures such as cross drains, rock drains, relief drains, out sloping (or changing surface drainage), rolling dips and water bars and ditch outs as needed, and applies to only those segments of the trail system that have resource concerns requiring rehabilitation. Some hand work (chainsaw) will be needed to allow the use of the equipment. Installation will be supervised. Other practices such as Stream Crossing, and Critical Area Planting, Access Road, and Structure for Water Control can be adjacent/appurtenant but not part of this practice scenario. Treatments are for long-term reduction of sediment, restoration of fish habitat, creation of fire access, and the removal of routes off unstable slopes. Resource concerns include: Excessive sedimentation in surface waters, Concentrated flow erosion, Sheet and rill erosion, and Degradation of wildlife species.

Before Situation:

Trails are delivering sediment to waterways, impacting riparian areas and wetlands and possibly affecting T&E species. The system's usefulness for access is also being compromised by inadequate erosion and drainage control systems. However rehabilitation over abandonment is an acceptable course of action.

After Situation:

Trails and landings provide access and do not adversely affect the resources concerns.

Feature Measure: Length of trail treated

Scenario Unit: Feet

Scenario Typical Size: 1,000.0

Scenario Total Cost: $3,629.16

Scenario Cost/Unit: $3.63

Cost Details:

Component Name	ID	Description	Unit	Cost	QTY	Total
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.	Hours	$109.36	16	$1,749.76
Truck, Pickup	939	Equipment and power unit costs. Labor not included.	Hours	$24.18	1	$24.18
Water Bars	1500	Installation of graded trail water controlling structures such as water bars, broad based dips for erosion control. Typical cross section is 1.5 feet high with 4:1 side slopes yielding about 0.33 CY/ft of length.	Feet	$2.89	156	$450.84
Labor						
Equipment Operators, Heavy	233	Includes: Cranes, Hydraulic Excavators >=50 HP, Dozers, Paving Machines, Rock Trenchers, Trenchers >=12 in., Dump Trucks, Ag Equipment >=150 HP, Scrapers, Water Wagons.	Hours	$38.00	16	$608.00
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.	Hours	$102.76	3	$308.28
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	$488.10	1	$488.10

Practice: 655 - Forest Trails and Landings

Scenario: #4 - Trail Erosion Control w/o Vegetation, Slopes >35%

Scenario Description:

Rehabilitation of existing forest trails and landings by addressing legacy resource issues such as gully erosion and sedimentation, for infrequent use. Typically the trail is a single lane, existing 10-12 foot wide skid trail on a steep (45%) slope on forestland requiring sustained erosion control measures applied by using heavy equipment such as dozers, backhoes, or excavators. The purpose is to hydrologically disconnect existing trail/landing system from the streams and natural drainages and reduce soil erosion. This includes the design and installation of drains, out sloping (or changing road surface drainage), water bars and ditch outs as needed This scenario applies to only those segments of the trail system that have resource concerns requiring rehabilitation. A typical water bar or rolling dip installed in this scenario is on a 30 foot spacing with a depth of about 2-3 foot (closeout style). Some hand work (chainsaw) will be needed to allow the use of the equipment. The work will be supervised. Other practices such as Stream Crossing, and Critical Area Planting, Access Road, Lined Waterway or Outlet and Structure for Water Control can be adjacent/appurtenant but not part of this practice scenario . Resource concerns include: Excessive sedimentation in surface waters, Concentrated flow erosion, Classic Gully erosion, and Degradation of wildlife species.

Before Situation:

Trails are delivering sediment to waterways, impacting riparian/wetlands and/or possibly affecting fish/T&E species. The usefulness of the trail/landing system is being adversely affected by erosion.

After Situation:

Trails and landings provide access and do not adversely affect the resources concerns. Erosion from the trail is controlled.

Feature Measure: Length of trail treated

Scenario Unit: Feet

Scenario Typical Size: 500.0

Scenario Total Cost: $2,919.46

Scenario Cost/Unit: $5.84

Cost Details:

Component Name	ID	Description	Unit	Cost	QTY	Total
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.	Hours	$109.36	10	$1,093.60
Truck, Pickup	939	Equipment and power unit costs. Labor not included.	Hours	$24.18	2	$48.36
Water Bars	1500	Installation of graded trail water controlling structures such as water bars, broad based dips for erosion control. Typical cross section is 1.5 feet high with 4:1 side slopes yielding about 0.33 CY/ft of length.	Feet	$2.89	208	$601.12
Labor						
Equipment Operators, Heavy	233	Includes: Cranes, Hydraulic Excavators >=50 HP, Dozers, Paving Machines, Rock Trenchers, Trenchers >=12 in., Dump Trucks, Ag Equipment >=150 HP, Scrapers, Water Wagons.	Hours	$38.00	10	$380.00
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.	Hours	$102.76	3	$308.28
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	$488.10	1	$488.10

Practice: 655 - Forest Trails and Landings

Scenario: #5 - Grading and Shaping with Vegetative Establishment

Scenario Description:

Rehabilitation of existing forest access trails and landings on a medium slope by addressing rutting, erosion, and sedimentation. Typically the trail is a single, existing 16 - 18-foot wide (including cut and fill) seasonal road prism on gently sloping terrain requiring sustained erosion control measures applied with heavy equipment such as dozers, graders, backhoes, and/or excavators. The purpose is to hydrologically disconnect the existing trail/landing system from streams and natural drainages and to establish a vegetative cover. This scenario includes designing and installation measures such as cross drains, rock drains, relief drainage, out sloping (or changing surface drainage), rolling dips and water bars and ditch outs as needed, and applies to only those segments of the trail system that have resource concerns requiring rehabilitation.The trail will be seeded down with an appropriate herbaceous seed mixture for the site. Some hand work will be needed to allow the use of the equipment. The work will be supervised. Other practices such as Stream Crossing, and Critical Area Planting. Access Road and Structure for Water Control can be adjacent/appurtenant but not part of the practice scenario. Treatments are for long-term reduction of sediment, restore fish habitat, create fire access and to move routes off unstable slopes. Resource concerns include: Excessive sediment in surface waters, Concentrated and Sheet & rill flow erosion, Soil compaction, and Habitat degradation.

Before Situation:

Trail/landings are delivering sediment to waterways, impacting riparian/wetlands and/or possibly affecting fish/T&E species. The usefulness of the trail/landing system is being adversely affected by erosion.

After Situation:

A trail system is installed that provides access to the forested tract and does not cause excessive erosion or water quality concerns.

Feature Measure: Length of trail treated

Scenario Unit: Feet

Scenario Typical Size: 1,000.0

Scenario Total Cost: $4,071.95

Scenario Cost/Unit: $4.07

Cost Details:

Component Name	ID	Description	Unit	Cost	QTY	Total
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.	Hours	$109.36	16	$1,749.76
Truck, Pickup	939	Equipment and power unit costs. Labor not included.	Hours	$24.18	6	$145.08
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.	Acres	$12.00	0.4	$4.80
Water Bars	1500	Installation of graded trail water controlling structures such as water bars, broad based dips for erosion control. Typical cross section is 1.5 feet high with 4:1 side slopes yielding about 0.33 CY/ft of length.	Feet	$2.89	156	$450.84
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.	Hours	$27.56	8	$220.48
Equipment Operators, Heavy	233	Includes: Cranes, Hydraulic Excavators >=50 HP, Dozers, Paving Machines, Rock Trenchers, Trenchers >=12 in., Dump Trucks, Ag Equipment >=150 HP, Scrapers, Water Wagons.	Hours	$38.00	16	$608.00
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.	Hours	$102.76	3	$308.28
Materials						
Straw	1237	Small grain straw (non organic and certified organic). Includes materials only.	Ton	$65.00	1	$65.00
Native and Introduced Perennial Grasses, Legumes and/or Forbs, Low Density	2502	A mix of native and introduced perennial grasses, legumes, and/or forbs, grasses typically greater than 50% of the mix, may include biennials and a small percentage of annual species for establishment purposes and/or if allowed by the CPS. Planted at lower to medium density (40 pure live seeds/sq ft and less). Includes material and shipping.	Acres	$79.02	0.4	$31.61
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	$488.10	1	$488.10

Practice: 655 - Forest Trails and Landings

Scenario: #76 - Temporary Stream Crossing

Scenario Description:

The design and installation of a temporary stream crossing to address forest health and fish and wildlife habitat management and conservation needs. Improperly designed and/or installed stream crossings can have adverse effects on forest soils, water quality and aquatic wildlife. The temporary stream crossing will be restored and stabilized to natural conditions after use. Approaches to the stream crossing will also be stabilized and rehabilitated after use as necessary. Installation will be supervised by a professional forester, biologist or other qualified specialist. Permanent and/or high-traffic crossings will be designed and installed according to the Stream Crossing (578) Standard. Resource concerns include: Soil Erosion - Streambank, Shoreline, Water Conveyance Channels; Water Quality Degradation - Excessive sediment in surface waters; and, Fish and Wildlife - Inadequate Habitat - Water.

Before Situation:

Access to a forested tract is not available for the installation of conservation practices due to the lack of a suitable stream crossing(s), or, there is a liklihood that there will be traffic through the stream without the benefit of a designed and installed crossing.

After Situation:

Access was available for installing conservation practices, and the streambed, banks, and approaches have been restored to an initial or improved condition.

Feature Measure: Number of crossings

Scenario Unit: Each

Scenario Typical Size: 1.0

Scenario Total Cost: $1,330.41

Scenario Cost/Unit: $1,330.41

Cost Details:

Component Name	ID	Description	Unit	Cost	QTY	Total
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.	Hours	$109.36	2	$218.72
Skidsteer, 80 HP	933	Skidsteer loader with horsepower range of 60 to 90. Equipment and power unit costs. Labor not included.	Hours	$55.01	2	$110.02
Truck, Pickup	939	Equipment and power unit costs. Labor not included.	Hours	$24.18	1	$24.18
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.	Hours	$27.56	2	$55.12
Equipment Operators, Light	232	Includes: Skid Steer Loaders, Hydraulic Excavators <50 HP, Trenchers <12 in., Ag Equipment <150 HP, Pickup Trucks, Forklifts, Mulchers	Hours	$27.87	2	$55.74
Equipment Operators, Heavy	233	Includes: Cranes, Hydraulic Excavators >=50 HP, Dozers, Paving Machines, Rock Trenchers, Trenchers >=12 in., Dump Trucks, Ag Equipment >=150 HP, Scrapers, Water Wagons.	Hours	$38.00	2	$76.00
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.	Hours	$46.88	1	$46.88
Mobilization						
Mobilization, medium equipment	1139	Equipment with 70-150 HP or typical weights between 14,000 and 30,000 pounds.	Each	$255.65	1	$255.65
Mobilization, large equipment	1140	Equipment >150HP or typical weights greater than 30,000 pounds or loads requiring over width or over length permits.	Each	$488.10	1	$488.10

Practice: 655 - Forest Trails and Landings

Scenario: #77 - Temporary Landing, Sensitive Site

Scenario Description:

The design and installation of a temporary landing/turnaround location on sensitive sites using construction mats that protect resource concerns and meet short-term forest health management and conservation needs. Improperly designed and/or installed landings have adverse effects on water quality and aquatic life. After use, the mats will be removed and the landing area will be restored and stabilized. Use NRCS Conservation Practice Standard (CPS) 654, Road/Trail/Landing Closure and Treatment if surface reshaping or water control is needed; use CPS 342, Critical Area Planting, if only tillage and revegation is needed. Mat installation and removal will be supervised. Resource concerns include: Soil Erosion - Concentrated flow erosion, Ephemeral gully erosion, and Classic gully erosion; and, Water Quality - Excessive sediment in surface waters.

Before Situation:

Appropriate landing areas in a forested tract are not available for the installation of conservation practices due to sensitivity of the site. There is a liklihood that inappropriate areas will be used without the benefit of a designed and installed landing, leading to resource damage.

After Situation:

Conservation practices were installed using a construction mat to stabilize a temporary landing area. Resource damage was avoided, and the landing area has been restored to its previous or better condition.

Feature Measure: Area of landing

Scenario Unit: Square Feet

Scenario Typical Size: 8,400.0

Scenario Total Cost: $22,421.99

Scenario Cost/Unit: $2.67

Cost Details:

Component Name	ID	Description	Unit	Cost	QTY	Total
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.	Hours	$109.36	10	$1,093.60
Skidsteer, 80 HP	933	Skidsteer loader with horsepower range of 60 to 90. Equipment and power unit costs. Labor not included.	Hours	$55.01	10	$550.10
Truck, Pickup	939	Equipment and power unit costs. Labor not included.	Hours	$24.18	4	$96.72
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.	Hours	$27.56	10	$275.60
Equipment Operators, Light	232	Includes: Skid Steer Loaders, Hydraulic Excavators <50 HP, Trenchers <12 in., Ag Equipment <150 HP, Pickup Trucks, Forklifts, Mulchers	Hours	$27.87	10	$278.70
Equipment Operators, Heavy	233	Includes: Cranes, Hydraulic Excavators >=50 HP, Dozers, Paving Machines, Rock Trenchers, Trenchers >=12 in., Dump Trucks, Ag Equipment >=150 HP, Scrapers, Water Wagons.	Hours	$38.00	10	$380.00
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.	Hours	$46.88	4	$187.52
Materials						
Wood Construction Mat	2657	Wood Construction Mat weekly rental rate per Square Foot of mat. Material Only. Used for access and/or work pad in remote sensitive areas.	Square Feet	$1.12	16800	$18,816.00
Mobilization						
Mobilization, medium equipment	1139	Equipment with 70-150 HP or typical weights between 14,000 and 30,000 pounds.	Each	$255.65	1	$255.65
Mobilization, large equipment	1140	Equipment >150HP or typical weights greater than 30,000 pounds or loads requiring over width or over length permits.	Each	$488.10	1	$488.10

Practice: 655 - Forest Trails and Landings

Scenario: #78 - Temporary Stream Crossing, Sensitive Site

Scenario Description:

The design and installation of a temporary stream crossing on a sensitive site using a wooden construction mat that protects resource concerns. Improperly designed and/or installed stream crossings can have adverse effects on forest soils, water quality and aquatic wildlife. The temporary stream crossing provides access to a forest stand to address forest health, fish and wildlife habitat management, and other conservation needs. The temporary stream crossing and mat are removed when the conservation activity is complete, and the stream crossing and approaches are restored and stabilized to natural conditions. Installation is supervised by a a professional forester, biologist, or other qualified specialist. Permanent and/or high-traffic stream crossings must be designed and installed according to the Stream Crossing (578) Standard. Resource concerns include: Soil Erosion - Concentrated flow erosion, Ephemeral gully erosion, and Classic gully erosion; Fish and Wildlife - Inadequate Habitat - Water; and, Water Quality - Excessive sediment in surface waters.

Before Situation:

A forested tract on a sensitive site cannot be accessed for the installation of conservation practices due to the lack of a suitable stream crossing(s), or, there is a liklihood that there will be traffic through the stream without the benefit of a designed and installed crossing.

After Situation:

The sensitive site was accessed for installing conservation practices, and the streambed, banks, and approaches have been restored and stabilized to natural conditions.

Feature Measure: Number of crossings of a 10 foot wi

Scenario Unit: Each

Scenario Typical Size: 1.0

Scenario Total Cost: $2,098.25

Scenario Cost/Unit: $2,098.25

Cost Details:

Component Name	ID	Description	Unit	Cost	QTY	Total
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.	Hours	$109.36	3	$328.08
Skidsteer, 80 HP	933	Skidsteer loader with horsepower range of 60 to 90. Equipment and power unit costs. Labor not included.	Hours	$55.01	3	$165.03
Truck, Pickup	939	Equipment and power unit costs. Labor not included.	Hours	$24.18	1	$24.18
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.	Hours	$27.56	2	$55.12
Equipment Operators, Light	232	Includes: Skid Steer Loaders, Hydraulic Excavators <50 HP, Trenchers <12 in., Ag Equipment <150 HP, Pickup Trucks, Forklifts, Mulchers	Hours	$27.87	3	$83.61
Equipment Operators, Heavy	233	Includes: Cranes, Hydraulic Excavators >=50 HP, Dozers, Paving Machines, Rock Trenchers, Trenchers >=12 in., Dump Trucks, Ag Equipment >=150 HP, Scrapers, Water Wagons.	Hours	$38.00	3	$114.00
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.	Hours	$46.88	1	$46.88
Materials						
Wood Construction Mat	2657	Wood Construction Mat weekly rental rate per Square Foot of mat. Material Only. Used for access and/or work pad in remote sensitive areas.	Square Feet	$1.12	480	$537.60
Mobilization						
Mobilization, medium equipment	1139	Equipment with 70-150 HP or typical weights between 14,000 and 30,000 pounds.	Each	$255.65	1	$255.65
Mobilization, large equipment	1140	Equipment >150HP or typical weights greater than 30,000 pounds or loads requiring over width or over length permits.	Each	$488.10	1	$488.10

Practice: 655 - Forest Trails and Landings

Scenario: #79 - Temporary Wetland Crossing, Sensitive Site

Scenario Description:

The design and installation of a temporary wetland crossing to gain access to a forest stand, built with construction mats to protect natural resources while addressing forest health management, wildlife habitat, and other conservation objectives. Improperly designed and/or installed wetland crossings can have adverse effects on soil health, water quality, and wildlife. After conservation activities are completed, the construction mats will be removed and the wetland crossing will be restored and stabilized to a natural condition. Installation is supervised by a a professional forester, biologist, or other qualified specialist. Resource concerns include: Water Quality - Excessive sediment in surface waters, and Fish and Wildlife - Inadequate Habitat - Water.

Before Situation:

A forested tract on a sensitive site cannot be accessed for the installation of conservation practices due to the lack of a suitable wetland crossing(s). There is a liklihood that there will be traffic through the environmentally sensitive wetland without the benefit of a designed and installed wetland crossing, leading to resource damage.

After Situation:

Conservation practices were installed in the forested tract. The environmentally sensitive wetland was crossed using a construction mat to stabilize the site, and the wetland was subsequently restored and stabilized to natural conditions.

Feature Measure: Crossing for 530 linear feet of wetla

Scenario Unit: Square Feet

Scenario Typical Size: 6,600.0

Scenario Total Cost: $17,216.67

Scenario Cost/Unit: $2.61

Cost Details:

Component Name	ID	Description	Unit	Cost	QTY	Total
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.	Hours	$109.36	6	$656.16
Skidsteer, 80 HP	933	Skidsteer loader with horsepower range of 60 to 90. Equipment and power unit costs. Labor not included.	Hours	$55.01	6	$330.06
Truck, Pickup	939	Equipment and power unit costs. Labor not included.	Hours	$24.18	2	$48.36
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.	Hours	$27.56	6	$165.36
Equipment Operators, Light	232	Includes: Skid Steer Loaders, Hydraulic Excavators <50 HP, Trenchers <12 in., Ag Equipment <150 HP, Pickup Trucks, Forklifts, Mulchers	Hours	$27.87	6	$167.22
Equipment Operators, Heavy	233	Includes: Cranes, Hydraulic Excavators >=50 HP, Dozers, Paving Machines, Rock Trenchers, Trenchers >=12 in., Dump Trucks, Ag Equipment >=150 HP, Scrapers, Water Wagons.	Hours	$38.00	6	$228.00
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.	Hours	$46.88	2	$93.76
Materials						
Wood Construction Mat	2657	Wood Construction Mat weekly rental rate per Square Foot of mat. Material Only. Used for access and/or work pad in remote sensitive areas.	Square Feet	$1.12	13200	$14,784.00
Mobilization						
Mobilization, medium equipment	1139	Equipment with 70-150 HP or typical weights between 14,000 and 30,000 pounds.	Each	$255.65	1	$255.65
Mobilization, large equipment	1140	Equipment >150HP or typical weights greater than 30,000 pounds or loads requiring over width or over length permits.	Each	$488.10	1	$488.10

Practice: 655 - Forest Trails and Landings

Scenario: #80 - Trail/Landing Location and Marking

Scenario Description:

The use of professional assistance in trail design or redesign, including on-site marking of trail and landing locations or relocations, and assessment of site features and considerations. Costs for installing the trail and landings are not included. This scenario is used when a commercial operation will install simple trails and landings on a site where no stream or wetland crossings are needed, and where no steep slopes and/or erodible soils are present; otherwise, use Scenario 2, Trail and Landing Installation. Trails and landings are needed for conducting a conservation activity which may or may not also have a production benefit. The use of professional assistance in trail layout, marking, and site assessment will avoid resource damage that results from improper trail and landing placement. Note that payment for this trail/landing layout and marking scenario cannot be made until after the trails/landings have been properly installed and certified. Resource concerns include: Soil Erosion - Concentrated flow erosion, Ephemeral gully erosion, and Classic gully erosion; and, Water Quality - Excessive sediment in surface waters.

Before Situation:

Access to the tract is not available for occasional travel by the landowner or manager for the purposes of monitoring plant health or installing forestry conservation practices. Improperly installed trails and landings are causing, or will cause, soil erosion and water quality problems. There is a likelihood that a trail will be developed or used without the benefit of professional assistance resulting in resource damage.

After Situation:

A trail and landing system is marked on the ground. It will provide access to a forested site and its location will not cause excessive erosion or water quality concerns.

Feature Measure: Length of trail marked

Scenario Unit: Feet

Scenario Typical Size: 5,280.0

Scenario Total Cost: $1,889.03

Scenario Cost/Unit: $0.36

Cost Details:

Component Name	ID	Description	Unit	Cost	QTY	Total
Equipment Installation						
Truck, Pickup	939	Equipment and power unit costs. Labor not included.	Hours	$24.18	4	$96.72
Labor						
Specialist Labor	235	Labor requiring a specialized skill set: Includes Agronomists, Foresters, Biologists, etc. to provide additional technical information during the planning and implementation of the practice. Does not include NRCS or TSP services.	Hours	$102.76	16	$1,644.16
Materials						
Tree Marking Paint	313	Trees to be cut through tree marking are physically identified through the application of paint on the tree. Typically one quart of paint is used to mark one acre of trees. Includes materials and shipping only.	Acres	$8.78	2	$17.56
Wire flags	1586	Small vinyl flags attached to wire stakes, typically, 36 in. in length, for marking tree rows	Each	$0.12	500	$60.00
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	$70.59	1	$70.59

Practice: 656 - Constructed Wetland

Scenario: #1 - Small, Less Than 0.1 ac

Scenario Description:

This practice scenario includes the basic earthwork and native and/or organic wetland vegetation needed to create a constructed wetland to treat contaminated agricultural runoff for a small site (i.e. <0.1 ac). All other components, such as water control structures, dikes or upstream sediment basins, must be paid for under facilitating practices. Soil sampling is required. The purpose of the practice is to address resource concerns related to water quality degradation due to excess nutrient and pathogens. Associated practices: Structure for Water Control (587); Sediment Basin (350); Dike (356); Pond Sealing or Lining, Compacted Clay Treatment (521D); Pond Sealing or Lining, Flexible Membrane (521A); Fence (382); Grade Stabilization Structure (410); Pumping Plant (533); Waste Transfer (634)

Before Situation:

Contaminated agricultural runoff causes excess ponding and/or water quality degradation.

After Situation:

A 2000 sq foot constructed wetland (i.e. 20' x 100') will be constructed with an average 18" depth. Only the earthwork and wetland vegetation are considered in this scenario. Any structures or sediment basins will be designed under a separate practice. The constructed wetland treats the effluent by reducing excess nutrients and adding oxygen through wetland plants and functions before the effluent is transported to a waste storage facility or discharged off site, if permitted by regulation.

Feature Measure: Area of Constructed Wetland

Scenario Unit: Square Feet

Scenario Typical Size: 2,000.0

Scenario Total Cost: $886.36

Scenario Cost/Unit: $0.44

Cost Details:

Component Name	ID	Description	Unit	Cost	QTY	Total
Equipment Installation						
Clearing and Grubbing	40	Clearing and Grubbing, includes materials, equipment and labor	Acres	$315.96	0.05	$15.80
Stripping and stockpiling, topsoil	1199	Stripping and stockpiling of topsoil adjacent to stripping area. Includes equipment and labor.	Cubic Yards	$0.97	37	$35.89
Excavation, common earth, small equipment, 50 ft	1220	Bulk excavation of common earth with dozer <100 HP with average push distance of 50 feet. Includes equipment and labor.	Cubic Yards	$2.37	74	$175.38
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.	Hours	$27.56	2	$55.12
Materials						
Test, Soil Test, Standard	299	Includes materials, shiping, labor, and equipment costs.	Each	$11.76	2	$23.52
Native Aquatic Plants, Emergent or Submerged	2336	Native aquatic emergent or submerged. All required materials for establishing vegetation. Includes material and shipping.	Each	$1.00	325	$325.00
Mobilization						
Mobilization, medium equipment	1139	Equipment with 70-150 HP or typical weights between 14,000 and 30,000 pounds.	Each	$255.65	1	$255.65

Practice: 656 - Constructed Wetland

Scenario: #2 - Medium, 0.1 to 0.5 ac

Scenario Description:

This practice scenario includes the basic earthwork and native and/or organic wetland vegetation needed to create a constructed wetland to treat contaminated agricultural runoff for a medium site (i.e. 0.1 - 0.5 ac). All other components, such as water control structures, dikes or upstream sediment basins, must be paid for under facilitating practices. Soil sampling is required. The purpose of the practice is to address resource concerns related to water quality degradation due to excess nutrient and pathogens. Associated practices: Structure for Water Control (587); Sediment Basin (350); Dike (356); Pond Sealing or Lining, Compacted Clay Treatment (521D); Pond Sealing or Lining, Flexible Membrane (521A); Fence (382); Grade Stabilization Structure (410); Pumping Plant (533); Waste Transfer (634)

Before Situation:

Contaminated agricultural runoff causes excess ponding and/or water quality degradation.

After Situation:

A 0.25 acre constructed wetland (i.e. 45' x 240') will be constructed with an average 18" depth. Only the earthwork and wetland vegetation are considered in this scenario. Any structures or sediment basins will be designed under a separate practice. The constructed wetland is sited near the property boundary, but still takes cropland out of production (1/2 wetland acreage). The constructed wetland treats the effluent by reducing excess nutrients and adding oxygen through wetland plants and functions before the effluent is transported to a waste storage facility or discharged off site, if permitted by regulation.

Feature Measure: Area of Constructed Wetland

Scenario Unit: Acres

Scenario Typical Size: 0.3

Scenario Total Cost: $3,107.88

Scenario Cost/Unit: $12,431.52

Cost Details:

Component Name	ID	Description	Unit	Cost	QTY	Total
Equipment Installation						
Clearing and Grubbing	40	Clearing and Grubbing, includes materials, equipment and labor	Acres	$315.96	0.25	$78.99
Stripping and stockpiling, topsoil	1199	Stripping and stockpiling of topsoil adjacent to stripping area. Includes equipment and labor.	Cubic Yards	$0.97	200	$194.00
Excavation, common earth, small equipment, 50 ft	1220	Bulk excavation of common earth with dozer <100 HP with average push distance of 50 feet. Includes equipment and labor.	Cubic Yards	$2.37	400	$948.00
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.	Hours	$27.56	7	$192.92
Materials						
Test, Soil Test, Standard	299	Includes materials, shiping, labor, and equipment costs.	Each	$11.76	2	$23.52
Pipe, PVC, 2 in., SCH 40	976	Materials: - 2 inch - PVC - SCH 40 - ASTM D1785	Feet	$1.29	20	$25.80
Pipe, PVC, 2 in., SCH 40, perforated	1730	Materials: 2 inch PVC schedule 40 ASTM D1785, perforated	Feet	$1.95	20	$39.00
Native Aquatic Plants, Emergent or Submerged	2336	Native aquatic emergent or submerged. All required materials for establishing vegetation. Includes material and shipping.	Each	$1.00	1350	$1,350.00
Mobilization						
Mobilization, medium equipment	1139	Equipment with 70-150 HP or typical weights between 14,000 and 30,000 pounds.	Each	$255.65	1	$255.65

Practice: 656 - Constructed Wetland

Scenario: #3 - Large, More Than 0.5 ac

Scenario Description:

This practice scenario includes the basic earthwork and native and/or organic wetland vegetation needed to create a constructed wetland to treat contaminated agricultural runoff for a large site (i.e. >0.5 ac). All other components, such as water control structures, dikes or upstream sediment basins, must be paid for under facilitating practices. Soil sampling is required. The purpose of the practice is to address resource concerns related to water quality degradation due to excess nutrient and pathogens. Associated practices: Structure for Water Control (587); Sediment Basin (350); Dike (356); Pond Sealing or Lining, Compacted Clay Treatment (521D); Pond Sealing or Lining, Flexible Membrane (521A); Fence (382); Grade Stabilization Structure (410); Pumping Plant (533); Waste Transfer (634)

Before Situation:

Contaminated agricultural runoff causes excess ponding and/or water quality degradation.

After Situation:

A 1 acre constructed wetland (i.e. 95' x 460') will be constructed with an average 18" depth. Only the earthwork and wetland vegetation are considered in this scenario. Any structures or sediment basins will be designed under a separate practice. The constructed wetland is sited near the property boundary, but still takes cropland out of production (1/2 wetland acreage). The constructed wetland treats the effluent by reducing excess nutrients and adding oxygen through wetland plants and functions before the effluent is transported to a waste storage facility or discharged off site, if permitted by regulation.

Feature Measure: Area of Constructed Wetland

Scenario Unit: Acres

Scenario Typical Size: 1.0

Scenario Total Cost: $10,259.17

Scenario Cost/Unit: $10,259.17

Cost Details:

Component Name	ID	Description	Unit	Cost	QTY	Total
Equipment Installation						
Clearing and Grubbing	40	Clearing and Grubbing, includes materials, equipment and labor	Acres	$315.96	1	$315.96
Stripping and stockpiling, topsoil	1199	Stripping and stockpiling of topsoil adjacent to stripping area. Includes equipment and labor.	Cubic Yards	$0.97	807	$782.79
Excavation, common earth, small equipment, 50 ft	1220	Bulk excavation of common earth with dozer <100 HP with average push distance of 50 feet. Includes equipment and labor.	Cubic Yards	$2.37	1613	$3,822.81
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.	Hours	$37.19	24	$892.56
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.	Hours	$27.56	18	$496.08
Materials						
Test, Soil Test, Standard	299	Includes materials, shiping, labor, and equipment costs.	Each	$11.76	2	$23.52
Pipe, PVC, 2 in., SCH 40	976	Materials: - 2 inch - PVC - SCH 40 - ASTM D1785	Feet	$1.29	20	$25.80
Pipe, PVC, 2 in., SCH 40, perforated	1730	Materials: 2 inch PVC schedule 40 ASTM D1785, perforated	Feet	$1.95	20	$39.00
Native Aquatic Plants, Emergent or Submerged	2336	Native aquatic emergent or submerged. All required materials for establishing vegetation. Includes material and shipping.	Each	$1.00	3605	$3,605.00
Mobilization						
Mobilization, medium equipment	1139	Equipment with 70-150 HP or typical weights between 14,000 and 30,000 pounds.	Each	$255.65	1	$255.65

Practice: 657 - Wetland Restoration

Scenario: #1 - Mineral or Organic Flat

Scenario Description:

A Mineral Flat wetland is to be restored. The tract size is 160 Acres consists of surface saturated soils interspersed with shallow depressions that are not depressional class HGM wetlands. The wetland size is also 160 acres. Resource Concerns are: 4-SOIL QUALITY DEGRADATION - Organic matter depletion, 11- WATER QUALITY DEGRADATION - Excess nutrients in surface and ground waters, 12 - WATER QUALITY DEGRADATION - Pesticides transported to surface and ground waters, 16 - WATER QUALITY DEGRADATION - Excessive sediment in surface waters, 18 - DEGRADED PLANT CONDITION - Undesirable plant productivity and health, 19 - DEGRADED PLANT CONDITION, Inadequate strucuture and composition, 22- INADEQUATE HABITAT FOR FISH AND WILDLIFE - Habitat degradation.

Before Situation:

The site has been drained with a tile drain system. A suitable seed bank exists for natural regeneration to re-establish hydrophytic vegetation. The site is in agricultural production.

After Situation:

The drain tiles have been rendered non-functional by excavating 50 foot lengths of tile mains and laterals in 24 separate locations, and backfilling with excavated earth, which is compacted with the excavator bucket. There are no facilitating practices. Restoration of hydrology and plant community functions will improve the WATER QUALITY and DEGRADED PLANT CONDITION concerns listed above. The hydrologic and vegetative practices will address the SOIL QUALITY DEGRADATION and INADEQUATE HABITAT FOR FISH AND WILDLIFE concerns.

Feature Measure: Acres of Tract

Scenario Unit: Acres

Scenario Typical Size: 160.0

Scenario Total Cost: $2,416.61

Scenario Cost/Unit: $15.10

Cost Details:

Component Name	ID	Description	Unit	Cost	QTY	Total
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.	Hours	$62.17	24	$1,492.08
Labor						
Equipment Operators, Light	232	Includes: Skid Steer Loaders, Hydraulic Excavators <50 HP, Trenchers <12 in., Ag Equipment <150 HP, Pickup Trucks, Forklifts, Mulchers	Hours	$27.87	24	$668.88
Mobilization						
Mobilization, medium equipment	1139	Equipment with 70-150 HP or typical weights between 14,000 and 30,000 pounds.	Each	$255.65	1	$255.65

Practice: 657 - Wetland Restoration

Scenario: #2 - Riverine Levee Removal and Floodplain Features

Scenario Description:

A Riverine HGM tract on a large floodplain is to be restored. It has been converted to agricultural production by surface ditching and clearing of woody vegetation. The size of the tract is 100 acres. The wetland extent is 60 acres, and 40 acres are adjacent non-wetland. Resource Concerns are: 4-SOIL QUALITY DEGRADATION - Organic matter depletion, 11- WATER QUALITY DEGRADATION - Excess nutrients in surface and ground waters, 12 - WATER QUALITY DEGRADATION - Pesticides transported to surface and ground waters, 16 - WATER QUALITY DEGRADATION - Excessive sediment in surface waters, 18 - DEGRADED PLANT CONDITION - Undesirable plant productivity and health, 19 - DEGRADED PLANT CONDITION, Inadequate strucuture and composition, 22- INADEQUATE HABITAT FOR FISH AND WILDLIFE - Habitat degradation.

Before Situation:

A levee prevents floodwater from entering the tract. The original cover was forest. The site is drained by surface ditches which collect surface water and direct it to the river through a flap gate structure. The site has been completely cleared, and no suitable adjacent seedwall exists for natural regeneration of forest species. The lateral connectivity between the channel and floodplain has been altered by construction of levees along the reach.

After Situation:

The hydrology of the site is restored with the installation of ditch plugs, and the excavation of macrotopographic features with an average depth of 6" over 30% of the wetland area. Excavated spoil is placed adjacent to the features on the wetland and adjacent non-wetland area with a maximum depth of 24 inches. The levee has been breached at the upstream and downstream ends of the tract reach, restoring dynamic stream flooding. The breach length is 150 feet long at both locations. Both the wetland and non-wetland areas are planted with a Bottomland Hardwood species mix. The levee breaches are armored with rock riprap. Facilitating practices include Grade Stabilization Structure and Tree and Shrub Planting. Restoration of hydrology and plant community functions will improve the WATER QUALITY and DEGRADED PLANT CONDITION concerns listed above. The hydrologic and vegetative practices will address the SOIL QUALITY DEGRADATION and INADEQUATE HABITAT FOR FISH AND WILDLIFE concerns.

Feature Measure: Acres of Tract

Scenario Unit: Acres

Scenario Typical Size: 100.0

Scenario Total Cost: $39,625.50

Scenario Cost/Unit: $396.26

Cost Details:

Component Name	ID	Description	Unit	Cost	QTY	Total
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 Yards	$2.31	16520	$38,161.20
Mobilization						
Mobilization, large equipment	1140	Equipment >150HP or typical weights greater than 30,000 pounds or loads requiring over width or over length permits.	Each	$488.10	3	$1,464.30

Practice: 657 - Wetland Restoration

Scenario: #3 - Depression Sediment Removal and Ditch Plug

Scenario Description:

A Depressional HGM class wetland is to be restored. The tract size is 15 acres, and the actual wetland size is 10 acres. The site is a recharge depression, fed only from surface runoff. Resource Concerns are: 4-SOIL QUALITY DEGRADATION - Organic matter depletion, 11- WATER QUALITY DEGRADATION - Excess nutrients in surface and ground waters, 12 - WATER QUALITY DEGRADATION - Pesticides transported to surface and ground waters, 16 - WATER QUALITY DEGRADATION - Excessive sediment in surface waters, 18 - DEGRADED PLANT CONDITION - Undesirable plant productivity and health, 19 - DEGRADED PLANT CONDITION, Inadequate structure and composition, 22- INADEQUATE HABITAT FOR FISH AND WILDLIFE - Habitat degradation.

Before Situation:

The wetland has been converted to agricultural production, and the tract drained with a surface ditch. The ditch is 4' average depth, and 12 feet average width. The wetland receives surface runoff from an adjacent upland watershed, and ponds water on a shallow perched layer. The watershed has been converted from native to agricultural landuse, and the resultant soil erosion has deposited 6" of sediment in the bottom of the depression.

After Situation:

The ditch has been plugged by the installation of a 50' long section of compacted clay fill, and the deposition has been removed down to the original topsoil layer. A herbaceous plant community has been seeded. Facilitative practices include Conservation Cover. Restoration of hydrology and plant community functions will improve the WATER QUALITY and DEGRADED PLANT CONDITION concerns listed above. The hydrologic and vegetative practices will address the SOIL QUALITY DEGRADATION and INADEQUATE HABITAT FOR FISH AND WILDLIFE concerns.

Feature Measure: Acres of Tract

Scenario Unit: Acres

Scenario Typical Size: 15.0

Scenario Total Cost: $20,440.45

Scenario Cost/Unit: $1,362.70

Cost Details:

Component Name	ID	Description	Unit	Cost	QTY	Total
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 Yards	$2.31	8067	$18,634.77
Earthfill, Roller Compacted	49	Earthfill, roller or machine compacted, includes equipment and labor	Cubic Yards	$4.66	178	$829.48
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	$488.10	2	$976.20

Practice: 657 - Wetland Restoration

Scenario: #5 - Riverine Channel and Floodplain Restoration

Scenario Description:

A Riverine HGM landscape on a small stream on a low stream order riparian landscape has been converted to agricultural production. The stream channel has degraded. The reach is 1500 feet in length, and the tract size is 15 acres. The wetland area is 10 acres. Resource Concerns are: 4-SOIL QUALITY DEGRADATION - Organic matter depletion, 11- WATER QUALITY DEGRADATION - Excess nutrients in surface and ground waters, 12 - WATER QUALITY DEGRADATION - Pesticides transported to surface and ground waters, 16 - WATER QUALITY DEGRADATION - Excessive sediment in surface waters, 18 - DEGRADED PLANT CONDITION - Undesirable plant productivity and health, 19 - DEGRADED PLANT CONDITION, Inadequate strucuture and composition, 22- INADEQUATE HABITAT FOR FISH AND WILDLIFE - Habitat degradation.

Before Situation:

Channel incision has broken the lateral connectivity between the stream and floodplain. The coversion to cropland was accompanied by filling and leveling of backswamp, side channel, and oxbow features which formerly ponded water or exposed the floodplain groundwater table. The site no longer has access to floodwater or water surface profile supported groundwater. No suitable seed bank exists for natural regeneration of the original hydrophytic plant community, either in the channel, or on the floodplain.

After Situation:

The hydrology of the site is restored by the installation of a series of rock check structures to raise the stream water surface profile. Floodplain macrotopographic features replicating the original side channels, oxbows, and backswamps are constructed by excavation. Spoil is placed adjacent to the excavations to replicate natural depositional features. The average depth of the excavated features is 2 feet, and the surface area of the excavations is 25% of the tract size. The eroding stream bank is stabilized with soil bio-engineering features, and fish habitat improvement measures are installed in the channel. The tract is seeded to appropriate hydrophytic and upland vegetation, both woody and herbaceous. Facilitating practices are Streambank and Shoreline protection, Structure for Water Control, Conservation Cover, Tree/Shrub Establishment, and Stream Habitat Improvement and Management. Restoration of hydrology and plant community functions will improve the WATER QUALITY and DEGRADED PLANT CONDITION concerns listed above. The hydrologic and vegetative practices will address the SOIL QUALITY DEGRADATION and INADEQUATE HABITAT FOR FISH AND WILDLIFE concerns.

Feature Measure: Acres of Tract

Scenario Unit: Acres

Scenario Typical Size: 15.0

Scenario Total Cost: $7,963.95

Scenario Cost/Unit: $530.93

Cost Details:

Component Name	ID	Description	Unit	Cost	QTY	Total
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 Yards	$2.31	3025	$6,987.75
Mobilization						
Mobilization, large equipment	1140	Equipment >150HP or typical weights greater than 30,000 pounds or loads requiring over width or over length permits.	Each	$488.10	2	$976.20

Practice: 657 - Wetland Restoration

Scenario: #6 - Tidal Marsh Phragmites Removal

Scenario Description:

In coastal and estuarine wetland areas where tidal flow has been restored and invasive plants such as Phragmites has been eliminated there is a need to remove accumulated invasive plant rhizomes to facilitate natural restoration of native plant communities such as Spartina alternaflora, Spartina patens, and Iva frutescens and Distichilis spicatta. Normally excavating 0.5 to 1.0 ffot of the material will remove the accumulated rhizimes. The resulting mud flatts are then able to naturally be naturally revegetated. There may be situations when planting is required. Coastal wetland rance in size from 1 acre to 500 acrea. The marsh surface is excavated using low pressure excavation equipment. Coastal permitting agencies require the excavated materials to be removed from the wetland. Many projects requires installation of new culverts to allow flow through dikes and roads. Resouce concerns include: Inadequate Habitat for Fish and Wildlife, Degrade palnt condition. Facilitating practices include: 587 Structure for Watercontrol, 657 Wetland Restoration, 390 Riparian Herbaceous Cover.

Before Situation:

Coastal and estuarine wetlands are degraded due to growth of invasive plants such as Phragmites. The Phragmites has been eliminated using a variety of techniques including restoration of tidal flow, invasive plant removal, and tidal channel restoration. Large areas of dead rhizomes, usually 0.5 to 1.0 feet in thickness prevent native vegetation from re-establidhing.

After Situation:

The ares with dense mats of rhizomes are removes. Mud flats can be colonizes by native plancts such as: Spartina alternaflora, Spartina patens, and Iva frutescens and Distichilis spicatta. The restored area provides habitat for coastal wildlife.

Feature Measure: <Unknown>

Scenario Unit: Acres

Scenario Typical Size: 1.0

Scenario Total Cost: $25,612.62

Scenario Cost/Unit: $25,612.62

Cost Details:

Component Name	ID	Description	Unit	Cost	QTY	Total
Equipment Installation						
Dozer, 80 HP	929	Track mounted Dozer with horsepower range of 60 to 90. Equipment and power unit costs. Labor not included.	Hours	$55.20	80	$4,416.00
Skidsteer, 80 HP	933	Skidsteer loader with horsepower range of 60 to 90. Equipment and power unit costs. Labor not included.	Hours	$55.01	200	$11,002.00
Labor						
Equipment Operators, Light	232	Includes: Skid Steer Loaders, Hydraulic Excavators <50 HP, Trenchers <12 in., Ag Equipment <150 HP, Pickup Trucks, Forklifts, Mulchers	Hours	$27.87	280	$7,803.60
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.	Hours	$46.88	40	$1,875.20
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	$171.94	3	$515.82

Practice: 657 - Wetland Restoration

Scenario: #7 - Wetland Restoration Sediment Removal

Scenario Description:

A wetland complex has been altered due accumulation of sediments from adjacent landuse changes. The sediment accumulation has altered the plant composition, structure and hydrology of the wetland. Accumulated sediments will be removed to recreate the prior topography of the wetland so that native plants can become re-established. Removing the sediments will restore the wetland hydrology. Wetland range in size fro 0.5 acres to 50 acres. Resource concerns include: Habitat Fragmentation, Inadequate Cover/Shelter, Inadequate Food, Ihadequate Space. Associated practice include: 390 Riparian Herbaceous Cover, 659 Wetland Enhancement, 342 Critical Area Planting.

Before Situation:

In wetland areas associated with forestland, and cropland. Portions of the wetland has been atlered due to deposition and accumulation of sediments

After Situation:

Define the size and extent of the practice that will be installed. Describe how the practice is typically installed to solve the resource problem.

Feature Measure: <Unknown>

Scenario Unit: Acres

Scenario Typical Size: 1.0

Scenario Total Cost: $26,335.80

Scenario Cost/Unit: $26,335.80

Cost Details:

Component Name	ID	Description	Unit	Cost	QTY	Total
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.	Hours	$109.36	100	$10,936.00
Truck, dump, 8 CY	1401	Dump truck for moving bulk material. Typically capacity is 12 ton or 8 cubic yards. Includes equipment only.	Hours	$58.86	100	$5,886.00
Labor						
Equipment Operators, Heavy	233	Includes: Cranes, Hydraulic Excavators >=50 HP, Dozers, Paving Machines, Rock Trenchers, Trenchers >=12 in., Dump Trucks, Ag Equipment >=150 HP, Scrapers, Water Wagons.	Hours	$38.00	200	$7,600.00
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.	Hours	$46.88	20	$937.60
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	$488.10	2	$976.20

Practice: 657 - Wetland Restoration

Scenario: #8 - Wetland Hydrologic Barrier Removal

Scenario Description:

A wetland complex has been altered due road or trail crossings impairs hydrologic connectivity, function, and can result in altered plant communities. Water typically higher on one side of the road and lower due to the road berm. The crossing alters the wetland hydrology which in turn can alter historic plant communities. Roads will be retired and road/trial berms removed or berms breached with low water crossings in several locations to restore hydrology. Wetland range in size fro 0.5 acres to 50 acres.Resource concerns are: 18 - DEGRADED PLANT CONDITION - Undesirable plant productivity and health, 19 - DEGRADED PLANT CONDITION, Inadequate structure and composition, 22- INADEQUATE HABITAT FOR FISH AND WILDLIFE - Habitat degradation.

Before Situation:

A road or trail system used to access or manage land is bisecting and altering any wetland type. The road/trail berm and associated borrow ditch has altered hydrologic connectivity, water flow and altered the historic plant community. Alteration of wetlands by trails or access roads can occur on any land use.

After Situation:

Road/trail fill material and culverts are removed by heavy equipment and fill placed back in the borrow ditch from which it was taken. Excess fill will be trucked offsite. Where complete road/trail removal is not a viable alternative, the road or trail will be breached in as many locations as feasible and the bottom stabilized with gravel and compacted to allow infrequent crossing by equipment.

Feature Measure: footprint of trail removed

Scenario Unit: Acres

Scenario Typical Size: 0.4

Scenario Total Cost: $5,025.80

Scenario Cost/Unit: $14,359.43

Cost Details:

Component Name	ID	Description	Unit	Cost	QTY	Total
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.	Hours	$109.36	16	$1,749.76
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 Yards	$4.58	0	$0.00
Truck, dump, 8 CY	1401	Dump truck for moving bulk material. Typically capacity is 12 ton or 8 cubic yards. Includes equipment only.	Hours	$58.86	16	$941.76
Labor						
Equipment Operators, Heavy	233	Includes: Cranes, Hydraulic Excavators >=50 HP, Dozers, Paving Machines, Rock Trenchers, Trenchers >=12 in., Dump Trucks, Ag Equipment >=150 HP, Scrapers, Water Wagons.	Hours	$38.00	16	$608.00
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.	Hours	$46.88	16	$750.08
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	$488.10	2	$976.20

Practice: 658 - Wetland Creation

Scenario: #1 - Wetland Creation, Wildlife Pond

Scenario Description:

A wetland is created on a flat mineral upland at a location where surface runoff may be intercepted and ponded by excavation. Work involved includes excavation and removing material to a nearby area. Dozer shapes wetland and disposal areas. Resource concerns are 22 - INDEQUATE HABITAT FOR FISH AND WILDLIFE - Habitat degradation.

Before Situation:

The site is in cropland on an upland, non floodplain site (interfluve).

After Situation:

An excavation with an average depth of 12" has created a shallow depression in a broad swale which intercepts surface runoff. The excavated material has been hauled to and spread on adjacent areas. The INADEQUATE HABITAT FOR FISH AND WILDLIFE resource concern has been addressed with the provision of seasonal open water for terrestrial, aquatic, and waterfowl species.

Feature Measure: Acres of Wetland

Scenario Unit: Acres

Scenario Typical Size: 2.0

Scenario Total Cost: $18,043.59

Scenario Cost/Unit: $9,021.80

Cost Details:

Component Name	ID	Description	Unit	Cost	QTY	Total
Equipment Installation						
Truck, dump, 12 CY	1215	Dump truck for moving bulk material. Typically capacity is 16 ton or 12 cubic yards. Includes equipment only.	Hours	$78.77	96	$7,561.92
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 Yards	$1.53	3227	$4,937.31
Dozer, 105 HP	1320	Track mounted Dozer with horsepower range of 90 to 125. Equipment and power unit costs. Labor not included.	Hours	$87.15	8	$697.20
Labor						
Equipment Operators, Light	232	Includes: Skid Steer Loaders, Hydraulic Excavators <50 HP, Trenchers <12 in., Ag Equipment <150 HP, Pickup Trucks, Forklifts, Mulchers	Hours	$27.87	8	$222.96
Equipment Operators, Heavy	233	Includes: Cranes, Hydraulic Excavators >=50 HP, Dozers, Paving Machines, Rock Trenchers, Trenchers >=12 in., Dump Trucks, Ag Equipment >=150 HP, Scrapers, Water Wagons.	Hours	$38.00	96	$3,648.00
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	$488.10	2	$976.20

Practice: 659 - Wetland Enhancement

Scenario: #1 - Tidal Channel Restoration/Establishment

Scenario Description:

In coastal and estuarine wetland areas existing tidal channels are restored or new tidal cannels are installed to improve tidal flow and increase salinity levels in these wetlands The facilitated drainage increases in salinity and improves the overall health of the coastal wetland system. The increased salinit is capable of reducing or eliminating the invasive palnt Phragmites. Coastal wetland rance in size from 1 acre to 500 acrea. The channels are installed using low pressure excavation equipment. Coastal permitting agencies usually require the excavated materials to be removed from the wetland. Many projected requires installation of new culverts to allow flow through dikes and roads. Resouce concerns include: Inadequate Habitat for Fish and Wildlife, Degrade palnt condition. Facilitating practices include: 587 Structure for Watercontrol, 657 Wetland Restoration, 390 Riparian Herbaceous Cover.

Before Situation:

Coastal and estuarine wetlands are degraded due to inadequate flow of salt water. The marsh vegetation is diying off and being replaced by invasive plants such as Phragmites. Areas of the marsh are devoid of vegetation.

After Situation:

Tidal flow is restored and salinity is increased by restoring existing channels or installing new channels. The inscreased salintiy allows native coastal plants such as Spartina alternaflora, Spartina patens, and Iva frutescens and Distichilis spicatta to flourish and repopulate the marsh. The increased salinity

Feature Measure: <Unknown>

Scenario Unit: Acres

Scenario Typical Size: 0.3

Scenario Total Cost: $24,945.38

Scenario Cost/Unit: $99,781.52

Cost Details:

Component Name	ID	Description	Unit	Cost	QTY	Total
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.	Hours	$62.17	110	$6,838.70
Truck, dump, 8 CY	1401	Dump truck for moving bulk material. Typically capacity is 12 ton or 8 cubic yards. Includes equipment only.	Hours	$58.86	110	$6,474.60
Labor						
Equipment Operators, Light	232	Includes: Skid Steer Loaders, Hydraulic Excavators <50 HP, Trenchers <12 in., Ag Equipment <150 HP, Pickup Trucks, Forklifts, Mulchers	Hours	$27.87	220	$6,131.40
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.	Hours	$46.88	110	$5,156.80
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	$171.94	2	$343.88

Practice: 659 - Wetland Enhancement

Scenario: #2 - Tidal Marsh Excavation

Scenario Description:

In coastal and estuarine wetland areas where tidal flow has been restored and invasive plants such as Phragmites has been eliminated there is a need to remove accumulated invasive plant rhizomes to facilitate natural restoration of native plant communities such as Spartina alternaflora, Spartina patens, Iva frutescens and Distichilis spicatta. Normally excavating 0.5 to 1.0 ffot of the material will remove the accumulated rhizomes and associated organing material. The resulting mud flatts are then able to be naturally revegetated. There may be situations when planting is required. Coastal wetland range in size from 1 acre to 500 acrea. The marsh surface is excavated using low pressure excavation equipment. Coastal permitting agencies require the excavated materials to be removed from the wetland. Many projects require installation of new culverts to allow flow through dikes and roads. Resouce concerns include: Inadequate Habitat for Fish and Wildlife, Degrade palnt condition. Facilitating practices include: 587 Structure for Watercontrol, 657 Wetland Restoration, 390 Riparian Herbaceous Cover, 396 Aquatic Organism Passage..

Before Situation:

Coastal and estuarine wetlands are degraded due to growth of invasive plants such as Phragmites. The Phragmites has been eliminated using a variety of techniques including restoration of tidal flow, invasive plant removal, and tidal channel restoration. Large areas of dead rhizomes, usually 0.5 to 1.0 feet in thickness prevent native vegetation from re-establidhing.

After Situation:

The ares with dense mats of rhizomes are removes. Mud flats can be colonizes by native plancts such as: Spartina alternaflora, Spartina patens, and Iva frutescens and Distichilis spicatta. The restored area provides habitat for coastal wildlife.

Feature Measure: <Unknown>

Scenario Unit: Acres

Scenario Typical Size: 1.0

Scenario Total Cost: $25,612.62

Scenario Cost/Unit: $25,612.62

Cost Details:

Component Name	ID	Description	Unit	Cost	QTY	Total
Equipment Installation						
Dozer, 80 HP	929	Track mounted Dozer with horsepower range of 60 to 90. Equipment and power unit costs. Labor not included.	Hours	$55.20	80	$4,416.00
Skidsteer, 80 HP	933	Skidsteer loader with horsepower range of 60 to 90. Equipment and power unit costs. Labor not included.	Hours	$55.01	200	$11,002.00
Labor						
Equipment Operators, Light	232	Includes: Skid Steer Loaders, Hydraulic Excavators <50 HP, Trenchers <12 in., Ag Equipment <150 HP, Pickup Trucks, Forklifts, Mulchers	Hours	$27.87	280	$7,803.60
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.	Hours	$46.88	40	$1,875.20
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	$171.94	3	$515.82

Practice: 659 - Wetland Enhancement

Scenario: #3 - Tidal Barrier Removal

Scenario Description:

Removal of a barrier to tidal flow in a coastal wetland complex. Typically unsersized culverts that had been previously installed do not provide adequate flow into a coastal marsh system. The limited tidal flow has significant impacts on the salinity levels, native vegetation, and native species. The typical scenario included removal of a 24 inch culvert that is approximately 20 feet long. Materail will be hauled away from the site and disposed of outside of the wetland/marsh area. This scenario only includes removal of the culvert and fill material that has been placed in the channel. Facilitating practices include: 342 Critical Area Planting, 580 Streambank and Shoreline Protection, 584 Channel Stabilization, 315 Herbaceous Weed Control, 657 Wetland Restoration, 644 Wetland Wildlife Habitat Management.

Before Situation:

The practice wil be completed typically in a coastal marsh that has been impacted by reduced tidal flow. Culverts habe been installed across walking paths or small roads. The installed culverts have caused a reduction in the normal tidal flow. The decrease tidal flow has impacted the marsh and decrease native wildlife habitat, increased the presence of Phragmites and decreases the presence of native plants scuh as Spartina alternaflora and Spartina patens. The dense Phragmites vegetation has limited the use of the marsh by native wildlife. Water quality has been impacted by the decreased tidal flow.

After Situation:

The culvert has been removed and the natural tidal flow has been restored. The invasive plant Pharagmites is eventually eradicated. Native coastal marsh plants become re-established. Native wildlife using the marsh become more abundant. Wildlife food and cover is increased. Water quality has improved because of improved tidal flow.

Feature Measure: <Unknown>

Scenario Unit: Each

Scenario Typical Size: 1.0

Scenario Total Cost: $6,267.56

Scenario Cost/Unit: $6,267.56

Cost Details:

Component Name	ID	Description	Unit	Cost	QTY	Total
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.	Hours	$130.80	16	$2,092.80
Truck, dump, 12 CY	1215	Dump truck for moving bulk material. Typically capacity is 16 ton or 12 cubic yards. Includes equipment only.	Hours	$78.77	16	$1,260.32
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.	Hours	$27.56	16	$440.96
Equipment Operators, Heavy	233	Includes: Cranes, Hydraulic Excavators >=50 HP, Dozers, Paving Machines, Rock Trenchers, Trenchers >=12 in., Dump Trucks, Ag Equipment >=150 HP, Scrapers, Water Wagons.	Hours	$38.00	32	$1,216.00
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.	Hours	$46.88	6	$281.28
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	$488.10	2	$976.20

Practice: 659 - Wetland Enhancement

Scenario: #4 - Macro-Micro Topography Creation-On Site Disposal

Scenario Description:

The restoration of micro/macrotopography in a palustrine wetland area that was historically a forested wetland, wet meadow, or abandoned crop field. Alteration of the historic wetland has change the topography so that wetland values have been diminished. The wetland will be rehabilitated to enhance conditions primarily for waterfowl, amphibians and reptiles. The nearly level topography does not support a wide variety of native wetland plants. The hydrology has been significantly altered so that ponded water is not available for the establishement of wetland plants or for having adequate water for wildlife. Resource concerns include: Inadequate food and Cover, Inadequate water and Inadequate space. The micro/macro topography will be created using an excavator. Spoils materials will used or disposed of onsite. Micro/macro topography may range in depth from less than 1 to more than 3 feet. Facilitating practices include: 327 Conservation Cover, 342 Critical Area Planting, 644 Wetland Wildlife Habitat Management.

Before Situation:

A palustrine wetland complex has been altered due to changes in landuse or farming operations. There has been a significant change in the micro/macrotopography of the site. Typical native wetland plants are not present and there is a lack wetland hydrology. Plant communities are usuallly monotypic. Water is not available to facilitate wetland plant growth or to provide water for native wildlife. Wetland features and values are diminished or non-existant.

After Situation:

The micro/macrotopography has been restored. A variety of native wetland plants have colonized the wetland area providing both food and cover for native wildlife. Island nesting, breeding and foraging habitats have been enhances for resident wildlife. Wetland hydrology and communites have been restored. Water is available for native and migratory wildlife.

Feature Measure: <Unknown>

Scenario Unit: Acres

Scenario Typical Size: 1.0

Scenario Total Cost: $9,338.21

Scenario Cost/Unit: $9,338.21

Cost Details:

Component Name	ID	Description	Unit	Cost	QTY	Total
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.	Hours	$130.80	32	$4,185.60
Tractor, agricultural, 120 HP	962	Agricultural tractor with horsepower range of 90 to 140. Equipment and power unit costs. Labor not included.	Hours	$50.84	4	$203.36
Dozer, 105 HP	1320	Track mounted Dozer with horsepower range of 90 to 125. Equipment and power unit costs. Labor not included.	Hours	$87.15	8	$697.20
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.	Hours	$27.56	32	$881.92
Equipment Operators, Light	232	Includes: Skid Steer Loaders, Hydraulic Excavators <50 HP, Trenchers <12 in., Ag Equipment <150 HP, Pickup Trucks, Forklifts, Mulchers	Hours	$27.87	4	$111.48
Equipment Operators, Heavy	233	Includes: Cranes, Hydraulic Excavators >=50 HP, Dozers, Paving Machines, Rock Trenchers, Trenchers >=12 in., Dump Trucks, Ag Equipment >=150 HP, Scrapers, Water Wagons.	Hours	$38.00	41	$1,558.00
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.	Hours	$46.88	10	$468.80
Mobilization						
Mobilization, medium equipment	1139	Equipment with 70-150 HP or typical weights between 14,000 and 30,000 pounds.	Each	$255.65	1	$255.65
Mobilization, large equipment	1140	Equipment >150HP or typical weights greater than 30,000 pounds or loads requiring over width or over length permits.	Each	$488.10	2	$976.20

Practice: 659 - Wetland Enhancement

Scenario: #5 - Creation of Micro/Macrotopography Haul Away Spoils

Scenario Description:

The restoration of micro/macrotopography in a palustrine wetland area that was historically a forested wetland, wet meadow, or abandoned crop field. Alteration of the historic wetland has change the topography so that wetland values have been diminished. The wetland will be rehabilitated to enhance conditions primarily for waterfowl, amphibians and reptiles. The nearly level topography does not support a wide variety of native wetland plants. The hydrology has been significantly altered so that ponded water is not available for the establishement of wetland plants or for having adequate water for wildlife. Resource concerns include: Inadequate food and Cover, Inadequate water and Inadequate space. The micro/macro topography will be created using an excavator. Spoils materials will be hauled off site. Micro/macro topography may range in depth from less than 1 to more than 3 feet. Facilitating practices include: 327 Conservation Cover, 342 Critical Area Planting, 644 Wetland Wildlife Habitat Management.

Before Situation:

A palustrine wetland complex has been altered due to changes in landuse or farming operations. There has been a significant change in the micro/macrotopography of the site. Typical native wetland plants are not present and there is a lack wetland hydrology. Plant communities are usuallly monotypic. Water is not available to facilitate wetland plant growth or to provide water for native wildlife. Wetland features and values are diminished or non-existant.

After Situation:

The micro/macrotopography has been restored. A variety of native wetland plants have colonized the wetland area providing both food and cover for native wildlife. Nesting, breeding and foraging habitats have been enhances for resident wildlife. Wetland hydrology and communites have been restored. Water is available for native and migratory wildlife.

Feature Measure: <Unknown>

Scenario Unit: Acres

Scenario Typical Size: 1.0

Scenario Total Cost: $20,578.00

Scenario Cost/Unit: $20,578.00

Cost Details:

Component Name	ID	Description	Unit	Cost	QTY	Total
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.	Hours	$109.36	60	$6,561.60
Truck, dump, 18 CY	1400	Dump truck for moving bulk material. Typically capacity is 25 ton or 18 cubic yards. Includes equipment only.	Hours	$98.15	60	$5,889.00
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.	Hours	$27.56	60	$1,653.60
Equipment Operators, Heavy	233	Includes: Cranes, Hydraulic Excavators >=50 HP, Dozers, Paving Machines, Rock Trenchers, Trenchers >=12 in., Dump Trucks, Ag Equipment >=150 HP, Scrapers, Water Wagons.	Hours	$38.00	120	$4,560.00
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.	Hours	$46.88	20	$937.60
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	$488.10	2	$976.20

Practice: 660 - Tree/Shrub Pruning

Scenario: #1 - Pruning-Fire Hazard

Scenario Description:

Pruning trees of branches in a forest stand where wildfires are considered a high and very high hazard. Hand tools and power tools are used to cut branches from trees. Resource concerns include Degraded plant condition-wildfire hazard and Undesirable plant productivity and health.

Before Situation:

The forest stand is well to over-stocked, generally with 200 to 300+ trees per acre. Branches are touching understory vegetation or are in close proximity to forest floor where a ground fire can ignite the lower branches and move into the upper canopy. Wildfire hazard is very high.

After Situation:

The typical forest pruning treatment is 20 acres. Trees are pruned to the desirable height (generally 8-10') based on desired separation space between ground vegetation and tree crown. Pruned branches are treated if they are a hazard, see Woody Residue Treatment standard.

Feature Measure: area of treatment

Scenario Unit: Acres

Scenario Typical Size: 20.0

Scenario Total Cost: $5,321.56

Scenario Cost/Unit: $266.08

Cost Details:

Component Name	ID	Description	Unit	Cost	QTY	Total
Equipment Installation						
Chainsaw	937	Equipment and power unit costs. Labor not included.	Hours	$7.15	120	$858.00
Pruning tools, hand tools	1318	Pruning tools, hand tools, shears, loppers, pole saw, handsaw. Material costs only. Labor not included.	Hours	$2.13	20	$42.60
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.	Hours	$27.56	140	$3,858.40
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.	Hours	$46.88	12	$562.56

Practice: 660 - Tree/Shrub Pruning

Scenario: #2 - Pruning-Low Height

Scenario Description:

Pruning is done by hand with chain saws, tree loppers, hand shears, or hand saws. Trees are identified for pruning. To improve the quality of the stem wood, branches are pruned from the trees. Trees are growing at a fast pace, with leader growth on trees anywhere from 1.5 feet to 4 feet in length.

Before Situation:

Trees are retaining lower limbs along the entire tree bole, reducing wood quality. Pruning height will be based on overall stand diameter and height. Stand has been thinned and crop trees are identified for pruning. Degrade plant condition- undesirable plant productivity and health is the resource concern.

After Situation:

The typical forest pruning treatment is 20 acres. Trees are pruned to the desirable height of 8-10 feet. Pruned branches are treated if they are a hazard, see Woody Residue Treatment standard.

Feature Measure: area of treatment

Scenario Unit: Acres

Scenario Typical Size: 20.0

Scenario Total Cost: $4,249.40

Scenario Cost/Unit: $212.47

Cost Details:

Component Name	ID	Description	Unit	Cost	QTY	Total
Equipment Installation						
Chainsaw	937	Equipment and power unit costs. Labor not included.	Hours	$7.15	80	$572.00
Pruning tools, hand tools	1318	Pruning tools, hand tools, shears, loppers, pole saw, handsaw. Material costs only. Labor not included.	Hours	$2.13	20	$42.60
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.	Hours	$27.56	100	$2,756.00
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.	Hours	$46.88	15	$703.20
Materials						
Tree Marking Paint	313	Trees to be cut through tree marking are physically identified through the application of paint on the tree. Typically one quart of paint is used to mark one acre of trees. Includes materials and shipping only.	Acres	$8.78	20	$175.60

Practice: 660 - Tree/Shrub Pruning

Scenario: #3 - Pruning- High Height

Scenario Description:

Pruning is done by hand with pole saws or with gas pole saw. Crop trees are identified for pruning. The forest is on highly productive soils. Trees are growing at a fast pace, with leader growth on trees anywhere from 1.5 feet to 4 feet in length. To improve the quality of the stem wood, branches are pruned from the trees.

Before Situation:

Trees are retaining limbs mostly along the mid to upper section of the tree bole, reducing quality. Lower branches (0-8 feet) may have already been pruned, have naturally self pruned to differing heights. Pruning height is at least to eighteen (18) feet above the ground. Degrade plant condition- undesirable plant productivity and health is the resource concern.

After Situation:

The typical forest pruning treatment is 20 acres. Trees are pruned to the height of 18 feet or more. Pruned branches are treated so they do not become a fire or health hazard.

Feature Measure: area of treatment

Scenario Unit: Acres

Scenario Typical Size: 20.0

Scenario Total Cost: $6,350.00

Scenario Cost/Unit: $317.50

Cost Details:

Component Name	ID	Description	Unit	Cost	QTY	Total
Equipment Installation						
Chainsaw	937	Equipment and power unit costs. Labor not included.	Hours	$7.15	40	$286.00
Pruning tools, hand tools	1318	Pruning tools, hand tools, shears, loppers, pole saw, handsaw. Material costs only. Labor not included.	Hours	$2.13	40	$85.20
Pruning tool, pole saw	1319	Gasoline powered pole chainsaw. Labor not included.	Hours	$8.63	80	$690.40
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.	Hours	$27.56	160	$4,409.60
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.	Hours	$46.88	15	$703.20
Materials						
Tree Marking Paint	313	Trees to be cut through tree marking are physically identified through the application of paint on the tree. Typically one quart of paint is used to mark one acre of trees. Includes materials and shipping only.	Acres	$8.78	20	$175.60

Practice: 660 - Tree/Shrub Pruning

Scenario: #4 - Pruning-Wildlife

Scenario Description:

Pruning of hard/soft mast trees and shrubs to stimulate increased fruit/nut production for wildlife food. Primarily done around old agricultural fields, in old orchards, in forested areas. Is usually done with a chainsaw or handsaw to open the canopy and remove dead branches to increase airflow and sunlight penetration. Resource concerns are inadequate habitat for fish and wildlife - habitat degrdation and plant condition- undesirable plant productivity and health

Before Situation:

Trees have reduced mast production due to tree reaching maturity or heavy shade. Pruning is needed to remove older branches, dead material and increase sunlight into the canopy. New branching will be stimulated, increasing mast production.

After Situation:

Selected trees (10 per acre) are re-invigorated with new branching and an increase in mast production.

Feature Measure: area of treatment

Scenario Unit: Acres

Scenario Typical Size: 2.0

Scenario Total Cost: $632.90

Scenario Cost/Unit: $316.45

Cost Details:

Component Name	ID	Description	Unit	Cost	QTY	Total
Equipment Installation						
Chainsaw	937	Equipment and power unit costs. Labor not included.	Hours	$7.15	5	$35.75
Pruning tools, hand tools	1318	Pruning tools, hand tools, shears, loppers, pole saw, handsaw. Material costs only. Labor not included.	Hours	$2.13	5	$10.65
Pruning tool, pole saw	1319	Gasoline powered pole chainsaw. Labor not included.	Hours	$8.63	6	$51.78
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.	Hours	$27.56	16	$440.96
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.	Hours	$46.88	2	$93.76

Practice: 660 - Tree/Shrub Pruning

Scenario: #7 - Blueberries

Scenario Description:
Wild low bush blueberries are pruned every other year to eliminate competetive plants, and stimulate new growth.

Before Situation:
Wild low bush blueberries are burned every other year to eliminate weeds and stimulate new growth. Burning produces air pollutants and uses excess fuel.

After Situation:
Blueberries are pruned rather than burned. Organic matter is left on surface, improving soil condition. Less fuel is used than for the burning process. Air quality impacts are reduced.

Feature Measure: Acres of blueberry cropland

Scenario Unit: Acres

Scenario Typical Size: 10.0

Scenario Total Cost: $508.30

Scenario Cost/Unit: $50.83

Cost Details:

Component Name	ID	Description	Unit	Cost	QTY	Total
Equipment Installation						
All terrain vehicles, ATV	965	Includes equipment, power unit and labor costs.	Hours	$21.14	10	$211.40
Pruning tools, hand tools	1318	Pruning tools, hand tools, shears, loppers, pole saw, handsaw. Material costs only. Labor not included.	Hours	$2.13	10	$21.30
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.	Hours	$27.56	10	$275.60

Practice: 660 - Tree/Shrub Pruning

Scenario: #8 - Sanitation

Scenario Description:

Pruning trees where Insects, and/or diseases create the potential for reducing growth, causing tree deformities and/or death. Hand tools and power tools are used to cut branches from trees. Resource concerns include degraded plant vigor, growth, and condition causing undesirable plant productivity and health.

Before Situation:

The forest stand has been identified as infested and/or infected with insects and/or disease. Typical setting is forestland or wildlife lands where the infestations and infections are established and are negatively affecting wildlife food and cover and tree productivity and health. Skilled labor will be consultant time for forester and General labor for landowner or other workers pruning and or moving brush.

After Situation:

The typical forest pruning treatment is 5 acres. Trees are pruned to the remove the infested and or infected branches. Pruned branches are treated as prescribed by the consultant Forester. After treatment, infestations and infections have been controlled to a level that meets client objectives to improve wildlife habitat, tree productivity, health, and vigor. Pruned branches are treated if they are considered a hazard, see Woody Residue Treatment standard.

Feature Measure: individual tree pruned

Scenario Unit: Acres

Scenario Typical Size: 5.0

Scenario Total Cost: $1,634.70

Scenario Cost/Unit: $326.94

Cost Details:

Component Name	ID	Description	Unit	Cost	QTY	Total
Equipment Installation						
Chainsaw	937	Equipment and power unit costs. Labor not included.	Hours	$7.15	10	$71.50
Pruning tools, hand tools	1318	Pruning tools, hand tools, shears, loppers, pole saw, handsaw. Material costs only. Labor not included.	Hours	$2.13	5	$10.65
Pruning tool, pole saw	1319	Gasoline powered pole chainsaw. Labor not included.	Hours	$8.63	25	$215.75
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.	Hours	$27.56	40	$1,102.40
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.	Hours	$46.88	5	$234.40

Practice: 666 - Forest Stand Improvement

Scenario: #1 - Pre-commercial Thinning Pole- Hand tools

Scenario Description:

Adjusting the stocking of a young, non-merchantable stand of trees. The operation is supervised by a consultant forester and is carried out using hand tools such as chainsaws. Resource concerns include Undesirable plant productivity and health; Wildlife habitat degradation; Wildfire hazard; and Inadequate structure and composition.

Before Situation:

The stocking of a stand of trees that are too small to make a commercial thinning exceeds the recommended fully stocked level for the species and site. The effect is much slower growth than is reasonable or expected for the site, increased susceptibility to insects and disease, and an unacceptable devastating wildfire risk.

After Situation:

After adjusting the stocking to an acceptable level, stand growth, condition, and overall quality is improved. In addition, wildlife habitat is improved with the resulting increase of sunlight reaching the forest floor.

Feature Measure: Area treated

Scenario Unit: Acres

Scenario Typical Size: 10.0

Scenario Total Cost: $5,395.06

Scenario Cost/Unit: $539.51

Cost Details:

Component Name	ID	Description	Unit	Cost	QTY	Total
Equipment Installation						
Chainsaw	937	Equipment and power unit costs. Labor not included.	Hours	$7.15	70	$500.50
Truck, Pickup	939	Equipment and power unit costs. Labor not included.	Hours	$24.18	12	$290.16
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.	Hours	$37.19	80	$2,975.20
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.	Hours	$102.76	15	$1,541.40
Materials						
Tree Marking Paint	313	Trees to be cut through tree marking are physically identified through the application of paint on the tree. Typically one quart of paint is used to mark one acre of trees. Includes materials and shipping only.	Acres	$8.78	10	$87.80

Practice: 666 - Forest Stand Improvement

Scenario: #2 - Pre-commercial Thinning Hardwood- Hand tools

Scenario Description:

Adjusting the stocking of a "Young Over Stocked Hardwood Stands." The operation is supervised by a consultant forester and is carried out using hand tools such as chainsaws, loppers and/or machetes. Resource concerns include undesirable plant productivity and health; inadequate tree structure, composition, and spacing; and wildlife habitat degradation (i.e., ESH lifespan has passed).

Before Situation:

The stocking and size class of a stand of trees such that the conditions exceed the recommended fully stocked level for the species and site. The effect is slower growth than is reasonable or expected for the site, increased susceptibility to insects and disease, and a potential risk to wildfire.

After Situation:

After adjusting the stocking to an acceptable level of spacing or trees/ac. --stand growth, condition, and overall quality are improved and desirable wildlife habitat is achieved. The resulting stand condition will have sufficient growing space to increase diameter growth and expand live tree crowns.

Feature Measure: Area treated

Scenario Unit: Acres

Scenario Typical Size: 10.0

Scenario Total Cost: $7,949.48

Scenario Cost/Unit: $794.95

Cost Details:

Component Name	ID	Description	Unit	Cost	QTY	Total
Equipment Installation						
Chainsaw	937	Equipment and power unit costs. Labor not included.	Hours	$7.15	100	$715.00
Truck, Pickup	939	Equipment and power unit costs. Labor not included.	Hours	$24.18	26	$628.68
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.	Hours	$37.19	120	$4,462.80
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.	Hours	$102.76	20	$2,055.20
Materials						
Tree Marking Paint	313	Trees to be cut through tree marking are physically identified through the application of paint on the tree. Typically one quart of paint is used to mark one acre of trees. Includes materials and shipping only.	Acres	$8.78	10	$87.80

Practice: 666 - Forest Stand Improvement

Scenario: #5 - Timber Stand Improvement - Chemical, Ground

Scenario Description:
Using ground applied chemicals to release young desirable trees from competing and/or overtopping vegetation. Resource concerns include: Undesirable plant productivity and health, and Wildlife habitat degradation.

Before Situation:
An adequately stocked stand of desirable species and trees is not growing to its potential for the site due to severe competition from undesirable trees and brush. Releasing the desirable trees from the competition will be achieved through the application of appropriate herbicides according to label directions. Application will be by ground equipment as an over-the-top spray.

After Situation:
The released stand of trees contains the composition and quality needed to meet the landowner's objectives and address the resource concerns.

Feature Measure: Acres treated

Scenario Unit: Acres

Scenario Typical Size: 40.0

Scenario Total Cost: $10,553.60

Scenario Cost/Unit: $263.84

Cost Details:

Component Name	ID	Description	Unit	Cost	QTY	Total
Equipment Installation						
Truck, Pickup	939	Equipment and power unit costs. Labor not included.	Hours	$24.18	40	$967.20
Chemical, ground application	948	Chemical application performed by ground equipment. Includes equipment, power unit and labor costs.	Acres	$5.80	40	$232.00
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.	Hours	$37.19	80	$2,975.20
Equipment Operators, Light	232	Includes: Skid Steer Loaders, Hydraulic Excavators <50 HP, Trenchers <12 in., Ag Equipment <150 HP, Pickup Trucks, Forklifts, Mulchers	Hours	$27.87	80	$2,229.60
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.	Hours	$102.76	20	$2,055.20
Materials						
Tree Marking Paint	313	Trees to be cut through tree marking are physically identified through the application of paint on the tree. Typically one quart of paint is used to mark one acre of trees. Includes materials and shipping only.	Acres	$8.78	40	$351.20
Herbicide, Imazapyr	336	Pre and post-emergent, non-selective herbicide for control of undesirable vegetation in non-crop areas. Refer to WIN-PST for product names and active ingredients. Includes materials and shipping only.	Acres	$42.07	40	$1,682.80
Herbicide, Surfactant	1095	Surfactants reduce the surface tension of water to produce more uniform coverage and penetration of herbicides, and weed killers. Paraffin Based Petroleum Surfactant. Refer to WIN-PST for product names and active ingredients. Includes materials and shipping only.	Acres	$1.51	40	$60.40

Practice: 666 - Forest Stand Improvement

Scenario: #6 - Competition Control - Mechanical, Light Equipment

Scenario Description:

Using light equipment such as a tractor with brush hog to control vegetation that is competing with desirable trees and species or to reduce the stocking level of a stand of desirable trees. Trees to be removed will be marked by a Forester. Resource concerns include Undesirable plant productivity and health; Wildlife habitat degradation; Wildfire hazard; and Inadequate structure and composition.

Before Situation:

A stand of young, desirable trees is adversely affected by competition either from undesirable species or because the stand is overstocked. The vegetation to be controlled is small enough that it can be mowed or shredded. The work can be done by mowing or shredding strips through the stand, mowing between planted rows, etc.

After Situation:

After adjusting the stocking to an acceptable level and/or controlling the competing vegetation, stand growth, condition, and overall quality is improved. In addition, wildlife habitat is improved with the resulting increase of sunlight reaching the forest floor.

Feature Measure: Area Treated

Scenario Unit: Acres

Scenario Typical Size: 10.0

Scenario Total Cost: $6,316.35

Scenario Cost/Unit: $631.64

Cost Details:

Component Name	ID	Description	Unit	Cost	QTY	Total
Equipment Installation						
Truck, Pickup	939	Equipment and power unit costs. Labor not included.	Hours	$24.18	15	$362.70
Mechanical cutter, chopper	943	Forestry mulcher, flail shredder, hydro axe, brush cutter, etc. Equipment and power unit costs. Labor not included.	Hours	$90.63	30	$2,718.90
Labor						
Equipment Operators, Light	232	Includes: Skid Steer Loaders, Hydraulic Excavators <50 HP, Trenchers <12 in., Ag Equipment <150 HP, Pickup Trucks, Forklifts, Mulchers	Hours	$27.87	30	$836.10
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.	Hours	$102.76	20	$2,055.20
Materials						
Tree Marking Paint	313	Trees to be cut through tree marking are physically identified through the application of paint on the tree. Typically one quart of paint is used to mark one acre of trees. Includes materials and shipping only.	Acres	$8.78	10	$87.80
Mobilization						
Mobilization, medium equipment	1139	Equipment with 70-150 HP or typical weights between 14,000 and 30,000 pounds.	Each	$255.65	1	$255.65

Practice: 666 - Forest Stand Improvement

Scenario: #7 - Thinning for Wildlife and Forest Health

Scenario Description:

A certified forester will mark a stand for area-wide thinning. Non-commercial area-wide thinning is used to adjust the stocking of an overstocked stand to a recommended level -- generally equivalent to a "B-Line" stocking -- by lowing the overall basal area of the stand. Treatments are used to improve residual tree spacing that enhances the forest's ability to increase diameter growth and live crown expansion. The size of the material cut and/or the density of cut material is such that moving of forest products is not required. All cut material is left on the forest floor for nutrient recycling. Larger equipment is not necessary, additional time is spent lopping slash. Resource concerns include: Inadequate structure and composition, Undesirable plant productivity and health, and Habitat degradation.

Before Situation:

The stand of pole-sized to overly mature trees is overstocked resulting in over competition, thus inhibiting growth potential and forest health. This condition is causing a lack of tree structure and composition as well as species diversity that is needed to meet the landowner's objective. Under the supervision of a consultant forester, the stand will be marked for thinning and timber stand improvement.

After Situation:

The stand will have adequate stocking that improves the overall residual tree growth and vigor. This is accomplished by removing defected and malformed, undesirable trees leaving only the best-formed and highest quality trees in the stand. The result will be a more resilient and fully stocked stand to mature into a healthy and viable forest.

Feature Measure: Acres treated

Scenario Unit: Acres

Scenario Typical Size: 10.0

Scenario Total Cost: $6,903.91

Scenario Cost/Unit: $690.39

Cost Details:

Component Name	ID	Description	Unit	Cost	QTY	Total
Equipment Installation						
Chainsaw	937	Equipment and power unit costs. Labor not included.	Hours	$7.15	80	$572.00
All terrain vehicles, ATV	965	Includes equipment, power unit and labor costs.	Hours	$21.14	40	$845.60
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.	Hours	$37.19	88	$3,272.72
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.	Hours	$102.76	20	$2,055.20
Materials						
Tree Marking Paint	313	Trees to be cut through tree marking are physically identified through the application of paint on the tree. Typically one quart of paint is used to mark one acre of trees. Includes materials and shipping only.	Acres	$8.78	10	$87.80
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	$70.59	1	$70.59

Practice: 666 - Forest Stand Improvement

Scenario: #8 - Creating Small Patch Clearcuts

Scenario Description:

A certified forester will mark a stand for a small patch cut. The creation of a small patch cut, typically less than 3 acres in size, in an over-mature and/or degraded stand. The boundary of the patch cut will me marked as well as any reserve trees to remain with the cut. One or two reserve trees (greater than 10" dbh) per acre may be retained within the cut boundary. Cutting is to be done with chainsaws, cut material is to be lopped to within 4' of the ground. Material may be used for the creation of brush piles under conservation practice standard 649. Resource concerns include: Undesirable plant productivity and health, inadequate structure and composition, and habitat degradation.

Before Situation:

The existing stand is overly mature and/or has been degraded in value by past harvesting practices. The level of acceptable growing stock is too low to justify managing this stand in its present condition. The present form, species composition and structure cannot meet the resource concerns and landowner objectives. Creating small openings by cutting all trees greater than 2" in diameter will foster the regeneration of high-value shade intolerant species. The work will be done with chainsaws.

After Situation:

A small patch cut or series of patch cuts have been created. A new, young stand of desirable species is established and stand age-class diversity is created. In addition, early successional wildlife habitat as well as forest type diversity are created.

Feature Measure: Area treated

Scenario Unit: Acres

Scenario Typical Size: 2.0

Scenario Total Cost: $1,822.62

Scenario Cost/Unit: $911.31

Cost Details:

Component Name	ID	Description	Unit	Cost	QTY	Total
Equipment Installation						
Chainsaw	937	Equipment and power unit costs. Labor not included.	Hours	$7.15	20	$143.00
All terrain vehicles, ATV	965	Includes equipment, power unit and labor costs.	Hours	$21.14	20	$422.80
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.	Hours	$37.19	24	$892.56
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.	Hours	$102.76	2	$205.52
Materials						
Tree Marking Paint	313	Trees to be cut through tree marking are physically identified through the application of paint on the tree. Typically one quart of paint is used to mark one acre of trees. Includes materials and shipping only.	Acres	$8.78	2	$17.56
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	$70.59	2	$141.18

Practice: 666 - Forest Stand Improvement

Scenario: #9 - Creating Large Patch Openings

Scenario Description:

A certified forester will mark a stand for a large patch cut. The creation of a large patch cut, typically greater than 4 acres in size, in a larger, over-mature and/or degraded stand. Approximately 10 acres in one or more openings will be created. The boundary of the patch cut will be marked as well as any reserve trees to remain with the cut. Two to five reserve trees (greater than 10" dbh) per acre may be retained within the cut boundary. The cutting is to be done with mechanized forestry equipment (feller buncher, log skidder, forwarder). Slash is to remain on site for nutrient recycling and is to be lopped to within 4' of the ground. Tree boles are removed from patches so as not to impede regeneration and future access. Tree boles and tops may be used for the creation of brush piles under conservation practice standard 649. Felled trees may be moved within the site for habitat needs and re-entry needs for future practices. Resource concerns include: Undesirable plant productivity and health, inadequate structure and composition, and habitat degradation..

Before Situation:

The existing stand is overly mature and/or has been degraded in value by past harvesting practices. The level of acceptable growing stock is too low to justify managing this stand in its present condition. The present form, species composition and structure cannot meet the resource concerns and landowner objectives. Creating openings by cutting all trees greater than 2" in diameter will foster the regeneration of high-value shade intolerant species.

After Situation:

A large patch cut or series of patch cuts have been created in a larger stand. A new, young stand of desirable species is established. About 20 acres have been improved by this activity. In addition, early successional wildlife habitat as well as forest type diversity are created.

Feature Measure: Area treated

Scenario Unit: Acres

Scenario Typical Size: 10.0

Scenario Total Cost: $7,476.28

Scenario Cost/Unit: $747.63

Cost Details:

Component Name	ID	Description	Unit	Cost	QTY	Total
Equipment Installation						
Chainsaw	937	Equipment and power unit costs. Labor not included.	Hours	$7.15	20	$143.00
Feller buncher	941	Equipment and power unit costs. Labor not included.	Hours	$80.94	30	$2,428.20
Log skidder	942	Equipment and power unit costs. Labor not included.	Hours	$124.33	10	$1,243.30
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.	Hours	$37.19	20	$743.80
Equipment Operators, Heavy	233	Includes: Cranes, Hydraulic Excavators >=50 HP, Dozers, Paving Machines, Rock Trenchers, Trenchers >=12 in., Dump Trucks, Ag Equipment >=150 HP, Scrapers, Water Wagons.	Hours	$38.00	40	$1,520.00
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.	Hours	$102.76	8	$822.08
Materials						
Tree Marking Paint	313	Trees to be cut through tree marking are physically identified through the application of paint on the tree. Typically one quart of paint is used to mark one acre of trees. Includes materials and shipping only.	Acres	$8.78	10	$87.80
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	$488.10	1	$488.10

Practice: 666 - Forest Stand Improvement

Scenario: #11 - Crop/Mast Tree Release

Scenario Description:

A professional/certified forester will mark a stand for crop tree release. The crop trees as well as the trees to be cut will be differentiated and marked. Through a crown release, growth will be focused on high quality dominant and co-dominant trees that have already gained a good competitive position within the stand. Crop tree crowns will be released from other competing crowns, typically releasing 3-4 sides of the tree crown. The difference between the Area-Wide Thinning and Crop Tree Release is the focus and release of the best trees which often means removing trees that would otherwise be retained during an area-wide thinning practice. Area-wide thinning does not focus on the release of crowns and is spatially distributed more evenly than crop tree release.

Before Situation:

High quality crop trees are competing for crown space that is limiting tree productivity, health, vigor, and wildlife habitat. Overstocked stands are limiting tree growth, increasing potential for disease, limiting flowering/fruiting potential and amount of mast available to wildlife and seed germination.

After Situation:

Desirable crop trees have been released from competition by cutting trees with competing crowns. The result is an increase in growth rates, improvement in forest health, and wildlife habitat through the expansion of the crown and increased rates of photosynthesis. Desirable timber trees and valuable trees for wildlife now have free growing space. Wildlife habitat is improved through increased food/mast production and understory development with potential for large wildlife tree development (nest, den, cavity trees).

Feature Measure: Acres served

Scenario Unit: Acres

Scenario Typical Size: 10.0

Scenario Total Cost: $5,950.69

Scenario Cost/Unit: $595.07

Cost Details:

Component Name	ID	Description	Unit	Cost	QTY	Total
Equipment Installation						
Chainsaw	937	Equipment and power unit costs. Labor not included.	Hours	$7.15	80	$572.00
All terrain vehicles, ATV	965	Includes equipment, power unit and labor costs.	Hours	$21.14	40	$845.60
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.	Hours	$37.19	90	$3,347.10
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.	Hours	$102.76	10	$1,027.60
Materials						
Tree Marking Paint	313	Trees to be cut through tree marking are physically identified through the application of paint on the tree. Typically one quart of paint is used to mark one acre of trees. Includes materials and shipping only.	Acres	$8.78	10	$87.80
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	$70.59	1	$70.59

Practice: 666 - Forest Stand Improvement

Scenario: #12 - Girdling

Scenario Description:

A certified forester will mark a stand for girdling select trees. The removal of less desirable trees of any species in a stand of saplings or larger trees primarily to improve composition, quality and wildlife. The stand lacks acceptable snag trees in either size or quantity. Trees are marked and girdled to thin the stand and create standing dead snags. Resource concerns include Undesirable plant productivity and health; Wildlife habitat degradation; and Inadequate structure and composition.

Before Situation:

The stand of pole-sized to overly mature trees is overstocked resulting in over competition, thus inhibiting growth potential and forest health. Or there is insufficient standing dead snags or cavity nesting trees within the stand. This condition is causing a lack of tree structure and composition as well as species diversity that is needed to meet the landowner's objective.

After Situation:

The stand will have adequate stocking that improves the overall residual tree growth and vigor. This is accomplished by removing defected and malformed, undesirable trees leaving only the best-formed and highest quality trees in the stand. Standing dead snags are created for wildlife. The result will be a more resilient and fully stocked stand to mature into a healthy and viable forest.

Feature Measure: Area treated

Scenario Unit: Acres

Scenario Typical Size: 10.0

Scenario Total Cost: $2,537.73

Scenario Cost/Unit: $253.77

Cost Details:

Component Name	ID	Description	Unit	Cost	QTY	Total
Equipment Installation						
Chainsaw	937	Equipment and power unit costs. Labor not included.	Hours	$7.15	20	$143.00
All terrain vehicles, ATV	965	Includes equipment, power unit and labor costs.	Hours	$21.14	18	$380.52
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.	Hours	$37.19	24	$892.56
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.	Hours	$102.76	8	$822.08
Materials						
Tree Marking Paint	313	Trees to be cut through tree marking are physically identified through the application of paint on the tree. Typically one quart of paint is used to mark one acre of trees. Includes materials and shipping only.	Acres	$8.78	10	$87.80
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	$70.59	3	$211.77

Practice: 666 - Forest Stand Improvement

Scenario: #55 - Pre-commercial Thinning -Softwood - Handtools

Scenario Description:

Adjusting the stocking of a young, non-merchantable softwood trees. The operation is supervised by a consultant forester and is carried out using hand tools such as chainsaws, loppers and/or machettes. Resource concerns include undesirable plant productivity and health; inadequate structure and composition; and wildlife habitat degradation.

Before Situation:

The stocking and size class of a stand of trees such that the conditions exceed the recommended fully stocked level for the species and site. The effect is slower growth than is reasonable or expected for the site, increased susceptibility to insects and disease, and a potential risk to wildfire.

After Situation:

After adjusting the stocking to an acceptable level of spacing or trees/ac. --stand growth, condition, and overall quality are improved and desirable wildlife habitat is achieved. The resulting stand condition will have sufficient growing space to increase diameter growth and expand live tree crowns.

Feature Measure: Area treated

Scenario Unit: Acres

Scenario Typical Size: 10.0

Scenario Total Cost: $11,252.80

Scenario Cost/Unit: $1,125.28

Cost Details:

Component Name	ID	Description	Unit	Cost	QTY	Total
Equipment Installation						
Chainsaw	937	Equipment and power unit costs. Labor not included.	Hours	$7.15	200	$1,430.00
Truck, Pickup	939	Equipment and power unit costs. Labor not included.	Hours	$24.18	10	$241.80
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.	Hours	$37.19	200	$7,438.00
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.	Hours	$102.76	20	$2,055.20
Materials						
Tree Marking Paint	313	Trees to be cut through tree marking are physically identified through the application of paint on the tree. Typically one quart of paint is used to mark one acre of trees. Includes materials and shipping only.	Acres	$8.78	10	$87.80

Practice: 666 - Forest Stand Improvement

Scenario: #57 - Tree Marking Updated

Scenario Description:

"Trees within a forest stand are marked for removal by a professional forester, in accordance with recommendations in an approved Forest Management Plan, to improve the health, productivity, composition and/or structure of the stand, to improve wildlife habitat, reduce wildfire hazard, and/or address concerns for soil erosion and water quality. The cost for this scenario is based on the labor for a professional forester to provide timber marking to ensure that the treatment is silviculturally sound, damage to the residual stand is minimized, and implementation accomplishes the desired improvements for resource concerns. Costs for removing undesirable trees are not included, as this will be accomplished through a commercial operation. NOTE: payment for this tree marking scenario cannot be made until the conservation activity (tree removal) has been properly installed and certified. Resource concerns include: Degraded Plant Condition - Undesirable plant productivity and health, Inadequate structure and composition, and Wildfire Hazard, Excessive Biomass Accumulation; Soil Erosion - Concentrated flow erosion, Ephemeral gully erosion, and Classic gully erosion; Fish and Wildlife - Inadequate Habitat - Cover/Shelter, and Food; and, Water Quality - Excessive sediment in surface waters."

Before Situation:

A forest stand is excessively dense (overstocked) and/or lacks desired attributes of species composition, structure, and/or health, and may have additional soil and water resource concerns. Wildlife habitat may lack desired tree species composition, structure, and/or understory vegetative conditions. There is a likelihood that trees could be cut and removed without the benefit of professional assistance, resulting in resource damage.

After Situation:

Trees within the stand have been appropriately marked by a professional forester for a treatment recommended in an approved Forest Management Plan. The treatment will be implemented through a commercial operation without excessive damage to the residual trees and site.

Feature Measure: Area treated

Scenario Unit: Acres

Scenario Typical Size: 10.0

Scenario Total Cost: $1,250.94

Scenario Cost/Unit: $125.09

Cost Details:

Component Name	ID	Description	Unit	Cost	QTY	Total
Equipment Installation						
All terrain vehicles, ATV	965	Includes equipment, power unit and labor costs.	Hours	$21.14	8	$169.12
Labor						
Specialist Labor	235	Labor requiring a specialized skill set: Includes Agronomists, Foresters, Biologists, etc. to provide additional technical information during the planning and implementation of the practice. Does not include NRCS or TSP services.	Hours	$102.76	8	$822.08
Materials						
Tree Marking Paint	313	Trees to be cut through tree marking are physically identified through the application of paint on the tree. Typically one quart of paint is used to mark one acre of trees. Includes materials and shipping only.	Acres	$8.78	10	$87.80
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	$171.94	1	$171.94

Practice: 666 - Forest Stand Improvement

Scenario: #58 - Basal Stem Treatment

Scenario Description:

Altering the composition and stocking of a stand of trees by treating individual stems. The trees to be retained are marked by a consultant forester. The undesirable trees are killed using single-stem treatments such as injection or basal bark spraying. This scenario is used when the species and/or condition of trees makes it infeasible to use a commercial operation to remove them from the site. Resource concerns include: Degraded Plant Condition - Undesirable plant productivity and health, Inadequate structure and composition, and Wildfire Hazard, Excessive Biomass Accumulation; Soil Erosion - Concentrated flow erosion, Ephemeral gully erosion, and Classic gully erosion; Fish and Wildlife - Inadequate Habitat - Cover/Shelter, and Food; and, Water Quality - Excessive sediment in surface waters. "

Before Situation:

The existing stand is composed of undesirable woody species and stocking exceeds the recommended levels for healthy growth. Stand and canopy density shades out understory shrubs and herbaceous plants, reducing food and cover for wildlife, and allowing soil erosion to occur due to the lack of herbaceous vegetation to slow runoff. Stand density compromises eco-site productivity and landscape hydrologic functions. Stand density compromises tree health and increases susceptibility to unacceptable outbreaks of insects and diseases, and creates catastrophic wild-land fire risk conditions that may threaten landscape health and function.

After Situation:

After management, stand density, structure and composition are at an acceptable level. Canopy gaps allow increased sunlight and air movement; understory plant growth, condition and quality are improved. Habitat for wildlife is improved, and soil erosion is limited. Stand density enhances eco-site diversity, and landscape hydrologic functions are improved. Trees are healthy and less susceptible to damaging levels of insect pests and diseases. The risk from catastrophic wild-land fire is reduced.

Feature Measure: Acres Treated

Scenario Unit: Acres

Scenario Typical Size: 10.0

Scenario Total Cost: $3,983.47

Scenario Cost/Unit: $398.35

Cost Details:

Component Name	ID	Description	Unit	Cost	QTY	Total
Equipment Installation						
Truck, Pickup	939	Equipment and power unit costs. Labor not included.	Hours	$24.18	6	$145.08
Chemical, spot treatment, single stem application	964	Ground applied chemical to individual plants or group of plants, e.g., backpack sprayer treatment. Equipment and labor cost included.	Hours	$71.67	20	$1,433.40
Labor						
Specialist Labor	235	Labor requiring a specialized skill set: Includes Agronomists, Foresters, Biologists, etc. to provide additional technical information during the planning and implementation of the practice. Does not include NRCS or TSP services.	Hours	$102.76	20	$2,055.20
Materials						
Herbicide, Triclopyor	338	Refer to WIN-PST for product names and active ingredients. Materials and shipping	Acres	$27.92	10	$279.20
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	$70.59	1	$70.59

Practice: 666 - Forest Stand Improvement

Scenario: #60 - Weeding Saplings - Mechanical

Scenario Description:

Adjusting the stocking of a young, non-merchantable stand of trees. The operation is supervised by a consultant forester and is carried out using a brontosaurus or other mechanical means. Resource concerns include: Degraded Plant Condition - Undesirable plant productivity and health, Inadequate structure and composition, and Wildfire Hazard, Excessive Biomass Accumulation; Soil Erosion - Concentrated flow erosion, Ephemeral gully erosion, and Classic gully erosion; Fish and Wildlife - Inadequate Habitat - Cover/Shelter, and Food; and, Water Quality - Excessive sediment in surface waters.

Before Situation:

The tree stocking exceeds 2000 stems per acres, average diameters are too small, exceeding recommended stocking level for the species and site. The effect is much slower growth than is reasonable or expected for the site, increased susceptibility to insects and disease, and an unacceptable wildfire risk.

After Situation:

After adjusting the stocking to an acceptable level, stand growth, condition, and overall quality is improved. In addition, wildlife habitat is improved with the resulting increase of sunlight reaching the forest floor.

Feature Measure: Area Treated

Scenario Unit: Acres

Scenario Typical Size: 10.0

Scenario Total Cost: $9,666.74

Scenario Cost/Unit: $966.67

Cost Details:

Component Name	ID	Description	Unit	Cost	QTY	Total
Equipment Installation						
Truck, Pickup	939	Equipment and power unit costs. Labor not included.	Hours	$24.18	10	$241.80
Mechanical cutter, chopper	943	Forestry mulcher, flail shredder, hydro axe, brush cutter, etc. Equipment and power unit costs. Labor not included.	Hours	$90.63	60	$5,437.80
Labor						
Equipment Operators, Light	232	Includes: Skid Steer Loaders, Hydraulic Excavators <50 HP, Trenchers <12 in., Ag Equipment <150 HP, Pickup Trucks, Forklifts, Mulchers	Hours	$27.87	60	$1,672.20
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.	Hours	$102.76	20	$2,055.20
Materials						
Tree Marking Paint	313	Trees to be cut through tree marking are physically identified through the application of paint on the tree. Typically one quart of paint is used to mark one acre of trees. Includes materials and shipping only.	Acres	$8.78	10	$87.80
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	$171.94	1	$171.94

Practice: 670 - Energy Efficient Lighting System

Scenario: #2 - Lighting - LED

Scenario Description:

To install dimmable LEDs to replace incandescent lamps on a one-for-one basis. Light fixtures do not have to be replaced. A typical poultry house has 48 fixtures. LED requirements: minimum 6 Watt, 3700 Kelvin, dimmable, grow-out bulb; industrial grade; suitably protected from dirt accumulation. In high humidity environments or areas subject to wash down, gasketted or weatherproof housings are required to prevent corrosion and premature failure.

Before Situation:

An inefficient lighting system such as one using incandescent lamps has been identified by an on-farm energy audit.

After Situation:

More efficient lighting is provided by Light-Emitting Diode (LED) lamps in order to reduce energy use as evidenced by the energy audit.Associated practices/activities: 122-AgEMP - HQ and 374-Farmstead Energy Improvement. The resource concern is inefficient use of energy in the farm operation which increases dependence on non-renewable energy sources and can be addressed through improved energy efficiency. Any improvements are based on a Type 2 energy audit meeting the requirements of ASABE S612.

Feature Measure: Each lamp replaced

Scenario Unit: Each

Scenario Typical Size: 1.0

Scenario Total Cost: $13.01

Scenario Cost/Unit: $13.01

Cost Details:

Component Name	ID	Description	Unit	Cost	QTY	Total
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.	Hours	$27.56	0.17	$4.69
Materials						
Lighting, bulb, LED, dimmable, minimum 450 lumens	1167	Light Emitting Diode (LED), typically 3700 Kelvin, dimmable, grow-out bulb; industrial grade; suitably protected from dirt accumulation. Materials only.	Each	$8.32	1	$8.32

Practice: 670 - Energy Efficient Lighting System

Scenario: #3 - LED 23 W flood fixture

Scenario Description:

To install LED flood lighting fixtures to replace incandescent light fixtures on a one-for-one basis. LED requirements: industrial grade; suitably protected from dirt accumulation. In high humidity environments or areas subject to wash down, gasketted or weatherproof housings are required to prevent corrosion and premature failure. An existing 100W bulb and fixture is replaced by a 23W LED bulb and flood fixture.

Before Situation:

Describe the setting where the practice will be installed. An inefficient lighting system such as one using incandescent lamps has been identified by an on-farm energy audit.

After Situation:

More efficient lighting is provided by Light-Emitting Diode (LED) lamps in order to reduce energy use as evidenced by the energy audit.Associated practices/activities: 122-AgEMP - HQ, 670-Lighting System Improvement, and other activities within 374-Farmstead Energy Improvement. The resource concern is inefficient use of energy in the farm operation which increases dependence on non-renewable energy sources and can be addressed through improved energy efficiency. Any improvements are based on a Type 2 energy audit meeting the requirements of ASABE S612.

Feature Measure: Each fixture replaced

Scenario Unit: Each

Scenario Typical Size: 1.0

Scenario Total Cost: $59.05

Scenario Cost/Unit: $59.05

Cost Details:

Component Name	ID	Description	Unit	Cost	QTY	Total
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.	Hours	$27.56	1.5	$41.34
Materials						
Lighting, Fixture, Flood, LED, min 1,000 Lumens, Dimmable	2600	Light Emitting Diode (LED) flood bulb with moisture proof flood light fixture. Minimum of 1,000 lumens, typically replaces 60 -100 watt incandescent, and is suitably protected from dirt accumulation. Minimum 25,000 hour lifespan. Includes Materials only.	Watt	$0.77	23	$17.71

Practice: 670 - Energy Efficient Lighting System

Scenario: #4 - LED 46W flood fixture

Scenario Description:

To install LED flood lighting fixtures to replace incandescent light fixtures on a one-for-one basis. LED requirements: industrial grade; suitably protected from dirt accumulation. In high humidity environments or areas subject to wash down, gasketted or weatherproof housings are required to prevent corrosion and premature failure. An existing 200W bulb and fixture is replaced by a 46W LED bulb and flood fixture.

Before Situation:

Describe the setting where the practice will be installed. An inefficient lighting system such as one using incandescent lamps has been identified by an on-farm energy audit.

After Situation:

More efficient lighting is provided by Light-Emitting Diode (LED) lamps in order to reduce energy use as evidenced by the energy audit.Associated practices/activities: 122-AgEMP - HQ, 670-Lighting System Improvement, and other activities within 374-Farmstead Energy Improvement. The resource concern is inefficient use of energy in the farm operation which increases dependence on non-renewable energy sources and can be addressed through improved energy efficiency. Any improvements are based on a Type 2 energy audit meeting the requirements of ASABE S612.

Feature Measure: Each fixture replaced

Scenario Unit: Each

Scenario Typical Size: 1.0

Scenario Total Cost: $192.68

Scenario Cost/Unit: $192.68

Cost Details:

Component Name	ID	Description	Unit	Cost	QTY	Total
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.	Hours	$27.56	1.5	$41.34
Materials						
Lighting, Fixture, Flood, LED, typically 4,000-8000 lumens, wet location	2601	Light emitting diode (LED) fixture, typical output of 4,000 - 8,000 lumens industrial grade with fixture; wet location; minimum 50,000 hour lifespan. Includes materials only.	Watt	$3.29	46	$151.34

Practice: 670 - Energy Efficient Lighting System

Scenario: #5 - Linear LED fixture

Scenario Description:

The lighting system consists of a four-foot, multi-LED fixture; no electronic ballast. Associated materials for installation of replacement fixtures are included. Appropriate disposal of existing lamps, ballasts and other materials is required.

Before Situation:

Inefficient lighting (such as incandescent or T12 fluorescent tubes driven by magnetic ballasts) as evidenced by an on-farm energy audit.

After Situation:

High-efficiency lighting system which reduces energy use. The new lighting equipment will provide suitable light levels and reduce overall power requirements (kW) compared to the existing lighting system as evidenced by the energy audit. Associated practices/activities: may include 122-AgEMP - HQ, 670-Lighting System Improvement, and other activities within 374-Farmstead Energy Improvement. The resource concern is inefficient use of energy in the farm operation which increases dependence on non-renewable energy sources and can be addressed through improved energy efficiency. Any improvements are based on a Type 2 energy audit meeting the requirements of ASABE S612.

Feature Measure: Each fixture replaced

Scenario Unit: Each

Scenario Typical Size: 1.0

Scenario Total Cost: $78.82

Scenario Cost/Unit: $78.82

Cost Details:

Component Name	ID	Description	Unit	Cost	QTY	Total
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.	Hours	$37.19	1	$37.19
Materials						
Lighting, LED (Linear)	2417	LED Strip/Shop Light - minimum 4000 Lumens; non-dimmable, dry location, 50,000 hour lifespan or greater. Materials and shipping only.	Each	$41.63	1	$41.63

Practice: 670 - Energy Efficient Lighting System

Scenario: #9 - Automatic Controller System

Scenario Description:

The typical scenario consists of an automatic control system installed on an existing manually controlled agricultural system. Typical components may include any of the following: wiring, sensors, data logger, logic controller, communication link, software, switches, and relay.

Before Situation:

A manually controlled system is existing in an agricultural facility that causes the inefficient use of energy, as evidenced by an on-farm energy audit.

After Situation:

An on-farm energy audit has determined that energy use can be reduced through use of an automatic controller that helps regulates the energy consumption of the existing system. Associated practices/activities may include: 122-AgEMP - HQ, and other activities within 374-Farmstead Energy Improvement. The resource concern is inefficient use of energy in the farm operation which increases dependence on non-renewable energy sources and can be addressed through improved energy efficiency. Any improvements are based on a Type 2 energy audit meeting the requirements of ASABE S612.

Feature Measure: Each system

Scenario Unit: Each

Scenario Typical Size: 1.0

Scenario Total Cost: $498.42

Scenario Cost/Unit: $498.42

Cost Details:

Component Name	ID	Description	Unit	Cost	QTY	Total
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.	Hours	$37.19	4	$148.76
Materials						
Programable LED Dimmer	2720	Programable light dimmer/controller for poultry and hog barns - Includes material and shipping only	Each	$349.66	1	$349.66

Practice: 672 - Energy Efficient Building Envelope

Scenario: #1 - Wall Insulation

Scenario Description:

Enclose both sidewalls and endwalls from ceiling to floor in one of two manners: 1) metal exterior, 3.5" fiberglass batts (R-11), vapor barrier, & interior plywood or OSB sheathing, or 2) closed-cell polyurethane foam application (minimum 1" thickness (R-7) of 2.5 lbs/cu.ft. or higher density, (3.0 or higher density preferred) with a form of physical protective barrier on lower 2' (may be 6 lbs/cu.ft. or higher density 1/8" thick foam, or treated lumber). Based on a 40' x 400' agricultural structure. NOTE: NOT USED FOR GREENHOUSES.

Before Situation:

An agricultural facility with an inefficient building envelope with limited wall insulation.

After Situation:

A more effective and efficient building envelope can be created through addition of, or increased, insulation. Associated practices/activities: may include 122-AgEMP - HQ, 374-Farmstead Energy Improvement, and other activities within 672-Building Envelope Improvement. The resource concern is inefficient use of energy in the farm operation which increases dependence on non-renewable energy sources and can be addressed through improved energy efficiency. Any improvements are based on a Type 2 energy audit meeting the requirements of ASABE S612.

Feature Measure: Square Feet of Wall Insulated

Scenario Unit: Square Feet

Scenario Typical Size: 12,000.0

Scenario Total Cost: $29,760.00

Scenario Cost/Unit: $2.48

Cost Details:

Component Name	ID	Description	Unit	Cost	QTY	Total
Materials						
Insulation, Panel, R-11 with sheathing	1197	Insulated wall panel typically 3.5 inch fiberglass batts (R-11), vapor barrier and OSB sheathing, or equal, includes materials, equipment and labor to install.	Square Feet	$2.31	6000	$13,860.00
Insulation, polyurethane, R-7, with sheathing skirt	1198	Closed-cell polyurethane foam insulation (minimum 1 inch thickness (R-7) with a protective sheeting barrier on lower 2 feet of wall height. Includes materials, equipment and labor to install.	Square Feet	$2.65	6000	$15,900.00

Practice: 672 - Energy Efficient Building Envelope

Scenario: #2 - Sealant

Scenario Description:

A typical scenario is sealing the gaps between walls, gables, ceiling, etc. in a poultry house or greenhouse. Sealing is performed by a professional contractor, not merely use of spray foam from a can. The unit basis of payment in this scenario is each house based on 60' x 500' poultry house with an assumed need of sealant to seal 2400 linear feet of gap.

Before Situation:

An agricultural facility with an inefficient building envelope with gaps between walls, ceiling, etc. for a total of 2400 linear feet.

After Situation:

A more effective and efficient building envelope can be created through interior sealing of the exterior walls at the footer plate, eaves, ridge cap, and gable ends. The sealant reduces seasonal heat loss and heat gain due to infiltration which reduces the respective need for heating and cooling equipment to operate. Associated practices/activities: may include 122-AgEMP - HQ, 374-Farmstead Energy Improvement, and other activities within 672-Building Envelope Improvement . The resource concern is inefficient use of energy in the farm operation which increases dependence on non-renewable energy sources and can be addressed through improved energy efficiency. Any improvements are based on a Type 2 energy audit meeting the requirements of ASABE S612.

Feature Measure: Perimeter of heated structure

Scenario Unit: Feet

Scenario Typical Size: 2,400.0

Scenario Total Cost: $4,944.00

Scenario Cost/Unit: $2.06

Cost Details:

Component Name	ID	Description	Unit	Cost	QTY	Total
Materials						
Sealant	1150	Greenhouse and building gap sealant. Performed by a professional contractor spraying the areas with an approved sealant for poultry production facilities. Includes materials, equipment and labor to install.	Feet	$2.06	2400	$4,944.00

Practice: 672 - Energy Efficient Building Envelope

Scenario: #4 - Greenhouse Bubble Insulation

Scenario Description:

Place aluminium foil faced double bubble insulation on greenhouse sidewalls to bench height (3') and/or cover the endwalls of a greenhouse with insulation from ceiling to floor. NOTE: FOR GREENHOUSES ONLY.

Before Situation:

A greenhouse with standard glazing, plastic or polycarbonate walls has an inefficient building envelope constructed with limited wall insulation. Heating of existing greenhouse is inefficient due to excessive heat loss.

After Situation:

Aluminium foil faced double bubble insulation is placed betwen the inner layer of plastic and the frame of greenhouse sidewalls to bench height (3') and/or covers the endwalls of a greenhouse with insulation from ceiling to floor. A more effective and efficient building envelope created through addition of insulation. The increased insulation reduces seasonal heat loss which reduces the respective need for heating equipment to operate. Associated practices/activities: may include 122-AgEMP - HQ, 374-Farmstead Energy Improvement, and other activities within 672-Building Envelope Improvement. The resource concern is inefficient use of energy in the farm operation which increases dependence on non-renewable energy sources and can be addressed through improved energy efficiency. Any improvements are based on a Type 2 energy audit meeting the requirements of ASABE S612.

Feature Measure: Square Feet of Wall Insulated

Scenario Unit: Square Feet

Scenario Typical Size: 600.0

Scenario Total Cost: $334.76

Scenario Cost/Unit: $0.56

Cost Details:

Component Name	ID	Description	Unit	Cost	QTY	Total
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.	Hours	$37.19	4	$148.76
Materials						
Insulation, Greenhouse, Reflective Bubble	2410	Double bubble reflective insulation with aluminum foil on both sides. Includes materials and shipping only.	Square Feet	$0.31	600	$186.00

Practice: 672 - Energy Efficient Building Envelope

Scenario: #5 - Greenhouse Solid Insulation

Scenario Description:

Cover the endwalls 3ft to floor and/or the foundation (24 inches below ground) of a greenhouse with 1 inch of solid polystyrene or polyurethane insulation. NOTE: FOR GREENHOUSES ONLY.

Before Situation:

A greenhouse with an inefficient building envelope covered with limited end wall or foundation insulation.

After Situation:

Endwalls of greenhouse are covered 3ft to floor and/or the foundation is covered to 24 inches below ground with 1 inch of solid polystyrene or polyurethane insulation. A more effective and efficient building envelope created through addition of insulation. Associated practices/activities: may include 122-AgEMP - HQ, 374-Farmstead Energy Improvement, and other activities within 672-Building Envelope Improvement. The resource concern is inefficient use of energy in the farm operation which increases dependence on non-renewable energy sources and can be addressed through improved energy efficiency. Any improvements are based on a Type 2 energy audit meeting the requirements of ASABE S612.

Feature Measure: Square Feet Insulated

Scenario Unit: Square Feet

Scenario Typical Size: 500.0

Scenario Total Cost: $593.76

Scenario Cost/Unit: $1.19

Cost Details:

Component Name	ID	Description	Unit	Cost	QTY	Total
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.	Hours	$37.19	4	$148.76
Materials						
Insulation, Greenhouse, Solid	2411	Solid insulation board with aluminum foil on both sides. 1 in. X 4 ft. X 8 ft. or 32 sq.ft. Includes materials and shipping only.	Square Feet	$0.89	500	$445.00

Practice: 672 - Energy Efficient Building Envelope

Scenario: #6 - Greenhouse Screens <= 10,000 sq. ft.

Scenario Description:

The mechanical energy screen system consists of a drive motor, support cables, controls, and shade material, which may be woven, knitted, or non-woven strips of aluminum fiber, polyethylene, nylon or other synthetic material. The screen provides a means to better control solar heat gain and heat transfer during night or cold weather conditions to reduce energy use. Screens and similar devices may also be used to divide internal areas and allow for differentiated heating, ventilation, or cooling system operation to reduce energy use. This scenario includes screens that are <= 10,000 square foot.

Before Situation:

Heating and cooling of an existing greenhouse, or similar structure with conditioned spaces, is inefficient due to poorly regulated heat transfer. A need to regulate an entire space for uniform conditions when some portions have differing, intermittent requirements can also reduce efficiency.

After Situation:

The greenhouse is fitted with a mechanically controlled energy screen installed truss-to-truss or gutter-to-gutter, with side screens as necessary, reducing heat loss in the greenhouse. Associated practices/activities: may include 122-AgEMP - HQ, 374-Farmstead Energy Improvemen, and other activities within 672-Building Envelope Improvement. The resource concern is inefficient use of energy in the farm operation which increases dependence on non-renewable energy sources and can be addressed through improved energy efficiency. Any improvements are based on a Type 2 energy audit meeting the requirements of ASABE S612.

Feature Measure: Area of Screen

Scenario Unit: Square Feet

Scenario Typical Size: 8,000.0

Scenario Total Cost: $28,275.04

Scenario Cost/Unit: $3.53

Cost Details:

Component Name	ID	Description	Unit	Cost	QTY	Total
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.	Hours	$37.19	16	$595.04
Materials						
Thermal blanket, <= 10,000 square foot	1147	Thermal blanket greenhouse screens: mechanical energy screen system consists of a drive motor, support cables, controls, and shade material, which may be woven, knitted, or non-woven. Size range is less than 10,000 square feet. Materials only.	Square Feet	$3.46	8000	$27,680.00

Practice: 672 - Energy Efficient Building Envelope

Scenario: #7 - Greenhouse Screens > 10,000 sq.ft.

Scenario Description:

The mechanical energy screen system consists of a drive motor, support cables, controls, and shade material, which may be woven, knitted, or non-woven strips of aluminum fiber, polyethylene, nylon or other synthetic material. The screen provides a means to better control solar heat gain and heat transfer during night or cold weather conditions to reduce energy use. Screens and similar devices may also be used to divide internal areas and allow for differentiated heating, ventilation, or cooling system operation to reduce energy use. This scenario includes screens that are > 10,000 square foot

Before Situation:

Heating and cooling of an existing greenhouse, or similar structure with conditioned spaces, is inefficient due to poorly regulated heat transfer. A need to regulate an entire space for uniform conditions when some portions have differing, intermittent requirements can also reduce efficiency.

After Situation:

The greenhouse is fitted with a mechanically controlled energy screen installed truss-to-truss or gutter-to-gutter, with side screens as necessary, reducing heat loss in the greenhouse. Associated practices/activities: may include 122-AgEMP - HQ, 374-Farmstead Energy Improvement, and other activities within 672-Building Envelope Improvement. The resource concern is inefficient use of energy in the farm operation which increases dependence on non-renewable energy sources and can be addressed through improved energy efficiency. Any improvements are based on a Type 2 energy audit meeting the requirements of ASABE S612.

Feature Measure: Area of Screen

Scenario Unit: Square Feet

Scenario Typical Size: 15,000.0

Scenario Total Cost: $34,200.00

Scenario Cost/Unit: $2.28

Cost Details:

Component Name	ID	Description	Unit	Cost	QTY	Total
Materials						
Thermal blanket 10,001 - 50,000 square foot	1148	Thermal blanket greenhouse screens: mechanical energy screen system consists of a drive motor, support cables, controls, and shade material, which may be woven, knitted, or non-woven. Size Range is 10,001 to 50,000 square feet. Materials only.	Square Feet	$2.28	15000	$34,200.00

Practice: 672 - Energy Efficient Building Envelope

Scenario: #71 - Building Envelope - Attic Insulation

Scenario Description:

Install a minimum R-7 insulation in addition to existing attic or ceiling to reduce heat transfer. Increased insulation reduces seasonal heat loss and heat gain which reduces the respective need for heating and cooling equipment to operate.

Before Situation:

A poultry house with an inefficient building envelope with limited attic insulation.

After Situation:

A more effective and efficient building envelope can be created through addition of, or increased, attic insulation. Associated practices/activities: 122-AgEMP - HQ and 374-Farmstead Energy Improvement. The resource concern is inefficient use of energy in the farm operation which increases dependence on non-renewable energy sources and can be addressed through improved energy efficiency. Any improvements are based on a Type 2 energy audit meeting the requirements of ASABE S612.

Feature Measure: Area of Attic Insulated

Scenario Unit: Square Feet

Scenario Typical Size: 20,000.0

Scenario Total Cost: $18,600.00

Scenario Cost/Unit: $0.93

Cost Details:

Component Name	ID	Description	Unit	Cost	QTY	Total
Materials						
Insulation, Fiberglass or cellulose, R-15	1196	Fiberglass or cellulose insulation R-15, includes materials, equipment and labor to install.	Square Feet	$0.93	20000	$18,600.00

Practice: B000BFF1 - Buffer Bundle#1

Scenario: #1 - Buffer Bundle#1

Scenario Description:
Addresses water quality degradation, degraded plant condition, fish/wildlife inadequate habitat, and/or air quality impacts.

Before Situation:
Resources are protected at the minimum level of the conservation practice standard(s) applied as part of the enhancement.

After Situation:
The adoption of this enhancement will provide resource protection above the minimum level of the conservation practice standard(s) applied

Feature Measure: Acre

Scenario Unit: Acres

Scenario Typical Size: 3.0

Scenario Total Cost: $8,030.72

Scenario Cost/Unit: $2,676.91

Cost Details:

Component Name	ID	Description	Unit	Cost	QTY	Total
Equipment Installation						
Truck, Pickup	939	Equipment and power unit costs. Labor not included.	Hours	$24.18	8	$193.44
Tillage, Light	945	Includes light disking (tandem) or field cultivator. Includes equipment, power unit and labor costs.	Acres	$10.68	1	$10.68
Chemical, ground application	948	Chemical application performed by ground equipment. Includes equipment, power unit and labor costs.	Acres	$5.80	7	$40.60
Seeding Operation, No Till/Grass Drill	960	No Till drill or grass drill for seeding. Includes equipment, power unit and labor costs.	Acres	$21.92	1	$21.92
Tractor, agricultural, 60 HP	963	Agricultural tractor with horsepower range of 50 to 90. Equipment and power unit costs. Labor not included.	Hours	$23.10	6	$138.60
All terrain vehicles, ATV	965	Includes equipment, power unit and labor costs.	Hours	$21.14	10	$211.40
Cultipacking	1100	Includes equipment, power unit and labor costs.	Acres	$8.68	1	$8.68
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.	Hours	$11.47	10	$114.70
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.	Hours	$5.96	6	$35.76
Foregone Income						
FI, Corn Dryland	1959	Dryland Corn is Primary Crop	Acres	$270.47	1.23	$332.68
FI, Soybeans Dryland	1961	Dryland Soybeans is Primary Crop	Acres	$261.29	1.08	$282.19
FI, Wheat Dryland	1963	Dryland Wheat is Primary Crop	Acres	$214.72	0.69	$148.16
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.	Hours	$37.19	2	$74.38
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.	Hours	$27.56	16	$440.96
Equipment Operators, Light	232	Includes: Skid Steer Loaders, Hydraulic Excavators <50 HP, Trenchers <12 in., Ag Equipment <150 HP, Pickup Trucks, Forklifts, Mulchers	Hours	$27.87	6	$167.22
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.	Hours	$46.88	6	$281.28
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.	Hours	$102.76	2	$205.52
Materials						

Herbicide, Glyphosate	334	A broad-spectrum, non-selective systemic herbicide. Refer to WIN-PST for product names and active ingredients. Includes materials and shipping only.	Acres	$9.21	5	$46.05
Herbicide, Sulfometuron & metsulfuron	344	A residual sulfonylurea herbicide that kills broadleaf weeds and some annual grasses. It is a systemic compound with foliar and soil activity. Refer to WIN-PST for product names and active ingredients. Includes materials and shipping only.	Acres	$10.96	5	$54.80
Herbicide, Surfactant	1095	Surfactants reduce the surface tension of water to produce more uniform coverage and penetration of herbicides, and weed killers. Paraffin Based Petroleum Surfactant. Refer to WIN-PST for product names and active ingredients. Includes materials and shipping only.	Acres	$1.51	5	$7.55
Shrub, Seedling, Medium	1507	Bare root shrub seedling, 18 to 36 inches tall; includes tropical containerized seedlings 10 to 20 cubic inches. Includes materials and shipping only.	Each	$1.41	341	$480.81
Tree, Hardwood, Seedling, Medium	1510	Bare root hardwood seedlings 18 to 36 inches tall; includes tropical containerized seedlings of 10 to 20 cubic inches. Includes materials and shipping only.	Each	$1.52	2518	$3,827.36
Annual Grasses, Legumes or Forbs	2732	A mix of annual grasses, legumes and/or forbs, mostly introduced but may be native. Used for temporary cover or cover crops. Includes material and shipping.	Acres	$47.95	1	$47.95
Native Perennial Grasses, Legumes and/or Forbs, Medium Density	2754	A mix of native perennial grasses, legumes, and/or forbs, grasses typically greater than 50% of the mix, mmay include a small percentage of annual species for establishment purposes and/or if allowed by the CPS. Planted at medium to higher density (41-60 pure live seeds/sq ft). Species typically easy to purchase. Includes material and shipping.	Acres	$258.50	1	$258.50
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	$171.94	2	$343.88
Mobilization, medium equipment	1139	Equipment with 70-150 HP or typical weights between 14,000 and 30,000 pounds.	Each	$255.65	1	$255.65

Practice: B000CPL12 - Non-Irrigated Precision Ag (MRBI)

Scenario: #7 - Non-Irrigated Precision Ag (MRBI)

Scenario Description:
Addresses water quality degradation, soil quality, and soil erosion.

Before Situation:
Resources are protected at the minimum level of the conservation practice standard(s) applied as part of the enhancement.

After Situation:
The adoption of this enhancement will provide resource protection above the minimum level of the conservation practice standard(s) applied

Feature Measure: acres of cropland where enhancem

Scenario Unit: Acres

Scenario Typical Size: 100.0

Scenario Total Cost: $3,637.23

Scenario Cost/Unit: $36.37

Cost Details:

Component Name	ID	Description	Unit	Cost	QTY	Total
Equipment Installation						
Chemical, precision application	949	Chemical application performed by light bar/GPS navigation system. Includes equipment, power unit and labor costs.	Acres	$7.74	100	$774.00
Fertilizer, precision application	952	Fertilizer application performed by light bar/GPS navigation system. Includes equipment, power unit and labor costs.	Acres	$8.38	100	$838.00
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.	Hours	$37.19	1	$37.19
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.	Hours	$102.76	9	$924.84
Materials						
Test, Soil Test, Standard	299	Includes materials, shiping, labor, and equipment costs.	Each	$11.76	35	$411.60
Annual Grasses	2730	Annual grasses, one or more species, mostly introduced but may be native. Used for temporary cover or cover crops. Includes material and shipping.	Acres	$32.58	20	$651.60

Practice: B000CPL13 - Non-Irrigated Cropland (MRBI)

Scenario: #7 - Non-Irrigated Cropland (MRBI)

Scenario Description:
Addresses water quality degradation, soil quality, and soil erosion.

Before Situation:
Resources are protected at the minimum level of the conservation practice standard(s) applied as part of the enhancement.

After Situation:
The adoption of this enhancement will provide resource protection above the minimum level of the conservation practice standard(s) applied.

Feature Measure: acres of cropland where enhancem

Scenario Unit: Acres

Scenario Typical Size: 100.0

Scenario Total Cost: $4,549.04

Scenario Cost/Unit: $45.49

Cost Details:

Component Name	ID	Description	Unit	Cost	QTY	Total
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.	Hours	$37.19	11	$409.09
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.	Hours	$102.76	10	$1,027.60
Materials						
Nitrogen-Urease inhibitor	260	Nitrogen-Urease inhibitor	Acres	$24.14	100	$2,414.00
Test, Soil Nitrogen Testing	311	Pre-Side Dress/Deep Soil Testing. Includes materials and shipping only.	Each	$9.35	5	$46.75
Annual Grasses	2730	Annual grasses, one or more species, mostly introduced but may be native. Used for temporary cover or cover crops. Includes material and shipping.	Acres	$32.58	20	$651.60

Practice: B000CPL14 - YEAR 1 Irrigated Precision Ag Cropland (MRBI)

Scenario: #7 - YEAR 1 Irrigated Precision Ag Cropland (MRBI)

Scenario Description:
Addresses water quality degradation, insufficient water, soil erosion, and inefficient energy.

Before Situation:
Resources are protected at the minimum level of the conservation practice standard(s) applied as part of the enhancement.

After Situation:
The adoption of this enhancement will provide resource protection above the minimum level of the conservation practice standard(s) applied

Feature Measure: acres of cropland where enhancem

Scenario Unit: Acres

Scenario Typical Size: 100.0

Scenario Total Cost: $12,494.08

Scenario Cost/Unit: $124.94

Cost Details:

Component Name	ID	Description	Unit	Cost	QTY	Total
Equipment Installation						
Truck, Pickup	939	Equipment and power unit costs. Labor not included.	Hours	$24.18	30	$725.40
Fertilizer, precision application	952	Fertilizer application performed by light bar/GPS navigation system. Includes equipment, power unit and labor costs.	Acres	$8.38	100	$838.00
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.	Hours	$37.19	19	$706.61
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.	Hours	$46.88	16	$750.08
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.	Hours	$102.76	41	$4,213.16
Materials						
Test, Soil Test, Standard	299	Includes materials, shiping, labor, and equipment costs.	Each	$11.76	35	$411.60
Switches and Controls, temp sensors	1192	Temperature and soil moisture sensors installed as part of an electronic monitoring (with or without wireless telecommunications) commonly used to control pumps and irrigation systems	Each	$579.54	3	$1,738.62
Data Logger with Telemetry System	1454	Data Logger W/Graphic Output for water management and telemetry - data communication device with power supply in a weather proof enclosure. Equipment only.	Each	$1,577.29	1	$1,577.29
Weather Station, Advanced	2550	Advance Weather Station which collects and records recording rainfall, humidity, barometric pressure, wind speed, temperature, and solar radiation from a solar powered self-standing tripod to an advance weather recording console. Used for both 449 advance irrigation water management and for Activity 202 water quality monitoring .	Each	$811.13	1	$811.13
Annual Grasses	2730	Annual grasses, one or more species, mostly introduced but may be native. Used for temporary cover or cover crops. Includes material and shipping.	Acres	$32.58	20	$651.60
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	$70.59	1	$70.59

Practice: B000CPL15 - YEAR 2+ Irrigated Precision Ag Cropland (MRBI)

Scenario: #7 - YEAR 2+ Irrigated Precision Ag Cropland (MRBI)

Scenario Description:
Addresses water quality degradation, insufficient water, and soil erosion.

Before Situation:
Resources are protected at the minimum level of the conservation practice standard(s) applied as part of the enhancement.

After Situation:
The adoption of this enhancement will provide resource protection above the minimum level of the conservation practice standard(s) applied

Feature Measure: acres of cropland where enhancem

Scenario Unit: Acres

Scenario Typical Size: 100.0

Scenario Total Cost: $4,756.63

Scenario Cost/Unit: $47.57

Cost Details:

Component Name	ID	Description	Unit	Cost	QTY	Total
Equipment Installation						
Fertilizer, precision application	952	Fertilizer application performed by light bar/GPS navigation system. Includes equipment, power unit and labor costs.	Acres	$8.38	100	$838.00
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.	Hours	$37.19	41	$1,524.79
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.	Hours	$46.88	24	$1,125.12
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.	Hours	$102.76	2	$205.52
Materials						
Test, Soil Test, Standard	299	Includes materials, shiping, labor, and equipment costs.	Each	$11.76	35	$411.60
Annual Grasses	2730	Annual grasses, one or more species, mostly introduced but may be native. Used for temporary cover or cover crops. Includes material and shipping.	Acres	$32.58	20	$651.60

Practice: B000CPL16 - Non-Irrigated Cropland with Water Bodies (MRBI)

Scenario: #7 - Non-Irrigated Cropland with Water Bodies (MRBI)

Scenario Description:
Addresses water quality degradation, soil erosion, and soil quality

Before Situation:
Resources are protected at the minimum level of the conservation practice standard(s) applied as part of the enhancement.

After Situation:
The adoption of this enhancement will provide resource protection above the minimum level of the conservation practice standard(s) applied

Feature Measure: acres of cropland where enhancem

Scenario Unit: Acres

Scenario Typical Size: 100.0

Scenario Total Cost: $5,317.21

Scenario Cost/Unit: $53.17

Cost Details:

Component Name	ID	Description	Unit	Cost	QTY	Total
Equipment Installation						
Chemical, ground application	948	Chemical application performed by ground equipment. Includes equipment, power unit and labor costs.	Acres	$5.80	2	$11.60
Seeding Operation, No Till/Grass Drill	960	No Till drill or grass drill for seeding. Includes equipment, power unit and labor costs.	Acres	$21.92	2	$43.84
Foregone Income						
FI, Corn Dryland	1959	Dryland Corn is Primary Crop	Acres	$270.47	0.82	$221.79
FI, Soybeans Dryland	1961	Dryland Soybeans is Primary Crop	Acres	$261.29	0.72	$188.13
FI, Wheat Dryland	1963	Dryland Wheat is Primary Crop	Acres	$214.72	0.46	$98.77
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.	Hours	$37.19	11	$409.09
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.	Hours	$102.76	9	$924.84
Materials						
Nitrogen-Urease inhibitor	260	Nitrogen-Urease inhibitor	Acres	$24.14	100	$2,414.00
Test, Soil Nitrogen Testing	311	Pre-Side Dress/Deep Soil Testing. Includes materials and shipping only.	Each	$9.35	5	$46.75
Herbicide, Imazapyr	336	Pre and post-emergent, non-selective herbicide for control of undesirable vegetation in non-crop areas. Refer to WIN-PST for product names and active ingredients. Includes materials and shipping only.	Acres	$42.07	2	$84.14
Annual Grasses	2730	Annual grasses, one or more species, mostly introduced but may be native. Used for temporary cover or cover crops. Includes material and shipping.	Acres	$32.58	20	$651.60
Native Perennial Grasses, Low Density	2750	Native perennial grasses, may include a small percentage of annual species for establishment purposes and/or if allowed by the CPS. Planted at lower to medium density (40 pure live seeds/sq ft and less). Includes material and shipping.	Acres	$111.33	2	$222.66

Practice: B000CPL17 - Non-Irrigated Cropland with Water Bodies Riparian Forest Buffer (MRBI)

Scenario: #7 - Non-Irrigated Cropland with Water Bodies Riparian Forest Buffer (MRBI)

Scenario Description:
Addresses water quality degradation, soil erosion, and soil quality

Before Situation:
Resources are protected at the minimum level of the conservation practice standard(s) applied as part of the enhancement.

After Situation:
The adoption of this enhancement will provide resource protection above the minimum level of the conservation practice standard(s) applied

Feature Measure: acres of cropland where enhancem

Scenario Unit: Acres

Scenario Typical Size: 100.0

Scenario Total Cost: $8,680.73

Scenario Cost/Unit: $86.81

Cost Details:

Component Name	ID	Description	Unit	Cost	QTY	Total
Equipment Installation						
Truck, Pickup	939	Equipment and power unit costs. Labor not included.	Hours	$24.18	18	$435.24
Mower, Bush Hog	940	Equipment and power unit costs. Labor not included.	Hours	$50.43	2	$100.86
Chemical, ground application	948	Chemical application performed by ground equipment. Includes equipment, power unit and labor costs.	Acres	$5.80	2	$11.60
Tractor, agricultural, 60 HP	963	Agricultural tractor with horsepower range of 50 to 90. Equipment and power unit costs. Labor not included.	Hours	$23.10	4	$92.40
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.	Hours	$11.47	16	$183.52
Foregone Income						
FI, Corn Dryland	1959	Dryland Corn is Primary Crop	Acres	$270.47	0.82	$221.79
FI, Soybeans Dryland	1961	Dryland Soybeans is Primary Crop	Acres	$261.29	0.72	$188.13
FI, Wheat Dryland	1963	Dryland Wheat is Primary Crop	Acres	$214.72	0.46	$98.77
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.	Hours	$37.19	11	$409.09
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.	Hours	$27.56	18	$496.08
Equipment Operators, Light	232	Includes: Skid Steer Loaders, Hydraulic Excavators <50 HP, Trenchers <12 in., Ag Equipment <150 HP, Pickup Trucks, Forklifts, Mulchers	Hours	$27.87	4	$111.48
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.	Hours	$46.88	4	$187.52
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.	Hours	$102.76	9	$924.84
Materials						
Nitrogen-Urease inhibitor	260	Nitrogen-Urease inhibitor	Acres	$24.14	100	$2,414.00
Test, Soil Nitrogen Testing	311	Pre-Side Dress/Deep Soil Testing. Includes materials and shipping only.	Each	$9.35	5	$46.75
Herbicide, Glyphosate	334	A broad-spectrum, non-selective systemic herbicide. Refer to WIN-PST for product names and active ingredients. Includes materials and shipping only.	Acres	$9.21	1	$9.21
Herbicide, Sulfometuron & metsulfuron	344	A residual sulfonylurea herbicide that kills broadleaf weeds and some annual grasses. It is a systemic compound with foliar and soil activity. Refer to WIN-PST for product names and active ingredients. Includes materials and shipping only.	Acres	$10.96	1	$10.96

Herbicide, Surfactant	1095	Surfactants reduce the surface tension of water to produce more uniform coverage and penetration of herbicides, and weed killers. Paraffin Based Petroleum Surfactant. Refer to WIN-PST for product names and active ingredients. Includes materials and shipping only.	Acres	$1.51	1	$1.51
Tree, Hardwood, Seedling, Medium	1510	Bare root hardwood seedlings 18 to 36 inches tall; includes tropical containerized seedlings of 10 to 20 cubic inches. Includes materials and shipping only.	Each	$1.52	872	$1,325.44
Tree shelter, solid tube type, 4 in. x 48 in.	1566	4 inch x 48 inch tree tube for protection from animal damage. Materials only.	Each	$4.22	100	$422.00
Stakes, wood, 1 in. x 1 in. x 48 in.	1578	1 in. x 1 in. x 48 in. wood stakes to fasten items in place. Includes materials only.	Each	$1.66	100	$166.00
Annual Grasses	2730	Annual grasses, one or more species, mostly introduced but may be native. Used for temporary cover or cover crops. Includes material and shipping.	Acres	$32.58	20	$651.60
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	$171.94	1	$171.94

Practice: B000CPL18 - Crop Bundle #18 - Precision Ag

Scenario: #7 - Crop Bundle #18 - Precision Ag

Scenario Description:
Addresses water quality degradation, fish and wildlife inadequate habitat, air quality impairment, and either soil erosion or soil quality degradation resource concerns.

Before Situation:
Resources are protected at the minimum level of the conservation practice standard(s) applied as part of the enhancement.

After Situation:
The adoption of this enhancement will provide resource protection above the minimum level of the conservation practice standard(s) applied

Feature Measure: acres of cropland where enhancem

Scenario Unit: Acres

Scenario Typical Size: 100.0

Scenario Total Cost: $3,708.25

Scenario Cost/Unit: $37.08

Cost Details:

Component Name	ID	Description	Unit	Cost	QTY	Total
Equipment Installation						
Chemical, precision application	949	Chemical application performed by light bar/GPS navigation system. Includes equipment, power unit and labor costs.	Acres	$7.74	100	$774.00
Fertilizer, precision application	952	Fertilizer application performed by light bar/GPS navigation system. Includes equipment, power unit and labor costs.	Acres	$8.38	100	$838.00
Foregone Income						
FI, Corn Dryland	1959	Dryland Corn is Primary Crop	Acres	$270.47	0.17	$45.98
FI, Soybeans Dryland	1961	Dryland Soybeans is Primary Crop	Acres	$261.29	0.17	$44.42
FI, Wheat Dryland	1963	Dryland Wheat is Primary Crop	Acres	$214.72	0.17	$36.50
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.	Hours	$37.19	1	$37.19
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.	Hours	$46.88	1	$46.88
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.	Hours	$102.76	8	$822.08
Materials						
Test, Soil Test, Standard	299	Includes materials, shiping, labor, and equipment costs.	Each	$11.76	35	$411.60
Annual Grasses	2730	Annual grasses, one or more species, mostly introduced but may be native. Used for temporary cover or cover crops. Includes material and shipping.	Acres	$32.58	20	$651.60

Practice: B000CPL19 - Crop Bundle #19 - Soil Health Precision Ag

Scenario: #7 - Crop Bundle #19 - Soil Health Precision Ag

Scenario Description:
Addresses water quality degradation, soil quality degradation, fish and wildlife inadequate habitat, and insufficient water resource concerns.

Before Situation:
Resources are protected at the minimum level of the conservation practice standard(s) applied as part of the enhancement.

After Situation:
The adoption of this enhancement will provide resource protection above the minimum level of the conservation practice standard(s) applied

Feature Measure: acres of cropland where enhancem

Scenario Unit: Acres

Scenario Typical Size: 100.0

Scenario Total Cost: $3,692.36

Scenario Cost/Unit: $36.92

Cost Details:

Component Name	ID	Description	Unit	Cost	QTY	Total
Equipment Installation						
Chemical, precision application	949	Chemical application performed by light bar/GPS navigation system. Includes equipment, power unit and labor costs.	Acres	$7.74	100	$774.00
Fertilizer, precision application	952	Fertilizer application performed by light bar/GPS navigation system. Includes equipment, power unit and labor costs.	Acres	$8.38	100	$838.00
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.	Hours	$37.19	2	$74.38
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.	Hours	$102.76	13	$1,335.88
Materials						
Test, Soil Test, Standard	299	Includes materials, shiping, labor, and equipment costs.	Each	$11.76	35	$411.60
Native Perennial Grasses, Legumes and/or Forbs, Medium Density	2754	A mix of native perennial grasses, legumes, and/or forbs, grasses typically greater than 50% of the mix, mmay include a small percentage of annual species for establishment purposes and/or if allowed by the CPS. Planted at medium to higher density (41-60 pure live seeds/sq ft). Species typically easy to purchase. Includes material and shipping.	Acres	$258.50	1	$258.50

Practice: B000CPL20 - Crop Bundle #20 - Soil Health Assessment

Scenario: #7 - Crop Bundle #20 - Soil Health Assessment

Scenario Description:
Addresses water quality degradation, soil quality degradation, fish and wildlife inadequate habitat, and insufficient water resource concerns.

Before Situation:
Resources are protected at the minimum level of the conservation practice standard(s) applied as part of the enhancement.

After Situation:
The adoption of this enhancement will provide resource protection above the minimum level of the conservation practice standard(s) applied.

Feature Measure: acres of cropland where enhancem

Scenario Unit: Acres

Scenario Typical Size: 100.0

Scenario Total Cost: $4,986.09

Scenario Cost/Unit: $49.86

Cost Details:

Component Name	ID	Description	Unit	Cost	QTY	Total
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.	Hours	$37.19	12	$446.28
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.	Hours	$102.76	16	$1,644.16
Materials						
Nitrogen-Urease inhibitor	260	Nitrogen-Urease inhibitor	Acres	$24.14	100	$2,414.00
Test, Soil Test, Standard	299	Includes materials, shiping, labor, and equipment costs.	Each	$11.76	15	$176.40
Test, Soil Nitrogen Testing	311	Pre-Side Dress/Deep Soil Testing. Includes materials and shipping only.	Each	$9.35	5	$46.75
Native Perennial Grasses, Legumes and/or Forbs, Medium Density	2754	A mix of native perennial grasses, legumes, and/or forbs, grasses typically greater than 50% of the mix, mmay include a small percentage of annual species for establishment purposes and/or if allowed by the CPS. Planted at medium to higher density (41-60 pure live seeds/sq ft). Species typically easy to purchase. Includes material and shipping.	Acres	$258.50	1	$258.50

Practice: B000CPL21 - Crop Bundle #21 - Crop Bundle (Organic)

Scenario: #7 - Crop Bundle #21 - Crop Bundle (Organic)

Scenario Description:
Addresses soil quality degradation, water quality degradation, and degraded plant condition resource concerns.

Before Situation:
Resources are protected at the minimum level of the conservation practice standard(s) applied as part of the enhancement.

After Situation:
The adoption of this enhancement will provide resource protection above the minimum level of the conservation practice standard(s) applied.

Feature Measure: acres of cropland where enhancem

Scenario Unit: Acres

Scenario Typical Size: 100.0

Scenario Total Cost: $6,657.39

Scenario Cost/Unit: $66.57

Cost Details:

Component Name	ID	Description	Unit	Cost	QTY	Total
Equipment Installation						
Truck, Pickup	939	Equipment and power unit costs. Labor not included.	Hours	$24.18	10	$241.80
Tillage, Light	945	Includes light disking (tandem) or field cultivator. Includes equipment, power unit and labor costs.	Acres	$10.68	1	$10.68
Chemical, ground application	948	Chemical application performed by ground equipment. Includes equipment, power unit and labor costs.	Acres	$5.80	2	$11.60
Seeding Operation, No Till/Grass Drill	960	No Till drill or grass drill for seeding. Includes equipment, power unit and labor costs.	Acres	$21.92	1	$21.92
All terrain vehicles, ATV	965	Includes equipment, power unit and labor costs.	Hours	$21.14	10	$211.40
Cultipacking	1100	Includes equipment, power unit and labor costs.	Acres	$8.68	1	$8.68
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.	Hours	$11.47	10	$114.70
Foregone Income						
FI, Corn Dryland	1959	Dryland Corn is Primary Crop	Acres	$270.47	0.82	$221.79
FI, Soybeans Dryland	1961	Dryland Soybeans is Primary Crop	Acres	$261.29	0.72	$188.13
FI, Wheat Dryland	1963	Dryland Wheat is Primary Crop	Acres	$214.72	0.46	$98.77
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.	Hours	$37.19	10	$371.90
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.	Hours	$27.56	10	$275.60
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.	Hours	$102.76	9	$924.84
Materials						
Nitrogen-Urease inhibitor	260	Nitrogen-Urease inhibitor	Acres	$24.14	100	$2,414.00
Test, Soil Nitrogen Testing	311	Pre-Side Dress/Deep Soil Testing. Includes materials and shipping only.	Each	$9.35	5	$46.75
Herbicide, Glyphosate	334	A broad-spectrum, non-selective systemic herbicide. Refer to WIN-PST for product names and active ingredients. Includes materials and shipping only.	Acres	$9.21	1	$9.21
Herbicide, Sulfometuron & metsulfuron	344	A residual sulfonylurea herbicide that kills broadleaf weeds and some annual grasses. It is a systemic compound with foliar and soil activity. Refer to WIN-PST for product names and active ingredients. Includes materials and shipping only.	Acres	$10.96	1	$10.96

Herbicide, Surfactant	1095	Surfactants reduce the surface tension of water to produce more uniform coverage and penetration of herbicides, and weed killers. Paraffin Based Petroleum Surfactant. Refer to WIN-PST for product names and active ingredients. Includes materials and shipping only.	Acres	$1.51	1	$1.51
Shrub, Seedling, Medium	1507	Bare root shrub seedling, 18 to 36 inches tall; includes tropical containerized seedlings 10 to 20 cubic inches. Includes materials and shipping only.	Each	$1.41	341	$480.81
Tree, Hardwood, Seedling, Medium	1510	Bare root hardwood seedlings 18 to 36 inches tall; includes tropical containerized seedlings of 10 to 20 cubic inches. Includes materials and shipping only.	Each	$1.52	340	$516.80
Annual Grasses, Legumes or Forbs	2732	A mix of annual grasses, legumes and/or forbs, mostly introduced but may be native. Used for temporary cover or cover crops. Includes material and shipping.	Acres	$47.95	1	$47.95
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	$171.94	1	$171.94
Mobilization, medium equipment	1139	Equipment with 70-150 HP or typical weights between 14,000 and 30,000 pounds.	Each	$255.65	1	$255.65

Practice: B000CPL22 - Crop Bundle #22 - Erosion Bundle (Organic)

Scenario: #7 - Crop Bundle #22 - Erosion Bundle (Organic)

Scenario Description:
Addresses soil quality degradation, water quality degradation, soil erosion, and fish and wildlife inadequate habitat resource concerns.

Before Situation:
Resources are protected at the minimum level of the conservation practice standard(s) applied as part of the enhancement.

After Situation:
The adoption of this enhancement will provide resource protection above the minimum level of the conservation practice standard(s) applied.

Feature Measure: acres of cropland where enhancem

Scenario Unit: Acres

Scenario Typical Size: 100.0

Scenario Total Cost: $5,292.96

Scenario Cost/Unit: $52.93

Cost Details:

Component Name	ID	Description	Unit	Cost	QTY	Total
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.	Hours	$37.19	13	$483.47
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.	Hours	$102.76	14	$1,438.64
Materials						
Nitrogen-Urease inhibitor	260	Nitrogen-Urease inhibitor	Acres	$24.14	100	$2,414.00
Test, Soil Nitrogen Testing	311	Pre-Side Dress/Deep Soil Testing. Includes materials and shipping only.	Each	$9.35	5	$46.75
Annual Grasses	2730	Annual grasses, one or more species, mostly introduced but may be native. Used for temporary cover or cover crops. Includes material and shipping.	Acres	$32.58	20	$651.60
Native Perennial Grasses, Legumes and/or Forbs, Medium Density	2754	A mix of native perennial grasses, legumes, and/or forbs, grasses typically greater than 50% of the mix, mmay include a small percentage of annual species for establishment purposes and/or if allowed by the CPS. Planted at medium to higher density (41-60 pure live seeds/sq ft). Species typically easy to purchase. Includes material and shipping.	Acres	$258.50	1	$258.50

Practice: B000FST1 - Forest Bundle#1

Scenario: #1 - Forest Bundle#1

Scenario Description:
Addresses forest management on sites that are not adapted to natural fire disturbances. Addresses resouce concerns air quality impacts, degraded plant condition and fish/wildlife inadequate habitat.

Before Situation:
Resources are protected at the minimum level of the conservation practice standard(s) applied as part of the enhancement.

After Situation:
The adoption of this enhancement will provide resource protection above the minimum level of the conservation practice standard(s) applied

Feature Measure: Acre

Scenario Unit: Acres

Scenario Typical Size: 111.0

Scenario Total Cost: $10,084.74

Scenario Cost/Unit: $90.85

Cost Details:

Component Name	ID	Description	Unit	Cost	QTY	Total
Equipment Installation						
Chainsaw	937	Equipment and power unit costs. Labor not included.	Hours	$7.15	45	$321.75
Truck, Pickup	939	Equipment and power unit costs. Labor not included.	Hours	$24.18	15	$362.70
Chemical, ground application	948	Chemical application performed by ground equipment. Includes equipment, power unit and labor costs.	Acres	$5.80	1	$5.80
Chemical, spot treatment, single stem application	964	Ground applied chemical to individual plants or group of plants, e.g., backpack sprayer treatment. Equipment and labor cost included.	Hours	$71.67	41	$2,938.47
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.	Hours	$11.47	11	$126.17
Foregone Income						
FI, Corn Dryland	1959	Dryland Corn is Primary Crop	Acres	$270.47	0.41	$110.89
FI, Soybeans Dryland	1961	Dryland Soybeans is Primary Crop	Acres	$261.29	0.36	$94.06
FI, Wheat Dryland	1963	Dryland Wheat is Primary Crop	Acres	$214.72	0.23	$49.39
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.	Hours	$37.19	7	$260.33
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.	Hours	$27.56	49	$1,350.44
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.	Hours	$102.76	12	$1,233.12
CAP Labor, forester	1302	Conservation Activity Plan labor to manage nonindustrial private forest lands for conservation, economic, and recreational purposes. Will inventory the type, amount, and location of standing timber and appraise the timber's condition. Will determine how to conserve wildlife habitats, improve water quality and soil stability, and how best to comply with environmental regulations. May devise plans for planting and growing new trees, monitoring trees for healthy growth, determining optimal thinning schedules, and increasing carbon capture and storage.	Hours	$76.26	17	$1,296.42
Materials						
Tree Marking Paint	313	Trees to be cut through tree marking are physically identified through the application of paint on the tree. Typically one quart of paint is used to mark one acre of trees. Includes materials and shipping only.	Acres	$8.78	20	$175.60
Herbicide, Glyphosate	334	A broad-spectrum, non-selective systemic herbicide. Refer to WIN-PST for product names and active ingredients. Includes materials and shipping only.	Acres	$9.21	1	$9.21

Herbicide, Picloram	337	Refer to WIN-PST for product names and active ingredients. Includes materials and shipping only.	Acres	$18.17	21	$381.57
Herbicide, Sulfometuron & metsulfuron	344	A residual sulfonylurea herbicide that kills broadleaf weeds and some annual grasses. It is a systemic compound with foliar and soil activity. Refer to WIN-PST for product names and active ingredients. Includes materials and shipping only.	Acres	$10.96	1	$10.96
Herbicide, Surfactant	1095	Surfactants reduce the surface tension of water to produce more uniform coverage and penetration of herbicides, and weed killers. Paraffin Based Petroleum Surfactant. Refer to WIN-PST for product names and active ingredients. Includes materials and shipping only.	Acres	$1.51	1	$1.51
Shrub, Seedling, Medium	1507	Bare root shrub seedling, 18 to 36 inches tall; includes tropical containerized seedlings 10 to 20 cubic inches. Includes materials and shipping only.	Each	$1.41	605	$853.05
Tree, Hardwood, Seedling, Medium	1510	Bare root hardwood seedlings 18 to 36 inches tall; includes tropical containerized seedlings of 10 to 20 cubic inches. Includes materials and shipping only.	Each	$1.52	218	$331.36
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	$171.94	1	$171.94

Practice: B000GRZ1 - Grazing Bundle 1 - Range and Pasture

Scenario: #7 - Grazing Bundle 1 - Range and Pasture

Scenario Description:
This bundle addresses soil erosion, degraded plant condition, and fish and wildlife inadequate habitat resource concerns through adoption of enhancements E528L, E315A, and E645A.

Before Situation:
Resources are protected at the minimum level of the conservation practice standard(s) applied as part of the enhancement.

After Situation:
The adoption of this enhancement will provide resource protection above the minimum level of the conservation practice standard(s) applied.

Feature Measure: Acre

Scenario Unit: Acres

Scenario Typical Size: 40.0

Scenario Total Cost: $3,565.36

Scenario Cost/Unit: $89.13

Cost Details:

Component Name	ID	Description	Unit	Cost	QTY	Total
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	$109.25	1	$109.25
Equipment Installation						
Truck, Pickup	939	Equipment and power unit costs. Labor not included.	Hours	$24.18	24	$580.32
Chemical, spot treatment, single stem application	964	Ground applied chemical to individual plants or group of plants, e.g., backpack sprayer treatment. Equipment and labor cost included.	Hours	$71.67	2	$143.34
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.	Hours	$10.75	24	$258.00
Foregone Income						
FI, Grazing AUMs	2079	Grazing is the Primary Land Use	Animal Unit Month	$19.19	10	$191.90
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.	Hours	$27.56	58	$1,598.48
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.	Hours	$46.88	2	$93.76
Materials						
Wire, Polywire	8	Wire, Polywire for electric fence - 1,300 ft. Includes materials and shipping only.	Each	$56.51	1	$56.51
Electric, Energizer, Solar	27	Electric, Energizer, Solar for electric fence. Includes materials and shipping only.	Each	$361.86	1	$361.86
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	$171.94	1	$171.94

Practice: B000GRZ2 - Grazing Bundle 2 - Range and Pasture

Scenario: #7 - Grazing Bundle 2 - Range and Pasture

Scenario Description:
This bundle addresses water quality degradation, fish and wildlife inadequate habitat, and soil erosion resource concerns through adoption of enhancements E472A, E382A, and E580A.

Before Situation:
Resources are protected at the minimum level of the conservation practice standard(s) applied as part of the enhancement.

After Situation:
The adoption of this enhancement will provide resource protection above the minimum level of the conservation practice standard(s) applied.

Feature Measure: Acre

Scenario Unit: Acres

Scenario Typical Size: 3.5

Scenario Total Cost: $7,822.74

Scenario Cost/Unit: $2,235.07

Cost Details:

Component Name	ID	Description	Unit	Cost	QTY	Total
Equipment Installation						
Auger, Post driver attachment	934	Auger or post driver attachment to a tractor or skidsteer. Does not include power unit. Labor not included.	Hours	$12.74	5	$63.70
Truck, Pickup	939	Equipment and power unit costs. Labor not included.	Hours	$24.18	13	$314.34
Tractor, agricultural, 60 HP	963	Agricultural tractor with horsepower range of 50 to 90. Equipment and power unit costs. Labor not included.	Hours	$23.10	5	$115.50
All terrain vehicles, ATV	965	Includes equipment, power unit and labor costs.	Hours	$21.14	9	$190.26
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.	Hours	$10.75	8	$86.00
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.	Hours	$11.47	8	$91.76
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.	Hours	$27.56	81	$2,232.36
Equipment Operators, Light	232	Includes: Skid Steer Loaders, Hydraulic Excavators <50 HP, Trenchers <12 in., Ag Equipment <150 HP, Pickup Trucks, Forklifts, Mulchers	Hours	$27.87	5	$139.35
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.	Hours	$46.88	8	$375.04
Materials						
Wire, Barbed, Galvanized, 12.5 Gauge, 1,320' roll	1	Galvanized 12.5 gauge, 1,320' roll. Includes materials and shipping only.	Each	$77.50	4	$310.00
Post, Wood, CCA treated, 3-4 in. x 7 ft.	9	Wood Post, Line 3-4 inch dia. X 7 ft., CCA Treated. Includes materials and shipping only.	Each	$8.09	20	$161.80
Post, Wood, CCA treated, 6 in. x 8 ft.	12	Wood Post, End 6 inch dia. X 8 ft., CCA Treated. Includes materials and shipping only.	Each	$18.91	8	$151.28
Post, Steel T, 1.33 lbs, 6'	15	Steel Post, Studded 6' - 1.33 lb. Includes materials and shipping only.	Each	$6.08	90	$547.20
Fence, Wire Assembly, Barbed Wire	30	Brace pins, battens, clips, staples. Includes materials and shipping only.	Feet	$0.19	1320	$250.80
Vinyl Undersill Strips	241	Marking material using the undersill strips of vinyl siding. Priced per foot of fence per each wire. Materials only.	Feet	$0.07	2000	$140.00
Gate, Pipe, 12 ft.	1057	6 rail tube gate, 16 gauge. Includes materials and shipping only.	Each	$195.18	2	$390.36
Shrub, Potted, Small	1524	Potted shrub seedling, 1 quart to 1 gallon. Includes materials and shipping only.	Each	$6.41	65	$416.65
Tree, Hardwood, Potted, Small	1529	Potted hardwood seedling, 1 quart to 1 gallon. Includes materials and shipping only.	Each	$7.78	65	$505.70
Tree, Conifer, Potted, Small	1534	Potted conifer seedling, 1 quart to 1 gallon. Includes materials and shipping only.	Each	$5.71	65	$371.15

Tree shelter, mesh tree tube, 48 in.	1556	48 inch tall vexar or other open weave tubular tree shelter to protect from animal damage. Materials only.	Each	$1.02	65	$66.30
Tree shelter, solid tube type, 4 in. x 24 in.	1563	4 inch x 24 inch tree tube for protection from animal damage. Materials only.	Each	$2.05	65	$133.25
Tree shelter, solid tube type, 4 in. x 48 in.	1566	4 inch x 48 inch tree tube for protection from animal damage. Materials only.	Each	$4.22	65	$274.30
Stakes, wood, 1 in. x 1 in. x 48 in.	1578	1 in. x 1 in. x 48 in. wood stakes to fasten items in place. Includes materials only.	Each	$1.66	195	$323.70
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	$171.94	1	$171.94

Practice: B000GRZ3 - Grazing Bundle 3 - Range and Pasture

Scenario: #7 - Grazing Bundle 3 - Range and Pasture

Scenario Description:
This bundle addresses water quality degradation, fish and wildlife inadequate habitat, and soil erosion resource concerns through adoption of enhancements E472A, E390B, and E580A.

Before Situation:
Resources are protected at the minimum level of the conservation practice standard(s) applied as part of the enhancement.

After Situation:
The adoption of this enhancement will provide resource protection above the minimum level of the conservation practice standard(s) applied.

Feature Measure: Acre

Scenario Unit: Acres

Scenario Typical Size: 6.0

Scenario Total Cost: $8,922.61

Scenario Cost/Unit: $1,487.10

Cost Details:

Component Name	ID	Description	Unit	Cost	QTY	Total
Equipment Installation						
Auger, Post driver attachment	934	Auger or post driver attachment to a tractor or skidsteer. Does not include power unit. Labor not included.	Hours	$12.74	5	$63.70
Truck, Pickup	939	Equipment and power unit costs. Labor not included.	Hours	$24.18	13	$314.34
Chemical, ground application	948	Chemical application performed by ground equipment. Includes equipment, power unit and labor costs.	Acres	$5.80	4	$23.20
Seeding Operation, No Till/Grass Drill	960	No Till drill or grass drill for seeding. Includes equipment, power unit and labor costs.	Acres	$21.92	2	$43.84
Tractor, agricultural, 60 HP	963	Agricultural tractor with horsepower range of 50 to 90. Equipment and power unit costs. Labor not included.	Hours	$23.10	5	$115.50
All terrain vehicles, ATV	965	Includes equipment, power unit and labor costs.	Hours	$21.14	8	$169.12
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.	Hours	$10.75	8	$86.00
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.	Hours	$11.47	8	$91.76
Foregone Income						
FI, Corn Dryland	1959	Dryland Corn is Primary Crop	Acres	$270.47	0.82	$221.79
FI, Soybeans Dryland	1961	Dryland Soybeans is Primary Crop	Acres	$261.29	0.72	$188.13
FI, Wheat Dryland	1963	Dryland Wheat is Primary Crop	Acres	$214.72	0.46	$98.77
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.	Hours	$27.56	81	$2,232.36
Equipment Operators, Light	232	Includes: Skid Steer Loaders, Hydraulic Excavators <50 HP, Trenchers <12 in., Ag Equipment <150 HP, Pickup Trucks, Forklifts, Mulchers	Hours	$27.87	5	$139.35
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.	Hours	$46.88	8	$375.04
Materials						
Wire, Barbed, Galvanized, 12.5 Gauge, 1,320' roll	1	Galvanized 12.5 gauge, 1,320' roll. Includes materials and shipping only.	Each	$77.50	4	$310.00
Post, Wood, CCA treated, 3-4 in. x 7 ft.	9	Wood Post, Line 3-4 inch dia. X 7 ft., CCA Treated. Includes materials and shipping only.	Each	$8.09	20	$161.80
Post, Wood, CCA treated, 6 in. x 8 ft.	12	Wood Post, End 6 inch dia. X 8 ft., CCA Treated. Includes materials and shipping only.	Each	$18.91	8	$151.28
Post, Steel T, 1.33 lbs, 6'	15	Steel Post, Studded 6' - 1.33 lb. Includes materials and shipping only.	Each	$6.08	90	$547.20
Fence, Wire Assembly, Barbed Wire	30	Brace pins, battens, clips, staples. Includes materials and shipping only.	Feet	$0.19	1320	$250.80

Herbicide, Imazapyr	336	Pre and post-emergent, non-selective herbicide for control of undesirable vegetation in non-crop areas. Refer to WIN-PST for product names and active ingredients. Includes materials and shipping only.	Acres	$42.07	4	$168.28
Gate, Pipe, 12 ft.	1057	6 rail tube gate, 16 gauge. Includes materials and shipping only.	Each	$195.18	2	$390.36
Shrub, Potted, Small	1524	Potted shrub seedling, 1 quart to 1 gallon. Includes materials and shipping only.	Each	$6.41	65	$416.65
Tree, Hardwood, Potted, Small	1529	Potted hardwood seedling, 1 quart to 1 gallon. Includes materials and shipping only.	Each	$7.78	65	$505.70
Tree, Conifer, Potted, Small	1534	Potted conifer seedling, 1 quart to 1 gallon. Includes materials and shipping only.	Each	$5.71	65	$371.15
Tree shelter, mesh tree tube, 48 in.	1556	48 inch tall vexar or other open weave tubular tree shelter to protect from animal damage. Materials only.	Each	$1.02	65	$66.30
Tree shelter, solid tube type, 4 in. x 24 in.	1563	4 inch x 24 inch tree tube for protection from animal damage. Materials only.	Each	$2.05	65	$133.25
Tree shelter, solid tube type, 4 in. x 48 in.	1566	4 inch x 48 inch tree tube for protection from animal damage. Materials only.	Each	$4.22	65	$274.30
Stakes, wood, 1 in. x 1 in. x 48 in.	1578	1 in. x 1 in. x 48 in. wood stakes to fasten items in place. Includes materials only.	Each	$1.66	195	$323.70
Native Perennial Grasses, Legumes and/or Forbs, Medium Density	2754	A mix of native perennial grasses, legumes, and/or forbs, grasses typically greater than 50% of the mix, mmay include a small percentage of annual species for establishment purposes and/or if allowed by the CPS. Planted at medium to higher density (41-60 pure live seeds/sq ft). Species typically easy to purchase. Includes material and shipping.	Acres	$258.50	2	$517.00
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	$171.94	1	$171.94

Practice: B000GRZ4 - Grazing Bundle 4 - Range and Pasture

Scenario: #7 - Grazing Bundle 4 - Range and Pasture

Scenario Description:
This bundle addresses water quality degradation, fish and wildlife inadequate habitat, and soil erosion resource concerns through adoption of enhancements E472A, E391C, and E580A.

Before Situation:
Resources are protected at the minimum level of the conservation practice standard(s) applied as part of the enhancement.

After Situation:
The adoption of this enhancement will provide resource protection above the minimum level of the conservation practice standard(s) applied.

Feature Measure: Acre

Scenario Unit: Acres

Scenario Typical Size: 4.0

Scenario Total Cost: $11,341.99

Scenario Cost/Unit: $2,835.50

Cost Details:

Component Name	ID	Description	Unit	Cost	QTY	Total
Equipment Installation						
Auger, Post driver attachment	934	Auger or post driver attachment to a tractor or skidsteer. Does not include power unit. Labor not included.	Hours	$12.74	5	$63.70
Truck, Pickup	939	Equipment and power unit costs. Labor not included.	Hours	$24.18	29	$701.22
Mower, Bush Hog	940	Equipment and power unit costs. Labor not included.	Hours	$50.43	2	$100.86
Chemical, ground application	948	Chemical application performed by ground equipment. Includes equipment, power unit and labor costs.	Acres	$5.80	2	$11.60
Tractor, agricultural, 60 HP	963	Agricultural tractor with horsepower range of 50 to 90. Equipment and power unit costs. Labor not included.	Hours	$23.10	9	$207.90
All terrain vehicles, ATV	965	Includes equipment, power unit and labor costs.	Hours	$21.14	8	$169.12
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.	Hours	$10.75	8	$86.00
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.	Hours	$11.47	24	$275.28
Foregone Income						
FI, Corn Dryland	1959	Dryland Corn is Primary Crop	Acres	$270.47	0.82	$221.79
FI, Soybeans Dryland	1961	Dryland Soybeans is Primary Crop	Acres	$261.29	0.72	$188.13
FI, Wheat Dryland	1963	Dryland Wheat is Primary Crop	Acres	$214.72	0.46	$98.77
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.	Hours	$27.56	99	$2,728.44
Equipment Operators, Light	232	Includes: Skid Steer Loaders, Hydraulic Excavators <50 HP, Trenchers <12 in., Ag Equipment <150 HP, Pickup Trucks, Forklifts, Mulchers	Hours	$27.87	9	$250.83
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.	Hours	$46.88	12	$562.56
Materials						
Wire, Barbed, Galvanized, 12.5 Gauge, 1,320' roll	1	Galvanized 12.5 gauge, 1,320' roll. Includes materials and shipping only.	Each	$77.50	4	$310.00
Post, Wood, CCA treated, 3-4 in. x 7 ft.	9	Wood Post, Line 3-4 inch dia. X 7 ft., CCA Treated. Includes materials and shipping only.	Each	$8.09	20	$161.80
Post, Wood, CCA treated, 6 in. x 8 ft.	12	Wood Post, End 6 inch dia. X 8 ft., CCA Treated. Includes materials and shipping only.	Each	$18.91	8	$151.28
Post, Steel T, 1.33 lbs, 6'	15	Steel Post, Studded 6' - 1.33 lb. Includes materials and shipping only.	Each	$6.08	90	$547.20
Fence, Wire Assembly, Barbed Wire	30	Brace pins, battens, clips, staples. Includes materials and shipping only.	Feet	$0.19	1320	$250.80

Herbicide, Glyphosate	334	A broad-spectrum, non-selective systemic herbicide. Refer to WIN-PST for product names and active ingredients. Includes materials and shipping only.	Acres	$9.21	1	$9.21
Herbicide, Sulfometuron & metsulfuron	344	A residual sulfonylurea herbicide that kills broadleaf weeds and some annual grasses. It is a systemic compound with foliar and soil activity. Refer to WIN-PST for product names and active ingredients. Includes materials and shipping only.	Acres	$10.96	1	$10.96
Gate, Pipe, 12 ft.	1057	6 rail tube gate, 16 gauge. Includes materials and shipping only.	Each	$195.18	2	$390.36
Herbicide, Surfactant	1095	Surfactants reduce the surface tension of water to produce more uniform coverage and penetration of herbicides, and weed killers. Paraffin Based Petroleum Surfactant. Refer to WIN-PST for product names and active ingredients. Includes materials and shipping only.	Acres	$1.51	1	$1.51
Tree, Hardwood, Seedling, Medium	1510	Bare root hardwood seedlings 18 to 36 inches tall; includes tropical containerized seedlings of 10 to 20 cubic inches. Includes materials and shipping only.	Each	$1.52	872	$1,325.44
Shrub, Potted, Small	1524	Potted shrub seedling, 1 quart to 1 gallon. Includes materials and shipping only.	Each	$6.41	65	$416.65
Tree, Conifer, Potted, Small	1534	Potted conifer seedling, 1 quart to 1 gallon. Includes materials and shipping only.	Each	$5.71	65	$371.15
Tree shelter, mesh tree tube, 48 in.	1556	48 inch tall vexar or other open weave tubular tree shelter to protect from animal damage. Materials only.	Each	$1.02	65	$66.30
Tree shelter, solid tube type, 4 in. x 24 in.	1563	4 inch x 24 inch tree tube for protection from animal damage. Materials only.	Each	$2.05	65	$133.25
Tree shelter, solid tube type, 4 in. x 48 in.	1566	4 inch x 48 inch tree tube for protection from animal damage. Materials only.	Each	$4.22	165	$696.30
Stakes, wood, 1 in. x 1 in. x 48 in.	1578	1 in. x 1 in. x 48 in. wood stakes to fasten items in place. Includes materials only.	Each	$1.66	295	$489.70
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	$171.94	2	$343.88

Practice: B000GRZ5 - Grazing Bundle 5 - Range and Pasture

Scenario: #7 - Grazing Bundle 5 - Range and Pasture

Scenario Description:
This bundle addresses livestock production limitation, degraded plant condition, and fish and wildlife inadequate habitat resource concerns through adoption of enhancements E528A, E315A, and E645A.

Before Situation:
Resources are protected at the minimum level of the conservation practice standard(s) applied as part of the enhancement.

After Situation:
The adoption of this enhancement will provide resource protection above the minimum level of the conservation practice standard(s) applied.

Feature Measure: Acre

Scenario Unit: Acres

Scenario Typical Size: 1,050.0

Scenario Total Cost: $6,115.16

Scenario Cost/Unit: $5.82

Cost Details:

Component Name	ID	Description	Unit	Cost	QTY	Total
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	$109.25	1	$109.25
Equipment Installation						
Truck, Pickup	939	Equipment and power unit costs. Labor not included.	Hours	$24.18	28	$677.04
Chemical, spot treatment, single stem application	964	Ground applied chemical to individual plants or group of plants, e.g., backpack sprayer treatment. Equipment and labor cost included.	Hours	$71.67	2	$143.34
All terrain vehicles, ATV	965	Includes equipment, power unit and labor costs.	Hours	$21.14	12	$253.68
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.	Hours	$10.75	24	$258.00
Foregone Income						
FI, Grazing AUMs	2079	Grazing is the Primary Land Use	Animal Unit Month	$19.19	36	$690.84
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.	Hours	$27.56	65	$1,791.40
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.	Hours	$46.88	2	$93.76
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.	Hours	$102.76	12	$1,233.12
Materials						
Wire, Polywire	8	Wire, Polywire for electric fence - 1,300 ft. Includes materials and shipping only.	Each	$56.51	1	$56.51
Electric, Energizer, Solar	27	Electric, Energizer, Solar for electric fence. Includes materials and shipping only.	Each	$361.86	1	$361.86
Tank, Polyethylene, 300 gallon	291	Portable heavy duty rubber stock tank.	Each	$274.42	1	$274.42
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	$171.94	1	$171.94

Practice: B000PST5 - Pasture Bundle 5

Scenario: #7 - Pasture Bundle #5

Scenario Description:
Implementation of site specific strategies applied to range or pasture land uses through adoption of the following CSP enhancements: E528J, E315A, and E645A.

Before Situation:
Resources are protected at the minimum level of the conservation practice standard(s) applied as part of the enhancement.

After Situation:
Adoption of these bundled enhancements provides a combined benefit for resource protection that exceeds the minimum level for the associated practice standards in order to address the resource concerns Soil Erosion or Water Quality Degradation, Degraded Plant Condition, and Fish and Wildlife Inadequate Habitat.

Feature Measure: Acre

Scenario Unit: Acres

Scenario Typical Size: 60.0

Scenario Total Cost: $3,832.33

Scenario Cost/Unit: $63.87

Cost Details:

Component Name	ID	Description	Unit	Cost	QTY	Total
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	$109.25	1	$109.25
Equipment Installation						
Truck, Pickup	939	Equipment and power unit costs. Labor not included.	Hours	$24.18	24	$580.32
Chemical, spot treatment, single stem application	964	Ground applied chemical to individual plants or group of plants, e.g., backpack sprayer treatment. Equipment and labor cost included.	Hours	$71.67	2	$143.34
All terrain vehicles, ATV	965	Includes equipment, power unit and labor costs.	Hours	$21.14	6	$126.84
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.	Hours	$10.75	24	$258.00
Foregone Income						
FI, Grazing AUMs	2079	Grazing is the Primary Land Use	Animal Unit Month	$19.19	6	$115.14
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.	Hours	$27.56	56	$1,543.36
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.	Hours	$46.88	2	$93.76
Materials						
Wire, Polywire	8	Wire, Polywire for electric fence - 1,300 ft. Includes materials and shipping only.	Each	$56.51	4	$226.04
Electric, Energizer, Solar	27	Electric, Energizer, Solar for electric fence. Includes materials and shipping only.	Each	$361.86	1	$361.86
Tank, Polyethylene, 300 gallon	291	Portable heavy duty rubber stock tank.	Each	$274.42	1	$274.42

Practice: E300EAP1 - Existing Activity Payment-Land Use

Scenario: #7 - CSP EAP Cropland and Farmstead

Scenario Description:

This existing activity payment component (EAP1) provides a CSP participant with a payment for existing stewardship specific to the land uses included in the operation. This scenario covers the land uses cropland and farmstead.

Before Situation:

Producer implements conservation activities on cropland or farmstead to achieve a base level of stewardship.

After Situation:

Through participation in the CSP, the producer continues to maintain or improve the base level of stewardship assessed at the time of enrollment.

Feature Measure: Acre

Scenario Unit: Acres

Scenario Typical Size: 1.0

Scenario Total Cost: $7.50

Scenario Cost/Unit: $7.50

Cost Details:

Component Name	ID	Description	Unit	Cost	QTY	Total
Labor						
EAP - Cropland/Farmstead	2737	Existing Activity Payment for Cropland or Farmstead land use.	Acres	$7.50	1	$7.50

Practice: E300EAP1 - Existing Activity Payment-Land Use

Scenario: #23 - CSP EAP Pasture

Scenario Description:

This existing activity payment component (EAP1) provides a CSP participant with a payment for existing stewardship specific to the land uses included in the operation. This scenario covers the land use pasture.

Before Situation:

Producer implements conservation activities on pasture to achieve a base level of stewardship.

After Situation:

Through participation in the CSP, the producer continues to maintain or improve the base level of stewardship assessed at the time of enrollment.

Feature Measure: Acre

Scenario Unit: Acres

Scenario Typical Size: 1.0

Scenario Total Cost: $3.00

Scenario Cost/Unit: $3.00

Cost Details:

Component Name	ID	Description	Unit	Cost	QTY	Total
Labor						
EAP - Pasture	2738	Existing Activity Payment for Pasture land use.	Acres	$3.00	1	$3.00

Practice: E300EAP1 - Existing Activity Payment-Land Use

Scenario: #30 - CSP EAP Range

Scenario Description:

This existing activity payment component (EAP1) provides a CSP participant with a payment for existing stewardship specific to the land uses included in the operation. This scenario covers the land use range.

Before Situation:

Producer implements conservation activities on range to achieve a base level of stewardship.

After Situation:

Through participation in the CSP, the producer continues to maintain or improve the base level of stewardship assessed at the time of enrollment.

Feature Measure: Acre

Scenario Unit: Acres

Scenario Typical Size: 1.0

Scenario Total Cost: $1.00

Scenario Cost/Unit: $1.00

Cost Details:

Component Name	ID	Description	Unit	Cost	QTY	Total
Labor						
EAP - Range	2739	Existing Activity Payment for Range land use.	Acres	$1.00	1	$1.00

Practice: E300EAP1 - Existing Activity Payment-Land Use

Scenario: #46 - CSP EAP NIPF

Scenario Description:

This existing activity payment component (EAP1) provides a CSP participant with a payment for existing stewardship specific to the land uses included in the operation. This scenario covers the land uses non-industrial private forest land (NIPF).

Before Situation:

Producer implements conservation activities on NIPF to achieve a base level of stewardship.

After Situation:

Through participation in the CSP, the producer continues to maintain or improve the base level of stewardship assessed at the time of enrollment.

Feature Measure: Acre

Scenario Unit: Acres

Scenario Typical Size: 1.0

Scenario Total Cost: $0.50

Scenario Cost/Unit: $0.50

Cost Details:

Component Name	ID	Description	Unit	Cost	QTY	Total
Labor						
EAP - Non-Industrial Private Forestland (NIPF)	2740	Existing Activity Payment for Non-Industrial Private Forestland (NIPF).	Acres	$0.50	1	$0.50

Practice: E300EAP1 - Existing Activity Payment-Land Use

Scenario: #62 - CSP EAP AAL

Scenario Description:

This existing activity payment component (EAP1) provides a CSP participant with a payment for existing stewardship specific to the land uses included in the operation. This scenario covers the land use associated agricultural land (AAL).

Before Situation:

Producer implements conservation activities on AAL to achieve a base level of stewardship.

After Situation:

Through participation in the CSP, the producer continues to maintain or improve the base level of stewardship assessed at the time of enrollment.

Feature Measure: Acre

Scenario Unit: Acres

Scenario Typical Size: 1.0

Scenario Total Cost: $0.50

Scenario Cost/Unit: $0.50

Cost Details:

Component Name	ID	Description	Unit	Cost	QTY	Total
Labor						
EAP - Associated Agricultural Land (AAL)	2741	Existing Activity Payment for Associated Agricultural Land (AAL)	Acres	$0.50	1	$0.50

Practice: E300EAP2 - Existing Activity Payment-Resource Concern

Scenario: #7 - CSP EAP RC met at time of enrollment

Scenario Description:
This existing activity payment component (EAP2) provides a CSP participant with a payment for existing stewardship specific to the number of resource concerns met at the time of enrollment.

Before Situation:
Producer implements conservation activities across all land uses included in the operation to meet a minimum of two resource concerns at the time of enrollment.

After Situation:
Through participation in the CSP, the producer continues to maintain or improve the resource concerns met at the time of enrollment.

Feature Measure: Resource Concern Met

Scenario Unit: Number

Scenario Typical Size: 1.0

Scenario Total Cost: $300.00

Scenario Cost/Unit: $300.00

Cost Details:

Component Name	ID	Description	Unit	Cost	QTY	Total
Labor						
EAP - Resource Concern	2742	Existing Activity Payment for Resource Concern(s).	Number	$300.00	1	$300.00

Practice: E300GCI - Grassland Conservation Initiative

Scenario: #7 - Grassland Conservation Initiative Activity

Scenario Description:

The Grassland Conservation Initiative Activity assists producers in protecting grazing uses; conserving and improving soil, water, and wildlife resources; and achieving related conservation values by conserving eligible land through grassland conservation contracts. Producers participating in the GCI must agree to meet or exceed planning criteria for at least one of the priority resource concerns: Soil Erosion, Soil Quality Degradation, Water Quality Degradation, Fish and Wildlife Habitat Improvement, Air Quality Impacts, Degraded Plant Condition, and/or Livestock Production Limitation.

Before Situation:

Eligible base acres have been maintained and reported as grass, idle, or fallow for all years between January 2009 and December 2017.

After Situation:

Through participation in the GCI, the producer will meet or exceed the planning criteria for at least one priority resource concern by managing the enrolled land to maintain grassland values even if the producer chooses to plant a crop on the enrolled acres.

Feature Measure: Acres

Scenario Unit: Acres

Scenario Typical Size: 1.0

Scenario Total Cost: $18.00

Scenario Cost/Unit: $18.00

Cost Details:

Component Name	ID	Description	Unit	Cost	QTY	Total
Labor						
Grassland Conservation Initiative - Labor	2736	Labor to assist producers protect grazing uses through grassland conservation contracts.	Acres	$18.00	1	$18.00

Practice: E314A - Brush management to improve wildlife habitat

Scenario: #1 - Brush management to improve wildlife habitat

Scenario Description:

Brush management is employed to create a desired plant community, consistent with the related ecological site steady state, which will maintain or enhance the wildlife habitat desired for the identified wildlife species. It will be designed to provide plant structure, density and diversity needed to meet those habitat objectives. This enhancement does not apply to removal of woody vegetation by prescribed fire or removal of woody vegetation to facilitate a land use change.

Before Situation:

Resources are protected at the minimum level of the Conservation Practice Standard (CPS) 314 - Brush Management

After Situation:

The adoption of this enhancement will provide resource protection above the minimum level as described in Conservation Practice Standard (CPS) 314 - Brush Management

Feature Measure: Acre

Scenario Unit: Acres

Scenario Typical Size: 100.0

Scenario Total Cost: $1,904.65

Scenario Cost/Unit: $19.05

Cost Details:

Component Name	ID	Description	Unit	Cost	QTY	Total
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	$109.25	1	$109.25
Foregone Income						
FI, Grazing AUMs	2079	Grazing is the Primary Land Use	Animal Unit Month	$19.19	12	$230.28
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.	Hours	$37.19	32	$1,190.08
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.	Hours	$46.88	8	$375.04

Practice: E315A - Herbaceous weed treatment to create plant communities consistent with the ecological site

Scenario: #1 - Herbaceous weed treatment to create plant communities consistent with the ecological site

Scenario Description:

Mechanical, chemical, or biological, herbaceous weed treatment will be employed to control targeted, herbaceous weeds so as to create, release, or restore desired plant communities that are consistent with achievable, ecological site, steady state descriptions.

Before Situation:

Resources are protected at the minimum level of the Conservation Practice Standard (CPS) 315 - Herbaceous Weed Control

After Situation:

The adoption of this enhancement will provide resource protection above the minimum level as described in Conservation Practice Standard (CPS) 315 - Herbaceous Weed Control

Feature Measure: Acre

Scenario Unit: Acres

Scenario Typical Size: 10.0

Scenario Total Cost: $143.34

Scenario Cost/Unit: $14.33

Cost Details:

Component Name	ID	Description	Unit	Cost	QTY	Total
Equipment Installation						
Chemical, spot treatment, single stem application	964	Ground applied chemical to individual plants or group of plants, e.g., backpack sprayer treatment. Equipment and labor cost included.	Hours	$71.67	2	$143.34

Practice: E327A - Conservation cover for pollinators and beneficial insects

Scenario: #1 - Conservation cover for pollinators and beneficial insects

Scenario Description:

Seed or plug nectar and pollen producing plants in non-cropped areas such as field borders, vegetative barriers, contour buffer strips, grassed waterways, shelterbelts, hedgerows, windbreaks, conservation cover, and riparian forest and herbaceous buffers.

Before Situation:

Resources are protected at the minimum level of the Conservation Practice Standard (CPS) 327 - Conservation Cover

After Situation:

The adoption of this enhancement will provide resource protection above the minimum level as described in Conservation Practice Standard (CPS) 327 - Conservation Cover

Feature Measure: acre

Scenario Unit: Acres

Scenario Typical Size: 1.0

Scenario Total Cost: $153.10

Scenario Cost/Unit: $153.10

Cost Details:

Component Name	ID	Description	Unit	Cost	QTY	Total
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.	Hours	$37.19	1	$37.19
Materials						
Test, Soil Health, Basic Package	2734	Basic soil health laboratory assessment for soil organic carbon, aggregation, bioavailable nitrogen, respiration, and active carbon according to technical note 450-03. Includes shipping and handling.	Number	$115.91	1	$115.91

Practice: E327B - Establish Monarch butterfly habitat

Scenario: #1 - Establish Monarch butterfly habitat

Scenario Description:
Seed or plug milkweed (Asclepias spp.), and high-value monarch butterfly nectar plants on marginal cropland, field borders, contour buffer strips, and similar areas.

Before Situation:
Resources are protected at the minimum level of the Conservation Practice Standard (CPS) 327 - Conservation Cover

After Situation:
The adoption of this enhancement will provide resource protection above the minimum level as described in Conservation Practice Standard (CPS) 327 - Conservation Cover

Feature Measure: Acre

Scenario Unit: Acres

Scenario Typical Size: 1.0

Scenario Total Cost: $857.75

Scenario Cost/Unit: $857.75

Cost Details:

Component Name	ID	Description	Unit	Cost	QTY	Total
Equipment Installation						
Mower, Bush Hog	940	Equipment and power unit costs. Labor not included.	Hours	$50.43	1	$50.43
Chemical, spot treatment, single stem application	964	Ground applied chemical to individual plants or group of plants, e.g., backpack sprayer treatment. Equipment and labor cost included.	Hours	$71.67	2	$143.34
Cultipacking	1100	Includes equipment, power unit and labor costs.	Acres	$8.68	1	$8.68
Labor						
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.	Hours	$46.88	2	$93.76
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.	Hours	$102.76	1	$102.76
Materials						
Native Perennial Grasses, Legumes and/or Forb Mix for Targeted Wildlife/Pollinator Habitat or Ecological Restoration, moderate commercial availability	2619	Diverse mix of native perennial grasses, legumes and forbs, less than 50% grasses, may include biennials and a small percentage of annual species for establishment purposes and/or if allowed by the CPS. This is a mix composed of species required to meet specific wildlife/pollinator habitat or ecological requirements. Seed is moderately easy to purchase commercially. Includes materials and shipping.	Acres	$458.78	1	$458.78

Practice: E328A - Resource conserving crop rotation

Scenario: #1 - Resource conserving crop rotation

Scenario Description:

Establish a Resource Conserving Crop Rotation. Rotation must include AT LEAST one resource conserving crop as determined by the State Conservationist in a minimum three year crop rotation. The crop rotation will reduce soil erosion (water and wind), improve soil health, improve soil moisture efficiency, and reduce plant pest pressures.

Before Situation:

Resources are protected at the minimum level of the Conservation Practice Standard (CPS) 328 - Conservation Crop Rotation

After Situation:

The adoption of this enhancement will provide resource protection above the minimum level as described in Conservation Practice Standard (CPS) 328 - Conservation Crop Rotation

Feature Measure: Acre

Scenario Unit: Acres

Scenario Typical Size: 100.0

Scenario Total Cost: $1,438.64

Scenario Cost/Unit: $14.39

Cost Details:

Component Name	ID	Description	Unit	Cost	QTY	Total
Labor						
Specialist Labor	235	Labor requiring a specialized skill set: Includes Agronomists, Foresters, Biologists, etc. to provide additional technical information during the planning and implementation of the practice. Does not include NRCS or TSP services.	Hours	$102.76	14	$1,438.64

Practice: E328B - Improved resource conserving crop rotation

Scenario: #1 - Improved resource conserving crop rotation

Scenario Description:

Improve an existing Resource Conserving Crop Rotation. Must enrich an existing rotation which already includes AT LEAST one resource conserving crop as determined by the State Conservationist in a minimum three year crop rotation. The crop rotation will reduce soil erosion (water and wind), improve soil health, improve soil moisture efficiency, and reduce plant pest pressures.

Before Situation:

Resources are protected at the minimum level of the Conservation Practice Standard (CPS) 328 - Conservation Crop Rotation

After Situation:

The adoption of this enhancement will provide resource protection above the minimum level as described in Conservation Practice Standard (CPS) 328 - Conservation Crop Rotation

Feature Measure: Acre

Scenario Unit: Acres

Scenario Typical Size: 100.0

Scenario Total Cost: $513.80

Scenario Cost/Unit: $5.14

Cost Details:

Component Name	ID	Description	Unit	Cost	QTY	Total
Labor						
Specialist Labor	235	Labor requiring a specialized skill set: Includes Agronomists, Foresters, Biologists, etc. to provide additional technical information during the planning and implementation of the practice. Does not include NRCS or TSP services.	Hours	$102.76	5	$513.80

Practice: E328C - Conservation crop rotation on recently converted CRP grass/legume cover

Scenario: #1 - Conservation crop rotation on recently converted CRP grass/legume cover for water erosion

Scenario Description:

Implement a crop rotation management system on crop land acres that have recently converted from CRP grass/legume conservation cover to annual planted crops. Crop rotation minimizes disturbance resulting in a Soil Tillage Intensity Rating (STIR) less than 10 and reduces soil erosion from water or wind to below soil tolerance (T) level. The current NRCS wind and water erosion prediction technologies must be used to document the rotation, soil erosion estimate, and STIR calculations. *This enhancement is limited to acres where the conversion event took place not more than 2 years prior. Enhancement not applicable on hayland.

Before Situation:

Resources are protected at the minimum level of the Conservation Practice Standard (CPS) 328 - Conservation Crop Rotation

After Situation:

The adoption of this enhancement will provide resource protection above the minimum level as described in Conservation Practice Standard (CPS) 328 - Conservation Crop Rotation

Feature Measure: Acre

Scenario Unit: Acres

Scenario Typical Size: 100.0

Scenario Total Cost: $308.28

Scenario Cost/Unit: $3.08

Cost Details:

Component Name	ID	Description	Unit	Cost	QTY	Total
Labor						
Specialist Labor	235	Labor requiring a specialized skill set: Includes Agronomists, Foresters, Biologists, etc. to provide additional technical information during the planning and implementation of the practice. Does not include NRCS or TSP services.	Hours	$102.76	3	$308.28

Practice: E328D - Leave standing grain crops unharvested to benefit wildlife

Scenario: #1 - Leave standing grain crops unharvested to benefit wildlife

Scenario Description:
Implement a crop rotation which allows a portion of grain crops to be left in fields un-harvested to provide food and cover for wildlife during winter months.

Before Situation:
Resources are protected at the minimum level of the Conservation Practice Standard (CPS) 328 - Conservation Crop Rotation

After Situation:
The adoption of this enhancement will provide resource protection above the minimum level as described in Conservation Practice Standard (CPS) 328 - Conservation Crop Rotation

Feature Measure: Acre

Scenario Unit: Acres

Scenario Typical Size: 40.0

Scenario Total Cost: $173.78

Scenario Cost/Unit: $4.34

Cost Details:

Component Name	ID	Description	Unit	Cost	QTY	Total
Foregone Income						
FI, Corn Dryland	1959	Dryland Corn is Primary Crop	Acres	$270.47	0.17	$45.98
FI, Soybeans Dryland	1961	Dryland Soybeans is Primary Crop	Acres	$261.29	0.17	$44.42
FI, Wheat Dryland	1963	Dryland Wheat is Primary Crop	Acres	$214.72	0.17	$36.50
Labor						
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.	Hours	$46.88	1	$46.88

Practice: E328E - Soil health crop rotation

Scenario: #1 - Soil health crop rotation

Scenario Description:

Implement a crop rotation which addresses all four principle components of soil health: increases diversity of the cropping system; maintains residue throughout the year; keeps a living root; and minimizes soil chemical, physical and biological disturbance. The rotation will include at least 4 different crop and/or cover crop types (crop types include cool season grass, warm season grass, cool season broadleaf, warm season broadleaf) grown in a sequence that will produce a positive trend in the Organic Matter (OM) sub factor value over the life of the rotation, as determined by the Soil Conditioning Index (SCI). The current NRCS wind and water erosion prediction technologies must be used to document the rotation and SCI calculations.

Before Situation:

Resources are protected at the minimum level of the Conservation Practice Standard (CPS) 328 - Conservation Crop Rotation

After Situation:

The adoption of this enhancement will provide resource protection above the minimum level as described in Conservation Practice Standard (CPS) 328 - Conservation Crop Rotation

Feature Measure: Acre

Scenario Unit: Acres

Scenario Typical Size: 100.0

Scenario Total Cost: $513.80

Scenario Cost/Unit: $5.14

Cost Details:

Component Name	ID	Description	Unit	Cost	QTY	Total
Labor						
Specialist Labor	235	Labor requiring a specialized skill set: Includes Agronomists, Foresters, Biologists, etc. to provide additional technical information during the planning and implementation of the practice. Does not include NRCS or TSP services.	Hours	$102.76	5	$513.80

Practice: E328F - Modifications to improve soil health and increase soil organic matter

Scenario: #1 - Modifications to improve soil health and increase soil organic matter

Scenario Description:

Use of soil health assessment to evaluate impact of current conservation crop rotation in addressing soil organic matter depletion (primary assessment made in Year 1). Modifications to the crop rotation and/or crop management will be made as a result of the assessment results (adding a new crop and/or cover crop to the rotation; making changes to planting and/or tillage system, harvest timing of crops, or termination timing of cover crops). During Year 3 a follow up assessment will be completed to allow time for the modifications to show increased soil organic matter. Modified system must produce a positive trend in the Organic Matter (OM) sub factor value over the life of the rotation, as determined by the Soil Conditioning Index (SCI). The current NRCS wind and water erosion prediction technologies must be used to document the rotation and SCI calculations.

Before Situation:

Resources are protected at the minimum level of the Conservation Practice Standard (CPS) 328 - Conservation Crop Rotation

After Situation:

The adoption of this enhancement will provide resource protection above the minimum level as described in Conservation Practice Standard (CPS) 328 - Conservation Crop Rotation

Feature Measure: Acre

Scenario Unit: Acres

Scenario Typical Size: 100.0

Scenario Total Cost: $218.67

Scenario Cost/Unit: $2.19

Cost Details:

Component Name	ID	Description	Unit	Cost	QTY	Total
Labor						
Specialist Labor	235	Labor requiring a specialized skill set: Includes Agronomists, Foresters, Biologists, etc. to provide additional technical information during the planning and implementation of the practice. Does not include NRCS or TSP services.	Hours	$102.76	1	$102.76
Materials						
Test, Soil Health, Basic Package	2734	Basic soil health laboratory assessment for soil organic carbon, aggregation, bioavailable nitrogen, respiration, and active carbon according to technical note 450-03. Includes shipping and handling.	Number	$115.91	1	$115.91

Practice: E328G - Crop rotation on recently converted CRP grass/legume cover for soil organic matter improvement

Scenario: #1 - Crop rotation on recently converted CRP grass/legume cover for soil organic matter improvement

Scenario Description:

Crop rotation on acres converted, no more than 2 years prior, from CRP grass/legume cover to annual crops. Diverse rotation with living roots and residue cover throughout year and minimal disturbance. Enhancement not applicable on hayland.

Before Situation:

Resources are protected at the minimum level of the Conservation Practice Standard (CPS) 328 - Conservation Crop Rotation

After Situation:

The adoption of this enhancement will provide resource protection above the minimum level as described in Conservation Practice Standard (CPS) 328 - Conservation Crop Rotation

Feature Measure: Acre

Scenario Unit: Acres

Scenario Typical Size: 100.0

Scenario Total Cost: $513.80

Scenario Cost/Unit: $5.14

Cost Details:

Component Name	ID	Description	Unit	Cost	QTY	Total
Labor						
Specialist Labor	235	Labor requiring a specialized skill set: Includes Agronomists, Foresters, Biologists, etc. to provide additional technical information during the planning and implementation of the practice. Does not include NRCS or TSP services.	Hours	$102.76	5	$513.80

Practice: E328H - Conservation crop rotation to reduce the concentration of salts

Scenario: #1 - Conservation crop rotation to reduce the concentration of salts

Scenario Description:

Implement a crop rotation to reduce the concentration of salts and other chemicals from saline seeps. The rotation should include at least 3 crops and/or cover crops grown in a sequence in the recharge areas of saline seeps that have rooting depths and water requirements adequate to fully utilize all available soil water. Do not use summer fallow. Use an approved water balance procedure to determine crop selection and sequence. Select crops with a tolerance to salinity levels that match the salinity of the discharge area. (See state lists)

Before Situation:

Resources are protected at the minimum level of the Conservation Practice Standard (CPS) 328 - Conservation Crop Rotation

After Situation:

The adoption of this enhancement will provide resource protection above the minimum level as described in Conservation Practice Standard (CPS) 328 - Conservation Crop Rotation

Feature Measure: Acre

Scenario Unit: Acres

Scenario Typical Size: 100.0

Scenario Total Cost: $411.04

Scenario Cost/Unit: $4.11

Cost Details:

Component Name	ID	Description	Unit	Cost	QTY	Total
Labor						
Specialist Labor	235	Labor requiring a specialized skill set: Includes Agronomists, Foresters, Biologists, etc. to provide additional technical information during the planning and implementation of the practice. Does not include NRCS or TSP services.	Hours	$102.76	4	$411.04

Practice: E328I - Forage harvest to reduce water quality impacts by utilization of excess soil nutrients

Scenario: #1 - Forage harvest to reduce water quality impacts by utilization of excess soil nutrients

Scenario Description:

Establish a forage crop (single species or mix) following a primary annual crop to take up excess soil nutrients. Select forage known to effectively utilize and scavenge nutrients. Forage shall be harvested for forage, but not be grazed or burned.

Before Situation:

Resources are protected at the minimum level of the Conservation Practice Standard (CPS) 328 - Conservation Crop Rotation

After Situation:

The adoption of this enhancement will provide resource protection above the minimum level as described in Conservation Practice Standard (CPS) 328 - Conservation Crop Rotation

Feature Measure: Acres of Cropland with New Crop R

Scenario Unit: Acres

Scenario Typical Size: 100.0

Scenario Total Cost: $469.84

Scenario Cost/Unit: $4.70

Cost Details:

Component Name	ID	Description	Unit	Cost	QTY	Total
Labor						
Specialist Labor	235	Labor requiring a specialized skill set: Includes Agronomists, Foresters, Biologists, etc. to provide additional technical information during the planning and implementation of the practice. Does not include NRCS or TSP services.	Hours	$102.76	4	$411.04
Materials						
Test, Soil Test, Standard	299	Includes materials, shiping, labor, and equipment costs.	Each	$11.76	5	$58.80

Practice: E328J - Improved crop rotation to provide benefits to pollinators

Scenario: #1 - Improved crop rotation to provide benefits to pollinators

Scenario Description:

Improve the existing crop rotation by adding pollinator friendly crops into the rotation. The crop rotation shall include a minimum of three different crops in a minimum five year crop rotation. Each year, the pollinator friendly crop will be planted on a minimum of 5% of cropland acres contained within the agricultural operation. Use of insecticides is limited for the pollinator friendly crop.

Before Situation:

Resources are protected at the minimum level of the Conservation Practice Standard (CPS) 328 - Conservation Crop Rotation

After Situation:

The adoption of this enhancement will provide resource protection above the minimum level as described in Conservation Practice Standard (CPS) 328 - Conservation Crop Rotation

Feature Measure: Acres planted to pollinator rotation

Scenario Unit: Acres

Scenario Typical Size: 5.0

Scenario Total Cost: $411.04

Scenario Cost/Unit: $82.21

Cost Details:

Component Name	ID	Description	Unit	Cost	QTY	Total
Labor						
Specialist Labor	235	Labor requiring a specialized skill set: Includes Agronomists, Foresters, Biologists, etc. to provide additional technical information during the planning and implementation of the practice. Does not include NRCS or TSP services.	Hours	$102.76	4	$411.04

Practice: E328K - Multiple crop types to benefit wildlife

Scenario: #7 - Multiple crop types to benefit wildlife

Scenario Description:

Alternating crops in a systematic arrangement of strips across a field to provide diverse rotations of crops that provide wildlife food. At least two crops will be planted in adjacent strips a minimum of 0.5 acres in size.

Before Situation:

Resources are protected at the minimum level of the Conservation Practice Standard 328 - Conservation Crop Rotation.

After Situation:

The adoption of this enhancement will provide resource protection above the minimum level as described in Conservation Practice Standard 328 - Conservation Crop Rotation.

Feature Measure: Acres

Scenario Unit: Acres

Scenario Typical Size: 20.0

Scenario Total Cost: $102.76

Scenario Cost/Unit: $5.14

Cost Details:

Component Name	ID	Description	Unit	Cost	QTY	Total
Labor						
Specialist Labor	235	Labor requiring a specialized skill set: Includes Agronomists, Foresters, Biologists, etc. to provide additional technical information during the planning and implementation of the practice. Does not include NRCS or TSP services.	Hours	$102.76	1	$102.76

Practice: E329A - No till to reduce soil erosion

Scenario: #1 - No till to reduce soil erosion

Scenario Description:

Establish no till system to reduce sheet and rill erosion soil loss. Field(s) must have a soil loss at or below the soil tolerance (T) level for water and wind erosion for the crop rotation and a Soil Tillage Intensity Rating (STIR) of no greater than 10 for each crop in the planned rotation. The current NRCS wind and water erosion prediction technologies must be used to calculate soil loss and STIR.

Before Situation:

Resources are protected at the minimum level of the Conservation Practice Standard (CPS) 329 - Residue and Tillage Management - No-Till/ Strip Till/ Direct Seed

After Situation:

The adoption of this enhancement will provide resource protection above the minimum level as described in Conservation Practice Standard (CPS) 329 - Residue and Tillage Management - No-Till/ Strip Till/ Direct Seed

Feature Measure: Acre

Scenario Unit: Acres

Scenario Typical Size: 100.0

Scenario Total Cost: $308.28

Scenario Cost/Unit: $3.08

Cost Details:

Component Name	ID	Description	Unit	Cost	QTY	Total
Labor						
Specialist Labor	235	Labor requiring a specialized skill set: Includes Agronomists, Foresters, Biologists, etc. to provide additional technical information during the planning and implementation of the practice. Does not include NRCS or TSP services.	Hours	$102.76	3	$308.28

Practice: E329B - No till to reduce tillage induced particulate matter

Scenario: #1 - No till to reduce tillage induced particulate matter

Scenario Description:

Establish no till system to reduce tillage induced particulate matter. Field(s) must have a soil loss at or below the soil tolerance (T) level for the crop rotation and a Soil Tillage Intensity Rating (STIR) of no greater than 10 for each crop in the planned rotation. The current NRCS wind and water erosion prediction technologies must be used to document soil loss and STIR calculations.

Before Situation:

Resources are protected at the minimum level of the Conservation Practice Standard (CPS) 329 - Residue and Tillage Management - No-Till/ Strip Till/ Direct Seed

After Situation:

The adoption of this enhancement will provide resource protection above the minimum level as described in Conservation Practice Standard (CPS) 329 - Residue and Tillage Management - No-Till/ Strip Till/ Direct Seed

Feature Measure: Acre

Scenario Unit: Acres

Scenario Typical Size: 100.0

Scenario Total Cost: $308.28

Scenario Cost/Unit: $3.08

Cost Details:

Component Name	ID	Description	Unit	Cost	QTY	Total
Labor						
Specialist Labor	235	Labor requiring a specialized skill set: Includes Agronomists, Foresters, Biologists, etc. to provide additional technical information during the planning and implementation of the practice. Does not include NRCS or TSP services.	Hours	$102.76	3	$308.28

Practice: E329C - No till to increase plant-available moisture

Scenario: #1 - No till to increase plant-available moisture

Scenario Description:

Establish a no till system to increase plant-available moisture. Each crop in the crop rotation shall have a Soil Tillage Intensity Rating (STIR) of no greater than 20. The current NRCS wind and water erosion prediction technologies must be used to document STIR calculations. Maintain a minimum 60 percent surface residue cover throughout the year to reduce evaporation from the soil surface.

Before Situation:

Resources are protected at the minimum level of the Conservation Practice Standard (CPS) 329 - Residue and Tillage Management - No-Till/ Strip Till/ Direct Seed

After Situation:

The adoption of this enhancement will provide resource protection above the minimum level as described in Conservation Practice Standard (CPS) 329 - Residue and Tillage Management - No-Till/ Strip Till/ Direct Seed

Feature Measure: Acre

Scenario Unit: Acres

Scenario Typical Size: 100.0

Scenario Total Cost: $308.28

Scenario Cost/Unit: $3.08

Cost Details:

Component Name	ID	Description	Unit	Cost	QTY	Total
Labor						
Specialist Labor	235	Labor requiring a specialized skill set: Includes Agronomists, Foresters, Biologists, etc. to provide additional technical information during the planning and implementation of the practice. Does not include NRCS or TSP services.	Hours	$102.76	3	$308.28

Practice: E329D - No till system to increase soil health and soil organic matter content

Scenario: #1 - No till system to increase soil health and soil organic matter content

Scenario Description:

Establish a no till system to increase soil health and soil organic matter content. Each crop in the crop rotation shall have a Soil Tillage Intensity Rating (STIR) of no greater than 20. The crop rotation must achieve a soil conditioning index (SCI) of zero or higher. The current NRCS wind and water erosion prediction technologies must be used to document STIR and SCI calculations. Residue shall not be burned, grazed, or harvested.

Before Situation:

Resources are protected at the minimum level of the Conservation Practice Standard (CPS) 329 - Residue and Tillage Management - No-Till/ Strip Till/ Direct Seed

After Situation:

The adoption of this enhancement will provide resource protection above the minimum level as described in Conservation Practice Standard (CPS) 329 - Residue and Tillage Management - No-Till/ Strip Till/ Direct Seed

Feature Measure: Acre

Scenario Unit: Acres

Scenario Typical Size: 100.0

Scenario Total Cost: $411.04

Scenario Cost/Unit: $4.11

Cost Details:

Component Name	ID	Description	Unit	Cost	QTY	Total
Labor						
Specialist Labor	235	Labor requiring a specialized skill set: Includes Agronomists, Foresters, Biologists, etc. to provide additional technical information during the planning and implementation of the practice. Does not include NRCS or TSP services.	Hours	$102.76	4	$411.04

Practice: E329E - No till to reduce energy

Scenario: #1 - No till to reduce energy

Scenario Description:

Establish a no till system which reduces total energy consumption associated with field operations by at least 25% compared to current tillage system (benchmark). Each crop in the crop rotation shall have a Soil Tillage Intensity Rating (STIR) of no greater than 20. The current NRCS wind and water erosion prediction technologies must be used to document STIR calculations and energy consumption.

Before Situation:

Resources are protected at the minimum level of the Conservation Practice Standard (CPS) 329 - Residue and Tillage Management - No-Till/ Strip Till/ Direct Seed

After Situation:

The adoption of this enhancement will provide resource protection above the minimum level as described in Conservation Practice Standard (CPS) 329 - Residue and Tillage Management - No-Till/ Strip Till/ Direct Seed

Feature Measure: Acre

Scenario Unit: Acres

Scenario Typical Size: 100.0

Scenario Total Cost: $411.04

Scenario Cost/Unit: $4.11

Cost Details:

Component Name	ID	Description	Unit	Cost	QTY	Total
Labor						
Specialist Labor	235	Labor requiring a specialized skill set: Includes Agronomists, Foresters, Biologists, etc. to provide additional technical information during the planning and implementation of the practice. Does not include NRCS or TSP services.	Hours	$102.76	4	$411.04

Practice: E334A - Controlled traffic farming to reduce compaction

Scenario: #1 - Controlled traffic farming to reduce compaction

Scenario Description:

Establish a controlled traffic system where no more than 25% of the surface is tracked with heavy axel loads to minimize soil compaction. For row crops (e.g. corn in 30-inch rows) no tire should run on a row except for flotation tires on combines and/or fertilizer and lime spreading trucks. If wide flotation tires are used, they must be big enough that the inflation pressure will be below 18 psi to minimize compaction on trafficked rows.

Before Situation:

Resources are protected at the minimum level of the Conservation Practice Standard (CPS) 334 - Controlled Traffic Farming

After Situation:

The adoption of this enhancement will provide resource protection above the minimum level as described in Conservation Practice Standard (CPS) 334 - Controlled Traffic Farming

Feature Measure: Acre

Scenario Unit: Acres

Scenario Typical Size: 100.0

Scenario Total Cost: $789.40

Scenario Cost/Unit: $7.89

Cost Details:

Component Name	ID	Description	Unit	Cost	QTY	Total
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.	Hours	$27.56	10	$275.60
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.	Hours	$102.76	5	$513.80

Practice: E338A - Strategically planned, patch burning for grazing distribution and wildlife habitat

Scenario: #1 - Strategically planned, patch burning for grazing distribution and wildlife habitat

Scenario Description:

Patch burn grazing is the application of prescribed fires on portions of an identified grazing unit at different times of the year. Patch burn grazing allows grazing animals to select where they want to graze creating a mosaic of vegetation structures and diversity that will maintain or enhance the wildlife habitat desired for the identified wildlife species and maintain livestock production.

Before Situation:

Resources are protected at the minimum level of the Conservation Practice Standard (CPS) 338 - Prescribed Burning

After Situation:

The adoption of this enhancement will provide resource protection above the minimum level as described in Conservation Practice Standard (CPS) 338 - Prescribed Burning

Feature Measure: Acre

Scenario Unit: Acres

Scenario Typical Size: 100.0

Scenario Total Cost: $782.57

Scenario Cost/Unit: $7.83

Cost Details:

Component Name	ID	Description	Unit	Cost	QTY	Total
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	$109.25	1	$109.25
Equipment Installation						
Dozer, 140 HP	927	Track mounted Dozer with horsepower range of 125 to 160. Equipment and power unit costs. Labor not included.	Hours	$104.83	4	$419.32
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.	Hours	$27.56	2	$55.12
Equipment Operators, Heavy	233	Includes: Cranes, Hydraulic Excavators >=50 HP, Dozers, Paving Machines, Rock Trenchers, Trenchers >=12 in., Dump Trucks, Ag Equipment >=150 HP, Scrapers, Water Wagons.	Hours	$38.00	4	$152.00
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.	Hours	$46.88	1	$46.88

Practice: E338B - Short-interval burns to promote a healthy herbaceous plant community

Scenario: #1 - Short-interval burns to promote a healthy herbaceous plant community

Scenario Description:

The controlled use of fire is applied in a forest to restore fire-adapted plants while improving wildlife habitat, wildlife food supply, and reducing the risk of damage from intense, severe wildfires. The ideal interval between prescribed burns is not often achieved. To improve the effectiveness of prescribed burning, the frequency of prescribed burning is increased appropriately, for a specified time period, to help restore ecological conditions in forests and woodlands. Short return interval prescribed burning is used to regenerate desirable tree species, improve the condition of fire-adapted plants and native herbaceous vegetation, improve wildlife food supply, create wildlife habitat (snags and den/cavity trees), limit encroachment of competing vegetation including non-native species, and reduce the future risk of damage from intense, severe wildfires.

Before Situation:

The site has a mixture of woody sprouts and some herbaceous vegetation in the forest understory.

After Situation:

The site has a mixture of warm season perennial vegetation and cool-season annual forages. Grazing is occurring to manage the herbaceous vegetation and keep undesirable woody vegetation from occupying the forest understory.

Feature Measure: Acre

Scenario Unit: Acres

Scenario Typical Size: 40.0

Scenario Total Cost: $3,631.17

Scenario Cost/Unit: $90.78

Cost Details:

Component Name	ID	Description	Unit	Cost	QTY	Total
Equipment Installation						
Dozer, 80 HP	929	Track mounted Dozer with horsepower range of 60 to 90. Equipment and power unit costs. Labor not included.	Hours	$55.20	8	$441.60
Truck, water	1448	Water tanker truck. Equipment only. Labor not included.	Hours	$147.80	8	$1,182.40
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.	Hours	$27.56	24	$661.44
Equipment Operators, Heavy	233	Includes: Cranes, Hydraulic Excavators >=50 HP, Dozers, Paving Machines, Rock Trenchers, Trenchers >=12 in., Dump Trucks, Ag Equipment >=150 HP, Scrapers, Water Wagons.	Hours	$38.00	8	$304.00
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.	Hours	$46.88	8	$375.04
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.	Hours	$102.76	4	$411.04
Mobilization						
Mobilization, medium equipment	1139	Equipment with 70-150 HP or typical weights between 14,000 and 30,000 pounds.	Each	$255.65	1	$255.65

Practice: E338C - Sequential patch burning

Scenario: #1 - Sequential patch burning

Scenario Description:

Conduct prescribed under burning beneath a forest canopy (ground fire), burning a portion of the area each year to create a mosaic of vegetation in several stages of development, to provide a more diverse understory and contribute to wildlife habitat. The health of conifer and oak-conifer forests, particularly longleaf pine with a characteristic herbaceous understory, is dependent on fire or another means of controlling encroaching woody vegetation. A healthy longleaf or shortleaf pine, or pine-oak forest, can support a wide array of wildlife including pollinators and several endangered or threatened species.

Before Situation:

Resources are protected at the minimum level of the Conservation Practice Standard (CPS) 338 - Prescribed Burning

After Situation:

The adoption of this enhancement will provide resource protection above the minimum level as described in Conservation Practice Standard (CPS) 338 - Prescribed Burning

Feature Measure: Acre

Scenario Unit: Acres

Scenario Typical Size: 10.0

Scenario Total Cost: $1,694.91

Scenario Cost/Unit: $169.49

Cost Details:

Component Name	ID	Description	Unit	Cost	QTY	Total
Equipment Installation						
Truck, Pickup	939	Equipment and power unit costs. Labor not included.	Hours	$24.18	2	$48.36
All terrain vehicles, ATV	965	Includes equipment, power unit and labor costs.	Hours	$21.14	2	$42.28
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.	Hours	$14.01	2	$28.02
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.	Hours	$37.19	16	$595.04
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.	Hours	$27.56	2	$55.12
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.	Hours	$46.88	2	$93.76
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.	Hours	$102.76	3	$308.28
Materials						
Fuel, ignition fuel mixture	1596	Mixture of gasoline and diesel for ignition of prescribed burns. Materials only.	Gallons	$2.55	5	$12.75
Mobilization						
Mobilization, medium equipment	1139	Equipment with 70-150 HP or typical weights between 14,000 and 30,000 pounds.	Each	$255.65	2	$511.30

Practice: E340A - Cover crop to reduce soil erosion

Scenario: #1 - Cover crop to reduce soil erosion

Scenario Description:

Cover crop added to current crop rotation to reduce soil erosion from water and wind to below soil tolerance (T) level. Cover crops grown during critical erosion period(s). Species are selected that will have physical characteristics to provide adequate erosion protection.

Before Situation:

Resources are protected at the minimum level of the Conservation Practice Standard (CPS) 340 - Cover Crop

After Situation:

The adoption of this enhancement will provide resource protection above the minimum level as described in Conservation Practice Standard (CPS) 340 - Cover Crop

Feature Measure: Acre

Scenario Unit: Acres

Scenario Typical Size: 100.0

Scenario Total Cost: $688.79

Scenario Cost/Unit: $6.89

Cost Details:

Component Name	ID	Description	Unit	Cost	QTY	Total
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.	Hours	$37.19	1	$37.19
Materials						
Annual Grasses	2730	Annual grasses, one or more species, mostly introduced but may be native. Used for temporary cover or cover crops. Includes material and shipping.	Acres	$32.58	20	$651.60

Practice: E340B - Intensive cover cropping to increase soil health and soil organic matter content

Scenario: #1 - Intensive cover cropping to increase soil health and soil organic matter content

Scenario Description:

Implementation of cover crop mix to provide soil coverage during ALL non-crop production periods in an annual crop rotation. Cover crop shall not be harvested or burned. Planned crop rotation including cover crops and associated management activities must achieve a soil conditioning index (SCI) of zero or higher. The current NRCS wind and water erosion prediction technologies must be used to document SCI calculations.

Before Situation:

Resources are protected at the minimum level of the Conservation Practice Standard (CPS) 340 - Cover Crop

After Situation:

The adoption of this enhancement will provide resource protection above the minimum level as described in Conservation Practice Standard (CPS) 340 - Cover Crop

Feature Measure: Acre

Scenario Unit: Acres

Scenario Typical Size: 100.0

Scenario Total Cost: $1,164.52

Scenario Cost/Unit: $11.65

Cost Details:

Component Name	ID	Description	Unit	Cost	QTY	Total
Labor						
Specialist Labor	235	Labor requiring a specialized skill set: Includes Agronomists, Foresters, Biologists, etc. to provide additional technical information during the planning and implementation of the practice. Does not include NRCS or TSP services.	Hours	$102.76	2	$205.52
Materials						
Annual Grasses, Legumes or Forbs	2732	A mix of annual grasses, legumes and/or forbs, mostly introduced but may be native. Used for temporary cover or cover crops. Includes material and shipping.	Acres	$47.95	20	$959.00

Practice: E340C - Use of multi-species cover crops to improve soil health and increase soil organic matter

Scenario: #1 - Use of multi-species cover crops to improve soil health and increase soil organic matter

Scenario Description:

Implement a multi-species cover crop to add diversity and increase biomass production to improve soil health and increase soil organic matter. Cover crop mix must include a minimum of 4 different species. The cover crop mix will increase diversity of the crop rotation by including crop types currently missing, e.g. Cool Season Grass (CSG), Cool Season Broadleaves (CSB), Warm Season Grasses (WSG), Warm Season Broadleaves (WSB).

Before Situation:

Resources are protected at the minimum level of the Conservation Practice Standard (CPS) 340 - Cover Crop

After Situation:

The adoption of this enhancement will provide resource protection above the minimum level as described in Conservation Practice Standard (CPS) 340 - Cover Crop

Feature Measure: Acre

Scenario Unit: Acres

Scenario Typical Size: 100.0

Scenario Total Cost: $1,033.38

Scenario Cost/Unit: $10.33

Cost Details:

Component Name	ID	Description	Unit	Cost	QTY	Total
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.	Hours	$37.19	2	$74.38
Materials						
Annual Grasses, Legumes or Forbs	2732	A mix of annual grasses, legumes and/or forbs, mostly introduced but may be native. Used for temporary cover or cover crops. Includes material and shipping.	Acres	$47.95	20	$959.00

Practice: E340D - Intensive orchard/vineyard floor cover cropping to increase soil health

Scenario: #1 - Intensive orchard/vineyard floor cover cropping to increase soil health

Scenario Description:

Implement orchard or vineyard floor cover crops. Cover crop shall not be harvested, grazed, or burned. Must achieve a soil conditioning index of zero or higher and produce a positive trend in the Organic Matter subfactor over the life of the rotation.

Before Situation:

Resources are protected at the minimum level of the Conservation Practice Standard (CPS) 340 - Cover Crop

After Situation:

The adoption of this enhancement will provide resource protection above the minimum level as described in Conservation Practice Standard (CPS) 340 - Cover Crop

Feature Measure: Acre

Scenario Unit: Acres

Scenario Typical Size: 100.0

Scenario Total Cost: $1,033.38

Scenario Cost/Unit: $10.33

Cost Details:

Component Name	ID	Description	Unit	Cost	QTY	Total
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.	Hours	$37.19	2	$74.38
Materials						
Annual Grasses, Legumes or Forbs	2732	A mix of annual grasses, legumes and/or forbs, mostly introduced but may be native. Used for temporary cover or cover crops. Includes material and shipping.	Acres	$47.95	20	$959.00

Practice: E340E - Use of soil health assessment to assist with development of cover crop mix to improve soil health

Scenario: #1 - Use of soil health assessment to assist with development of cover crop mix to improve soil health

Scenario Description:

Soil health assessment (year 1) to evaluate current crop rotation in addressing soil organic matter depletion. Results are utilized to select a multi-species cover crop mix to add to the current crop rotation. Follow up assessment completed (year 3).

Before Situation:

Resources are protected at the minimum level of the Conservation Practice Standard (CPS) 340 - Cover Crop

After Situation:

The adoption of this enhancement will provide resource protection above the minimum level as described in Conservation Practice Standard (CPS) 340 - Cover Crop

Feature Measure: Acre

Scenario Unit: Acres

Scenario Typical Size: 100.0

Scenario Total Cost: $303.81

Scenario Cost/Unit: $3.04

Cost Details:

Component Name	ID	Description	Unit	Cost	QTY	Total
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.	Hours	$37.19	1	$37.19
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.	Hours	$102.76	1	$102.76
Materials						
Annual Grasses, Legumes or Forbs	2732	A mix of annual grasses, legumes and/or forbs, mostly introduced but may be native. Used for temporary cover or cover crops. Includes material and shipping.	Acres	$47.95	1	$47.95
Test, Soil Health, Basic Package	2734	Basic soil health laboratory assessment for soil organic carbon, aggregation, bioavailable nitrogen, respiration, and active carbon according to technical note 450-03. Includes shipping and handling.	Number	$115.91	1	$115.91

Practice: E340F - Cover crop to minimize soil compaction

Scenario: #1 - Cover crop to minimize soil compaction

Scenario Description:

Establish a cover crop mix that includes plants with both fibrous root and deep rooted systems. Fibrous to treat and prevent both near surface (0-4”) and deep (>4”) soil compaction and deep rooted to break up deep compacted soils. Cover crop shall not be harvested, grazed, or burned.

Before Situation:

Resources are protected at the minimum level of the Conservation Practice Standard (CPS) 340 - Cover Crop

After Situation:

The adoption of this enhancement will provide resource protection above the minimum level as described in Conservation Practice Standard (CPS) 340 - Cover Crop

Feature Measure: Acre

Scenario Unit: Acres

Scenario Typical Size: 100.0

Scenario Total Cost: $996.19

Scenario Cost/Unit: $9.96

Cost Details:

Component Name	ID	Description	Unit	Cost	QTY	Total
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.	Hours	$37.19	1	$37.19
Materials						
Annual Grasses, Legumes or Forbs	2732	A mix of annual grasses, legumes and/or forbs, mostly introduced but may be native. Used for temporary cover or cover crops. Includes material and shipping.	Acres	$47.95	20	$959.00

Practice: E340G - Cover crop to reduce water quality degradation by utilizing excess soil nutrients

Scenario: #1 - Cover crop to reduce water quality degradation by utilizing excess soil nutrients

Scenario Description:

Establish a cover crop mix to take up excess soil nutrients. Select cover crop species for their ability to effectively utilize nutrients. Terminate the cover crop as late as practical to maximize plant biomass production and nutrient uptake. Cover crop shall not be harvested, grazed, or burned.

Before Situation:

Resources are protected at the minimum level of the Conservation Practice Standard (CPS) 340 - Cover Crop

After Situation:

The adoption of this enhancement will provide resource protection above the minimum level as described in Conservation Practice Standard (CPS) 340 - Cover Crop

Feature Measure: Acre

Scenario Unit: Acres

Scenario Typical Size: 100.0

Scenario Total Cost: $996.19

Scenario Cost/Unit: $9.96

Cost Details:

Component Name	ID	Description	Unit	Cost	QTY	Total
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.	Hours	$37.19	1	$37.19
Materials						
Annual Grasses, Legumes or Forbs	2732	A mix of annual grasses, legumes and/or forbs, mostly introduced but may be native. Used for temporary cover or cover crops. Includes material and shipping.	Acres	$47.95	20	$959.00

Practice: E340H - Cover crop to suppress excessive weed pressures and break pest cycles

Scenario: #1 - Cover crop to suppress excessive weed pressures and break pest cycles

Scenario Description:

Establish a cover crop mix to suppress excessive weed pressures and break pest cycles. Select cover crop species for their life cycles, growth habits, and other biological, chemical and/or physical characteristics. Select cover crop species that do not harbor pests or diseases of subsequent crops in the rotation. Cover crop shall not be harvested, grazed, or burned.

Before Situation:

Resources are protected at the minimum level of the Conservation Practice Standard (CPS) 340 - Cover Crop

After Situation:

The adoption of this enhancement will provide resource protection above the minimum level as described in Conservation Practice Standard (CPS) 340 - Cover Crop

Feature Measure: Acre

Scenario Unit: Acres

Scenario Typical Size: 100.0

Scenario Total Cost: $1,033.38

Scenario Cost/Unit: $10.33

Cost Details:

Component Name	ID	Description	Unit	Cost	QTY	Total
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.	Hours	$37.19	2	$74.38
Materials						
Annual Grasses, Legumes or Forbs	2732	A mix of annual grasses, legumes and/or forbs, mostly introduced but may be native. Used for temporary cover or cover crops. Includes material and shipping.	Acres	$47.95	20	$959.00

Practice: E340I - Using cover crops for biological strip till

Scenario: #7 - Using cover crops for biological strip till

Scenario Description:

Establish alternating strips of cover crops in which one strip acts as a biological strip-tiller and the adjacent strip promotes soil health with high residue cover crops. This will facilitate planting of the subsequent cash crop into the biologically strip-tilled row without the need for mechanical disturbance.

Before Situation:

Resources are protected at the minimum level of the Conservation Practice Standard 340 - Cover Crop.

After Situation:

The adoption of this enhancement will provide protection above the minimum level as described in Conservation Practice Standard 340 - Cover Crop.

Feature Measure: Acres

Scenario Unit: Acres

Scenario Typical Size: 100.0

Scenario Total Cost: $1,144.95

Scenario Cost/Unit: $11.45

Cost Details:

Component Name	ID	Description	Unit	Cost	QTY	Total
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.	Hours	$37.19	5	$185.95
Materials						
Annual Grasses, Legumes or Forbs	2732	A mix of annual grasses, legumes and/or forbs, mostly introduced but may be native. Used for temporary cover or cover crops. Includes material and shipping.	Acres	$47.95	20	$959.00

Practice: E345A - Reduced tillage to reduce soil erosion

Scenario: #1 - Reduced tillage to reduce soil erosion

Scenario Description:

Establish a reduced tillage system to reduce soil loss. Field(s) must have a soil loss at or below the soil tolerance (T) level for water and wind erosion for the crop rotation and a Soil Tillage Intensity Rating (STIR) of no greater than 40 for each crop in the planned rotation. The current NRCS wind and water erosion prediction technologies must be used to calculate soil loss and STIR.

Before Situation:

Resources are protected at the minimum level of the Conservation Practice Standard (CPS) 345 - Residue and Tillage Management, Reduced Till

After Situation:

The adoption of this enhancement will provide resource protection above the minimum level as described in Conservation Practice Standard (CPS) 345 - Residue and Tillage Management, Reduced Till

Feature Measure: Acre

Scenario Unit: Acres

Scenario Typical Size: 100.0

Scenario Total Cost: $411.04

Scenario Cost/Unit: $4.11

Cost Details:

Component Name	ID	Description	Unit	Cost	QTY	Total
Labor						
Specialist Labor	235	Labor requiring a specialized skill set: Includes Agronomists, Foresters, Biologists, etc. to provide additional technical information during the planning and implementation of the practice. Does not include NRCS or TSP services.	Hours	$102.76	4	$411.04

Practice: E345B - Reduced tillage to reduce tillage induced particulate matter

Scenario: #1 - Reduced tillage to reduce tillage induced particulate matter

Scenario Description:

Establish a reduced tillage system to reduce tillage induced particulate matter. Field(s) must have a soil loss at or below the soil tolerance (T) level for the crop rotation and a Soil Tillage Intensity Rating (STIR) of no greater than 40 for each crop in the planned rotation. The current NRCS wind and water erosion prediction technologies must be used to document soil loss and STIR calculations.

Before Situation:

Resources are protected at the minimum level of the Conservation Practice Standard (CPS) 345 - Residue and Tillage Management, Reduced Till

After Situation:

The adoption of this enhancement will provide resource protection above the minimum level as described in Conservation Practice Standard (CPS) 345 - Residue and Tillage Management, Reduced Till

Feature Measure: Acre

Scenario Unit: Acres

Scenario Typical Size: 100.0

Scenario Total Cost: $308.28

Scenario Cost/Unit: $3.08

Cost Details:

Component Name	ID	Description	Unit	Cost	QTY	Total
Labor						
Specialist Labor	235	Labor requiring a specialized skill set: Includes Agronomists, Foresters, Biologists, etc. to provide additional technical information during the planning and implementation of the practice. Does not include NRCS or TSP services.	Hours	$102.76	3	$308.28

Practice: E345C - Reduced tillage to increase plant-available moisture

Scenario: #1 - Reduced tillage to increase plant-available moisture

Scenario Description:

Establish a reduced till system to increase plant-available moisture. Each crop in the crop rotation shall have a Soil Tillage Intensity Rating (STIR) of no greater than 80. The current NRCS wind and water erosion prediction technologies must be used to document STIR calculations. Maintain a minimum 60 percent surface residue cover throughout the year to reduce evaporation from the soil surface.

Before Situation:

Resources are protected at the minimum level of the Conservation Practice Standard (CPS) 345 - Residue and Tillage Management, Reduced Till

After Situation:

The adoption of this enhancement will provide resource protection above the minimum level as described in Conservation Practice Standard (CPS) 345 - Residue and Tillage Management, Reduced Till

Feature Measure: Acre

Scenario Unit: Acres

Scenario Typical Size: 100.0

Scenario Total Cost: $308.28

Scenario Cost/Unit: $3.08

Cost Details:

Component Name	ID	Description	Unit	Cost	QTY	Total
Labor						
Specialist Labor	235	Labor requiring a specialized skill set: Includes Agronomists, Foresters, Biologists, etc. to provide additional technical information during the planning and implementation of the practice. Does not include NRCS or TSP services.	Hours	$102.76	3	$308.28

Practice: E345D - Reduced tillage to increase soil health and soil organic matter content

Scenario: #1 - Reduced tillage to increase soil health and soil organic matter content

Scenario Description:

Establish a reduced till system to increase soil health and soil organic matter content. Each crop in the crop rotation shall have a Soil Tillage Intensity Rating (STIR) of no greater than 80. The crop rotation must achieve a soil conditioning index (SCI) of zero or higher and produce a positive trend in the Organic Matter (OM) subfactor over the life of the crop rotation. The current NRCS wind and water erosion prediction technologies must be used to document STIR and SCI calculations. Residue shall not be burned, grazed, or harvested.

Before Situation:

Resources are protected at the minimum level of the Conservation Practice Standard (CPS) 345 - Residue and Tillage Management, Reduced Till

After Situation:

The adoption of this enhancement will provide resource protection above the minimum level as described in Conservation Practice Standard (CPS) 345 - Residue and Tillage Management, Reduced Till

Feature Measure: Acre

Scenario Unit: Acres

Scenario Typical Size: 100.0

Scenario Total Cost: $411.04

Scenario Cost/Unit: $4.11

Cost Details:

Component Name	ID	Description	Unit	Cost	QTY	Total
Labor						
Specialist Labor	235	Labor requiring a specialized skill set: Includes Agronomists, Foresters, Biologists, etc. to provide additional technical information during the planning and implementation of the practice. Does not include NRCS or TSP services.	Hours	$102.76	4	$411.04

Practice: E345E - Reduced tillage to reduce energy use

Scenario: #1 - Reduced tillage to reduce energy use

Scenario Description:

Establish a reduced tillage system which reduces total energy consumption associated with field operations by at least 25% compared to conventional tillage systems (benchmark). Each crop in the crop rotation shall have a Soil Tillage Intensity Rating (STIR) of no greater than 80. The current NRCS wind and water erosion prediction technologies must be used to document STIR calculations and energy consumption.

Before Situation:

Resources are protected at the minimum level of the Conservation Practice Standard (CPS) 345 - Residue and Tillage Management, Reduced Till

After Situation:

The adoption of this enhancement will provide resource protection above the minimum level as described in Conservation Practice Standard (CPS) 345 - Residue and Tillage Management, Reduced Till

Feature Measure: Acre

Scenario Unit: Acres

Scenario Typical Size: 100.0

Scenario Total Cost: $308.28

Scenario Cost/Unit: $3.08

Cost Details:

Component Name	ID	Description	Unit	Cost	QTY	Total
Labor						
Specialist Labor	235	Labor requiring a specialized skill set: Includes Agronomists, Foresters, Biologists, etc. to provide additional technical information during the planning and implementation of the practice. Does not include NRCS or TSP services.	Hours	$102.76	3	$308.28

Practice: E374A - Install variable frequency drive(s) on pump(s)

Scenario: #1 - Install variable frequency drive(s) on pump(s)

Scenario Description:
Install Variable Frequency Drive(s) (VFD) on Pumping Plant (Conservation Practice Standard CPS 533) with the correct sensors, on all pumps indicated in the energy audit.

Before Situation:
Resources are protected at the minimum level of the Conservation Practice Standard (CPS) 374 - Farmstead Energy Improvement

After Situation:
The adoption of this enhancement will provide resource protection above the minimum level as described in Conservation Practice Standard (CPS) 374 - Farmstead Energy Improvement

Feature Measure: Each

Scenario Unit: Brake Horse Power

Scenario Typical Size: 50.0

Scenario Total Cost: $5,197.50

Scenario Cost/Unit: $103.95

Cost Details:

Component Name	ID	Description	Unit	Cost	QTY	Total
Materials						
Variable Speed Drive, 50 HP	1288	Variable speed drive for 50 Horsepower electric motor. Does not include motor. Materials only.	Horsepower	$103.95	50	$5,197.50

Practice: E374B - Switch fuel source for pump motor(s)

Scenario: #1 - Switch fuel source for pump motor(s)

Scenario Description:
Switch the fuel source for the pump motor(s) indicated in the energy audit to a renewable source (wind, solar, geothermal, etc.). (CPS 533 Pumping Plant)

Before Situation:
Resources are protected at the minimum level of the Conservation Practice Standard (CPS) 374 - Farmstead Energy Improvement

After Situation:
The adoption of this enhancement will provide resource protection above the minimum level as described in Conservation Practice Standard (CPS) 374 - Farmstead Energy Improvement

Feature Measure: Horsepower

Scenario Unit: Horsepower

Scenario Typical Size: 5.0

Scenario Total Cost: $14,549.96

Scenario Cost/Unit: $2,909.99

Cost Details:

Component Name	ID	Description	Unit	Cost	QTY	Total
Equipment Installation						
Truck, Pickup	939	Equipment and power unit costs. Labor not included.	Hours	$24.18	1	$24.18
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.	Hours	$37.19	12	$446.28
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.	Hours	$102.76	2	$205.52
Materials						
Pump, <= 5 HP, pump and motor, fixed cost portion	1009	Fixed cost portion of a pump less than or equal to 5 HP pump and motor. This portion is a base cost and is not dependant on horsepower. The total cost of any pump will include this fixed cost plus a variable cost portion. The completed pump and motor will include the motor and controls. Includes material and shipping only.	Each	$1,019.47	1	$1,019.47
Pump, <= 5 HP, pump and motor, variable cost portion	1010	Variable cost portion of a pump less than or equal to 5 HP pump and motor. This portion IS dependent on the total horsepower for the pump. The total cost of any pump will include this variable cost plus the fixed cost portion. The completed pump and motor will include the motor and controls. Includes material and shipping only.	Horsepower	$353.92	5	$1,769.60
Solar Panels, fixed cost portion	1031	Fixed cost portion of the Solar Panels. This portion is a base cost for all Solar Panels and is not dependant on KiloWatt. The total cost of any Solar Panels will include this fixed cost plus a variable cost portion. The completed Solar Panels will include all materials (electrical, controllers, service drops and etc). This cost will include material, labor and equipment.	Each	$273.31	5	$1,366.55
Solar Panels, variable cost portion	1135	Variable cost portion of the Solar Panels. This portion IS dependent on the total Kilowatt for the Solar Panels. The total cost of any Solar Panels will include this variable cost plus the fixed cost portion. The completed Solar Panels will include all materials (electrical, controllers, and service drop, etc). This cost will include material, labor and equipment.	Kilowatt	$2,429.59	4	$9,718.36

Practice: E376A - Modify field operations to reduce particulate matter

Scenario: #1 - Modify field operations to reduce particulate matter

Scenario Description:
Modify tillage and/or harvest operations to reduce particulates by at least 20 percent below the required levels.

Before Situation:
Resources are protected at the minimum level of the Conservation Practice Standard (CPS) 376 - Field Operations Emissions Reduction

After Situation:
The adoption of this enhancement will provide resource protection above the minimum level as described in Conservation Practice Standard (CPS) 376 - Field Operations Emissions Reduction

Feature Measure: Acre

Scenario Unit: Acres

Scenario Typical Size: 100.0

Scenario Total Cost: $308.28

Scenario Cost/Unit: $3.08

Cost Details:

Component Name	ID	Description	Unit	Cost	QTY	Total
Labor						
Specialist Labor	235	Labor requiring a specialized skill set: Includes Agronomists, Foresters, Biologists, etc. to provide additional technical information during the planning and implementation of the practice. Does not include NRCS or TSP services.	Hours	$102.76	3	$308.28

Practice: E381A - Silvopasture to improve wildlife habitat

Scenario: #1 - Silvopasture to improve wildlife habitat

Scenario Description:
Establishing a combination of trees or shrubs and compatible forages on the same acreage, providing forage, shade, and/or shelter for livestock that include a purpose of enhancing wildlife cover and shelter.

Before Situation:
Resources are protected at the minimum level of the Conservation Practice Standard (CPS) 381 - Silvopasture

After Situation:
The adoption of this enhancement will provide resource protection above the minimum level as described in Conservation Practice Standard (CPS) 381 - Silvopasture

Feature Measure: Acre

Scenario Unit: Acres

Scenario Typical Size: 100.0

Scenario Total Cost: $7,596.52

Scenario Cost/Unit: $75.97

Cost Details:

Component Name	ID	Description	Unit	Cost	QTY	Total
Equipment Installation						
Chemical, ground application	948	Chemical application performed by ground equipment. Includes equipment, power unit and labor costs.	Acres	$5.80	20	$116.00
Foregone Income						
FI, Grazing AUMs	2079	Grazing is the Primary Land Use	Animal Unit Month	$19.19	200	$3,838.00
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.	Hours	$27.56	16	$440.96
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.	Hours	$46.88	2	$93.76
Materials						
Herbicide, Glyphosate	334	A broad-spectrum, non-selective systemic herbicide. Refer to WIN-PST for product names and active ingredients. Includes materials and shipping only.	Acres	$9.21	20	$184.20
Shrub, Seedling, Large	1508	Bare root shrub seedling, 36 to 60 inches tall; includes tropical containerized seedlings larger than 20 cubic inches. Includes materials and shipping only.	Each	$2.82	200	$564.00
Tree, Conifer, Seedling, Large	1515	Containerized conifer seedlings, 15 or 20 cubic inches; or bare root conifer seedlings 2+1 (three-year old seedlings that grew two years in the original seedbed and another year in a transplant bed) or bare root seedlings 3+0 and older (three-year or older seedlings grown in their original seedbed, or transplanted seedlings). Includes materials and shipping only.	Each	$1.33	100	$133.00
Native Perennial Grasses, Low Density	2750	Native perennial grasses, may include a small percentage of annual species for establishment purposes and/or if allowed by the CPS. Planted at lower to medium density (40 pure live seeds/sq ft and less). Includes material and shipping.	Acres	$111.33	20	$2,226.60

Practice: E383A - Grazing-maintained fuel break to reduce the risk of fire

Scenario: #1 - Grazing-maintained fuel break to reduce the risk of fire

Scenario Description:

The area has existing fuel break(s) of 30 to 60 feet in width, supporting a mixture of woody sprouts and some herbaceous vegetation. Warm-season perennial vegetation will be established on the fuel breaks, and will be over-seeded with cool-season annual forages in the fall. Grazing will be managed on the fuel breaks to remove or modify the fine fuel vegetation, thus reducing the risk of fire spread from ground fires. Ground cover will be maintained to control soil erosion and facilitate prescribed burning.

Before Situation:

Resources are protected at the minimum level of the Conservation Practice Standard (CPS) 383 - Fuel Break

After Situation:

The adoption of this enhancement will provide resource protection above the minimum level as described in Conservation Practice Standard (CPS) 383 - Fuel Break

Feature Measure: Acre

Scenario Unit: Acres

Scenario Typical Size: 10.0

Scenario Total Cost: $2,375.88

Scenario Cost/Unit: $237.59

Cost Details:

Component Name	ID	Description	Unit	Cost	QTY	Total
Equipment Installation						
Fertilizer, ground application, dry bulk	950	Dry bulk fertilizer application performed by ground equipment. Includes equipment, power unit and labor costs.	Acres	$6.63	10	$66.30
Seeding Operation, No Till/Grass Drill	960	No Till drill or grass drill for seeding. Includes equipment, power unit and labor costs.	Acres	$21.92	10	$219.20
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.	Hours	$27.56	24	$661.44
Materials						
Nitrogen (N), Urea	71	Price per pound of N supplied by Urea. Price is not per pound of total product applied, no conversion is needed.	Pound	$0.47	1000	$470.00
Annual Grasses, Legumes or Forbs	2732	A mix of annual grasses, legumes and/or forbs, mostly introduced but may be native. Used for temporary cover or cover crops. Includes material and shipping.	Acres	$47.95	10	$479.50
Introduced Perennial Grasses, Legumes and/or Forbs, Low Density	2747	Introduced perennial grasses, legumes, and/or forbs, may include a small percentage of annual species for establishment purposes and/or if allowed by the CPS. Planted at lower to medium density (40 pure live seeds/sq ft and less). Includes material and shipping.	Acres	$30.75	10	$307.50
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	$171.94	1	$171.94

Practice: E384A - Biochar production from woody residue

Scenario: #1 - Biochar production from woody residue

Scenario Description:
Utilizes woody debris remaining after fuel reduction harvests or wildfires to create biochar. Biochar stores carbon and is a useful soil amendment that improves SOM and water-holding capacity.

Before Situation:
Resources are protected at the minimum level of the Conservation Practice Standard (CPS) 384 - Woody Residue Treatment

After Situation:
The adoption of this enhancement will provide resource protection above the minimum level as described in Conservation Practice Standard (CPS) 384 - Woody Residue Treatment

Feature Measure: Acre

Scenario Unit: Acres

Scenario Typical Size: 2.0

Scenario Total Cost: $13,285.52

Scenario Cost/Unit: $6,642.76

Cost Details:

Component Name	ID	Description	Unit	Cost	QTY	Total
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.	Hours	$62.17	40	$2,486.80
Chainsaw	937	Equipment and power unit costs. Labor not included.	Hours	$7.15	40	$286.00
Truck, Pickup	939	Equipment and power unit costs. Labor not included.	Hours	$24.18	15	$362.70
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.	Hours	$14.01	80	$1,120.80
Wood Processor	2680	Towable equipment used to cut and split wood, Daily rental rate. All materials and equipment included	Day	$240.00	5	$1,200.00
Biochar Kiln, open fire	2681	Open fire kiln or metal container used to produce biochar/charcoal production. Daily rental rate. Includes all material and equipment	Hours	$7.43	320	$2,377.60
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.	Hours	$27.56	120	$3,307.20
Equipment Operators, Light	232	Includes: Skid Steer Loaders, Hydraulic Excavators <50 HP, Trenchers <12 in., Ag Equipment <150 HP, Pickup Trucks, Forklifts, Mulchers	Hours	$27.87	40	$1,114.80
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.	Hours	$102.76	5	$513.80
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	$171.94	3	$515.82

Practice: E386A - Enhanced field borders to reduce soil erosion along the edge(s) of a field

Scenario: #1 - Enhanced field borders to reduce soil erosion along the edge(s) of a field

Scenario Description:
Enhance existing field borders to a width of at least 30 feet and establish a single species or mixture of species that provide a dense ground cover along the edge(s) of the field.

Before Situation:
Resources are protected at the minimum level of the Conservation Practice Standard (CPS) 386 - Field Border

After Situation:
The adoption of this enhancement will provide resource protection above the minimum level as described in Conservation Practice Standard (CPS) 386 - Field Border

Feature Measure: Acre

Scenario Unit: Acres

Scenario Typical Size: 1.0

Scenario Total Cost: $600.99

Scenario Cost/Unit: $600.99

Cost Details:

Component Name	ID	Description	Unit	Cost	QTY	Total
Equipment Installation						
Tillage, Light	945	Includes light disking (tandem) or field cultivator. Includes equipment, power unit and labor costs.	Acres	$10.68	1	$10.68
Chemical, ground application	948	Chemical application performed by ground equipment. Includes equipment, power unit and labor costs.	Acres	$5.80	1	$5.80
Seeding Operation, No Till/Grass Drill	960	No Till drill or grass drill for seeding. Includes equipment, power unit and labor costs.	Acres	$21.92	1	$21.92
Cultipacking	1100	Includes equipment, power unit and labor costs.	Acres	$8.68	1	$8.68
Foregone Income						
FI, Corn Dryland	1959	Dryland Corn is Primary Crop	Acres	$270.47	0.41	$110.89
FI, Soybeans Dryland	1961	Dryland Soybeans is Primary Crop	Acres	$261.29	0.36	$94.06
FI, Wheat Dryland	1963	Dryland Wheat is Primary Crop	Acres	$214.72	0.23	$49.39
Materials						
Introduced Perennial Grasses, Legumes and/or Forbs, Medium Density	2748	Introduced perennial grasses, legumes, and/or forbs, may include a small percentage of annual species for establishment purposes and/or if allowed by the CPS. Planted at medium to higher density (41-60 pure live seeds/sq ft). Includes material and shipping.	Acres	$43.92	1	$43.92
Mobilization						
Mobilization, medium equipment	1139	Equipment with 70-150 HP or typical weights between 14,000 and 30,000 pounds.	Each	$255.65	1	$255.65

Practice: E386B - Enhanced field borders to increase carbon storage along the edge(s) of the field

Scenario: #1 - Enhanced field borders to increase carbon storage along the edge(s) of the field

Scenario Description:
Enhance existing field borders to a width of at least 30 feet and establish a single species or mixture of species that provide a dense ground cover and dense rooting system along the edge(s) of the field.

Before Situation:
Resources are protected at the minimum level of the Conservation Practice Standard (CPS) 386 - Field Border

After Situation:
The adoption of this enhancement will provide resource protection above the minimum level as described in Conservation Practice Standard (CPS) 386 - Field Border

Feature Measure: Acre

Scenario Unit: Acres

Scenario Typical Size: 1.0

Scenario Total Cost: $680.52

Scenario Cost/Unit: $680.52

Cost Details:

Component Name	ID	Description	Unit	Cost	QTY	Total
Equipment Installation						
Tillage, Light	945	Includes light disking (tandem) or field cultivator. Includes equipment, power unit and labor costs.	Acres	$10.68	1	$10.68
Chemical, ground application	948	Chemical application performed by ground equipment. Includes equipment, power unit and labor costs.	Acres	$5.80	1	$5.80
Seeding Operation, No Till/Grass Drill	960	No Till drill or grass drill for seeding. Includes equipment, power unit and labor costs.	Acres	$21.92	1	$21.92
Cultipacking	1100	Includes equipment, power unit and labor costs.	Acres	$8.68	1	$8.68
Foregone Income						
FI, Corn Dryland	1959	Dryland Corn is Primary Crop	Acres	$270.47	0.41	$110.89
FI, Soybeans Dryland	1961	Dryland Soybeans is Primary Crop	Acres	$261.29	0.36	$94.06
FI, Wheat Dryland	1963	Dryland Wheat is Primary Crop	Acres	$214.72	0.23	$49.39
Materials						
Native and Introduced Perennial Grasses, Legumes and/or Forbs, Medium Density	2756	A mix of native and introduced perennial grasses, legumes, and/or forbs, grasses typically greater than 50% of the mix, may include a small percentage of annual species for establishment purposes and/or if allowed by the CPS. Planted at medium to high density (41-60 pure live seeds/sq ft). Includes material and shipping.	Acres	$123.45	1	$123.45
Mobilization						
Mobilization, medium equipment	1139	Equipment with 70-150 HP or typical weights between 14,000 and 30,000 pounds.	Each	$255.65	1	$255.65

Practice: E386C - Enhanced field borders to decrease particulate emissions along the edge(s) of the field

Scenario: #1 - Enhanced field borders to decrease particulate emissions along the edge(s) of the field

Scenario Description:
Enhance existing field borders to a width of at least 40 feet and establish a mixture of species that decrease the particulate emissions along the edge(s) of the field.

Before Situation:
Resources are protected at the minimum level of the Conservation Practice Standard (CPS) 386 - Field Border

After Situation:
The adoption of this enhancement will provide resource protection above the minimum level as described in Conservation Practice Standard (CPS) 386 - Field Border

Feature Measure: Acre

Scenario Unit: Acres

Scenario Typical Size: 1.0

Scenario Total Cost: $614.17

Scenario Cost/Unit: $614.17

Cost Details:

Component Name	ID	Description	Unit	Cost	QTY	Total
Equipment Installation						
Tillage, Light	945	Includes light disking (tandem) or field cultivator. Includes equipment, power unit and labor costs.	Acres	$10.68	1	$10.68
Chemical, ground application	948	Chemical application performed by ground equipment. Includes equipment, power unit and labor costs.	Acres	$5.80	1	$5.80
Seeding Operation, No Till/Grass Drill	960	No Till drill or grass drill for seeding. Includes equipment, power unit and labor costs.	Acres	$21.92	1	$21.92
Cultipacking	1100	Includes equipment, power unit and labor costs.	Acres	$8.68	1	$8.68
Foregone Income						
FI, Corn Dryland	1959	Dryland Corn is Primary Crop	Acres	$270.47	0.41	$110.89
FI, Soybeans Dryland	1961	Dryland Soybeans is Primary Crop	Acres	$261.29	0.36	$94.06
FI, Wheat Dryland	1963	Dryland Wheat is Primary Crop	Acres	$214.72	0.23	$49.39
Materials						
Introduced Perennial Grasses, Legumes and/or Forbs, High Density	2749	Introduced perennial grasses, legumes, and/or forbs, may include a small percentage of annual species for establishment purposes and/or if allowed by the CPS. Planted at high density (greater than 60 pure live seeds/sq ft). Includes material and shipping.	Acres	$57.10	1	$57.10
Mobilization						
Mobilization, medium equipment	1139	Equipment with 70-150 HP or typical weights between 14,000 and 30,000 pounds.	Each	$255.65	1	$255.65

Practice: E386D - Enhanced field borders to increase food for pollinators along the edge(s) of a field

Scenario: #1 - Enhanced field borders to increase food for pollinators along the edge(s) of a field

Scenario Description:
Enhance existing field borders to a width of at least 40 feet and establish a mixture of species that provide food for pollinators along the edge(s) of the field.

Before Situation:
Resources are protected at the minimum level of the Conservation Practice Standard (CPS) 386 - Field Border

After Situation:
The adoption of this enhancement will provide resource protection above the minimum level as described in Conservation Practice Standard (CPS) 386 - Field Border

Feature Measure: Acre

Scenario Unit: Acres

Scenario Typical Size: 1.0

Scenario Total Cost: $680.52

Scenario Cost/Unit: $680.52

Cost Details:

Component Name	ID	Description	Unit	Cost	QTY	Total
Equipment Installation						
Tillage, Light	945	Includes light disking (tandem) or field cultivator. Includes equipment, power unit and labor costs.	Acres	$10.68	1	$10.68
Chemical, ground application	948	Chemical application performed by ground equipment. Includes equipment, power unit and labor costs.	Acres	$5.80	1	$5.80
Seeding Operation, No Till/Grass Drill	960	No Till drill or grass drill for seeding. Includes equipment, power unit and labor costs.	Acres	$21.92	1	$21.92
Cultipacking	1100	Includes equipment, power unit and labor costs.	Acres	$8.68	1	$8.68
Foregone Income						
FI, Corn Dryland	1959	Dryland Corn is Primary Crop	Acres	$270.47	0.41	$110.89
FI, Soybeans Dryland	1961	Dryland Soybeans is Primary Crop	Acres	$261.29	0.36	$94.06
FI, Wheat Dryland	1963	Dryland Wheat is Primary Crop	Acres	$214.72	0.23	$49.39
Materials						
Native and Introduced Perennial Grasses, Legumes and/or Forbs, Medium Density	2756	A mix of native and introduced perennial grasses, legumes, and/or forbs, grasses typically greater than 50% of the mix, may include a small percentage of annual species for establishment purposes and/or if allowed by the CPS. Planted at medium to high density (41-60 pure live seeds/sq ft). Includes material and shipping.	Acres	$123.45	1	$123.45
Mobilization						
Mobilization, medium equipment	1139	Equipment with 70-150 HP or typical weights between 14,000 and 30,000 pounds.	Each	$255.65	1	$255.65

Practice: E386E - Enhanced field borders to increase wildlife food and habitat along the edge(s) of a field

Scenario: #1 - Enhanced field borders to increase wildlife food and habitat along the edge(s) of a field

Scenario Description:

Enhance existing field borders to a width of at least 40 feet and establish a mixture of species that provide wildlife food and habitat along the edge(s) of the field. The extended field border will also provide enhanced wildlife habitat continuity.

Before Situation:

Resources are protected at the minimum level of the Conservation Practice Standard (CPS) 386 - Field Border

After Situation:

The adoption of this enhancement will provide resource protection above the minimum level as described in Conservation Practice Standard (CPS) 386 - Field Border

Feature Measure: Acre

Scenario Unit: Acres

Scenario Typical Size: 1.0

Scenario Total Cost: $680.52

Scenario Cost/Unit: $680.52

Cost Details:

Component Name	ID	Description	Unit	Cost	QTY	Total
Equipment Installation						
Tillage, Light	945	Includes light disking (tandem) or field cultivator. Includes equipment, power unit and labor costs.	Acres	$10.68	1	$10.68
Chemical, ground application	948	Chemical application performed by ground equipment. Includes equipment, power unit and labor costs.	Acres	$5.80	1	$5.80
Seeding Operation, No Till/Grass Drill	960	No Till drill or grass drill for seeding. Includes equipment, power unit and labor costs.	Acres	$21.92	1	$21.92
Cultipacking	1100	Includes equipment, power unit and labor costs.	Acres	$8.68	1	$8.68
Foregone Income						
FI, Corn Dryland	1959	Dryland Corn is Primary Crop	Acres	$270.47	0.41	$110.89
FI, Soybeans Dryland	1961	Dryland Soybeans is Primary Crop	Acres	$261.29	0.36	$94.06
FI, Wheat Dryland	1963	Dryland Wheat is Primary Crop	Acres	$214.72	0.23	$49.39
Materials						
Native and Introduced Perennial Grasses, Legumes and/or Forbs, Medium Density	2756	A mix of native and introduced perennial grasses, legumes, and/or forbs, grasses typically greater than 50% of the mix, may include a small percentage of annual species for establishment purposes and/or if allowed by the CPS. Planted at medium to high density (41-60 pure live seeds/sq ft). Includes material and shipping.	Acres	$123.45	1	$123.45
Mobilization						
Mobilization, medium equipment	1139	Equipment with 70-150 HP or typical weights between 14,000 and 30,000 pounds.	Each	$255.65	1	$255.65

Practice: E390A - Increase riparian herbaceous cover width for sediment and nutrient reduction

Scenario: #1 - Increase riparian herbaceous cover width for sediment and nutrient reduction

Scenario Description:

Where an existing herbaceous riparian buffer is located along a river, stream, pond, lake, or other waterbody, increase the width of the buffer in order to allow a greater percentage of sediment and nutrient removal from surface and subsurface flows.

Before Situation:

Resources are protected at the minimum level of the Conservation Practice Standard (CPS) 390 - Riparian Herbaceous Cover

After Situation:

The adoption of this enhancement will provide resource protection above the minimum level as described in Conservation Practice Standard (CPS) 390 - Riparian Herbaceous Cover

Feature Measure: Acre

Scenario Unit: Acres

Scenario Typical Size: 2.0

Scenario Total Cost: $966.37

Scenario Cost/Unit: $483.18

Cost Details:

Component Name	ID	Description	Unit	Cost	QTY	Total
Equipment Installation						
Chemical, ground application	948	Chemical application performed by ground equipment. Includes equipment, power unit and labor costs.	Acres	$5.80	2	$11.60
Seeding Operation, No Till/Grass Drill	960	No Till drill or grass drill for seeding. Includes equipment, power unit and labor costs.	Acres	$21.92	2	$43.84
Foregone Income						
FI, Corn Dryland	1959	Dryland Corn is Primary Crop	Acres	$270.47	0.82	$221.79
FI, Soybeans Dryland	1961	Dryland Soybeans is Primary Crop	Acres	$261.29	0.72	$188.13
FI, Wheat Dryland	1963	Dryland Wheat is Primary Crop	Acres	$214.72	0.46	$98.77
Materials						
Herbicide, Imazapyr	336	Pre and post-emergent, non-selective herbicide for control of undesirable vegetation in non-crop areas. Refer to WIN-PST for product names and active ingredients. Includes materials and shipping only.	Acres	$42.07	2	$84.14
Native Perennial Grasses, Medium Density	2751	Native perennial grasses, may include a small percentage of annual species for establishment purposes and/or if allowed by the CPS. Planted at medium to higher density (41-60 pure live seeds/sq ft). Includes material and shipping.	Acres	$159.05	2	$318.10

Practice: E390B - Increase riparian herbaceous cover width to enhance wildlife habitat

Scenario: #1 - Increase riparian herbaceous cover width to enhance wildlife habitat

Scenario Description:

Where an existing herbaceous riparian buffer is located along a river, stream, pond, lake, or other waterbody, increase the diversity of native species, control invasive species, install fencing and relocate equipment operations, trails, and livestock, and increase the width of the buffer.

Before Situation:

Resources are protected at the minimum level of the Conservation Practice Standard (CPS) 390 - Riparian Herbaceous Cover

After Situation:

The adoption of this enhancement will provide resource protection above the minimum level as described in Conservation Practice Standard (CPS) 390 - Riparian Herbaceous Cover

Feature Measure: Acre

Scenario Unit: Acres

Scenario Typical Size: 4.0

Scenario Total Cost: $1,382.85

Scenario Cost/Unit: $345.71

Cost Details:

Component Name	ID	Description	Unit	Cost	QTY	Total
Equipment Installation						
Chemical, ground application	948	Chemical application performed by ground equipment. Includes equipment, power unit and labor costs.	Acres	$5.80	4	$23.20
Seeding Operation, No Till/Grass Drill	960	No Till drill or grass drill for seeding. Includes equipment, power unit and labor costs.	Acres	$21.92	2	$43.84
Foregone Income						
FI, Corn Dryland	1959	Dryland Corn is Primary Crop	Acres	$270.47	1	$270.47
FI, Soybeans Dryland	1961	Dryland Soybeans is Primary Crop	Acres	$261.29	1	$261.29
FI, Wheat Dryland	1963	Dryland Wheat is Primary Crop	Acres	$214.72	0.46	$98.77
Materials						
Herbicide, Imazapyr	336	Pre and post-emergent, non-selective herbicide for control of undesirable vegetation in non-crop areas. Refer to WIN-PST for product names and active ingredients. Includes materials and shipping only.	Acres	$42.07	4	$168.28
Native Perennial Grasses, Legumes and/or Forbs, Medium Density	2754	A mix of native perennial grasses, legumes, and/or forbs, grasses typically greater than 50% of the mix, mmay include a small percentage of annual species for establishment purposes and/or if allowed by the CPS. Planted at medium to higher density (41-60 pure live seeds/sq ft). Species typically easy to purchase. Includes material and shipping.	Acres	$258.50	2	$517.00

Practice: E391A - Increase riparian forest buffer width for sediment and nutrient reduction

Scenario: #1 - Increase riparian forest buffer width for sediment and nutrient reduction

Scenario Description:
Where an existing forested riparian area is located along a river, stream, pond, lake, or other waterbody, increase the width of the buffer in order to allow a greater percentage of sediment and nutrient removal from surface and subsurface flows.

Before Situation:
Resources are protected at the minimum level of the Conservation Practice Standard (CPS) 391 - Riparian Forest Buffer

After Situation:
The adoption of this enhancement will provide resource protection above the minimum level as described in Conservation Practice Standard (CPS) 391 - Riparian Forest Buffer

Feature Measure: Acre

Scenario Unit: Acres

Scenario Typical Size: 2.0

Scenario Total Cost: $4,130.97

Scenario Cost/Unit: $2,065.48

Cost Details:

Component Name	ID	Description	Unit	Cost	QTY	Total
Equipment Installation						
Truck, Pickup	939	Equipment and power unit costs. Labor not included.	Hours	$24.18	16	$386.88
Mower, Bush Hog	940	Equipment and power unit costs. Labor not included.	Hours	$50.43	2	$100.86
Chemical, ground application	948	Chemical application performed by ground equipment. Includes equipment, power unit and labor costs.	Acres	$5.80	2	$11.60
Tractor, agricultural, 60 HP	963	Agricultural tractor with horsepower range of 50 to 90. Equipment and power unit costs. Labor not included.	Hours	$23.10	4	$92.40
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.	Hours	$11.47	16	$183.52
Foregone Income						
FI, Corn Dryland	1959	Dryland Corn is Primary Crop	Acres	$270.47	0.82	$221.79
FI, Soybeans Dryland	1961	Dryland Soybeans is Primary Crop	Acres	$261.29	0.72	$188.13
FI, Wheat Dryland	1963	Dryland Wheat is Primary Crop	Acres	$214.72	0.46	$98.77
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.	Hours	$27.56	16	$440.96
Equipment Operators, Light	232	Includes: Skid Steer Loaders, Hydraulic Excavators <50 HP, Trenchers <12 in., Ag Equipment <150 HP, Pickup Trucks, Forklifts, Mulchers	Hours	$27.87	4	$111.48
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.	Hours	$46.88	4	$187.52
Materials						
Herbicide, Glyphosate	334	A broad-spectrum, non-selective systemic herbicide. Refer to WIN-PST for product names and active ingredients. Includes materials and shipping only.	Acres	$9.21	1	$9.21
Herbicide, Sulfometuron & metsulfuron	344	A residual sulfonylurea herbicide that kills broadleaf weeds and some annual grasses. It is a systemic compound with foliar and soil activity. Refer to WIN-PST for product names and active ingredients. Includes materials and shipping only.	Acres	$10.96	1	$10.96
Herbicide, Surfactant	1095	Surfactants reduce the surface tension of water to produce more uniform coverage and penetration of herbicides, and weed killers. Paraffin Based Petroleum Surfactant. Refer to WIN-PST for product names and active ingredients. Includes materials and shipping only.	Acres	$1.51	1	$1.51
Tree, Hardwood, Seedling, Medium	1510	Bare root hardwood seedlings 18 to 36 inches tall; includes tropical containerized seedlings of 10 to 20 cubic inches. Includes materials and shipping only.	Each	$1.52	872	$1,325.44

Tree shelter, solid tube type, 4 in. x 48 in.	1566	4 inch x 48 inch tree tube for protection from animal damage. Materials only.	Each	$4.22	100	$422.00
Stakes, wood, 1 in. x 1 in. x 48 in.	1578	1 in. x 1 in. x 48 in. wood stakes to fasten items in place. Includes materials only.	Each	$1.66	100	$166.00
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	$171.94	1	$171.94

Practice: E391B - Increase stream shading for stream temperature reduction

Scenario: #1 - Increase stream shading for stream temperature reduction

Scenario Description:
Riparian area tree canopy cover density is increased and the extent of the forested riparian area is increased to provide greater stream shading.

Before Situation:
Resources are protected at the minimum level of the Conservation Practice Standard (CPS) 391 - Riparian Forest Buffer

After Situation:
The adoption of this enhancement will provide resource protection above the minimum level as described in Conservation Practice Standard (CPS) 391 - Riparian Forest Buffer

Feature Measure: Acre

Scenario Unit: Acres

Scenario Typical Size: 2.0

Scenario Total Cost: $4,186.09

Scenario Cost/Unit: $2,093.04

Cost Details:

Component Name	ID	Description	Unit	Cost	QTY	Total
Equipment Installation						
Truck, Pickup	939	Equipment and power unit costs. Labor not included.	Hours	$24.18	16	$386.88
Mower, Bush Hog	940	Equipment and power unit costs. Labor not included.	Hours	$50.43	2	$100.86
Chemical, ground application	948	Chemical application performed by ground equipment. Includes equipment, power unit and labor costs.	Acres	$5.80	2	$11.60
Tractor, agricultural, 60 HP	963	Agricultural tractor with horsepower range of 50 to 90. Equipment and power unit costs. Labor not included.	Hours	$23.10	4	$92.40
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.	Hours	$11.47	16	$183.52
Foregone Income						
FI, Corn Dryland	1959	Dryland Corn is Primary Crop	Acres	$270.47	0.82	$221.79
FI, Soybeans Dryland	1961	Dryland Soybeans is Primary Crop	Acres	$261.29	0.72	$188.13
FI, Wheat Dryland	1963	Dryland Wheat is Primary Crop	Acres	$214.72	0.46	$98.77
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.	Hours	$27.56	18	$496.08
Equipment Operators, Light	232	Includes: Skid Steer Loaders, Hydraulic Excavators <50 HP, Trenchers <12 in., Ag Equipment <150 HP, Pickup Trucks, Forklifts, Mulchers	Hours	$27.87	4	$111.48
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.	Hours	$46.88	4	$187.52
Materials						
Herbicide, Glyphosate	334	A broad-spectrum, non-selective systemic herbicide. Refer to WIN-PST for product names and active ingredients. Includes materials and shipping only.	Acres	$9.21	1	$9.21
Herbicide, Sulfometuron & metsulfuron	344	A residual sulfonylurea herbicide that kills broadleaf weeds and some annual grasses. It is a systemic compound with foliar and soil activity. Refer to WIN-PST for product names and active ingredients. Includes materials and shipping only.	Acres	$10.96	1	$10.96
Herbicide, Surfactant	1095	Surfactants reduce the surface tension of water to produce more uniform coverage and penetration of herbicides, and weed killers. Paraffin Based Petroleum Surfactant. Refer to WIN-PST for product names and active ingredients. Includes materials and shipping only.	Acres	$1.51	1	$1.51
Tree, Hardwood, Seedling, Medium	1510	Bare root hardwood seedlings 18 to 36 inches tall; includes tropical containerized seedlings of 10 to 20 cubic inches. Includes materials and shipping only.	Each	$1.52	872	$1,325.44
Tree shelter, solid tube type, 4 in. x 48 in.	1566	4 inch x 48 inch tree tube for protection from animal damage. Materials only.	Each	$4.22	100	$422.00

Stakes, wood, 1 in. x 1 in. x 48 in.	1578	1 in. x 1 in. x 48 in. wood stakes to fasten items in place. Includes materials only.	Each	$1.66	100	$166.00
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	$171.94	1	$171.94

Practice: E391C - Increase riparian forest buffer width to enhance wildlife habitat

Scenario: #1 - Increase riparian forest buffer width to enhance wildlife habitat

Scenario Description:

Where an existing riparian forest buffer is located along a river, stream, pond, lake, or other waterbody, increase the diversity of native species, control invasive species, install fencing and relocate equipment operations, trails, and livestock to increase the functional width of the buffer.

Before Situation:

Resources are protected at the minimum level of the Conservation Practice Standard (CPS) 391 - Riparian Forest Buffer

After Situation:

The adoption of this enhancement will provide resource protection above the minimum level as described in Conservation Practice Standard (CPS) 391 - Riparian Forest Buffer

Feature Measure: Acre

Scenario Unit: Acres

Scenario Typical Size: 2.0

Scenario Total Cost: $4,186.09

Scenario Cost/Unit: $2,093.04

Cost Details:

Component Name	ID	Description	Unit	Cost	QTY	Total
Equipment Installation						
Truck, Pickup	939	Equipment and power unit costs. Labor not included.	Hours	$24.18	16	$386.88
Mower, Bush Hog	940	Equipment and power unit costs. Labor not included.	Hours	$50.43	2	$100.86
Chemical, ground application	948	Chemical application performed by ground equipment. Includes equipment, power unit and labor costs.	Acres	$5.80	2	$11.60
Tractor, agricultural, 60 HP	963	Agricultural tractor with horsepower range of 50 to 90. Equipment and power unit costs. Labor not included.	Hours	$23.10	4	$92.40
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.	Hours	$11.47	16	$183.52
Foregone Income						
FI, Corn Dryland	1959	Dryland Corn is Primary Crop	Acres	$270.47	0.82	$221.79
FI, Soybeans Dryland	1961	Dryland Soybeans is Primary Crop	Acres	$261.29	0.72	$188.13
FI, Wheat Dryland	1963	Dryland Wheat is Primary Crop	Acres	$214.72	0.46	$98.77
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.	Hours	$27.56	18	$496.08
Equipment Operators, Light	232	Includes: Skid Steer Loaders, Hydraulic Excavators <50 HP, Trenchers <12 in., Ag Equipment <150 HP, Pickup Trucks, Forklifts, Mulchers	Hours	$27.87	4	$111.48
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.	Hours	$46.88	4	$187.52
Materials						
Herbicide, Glyphosate	334	A broad-spectrum, non-selective systemic herbicide. Refer to WIN-PST for product names and active ingredients. Includes materials and shipping only.	Acres	$9.21	1	$9.21
Herbicide, Sulfometuron & metsulfuron	344	A residual sulfonylurea herbicide that kills broadleaf weeds and some annual grasses. It is a systemic compound with foliar and soil activity. Refer to WIN-PST for product names and active ingredients. Includes materials and shipping only.	Acres	$10.96	1	$10.96
Herbicide, Surfactant	1095	Surfactants reduce the surface tension of water to produce more uniform coverage and penetration of herbicides, and weed killers. Paraffin Based Petroleum Surfactant. Refer to WIN-PST for product names and active ingredients. Includes materials and shipping only.	Acres	$1.51	1	$1.51
Tree, Hardwood, Seedling, Medium	1510	Bare root hardwood seedlings 18 to 36 inches tall; includes tropical containerized seedlings of 10 to 20 cubic inches. Includes materials and shipping only.	Each	$1.52	872	$1,325.44

Tree shelter, solid tube type, 4 in. x 48 in.	1566	4 inch x 48 inch tree tube for protection from animal damage. Materials only.	Each	$4.22	100	$422.00
Stakes, wood, 1 in. x 1 in. x 48 in.	1578	1 in. x 1 in. x 48 in. wood stakes to fasten items in place. Includes materials only.	Each	$1.66	100	$166.00
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	$171.94	1	$171.94

Practice: E393A - Extend existing filter strip to reduce water quality impacts

Scenario: #1 - Extend existing filter strip to reduce water quality impacts

Scenario Description:

Extend existing filter strips for water quality protection. Extend the existing buffer for a total of 60 feet or more to enhance water quality functions. The extended buffers must be composed of at least 5 species of non-noxious, wildlife friendly grasses and/or perennial forbs best suited to site conditions. Include species that provide pollinator food and habitat where possible.

Before Situation:

Resources are protected at the minimum level of the Conservation Practice Standard (CPS) 393 - Filter Strip

After Situation:

The adoption of this enhancement will provide resource protection above the minimum level as described in Conservation Practice Standard (CPS) 393 - Filter Strip

Feature Measure: Acre

Scenario Unit: Acres

Scenario Typical Size: 1.0

Scenario Total Cost: $886.04

Scenario Cost/Unit: $886.04

Cost Details:

Component Name	ID	Description	Unit	Cost	QTY	Total
Equipment Installation						
Tillage, Light	945	Includes light disking (tandem) or field cultivator. Includes equipment, power unit and labor costs.	Acres	$10.68	1	$10.68
Chemical, ground application	948	Chemical application performed by ground equipment. Includes equipment, power unit and labor costs.	Acres	$5.80	1	$5.80
Seeding Operation, No Till/Grass Drill	960	No Till drill or grass drill for seeding. Includes equipment, power unit and labor costs.	Acres	$21.92	1	$21.92
Cultipacking	1100	Includes equipment, power unit and labor costs.	Acres	$8.68	1	$8.68
Foregone Income						
FI, Corn Dryland	1959	Dryland Corn is Primary Crop	Acres	$270.47	0.41	$110.89
FI, Soybeans Dryland	1961	Dryland Soybeans is Primary Crop	Acres	$261.29	0.36	$94.06
FI, Wheat Dryland	1963	Dryland Wheat is Primary Crop	Acres	$214.72	0.23	$49.39
Labor						
Specialist Labor	235	Labor requiring a specialized skill set: Includes Agronomists, Foresters, Biologists, etc. to provide additional technical information during the planning and implementation of the practice. Does not include NRCS or TSP services.	Hours	$102.76	2	$205.52
Materials						
Native and Introduced Perennial Grasses, Legumes and/or Forbs, Medium Density	2756	A mix of native and introduced perennial grasses, legumes, and/or forbs, grasses typically greater than 50% of the mix, may include a small percentage of annual species for establishment purposes and/or if allowed by the CPS. Planted at medium to high density (41-60 pure live seeds/sq ft). Includes material and shipping.	Acres	$123.45	1	$123.45
Mobilization						
Mobilization, medium equipment	1139	Equipment with 70-150 HP or typical weights between 14,000 and 30,000 pounds.	Each	$255.65	1	$255.65

Practice: E395A - Stream habitat improvement through placement of woody biomass

Scenario: #1 - Stream habitat improvement through placement of woody biomass

Scenario Description:
Flexible placement of wood (unanchored/unpinned) in small, 1st and 2nd order streams to improve stream habitat conditions for aquatic species and natural stream processes.

Before Situation:
Resources are protected at the minimum level of the Conservation Practice Standard (CPS) 395 - Stream Habitat Improvement and Management

After Situation:
The adoption of this enhancement will provide resource protection above the minimum level as described in Conservation Practice Standard (CPS) 395 - Stream Habitat Improvement and Management

Feature Measure: Bankfull width X Length

Scenario Unit: Acres

Scenario Typical Size: 1.0

Scenario Total Cost: $19,723.04

Scenario Cost/Unit: $19,723.04

Cost Details:

Component Name	ID	Description	Unit	Cost	QTY	Total
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.	Hours	$130.80	16	$2,092.80
Truck, dump, 12 CY	1215	Dump truck for moving bulk material. Typically capacity is 16 ton or 12 cubic yards. Includes equipment only.	Hours	$78.77	8	$630.16
Labor						
Equipment Operators, Heavy	233	Includes: Cranes, Hydraulic Excavators >=50 HP, Dozers, Paving Machines, Rock Trenchers, Trenchers >=12 in., Dump Trucks, Ag Equipment >=150 HP, Scrapers, Water Wagons.	Hours	$38.00	24	$912.00
Materials						
Aggregate, Sand, Graded, Washed	45	Sand, typical ASTM C33 gradation, includes materials, equipment and labor to transport and place	Cubic Yards	$43.40	20	$868.00
Aggregate, Gravel, Graded	46	Gravel, includes materials, equipment and labor to transport and place. Includes washed and unwashed gravel.	Cubic Yards	$45.42	30	$1,362.60
Compost	265	A mixture of decaying organic matter, as from leaves and manure, used to improve soil structure and provide nutrients.	Ton	$43.63	1	$43.63
Tree & Shrub, Woody, Cuttings, Large	1309	Woody pole cuttings or posts 2 to 6 inches in diameter and 6 ft. long. Includes materials and shipping only.	Each	$14.97	300	$4,491.00
Boulder	1761	Rock boulders (approximately 5 ft dia. 6.67 Tons) Inlcudes materials and delivery (up to 100 miles) only.	Ton	$66.53	40	$2,661.20
Steel, rebar	1832	Steel rebar, grade 60. Materials only.	Pound	$0.69	50	$34.50
Aggregate, river rock	1834	Well graded, rounded mineral substrates derived from local riverine settings. Includes materials and local delivery	Ton	$36.99	15	$554.85
Log, un-anchored	2035	Price of log picked up at the Mill. Includes material only.	Ton	$163.19	30	$4,895.70
Root Wad	2045	Tree stump buried into the streambank with the roots left exposed. Includes material only.	Ton	$10.02	20	$200.40
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	$488.10	2	$976.20

Practice: E399A - Fishpond management for native aquatic and terrestrial species

Scenario: #1 - Fishpond management for native aquatic and terrestrial species

Scenario Description:
Pond rehabilitation, buffer, and watershed management actions are taken to improve habitat for native species of fish, amphibians, and shorebirds.

Before Situation:
Resources are protected at the minimum level of the Conservation Practice Standard (CPS) 399 - Fishpond Management

After Situation:
The adoption of this enhancement will provide resource protection above the minimum level as described in Conservation Practice Standard (CPS) 399 - Fishpond Management

Feature Measure: Pond area + buffer area

Scenario Unit: Acres

Scenario Typical Size: 2.0

Scenario Total Cost: $2,667.79

Scenario Cost/Unit: $1,333.90

Cost Details:

Component Name	ID	Description	Unit	Cost	QTY	Total
Equipment Installation						
Truck, Pickup	939	Equipment and power unit costs. Labor not included.	Hours	$24.18	4	$96.72
Chemical, ground application	948	Chemical application performed by ground equipment. Includes equipment, power unit and labor costs.	Acres	$5.80	1	$5.80
Seeding Operation, No Till/Grass Drill	960	No Till drill or grass drill for seeding. Includes equipment, power unit and labor costs.	Acres	$21.92	1	$21.92
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.	Hours	$37.19	3	$111.57
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.	Hours	$27.56	32	$881.92
Materials						
Herbicide, Imazapyr	336	Pre and post-emergent, non-selective herbicide for control of undesirable vegetation in non-crop areas. Refer to WIN-PST for product names and active ingredients. Includes materials and shipping only.	Acres	$42.07	1	$42.07
Herbicide, Diquat dibromide	1820	Aquatic herbicide and plant growth regulator. Refer to WIN-PST for product names and active ingredients. Includes materials and shipping only.	Gallons	$77.35	1	$77.35
Native Aquatic Plants, Emergent or Submerged	2336	Native aquatic emergent or submerged. All required materials for establishing vegetation. Includes material and shipping.	Each	$1.00	1000	$1,000.00
Native Perennial Grasses, Legumes and/or Forbs, Medium Density	2754	A mix of native perennial grasses, legumes, and/or forbs, grasses typically greater than 50% of the mix, mmay include a small percentage of annual species for establishment purposes and/or if allowed by the CPS. Planted at medium to higher density (41-60 pure live seeds/sq ft). Species typically easy to purchase. Includes material and shipping.	Acres	$258.50	1	$258.50
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	$171.94	1	$171.94

Practice: E447A - Advanced Tailwater Recovery

Scenario: #7 - Advanced Tailwater Recovery

Scenario Description:

This enhancement is for a recovery system that capture 100% of excess irrigation and drainage runoff water from the contiguous land where the activity is implemented. Runoff water is conveyed through properly designed recovery ditches to a storage structure. Each recovery ditch and storage structure have adequate capacity to store excess irrigation water and reasonable runoff water. The system is designed to incorporate the collected water back into the delivery system so that excess water is reused. The system is fully automated to operate the recovery pumps, valves, and collection system. Key elements in the system are sensors that can evaluate data and operate devices through the system in opening/closing or on /off based on scientifically determined parameters.

Before Situation:

Resources are protected at the minimum level of the Conservation Practice Standard 447 - Irrigation System, Tailwater Recovery.

After Situation:

The adoption of this enhancement will provide resource protection above the minimum level as described in Conservation Practice Standard 447 - Irrigation System, Tailwater Recovery.

Feature Measure: Acres

Scenario Unit: Acres

Scenario Typical Size: 200.0

Scenario Total Cost: $1,737.28

Scenario Cost/Unit: $8.69

Cost Details:

Component Name	ID	Description	Unit	Cost	QTY	Total
Equipment Installation						
Truck, Pickup	939	Equipment and power unit costs. Labor not included.	Hours	$24.18	8	$193.44
All terrain vehicles, ATV	965	Includes equipment, power unit and labor costs.	Hours	$21.14	24	$507.36
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.	Hours	$27.56	24	$661.44
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.	Hours	$46.88	8	$375.04

Practice: E449A - Complete pumping plant evaluation for water savings

Scenario: #1 - Complete pumping plant evaluation for water savings

Scenario Description:

Evaluation of all pumping plants to determine the potential to rehabilitate/replace/reconfigure pump performance to improve water delivery efficiency 10% or more. Evaluate to determine if a Variable Frequency Drive motor controller(s) is recommended and the simple payback in terms of energy savings is less than 10 years.

Before Situation:

Resources are protected at the minimum level of the Conservation Practice Standard (CPS) 449 – Irrigation Water Management

After Situation:

The adoption of this enhancement will provide resource protection above the minimum level as described in the Conservation Practice Standard, (CPS) 449 – Irrigation Water Management.

Feature Measure: Acres

Scenario Unit: Acres

Scenario Typical Size: 640.0

Scenario Total Cost: $3,656.43

Scenario Cost/Unit: $5.71

Cost Details:

Component Name	ID	Description	Unit	Cost	QTY	Total
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.	Hours	$37.19	8	$297.52
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.	Hours	$102.76	32	$3,288.32
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	$70.59	1	$70.59

Practice: E449B - Alternated Wetting and Drying (AWD) of rice fields

Scenario: #1 - Alternated Wetting and Drying (AWD) of rice fields

Scenario Description:

Rice fields are drained and allowed to “dry down” to a saturated soil condition prior to re-flooding the field. System is installed in year 1 with Scenario E449144Z8 and this scenario used in years 2-5.

Before Situation:

Resources are protected at the minimum level of the conservation Practice Standard (CPS) 449 – Irrigation Water Management.

After Situation:

The adoption of this enhancement will provide resource protection above the minimum level as described in the Conservation Practice Standard (CPS) 449 – Irrigation Water Management.

Feature Measure: Acre

Scenario Unit: Acres

Scenario Typical Size: 40.0

Scenario Total Cost: $1,383.68

Scenario Cost/Unit: $34.59

Cost Details:

Component Name	ID	Description	Unit	Cost	QTY	Total
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.	Hours	$27.56	40	$1,102.40
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.	Hours	$46.88	6	$281.28

Practice: E484A - Mulching to improve soil health

Scenario: #1 - Mulching to improve soil health

Scenario Description:

Implement a crop rotation which utilizes mulch and addresses all four principle components of soil health: increases diversity of the cropping system; maintains residue throughout the year; keeps a living root; and minimizes soil chemical, physical and biological disturbance. Plant-based mulching materials will be applied at least once during the rotation. The rotation will include at least 4 different crops and/or cover crops grown in a sequence that will produce a positive trend in the Organic Matter (OM) subfactor value over the life of the rotation, as determined by the Soil Conditioning Index (SCI). The current NRCS wind and water erosion prediction technologies must be used to document the rotation and SCI calculations.

Before Situation:

Resources are protected at the minimum level of the Conservation Practice Standard (CPS) 484 - Mulching

After Situation:

The adoption of this enhancement will provide resource protection above the minimum level as described in Conservation Practice Standard (CPS) 484 - Mulching

Feature Measure: Acre

Scenario Unit: Acres

Scenario Typical Size: 100.0

Scenario Total Cost: $205.52

Scenario Cost/Unit: $2.06

Cost Details:

Component Name	ID	Description	Unit	Cost	QTY	Total
Labor						
Specialist Labor	235	Labor requiring a specialized skill set: Includes Agronomists, Foresters, Biologists, etc. to provide additional technical information during the planning and implementation of the practice. Does not include NRCS or TSP services.	Hours	$102.76	2	$205.52

Practice: E484B - Reduce particulate matter emissions by using orchard or vineyard generated woody materials as mulch

Scenario: #1 - Reduce particulate matter emissions by using orchard or vineyard generated woody materials as mulch

Scenario Description:

Reduce particulate matter emissions by using orchard or vineyard generated woody materials as mulch. At least 90% of all woody materials are to be used as mulch on the operation. An exception may be made when it is determined that infected material must be burned to preserve crop health.

Before Situation:

Resources are protected at the minimum level of the Conservation Practice Standard (CPS) 484 – Mulching

After Situation:

The adoption of this enhancement will provide resource protection above the minimum level as described in Conservation Practice Standard (CPS) 484 - Mulching

Feature Measure: Actual Acres of Crop producing Wo

Scenario Unit: Acres

Scenario Typical Size: 40.0

Scenario Total Cost: $631.52

Scenario Cost/Unit: $15.79

Cost Details:

Component Name	ID	Description	Unit	Cost	QTY	Total
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.	Hours	$27.56	8	$220.48
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.	Hours	$102.76	4	$411.04

Practice: E484C - Mulching with natural materials in specialty crops for weed control

Scenario: #7 - Mulching with natural materials in specialty crops for weed control

Scenario Description:
Application of straw mulch or other state approved natural material (such as wood chips, compost, green chop, dry hay or sawdust) for weed control in specialty crops.

Before Situation:
Resources are protected at the minimum level of the Conservation Practice Standard 484 - Mulching

After Situation:
The adoption of this enhancement will provide resource protection above the minimum level as described in Conservation Practice Standard 484 - Mulching

Feature Measure: Acres

Scenario Unit: Acres

Scenario Typical Size: 10.0

Scenario Total Cost: $392.10

Scenario Cost/Unit: $39.21

Cost Details:

Component Name	ID	Description	Unit	Cost	QTY	Total
Equipment Installation						
Tractor, agricultural, 60 HP	963	Agricultural tractor with horsepower range of 50 to 90. Equipment and power unit costs. Labor not included.	Hours	$23.10	2	$46.20
Mulcher, straw blower	1305	Straw bale mulcher/blower to mechanically spread small or large straw bales. Labor not included.	Hours	$44.95	2	$89.90
Labor						
Equipment Operators, Light	232	Includes: Skid Steer Loaders, Hydraulic Excavators <50 HP, Trenchers <12 in., Ag Equipment <150 HP, Pickup Trucks, Forklifts, Mulchers	Hours	$27.87	2	$55.74
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.	Hours	$102.76	1	$102.76
Materials						
Straw	1237	Small grain straw (non organic and certified organic). Includes materials only.	Ton	$65.00	1.5	$97.50

Practice: E511A - Harvest of crops (hay or small grains) using measures that allow desired species to flush or escape

Scenario: #1 - Harvest of crops (hay or small grains) using measures that allow desired species to flush or escape

Scenario Description:

Harvest of crops (hay or small grains) using conservation measures that allow desired species to flush or escape. (For species list see State Wildlife Action Plan) Conservation measures include timing of harvest, idling land during the nesting or fawning period, and applying harvest techniques that reduce mortality to wildlife.

Before Situation:

Resources are protected at the minimum level of the Conservation Practice Standard (CPS) 511 - Forage Harvest Management

After Situation:

The adoption of this enhancement will provide resource protection above the minimum level as described in Conservation Practice Standard (CPS) 511 - Forage Harvest Management

Feature Measure: Acre

Scenario Unit: Acres

Scenario Typical Size: 50.0

Scenario Total Cost: $180.42

Scenario Cost/Unit: $3.61

Cost Details:

Component Name	ID	Description	Unit	Cost	QTY	Total
Foregone Income						
FI, Hay, General Grass	2122	General Grass Hay is Primary Land Use	Ton	$30.49	1.67	$50.92
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.	Hours	$37.19	2	$74.38
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.	Hours	$27.56	2	$55.12

Practice: E511B - Forage harvest management that helps maintain wildlife habitat cover, shelter or continuity

Scenario: #1 - Forage harvest management that helps maintain wildlife habitat cover, shelter or continuity

Scenario Description:

The timely cutting and removal of forages from the field as hay, green-chop, or ensilage in such a way, and in time frames, to optimize both forage yield/quality and wildlife cover and shelter and/or continuity between otherwise disconnected habitats.

Before Situation:

Resources are protected at the minimum level of the Conservation Practice Standard (CPS) 511 - Forage Harvest Management

After Situation:

The adoption of this enhancement will provide resource protection above the minimum level as described in Conservation Practice Standard (CPS) 511 - Forage Harvest Management

Feature Measure: Acre

Scenario Unit: Acres

Scenario Typical Size: 100.0

Scenario Total Cost: $526.63

Scenario Cost/Unit: $5.27

Cost Details:

Component Name	ID	Description	Unit	Cost	QTY	Total
Foregone Income						
FI, Grazing AUMs	2079	Grazing is the Primary Land Use	Animal Unit Month	$19.19	25	$479.75
Labor						
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.	Hours	$46.88	1	$46.88

Practice: E512A - Cropland conversion to grass-based agriculture to reduce soil erosion

Scenario: #1 - Cropland conversion to grass-based agriculture to reduce soil erosion

Scenario Description:

Conversion of cropped land to grass-based agriculture to reduce soil erosion. Mixtures of perennial grasses, forbs, and legume species are established on cropland where annually-seeded cash crops have been grown.

Before Situation:

Resources are protected at the minimum level of the Conservation Practice Standard (CPS) 512 - Forage and Biomass Planting

After Situation:

The adoption of this enhancement will provide resource protection above the minimum level as described in Conservation Practice Standard (CPS) 512 - Forage and Biomass Planting

Feature Measure: Acre

Scenario Unit: Acres

Scenario Typical Size: 100.0

Scenario Total Cost: $708.76

Scenario Cost/Unit: $7.09

Cost Details:

Component Name	ID	Description	Unit	Cost	QTY	Total
Labor						
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.	Hours	$46.88	2	$93.76
Materials						
Introduced Perennial Grasses, Legumes and/or Forbs, Low Density	2747	Introduced perennial grasses, legumes, and/or forbs, may include a small percentage of annual species for establishment purposes and/or if allowed by the CPS. Planted at lower to medium density (40 pure live seeds/sq ft and less). Includes material and shipping.	Acres	$30.75	20	$615.00

Practice: E512B - Forage and biomass planting to reduce soil erosion or increase organic matter to build soil health

Scenario: #1 - Forage and biomass planting to reduce soil erosion or increase organic matter to build soil health

Scenario Description:

Establishing adapted and/or compatible species, varieties, or cultivars of herbaceous species suitable for pasture, hay, or biomass production that can provide for reduced soil erosion, improving soil health.

Before Situation:

Resources are protected at the minimum level of the Conservation Practice Standard (CPS) 512 - Forage and Biomass Planting

After Situation:

The adoption of this enhancement will provide resource protection above the minimum level as described in Conservation Practice Standard (CPS) 512 - Forage and Biomass Planting

Feature Measure: Acre

Scenario Unit: Acres

Scenario Typical Size: 100.0

Scenario Total Cost: $2,320.36

Scenario Cost/Unit: $23.20

Cost Details:

Component Name	ID	Description	Unit	Cost	QTY	Total
Labor						
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.	Hours	$46.88	2	$93.76
Materials						
Native Perennial Grasses, Low Density	2750	Native perennial grasses, may include a small percentage of annual species for establishment purposes and/or if allowed by the CPS. Planted at lower to medium density (40 pure live seeds/sq ft and less). Includes material and shipping.	Acres	$111.33	20	$2,226.60

Practice: E512C - Cropland conversion to grass for soil organic matter improvement

Scenario: #1 - Cropland conversion to grass for soil organic matter improvement

Scenario Description:

Conversion of cropped land to grass-based agriculture. Mixtures of perennial grasses, forbs, and/or legume species are established on cropland where annually-seeded cash crops have been grown.

Before Situation:

Resources are protected at the minimum level of the Conservation Practice Standard (CPS) 512 - Forage and Biomass Planting

After Situation:

The adoption of this enhancement will provide resource protection above the minimum level as described in Conservation Practice Standard (CPS) 512 - Forage and Biomass Planting

Feature Measure: Acre

Scenario Unit: Acres

Scenario Typical Size: 100.0

Scenario Total Cost: $1,081.16

Scenario Cost/Unit: $10.81

Cost Details:

Component Name	ID	Description	Unit	Cost	QTY	Total
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.	Hours	$27.56	2	$55.12
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.	Hours	$102.76	4	$411.04
Materials						
Introduced Perennial Grasses, Legumes and/or Forbs, Low Density	2747	Introduced perennial grasses, legumes, and/or forbs, may include a small percentage of annual species for establishment purposes and/or if allowed by the CPS. Planted at lower to medium density (40 pure live seeds/sq ft and less). Includes material and shipping.	Acres	$30.75	20	$615.00

Practice: E512D - Forage plantings that help increase organic matter in depleted soils

Scenario: #1 - Forage plantings that help increase organic matter in depleted soils

Scenario Description:

Establishing adapted and/or compatible species, varieties, or cultivars of herbaceous species suitable for pasture, hay, or biomass production that can help improve soil quality of depleted sites through increase or conservation of the organic matter in the soil.

Before Situation:

Resources are protected at the minimum level of the Conservation Practice Standard (CPS) 512 - Forage and Biomass Planting

After Situation:

The adoption of this enhancement will provide resource protection above the minimum level as described in Conservation Practice Standard (CPS) 512 - Forage and Biomass Planting

Feature Measure: Acre

Scenario Unit: Acres

Scenario Typical Size: 100.0

Scenario Total Cost: $1,188.51

Scenario Cost/Unit: $11.89

Cost Details:

Component Name	ID	Description	Unit	Cost	QTY	Total
Foregone Income						
FI, Grazing AUMs	2079	Grazing is the Primary Land Use	Animal Unit Month	$19.19	25	$479.75
Labor						
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.	Hours	$46.88	2	$93.76
Materials						
Introduced Perennial Grasses, Legumes and/or Forbs, Low Density	2747	Introduced perennial grasses, legumes, and/or forbs, may include a small percentage of annual species for establishment purposes and/or if allowed by the CPS. Planted at lower to medium density (40 pure live seeds/sq ft and less). Includes material and shipping.	Acres	$30.75	20	$615.00

Practice: E512E - Forage and biomass planting that produces feedstock for biofuels or energy production.

Scenario: #1 - Forage and biomass planting that produces feedstock for biofuels or energy production.

Scenario Description:

Conversion of cropped land to grass-based agriculture. Mixtures of perennial grasses, forbs, and/or legume species are established on cropland where annually-seeded cash crops have been grown.

Before Situation:

Resources are protected at the minimum level of the Conservation Practice Standard (CPS) 512 - Forage and Biomass Planting

After Situation:

The adoption of this enhancement will provide resource protection above the minimum level as described in Conservation Practice Standard (CPS) 512 - Forage and Biomass Planting

Feature Measure: Acre

Scenario Unit: Acres

Scenario Typical Size: 100.0

Scenario Total Cost: $5,772.02

Scenario Cost/Unit: $57.72

Cost Details:

Component Name	ID	Description	Unit	Cost	QTY	Total
Labor						
Specialist Labor	235	Labor requiring a specialized skill set: Includes Agronomists, Foresters, Biologists, etc. to provide additional technical information during the planning and implementation of the practice. Does not include NRCS or TSP services.	Hours	$102.76	2	$205.52
Materials						
Native Perennial Grasses, Low Density	2750	Native perennial grasses, may include a small percentage of annual species for establishment purposes and/or if allowed by the CPS. Planted at lower to medium density (40 pure live seeds/sq ft and less). Includes material and shipping.	Acres	$111.33	50	$5,566.50

Practice: E512F - Establishing native grass or legumes in forage base to improve the plant community

Scenario: #1 - Establishing native grass or legumes in forage base to improve the plant community

Scenario Description:

Establishing adapted and/or compatible species, varieties, or cultivars of perennial, herbaceous species that can provide the structure and composition needed to enhance livestock and wildlife habitat, particularly when targeted forage supply and quality, cover, and shelter are not available in other pastures.

Before Situation:

Resources are protected at the minimum level of the Conservation Practice Standard (CPS) 512 - Forage and Biomass Planting

After Situation:

The adoption of this enhancement will provide resource protection above the minimum level as described in Conservation Practice Standard (CPS) 512 - Forage and Biomass Planting

Feature Measure: Acre

Scenario Unit: Acres

Scenario Typical Size: 100.0

Scenario Total Cost: $1,912.26

Scenario Cost/Unit: $19.12

Cost Details:

Component Name	ID	Description	Unit	Cost	QTY	Total
Labor						
Specialist Labor	235	Labor requiring a specialized skill set: Includes Agronomists, Foresters, Biologists, etc. to provide additional technical information during the planning and implementation of the practice. Does not include NRCS or TSP services.	Hours	$102.76	1	$102.76
Materials						
Native Perennial Grasses, Legumes and/or Forbs, Low Density	2753	A mix of native perennial grasses, legumes, and/or forbs, grasses typically greater than 50% of the mix, may include a small percentage of annual species for establishment purposes and/or if allowed by the CPS. Planted at lower to medium density (40 pure live seeds/sq ft and less). Species typically easy to purchase. Includes material and shipping.	Acres	$180.95	10	$1,809.50

Practice: E512G - Native grasses or legumes in forage base

Scenario: #1 - Native grasses or legumes in forage base

Scenario Description:

Establishing adapted and/or compatible species, varieties, or cultivars of perennial, herbaceous species that can provide the structure and composition needed to enhance livestock and wildlife habitat, particularly when targeted forage supply and quality, cover, and shelter are not available in other pastures.

Before Situation:

Resources are protected at the minimum level of the Conservation Practice Standard (CPS) 512 - Forage and Biomass Planting

After Situation:

The adoption of this enhancement will provide resource protection above the minimum level as described in Conservation Practice Standard (CPS) 512 - Forage and Biomass Planting

Feature Measure: Acre

Scenario Unit: Acres

Scenario Typical Size: 100.0

Scenario Total Cost: $2,877.01

Scenario Cost/Unit: $28.77

Cost Details:

Component Name	ID	Description	Unit	Cost	QTY	Total
Labor						
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.	Hours	$46.88	2	$93.76
Materials						
Native Perennial Grasses, Low Density	2750	Native perennial grasses, may include a small percentage of annual species for establishment purposes and/or if allowed by the CPS. Planted at lower to medium density (40 pure live seeds/sq ft and less). Includes material and shipping.	Acres	$111.33	25	$2,783.25

Practice: E512H - Forage plantings that enhance bird habitat cover and shelter or structure and composition

Scenario: #1 - Forage plantings that enhance bird habitat cover and shelter or structure and composition

Scenario Description:

Establishing adapted and/or compatible species, varieties, or cultivars of herbaceous species suitable for pasture, hay, or biomass production that can provide cover and shelter or structure and composition to bird habitat.

Before Situation:

Resources are protected at the minimum level of the Conservation Practice Standard (CPS) 512 - Forage and Biomass Planting

After Situation:

The adoption of this enhancement will provide resource protection above the minimum level as described in Conservation Practice Standard (CPS) 512 - Forage and Biomass Planting

Feature Measure: Acre

Scenario Unit: Acres

Scenario Typical Size: 100.0

Scenario Total Cost: $2,659.38

Scenario Cost/Unit: $26.59

Cost Details:

Component Name	ID	Description	Unit	Cost	QTY	Total
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.	Hours	$37.19	2	$74.38
Materials						
Native Perennial Grasses, Legumes and/or Forbs, Medium Density	2754	A mix of native perennial grasses, legumes, and/or forbs, grasses typically greater than 50% of the mix, mmay include a small percentage of annual species for establishment purposes and/or if allowed by the CPS. Planted at medium to higher density (41-60 pure live seeds/sq ft). Species typically easy to purchase. Includes material and shipping.	Acres	$258.50	10	$2,585.00

Practice: E512I - Establish pollinator and/or beneficial insect and/or monarch habitat

Scenario: #1 - Establish pollinator and/or beneficial insect and/or monarch habitat

Scenario Description:

Establishing adapted and/or compatible species, varieties, or cultivars of herbaceous species that can provide nectar for Monarch butterflies and/or pollinators and forage and other habitat values for wildlife and livestock, particularly at times when targeted nectar, forage supply and quality, cover, and shelter are not available in other pastures.

Before Situation:

Resources are protected at the minimum level of the Conservation Practice Standard (CPS) 512 - Forage and Biomass Planting

After Situation:

The adoption of this enhancement will provide resource protection above the minimum level as described in Conservation Practice Standard (CPS) 512 - Forage and Biomass Planting

Feature Measure: Acre

Scenario Unit: Acres

Scenario Typical Size: 100.0

Scenario Total Cost: $2,790.52

Scenario Cost/Unit: $27.91

Cost Details:

Component Name	ID	Description	Unit	Cost	QTY	Total
Labor						
Specialist Labor	235	Labor requiring a specialized skill set: Includes Agronomists, Foresters, Biologists, etc. to provide additional technical information during the planning and implementation of the practice. Does not include NRCS or TSP services.	Hours	$102.76	2	$205.52
Materials						
Native Perennial Grasses, Legumes and/or Forbs, Medium Density	2754	A mix of native perennial grasses, legumes, and/or forbs, grasses typically greater than 50% of the mix, mmay include a small percentage of annual species for establishment purposes and/or if allowed by the CPS. Planted at medium to higher density (41-60 pure live seeds/sq ft). Species typically easy to purchase. Includes material and shipping.	Acres	$258.50	10	$2,585.00

Practice: E512J - Establish wildlife corridors to provide habitat continuity or access to water

Scenario: #1 - Establish wildlife corridors to provide habitat continuity or access to water

Scenario Description:

Establishing adapted and/or compatible species, varieties, or cultivars of perennial, herbaceous species that can provide cover needed for wildlife species of concern to move from food/cover/water sources to other food/cover/water sources as needed for their life cycles, and/or to enhance the utility of underused wildlife habitat areas.

Before Situation:

Resources are protected at the minimum level of the Conservation Practice Standard (CPS) 512 - Forage and Biomass Planting

After Situation:

The adoption of this enhancement will provide resource protection above the minimum level as described in Conservation Practice Standard (CPS) 512 - Forage and Biomass Planting

Feature Measure: Acre

Scenario Unit: Acres

Scenario Typical Size: 100.0

Scenario Total Cost: $1,686.81

Scenario Cost/Unit: $16.87

Cost Details:

Component Name	ID	Description	Unit	Cost	QTY	Total
Foregone Income						
FI, Grazing AUMs	2079	Grazing is the Primary Land Use	Animal Unit Month	$19.19	25	$479.75
Labor						
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.	Hours	$46.88	2	$93.76
Materials						
Native Perennial Grasses, Low Density	2750	Native perennial grasses, may include a small percentage of annual species for establishment purposes and/or if allowed by the CPS. Planted at lower to medium density (40 pure live seeds/sq ft and less). Includes material and shipping.	Acres	$111.33	10	$1,113.30

Practice: E528A - Maintaining quantity and quality of forage for animal health and productivity

Scenario: #1 - Maintaining quantity and quality of forage for animal health and productivity

Scenario Description:

Managing the harvest of vegetation with grazing and/or browsing animals for the purposes of maintaining desired pasture composition/plant vigor and improving/maintaining quantity and quality of forage for the animals' health and productivity following the recommendations of a qualifying professional, as detailed in the documentation and implementation requirements.

Before Situation:

Resources are protected at the minimum level of the Conservation Practice Standard (CPS) 528 - Prescribed Grazing

After Situation:

The adoption of this enhancement will provide resource protection above the minimum level as described in Conservation Practice Standard (CPS) 528 - Prescribed Grazing

Feature Measure: Acre

Scenario Unit: Acres

Scenario Typical Size: 1,000.0

Scenario Total Cost: $3,915.64

Scenario Cost/Unit: $3.92

Cost Details:

Component Name	ID	Description	Unit	Cost	QTY	Total
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	$109.25	1	$109.25
Equipment Installation						
Truck, Pickup	939	Equipment and power unit costs. Labor not included.	Hours	$24.18	4	$96.72
All terrain vehicles, ATV	965	Includes equipment, power unit and labor costs.	Hours	$21.14	12	$253.68
Foregone Income						
FI, Grazing AUMs	2079	Grazing is the Primary Land Use	Animal Unit Month	$19.19	36	$690.84
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.	Hours	$27.56	17	$468.52
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.	Hours	$46.88	2	$93.76
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.	Hours	$102.76	12	$1,233.12
Materials						
Wire, Polywire	8	Wire, Polywire for electric fence - 1,300 ft. Includes materials and shipping only.	Each	$56.51	1	$56.51
Electric, Energizer, Solar	27	Electric, Energizer, Solar for electric fence. Includes materials and shipping only.	Each	$361.86	1	$361.86
Tank, Polyethylene, 300 gallon	291	Portable heavy duty rubber stock tank.	Each	$274.42	1	$274.42
Nutritional Balance Analyzer, fecal sample analysis only	1127	NIRS fecal analysis, animal performance report. Includes materials and shipping only.	Each	$46.16	6	$276.96

Practice: E528B - Grazing management that improves monarch butterfly habitat

Scenario: #1 - Grazing management that improves monarch butterfly habitat

Scenario Description:

Implement a grazing management plan that will increase the abundance and diversity of monarch nectar-producing perennial forbs, including milkweed, while maintaining ecosystem benefits for other wildlife and livestock.

Before Situation:

Resources are protected at the minimum level of the Conservation Practice Standard (CPS) 528 - Prescribed Grazing

After Situation:

The adoption of this enhancement will provide resource protection above the minimum level as described in Conservation Practice Standard (CPS) 528 - Prescribed Grazing

Feature Measure: Acre

Scenario Unit: Acres

Scenario Typical Size: 100.0

Scenario Total Cost: $1,011.90

Scenario Cost/Unit: $10.12

Cost Details:

Component Name	ID	Description	Unit	Cost	QTY	Total
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	$109.25	1	$109.25
Foregone Income						
FI, Grazing AUMs	2079	Grazing is the Primary Land Use	Animal Unit Month	$19.19	2.5	$47.98
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.	Hours	$27.56	1	$27.56
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.	Hours	$46.88	1	$46.88
Materials						
Wire, Polywire	8	Wire, Polywire for electric fence - 1,300 ft. Includes materials and shipping only.	Each	$56.51	1	$56.51
Electric, Energizer, Solar	27	Electric, Energizer, Solar for electric fence. Includes materials and shipping only.	Each	$361.86	2	$723.72

Practice: E528C - Incorporating wildlife refuge areas in contingency plans for wildlife.

Scenario: #1 - Incorporating wildlife refuge areas in contingency plans for wildlife.

Scenario Description:

A prescribed grazing plan that includes 12 month (or longer) rest (non-grazing period equal or greater than one year) of a grazing unit that consists of native grasses and/or legumes and/or perennial forbs for the purpose of meeting the needs for drought/disaster contingency plans that will also provide wildlife habitat or wildlife access to water for a period of time.

Before Situation:

Resources are protected at the minimum level of the Conservation Practice Standard (CPS) 528 - Prescribed Grazing

After Situation:

The adoption of this enhancement will provide resource protection above the minimum level as described in Conservation Practice Standard (CPS) 528 - Prescribed Grazing

Feature Measure: Acre

Scenario Unit: Acres

Scenario Typical Size: 100.0

Scenario Total Cost: $1,748.86

Scenario Cost/Unit: $17.49

Cost Details:

Component Name	ID	Description	Unit	Cost	QTY	Total
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	$109.25	1	$109.25
Equipment Installation						
Truck, Pickup	939	Equipment and power unit costs. Labor not included.	Hours	$24.18	2	$48.36
All terrain vehicles, ATV	965	Includes equipment, power unit and labor costs.	Hours	$21.14	6	$126.84
Foregone Income						
FI, Grazing AUMs	2079	Grazing is the Primary Land Use	Animal Unit Month	$19.19	15	$287.85
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.	Hours	$27.56	8	$220.48
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.	Hours	$46.88	2	$93.76
Materials						
Wire, Polywire	8	Wire, Polywire for electric fence - 1,300 ft. Includes materials and shipping only.	Each	$56.51	4	$226.04
Electric, Energizer, Solar	27	Electric, Energizer, Solar for electric fence. Includes materials and shipping only.	Each	$361.86	1	$361.86
Tank, Polyethylene, 300 gallon	291	Portable heavy duty rubber stock tank.	Each	$274.42	1	$274.42

Practice: E528D - Grazing management for improving quantity and quality of food or cover and shelter for wildlife

Scenario: #1 - Grazing management for improving quantity and quality of food or cover and shelter for wildlife

Scenario Description:

Grazing management employed will provide the plant structure, density and diversity needed for improving the quantity and quality of cover, shelter and food for the desired wildlife species of concern.

Before Situation:

Resources are protected at the minimum level of the Conservation Practice Standard (CPS) 528 - Prescribed Grazing

After Situation:

The adoption of this enhancement will provide resource protection above the minimum level as described in Conservation Practice Standard (CPS) 528 - Prescribed Grazing

Feature Measure: Acre

Scenario Unit: Acres

Scenario Typical Size: 1,000.0

Scenario Total Cost: $578.05

Scenario Cost/Unit: $0.58

Cost Details:

Component Name	ID	Description	Unit	Cost	QTY	Total
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	$109.25	1	$109.25
Labor						
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.	Hours	$46.88	10	$468.80

Practice: E528E - Improved grazing management for enhanced plant structure and composition for wildlife

Scenario: #1 - Improved grazing management for enhanced plant structure and composition for wildlife

Scenario Description:
Managing the harvest of vegetation with grazing and/or browsing animals for the purpose of improving the quantity and quality of the structure and composition of the plant community that is available for wildlife.

Before Situation:
Resources are protected at the minimum level of the Conservation Practice Standard (CPS) 528 - Prescribed Grazing

After Situation:
The adoption of this enhancement will provide resource protection above the minimum level as described in Conservation Practice Standard (CPS) 528 - Prescribed Grazing

Feature Measure: Acre

Scenario Unit: Acres

Scenario Typical Size: 100.0

Scenario Total Cost: $334.73

Scenario Cost/Unit: $3.35

Cost Details:

Component Name	ID	Description	Unit	Cost	QTY	Total
Foregone Income						
FI, Grazing AUMs	2079	Grazing is the Primary Land Use	Animal Unit Month	$19.19	15	$287.85
Labor						
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.	Hours	$46.88	1	$46.88

Practice: E528F - Stockpiling cool season forage to improve structure and composition or plant productivity and health

Scenario: #1 - Stockpiling cool season forage to improve structure and composition or plant productivity and health

Scenario Description:
Grazing management employed to stop grazing events of selected paddock(s) to allow pasture forages to grow to maximum vegetative biomass accumulation before the end of the growing season.

Before Situation:
Resources are protected at the minimum level of the Conservation Practice Standard (CPS) 528 - Prescribed Grazing

After Situation:
The adoption of this enhancement will provide resource protection above the minimum level as described in Conservation Practice Standard (CPS) 528 - Prescribed Grazing

Feature Measure: Acre

Scenario Unit: Acres

Scenario Typical Size: 100.0

Scenario Total Cost: $2,458.66

Scenario Cost/Unit: $24.59

Cost Details:

Component Name	ID	Description	Unit	Cost	QTY	Total
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	$109.25	1	$109.25
Equipment Installation						
Truck, Pickup	939	Equipment and power unit costs. Labor not included.	Hours	$24.18	2	$48.36
All terrain vehicles, ATV	965	Includes equipment, power unit and labor costs.	Hours	$21.14	6	$126.84
Foregone Income						
FI, Grazing AUMs	2079	Grazing is the Primary Land Use	Animal Unit Month	$19.19	10	$191.90
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.	Hours	$27.56	8	$220.48
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.	Hours	$46.88	2	$93.76
Materials						
Wire, Polywire	8	Wire, Polywire for electric fence - 1,300 ft. Includes materials and shipping only.	Each	$56.51	1	$56.51
Electric, Energizer, Solar	27	Electric, Energizer, Solar for electric fence. Includes materials and shipping only.	Each	$361.86	1	$361.86
Nitrogen (N), Urea	71	Price per pound of N supplied by Urea. Price is not per pound of total product applied, no conversion is needed.	Pound	$0.47	2000	$940.00
Tank, Polyethylene, 300 gallon	291	Portable heavy duty rubber stock tank.	Each	$274.42	1	$274.42
Test, Soil Test, Standard	299	Includes materials, shiping, labor, and equipment costs.	Each	$11.76	3	$35.28

Practice: E528G - Improved grazing management on pasture for plant productivity and health with monitoring activities

Scenario: #1 - Improved grazing management on pasture for plant productivity and health with monitoring activities

Scenario Description:

Managing the harvest of vegetation with grazing and/or browsing animals as adjusted when following recommendations of a qualifying professional, as detailed in the enhancement criteria, generated through pasture condition scoring (PCS).

Before Situation:

Resources are protected at the minimum level of the Conservation Practice Standard (CPS) 528 - Prescribed Grazing

After Situation:

The adoption of this enhancement will provide resource protection above the minimum level as described in Conservation Practice Standard (CPS) 528 - Prescribed Grazing

Feature Measure: Acre

Scenario Unit: Acres

Scenario Typical Size: 100.0

Scenario Total Cost: $998.50

Scenario Cost/Unit: $9.99

Cost Details:

Component Name	ID	Description	Unit	Cost	QTY	Total
Foregone Income						
FI, Grazing AUMs	2079	Grazing is the Primary Land Use	Animal Unit Month	$19.19	30	$575.70
Labor						
Specialist Labor	235	Labor requiring a specialized skill set: Includes Agronomists, Foresters, Biologists, etc. to provide additional technical information during the planning and implementation of the practice. Does not include NRCS or TSP services.	Hours	$102.76	4	$411.04
Materials						
Test, Soil Test, Standard	299	Includes materials, shiping, labor, and equipment costs.	Each	$11.76	1	$11.76

Practice: E528I - Grazing management that protects sensitive areas -surface or ground water from nutrients

Scenario: #1 - Grazing management that protects sensitive areas -surface or ground water from nutrients

Scenario Description:
Grazing management employed will provide cover and density needed in the watershed in order to protect sensitive areas such as sinkholes, streams, highly erodible areas, or locations with plants that cannot tolerate defoliation.

Before Situation:
Resources are protected at the minimum level of the Conservation Practice Standard (CPS) 528 - Prescribed Grazing

After Situation:
The adoption of this enhancement will provide resource protection above the minimum level as described in Conservation Practice Standard (CPS) 528 - Prescribed Grazing

Feature Measure: Acre

Scenario Unit: Acres

Scenario Typical Size: 1,000.0

Scenario Total Cost: $1,872.61

Scenario Cost/Unit: $1.87

Cost Details:

Component Name	ID	Description	Unit	Cost	QTY	Total
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	$109.25	1	$109.25
Equipment Installation						
Truck, Pickup	939	Equipment and power unit costs. Labor not included.	Hours	$24.18	4	$96.72
All terrain vehicles, ATV	965	Includes equipment, power unit and labor costs.	Hours	$21.14	12	$253.68
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.	Hours	$27.56	17	$468.52
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.	Hours	$46.88	2	$93.76
Materials						
Wire, Polytape	7	Wire, Polytape for electric fence. Rolls of 655' to 825'. Includes materials and shipping only.	Each	$53.60	4	$214.40
Electric, Energizer, Solar	27	Electric, Energizer, Solar for electric fence. Includes materials and shipping only.	Each	$361.86	1	$361.86
Tank, Polyethylene, 300 gallon	291	Portable heavy duty rubber stock tank.	Each	$274.42	1	$274.42

Practice: E528J - Prescribed grazing on pastureland that improves riparian and watershed function

Scenario: #1 - Prescribed grazing on pastureland that improves riparian and watershed function

Scenario Description:
Grazing management employed will provide cover and density needed in the watershed in order to reduce runoff, improve infiltration, provide for above ground water filtration and sustain applicable fish and wildlife species habitat.

Before Situation:
Resources are protected at the minimum level of the Conservation Practice Standard (CPS) 528 - Prescribed Grazing

After Situation:
The adoption of this enhancement will provide resource protection above the minimum level as described in Conservation Practice Standard (CPS) 528 - Prescribed Grazing

Feature Measure: Acre

Scenario Unit: Acres

Scenario Typical Size: 100.0

Scenario Total Cost: $1,652.91

Scenario Cost/Unit: $16.53

Cost Details:

Component Name	ID	Description	Unit	Cost	QTY	Total
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	$109.25	1	$109.25
Equipment Installation						
Truck, Pickup	939	Equipment and power unit costs. Labor not included.	Hours	$24.18	2	$48.36
All terrain vehicles, ATV	965	Includes equipment, power unit and labor costs.	Hours	$21.14	6	$126.84
Foregone Income						
FI, Grazing AUMs	2079	Grazing is the Primary Land Use	Animal Unit Month	$19.19	10	$191.90
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.	Hours	$27.56	8	$220.48
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.	Hours	$46.88	2	$93.76
Materials						
Wire, Polywire	8	Wire, Polywire for electric fence - 1,300 ft. Includes materials and shipping only.	Each	$56.51	4	$226.04
Electric, Energizer, Solar	27	Electric, Energizer, Solar for electric fence. Includes materials and shipping only.	Each	$361.86	1	$361.86
Tank, Polyethylene, 300 gallon	291	Portable heavy duty rubber stock tank.	Each	$274.42	1	$274.42

Practice: E528K - Improved grazing management for soil compaction on pasture through monitoring activities

Scenario: #1 - Improved grazing management for soil compaction on pasture through monitoring activities

Scenario Description:

Manage the harvest of vegetation with grazing and/or browsing animals as adjusted when following recommendations of a qualifying professional, as detailed in the enhancement criteria, generated through pasture condition scoring (PCS).

Before Situation:

Resources are protected at the minimum level of the Conservation Practice Standard (CPS) 528 - Prescribed Grazing

After Situation:

The adoption of this enhancement will provide resource protection above the minimum level as described in Conservation Practice Standard (CPS) 528 - Prescribed Grazing

Feature Measure: Acre

Scenario Unit: Acres

Scenario Typical Size: 100.0

Scenario Total Cost: $806.94

Scenario Cost/Unit: $8.07

Cost Details:

Component Name	ID	Description	Unit	Cost	QTY	Total
Foregone Income						
FI, Grazing AUMs	2079	Grazing is the Primary Land Use	Animal Unit Month	$19.19	10	$191.90
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.	Hours	$27.56	4	$110.24
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.	Hours	$46.88	2	$93.76
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.	Hours	$102.76	4	$411.04

Practice: E528L - Prescribed grazing that improves or maintains riparian and watershed function-erosion

Scenario: #1 - Prescribed grazing that improves or maintains riparian and watershed function-erosion

Scenario Description:
Grazing management employed will provide cover and density needed in the watershed in order to reduce runoff, improve infiltration, provide for above ground water filtration and sustain applicable fish and wildlife species habitat.

Before Situation:
Resources are protected at the minimum level of the Conservation Practice Standard (CPS) 528 - Prescribed Grazing

After Situation:
The adoption of this enhancement will provide resource protection above the minimum level as described in Conservation Practice Standard (CPS) 528 - Prescribed Grazing

Feature Measure: Acre

Scenario Unit: Acres

Scenario Typical Size: 100.0

Scenario Total Cost: $1,088.88

Scenario Cost/Unit: $10.89

Cost Details:

Component Name	ID	Description	Unit	Cost	QTY	Total
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	$109.25	1	$109.25
Foregone Income						
FI, Grazing AUMs	2079	Grazing is the Primary Land Use	Animal Unit Month	$19.19	10	$191.90
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.	Hours	$27.56	10	$275.60
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.	Hours	$46.88	2	$93.76
Materials						
Wire, Polywire	8	Wire, Polywire for electric fence - 1,300 ft. Includes materials and shipping only.	Each	$56.51	1	$56.51
Electric, Energizer, Solar	27	Electric, Energizer, Solar for electric fence. Includes materials and shipping only.	Each	$361.86	1	$361.86

Practice: E528M - Grazing management that protects sensitive areas from gully erosion

Scenario: #1 - Grazing management that protects sensitive areas from gully erosion

Scenario Description:
Grazing management employed will provide vegetative cover and density needed in the watershed in order to protect sensitive areas such as sinkholes, streams, highly erodible areas, or locations that cannot tolerate plant defoliation.

Before Situation:
Resources are protected at the minimum level of the Conservation Practice Standard (CPS) 528 - Prescribed Grazing

After Situation:
The adoption of this enhancement will provide resource protection above the minimum level as described in Conservation Practice Standard (CPS) 528 - Prescribed Grazing

Feature Measure: Acre

Scenario Unit: Acres

Scenario Typical Size: 1,000.0

Scenario Total Cost: $1,711.81

Scenario Cost/Unit: $1.71

Cost Details:

Component Name	ID	Description	Unit	Cost	QTY	Total
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	$109.25	1	$109.25
Equipment Installation						
Truck, Pickup	939	Equipment and power unit costs. Labor not included.	Hours	$24.18	4	$96.72
All terrain vehicles, ATV	965	Includes equipment, power unit and labor costs.	Hours	$21.14	12	$253.68
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.	Hours	$27.56	17	$468.52
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.	Hours	$46.88	2	$93.76
Materials						
Wire, Polytape	7	Wire, Polytape for electric fence. Rolls of 655' to 825'. Includes materials and shipping only.	Each	$53.60	1	$53.60
Electric, Energizer, Solar	27	Electric, Energizer, Solar for electric fence. Includes materials and shipping only.	Each	$361.86	1	$361.86
Tank, Polyethylene, 300 gallon	291	Portable heavy duty rubber stock tank.	Each	$274.42	1	$274.42

Practice: E528N - Improved grazing management through monitoring activities

Scenario: #1 - Improved grazing management through monitoring activities

Scenario Description:

Three predominant key grazing areas are evaluated utilizing the Rangeland Health Assessment (where reference material is developed) or Describing Indicators of Rangeland Health protocols (where reference material is not developed) to determine how well the ecological processes of the site(s) are functioning. Utilizing knowledge learned from this as a part of the ranch resource assessment, a qualifying professional, as detailed in the enhancement criteria, will provide recommendations or follow-up evaluations toward mitigating some of the degradation risks that are initially identified.

Before Situation:

Resources are protected at the minimum level of the Conservation Practice Standard (CPS) 528 - Prescribed Grazing

After Situation:

The adoption of this enhancement will provide resource protection above the minimum level as described in Conservation Practice Standard (CPS) 528 - Prescribed Grazing

Feature Measure: Acre

Scenario Unit: Acres

Scenario Typical Size: 1,000.0

Scenario Total Cost: $1,974.61

Scenario Cost/Unit: $1.97

Cost Details:

Component Name	ID	Description	Unit	Cost	QTY	Total
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	$109.25	1	$109.25
Equipment Installation						
All terrain vehicles, ATV	965	Includes equipment, power unit and labor costs.	Hours	$21.14	8	$169.12
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.	Hours	$27.56	10	$275.60
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.	Hours	$46.88	4	$187.52
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.	Hours	$102.76	12	$1,233.12

Practice: E528O - Clipping mature forages to set back vegetative growth for improved forage quality

Scenario: #7 - Clipping mature forages to set back vegetative growth for improved forage quality

Scenario Description:
Timely clipping of mature forages through mowing, swathing or some other mechanical cutting will occur to increase forage palatability by setting plants back to a vegetative state for improved grazing management and forage quality.

Before Situation:
Resources are protected at the minimum level of the Conservation Practice Standard 528 - Prescribed Grazing

After Situation:
The adoption of this enhancement will provide resource protection above the minimum level as described in Conservation Practice Standard 528 - Prescribed Grazing

Feature Measure: Acres

Scenario Unit: Acres

Scenario Typical Size: 80.0

Scenario Total Cost: $2,874.01

Scenario Cost/Unit: $35.93

Cost Details:

Component Name	ID	Description	Unit	Cost	QTY	Total
Equipment Installation						
Mechanical cutter, chopper	943	Forestry mulcher, flail shredder, hydro axe, brush cutter, etc. Equipment and power unit costs. Labor not included.	Hours	$90.63	20	$1,812.60
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	$48.65	1	$48.65
Labor						
Equipment Operators, Light	232	Includes: Skid Steer Loaders, Hydraulic Excavators <50 HP, Trenchers <12 in., Ag Equipment <150 HP, Pickup Trucks, Forklifts, Mulchers	Hours	$27.87	24	$668.88
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	$171.94	2	$343.88

Practice: E528P - Implementing Bale or Swath Grazing to increase organic matter and reduce nutrients in surface water

Scenario: #7 - Implementing bale or swath grazing to increase organic matter or reduce nutrients in surface water

Scenario Description:

Bale or swath grazing to improve organic matter, aggregate stability or soil organism habitat or to reduce nutrient risks to surface water by leaving field harvested forages on site or supplementing with off-field forages. Grazing forages in this manner, will help reduce nutrient concentrations from confined animal lots while incorporating organic matter, feeding and diversifying the microbiome, building better soil aggregation and increasing soil health.

Before Situation:

Resources are protected at the minimum level of the Conservation Practice Standard 528 - Prescribed Grazing

After Situation:

The adoption of this enhancement will provide resource protection above the minimum level as described in Conservation Practice Standard 528 - Prescribed Grazing

Feature Measure: Acres

Scenario Unit: Acres

Scenario Typical Size: 20.0

Scenario Total Cost: $2,893.52

Scenario Cost/Unit: $144.68

Cost Details:

Component Name	ID	Description	Unit	Cost	QTY	Total
Equipment Installation						
Truck, Pickup	939	Equipment and power unit costs. Labor not included.	Hours	$24.18	20	$483.60
Tractor, agricultural, 120 HP	962	Agricultural tractor with horsepower range of 90 to 140. Equipment and power unit costs. Labor not included.	Hours	$50.84	20	$1,016.80
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.	Hours	$8.19	20	$163.80
Labor						
Equipment Operators, Light	232	Includes: Skid Steer Loaders, Hydraulic Excavators <50 HP, Trenchers <12 in., Ag Equipment <150 HP, Pickup Trucks, Forklifts, Mulchers	Hours	$27.87	40	$1,114.80
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.	Hours	$102.76	1	$102.76
Materials						
Test, Soil Test, Standard	299	Includes materials, shiping, labor, and equipment costs.	Each	$11.76	1	$11.76

Practice: E528Q - Use of body condition scoring for livestock on a monthly basis to keep track of herd health

Scenario: #7 - Use of body condition scoring for livestock on a monthly basis to keep track of herd health

Scenario Description:

Body condition scoring (BCS) serves as a useful management tool to monitor livestock performance with respect to current and recent feeding or grazing programs. Body condition scoring is a numeric scoring system, producers can use to consistently evaluate animals' estimated body energy reserves through degree of fatness. This information can be used to adjust nutritional strategies to reach optimal BCS. Since body condition is closely associated with reproductive performance as well as feed efficiency, monitoring body condition can help producers reach production goals and increase the operation's bottom line. Knowledge and understanding of BCS will assist producers to adjust a supplemental feeding program to maintain animal health and nutrition on a-monthly-basis.

Before Situation:

Resources are protected at the minimum level of the Conservation Practice Standard 528 - Prescribed Grazing

After Situation:

The adoption of this enhancement will provide resource protection above the minimum level as described in Conservation Practice Standard 528 - Prescribed Grazing

Feature Measure: Acres

Scenario Unit: Acres

Scenario Typical Size: 100.0

Scenario Total Cost: $179.04

Scenario Cost/Unit: $1.79

Cost Details:

Component Name	ID	Description	Unit	Cost	QTY	Total
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	$109.25	1	$109.25
Equipment Installation						
All terrain vehicles, ATV	965	Includes equipment, power unit and labor costs.	Hours	$21.14	1	$21.14
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	$48.65	1	$48.65

Practice: E528R - Management Intensive Rotational Grazing

Scenario: #7 - Management Intensive Rotational Grazing

Scenario Description:
Management intensive, multi-paddock grazing system where livestock are regularly and systematically moved to fresh forage to optimize quantity and quality of forage growth, improve manure distribution, improve wildlife cover, and improve soil health.

Before Situation:
Resources are protected at the minimum level of the Conservation Practice Standard 528 - Prescribed Grazing

After Situation:
The adoption of this enhancement will provide resource protection above the minimum level as described in Conservation Practice Standard 528 - Prescribed Grazing

Feature Measure: Acres

Scenario Unit: Acres

Scenario Typical Size: 100.0

Scenario Total Cost: $3,608.76

Scenario Cost/Unit: $36.09

Cost Details:

Component Name	ID	Description	Unit	Cost	QTY	Total
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	$109.25	1	$109.25
Equipment Installation						
Truck, Pickup	939	Equipment and power unit costs. Labor not included.	Hours	$24.18	2	$48.36
All terrain vehicles, ATV	965	Includes equipment, power unit and labor costs.	Hours	$21.14	10	$211.40
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	$48.65	1	$48.65
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.	Hours	$27.56	15	$413.40
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.	Hours	$46.88	2	$93.76
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.	Hours	$102.76	6	$616.56
Materials						
Wire, Polywire	8	Wire, Polywire for electric fence - 1,300 ft. Includes materials and shipping only.	Each	$56.51	2	$113.02
Electric, Ground Rods	20	Electric, Ground Rod for electric fence. Includes materials and shipping only.	Each	$11.82	3	$35.46
Electric, Ground Rod Clamps	21	Electric, Ground Rod Clamps for electric fence. Includes materials and shipping only.	Each	$2.37	3	$7.11
Electric, Tester	26	Electric, Tester for electric fence. Includes materials and shipping only.	Each	$51.09	1	$51.09
Electric, Energizer, Solar	27	Electric, Energizer, Solar for electric fence. Includes materials and shipping only.	Each	$361.86	1	$361.86
Tank, Polyethylene, 300 gallon	291	Portable heavy duty rubber stock tank.	Each	$274.42	2	$548.84
Pipe, PE, 1 1/4 in., DR 9	998	Materials: - 1 1/4 inch - PE - 160 psi - ASTM D3035 DR 9	Feet	$0.95	1000	$950.00

Practice: E533A - Advanced Pumping Plant Automation

Scenario: #7 - Advanced Pumping Plant Automation

Scenario Description:

This enhancement consists of installing a control device to a pump station that allows the user to remotely monitor and operate the pump station based on field measured data. Pumping stations may have either a combustible or electric power unit that are compatible with the control device or sensor. These devices/sensors collect field-measured data and provide this data in real time to the landowner to make irrigation decisions and adjustments to the pump operation.

Before Situation:

Resources are protected at the minimum level of the Conservation Practice Standard 533 - Pumping Plant.

After Situation:

The adoption of this enhancement will provide resource protection above the minimum level as described in Conservation Practice Standard 533 - Pumping Plant.

Feature Measure: Number

Scenario Unit: Number

Scenario Typical Size: 1.0

Scenario Total Cost: $5,241.09

Scenario Cost/Unit: $5,241.09

Cost Details:

Component Name	ID	Description	Unit	Cost	QTY	Total
Equipment Installation						
Truck, Pickup	939	Equipment and power unit costs. Labor not included.	Hours	$24.18	4	$96.72
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.	Hours	$37.19	4	$148.76
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.	Hours	$27.56	4	$110.24
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.	Hours	$102.76	4	$411.04
Materials						
Solar Panels, fixed cost portion	1031	Fixed cost portion of the Solar Panels. This portion is a base cost for all Solar Panels and is not dependant on KiloWatt. The total cost of any Solar Panels will include this fixed cost plus a variable cost portion. The completed Solar Panels will include all materials (electrical, controllers, service drops and etc). This cost will include material, labor and equipment.	Each	$273.31	1	$273.31
Solar Panels, variable cost portion	1135	Variable cost portion of the Solar Panels. This portion IS dependent on the total Kilowatt for the Solar Panels. The total cost of any Solar Panels will include this variable cost plus the fixed cost portion. The completed Solar Panels will include all materials (electrical, controllers, and service drop, etc). This cost will include material, labor and equipment.	Kilowatt	$2,429.59	0.1	$242.96
Switches and Controls, temp sensors	1192	Temperature and soil moisture sensors installed as part of an electronic monitoring (with or without wireless telecommunications) commonly used to control pumps and irrigation systems	Each	$579.54	1	$579.54
Switches and Controls, programmable controller	1193	Programmable logic controller (with or without wireless telecommunications) commonly used to control pumps and irrigation systems	Each	$307.65	1	$307.65
Switches and Controls, Wi-Fi system and software	1194	Software with built-in cellular or Wi-Fi communication commonly used to control pumps and irrigation systems	Each	$786.78	1	$786.78
Switches and Controls, radio system	1195	Output radio, field transmitter, and receiver commonly used to control pumps and irrigation systems	Each	$461.69	1	$461.69
Data Logger with Telemetry System	1454	Data Logger W/Graphic Output for water management and telemetry - data communication device with power supply in a weather proof enclosure. Equipment only.	Each	$1,577.29	1	$1,577.29
Safety Camera on Automated Pump	2474	Waterproof outdoor wireless IP Network security camera with housing. Includes materials only.	Each	$212.21	1	$212.21
Engine/Fuel Tank Sensor	2487	Transducer and sensors to monitor the oil pressure, oil and water temperatures, fuel flow meter with digital pulse output and fuel levels in a tank. Includes the conduit and cabling.	Each	$32.90	1	$32.90

Practice: E533B - Complete pumping plant evaluation for energy savings

Scenario: #1 - Complete pumping plant evaluation for energy savings

Scenario Description:

Evaluation of all pumping plants to determine the potential to rehabilitate/replace/reconfigure pump performance to improve water delivery efficiency 10% or more. Evaluate to determine if a Variable Frequency Drive motor controller(s) is recommended and the simple payback in terms of energy savings is less than 10 years.

Before Situation:

Resources are protected at the minimum level of the Conservation Practice Standard (CPS) 449 - Irrigation Water Management

After Situation:

The adoption of this enhancement will provide resource protection above the minimum level as described in Conservation Practice Standard (CPS) 449 - Irrigation Water Management

Feature Measure: Acre

Scenario Unit: Acres

Scenario Typical Size: 640.0

Scenario Total Cost: $3,656.43

Scenario Cost/Unit: $5.71

Cost Details:

Component Name	ID	Description	Unit	Cost	QTY	Total
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.	Hours	$37.19	8	$297.52
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.	Hours	$102.76	32	$3,288.32
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	$70.59	1	$70.59

Practice: E550A - Range planting for increasing/maintaining organic matter

Scenario: #1 - Range planting for increasing/maintaining organic matter

Scenario Description:
Establishment of adapted perennial or self-sustaining vegetation such as grasses, forbs, legumes, shrubs and trees for the purpose of increasing or maintaining organic matter levels in the soil.

Before Situation:
Resources are protected at the minimum level of the Conservation Practice Standard (CPS) 550 - Range Planting

After Situation:
The adoption of this enhancement will provide resource protection above the minimum level as described in Conservation Practice Standard (CPS) 550 - Range Planting

Feature Measure: Acre

Scenario Unit: Acres

Scenario Typical Size: 100.0

Scenario Total Cost: $4,259.11

Scenario Cost/Unit: $42.59

Cost Details:

Component Name	ID	Description	Unit	Cost	QTY	Total
Foregone Income						
FI, Grazing AUMs	2079	Grazing is the Primary Land Use	Animal Unit Month	$19.19	15	$287.85
Labor						
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.	Hours	$46.88	2	$93.76
Materials						
Native Perennial Grasses, Legumes and/or Forbs, Medium Density	2754	A mix of native perennial grasses, legumes, and/or forbs, grasses typically greater than 50% of the mix, mmay include a small percentage of annual species for establishment purposes and/or if allowed by the CPS. Planted at medium to higher density (41-60 pure live seeds/sq ft). Species typically easy to purchase. Includes material and shipping.	Acres	$258.50	15	$3,877.50

Practice: E550B - Range planting for improving forage, browse, or cover for wildlife

Scenario: #1 - Range planting for improving forage, browse, or cover for wildlife

Scenario Description:

Establishment of adapted perennial or self-sustaining vegetation such as grasses, forbs, legumes, shrubs and trees for the purpose of improving forage, browse, or cover for wildlife on areas that have been degraded beyond recovery via ecological principles, or old crop fields and pastures devoid of desirable, native rangeland species that fit within an ecological site description steady state.

Before Situation:

Resources are protected at the minimum level of the Conservation Practice Standard (CPS) 550 - Range Planting

After Situation:

The adoption of this enhancement will provide resource protection above the minimum level as described in Conservation Practice Standard (CPS) 550 - Range Planting

Feature Measure: Acre

Scenario Unit: Acres

Scenario Typical Size: 100.0

Scenario Total Cost: $2,015.02

Scenario Cost/Unit: $20.15

Cost Details:

Component Name	ID	Description	Unit	Cost	QTY	Total
Labor						
Specialist Labor	235	Labor requiring a specialized skill set: Includes Agronomists, Foresters, Biologists, etc. to provide additional technical information during the planning and implementation of the practice. Does not include NRCS or TSP services.	Hours	$102.76	2	$205.52
Materials						
Native Perennial Grasses, Legumes and/or Forbs, Low Density	2753	A mix of native perennial grasses, legumes, and/or forbs, grasses typically greater than 50% of the mix, may include a small percentage of annual species for establishment purposes and/or if allowed by the CPS. Planted at lower to medium density (40 pure live seeds/sq ft and less). Species typically easy to purchase. Includes material and shipping.	Acres	$180.95	10	$1,809.50

Practice: E570A - Enhanced rain garden for wildlife

Scenario: #7 - Enhanced rain garden for wildlife

Scenario Description:
Seed or plug nectar and pollen producing plants into rain gardens to provide wildlife habitat.

Before Situation:
Resources are protected at the minimum level of the Conservation Practice Standard 570 - Stormwater Runoff Control

After Situation:
The adoption of this enhancement will provide resource protection above the minimum level as described in Conservation Practice Standard 570 - Stormwater Runoff Control

Feature Measure: Square Feet

Scenario Unit: Square Feet

Scenario Typical Size: 1,080.0

Scenario Total Cost: $207.42

Scenario Cost/Unit: $0.19

Cost Details:

Component Name	ID	Description	Unit	Cost	QTY	Total
Equipment Installation						
Truck, Pickup	939	Equipment and power unit costs. Labor not included.	Hours	$24.18	1	$24.18
Site Preparation, Mechanical	944	Aerator, rolling drum chopper, etc. Includes equipment, power unit and labor costs.	Acres	$64.17	0.1	$6.42
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.	Acres	$12.00	0.1	$1.20
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.	Hours	$27.56	4	$110.24
Materials						
Straw	1237	Small grain straw (non organic and certified organic). Includes materials only.	Ton	$65.00	0.3	$19.50
Native Perennial Grasses, Legumes and/or Forb Mix for Targeted Wildlife/Pollinator Habitat or Ecological Restoration, moderate commercial availability	2619	Diverse mix of native perennial grasses, legumes and forbs, less than 50% grasses, may include biennials and a small percentage of annual species for establishment purposes and/or if allowed by the CPS. This is a mix composed of species required to meet specific wildlife/pollinator habitat or ecological requirements. Seed is moderately easy to purchase commercially. Includes materials and shipping.	Acres	$458.78	0.1	$45.88

Practice: E578A - Stream crossing elimination

Scenario: #1 - Stream crossing elimination

Scenario Description:
Existing stream crossings on an operation are consolidated into fewer crossings in order to reduce impacts to stream habitat.

Before Situation:
Resources are protected at the minimum level of the Conservation Practice Standard (CPS) 578 - Stream Crossing

After Situation:
The adoption of this enhancement will provide resource protection above the minimum level as described in Conservation Practice Standard (CPS) 578 - Stream Crossing

Feature Measure: Typical feature is 0.09 acres

Scenario Unit: Each

Scenario Typical Size: 1.0

Scenario Total Cost: $8,195.26

Scenario Cost/Unit: $8,195.26

Cost Details:

Component Name	ID	Description	Unit	Cost	QTY	Total
Equipment Installation						
Dozer, 80 HP	929	Track mounted Dozer with horsepower range of 60 to 90. Equipment and power unit costs. Labor not included.	Hours	$55.20	16	$883.20
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.	Hours	$109.36	8	$874.88
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.	Acres	$12.00	0.1	$1.20
Truck, dump, 12 CY	1215	Dump truck for moving bulk material. Typically capacity is 16 ton or 12 cubic yards. Includes equipment only.	Hours	$78.77	16	$1,260.32
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.	Hours	$27.56	32	$881.92
Equipment Operators, Light	232	Includes: Skid Steer Loaders, Hydraulic Excavators <50 HP, Trenchers <12 in., Ag Equipment <150 HP, Pickup Trucks, Forklifts, Mulchers	Hours	$27.87	32	$891.84
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.	Hours	$46.88	16	$750.08
Materials						
Erosion Control Blanket, biodegradable	1213	Biodegradable erosion control blanket, typically a composite of natural fibers with reinforcing polymer netting. Materials and shipping only.	Square Yard	$1.32	300	$396.00
Tree & Shrub, Woody, Cuttings, Medium	1308	Woody cuttings, live stakes or whips typically 1/4 to 1 inch diameter and 24 to 48 inches long. Includes materials and shipping only.	Each	$0.89	300	$267.00
Aggregate, river rock	1834	Well graded, rounded mineral substrates derived from local riverine settings. Includes materials and local delivery	Ton	$36.99	42	$1,553.58
Annual Grasses	2730	Annual grasses, one or more species, mostly introduced but may be native. Used for temporary cover or cover crops. Includes material and shipping.	Acres	$32.58	0.1	$3.26
Introduced Perennial Grasses, Legumes and/or Forbs, Medium Density	2748	Introduced perennial grasses, legumes, and/or forbs, may include a small percentage of annual species for establishment purposes and/or if allowed by the CPS. Planted at medium to higher density (41-60 pure live seeds/sq ft). Includes material and shipping.	Acres	$43.92	0.1	$4.39
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	$171.94	1	$171.94
Mobilization, medium equipment	1139	Equipment with 70-150 HP or typical weights between 14,000 and 30,000 pounds.	Each	$255.65	1	$255.65

Practice: E580A - Stream corridor bank stability improvement

Scenario: #1 - Stream corridor bank stability improvement

Scenario Description:
Stream corridor bank vegetation components are established to provide additional streambank stability.

Before Situation:
Resources are protected at the minimum level of the Conservation Practice Standard (CPS) 580 - Streambank and Shoreline Protection

After Situation:
The adoption of this enhancement will provide resource protection above the minimum level as described in Conservation Practice Standard (CPS) 580 - Streambank and Shoreline Protection

Feature Measure: Area planted

Scenario Unit: Acres

Scenario Typical Size: 2.0

Scenario Total Cost: $4,329.29

Scenario Cost/Unit: $2,164.65

Cost Details:

Component Name	ID	Description	Unit	Cost	QTY	Total
Equipment Installation						
Truck, Pickup	939	Equipment and power unit costs. Labor not included.	Hours	$24.18	8	$193.44
All terrain vehicles, ATV	965	Includes equipment, power unit and labor costs.	Hours	$21.14	8	$169.12
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.	Hours	$10.75	8	$86.00
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.	Hours	$11.47	8	$91.76
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.	Hours	$27.56	48	$1,322.88
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.	Hours	$46.88	8	$375.04
Materials						
Shrub, Potted, Small	1524	Potted shrub seedling, 1 quart to 1 gallon. Includes materials and shipping only.	Each	$6.41	65	$416.65
Tree, Hardwood, Potted, Small	1529	Potted hardwood seedling, 1 quart to 1 gallon. Includes materials and shipping only.	Each	$7.78	65	$505.70
Tree, Conifer, Potted, Small	1534	Potted conifer seedling, 1 quart to 1 gallon. Includes materials and shipping only.	Each	$5.71	65	$371.15
Tree shelter, mesh tree tube, 48 in.	1556	48 inch tall vexar or other open weave tubular tree shelter to protect from animal damage. Materials only.	Each	$1.02	65	$66.30
Tree shelter, solid tube type, 4 in. x 24 in.	1563	4 inch x 24 inch tree tube for protection from animal damage. Materials only.	Each	$2.05	65	$133.25
Tree shelter, solid tube type, 4 in. x 48 in.	1566	4 inch x 48 inch tree tube for protection from animal damage. Materials only.	Each	$4.22	65	$274.30
Stakes, wood, 1 in. x 1 in. x 48 in.	1578	1 in. x 1 in. x 48 in. wood stakes to fasten items in place. Includes materials only.	Each	$1.66	195	$323.70

Practice: E580B - Stream corridor bank vegetation improvement

Scenario: #1 - Stream corridor bank vegetation improvement

Scenario Description:
Stream corridor bank vegetation components are established to improve ecosystem functioning and stability.

Before Situation:
Resources are protected at the minimum level of the Conservation Practice Standard (CPS) 580 - Streambank and Shoreline Protection

After Situation:
The adoption of this enhancement will provide resource protection above the minimum level as described in Conservation Practice Standard (CPS) 580 - Streambank and Shoreline Protection

Feature Measure: Area planted

Scenario Unit: Acres

Scenario Typical Size: 2.0

Scenario Total Cost: $4,329.29

Scenario Cost/Unit: $2,164.65

Cost Details:

Component Name	ID	Description	Unit	Cost	QTY	Total
Equipment Installation						
Truck, Pickup	939	Equipment and power unit costs. Labor not included.	Hours	$24.18	8	$193.44
All terrain vehicles, ATV	965	Includes equipment, power unit and labor costs.	Hours	$21.14	8	$169.12
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.	Hours	$10.75	8	$86.00
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.	Hours	$11.47	8	$91.76
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.	Hours	$27.56	48	$1,322.88
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.	Hours	$46.88	8	$375.04
Materials						
Shrub, Potted, Small	1524	Potted shrub seedling, 1 quart to 1 gallon. Includes materials and shipping only.	Each	$6.41	65	$416.65
Tree, Hardwood, Potted, Small	1529	Potted hardwood seedling, 1 quart to 1 gallon. Includes materials and shipping only.	Each	$7.78	65	$505.70
Tree, Conifer, Potted, Small	1534	Potted conifer seedling, 1 quart to 1 gallon. Includes materials and shipping only.	Each	$5.71	65	$371.15
Tree shelter, mesh tree tube, 48 in.	1556	48 inch tall vexar or other open weave tubular tree shelter to protect from animal damage. Materials only.	Each	$1.02	65	$66.30
Tree shelter, solid tube type, 4 in. x 24 in.	1563	4 inch x 24 inch tree tube for protection from animal damage. Materials only.	Each	$2.05	65	$133.25
Tree shelter, solid tube type, 4 in. x 48 in.	1566	4 inch x 48 inch tree tube for protection from animal damage. Materials only.	Each	$4.22	65	$274.30
Stakes, wood, 1 in. x 1 in. x 48 in.	1578	1 in. x 1 in. x 48 in. wood stakes to fasten items in place. Includes materials only.	Each	$1.66	195	$323.70

Practice: E590A - Improving nutrient uptake efficiency and reducing risk of nutrient losses

Scenario: #1 - Improving nutrient uptake efficiency and reducing risk of nutrient losses

Scenario Description:

Nutrient management encompasses managing the amount, source, placement, and timing of the application of plant nutrients and soil amendments. Nutrients are currently being applied on the farm based on the 4R nutrient stewardship principles. Enhanced nutrient use efficiency strategies or technologies are utilized to improve nutrient use efficiency and reduce risk of nutrient losses to surface and groundwater and reduce risks to air quality by reducing emissions of greenhouse gases (GHGs).

Before Situation:

Resources are protected at the minimum level of the Conservation Practice Standard (CPS) 590 - Nutrient Management

After Situation:

The adoption of this enhancement will provide resource protection above the minimum level as described in Conservation Practice Standard (CPS) 590 - Nutrient Management

Feature Measure: Acre

Scenario Unit: Acres

Scenario Typical Size: 100.0

Scenario Total Cost: $2,666.27

Scenario Cost/Unit: $26.66

Cost Details:

Component Name	ID	Description	Unit	Cost	QTY	Total
Labor						
Specialist Labor	235	Labor requiring a specialized skill set: Includes Agronomists, Foresters, Biologists, etc. to provide additional technical information during the planning and implementation of the practice. Does not include NRCS or TSP services.	Hours	$102.76	2	$205.52
Materials						
Nitrogen-Urease inhibitor	260	Nitrogen-Urease inhibitor	Acres	$24.14	100	$2,414.00
Test, Soil Nitrogen Testing	311	Pre-Side Dress/Deep Soil Testing. Includes materials and shipping only.	Each	$9.35	5	$46.75

Practice: E590B - Reduce risks of nutrient loss to surface water by utilizing precision agriculture technologies

Scenario: #1 - Reduce risks of nutrient loss to surface water by utilizing precision agriculture technologies

Scenario Description:
Precision application technology and techniques are utilized to plan and apply nutrients to improve nutrient use efficiency and reduce risk of nutrient losses.

Before Situation:
Resources are protected at the minimum level of the Conservation Practice Standard (CPS) 590 - Nutrient Management

After Situation:
The adoption of this enhancement will provide resource protection above the minimum level as described in Conservation Practice Standard (CPS) 590 - Nutrient Management

Feature Measure: Acre

Scenario Unit: Acres

Scenario Typical Size: 100.0

Scenario Total Cost: $1,455.12

Scenario Cost/Unit: $14.55

Cost Details:

Component Name	ID	Description	Unit	Cost	QTY	Total
Equipment Installation						
Fertilizer, precision application	952	Fertilizer application performed by light bar/GPS navigation system. Includes equipment, power unit and labor costs.	Acres	$8.38	100	$838.00
Labor						
Specialist Labor	235	Labor requiring a specialized skill set: Includes Agronomists, Foresters, Biologists, etc. to provide additional technical information during the planning and implementation of the practice. Does not include NRCS or TSP services.	Hours	$102.76	2	$205.52
Materials						
Test, Soil Test, Standard	299	Includes materials, shiping, labor, and equipment costs.	Each	$11.76	35	$411.60

Practice: E590C - Improving nutrient uptake efficiency and reducing risk of nutrient losses on pasture

Scenario: #7 - Improving nutrient uptake efficiency and reducing risk of nutrient losses on pasture

Scenario Description:

Nutrient management encompasses managing the amount, source, placement, and timing of the application of plant nutrients and soil amendments. Nutrients are currently being applied on the farm based on the 4R nutrient stewardship principles. Enhanced nutrient use efficiency strategies or technologies are utilized to improve nutrient use efficiency and reduce risk of nutrient losses on pasture.

Before Situation:

Resources are protected at the minimum level of the Conservation Practice Standard 590 - Nutrient Management

After Situation:

The adoption of this enhancement will provide resource protection above the minimum level as described in Conservation Practice Standard 590 - Nutrient Management

Feature Measure: Acres

Scenario Unit: Acres

Scenario Typical Size: 100.0

Scenario Total Cost: $1,719.44

Scenario Cost/Unit: $17.19

Cost Details:

Component Name	ID	Description	Unit	Cost	QTY	Total
Equipment Installation						
Fertilizer, precision application	952	Fertilizer application performed by light bar/GPS navigation system. Includes equipment, power unit and labor costs.	Acres	$8.38	100	$838.00
Labor						
Specialist Labor	235	Labor requiring a specialized skill set: Includes Agronomists, Foresters, Biologists, etc. to provide additional technical information during the planning and implementation of the practice. Does not include NRCS or TSP services.	Hours	$102.76	4	$411.04
Materials						
Test, Soil Test, Standard	299	Includes materials, shiping, labor, and equipment costs.	Each	$11.76	40	$470.40

Practice: E595A - Reduce risk of pesticides in surface water by utilizing precision pesticide application techniques

Scenario: #1 - Reduce risk of pesticides in surface water by utilizing precision pesticide application techniques

Scenario Description:

Utilize precision application techniques to reduce risk of pesticides in surface water by reducing total amount of chemical applied and reducing the potential for delivery of chemicals into water bodies.

Before Situation:

Resources are protected at the minimum level of the Conservation Practice Standard (CPS) 595 - Integrated Pest Management

After Situation:

The adoption of this enhancement will provide resource protection above the minimum level as described in Conservation Practice Standard (CPS) 595 - Integrated Pest Management

Feature Measure: Acre

Scenario Unit: Acres

Scenario Typical Size: 100.0

Scenario Total Cost: $1,082.28

Scenario Cost/Unit: $10.82

Cost Details:

Component Name	ID	Description	Unit	Cost	QTY	Total
Equipment Installation						
Chemical, precision application	949	Chemical application performed by light bar/GPS navigation system. Includes equipment, power unit and labor costs.	Acres	$7.74	100	$774.00
Labor						
Specialist Labor	235	Labor requiring a specialized skill set: Includes Agronomists, Foresters, Biologists, etc. to provide additional technical information during the planning and implementation of the practice. Does not include NRCS or TSP services.	Hours	$102.76	3	$308.28

Practice: E595B - Reduce risk of pesticides in water and air by utilizing IPM PAMS techniques

Scenario: #1 - Reduce risk of pesticides in water and air by utilizing IPM PAMS techniques

Scenario Description:

Utilize integrated pest management (IPM) prevent, avoidance, monitoring, and suppression (PAMS) techniques to reduce risk of pesticides in water and air. Reduce the potential for delivery of chemicals into water or ozone precursor emissions .

Before Situation:

Resources are protected at the minimum level of the Conservation Practice Standard (CPS) 595 - Integrated Pest Management

After Situation:

The adoption of this enhancement will provide resource protection above the minimum level as described in Conservation Practice Standard (CPS) 595 - Integrated Pest Management

Feature Measure: Acre

Scenario Unit: Acres

Scenario Typical Size: 100.0

Scenario Total Cost: $680.18

Scenario Cost/Unit: $6.80

Cost Details:

Component Name	ID	Description	Unit	Cost	QTY	Total
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.	Hours	$37.19	10	$371.90
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.	Hours	$102.76	3	$308.28

Practice: E595D - Increase the size requirement of refuges planted to slow pest resistance to Bt crops

Scenario: #1 - Increase the size requirement of refuges planted to slow pest resistance to Bt crops

Scenario Description:

Bacillus thuringiensis (Bt) plant incorporated protectants are plants that have been genetically altered to produce proteins that are harmful to certain insect pests. Widespread implementation of Bt crops has decreased insecticide use and increased crop yields, but it must be used as part of an integrated pest management (IPM) approach to protect the crop from pest species that are not susceptible to the Bt toxin and to manage pest resistance. Crop rotation, scouting and resistance management strategies, such as planting and creating refuges of non-Bt crops, are essential when farming Bt crops. Insects have developed resistance to Bt proteins. To mitigate the development of further resistance, growers are required to plant refuges of non-transgenic crops. These refuges produce numbers of susceptible insects that will help sustain populations of non-resistant insects. The size of Refuge requirement depends on the environment, pest and strain of the crop. Size of refuge is determined by resistance risk. Most Bt corn requires that 20% of the total Bt crop planted be non-Bt. Cotton can require 50% of the crop be planted to non-Bt. A recent study published in the Journal of Integrated Pest Management revealed, compliance has been a challenge. Nearly 40% of growers surveyed did not plant the required refuge (Reisig 2017). They credit non-compliance, in part, to lack of understanding by small-scale farmers about the need for refuges.

Before Situation:

Minimal or no refuges were planted as required for Bt crops.

After Situation:

Optimum sized and located refuges are planted for Bt crops.

Feature Measure: Ac

Scenario Unit: Acres

Scenario Typical Size: 40.0

Scenario Total Cost: $577.42

Scenario Cost/Unit: $14.44

Cost Details:

Component Name	ID	Description	Unit	Cost	QTY	Total
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.	Hours	$37.19	10	$371.90
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.	Hours	$102.76	2	$205.52

Practice: E595E - Eliminate use of chemical treatments to control pests and to increase the presence of dung beetles

Scenario: #1 - Eliminate use of chemical treatments to control pests and to increase the presence of dung beetles

Scenario Description:

Pests and parasites can have a significant impact on the economic viability of livestock operations, by affecting the performance and health of animals. The use of broad-spectrum insecticides, pour-ons and avermectins have been shown to have a detrimental effect on dung beetle populations. Having a healthy population of dung beetles facilitates the recycling of nutrients and promotes soil and grassland health. By eliminating the application of broad-spectrum insecticides, pour-ons, and avermectins, including injectable avermectins, for pest control in and on livestock along with rotational grazing and higher stock densities has shown to increase the dung beetle population. Use of natural or alternative methods of pest control over multiple years is encouraged.

Before Situation:

Pests and parasites can have a significant impact on the economic viability of livestock operations, by affecting the performance and health of animals. The use of broad-spectrum insecticides, pour-ons and avermectins have been shown to have a detrimental

After Situation:

Having a healthy population of dung beetles facilitates the recycling of nutrients and promotes soil and grassland health. By eliminating the application of broad-spectrum insecticides, pour-ons, and avermectins, including injectable avermectins, for pest

Feature Measure: Acre

Scenario Unit: Acres

Scenario Typical Size: 500.0

Scenario Total Cost: $3,056.96

Scenario Cost/Unit: $6.11

Cost Details:

Component Name	ID	Description	Unit	Cost	QTY	Total
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	$109.25	1	$109.25
Equipment Installation						
All terrain vehicles, ATV	965	Includes equipment, power unit and labor costs.	Hours	$21.14	26	$549.64
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	$48.65	1	$48.65
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.	Hours	$37.19	10	$371.90
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.	Hours	$27.56	10	$275.60
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.	Hours	$46.88	10	$468.80
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.	Hours	$102.76	12	$1,233.12

Practice: E612A - Cropland conversion to trees or shrubs for long term improvement of water quality

Scenario: #1 - Cropland conversion to trees or shrubs for long term improvement of water quality

Scenario Description:

Cropland conversion to trees and shrubs for long term erosion control and improvement of water quality. Trees and shrubs are established on cropland where annually-seeded cash crops have been grown. Tree and/or shrub species are selected for their efficacy in holding soil, and the planting design is configured to control runoff and trap sediment.

Before Situation:

Resources are protected at the minimum level of the Conservation Practice Standard (CPS) 612 - Tree/Shrub Establishment

After Situation:

The adoption of this enhancement will provide resource protection above the minimum level as described in Conservation Practice Standard (CPS) 612 - Tree/Shrub Establishment

Feature Measure: Acre

Scenario Unit: Acres

Scenario Typical Size: 10.0

Scenario Total Cost: $3,290.28

Scenario Cost/Unit: $329.03

Cost Details:

Component Name	ID	Description	Unit	Cost	QTY	Total
Equipment Installation						
Seeding Operation, No Till/Grass Drill	960	No Till drill or grass drill for seeding. Includes equipment, power unit and labor costs.	Acres	$21.92	10	$219.20
Ripper or subsoiler, 16 to 36 inch depth	1235	Deep ripper or subsoiler, (16-36 inches depth) includes tillage implement, power unit and labor.	Acres	$20.71	10	$207.10
Foregone Income						
FI, Corn Dryland	1959	Dryland Corn is Primary Crop	Acres	$270.47	4	$1,081.88
FI, Soybeans Dryland	1961	Dryland Soybeans is Primary Crop	Acres	$261.29	4	$1,045.16
FI, Wheat Dryland	1963	Dryland Wheat is Primary Crop	Acres	$214.72	2	$429.44
Materials						
Tropical species, Medium	1541	Tropical seedling, native or non-native, 1 quart to gallon pot, or containerized, 10 cubic inch. Includes materials and shipping only.	Each	$0.00	500	$0.00
Introduced Perennial Grasses, Legumes and/or Forbs, Low Density	2747	Introduced perennial grasses, legumes, and/or forbs, may include a small percentage of annual species for establishment purposes and/or if allowed by the CPS. Planted at lower to medium density (40 pure live seeds/sq ft and less). Includes material and shipping.	Acres	$30.75	10	$307.50

Practice: E612B - Planting for high carbon sequestration rate

Scenario: #1 - Planting for high carbon sequestration rate

Scenario Description:

Plant tree species and use stocking levels for higher growth to increase the rate of carbon sequestration (capture). Use species with a longer life span as well as relatively fast growth, and species suitable for durable manufactured products. Increase stocking levels in forests that are not fully stocked. Implement afforestation on appropriate open lands.

Before Situation:

Resources are protected at the minimum level of the Conservation Practice Standard (CPS) 612 - Tree/Shrub Establishment

After Situation:

The adoption of this enhancement will provide resource protection above the minimum level as described in Conservation Practice Standard (CPS) 612 - Tree/Shrub Establishment

Feature Measure: Acre

Scenario Unit: Acres

Scenario Typical Size: 10.0

Scenario Total Cost: $12,248.85

Scenario Cost/Unit: $1,224.89

Cost Details:

Component Name	ID	Description	Unit	Cost	QTY	Total
Equipment Installation						
Truck, Pickup	939	Equipment and power unit costs. Labor not included.	Hours	$24.18	6	$145.08
Chemical, ground application	948	Chemical application performed by ground equipment. Includes equipment, power unit and labor costs.	Acres	$5.80	4	$23.20
Tractor, agricultural, 60 HP	963	Agricultural tractor with horsepower range of 50 to 90. Equipment and power unit costs. Labor not included.	Hours	$23.10	6	$138.60
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.	Hours	$5.96	6	$35.76
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.	Hours	$27.56	6	$165.36
Equipment Operators, Light	232	Includes: Skid Steer Loaders, Hydraulic Excavators <50 HP, Trenchers <12 in., Ag Equipment <150 HP, Pickup Trucks, Forklifts, Mulchers	Hours	$27.87	6	$167.22
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.	Hours	$46.88	6	$281.28
Materials						
Herbicide, Glyphosate	334	A broad-spectrum, non-selective systemic herbicide. Refer to WIN-PST for product names and active ingredients. Includes materials and shipping only.	Acres	$9.21	4	$36.84
Herbicide, Sulfometuron & metsulfuron	344	A residual sulfonylurea herbicide that kills broadleaf weeds and some annual grasses. It is a systemic compound with foliar and soil activity. Refer to WIN-PST for product names and active ingredients. Includes materials and shipping only.	Acres	$10.96	4	$43.84
Herbicide, Surfactant	1095	Surfactants reduce the surface tension of water to produce more uniform coverage and penetration of herbicides, and weed killers. Paraffin Based Petroleum Surfactant. Refer to WIN-PST for product names and active ingredients. Includes materials and shipping only.	Acres	$1.51	3	$4.53
Tree, Hardwood, Seedling, Medium	1510	Bare root hardwood seedlings 18 to 36 inches tall; includes tropical containerized seedlings of 10 to 20 cubic inches. Includes materials and shipping only.	Each	$1.52	7260	$11,035.20
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	$171.94	1	$171.94

Practice: E612C - Establishing tree/shrub species to restore native plant communities

Scenario: #1 - Establishing tree/shrub species to restore native plant communities

Scenario Description:

Establish trees and/or shrubs to restore elements of plant diversity that have been lost through past diseases or improper management. For example, disease-resistant varieties of elm and chestnut can be established to restore the ecological functions of American elm and American chestnut. At the stand level, past forest management may have eliminated certain native tree species. Restoring stand-level diversity and function addresses a wide array of resource concerns and strengthens ongoing management activities. This enhancement improves a forest that is already in good condition by increasing plant diversity, and improving health and vigor through adding plants with resistance to disease, pests, or other local hazards. Additional benefits include contributing to carbon storage, and providing diversity in wildlife habitat and food sources.

Before Situation:

Resources are protected at the minimum level of the Conservation Practice Standard (CPS) 612 - Tree/Shrub Establishment

After Situation:

The adoption of this enhancement will provide resource protection above the minimum level as described in Conservation Practice Standard (CPS) 612 - Tree/Shrub Establishment

Feature Measure: Acre

Scenario Unit: Acres

Scenario Typical Size: 5.0

Scenario Total Cost: $4,723.26

Scenario Cost/Unit: $944.65

Cost Details:

Component Name	ID	Description	Unit	Cost	QTY	Total
Equipment Installation						
Truck, Pickup	939	Equipment and power unit costs. Labor not included.	Hours	$24.18	2	$48.36
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.	Hours	$11.47	12	$137.64
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.	Hours	$27.56	12	$330.72
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.	Hours	$102.76	4	$411.04
Materials						
Shrub, Potted, Small	1524	Potted shrub seedling, 1 quart to 1 gallon. Includes materials and shipping only.	Each	$6.41	50	$320.50
Tree, Hardwood, Potted, Medium	1532	Potted hardwood seedling, 2 gallons or larger. Includes materials and shipping only.	Each	$14.60	100	$1,460.00
Tree, Conifer, Potted, Medium	1537	Potted conifer seedling, 2 gallons or larger. Includes materials and shipping only.	Each	$13.76	100	$1,376.00
Tree shelter, solid tube type, 4 in. x 60 in.	1567	4 inch x 60 inch tree tube for protection from animal damage. Materials only.	Each	$4.26	150	$639.00

Practice: E612D - Adding food-producing trees and shrubs to existing plantings

Scenario: #1 - Adding food-producing trees and shrubs to existing plantings

Scenario Description:
Plant food-producing trees and shrubs for wildlife or human consumption within windbreaks, alley cropping, multi-story cropping, silvopasture systems, and/or riparian forest buffers.

Before Situation:
Resources are protected at the minimum level of the Conservation Practice Standard (CPS) 612 - Tree/Shrub Establishment

After Situation:
The adoption of this enhancement will provide resource protection above the minimum level as described in Conservation Practice Standard (CPS) 612 - Tree/Shrub Establishment

Feature Measure: Acres

Scenario Unit: Acres

Scenario Typical Size: 10.0

Scenario Total Cost: $2,101.43

Scenario Cost/Unit: $210.14

Cost Details:

Component Name	ID	Description	Unit	Cost	QTY	Total
Equipment Installation						
Truck, Pickup	939	Equipment and power unit costs. Labor not included.	Hours	$24.18	2	$48.36
Chemical, ground application	948	Chemical application performed by ground equipment. Includes equipment, power unit and labor costs.	Acres	$5.80	1	$5.80
All terrain vehicles, ATV	965	Includes equipment, power unit and labor costs.	Hours	$21.14	10	$211.40
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.	Hours	$11.47	10	$114.70
Foregone Income						
FI, Corn Dryland	1959	Dryland Corn is Primary Crop	Acres	$270.47	0.41	$110.89
FI, Soybeans Dryland	1961	Dryland Soybeans is Primary Crop	Acres	$261.29	0.36	$94.06
FI, Wheat Dryland	1963	Dryland Wheat is Primary Crop	Acres	$214.72	0.23	$49.39
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.	Hours	$27.56	10	$275.60
Materials						
Herbicide, Glyphosate	334	A broad-spectrum, non-selective systemic herbicide. Refer to WIN-PST for product names and active ingredients. Includes materials and shipping only.	Acres	$9.21	1	$9.21
Herbicide, Sulfometuron & metsulfuron	344	A residual sulfonylurea herbicide that kills broadleaf weeds and some annual grasses. It is a systemic compound with foliar and soil activity. Refer to WIN-PST for product names and active ingredients. Includes materials and shipping only.	Acres	$10.96	1	$10.96
Herbicide, Surfactant	1095	Surfactants reduce the surface tension of water to produce more uniform coverage and penetration of herbicides, and weed killers. Paraffin Based Petroleum Surfactant. Refer to WIN-PST for product names and active ingredients. Includes materials and shipping only.	Acres	$1.51	1	$1.51
Shrub, Seedling, Medium	1507	Bare root shrub seedling, 18 to 36 inches tall; includes tropical containerized seedlings 10 to 20 cubic inches. Includes materials and shipping only.	Each	$1.41	341	$480.81
Tree, Hardwood, Seedling, Medium	1510	Bare root hardwood seedlings 18 to 36 inches tall; includes tropical containerized seedlings of 10 to 20 cubic inches. Includes materials and shipping only.	Each	$1.52	340	$516.80
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	$171.94	1	$171.94

Practice: E612E - Cultural plantings

Scenario: #1 - Cultural plantings

Scenario Description:
Plant trees and shrubs that are of cultural significance, such as those species utilized by Tribes in traditional practices, medicinal plants, species used in basket-making, etc. (e.g., paper birch, slippery elm, witch hazel).

Before Situation:
Resources are protected at the minimum level of the Conservation Practice Standard (CPS) 612 - Tree/Shrub Establishment

After Situation:
The adoption of this enhancement will provide resource protection above the minimum level as described in Conservation Practice Standard (CPS) 612 - Tree/Shrub Establishment

Feature Measure: Acre

Scenario Unit: Acres

Scenario Typical Size: 1.0

Scenario Total Cost: $1,927.54

Scenario Cost/Unit: $1,927.54

Cost Details:

Component Name	ID	Description	Unit	Cost	QTY	Total
Equipment Installation						
Truck, Pickup	939	Equipment and power unit costs. Labor not included.	Hours	$24.18	2	$48.36
Chemical, ground application	948	Chemical application performed by ground equipment. Includes equipment, power unit and labor costs.	Acres	$5.80	1	$5.80
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.	Hours	$11.47	10	$114.70
Foregone Income						
FI, Corn Dryland	1959	Dryland Corn is Primary Crop	Acres	$270.47	0.41	$110.89
FI, Soybeans Dryland	1961	Dryland Soybeans is Primary Crop	Acres	$261.29	0.36	$94.06
FI, Wheat Dryland	1963	Dryland Wheat is Primary Crop	Acres	$214.72	0.23	$49.39
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.	Hours	$27.56	10	$275.60
Materials						
Herbicide, Glyphosate	334	A broad-spectrum, non-selective systemic herbicide. Refer to WIN-PST for product names and active ingredients. Includes materials and shipping only.	Acres	$9.21	1	$9.21
Herbicide, Sulfometuron & metsulfuron	344	A residual sulfonylurea herbicide that kills broadleaf weeds and some annual grasses. It is a systemic compound with foliar and soil activity. Refer to WIN-PST for product names and active ingredients. Includes materials and shipping only.	Acres	$10.96	1	$10.96
Herbicide, Surfactant	1095	Surfactants reduce the surface tension of water to produce more uniform coverage and penetration of herbicides, and weed killers. Paraffin Based Petroleum Surfactant. Refer to WIN-PST for product names and active ingredients. Includes materials and shipping only.	Acres	$1.51	1	$1.51
Tree, Hardwood, Seedling, Medium	1510	Bare root hardwood seedlings 18 to 36 inches tall; includes tropical containerized seedlings of 10 to 20 cubic inches. Includes materials and shipping only.	Each	$1.52	681	$1,035.12
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	$171.94	1	$171.94

Practice: E612F - Sugarbush management

Scenario: #1 - Sugarbush management

Scenario Description:

Establish or maintain species diversity in a sugarbush to enhance pollinator and wildlife needs. Maintain at least 20% of basal area in species other than sugar maple (Acer saccharum) to provide species diversity. Half of the trees that are not sugar maples (10%) will be mast producing species (hard or soft mass). Use maple tree tapping guidelines that minimize tree damage.

Before Situation:

Resources are protected at the minimum level of the Conservation Practice Standard (CPS) 612 - Tree/Shrub Establishment

After Situation:

The adoption of this enhancement will provide resource protection above the minimum level as described in Conservation Practice Standard (CPS) 612 - Tree/Shrub Establishment

Feature Measure: Acres

Scenario Unit: Acres

Scenario Typical Size: 1.0

Scenario Total Cost: $848.28

Scenario Cost/Unit: $848.28

Cost Details:

Component Name	ID	Description	Unit	Cost	QTY	Total
Equipment Installation						
Chainsaw	937	Equipment and power unit costs. Labor not included.	Hours	$7.15	2	$14.30
Truck, Pickup	939	Equipment and power unit costs. Labor not included.	Hours	$24.18	2	$48.36
Chemical, spot treatment, single stem application	964	Ground applied chemical to individual plants or group of plants, e.g., backpack sprayer treatment. Equipment and labor cost included.	Hours	$71.67	1	$71.67
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.	Hours	$11.47	2	$22.94
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.	Hours	$27.56	10	$275.60
Materials						
Herbicide, Glyphosate	334	A broad-spectrum, non-selective systemic herbicide. Refer to WIN-PST for product names and active ingredients. Includes materials and shipping only.	Acres	$9.21	0.5	$4.61
Tree, Hardwood, Potted, Medium	1532	Potted hardwood seedling, 2 gallons or larger. Includes materials and shipping only.	Each	$14.60	20	$292.00
Tree shelter, solid tube type, 4 in. x 60 in.	1567	4 inch x 60 inch tree tube for protection from animal damage. Materials only.	Each	$4.26	20	$85.20
Cable ties, plastic	1575	Plastic cable ties (typ. 8-12 in.) to assist in securing items. Materials only.	Each	$0.06	60	$3.60
Stakes, wood, 3/4 in. x 3/4 in. x 60 in.	1583	3/4 in. x 3/4 in. x 60 in. wood stakes to fasten items in place. Includes materials only.	Each	$1.50	20	$30.00

Practice: E612G - Tree/shrub planting for wildlife food

Scenario: #1 - Tree/shrub planting for wildlife food

Scenario Description:

Tree or shrub planting to enhance habitat for native wildlife. A minimum of five tree or shrub species will be used; they will be species that provide food and/or cover for identified wildlife species.

Before Situation:

Resources are protected at the minimum level of the Conservation Practice Standard (CPS) 612 - Tree/Shrub Establishment

After Situation:

The adoption of this enhancement will provide resource protection above the minimum level as described in Conservation Practice Standard (CPS) 612 - Tree/Shrub Establishment

Feature Measure: Acre

Scenario Unit: Acres

Scenario Typical Size: 1.0

Scenario Total Cost: $1,943.92

Scenario Cost/Unit: $1,943.92

Cost Details:

Component Name	ID	Description	Unit	Cost	QTY	Total
Equipment Installation						
Truck, Pickup	939	Equipment and power unit costs. Labor not included.	Hours	$24.18	2	$48.36
Chemical, ground application	948	Chemical application performed by ground equipment. Includes equipment, power unit and labor costs.	Acres	$5.80	1	$5.80
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.	Hours	$11.47	11	$126.17
Foregone Income						
FI, Corn Dryland	1959	Dryland Corn is Primary Crop	Acres	$270.47	0.41	$110.89
FI, Soybeans Dryland	1961	Dryland Soybeans is Primary Crop	Acres	$261.29	0.36	$94.06
FI, Wheat Dryland	1963	Dryland Wheat is Primary Crop	Acres	$214.72	0.23	$49.39
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.	Hours	$27.56	11	$303.16
Materials						
Herbicide, Glyphosate	334	A broad-spectrum, non-selective systemic herbicide. Refer to WIN-PST for product names and active ingredients. Includes materials and shipping only.	Acres	$9.21	1	$9.21
Herbicide, Sulfometuron & metsulfuron	344	A residual sulfonylurea herbicide that kills broadleaf weeds and some annual grasses. It is a systemic compound with foliar and soil activity. Refer to WIN-PST for product names and active ingredients. Includes materials and shipping only.	Acres	$10.96	1	$10.96
Herbicide, Surfactant	1095	Surfactants reduce the surface tension of water to produce more uniform coverage and penetration of herbicides, and weed killers. Paraffin Based Petroleum Surfactant. Refer to WIN-PST for product names and active ingredients. Includes materials and shipping only.	Acres	$1.51	1	$1.51
Shrub, Seedling, Medium	1507	Bare root shrub seedling, 18 to 36 inches tall; includes tropical containerized seedlings 10 to 20 cubic inches. Includes materials and shipping only.	Each	$1.41	605	$853.05
Tree, Hardwood, Seedling, Medium	1510	Bare root hardwood seedlings 18 to 36 inches tall; includes tropical containerized seedlings of 10 to 20 cubic inches. Includes materials and shipping only.	Each	$1.52	218	$331.36

Practice: E643A - Restoration of sensitive coastal vegetative communities

Scenario: #1 - Restoration of sensitive coastal vegetative communities

Scenario Description:

Enhance the level of restoration in unique and diminishing coastal ecosystems by establishing native herbaceous and woody plants. Protect established vegetation, and manage to maintain floristic quality and the provision of environmental services. This enhancement is applied on unique areas with rare and declining habitat conditions, where vegetation has been detrimentally altered by human or natural events. Targeted sites are those that formerly supported vegetative communities that are now declining and/or becoming rare. The sites will vary across the continent. The enhancement will expand and elevate the process of restoring these unique areas, increasing their ecological value and benefits to wildlife. It re-establishes a select group of trees and/or shrubs that are key components in this ecosystem.

Before Situation:

Resources are protected at the minimum level of the Conservation Practice Standard (CPS) 643 - Restoration and Management of Rare and Declining Habitats

After Situation:

The adoption of this enhancement will provide resource protection above the minimum level as described in Conservation Practice Standard (CPS) 643 - Restoration and Management of Rare and Declining Habitats

Feature Measure: Each

Scenario Unit: Each

Scenario Typical Size: 25.0

Scenario Total Cost: $3,235.45

Scenario Cost/Unit: $129.42

Cost Details:

Component Name	ID	Description	Unit	Cost	QTY	Total
Equipment Installation						
Skidsteer, 80 HP	933	Skidsteer loader with horsepower range of 60 to 90. Equipment and power unit costs. Labor not included.	Hours	$55.01	8	$440.08
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.	Hours	$11.47	8	$91.76
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.	Hours	$27.56	8	$220.48
Equipment Operators, Light	232	Includes: Skid Steer Loaders, Hydraulic Excavators <50 HP, Trenchers <12 in., Ag Equipment <150 HP, Pickup Trucks, Forklifts, Mulchers	Hours	$27.87	8	$222.96
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.	Hours	$46.88	2	$93.76
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.	Hours	$102.76	7	$719.32
Materials						
Post, Steel T, 1.33 lbs, 6'	15	Steel Post, Studded 6' - 1.33 lb. Includes materials and shipping only.	Each	$6.08	50	$304.00
Tree Marking Paint	313	Trees to be cut through tree marking are physically identified through the application of paint on the tree. Typically one quart of paint is used to mark one acre of trees. Includes materials and shipping only.	Acres	$8.78	5	$43.90
Cattle Panel	1409	Welded wire cattle panel typically 1/4" galvanized steel rods, 50" high x 16' long. Materials only.	Each	$22.49	25	$562.25
Tree, Hardwood, Potted, Medium	1532	Potted hardwood seedling, 2 gallons or larger. Includes materials and shipping only.	Each	$14.60	25	$365.00
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	$171.94	1	$171.94

Practice: E643B - Restoration and management of rare or declining habitat

Scenario: #1 - Restoration and management of rare or declining habitat

Scenario Description:
Provide protection from adverse environmental conditions to create refugia for documented occurrences of sensitive plant communities.

Before Situation:
Resources are protected at the minimum level of the Conservation Practice Standard (CPS) 643 - Restoration and Management of Rare and Declining Habitats

After Situation:
The adoption of this enhancement will provide resource protection above the minimum level as described in Conservation Practice Standard (CPS) 643 - Restoration and Management of Rare and Declining Habitats

Feature Measure: Feet of Fence

Scenario Unit: Feet

Scenario Typical Size: 440.0

Scenario Total Cost: $3,689.12

Scenario Cost/Unit: $8.38

Cost Details:

Component Name	ID	Description	Unit	Cost	QTY	Total
Equipment Installation						
Auger, Post driver attachment	934	Auger or post driver attachment to a tractor or skidsteer. Does not include power unit. Labor not included.	Hours	$12.74	8	$101.92
Chainsaw	937	Equipment and power unit costs. Labor not included.	Hours	$7.15	2	$14.30
Truck, Pickup	939	Equipment and power unit costs. Labor not included.	Hours	$24.18	8	$193.44
Tractor, agricultural, 60 HP	963	Agricultural tractor with horsepower range of 50 to 90. Equipment and power unit costs. Labor not included.	Hours	$23.10	8	$184.80
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.	Hours	$27.56	16	$440.96
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.	Hours	$102.76	2	$205.52
Materials						
Wire, Woven, Galvanized, 12.5 Gauge, 48 inch	4	Galvanized 12.5 gauge, 48 in. - 330' roll. Includes materials and shipping only.	Each	$263.35	3	$790.05
Post, Wood, CCA treated, 6 in. x 12-14 ft.	13	Wood Post, Line/End 6 inch dia. X 12-14 ft., CCA Treated. Includes materials and shipping only.	Each	$31.76	38	$1,206.88
Fence, Wire Assembly, Woven Wire	35	Brace pins, twist sticks, staples. Includes materials and shipping only.	Feet	$0.10	1648	$164.80
Gate, Game, 8 ft. High X 4 ft. Length	1082	4 Foot wide game gate (8 feet tall). Includes materials and shipping only.	Each	$214.51	1	$214.51
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	$171.94	1	$171.94

Practice: E643C - Restore glade habitat to benefit threatened and endangered species and state species of concern

Scenario: #7 - Restore glade habitat to benefit threatened and endangered species and state species of concern

Scenario Description:

Restore Glade natural communities as shown by the Ecological Site Description to conserve biodiversity. Enhancement requires reducing woody canopy cover and applying at least one prescribed fire to treated acres. Restoration of glade communities provide habitat for rare and declining species. Sites that previously or currently support the rare and declining habitat will be targeted for restoration.

Before Situation:

Resources are protected at the minimum level of the Conservation Practice Standard 643 - Restoration of Rare or Declining Habitat.

After Situation:

The adoption of this enhancement will provide resource protection above the minimum level as described in Conservation Practice Standard 643 - Restoration of Rare or Declining Habitat.

Feature Measure: Acres

Scenario Unit: Acres

Scenario Typical Size: 5.0

Scenario Total Cost: $6,268.18

Scenario Cost/Unit: $1,253.64

Cost Details:

Component Name	ID	Description	Unit	Cost	QTY	Total
Equipment Installation						
Skidsteer, 80 HP	933	Skidsteer loader with horsepower range of 60 to 90. Equipment and power unit costs. Labor not included.	Hours	$55.01	2	$110.02
Chainsaw	937	Equipment and power unit costs. Labor not included.	Hours	$7.15	80	$572.00
Truck, Pickup	939	Equipment and power unit costs. Labor not included.	Hours	$24.18	2.5	$60.45
Chemical, spot treatment, single stem application	964	Ground applied chemical to individual plants or group of plants, e.g., backpack sprayer treatment. Equipment and labor cost included.	Hours	$71.67	1.5	$107.51
All terrain vehicles, ATV	965	Includes equipment, power unit and labor costs.	Hours	$21.14	22	$465.08
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.	Hours	$14.01	2	$28.02
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.	Hours	$37.19	116	$4,314.04
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.	Hours	$46.88	4	$187.52
Materials						
Herbicide, Triclopyor	338	Refer to WIN-PST for product names and active ingredients. Materials and shipping	Acres	$27.92	0.5	$13.96
Fuel, ignition fuel mixture	1596	Mixture of gasoline and diesel for ignition of prescribed burns. Materials only.	Gallons	$2.55	5	$12.75
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	$70.59	2	$141.18
Mobilization, medium equipment	1139	Equipment with 70-150 HP or typical weights between 14,000 and 30,000 pounds.	Each	$255.65	1	$255.65

Practice: E644A - Managing Flood-Irrigated Landscapes for Wildlife

Scenario: #1 - Managing Flood-Irrigated Landscapes for Wildlife

Scenario Description:

Developing and implementing a conservation plan that supports maintenance of flood-irrigation in key landscapes to provide important foraging habitat for local breeding and migratory waterfowl and waterbirds.

Before Situation:

Resources are protected at the minimum level of the Conservation Practice Standard (CPS) 644 – Wetland Wildlife Habitat Management

After Situation:

The adoption of this enhancement will provide resource protection above the minimum level as described in Conservation Practice Standard (CPS) 644 – Wetland Wildlife Habitat Management

Feature Measure: Acre

Scenario Unit: Acres

Scenario Typical Size: 50.0

Scenario Total Cost: $1,337.74

Scenario Cost/Unit: $26.75

Cost Details:

Component Name	ID	Description	Unit	Cost	QTY	Total
Equipment Installation						
Truck, Pickup	939	Equipment and power unit costs. Labor not included.	Hours	$24.18	9	$217.62
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.	Hours	$27.56	22	$606.32
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.	Hours	$102.76	5	$513.80

Practice: E645A - Reduction of attractants to human-subsidized predators in sensitive wildlife species habitat

Scenario: #1 - Reduction of attractants to human-subsidized predators in sensitive wildlife species habitat

Scenario Description:

Reduction of artificial perching sites, nest sites, food, and water available to subsidized predators in areas where human-subsidized predators are a threat to sensitive wildlife species. Human-subsidized predators may include ravens, crows, magpies, coyotes, foxes, skunks, raccoons, and other species. Activities under this enhancement may include removal of non- native or invasive trees; removal of unused power poles, corrals, windmills, buildings, and other vertical structures; and/or removal or management of watering facilities, dead livestock, road kill, garbage, animal feed, dumps, and other non-natural food sources.

Before Situation:

Resources are protected at the minimum level of the Conservation Practice Standard (CPS) 645 - Upland Wildlife Habitat Management

After Situation:

The adoption of this enhancement will provide resource protection above the minimum level as described in Conservation Practice Standard (CPS) 645 - Upland Wildlife Habitat Management

Feature Measure: Acre

Scenario Unit: Number

Scenario Typical Size: 40.0

Scenario Total Cost: $2,161.20

Scenario Cost/Unit: $54.03

Cost Details:

Component Name	ID	Description	Unit	Cost	QTY	Total
Equipment Installation						
Truck, Pickup	939	Equipment and power unit costs. Labor not included.	Hours	$24.18	24	$580.32
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.	Hours	$10.75	24	$258.00
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.	Hours	$27.56	48	$1,322.88

Practice: E645B - Manage existing shrub thickets to provide adequate shelter for wildlife

Scenario: #7 - Manage existing shrub thickets to provide adequate shelter for wildlife

Scenario Description:

Existing shrub thickets provide an instant and important cover for wildlife. Various wildlife species may use shrubs as winter/thermal cover, summer shade, roosting, or as escape cover from predators. Proper management ensures that these shrubs will continue to provide the desired benefits for the local wildlife. A combination of herbicide treatments, cutting and trimming branches, and removal of other competing vegetation will occur. An eligible existing shrub thicket needs to have a canopy cover of 750 square feet, with an end goal of expanding to 1500 square feet. Any existing shrub thicket (not hand planted within the last 5 years) are eligible for this enhancement. Shrub thickets found within fence rows may now be very wide, but still meet the 750 square feet, are eligible.

Before Situation:

Resources are protected at the minimum level of the Conservation Practice Standard 645 - Upland Wildlife Habitat Management

After Situation:

The adoption of this enhancement will provide resource protection above the minimum level as described in Conservation Practice Standard 645 - Upland Wildlife Habitat Management

Feature Measure: Acres

Scenario Unit: Acres

Scenario Typical Size: 1.0

Scenario Total Cost: $317.35

Scenario Cost/Unit: $317.35

Cost Details:

Component Name	ID	Description	Unit	Cost	QTY	Total
Equipment Installation						
Chainsaw	937	Equipment and power unit costs. Labor not included.	Hours	$7.15	2	$14.30
Pruning tools, hand tools	1318	Pruning tools, hand tools, shears, loppers, pole saw, handsaw. Material costs only. Labor not included.	Hours	$2.13	2	$4.26
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.	Hours	$37.19	2	$74.38
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.	Hours	$27.56	4	$110.24
Materials						
Herbicide, Imazapyr	336	Pre and post-emergent, non-selective herbicide for control of undesirable vegetation in non-crop areas. Refer to WIN-PST for product names and active ingredients. Includes materials and shipping only.	Acres	$42.07	1	$42.07
Herbicide, Surfactant	1095	Surfactants reduce the surface tension of water to produce more uniform coverage and penetration of herbicides, and weed killers. Paraffin Based Petroleum Surfactant. Refer to WIN-PST for product names and active ingredients. Includes materials and shipping only.	Acres	$1.51	1	$1.51
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	$70.59	1	$70.59

Practice: E645C - Edge feathering for wildlife cover

Scenario: #7 - Edge feathering for wildlife cover

Scenario Description:

Selected trees are cut and brush clipped along the border between a wooded area and a grassland, cropland, or idle land, creating a dense woody cover of interlocking branches at ground level. The feathered edge will be an average of 30 feet wide and a minimum of 50 feet long, resulting in an area of 1500 square feet. The width of the strip will vary to follow topographic features and to create a wavy border; the design will also consider aesthetics. Vegetative composition and cover will vary within the edge, ranging from areas with no trees and shrubs to areas with scattered trees and extensive shrub cover. The variation in vegetation structure along with variable width of the edge will create feathering. The edge may include shrub plantings for wildlife food and aesthetics.

Before Situation:

Resources are protected at the minimum level of the Conservation Practice Standard 645 - Upland Wildlife Habitat Management

After Situation:

The adoption of this enhancement will provide resource protection above the minimum level as described in Conservation Practice Standard 645 - Upland Wildlife Habitat Management

Feature Measure: Acres

Scenario Unit: Acres

Scenario Typical Size: 1.0

Scenario Total Cost: $872.17

Scenario Cost/Unit: $872.17

Cost Details:

Component Name	ID	Description	Unit	Cost	QTY	Total
Equipment Installation						
Chainsaw	937	Equipment and power unit costs. Labor not included.	Hours	$7.15	8	$57.20
Chemical, spot treatment, single stem application	964	Ground applied chemical to individual plants or group of plants, e.g., backpack sprayer treatment. Equipment and labor cost included.	Hours	$71.67	2	$143.34
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.	Hours	$37.19	8	$297.52
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.	Hours	$27.56	8	$220.48
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.	Hours	$27.56	2	$55.12
Materials						
Herbicide, Triclopyor	338	Refer to WIN-PST for product names and active ingredients. Materials and shipping	Acres	$27.92	1	$27.92
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	$70.59	1	$70.59

Practice: E646A - Close structures to capture and retain rainfall for waterfowl and wading bird winter habitat

Scenario: #1 - Close structures to capture and retain rainfall for waterfowl and wading bird winter habitat

Scenario Description:

When flooded to shallow depths during fall and winter, agricultural fields provide ideal foraging habitat for myriad species of waterfowl and wading birds . In addition, flooded conditions promote establishment of aquatic invertebrate populations, thus providing protein-rich food sources for shorebirds as well as waterfowl and wading birds.

Before Situation:

Resources are protected at the minimum level of the Conservation Practice Standard (CPS) 646 - Shallow Water Development and Management

After Situation:

The adoption of this enhancement will provide resource protection above the minimum level as described in Conservation Practice Standard (CPS) 646 - Shallow Water Development and Management

Feature Measure: acre

Scenario Unit: Acres

Scenario Typical Size: 50.0

Scenario Total Cost: $1,463.82

Scenario Cost/Unit: $29.28

Cost Details:

Component Name	ID	Description	Unit	Cost	QTY	Total
Equipment Installation						
Truck, Pickup	939	Equipment and power unit costs. Labor not included.	Hours	$24.18	9	$217.62
Mower, Bush Hog	940	Equipment and power unit costs. Labor not included.	Hours	$50.43	2.5	$126.08
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.	Hours	$27.56	22	$606.32
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.	Hours	$102.76	5	$513.80

Practice: E646C - Manipulate vegetation and maintain closed structures for shorebirds mid-summer habitat

Scenario: #1 - Manipulate vegetation and maintain closed structures for shorebirds mid-summer habitat

Scenario Description:

Suitable shorebird habitat is limited during the summer and fall as birds migrate south post-breeding and providing shallow water and mud flat habitat will benefit a variety of shorebird species. Optimal conditions are created when water levels are slowly reduced through evaporation, which allows for propagation of invertebrates (typically insect larvae) used as food by shorebirds. Manipulation of vegetation, preferably through rolling, creates open conditions required by this suite of birds as a means to detect and avoid predators, and provides nutrient inputs for invertebrate production.

Before Situation:

Resources are protected at the minimum level of the Conservation Practice Standard (CPS) 646 - Shallow Water Development and Management

After Situation:

The adoption of this enhancement will provide resource protection above the minimum level as described in Conservation Practice Standard (CPS) 646 - Shallow Water Development and Management

Feature Measure: acre

Scenario Unit: Acres

Scenario Typical Size: 50.0

Scenario Total Cost: $2,723.56

Scenario Cost/Unit: $54.47

Cost Details:

Component Name	ID	Description	Unit	Cost	QTY	Total
Equipment Installation						
Truck, Pickup	939	Equipment and power unit costs. Labor not included.	Hours	$24.18	9	$217.62
Mower, Bush Hog	940	Equipment and power unit costs. Labor not included.	Hours	$50.43	4.5	$226.94
Tillage, Primary	946	Includes heavy disking (offset) or chisel plow. Includes equipment, power unit and labor costs.	Acres	$16.30	50	$815.00
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.	Hours	$27.56	22	$606.32
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.	Hours	$102.76	5	$513.80
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	$171.94	2	$343.88

Practice: E647B - Provide early successional shorebird habitat between first crop and ratoon crop

Scenario: #1 - Provide early successional shorebird habitat between first crop and ratoon crop

Scenario Description:

Many declining suites of wildlife species rely on early successional habitats for at least part of their life cycle needs. Migratory shorebird species in particular rely on open, moist soil or shallowly flooded conditions for foraging and security. Rice farms support many migratory and resident water bird species. The first rice crop harvest often coincides with the arrival of early migrating shorebirds. This time of year is also the highest rainfall months. If standing rice stubble from the first crop is rolled to push above-ground stalks level with the soil surface, the first component of this type of habitat is met. When moisture is added to this situation, short-term habitat is available until the ratoon crop initiates growth to a height beyond that which would provide benefit to the early successional species.

Before Situation:

Resources are protected at the minimum level of the Conservation Practice Standard (CPS) 647 - Early Successional Habitat Development and Management

After Situation:

The adoption of this enhancement will provide resource protection above the minimum level as described in Conservation Practice Standard (CPS) 647 - Early Successional Habitat Development and Management

Feature Measure: Acre

Scenario Unit: Acres

Scenario Typical Size: 50.0

Scenario Total Cost: $1,140.98

Scenario Cost/Unit: $22.82

Cost Details:

Component Name	ID	Description	Unit	Cost	QTY	Total
Equipment Installation						
Tractor, agricultural, 120 HP	962	Agricultural tractor with horsepower range of 90 to 140. Equipment and power unit costs. Labor not included.	Hours	$50.84	8	$406.72
Labor						
Equipment Operators, Light	232	Includes: Skid Steer Loaders, Hydraulic Excavators <50 HP, Trenchers <12 in., Ag Equipment <150 HP, Pickup Trucks, Forklifts, Mulchers	Hours	$27.87	8	$222.96
Mobilization						
Mobilization, medium equipment	1139	Equipment with 70-150 HP or typical weights between 14,000 and 30,000 pounds.	Each	$255.65	2	$511.30

Practice: E647C - Maintain most soil vegetation on cropland edges to enhance waterfowl and shorebird habitat

Scenario: #1 - Maintain most soil vegetation on cropland edges to enhance waterfowl and shorebird habitat

Scenario Description:

The wetter or more water saturated portions of cropland fields such as areas adjacent to field drains, have the potential to produce a significant amount of moist soil plants which are a tremendously valuable source of forage and cover for many waterfowl, shorebird and wading bird species, especially during a period of time when such plants may be limited. Under normal cropland production, the native vegetation is restricted on these sites through mechanical and/or chemical control. These maintained moist soil plants also will provide filtering and improve water quality.

Before Situation:

Resources are protected at the minimum level of the Conservation Practice Standard (CPS) 647 - Early Successional Habitat Development and Management

After Situation:

The adoption of this enhancement will provide resource protection above the minimum level as described in Conservation Practice Standard (CPS) 647 - Early Successional Habitat Development and Management

Feature Measure: Acre

Scenario Unit: Acres

Scenario Typical Size: 50.0

Scenario Total Cost: $578.78

Scenario Cost/Unit: $11.58

Cost Details:

Component Name	ID	Description	Unit	Cost	QTY	Total
Equipment Installation						
Mower, Bush Hog	940	Equipment and power unit costs. Labor not included.	Hours	$50.43	3	$151.29
Labor						
Equipment Operators, Light	232	Includes: Skid Steer Loaders, Hydraulic Excavators <50 HP, Trenchers <12 in., Ag Equipment <150 HP, Pickup Trucks, Forklifts, Mulchers	Hours	$27.87	3	$83.61
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	$171.94	2	$343.88

Practice: E666A - Maintaining and improving forest soil quality

Scenario: #1 - Maintaining and improving forest soil quality

Scenario Description:

Adopts guidelines for maintaining and improving soil quality on sites where forest management activities are practiced. These guidelines will increase soil organic matter content, improve nutrient cycling, and increase infiltration and retention of precipitation. Avoiding soil compaction will allow for greater root development and tree growth, limit windthrow, and reduce drought stress. Increasing carbon storage on site will maintain the soil microbial community and provide wildlife benefits.

Before Situation:

Resources are protected at the minimum level of the Conservation Practice Standard (CPS) 666 - Forest Stand Improvement

After Situation:

The adoption of this enhancement will provide resource protection above the minimum level as described in Conservation Practice Standard (CPS) 666 - Forest Stand Improvement

Feature Measure: Acre

Scenario Unit: Acres

Scenario Typical Size: 50.0

Scenario Total Cost: $2,085.12

Scenario Cost/Unit: $41.70

Cost Details:

Component Name	ID	Description	Unit	Cost	QTY	Total
Equipment Installation						
Chainsaw	937	Equipment and power unit costs. Labor not included.	Hours	$7.15	4	$28.60
Truck, Pickup	939	Equipment and power unit costs. Labor not included.	Hours	$24.18	2	$48.36
All terrain vehicles, ATV	965	Includes equipment, power unit and labor costs.	Hours	$21.14	4	$84.56
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.	Hours	$27.56	8	$220.48
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.	Hours	$102.76	13	$1,335.88
Materials						
Test, Soil Test, Standard	299	Includes materials, shiping, labor, and equipment costs.	Each	$11.76	10	$117.60
Tree Marking Paint	313	Trees to be cut through tree marking are physically identified through the application of paint on the tree. Typically one quart of paint is used to mark one acre of trees. Includes materials and shipping only.	Acres	$8.78	5	$43.90
Certified Organic, Annual Grasses, Legumes and/or Forbs	2343	Annual grasses, mostly introduced but may be native. Used for temporary cover or cover crops. Certified organic. Includes material and shipping only.	Acres	$68.58	3	$205.74

Practice: E666D - Forest management to enhance understory vegetation

Scenario: #1 - Forest management to enhance understory vegetation

Scenario Description:

This enhancement provides for management of the understory vegetation in a forested area by mechanical, chemical, and/or manual methods to improve the plant species mix and the health of the residual vegetation. Managing the understory vegetation increases available water to the plants, minimizes runoff and erosion, and improves water quality. An adequately stocked forest provides inputs of leaves, needles, and woody twigs and stems to the forest floor, adding to soil organic matter and contributing to forest soil health. Desirable tree species and understory vegetation, with spacing that allows ground cover to develop, will allow moisture to infiltrate and be stored in the soil, releasing moisture over longer periods of time.

Before Situation:

Resources are protected at the minimum level of the Conservation Practice Standard (CPS) 666 - Forest Stand Improvement

After Situation:

The adoption of this enhancement will provide resource protection above the minimum level as described in Conservation Practice Standard (CPS) 666 - Forest Stand Improvement

Feature Measure: Acre

Scenario Unit: Acres

Scenario Typical Size: 20.0

Scenario Total Cost: $5,186.42

Scenario Cost/Unit: $259.32

Cost Details:

Component Name	ID	Description	Unit	Cost	QTY	Total
Equipment Installation						
Mechanical cutter, chopper	943	Forestry mulcher, flail shredder, hydro axe, brush cutter, etc. Equipment and power unit costs. Labor not included.	Hours	$90.63	16	$1,450.08
Chemical, spot treatment, single stem application	964	Ground applied chemical to individual plants or group of plants, e.g., backpack sprayer treatment. Equipment and labor cost included.	Hours	$71.67	16	$1,146.72
Labor						
Equipment Operators, Light	232	Includes: Skid Steer Loaders, Hydraulic Excavators <50 HP, Trenchers <12 in., Ag Equipment <150 HP, Pickup Trucks, Forklifts, Mulchers	Hours	$27.87	16	$445.92
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.	Hours	$102.76	11	$1,130.36
Materials						
Herbicide, Imazapyr	336	Pre and post-emergent, non-selective herbicide for control of undesirable vegetation in non-crop areas. Refer to WIN-PST for product names and active ingredients. Includes materials and shipping only.	Acres	$42.07	20	$841.40
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	$171.94	1	$171.94

Practice: E666E - Reduce height of the forest understory to limit wildfire risk

Scenario: #1 - Reduce height of the forest understory to limit wildfire risk

Scenario Description:

Forest stand improvement that manages forest structure to reduce the risk of wildfire, and creates conditions that facilitate prescribed burning. The fire risk reduction is accomplished by reducing the height of the woody understory and midstory, creating space between the ground cover and the tree canopy. This enhancement provides for management of the understory vegetation in a forested area, using mechanical, chemical or manual methods to improve the plant species mix and the health of the residual vegetation, and reduce the risk of wildfire. In appropriate stands, the treatment creates conditions that favor prescribed burning. Forest stand improvement (FSI) activities are used to remove trees of undesirable species, form, quality, condition, or growth rate. The quantity and quality of forest for wildlife and/or timber production will be increased by manipulating stand density and structure. These treatments can also reduce wildfire hazards, improve forest health, restore natural plant communities, and achieve or maintain a desired native understory plant community for soil health, wildlife, grazing, and/or browsing.

Before Situation:

Resources are protected at the minimum level of the Conservation Practice Standard (CPS) 666 - Forest Stand Improvement

After Situation:

The adoption of this enhancement will provide resource protection above the minimum level as described in Conservation Practice Standard (CPS) 666 - Forest Stand Improvement

Feature Measure: Acre

Scenario Unit: Acres

Scenario Typical Size: 20.0

Scenario Total Cost: $5,186.42

Scenario Cost/Unit: $259.32

Cost Details:

Component Name	ID	Description	Unit	Cost	QTY	Total
Equipment Installation						
Mechanical cutter, chopper	943	Forestry mulcher, flail shredder, hydro axe, brush cutter, etc. Equipment and power unit costs. Labor not included.	Hours	$90.63	16	$1,450.08
Chemical, spot treatment, single stem application	964	Ground applied chemical to individual plants or group of plants, e.g., backpack sprayer treatment. Equipment and labor cost included.	Hours	$71.67	16	$1,146.72
Labor						
Equipment Operators, Light	232	Includes: Skid Steer Loaders, Hydraulic Excavators <50 HP, Trenchers <12 in., Ag Equipment <150 HP, Pickup Trucks, Forklifts, Mulchers	Hours	$27.87	16	$445.92
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.	Hours	$102.76	11	$1,130.36
Materials						
Herbicide, Imazapyr	336	Pre and post-emergent, non-selective herbicide for control of undesirable vegetation in non-crop areas. Refer to WIN-PST for product names and active ingredients. Includes materials and shipping only.	Acres	$42.07	20	$841.40
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	$171.94	1	$171.94

Practice: E666F - Reduce forest stand density to create open stand structure

Scenario: #1 - Reduce forest stand density to create open stand structure

Scenario Description:

Reducing forest stand density creates open forest conditions with a low basal area which promotes the health and vigor of the residual trees. The open stand structure allows a significant amount of sunlight to reach the forest floor and stimulates the growth of understory vegetation. Understory vegetation management, along with the wide spacing between trees or clumps of trees, provides visual appeal, lowers the risk of wildfire, and provides habitat for many at-risk and listed wildlife species. The enhancement creates conditions that facilitate a follow-up treatment with prescribed burning.

Before Situation:

Resources are protected at the minimum level of the Conservation Practice Standard (CPS) 666 - Forest Stand Improvement

After Situation:

The adoption of this enhancement will provide resource protection above the minimum level as described in Conservation Practice Standard (CPS) 666 - Forest Stand Improvement

Feature Measure: Acre

Scenario Unit: Acres

Scenario Typical Size: 20.0

Scenario Total Cost: $5,947.10

Scenario Cost/Unit: $297.36

Cost Details:

Component Name	ID	Description	Unit	Cost	QTY	Total
Equipment Installation						
Mechanical cutter, chopper	943	Forestry mulcher, flail shredder, hydro axe, brush cutter, etc. Equipment and power unit costs. Labor not included.	Hours	$90.63	20	$1,812.60
Chemical, spot treatment, single stem application	964	Ground applied chemical to individual plants or group of plants, e.g., backpack sprayer treatment. Equipment and labor cost included.	Hours	$71.67	20	$1,433.40
Labor						
Equipment Operators, Light	232	Includes: Skid Steer Loaders, Hydraulic Excavators <50 HP, Trenchers <12 in., Ag Equipment <150 HP, Pickup Trucks, Forklifts, Mulchers	Hours	$27.87	20	$557.40
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.	Hours	$102.76	11	$1,130.36
Materials						
Herbicide, Imazapyr	336	Pre and post-emergent, non-selective herbicide for control of undesirable vegetation in non-crop areas. Refer to WIN-PST for product names and active ingredients. Includes materials and shipping only.	Acres	$42.07	20	$841.40
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	$171.94	1	$171.94

Practice: E666G - Reduce forest density and manage understory along roads to limit wildfire risk and improve habitat

Scenario: #1 - Reduce forest density and manage understory along roads to limit wildfire risk and improve habitat

Scenario Description:

Opening the tree canopy along roads ("daylighting"), and providing space between ground vegetation and tree crowns minimizes the spread of wildfires that often start along roads, and improves wildlife habitat and food sources for many species. Some trees near a forest road are removed through harvesting, cutting, mulching, or another option available at the site, with the objective of creating a partially open forest canopy bordering the road. A semi-open canopy allows more sunlight to reach the forest floor to promote herbaceous understory plants, and reduces maintenance needs by allowing moisture to evaporate from roads. The reduced canopy and herbaceous understory limit woodland fuel buildup and reduce fire intensity.

Before Situation:

Resources are protected at the minimum level of the Conservation Practice Standard (CPS) 666 - Forest Stand Improvement

After Situation:

The adoption of this enhancement will provide resource protection above the minimum level as described in Conservation Practice Standard (CPS) 666 - Forest Stand Improvement

Feature Measure: Acre

Scenario Unit: Acres

Scenario Typical Size: 10.0

Scenario Total Cost: $3,041.82

Scenario Cost/Unit: $304.18

Cost Details:

Component Name	ID	Description	Unit	Cost	QTY	Total
Equipment Installation						
Chainsaw	937	Equipment and power unit costs. Labor not included.	Hours	$7.15	8	$57.20
Mechanical cutter, chopper	943	Forestry mulcher, flail shredder, hydro axe, brush cutter, etc. Equipment and power unit costs. Labor not included.	Hours	$90.63	8	$725.04
Chemical, spot treatment, single stem application	964	Ground applied chemical to individual plants or group of plants, e.g., backpack sprayer treatment. Equipment and labor cost included.	Hours	$71.67	8	$573.36
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.	Hours	$27.56	8	$220.48
Equipment Operators, Light	232	Includes: Skid Steer Loaders, Hydraulic Excavators <50 HP, Trenchers <12 in., Ag Equipment <150 HP, Pickup Trucks, Forklifts, Mulchers	Hours	$27.87	8	$222.96
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.	Hours	$102.76	8	$822.08
Materials						
Herbicide, Imazapyr	336	Pre and post-emergent, non-selective herbicide for control of undesirable vegetation in non-crop areas. Refer to WIN-PST for product names and active ingredients. Includes materials and shipping only.	Acres	$42.07	10	$420.70

Practice: E666H - Increase on-site carbon storage

Scenario: #1 - Increase on-site carbon storage

Scenario Description:

Use forest management techniques to maintain and increase on-site carbon storage. These include, but are not limited to, applying uneven-aged management, using longer rotations, retaining cavity/den trees, snags, and down woody debris, and protecting or increasing soil organic material.

Before Situation:

Resources are protected at the minimum level of the Conservation Practice Standard (CPS) 666 - Forest Stand Improvement

After Situation:

The adoption of this enhancement will provide resource protection above the minimum level as described in Conservation Practice Standard (CPS) 666 - Forest Stand Improvement

Feature Measure: Acre

Scenario Unit: Acres

Scenario Typical Size: 100.0

Scenario Total Cost: $1,335.88

Scenario Cost/Unit: $13.36

Cost Details:

Component Name	ID	Description	Unit	Cost	QTY	Total
Labor						
Specialist Labor	235	Labor requiring a specialized skill set: Includes Agronomists, Foresters, Biologists, etc. to provide additional technical information during the planning and implementation of the practice. Does not include NRCS or TSP services.	Hours	$102.76	13	$1,335.88

Practice: E666I - Crop tree management for mast production

Scenario: #1 - Crop tree management for mast production

Scenario Description:
Forest stand improvement using crop tree management techniques to increase mast production

Before Situation:
Resources are protected at the minimum level of the Conservation Practice Standard (CPS) 666 - Forest Stand Improvement

After Situation:
The adoption of this enhancement will provide resource protection above the minimum level as described in Conservation Practice Standard (CPS) 666 - Forest Stand Improvement

Feature Measure: Acre

Scenario Unit: Acres

Scenario Typical Size: 10.0

Scenario Total Cost: $3,896.16

Scenario Cost/Unit: $389.62

Cost Details:

Component Name	ID	Description	Unit	Cost	QTY	Total
Equipment Installation						
Chainsaw	937	Equipment and power unit costs. Labor not included.	Hours	$7.15	25	$178.75
Truck, Pickup	939	Equipment and power unit costs. Labor not included.	Hours	$24.18	6	$145.08
Chemical, spot treatment, single stem application	964	Ground applied chemical to individual plants or group of plants, e.g., backpack sprayer treatment. Equipment and labor cost included.	Hours	$71.67	25	$1,791.75
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.	Hours	$27.56	25	$689.00
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.	Hours	$102.76	8	$822.08
Materials						
Tree Marking Paint	313	Trees to be cut through tree marking are physically identified through the application of paint on the tree. Typically one quart of paint is used to mark one acre of trees. Includes materials and shipping only.	Acres	$8.78	10	$87.80
Herbicide, Picloram	337	Refer to WIN-PST for product names and active ingredients. Includes materials and shipping only.	Acres	$18.17	10	$181.70

Practice: E666J - Facilitating oak forest regeneration

Scenario: #1 - Facilitating oak forest regeneration

Scenario Description:

Facilitate oak regeneration following a forest stand improvement treatment for natural oak regeneration (i.e., a regeneration cut). After a regeneration cut, oaks in the seedling and sapling stages are often out-competed by invasive brush and undesirable tree and shrub species. This enhancement will release seedling and sapling oaks from competing invasive plants and other undesirable species, and thin stump sprouts. A forester will monitor site conditions, treat competition, protect seedlings, and recommend additional follow-up treatments as needed. The enhancement protects investments in oak regeneration by providing for follow-up activities that require the expertise of a professional forester.

Before Situation:

Naturally regenerated oak seedlings and/or saplings are threatened by competition from undesirable vegetation.

After Situation:

Oaks in the forest stand are free from competition and have adequate space and light to allow them to grow into the forest canopy.

Feature Measure: Acres

Scenario Unit: Acres

Scenario Typical Size: 25.0

Scenario Total Cost: $13,747.87

Scenario Cost/Unit: $549.91

Cost Details:

Component Name	ID	Description	Unit	Cost	QTY	Total
Equipment Installation						
Chainsaw	937	Equipment and power unit costs. Labor not included.	Hours	$7.15	6	$42.90
Truck, Pickup	939	Equipment and power unit costs. Labor not included.	Hours	$24.18	16	$386.88
Chemical, spot treatment, single stem application	964	Ground applied chemical to individual plants or group of plants, e.g., backpack sprayer treatment. Equipment and labor cost included.	Hours	$71.67	10	$716.70
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.	Hours	$37.19	6	$223.14
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.	Hours	$27.56	56	$1,543.36
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.	Hours	$102.76	34	$3,493.84
Materials						
Tree Marking Paint	313	Trees to be cut through tree marking are physically identified through the application of paint on the tree. Typically one quart of paint is used to mark one acre of trees. Includes materials and shipping only.	Acres	$8.78	5	$43.90
Herbicide, Triclopyor	338	Refer to WIN-PST for product names and active ingredients. Materials and shipping	Acres	$27.92	5	$139.60
Herbicide, Surfactant	1095	Surfactants reduce the surface tension of water to produce more uniform coverage and penetration of herbicides, and weed killers. Paraffin Based Petroleum Surfactant. Refer to WIN-PST for product names and active ingredients. Includes materials and shipping only.	Acres	$1.51	5	$7.55
Tree shelter, solid tube type, 4 in. x 48 in.	1566	4 inch x 48 inch tree tube for protection from animal damage. Materials only.	Each	$4.22	1250	$5,275.00
Cable ties, plastic	1575	Plastic cable ties (typ. 8-12 in.) to assist in securing items. Materials only.	Each	$0.06	2500	$150.00
Stakes, wood, 3/4 in. x 3/4 in. x 48 in.	1582	3/4 in. x 3/4 in. x 48 in. wood stakes to fasten items in place. Includes materials only.	Each	$1.38	1250	$1,725.00

Practice: E666K - Creating structural diversity with patch openings

Scenario: #1 - Creating structural diversity with patch openings

Scenario Description:

Forest stand improvement that creates patch openings. Size, shape, and arrangement of patches will be based on natural features, and emulate patches that would result from natural disturbance regimes of wind or fire, varying geographically and by forest type, and by tree species desired from natural regeneration. The treatment will create diversity in stand composition and structure, increase pest resistance, and enhance wildlife food availability. Openings may provide regeneration sites and restore natural plant communities, and achieve or maintain a desired understory plant community for wildlife habitat.

Before Situation:

Resources are protected at the minimum level of the Conservation Practice Standard (CPS) 666 - Forest Stand Improvement

After Situation:

The adoption of this enhancement will provide resource protection above the minimum level as described in Conservation Practice Standard (CPS) 666 - Forest Stand Improvement

Feature Measure: Acre

Scenario Unit: Acres

Scenario Typical Size: 15.0

Scenario Total Cost: $8,652.00

Scenario Cost/Unit: $576.80

Cost Details:

Component Name	ID	Description	Unit	Cost	QTY	Total
Equipment Installation						
Chainsaw	937	Equipment and power unit costs. Labor not included.	Hours	$7.15	150	$1,072.50
Truck, Pickup	939	Equipment and power unit costs. Labor not included.	Hours	$24.18	15	$362.70
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.	Hours	$27.56	150	$4,134.00
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.	Hours	$102.76	30	$3,082.80

Practice: E666L - Forest Stand Improvement to rehabilitate degraded hardwood stands

Scenario: #1 - Forest Stand Improvement to rehabilitate degraded hardwood stands

Scenario Description:

Hardwood forestland has been subject to poor logging practices ("high-grading") for decades. Without professional forestry assistance the best species and individual trees are removed, often before maturity ("diameter-limit cutting"), leaving the poorest species and individual trees to regenerate the stand. Reversing this process requires cutting or killing poor quality trees while retaining any desirable species that might still be present. A combination of 3 silvicultural methods are applied: crop tree release, group selection (all trees removed from an area 0.25 to 1.0 acre in size) and small clear-cuts (all trees removed from an area 1-3 acres in size).

Before Situation:

Resources are protected at the minimum level of the Conservation Practice Standard (CPS) 666 - Forest Stand Improvement

After Situation:

The adoption of this enhancement will provide resource protection above the minimum level as described in Conservation Practice Standard (CPS) 666 - Forest Stand Improvement

Feature Measure: Acres treated

Scenario Unit: Acres

Scenario Typical Size: 10.0

Scenario Total Cost: $5,446.88

Scenario Cost/Unit: $544.69

Cost Details:

Component Name	ID	Description	Unit	Cost	QTY	Total
Equipment Installation						
Chainsaw	937	Equipment and power unit costs. Labor not included.	Hours	$7.15	16	$114.40
Truck, Pickup	939	Equipment and power unit costs. Labor not included.	Hours	$24.18	2	$48.36
Chemical, spot treatment, single stem application	964	Ground applied chemical to individual plants or group of plants, e.g., backpack sprayer treatment. Equipment and labor cost included.	Hours	$71.67	40	$2,866.80
All terrain vehicles, ATV	965	Includes equipment, power unit and labor costs.	Hours	$21.14	16	$338.24
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.	Hours	$27.56	16	$440.96
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.	Hours	$102.76	8	$822.08
Materials						
Tree Marking Paint	313	Trees to be cut through tree marking are physically identified through the application of paint on the tree. Typically one quart of paint is used to mark one acre of trees. Includes materials and shipping only.	Acres	$8.78	10	$87.80
Herbicide, Triazine	1321	Broad spectrum herbicide. Refer to WIN-PST for product names and active ingredients. Includes materials and shipping only.	Acres	$55.63	10	$556.30
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	$171.94	1	$171.94

Practice: E666M - Maintaining structural diversity in dry Western forests

Scenario: #1 - Maintaining structural diversity in dry Western forests

Scenario Description:

This enhancement retains the beneficial effects of treatments that have been applied to restore ecological function in dry Western forests. It is implemented following a forest stand improvement treatment designed to restore variable and patchy conditions typical of benchmark ecological sites. After a restoration treatment, young trees often regenerate in numbers higher than desired, leading to increased fire risk and loss of wildlife habitat. The enhancement will address follow-up activities needed for maintaining forest structure. Site conditions will be monitored and follow-up treatments recommended as needed. The enhancement protects investments in habitat creation by providing for follow-up activities that require the expertise of a forester or wildlife biologist.

Before Situation:

A dry Western forest stand has an undesirable overabundance of tree regeneration that threatens to reverse previous restoration treatments and contribute to a buildup of fire fuels.

After Situation:

The forest stand has retained its patchy structure and open areas are dominated by grasses and forbs. Wildfire hazard has been reduced.

Feature Measure: Acres

Scenario Unit: Acres

Scenario Typical Size: 25.0

Scenario Total Cost: $6,435.35

Scenario Cost/Unit: $257.41

Cost Details:

Component Name	ID	Description	Unit	Cost	QTY	Total
Equipment Installation						
Truck, Pickup	939	Equipment and power unit costs. Labor not included.	Hours	$24.18	12	$290.16
Chemical, spot treatment, single stem application	964	Ground applied chemical to individual plants or group of plants, e.g., backpack sprayer treatment. Equipment and labor cost included.	Hours	$71.67	12	$860.04
Labor						
Specialist Labor	235	Labor requiring a specialized skill set: Includes Agronomists, Foresters, Biologists, etc. to provide additional technical information during the planning and implementation of the practice. Does not include NRCS or TSP services.	Hours	$102.76	50	$5,138.00
Materials						
Herbicide, Triclopyor	338	Refer to WIN-PST for product names and active ingredients. Materials and shipping	Acres	$27.92	5	$139.60
Herbicide, Surfactant	1095	Surfactants reduce the surface tension of water to produce more uniform coverage and penetration of herbicides, and weed killers. Paraffin Based Petroleum Surfactant. Refer to WIN-PST for product names and active ingredients. Includes materials and shipping only.	Acres	$1.51	5	$7.55

Practice: E666N - Creating structural diversity in dry Western forests

Scenario: #1 - Creating structural diversity in dry Western forests

Scenario Description:

Restore natural stand structure in dry Western forests by creating openings characteristic of reference ecological site conditions in stands where even thinning treatments have already been applied to reduce wildfire risk. Thinning treatments are effective in reducing fuels, but typically do not restore forest structural diversity to emulate benchmark or reference conditions. Applying this enhancement as a follow-up treatment will create a patchy structure that provides open areas where grasses and forbs can thrive and produce wildlife food and cover. The size, shape, and arrangement of openings will be based on moisture availability and site physiography, to emulate structural conditions that would result from natural disturbance regimes of wind and/or fire.

Before Situation:

A dry Western forest stand has been evenly thinned for fire fuel reduction but lacks the historically patchy structure created by fire. Without grassy openings, there is a lack of wildlife food.

After Situation:

The restored forest stand has a patchy structure with open areas where grasses and forbs provide wildlife food and cover.

Feature Measure: Acres

Scenario Unit: Acres

Scenario Typical Size: 25.0

Scenario Total Cost: $27,280.93

Scenario Cost/Unit: $1,091.24

Cost Details:

Component Name	ID	Description	Unit	Cost	QTY	Total
Equipment Installation						
Chainsaw	937	Equipment and power unit costs. Labor not included.	Hours	$7.15	120	$858.00
Truck, Pickup	939	Equipment and power unit costs. Labor not included.	Hours	$24.18	30	$725.40
Mechanical cutter, chopper	943	Forestry mulcher, flail shredder, hydro axe, brush cutter, etc. Equipment and power unit costs. Labor not included.	Hours	$90.63	60	$5,437.80
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.	Hours	$37.19	120	$4,462.80
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.	Hours	$27.56	240	$6,614.40
Equipment Operators, Heavy	233	Includes: Cranes, Hydraulic Excavators >=50 HP, Dozers, Paving Machines, Rock Trenchers, Trenchers >=12 in., Dump Trucks, Ag Equipment >=150 HP, Scrapers, Water Wagons.	Hours	$38.00	60	$2,280.00
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.	Hours	$102.76	64	$6,576.64
Materials						
Tree Marking Paint	313	Trees to be cut through tree marking are physically identified through the application of paint on the tree. Typically one quart of paint is used to mark one acre of trees. Includes materials and shipping only.	Acres	$8.78	8	$70.24
Mobilization						
Mobilization, medium equipment	1139	Equipment with 70-150 HP or typical weights between 14,000 and 30,000 pounds.	Each	$255.65	1	$255.65

Practice: E666O - Snags, den trees, and coarse woody debris for wildlife habitat

Scenario: #1 - Snags, den trees, and coarse woody debris for wildlife habitat

Scenario Description:
Improve wildlife habitat through creation and retention of snags, den trees, forest stand structural diversity, and coarse woody debris on the forest floor, to provide cover/shelter for native wildlife species.

Before Situation:
Resources are protected at the minimum level of the Conservation Practice Standard (CPS) 666 - Forest Stand Improvement

After Situation:
The adoption of this enhancement will provide resource protection above the minimum level as described in Conservation Practice Standard (CPS) 666 - Forest Stand Improvement

Feature Measure: Acre

Scenario Unit: Acres

Scenario Typical Size: 10.0

Scenario Total Cost: $567.74

Scenario Cost/Unit: $56.77

Cost Details:

Component Name	ID	Description	Unit	Cost	QTY	Total
Equipment Installation						
Chainsaw	937	Equipment and power unit costs. Labor not included.	Hours	$7.15	7	$50.05
Truck, Pickup	939	Equipment and power unit costs. Labor not included.	Hours	$24.18	1	$24.18
Chemical, spot treatment, single stem application	964	Ground applied chemical to individual plants or group of plants, e.g., backpack sprayer treatment. Equipment and labor cost included.	Hours	$71.67	3	$215.01
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.	Hours	$37.19	7	$260.33
Materials						
Herbicide, Picloram	337	Refer to WIN-PST for product names and active ingredients. Includes materials and shipping only.	Acres	$18.17	1	$18.17

Practice: E666P - Summer roosting habitat for native forest-dwelling bat species

Scenario: #1 - Summer roosting habitat for native forest-dwelling bat species

Scenario Description:
Create new potential roost trees within upland and riparian forests to achieve desired summer habitat for forest-dwelling bat species.

Before Situation:
Resources are protected at the minimum level of the Conservation Practice Standard (CPS) 666 - Forest Stand Improvement

After Situation:
The adoption of this enhancement will provide resource protection above the minimum level as described in Conservation Practice Standard (CPS) 666 - Forest Stand Improvement

Feature Measure: Acre

Scenario Unit: Acres

Scenario Typical Size: 10.0

Scenario Total Cost: $2,208.56

Scenario Cost/Unit: $220.86

Cost Details:

Component Name	ID	Description	Unit	Cost	QTY	Total
Equipment Installation						
Chainsaw	937	Equipment and power unit costs. Labor not included.	Hours	$7.15	13	$92.95
Truck, Pickup	939	Equipment and power unit costs. Labor not included.	Hours	$24.18	6	$145.08
Chemical, spot treatment, single stem application	964	Ground applied chemical to individual plants or group of plants, e.g., backpack sprayer treatment. Equipment and labor cost included.	Hours	$71.67	13	$931.71
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.	Hours	$27.56	13	$358.28
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.	Hours	$102.76	4	$411.04
Materials						
Tree Marking Paint	313	Trees to be cut through tree marking are physically identified through the application of paint on the tree. Typically one quart of paint is used to mark one acre of trees. Includes materials and shipping only.	Acres	$8.78	10	$87.80
Herbicide, Picloram	337	Refer to WIN-PST for product names and active ingredients. Includes materials and shipping only.	Acres	$18.17	10	$181.70

Practice: E666Q - Increase diversity in pine plantation monocultures

Scenario: #1 - Increase diversity in pine plantation monocultures

Scenario Description:

Create small openings to provide diversity in pine plantations, which are typically monocultures and inhospitable to wildlife. Small openings are one-half (0.5) to three (3) acres in size. The cleared area will have the vegetation removed through cutting, mulching, or other means compatible with the site.

Before Situation:

Resources are protected at the minimum level of the Conservation Practice Standard (CPS) 666 - Forest Stand Improvement

After Situation:

The adoption of this enhancement will provide resource protection above the minimum level as described in Conservation Practice Standard (CPS) 666 - Forest Stand Improvement

Feature Measure: Acre

Scenario Unit: Acres

Scenario Typical Size: 2.0

Scenario Total Cost: $1,153.60

Scenario Cost/Unit: $576.80

Cost Details:

Component Name	ID	Description	Unit	Cost	QTY	Total
Equipment Installation						
Chainsaw	937	Equipment and power unit costs. Labor not included.	Hours	$7.15	20	$143.00
Truck, Pickup	939	Equipment and power unit costs. Labor not included.	Hours	$24.18	2	$48.36
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.	Hours	$27.56	20	$551.20
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.	Hours	$102.76	4	$411.04

Practice: E666R - Forest songbird habitat maintenance

Scenario: #1 - Forest songbird habitat maintenance

Scenario Description:

Adopts guidelines and methods developed by the Forest Bird Initiative of the Vermont Audubon Society, to preserve habitat features following a forest stand improvement treatment designed to create habitat for a suite of forest-dwelling neotropical migratory songbirds. It includes developing or updating a forest management plan, inspecting and tending forest habitat, and monitoring bird populations. It protects investments in habitat creation by providing for follow-up activities that require the expertise of a professional forester or biologist. This enhancement is appropriate for states in the Atlantic Flyway and the Upper Midwest.

Before Situation:

The bird habitat of a forest stand is threatened by undesirable vegetation, including noxious and invasive plants, and tree regeneration of species not favorable to birds. Harmful insects and tree diseases may also be present, and storms may have damaged

After Situation:

The forest stand has retained its habitat features and is utilized by a diversity of neotropical migratory songbirds.

Feature Measure: Acres

Scenario Unit: Acres

Scenario Typical Size: 25.0

Scenario Total Cost: $4,856.24

Scenario Cost/Unit: $194.25

Cost Details:

Component Name	ID	Description	Unit	Cost	QTY	Total
Equipment Installation						
Chainsaw	937	Equipment and power unit costs. Labor not included.	Hours	$7.15	4	$28.60
Truck, Pickup	939	Equipment and power unit costs. Labor not included.	Hours	$24.18	10	$241.80
Chemical, spot treatment, single stem application	964	Ground applied chemical to individual plants or group of plants, e.g., backpack sprayer treatment. Equipment and labor cost included.	Hours	$71.67	4	$286.68
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.	Hours	$37.19	4	$148.76
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.	Hours	$27.56	4	$110.24
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.	Hours	$102.76	38	$3,904.88
Materials						
Tree Marking Paint	313	Trees to be cut through tree marking are physically identified through the application of paint on the tree. Typically one quart of paint is used to mark one acre of trees. Includes materials and shipping only.	Acres	$8.78	2	$17.56
Herbicide, Triclopyor	338	Refer to WIN-PST for product names and active ingredients. Materials and shipping	Acres	$27.92	4	$111.68
Herbicide, Surfactant	1095	Surfactants reduce the surface tension of water to produce more uniform coverage and penetration of herbicides, and weed killers. Paraffin Based Petroleum Surfactant. Refer to WIN-PST for product names and active ingredients. Includes materials and shipping only.	Acres	$1.51	4	$6.04