**Practice:** 102 - Comprehensive Nutrient Management Plan - Written

**Scenario** #42 - 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) of 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 has 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:**

**Feature Measure:** Number

**Scenario Unit::** Number

**Scenario Typical Size:** 1

**Total Scenario Cost:** $8,517.28

**Scenario Cost/Unit:** $8,517.28

**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). | Hour | $93.87 | 55 | $5,162.85 |
| 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. | Hour | $78.01 | 43 | $3,354.43 |

**Practice:** 102 - Comprehensive Nutrient Management Plan - Written

**Scenario** #43 - 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) of 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 has 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 inventories-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 for conservation practices 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

**Total Scenario Cost:** $10,628.71

**Scenario Cost/Unit:** $10,628.71

**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). | Hour | $93.87 | 75 | $7,040.25 |
| 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. | Hour | $78.01 | 46 | $3,588.46 |

**Practice:** 102 - Comprehensive Nutrient Management Plan - Written

**Scenario** #44 - 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) of 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 has 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 inventories-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 for conservation practices 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

**Total Scenario Cost:** $10,971.18

**Scenario Cost/Unit:** $10,971.18

**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). | Hour | $93.87 | 72 | $6,758.64 |
| 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. | Hour | $78.01 | 54 | $4,212.54 |

**Practice:** 102 - Comprehensive Nutrient Management Plan - Written

**Scenario** #45 - 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) of 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 has 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 inventories-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 for conservation practices 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

**Total Scenario Cost:** $12,143.91

**Scenario Cost/Unit:** $12,143.91

**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). | Hour | $93.87 | 82 | $7,697.34 |
| 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. | Hour | $78.01 | 57 | $4,446.57 |

**Practice:** 102 - Comprehensive Nutrient Management Plan - Written

**Scenario** #46 - 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) of 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 has 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 inventories-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 for conservation practices 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

**Total Scenario Cost:** $13,253.20

**Scenario Cost/Unit:** $13,253.20

**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). | Hour | $93.87 | 88 | $8,260.56 |
| 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. | Hour | $78.01 | 64 | $4,992.64 |

**Practice:** 102 - Comprehensive Nutrient Management Plan - Written

**Scenario** #47 - 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) of 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 has 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 inventories-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 for conservation practices 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

**Total Scenario Cost:** $13,503.09

**Scenario Cost/Unit:** $13,503.09

**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). | Hour | $93.87 | 89 | $8,354.43 |
| 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. | Hour | $78.01 | 66 | $5,148.66 |

**Practice:** 102 - Comprehensive Nutrient Management Plan - Written

**Scenario** #48 - 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) of 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's/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 has 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 inventories/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 for conservation practices 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

**Total Scenario Cost:** $7,677.61

**Scenario Cost/Unit:** $7,677.61

**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). | Hour | $93.87 | 66 | $6,195.42 |
| 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. | Hour | $78.01 | 19 | $1,482.19 |

**Practice:** 102 - Comprehensive Nutrient Management Plan - Written

**Scenario** #49 - 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) of 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's/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 has 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 inventories/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 for conservation practices 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

**Total Scenario Cost:** $9,539.15

**Scenario Cost/Unit:** $9,539.15

**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). | Hour | $93.87 | 85 | $7,978.95 |
| 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. | Hour | $78.01 | 20 | $1,560.20 |

**Practice:** 104 - Nutrient Management Plan - Written

**Scenario** #44 - 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 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, 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 develop 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

**Total Scenario Cost:** $2,321.40

**Scenario Cost/Unit:** $2,321.40

**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. | Hour | $77.38 | 30 | $2,321.40 |

**Practice:** 104 - Nutrient Management Plan - Written

**Scenario** #45 - Nutrient Management CAP 104- 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 applicant 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, profits margin, reduce costs, nutrient use efficiency 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 develop of the "Nutrient Management" conservation activity plan. 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

**Total Scenario Cost:** $3,095.20

**Scenario Cost/Unit:** $3,095.20

**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. | Hour | $77.38 | 40 | $3,095.20 |

**Practice:** 104 - Nutrient Management Plan - Written

**Scenario** #46 - Nutrient Management CAP 104 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 applicant 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, profits margin, reduce costs, nutrient use efficiency, 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. 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

**Total Scenario Cost:** $3,869.00

**Scenario Cost/Unit:** $3,869.00

**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. | Hour | $77.38 | 50 | $3,869.00 |

**Practice:** 104 - Nutrient Management Plan - Written

**Scenario** #47 - Nutrient Management CAP 104 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 applicant and management of nutrient 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, 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 develop of the "Nutrient Management" conservation activity plan. 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

**Total Scenario Cost:** $3,869.00

**Scenario Cost/Unit:** $3,869.00

**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. | Hour | $77.38 | 50 | $3,869.00 |

**Practice:** 104 - Nutrient Management Plan - Written

**Scenario** #48 - Nutrient Management CAP 104 - 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 applicant 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 develop of the "Nutrient Management" conservation activity plan. 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 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

**Total Scenario Cost:** $5,416.60

**Scenario Cost/Unit:** $5,416.60

**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. | Hour | $77.38 | 70 | $5,416.60 |

**Practice:** 106 - Forest Management Plan - Written

**Scenario** #50 - 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 Plan" 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

**Total Scenario Cost:** $1,421.20

**Scenario Cost/Unit:** $1,421.20

**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, monitor trees for healthy growth, and determine optimal thinning schedules. Cost associated with this component includes overhead and benefits (market price). | Hour | $74.80 | 19 | $1,421.20 |

**Practice:** 106 - Forest Management Plan - Written

**Scenario** #51 - 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 Plan" 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

**Total Scenario Cost:** $1,795.20

**Scenario Cost/Unit:** $1,795.20

**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, monitor trees for healthy growth, and determine optimal thinning schedules. Cost associated with this component includes overhead and benefits (market price). | Hour | $74.80 | 24 | $1,795.20 |

**Practice:** 106 - Forest Management Plan - Written

**Scenario** #52 - 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 Plan" 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

**Total Scenario Cost:** $3,216.40

**Scenario Cost/Unit:** $3,216.40

**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, monitor trees for healthy growth, and determine optimal thinning schedules. Cost associated with this component includes overhead and benefits (market price). | Hour | $74.80 | 43 | $3,216.40 |

**Practice:** 106 - Forest Management Plan - Written

**Scenario** #53 - 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 Plan" 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

**Total Scenario Cost:** $6,732.00

**Scenario Cost/Unit:** $6,732.00

**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, monitor trees for healthy growth, and determine optimal thinning schedules. Cost associated with this component includes overhead and benefits (market price). | Hour | $74.80 | 90 | $6,732.00 |

**Practice:** 106 - Forest Management Plan - Written

**Scenario** #54 - 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 Plan" 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

**Total Scenario Cost:** $4,637.60

**Scenario Cost/Unit:** $4,637.60

**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, monitor trees for healthy growth, and determine optimal thinning schedules. Cost associated with this component includes overhead and benefits (market price). | Hour | $74.80 | 62 | $4,637.60 |

**Practice:** 106 - Forest Management Plan - Written

**Scenario** #55 - 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 Plan" 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

**Total Scenario Cost:** $5,385.60

**Scenario Cost/Unit:** $5,385.60

**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, monitor trees for healthy growth, and determine optimal thinning schedules. Cost associated with this component includes overhead and benefits (market price). | Hour | $74.80 | 72 | $5,385.60 |

**Practice:** 108 - Feed Management Plan - Written

**Scenario** #42 - Feed Management Plan Less Than 100 Acres

**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" (FM) 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 FM 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 FM CAP meets the basic quality criteria for the 108 plan as cited in the NRCS Field Office Technical Guide.

**Feature Measure:** Number

**Scenario Unit::** Number

**Scenario Typical Size:** 1

**Total Scenario Cost:** $1,243.84

**Scenario Cost/Unit:** $1,243.84

**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). | Hour | $77.74 | 16 | $1,243.84 |

**Practice:** 108 - Feed Management Plan - Written

**Scenario** #43 - Feed Management Plan 100 to Less Than 1500 Acres

**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" (FM) 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 FM 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 FM CAP meets the basic quality criteria for the 108 plan as cited in the NRCS Field Office Technical Guide.

**Feature Measure:** Number

**Scenario Unit::** Number

**Scenario Typical Size:** 1

**Total Scenario Cost:** $3,265.08

**Scenario Cost/Unit:** $3,265.08

**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). | Hour | $77.74 | 42 | $3,265.08 |

**Practice:** 108 - Feed Management Plan - Written

**Scenario** #44 - Feed Management Plan 1500 - 5000 Acres

**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" (FM) 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 FM 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 FM CAP meets the basic quality criteria for the 108 plan as cited in the NRCS Field Office Technical Guide.

**Feature Measure:** Number

**Scenario Unit::** Number

**Scenario Typical Size:** 1

**Total Scenario Cost:** $5,441.80

**Scenario Cost/Unit:** $5,441.80

**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). | Hour | $77.74 | 70 | $5,441.80 |

**Practice:** 108 - Feed Management Plan - Written

**Scenario** #45 - Feed Management Plan Greater Than 5000 Acres

**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" (FM) 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 FM 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 FM CAP meets the basic quality criteria for the 108 plan as cited in the NRCS Field Office Technical Guide.

**Feature Measure:** Number

**Scenario Unit::** Number

**Scenario Typical Size:** 1

**Total Scenario Cost:** $6,996.60

**Scenario Cost/Unit:** $6,996.60

**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). | Hour | $77.74 | 90 | $6,996.60 |

**Practice:** 108 - Feed Management Plan - Written

**Scenario** #46 - 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" (FM) 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 FM 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 FM 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

**Total Scenario Cost:** $2,481.92

**Scenario Cost/Unit:** $2,481.92

**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. | Hour | $77.38 | 16 | $1,238.08 |
| 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). | Hour | $77.74 | 16 | $1,243.84 |

**Practice:** 108 - Feed Management Plan - Written

**Scenario** #47 - Feed Management Plan--Dairy Groups

**Scenario Description:**

A Feed Management Plan (FeedMP) will be developed that addresses all feeding related resource concerns present on a Dairy Animal Feeding Operation (AFO) by animal group, not to exceed eight groups. The producer may have multiple groups of animals fed and housed by production and/or life stage, including young stock, lactating animals (early, middle, late lactation), and dry non-lactating mature animals. Various levels of feeding management techniques, record keeping of feed rations, forage inventories and quality, and equipment may exist in the operation. Forages and grains may be either grown on the farm or purchased. Development of a FeedMP will assist in implementing current and future nutrient management plans to address nutrient related resource concerns on the operation. The development of a complete FeedMP will include forage testing and recommended management and conservation practices resulting in proper quantity and quality of available nutrients, feedstuffs, and/or additives fed to livestock groups included in the FeedMP . Planned changes in operation and feed methodology outlined in a FeedMP must address risk of excess amounts of nutrients in animal manure which result in negative impacts to water quality and air resource concerns. The FeedMP meets the AFO owner/operator's production objectives.

**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" (FM) 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 FM 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 FM CAP meets the basic quality criteria for the 108 plan as cited in the NRCS Field Office Technical Guide.

**Feature Measure:** Number of Groups

**Scenario Unit::** Each

**Scenario Typical Size:** 8

**Total Scenario Cost:** $2,519.04

**Scenario Cost/Unit:** $314.88

**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). | Hour | $79.70 | 16 | $1,275.20 |
| 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). | Hour | $77.74 | 16 | $1,243.84 |

**Practice:** 110 - Grazing Management Plan - Written

**Scenario** #10 - Grazing Management Plan Less Than 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 plan to address identified natural resource concerns. Producer is interested in management of animals to maximize profit margin, 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 develop of the "Grazing Management" conservation activity plan. The CAP criteria requires the plan to meet quality criteria for applicable resource concerns and provides for opportunities to implement essential conservation practices: Brush Management, Fencing, Firebreak, Forage Harvest Management, Grazing Land Mechanical Treatment, Herbaceous Weed Control, 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. 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

**Total Scenario Cost:** $1,243.84

**Scenario Cost/Unit:** $1,243.84

**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). | Hour | $77.74 | 16 | $1,243.84 |

**Practice:** 110 - Grazing Management Plan - Written

**Scenario** #18 - Grazing Management Plan 100 to Less Than 1500 Acres

**Scenario Description:**

Small agricultural operation with less than 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 plan to address identified natural resource concerns. Producer is interested in management of animals to maximize profit margin, 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 develop of the "Grazing Management" conservation activity plan. The CAP criteria requires the plan to meet quality criteria for applicable resource concerns and provides for opportunities to implement essential conservation practices: Brush Management, Fencing, Firebreak, Forage Harvest Management, Grazing Land Mechanical Treatment, Herbaceous Weed Control, 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. 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

**Total Scenario Cost:** $3,265.08

**Scenario Cost/Unit:** $3,265.08

**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). | Hour | $77.74 | 42 | $3,265.08 |

**Practice:** 110 - Grazing Management Plan - Written

**Scenario** #19 - Grazing Management Plan 1500 - 5000 Acres

**Scenario Description:**

Small agricultural operation with 1500 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 plan to address identified natural resource concerns. Producer is interested in management of animals to maximize profit margin, 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 develop of the "Grazing Management" conservation activity plan. The CAP criteria requires the plan to meet quality criteria for applicable resource concerns and provides for opportunities to implement essential conservation practices: Brush Management, Fencing, Firebreak, Forage Harvest Management, Grazing Land Mechanical Treatment, Herbaceous Weed Control, 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. 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

**Total Scenario Cost:** $5,441.80

**Scenario Cost/Unit:** $5,441.80

**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). | Hour | $77.74 | 70 | $5,441.80 |

**Practice:** 110 - Grazing Management Plan - Written

**Scenario** #20 - 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 plan to address identified natural resource concerns. Producer is interested in managment of animals to maximize profit margin, reduce costs, improveor address wildlife opportunties, 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 develop of the "Grazing Management" conservation activity plan. The CAP criteria requires the plan to meet quality criteria for applicable resource concerns and provides for opportunities to implement essential conservation practices: Brush Management, Fencing, Firebreak, Forage Harvest Management, Grazing Land Mechancial Treatement, Herbaceous Weed Control, 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. 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

**Total Scenario Cost:** $6,996.60

**Scenario Cost/Unit:** $6,996.60

**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). | Hour | $77.74 | 90 | $6,996.60 |

**Practice:** 112 - Prescribed Burning Plan - Written

**Scenario** #8 - 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 Plan" 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

**Total Scenario Cost:** $374.00

**Scenario Cost/Unit:** $374.00

**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, monitor trees for healthy growth, and determine optimal thinning schedules. Cost associated with this component includes overhead and benefits (market price). | Hour | $74.80 | 5 | $374.00 |

**Practice:** 112 - Prescribed Burning Plan - Written

**Scenario** #22 - 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 Plan" 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

**Total Scenario Cost:** $598.40

**Scenario Cost/Unit:** $598.40

**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, monitor trees for healthy growth, and determine optimal thinning schedules. Cost associated with this component includes overhead and benefits (market price). | Hour | $74.80 | 8 | $598.40 |

**Practice:** 112 - Prescribed Burning Plan - Written

**Scenario** #23 - 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 Plan" 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

**Total Scenario Cost:** $897.60

**Scenario Cost/Unit:** $897.60

**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, monitor trees for healthy growth, and determine optimal thinning schedules. Cost associated with this component includes overhead and benefits (market price). | Hour | $74.80 | 12 | $897.60 |

**Practice:** 112 - Prescribed Burning Plan - Written

**Scenario** #24 - 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 Plan" 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

**Total Scenario Cost:** $1,196.80

**Scenario Cost/Unit:** $1,196.80

**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, monitor trees for healthy growth, and determine optimal thinning schedules. Cost associated with this component includes overhead and benefits (market price). | Hour | $74.80 | 16 | $1,196.80 |

**Practice:** 112 - Prescribed Burning Plan - Written

**Scenario** #25 - 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 Plan" 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

**Total Scenario Cost:** $1,496.00

**Scenario Cost/Unit:** $1,496.00

**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, monitor trees for healthy growth, and determine optimal thinning schedules. Cost associated with this component includes overhead and benefits (market price). | Hour | $74.80 | 20 | $1,496.00 |

**Practice:** 114 - Integrated Pest Management Plan - Written

**Scenario** #17 - 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 evaulations 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:**

Agricultural currently producer has no plan or limited knowledge of development 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 managment of pests and reduce the 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 plan. Associated Practices: Integrated Pest Management, Crop Rotation, Cover Crop, Field Boarder, 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 "Integrated Pest Management" conservation activity plan. 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 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. 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

**Total Scenario Cost:** $1,934.50

**Scenario Cost/Unit:** $1,934.50

**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. | Hour | $77.38 | 25 | $1,934.50 |

**Practice:** 114 - Integrated Pest Management Plan - Written

**Scenario** #18 - 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:**

Agricultural currently producer has no plan or limited knowledge of development 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 managment of pests and reduce the 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 plan. Associated Practices: Integrated Pest Management, Crop Rotation, Cover Crop, Field Boarder, 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 "Integrated Pest Management" conservation activity plan. 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 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. 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

**Total Scenario Cost:** $2,476.16

**Scenario Cost/Unit:** $2,476.16

**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. | Hour | $77.38 | 32 | $2,476.16 |

**Practice:** 114 - Integrated Pest Management Plan - Written

**Scenario** #19 - 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 stratagies 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:**

Agricultural currently producer has no plan or limited knowledge of development 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 managment of pests and reduce the 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 plan. Associated Practices: Integrated Pest Management, Crop Rotation, Cover Crop, Field Boarder, 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 "Integrated Pest Management" conservation activity plan. 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 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. 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

**Total Scenario Cost:** $3,869.00

**Scenario Cost/Unit:** $3,869.00

**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. | Hour | $77.38 | 50 | $3,869.00 |

**Practice:** 118 - Irrigation Water Management Plan - Written

**Scenario** #7 - 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:**

Currently 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 managment of irrigation water to maximize yields, profit margin, 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 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. 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

**Total Scenario Cost:** $3,285.45

**Scenario Cost/Unit:** $3,285.45

**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). | Hour | $93.87 | 35 | $3,285.45 |

**Practice:** 128 - Agricultural Energy Management Plan - Written

**Scenario** #77 - 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. 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: Energy Conservation

**Before Situation:**

Agricultural producer currently has minimal knowledge of and no plan for energy conservation. 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

**Total Scenario Cost:** $2,135.95

**Scenario Cost/Unit:** $2,135.95

**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). | Hour | $93.87 | 9 | $844.83 |
| 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. | Hour | $40.72 | 17 | $692.24 |
| 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. | Hour | $28.37 | 1.5 | $42.56 |
| CAP Labor, Energy Auditor | 1740 | Conservation Activity Plan labor involving analyzing energy efficient measures and conducting energy audits of industrial areas and facilities. | Hour | $46.36 | 12 | $556.32 |

**Practice:** 128 - Agricultural Energy Management Plan - Written

**Scenario** #78 - AgEMP Medium, One Enterprise

**Scenario Description:**

Typical operation has either • 301 to 2500 Ac • 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. A medium operation as 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: Energy Conservation

**Before Situation:**

Agricultural producer currently has minimal knowledge of and no plan for energy conservation. Producer currently manages a medium small operation with enterprise 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

**Total Scenario Cost:** $2,657.90

**Scenario Cost/Unit:** $2,657.90

**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). | Hour | $93.87 | 12 | $1,126.44 |
| 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. | Hour | $40.72 | 18 | $732.96 |
| 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. | Hour | $28.37 | 2 | $56.74 |
| CAP Labor, Energy Auditor | 1740 | Conservation Activity Plan labor involving analyzing energy efficient measures and conducting energy audits of industrial areas and facilities. | Hour | $46.36 | 16 | $741.76 |

**Practice:** 128 - Agricultural Energy Management Plan - Written

**Scenario** #79 - AgEMP Large, One Enterprise

**Scenario Description:**

Typical operation has either • > 2,500 Ac • > 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. 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: Energy Conservation.

**Before Situation:**

Agricultural producer currently has minimal knowledge of and no plan for energy conservation. Producer currently manages a large operation with enterprise 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

**Total Scenario Cost:** $3,503.34

**Scenario Cost/Unit:** $3,503.34

**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). | Hour | $93.87 | 19 | $1,783.53 |
| 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. | Hour | $40.72 | 20 | $814.40 |
| 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. | Hour | $28.37 | 2.5 | $70.93 |
| CAP Labor, Energy Auditor | 1740 | Conservation Activity Plan labor involving analyzing energy efficient measures and conducting energy audits of industrial areas and facilities. | Hour | $46.36 | 18 | $834.48 |

**Practice:** 128 - Agricultural Energy Management Plan - Written

**Scenario** #80 - AgEMP Small, Two Enterprise

**Scenario Description:**

Typical operation has either • <300 Ac • <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. 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: Energy Conservation

**Before Situation:**

Agricultural producer currently has minimal knowledge of and no plan for energy conservation. An Agricultural Energy Mgmt CAP for any type small sized 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

**Total Scenario Cost:** $3,307.66

**Scenario Cost/Unit:** $3,307.66

**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). | Hour | $93.87 | 15 | $1,408.05 |
| 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. | Hour | $40.72 | 21 | $855.12 |
| 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. | Hour | $28.37 | 2.5 | $70.93 |
| CAP Labor, Energy Auditor | 1740 | Conservation Activity Plan labor involving analyzing energy efficient measures and conducting energy audits of industrial areas and facilities. | Hour | $46.36 | 21 | $973.56 |

**Practice:** 128 - Agricultural Energy Management Plan - Written

**Scenario** #81 - AgEMP Medium Two Enterprises

**Scenario Description:**

Typical operation has either • 301 to 2500 Ac • 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: Energy Conservation

**Before Situation:**

Agricultural producer currently has minimal knowledge of and no plan for energy conservation. An Agricultural Energy Mgmt 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

**Total Scenario Cost:** $4,479.37

**Scenario Cost/Unit:** $4,479.37

**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). | Hour | $93.87 | 21 | $1,971.27 |
| 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. | Hour | $40.72 | 25 | $1,018.00 |
| 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. | Hour | $28.37 | 3.5 | $99.30 |
| CAP Labor, Energy Auditor | 1740 | Conservation Activity Plan labor involving analyzing energy efficient measures and conducting energy audits of industrial areas and facilities. | Hour | $46.36 | 30 | $1,390.80 |

**Practice:** 128 - Agricultural Energy Management Plan - Written

**Scenario** #82 - AgEMP Large, Two Enterprises

**Scenario Description:**

Typical operation has either • > 2,500 Ac • > 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 extra enterprises. 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: Energy Conservation

**Before Situation:**

Agricultural producer currently has minimal knowledge of and no plan for energy conservation. An Agricultural Energy Mgmt 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). 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

**Total Scenario Cost:** $6,120.43

**Scenario Cost/Unit:** $6,120.43

**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). | Hour | $93.87 | 32 | $3,003.84 |
| 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. | Hour | $40.72 | 29 | $1,180.88 |
| 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. | Hour | $28.37 | 4.5 | $127.67 |
| CAP Labor, Energy Auditor | 1740 | Conservation Activity Plan labor involving analyzing energy efficient measures and conducting energy audits of industrial areas and facilities. | Hour | $46.36 | 39 | $1,808.04 |

**Practice:** 128 - Agricultural Energy Management Plan - Written

**Scenario** #83 - AgEMP Small, Three Enterprise

**Scenario Description:**

Typical operation has either • < 300 Acres • < 300 AU • Up to 2 irrigation pumps • <20,000 sq ft of heater greenhouse, or 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. 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:**

Agricultural producer currently has minimal knowledge of and no plan for energy conservation. An Agricultural Energy Mgmt CAP for any type of operation with three 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 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

**Total Scenario Cost:** $3,829.61

**Scenario Cost/Unit:** $3,829.61

**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). | Hour | $93.87 | 18 | $1,689.66 |
| 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. | Hour | $40.72 | 22 | $895.84 |
| 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. | Hour | $28.37 | 3 | $85.11 |
| CAP Labor, Energy Auditor | 1740 | Conservation Activity Plan labor involving analyzing energy efficient measures and conducting energy audits of industrial areas and facilities. | Hour | $46.36 | 25 | $1,159.00 |

**Practice:** 128 - Agricultural Energy Management Plan - Written

**Scenario** #84 - AgEMP Medium, Three Enterprise

**Scenario Description:**

Typical operation has either • 301 to 2500 Ac • 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. 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:**

Agricultural producer currently has minimal knowledge of and no plan for energy conservation. An Agricultural Energy Mgmt CAP for any type of operation with three 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

**Total Scenario Cost:** $5,001.32

**Scenario Cost/Unit:** $5,001.32

**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). | Hour | $93.87 | 24 | $2,252.88 |
| 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. | Hour | $40.72 | 26 | $1,058.72 |
| 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. | Hour | $28.37 | 4 | $113.48 |
| CAP Labor, Energy Auditor | 1740 | Conservation Activity Plan labor involving analyzing energy efficient measures and conducting energy audits of industrial areas and facilities. | Hour | $46.36 | 34 | $1,576.24 |

**Practice:** 128 - Agricultural Energy Management Plan - Written

**Scenario** #85 - AgEMP Large, Three Enterprise

**Scenario Description:**

Typical operation has either • > 2,500 Ac • > 1000 AU • More than 7 irrigation pumps or • > 40,001 sq ft of heater greenhouse Three enterprise 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 extra enterprises. 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:**

Agricultural producer currently has minimal knowledge of and no plan for energy conservation. An Agricultural Energy Mgmt 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). 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

**Total Scenario Cost:** $6,736.25

**Scenario Cost/Unit:** $6,736.25

**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). | Hour | $93.87 | 36 | $3,379.32 |
| 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. | Hour | $40.72 | 30 | $1,221.60 |
| 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. | Hour | $28.37 | 5 | $141.85 |
| CAP Labor, Energy Auditor | 1740 | Conservation Activity Plan labor involving analyzing energy efficient measures and conducting energy audits of industrial areas and facilities. | Hour | $46.36 | 43 | $1,993.48 |

**Practice:** 128 - Agricultural Energy Management Plan - Written

**Scenario** #86 - 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 an small 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 128CAP. 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:**

Agricultural producer currently has minimal knowledge of and no plan for energy conservation. An Agricultural Energy Mgmt CAP for any operation with four 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, 670Lighting 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

**Total Scenario Cost:** $4,675.05

**Scenario Cost/Unit:** $4,675.05

**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). | Hour | $93.87 | 25 | $2,346.75 |
| 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. | Hour | $40.72 | 24 | $977.28 |
| 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. | Hour | $28.37 | 3.5 | $99.30 |
| CAP Labor, Energy Auditor | 1740 | Conservation Activity Plan labor involving analyzing energy efficient measures and conducting energy audits of industrial areas and facilities. | Hour | $46.36 | 27 | $1,251.72 |

**Practice:** 128 - Agricultural Energy Management Plan - Written

**Scenario** #87 - AgEMP 128 Medium, Four Enterprise

**Scenario Description:**

Typical operation has either • 301 to 2500 Ac • 301 to 1000 AU • 3 to 6 Irrigation Pumps, or • 20,001 to 40,000 sq ft heated greenhouse Four enterprise 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. 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:**

Agricultural producer currently has minimal knowledge of and no plan for energy conservation. An Agricultural Energy Mgmt 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). 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

**Total Scenario Cost:** $5,846.76

**Scenario Cost/Unit:** $5,846.76

**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). | Hour | $93.87 | 31 | $2,909.97 |
| 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. | Hour | $40.72 | 28 | $1,140.16 |
| 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. | Hour | $28.37 | 4.5 | $127.67 |
| CAP Labor, Energy Auditor | 1740 | Conservation Activity Plan labor involving analyzing energy efficient measures and conducting energy audits of industrial areas and facilities. | Hour | $46.36 | 36 | $1,668.96 |

**Practice:** 128 - Agricultural Energy Management Plan - Written

**Scenario** #88 - AgEMP 128 Large, Four Enterprise

**Scenario Description:**

Typical operation has either • > 2,500 Ac • > 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 an large livestock operation, one of which is described above. . Multiple irrigation systems or a mixture of irrigation types may be counted as one of extra enterprises. 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:**

Agricultural producer currently has minimal knowledge of and no plan for energy conservation. An Agricultural Energy Mgmt 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

**Total Scenario Cost:** $7,675.56

**Scenario Cost/Unit:** $7,675.56

**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). | Hour | $93.87 | 44 | $4,130.28 |
| 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. | Hour | $40.72 | 32 | $1,303.04 |
| 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. | Hour | $28.37 | 5.5 | $156.04 |
| CAP Labor, Energy Auditor | 1740 | Conservation Activity Plan labor involving analyzing energy efficient measures and conducting energy audits of industrial areas and facilities. | Hour | $46.36 | 45 | $2,086.20 |

**Practice:** 130 - Drainage Water Management Plan - Written

**Scenario** #11 - 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 contolling 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

**Total Scenario Cost:** $2,750.21

**Scenario Cost/Unit:** $2,750.21

**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. | Hour | $108.23 | 8 | $865.84 |
| 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. | Hour | $78.01 | 13 | $1,014.13 |
| 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. | Hour | $54.39 | 16 | $870.24 |

**Practice:** 130 - Drainage Water Management Plan - Written

**Scenario** #12 - 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 contolling 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

**Total Scenario Cost:** $3,279.81

**Scenario Cost/Unit:** $3,279.81

**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. | Hour | $108.23 | 8 | $865.84 |
| 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. | Hour | $78.01 | 13 | $1,014.13 |
| 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. | Hour | $54.39 | 16 | $870.24 |
| 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. | Hour | $33.10 | 16 | $529.60 |

**Practice:** 138 - Conservation Plan Supporting Organic Transition - Written

**Scenario** #12 - Conservation Plan Supporting Organic Transition CAP

**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. The producer currently manages operation based upon personal knowledge, or other local criteria. Producer is interested in transitioning part or all of the managment unit to meet national USDA requirements for certified operation. 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. 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. The CAP plan will include conservation practices which address related resource concerns. 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

**Total Scenario Cost:** $3,198.41

**Scenario Cost/Unit:** $3,198.41

**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. | Hour | $78.01 | 41 | $3,198.41 |

**Practice:** 138 - Conservation Plan Supporting Organic Transition - Written

**Scenario** #13 - Conservation Plan Supporting Organic Transition CAP No Local TSP

**Scenario Description:**

Agricultural operation where producer will transition from conventional to organic to meet USDA National Organic Program (NOP) requirements. No qualified TSP within 300 miles. 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. The producer currently manages operation based upon personal knowledge, or other local criteria. Producer is interested in transitioning part or all of the managment unit to meet national USDA requirements for certified operation. 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. 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. The CAP plan will include conservation practices which address related resource concerns. 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

**Total Scenario Cost:** $4,992.64

**Scenario Cost/Unit:** $4,992.64

**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. | Hour | $78.01 | 64 | $4,992.64 |

**Practice:** 142 - Fish and Wildlife Habitat Plan - Written

**Scenario** #7 - Fish and Wildlife Habitat Management CAP

**Scenario Description:**

Various on-farm land uses. Natural Resource Concern: Fish and Wildlife, and other applicable resource concerns on an agricultural operation.

**Before Situation:**

Agricultural currently 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 habitat. Within existing land uses, 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, participant has obtained services from a certified TSP for develop of the "Fish and Wildlife Management" conservation activity plan. 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. 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

**Total Scenario Cost:** $3,347.40

**Scenario Cost/Unit:** $3,347.40

**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). | Hour | $79.70 | 42 | $3,347.40 |

**Practice:** 146 - Pollinator Habitat Plan - Written

**Scenario** #12 - 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, 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 develop of the "Pollinator Habitat Enhancement" conservation activity plan. 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. 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

**Total Scenario Cost:** $3,347.40

**Scenario Cost/Unit:** $3,347.40

**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). | Hour | $79.70 | 42 | $3,347.40 |

**Practice:** 146 - Pollinator Habitat Plan - Written

**Scenario** #13 - 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, 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 develop of the "Pollinator Habitat Enhancement" conservation activity plan. 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. 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

**Total Scenario Cost:** $4,861.70

**Scenario Cost/Unit:** $4,861.70

**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). | Hour | $79.70 | 61 | $4,861.70 |

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

**Scenario** #14 - 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 diversity crop rotations and rotate herbicide modes of action for purpose of managing resistant weed spread and protecting soil quality and plant condition. Producer is interested in managment of weeds to maximize yields, profit margin, reduce costs, address challenges in herbicide resistant weeds, 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: Integrated Pest Management, Crop Rotation, Cover Crop, Field Boarder, 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 develop of the "Herbicide Resistance Weed" conservation activity plan. 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 use of Integrated Pest Management and may use one or more of the following conservation practices: Crop Rotation, Cover Crop, and Residue Management. Recommendaitons on crop system diversification and integration of herbicide mode of action rotation effective for weed control on recommended crop rotation are integral to the CAP. CAP plan may include recommendations for associated conservation practices which address other related resource concerns. 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

**Total Scenario Cost:** $2,321.40

**Scenario Cost/Unit:** $2,321.40

**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. | Hour | $77.38 | 30 | $2,321.40 |

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

**Scenario** #15 - 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 diversity crop rotations and rotate herbicide modes of action for purpose of managing resistant weed spread and protecting soil quality and plant condition. Producer is interested in managment of weeds to maximize yields, profit margin, reduce costs, address challenges in herbicide resistant weeds, 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: Integrated Pest Management, Crop Rotation, Cover Crop, Field Boarder, 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 develop of the "Herbicide Resistance Weed" conservation activity plan. 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 use of Integrated Pest Management and may use one or more of the following conservation practices: Crop Rotation, Cover Crop, and Residue Management. Recommendaitons on crop system diversification and integration of herbicide mode of action rotation effective for weed control on recommended crop rotation are integral to the CAP. CAP plan may include recommendations for associated conservation practices which address other related resource concerns. 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

**Total Scenario Cost:** $3,017.82

**Scenario Cost/Unit:** $3,017.82

**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. | Hour | $77.38 | 39 | $3,017.82 |

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

**Scenario** #16 - 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 diversity crop rotations and rotate herbicide modes of action for purpose of managing resistant weed spread and protecting soil quality and plant condition. Producer is interested in managment of weeds to maximize yields, profit margin, reduce costs, address challenges in herbicide resistant weeds, 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: Integrated Pest Management, Crop Rotation, Cover Crop, Field Boarder, 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 develop of the "Herbicide Resistance Weed" conservation activity plan. 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 use of Integrated Pest Management and may use one or more of the following conservation practices: Crop Rotation, Cover Crop, and Residue Management. Recommendaitons on crop system diversification and integration of herbicide mode of action rotation effective for weed control on recommended crop rotation are integral to the CAP. CAP plan may include recommendations for associated conservation practices which address other related resource concerns. 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

**Total Scenario Cost:** $4,642.80

**Scenario Cost/Unit:** $4,642.80

**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. | Hour | $77.38 | 60 | $4,642.80 |

**Practice:** 201 - Edge-of-Field Water Quality Monitoringâ€“ Data Collection and Evaluation

**Scenario** #33 - Data Collect Surface Last Year with two treatment sites

**Scenario Description:**

This practice scenario provides for the use of an edge-of-field WQ monitoring station(s) for surface run-off for one control and two treatment sites with an average of 20 samples per year per station. The scenario requires the collection and analysis of edge-of-field water quality data along with a comprehensive report to statistically prove relationship between select conservation practices and water quality. The data will be transferred through semi-annual submittal and annual report and a comprehensive report of practice effectiveness. This scenario will be used in the last year of monitoring. THIS IS PLACED IN A PAIRED SITUATION IF THE CONTROL AND TREATMENT ARE ON DIFFERENT LANDOWNERS FIELDS THEN A JOINT CONTRACT WILL BE NECESSARY.

**Before Situation:**

The agricultural operation prior to installing this practice will have an existing system for collecting water quality data but not have been operating with a long enough time frame to measure practice effectiveness.

**After Situation:**

This practice scenario after installation of the WQ monitoring stations, provides for the data collection, analysis, semiannual submittal, and annual report for one control and two treatment sites. The operator will be able to collect field level water quality data of sufficient quality to measure loss of nutrients as listed in 201 to provide a comprehensive report of statistical testing of data collected during to complete monitoring period.

**Feature Measure:** Measuring site

**Scenario Unit::** Each

**Scenario Typical Size:** 1

**Cost Details:**

**Practice:** 201 - Edge-of-Field Water Quality Monitoringâ€“ Data Collection and Evaluation

**Scenario** #34 - Data Collect Surface Year 1-QAPP

**Scenario Description:**

This practice scenario provides for the design and use of an edge-of-field WQ monitoring station(s) for surface run-off for one control and one treatment site with an average of 20 samples per year per station. The scenario requires the creation of a survey to site a monitoring station, preparation of monitoring plan and a quality assurance project plan to detail how data will be collected, handled and analyzed, provides for the data collection, analysis, semiannual report, and annual report. This scenario will normally be used in year 1 of the contract when a monitoring plan and QAPP need to be prepared prior to installation under Edge-of-Field Water Quality Monitoring - System Installation (202). THIS IS PLACED IN A PAIRED SITUATION IF THE CONTROL AND TREATMENT ARE ON DIFFERENT LANDOWNERS FIELDS THEN A JOINT CONTRACT WILL BE NECESSARY.

**Before Situation:**

The agricultural operation prior to installing this practice will not have a plan or quality assurance project plan prepared for installing equipment nor collecting data for sediment and nutrients leaving the edge of field.

**After Situation:**

This practice scenario after installation of the WQ monitoring stations, provides for the data collection, analysis, semiannual report, and annual report for one control and one treatment site. This scenario will normally be used in year 1 of the contract when a monitoring plan and QAPP have been prepared prior to installation under Edge-of-Field Water Quality Monitoring - System Installation (202). The operator will be able to collect field level water quality data of sufficient quality to measure loss of nutrients as listed in 201.

**Feature Measure:** Measuring Sites

**Scenario Unit::** Each

**Scenario Typical Size:** 1

**Cost Details:**

**Practice:** 201 - Edge-of-Field Water Quality Monitoringâ€“ Data Collection and Evaluation

**Scenario** #35 - Data Collect Surface Year 1 - NO QAPP

**Scenario Description:**

This practice scenario provides for the use of an edge-of-field WQ monitoring station(s) for surface run-off for one control and one treatment site. The scenario requires the collection and analysis of edge-of-field water quality data with an average sample collection of 20 per year for surface sytems. The data will be transferred through semi-annual submittal and annual report which include some preliminary annual analysis. This scenario will normally be used in year 1 of the contract when a monitoring plan and QAPP will be not prepared as this is for an existing monitoring system that has been accepted as meeting both Activity 201 and 202. THIS IS PLACED IN A PAIRED SITUATION IF THE CONTROL AND TREATMENT ARE ON DIFFERENT LANDOWNERS FIELDS THEN A JOINT CONTRACT WILL BE NECESSARY.

**Before Situation:**

The agricultural operation prior to installing this practice will have an existing system for collecting water quality data but not have been operating with a long enough time frame to measure practice effectiveness.

**After Situation:**

This practice scenario after installation of the WQ monitoring stations, provides for the data collection, analysis, semiannual submittal, and annual report for one control and one treatment site. This scenario will normally be used in year 1 of the contract when a monitoring plan and QAPP have been prepared as part of an existing monitoring system installation where the QAPP and monitoring plan meets Activity 201 requirements and no major changes are needed to meet Activity 202 requirements. The operator will be able to collect field level water quality data of sufficient quality to measure loss of nutrients as listed in 201.

**Feature Measure:** Measuring Site

**Scenario Unit::** Each

**Scenario Typical Size:** 1

**Cost Details:**

**Practice:** 201 - Edge-of-Field Water Quality Monitoringâ€“ Data Collection and Evaluation

**Scenario** #36 - Data Collect Surface Year 2+

**Scenario Description:**

This practice scenario provides for the use of an edge-of-field WQ monitoring station(s) for surface run-off for one control and one treatment site. The scenario requires the collection and analysis of edge-of-field water quality data with an average sample collection of 20 per year for surface sytems. The data will be transferred through semi-annual submittal and annual report which include some preliminary annual analysis. This scenario will normally be used in year 2 to next to the last year of monitoring. THIS IS PLACED IN A PAIRED SITUATION IF THE CONTROL AND TREATMENT ARE ON DIFFERENT LANDOWNERS FIELDS THEN A JOINT CONTRACT WILL BE NECESSARY.

**Before Situation:**

The agricultural operation prior to installing this practice will have an existing system for collecting water quality data but not have been operating with a long enough time frame to measure practice effectiveness.

**After Situation:**

This practice scenario after installation of the WQ monitoring stations, provides for the data collection, analysis, semiannual submittal, and annual report for one control and one treatment site. The operator will be able to collect field level water quality data of sufficient quality to measure loss of nitrients as listed in 201.

**Feature Measure:** Measuring Site

**Scenario Unit::** Each

**Scenario Typical Size:** 1

**Cost Details:**

**Practice:** 201 - Edge-of-Field Water Quality Monitoringâ€“ Data Collection and Evaluation

**Scenario** #37 - Data Collect Surface Last Year

**Scenario Description:**

This practice scenario provides for the use of an edge-of-field WQ monitoring station(s) for surface run-off for one control and one treatment site with an average of 20 samples per year per station. The scenario requires the collection and analysis of edge-of-field water quality data along with a comprehensive report to statistically prove relationship between select conservation practices and water quality. The data will be transferred through semi-annual submittal and annual report and a comprehensive report of practice effectiveness. This scenario will be used in the last year of monitoring. THIS IS PLACED IN A PAIRED SITUATION IF THE CONTROL AND TREATMENT ARE ON DIFFERENT LANDOWNERS FIELDS THEN A JOINT CONTRACT WILL BE NECESSARY.

**Before Situation:**

The agricultural operation prior to installing this practice will have an existing system for collecting water quality data but not have been operating with a long enough time frame to measure practice effectiveness.

**After Situation:**

This practice scenario after installation of the WQ monitoring stations, provides for the data collection, analysis, semiannual submittal, and annual report for one control and one treatment site. The operator will be able to collect field level water quality data of sufficient quality to measure loss of nitrients as listed in 201 to provide a comprehensive report of statistical testing of data collected to complete monitoring period.

**Feature Measure:** Measuring Site

**Scenario Unit::** Each

**Scenario Typical Size:** 1

**Cost Details:**

**Practice:** 201 - Edge-of-Field Water Quality Monitoringâ€“ Data Collection and Evaluation

**Scenario** #38 - Data Collect Tile Year 1-QAPP

**Scenario Description:**

This practice scenario provides for the design and use of an edge-of-field WQ monitoring station(s) for tile and subsurface drainage run-off for one control and one treatment site with an average of 40 samples per year per station. A subsurface system also requires the addition of a surface sampling system at the same outlet to capture overland flow with 20 samples per year. Without the surface system then not all runoff is captured for calculating a true event mean concentration as per the 201 Standard. The scenario requires the creation of a survey to site a monitoring station, preparation of monitoring plan and a quality assurance project plan to detail how data will be collected, handled and analyzed, provides for the data collection, analysis, semiannual report, and annual report. This scenario will normally be used in year 1 of the contract when a monitoring plan and QAPP need to be prepared prior to installation under Edge-of-Field Water Quality Monitoring - System Installation (202). THIS IS PLACED IN A PAIRED SITUATION IF THE CONTROL AND TREATMENT ARE ON DIFFERENT LANDOWNERS FIELDS THEN A JOINT CONTRACT WILL BE NECESSARY.

**Before Situation:**

The agricultural operation prior to installing this practice will not have a plan or quality assurance project plan prepared for installing equipment nor collecting data for sediment and nutrients leaving the edge of field.

**After Situation:**

This practice scenario after installation of the WQ monitoring stations, provides for the data collection, analysis, semiannual report, and annual report for one control and one treatment site. This scenario will normally be used in year 1 of the contract when a monitoring plan and QAPP have been prepared prior to installation under Edge-of-Field Water Quality Monitoring - System Installation (202). The operator will be able to collect field level water quality data of sufficient quality to measure loss of nutrients as listed in 201.

**Feature Measure:** Measuring Site

**Scenario Unit::** Each

**Scenario Typical Size:** 1

**Cost Details:**

**Practice:** 201 - Edge-of-Field Water Quality Monitoringâ€“ Data Collection and Evaluation

**Scenario** #39 - Data Collect Tile Year 1 - NO QAPP

**Scenario Description:**

This practice scenario provides for the design and use of an edge-of-field WQ monitoring station(s) for tile and subsurface drainage run-off for one control and one treatment site with an average of 40 samples per year per station. A subsurface system also requires the addition of a surface sampling system at the same outlet to capture overland flow with 20 samples per year. Without the surface system then not all runoff is captured for calculating a true event mean concentration as per the 201 Standard. The data will be transferred through semi-annual submittal and annual reports, which include some preliminary annual analysis. This scenario will normally be used in year 1 of the contract when a monitoring plan and QAPP will be not prepared as this is for an existing monitoring system be accepted as meeting both Activity 201 and 202. THIS IS PLACED IN A PAIRED SITUATION IF THE CONTROL AND TREATMENT ARE ON DIFFERENT LANDOWNERS FIELDS THEN A JOINT CONTRACT WILL BE NECESSARY.

**Before Situation:**

The agricultural operation prior to installing this practice will have an existing system for collecting water quality data but not have been operating with a long enough time frame to measure practice effectiveness.

**After Situation:**

This practice scenario after installation of the WQ monitoring stations, provides for the data collection, analysis, semiannual submittal, and annual report for one control and one treatment site. This scenario will normally be used in year 1 of the contract when a monitoring plan and QAPP have been prepared as part of an existing monitoring system installation where the QAPP and monitoring plan meets Activity 201 requirements and no major changes are needed to meet Activity 202 requirements. The operator will be able to collect field level water quality data of sufficient quality to measure loss of nutrients as listed in 201.

**Feature Measure:** Measuring Site

**Scenario Unit::** Each

**Scenario Typical Size:** 1

**Cost Details:**

**Practice:** 201 - Edge-of-Field Water Quality Monitoringâ€“ Data Collection and Evaluation

**Scenario** #40 - Data Collect Tile Year 2+

**Scenario Description:**

This practice scenario provides for the design and use of an edge-of-field WQ monitoring station(s) for tile and subsurface drainage run-off for one control and one treatment site with an average of 40 samples per year per station. A subsurface system also requires the addition of a surface sampling system at the same outlet to capture overland flow with 20 samples per year. Without the surface system then not all runoff is captured for calculating a true event mean concentration as per the 201 Standard. The data will be transferred through semi-annual submittal and annual report, which include some preliminary annual analysis. This scenario will normally be used in year 2 to next to the last year of monitoring. THIS IS PLACED IN A PAIRED SITUATION IF THE CONTROL AND TREATMENT ARE ON DIFFERENT LANDOWNERS FIELDS THEN A JOINT CONTRACT WILL BE NECESSARY.

**Before Situation:**

The agricultural operation prior to installing this practice will not have a plan or quality assurance project plan prepared for installing equipment nor collecting data for sediment and nutrients leaving the edge of field.

**After Situation:**

This practice scenario after installation of the WQ monitoring stations, provides for the data collection, analysis, semiannual report, and annual report for one control and one treatment site. The operator will be able to collect field level water quality data of sufficient quality to measure loss of nutrients as listed in 201.

**Feature Measure:** Measuring site

**Scenario Unit::** Each

**Scenario Typical Size:** 1

**Cost Details:**

**Practice:** 201 - Edge-of-Field Water Quality Monitoringâ€“ Data Collection and Evaluation

**Scenario** #41 - Data Collect Tile Last Year

**Scenario Description:**

This practice scenario provides for the design and use of an edge-of-field WQ monitoring station(s) for tile and subsurface drainage run-off for one control and one treatment site with an average of 40 samples per year per station. A subsurface system also requires the addition of a surface sampling system at the same outlet to capture overland flow with 20 samples per year. Without the surface system then not all runoff is captured for calculating a true event mean concentration as per the 201 Standard. The scenario requires the collection and analysis of edge-of-field water quality data along with a comprehensive report to statistically prove relationship between select conservation practices and water quality. The data will be transferred through semi-annual submitall and annual report and a comprehensive report of practice effectiveness. This scenario will be used in the last year of monitoring. THIS IS PLACED IN A PAIRED SITUATION IF THE CONTROL AND TREATMENT ARE ON DIFFERENT LANDOWNERS FIELDS THEN A JOINT CONTRACT WILL BE NECESSARY.

**Before Situation:**

The agricultural operation prior to installing this practice will have an existing system for collecting water quality data but not have been operating with a long enough time frame to measure practice effectiveness.

**After Situation:**

This practice scenario after installation of the WQ monitoring stations, provides for the data collection, analysis, semiannual submittal, and annual report for one control and one treatment site. The operator will be able to collect field level water quality data of sufficient quality to measure loss of nitrients as listed in 201 to provide a comprehensive report of statistical testing of data collected during to complete monitoring period.

**Feature Measure:** Measuring site

**Scenario Unit::** Each

**Scenario Typical Size:** 1

**Cost Details:**

**Practice:** 201 - Edge-of-Field Water Quality Monitoringâ€“ Data Collection and Evaluation

**Scenario** #42 - Data Collect Surface Year 1-QAPP with two treatment Sites

**Scenario Description:**

This practice scenario provides for the design and use of an edge-of-field WQ monitoring station(s) for surface run-off for one control and two treatment sites with an average of 20 samples per year per station. The scenario requires the creation of a survey to site a monitoring station, preparation of monitoring plan and a quality assurance project plan to detail how data will be collected, handled and analyzed, provides for the data collection, analysis, semiannual report, and annual report. This scenario will normally be used in year 1 of the contract when a monitoring plan and QAPP need to be prepared prior to installation under Edge-of-Field Water Quality Monitoring - System Installation (202). THIS IS PLACED IN A PAIRED SITUATION IF THE CONTROL AND TREATMENT ARE ON DIFFERENT LANDOWNERS FIELDS THEN A JOINT CONTRACT WILL BE NECESSARY.

**Before Situation:**

The agricultural operation prior to installing this practice will not have a plan or quality assurance project plan prepared for installing equipment nor collecting data for sediment and nutrients leaving the edge of field.

**After Situation:**

This practice scenario after installation of the WQ monitoring stations, provides for the data collection, analysis, semiannual report, and annual report for one control and one treatment site. This scenario will normally be used in year 1 of the contract when a monitoring plan and QAPP have been prepared prior to installation under Edge-of-Field Water Quality Monitoring - System Installation (202). The operator will be able to collect field level water quality data of sufficient quality to measure loss of nutrients as listed in 201.

**Feature Measure:** Measuring Sites

**Scenario Unit::** Each

**Scenario Typical Size:** 1

**Cost Details:**

**Practice:** 201 - Edge-of-Field Water Quality Monitoringâ€“ Data Collection and Evaluation

**Scenario** #43 - Data Collect Surface Year 1 less QAPP (pre-install information) with two treatment sites

**Scenario Description:**

This practice scenario provides for the use of an edge-of-field WQ monitoring station(s) for surface run-off for one control and two treatment sites. The scenario requires the collection and analysis of edge-of-field water quality data with an average sample collection of 20 per year for each surface system. The data will be transferred through semi-annual submittal and annual report, which include some preliminary annual analysis. This scenario will normally be used in year 1 of the contract when a monitoring plan and QAPP will not be prepared as this is for an existing monitoring system be accepted as meeting both Activity 201 and 202. THIS IS PLACED IN A PAIRED SITUATION IF THE CONTROL AND TREATMENT ARE ON DIFFERENT LANDOWNERS FIELDS THEN A JOINT CONTRACT WILL BE NECESSARY.

**Before Situation:**

The agricultural operation prior to installing this practice will have an existing system for collecting water quality data but not have been operating with a long enough time frame to measure practice effectiveness.

**After Situation:**

This practice scenario after installation of the WQ monitoring stations, provides for the data collection, analysis, semiannual submittal, and annual report for one control and two treatment sites. This scenario will normally be used in year 1 of the contract when a monitoring plan and QAPP have been prepared as part of an existing monitoring system installation where the QAPP and monitoring plan meets Activity 201 requirements and no major changes are needed to meet Activity 202 requirements. The operator will be able to collect field level water quality data of sufficient quality to measure loss of nutrients as listed in 201.

**Feature Measure:** Measuring site

**Scenario Unit::** Each

**Scenario Typical Size:** 1

**Cost Details:**

**Practice:** 201 - Edge-of-Field Water Quality Monitoringâ€“ Data Collection and Evaluation

**Scenario** #44 - Data Collect Surface Year 2+ with two treatment sites

**Scenario Description:**

This practice scenario provides for the use of an edge-of-field WQ monitoring station(s) for surface run-off for one control and two treatment sites. The scenario requires the collection and analysis of edge-of-field water quality data with an average sample collection of 20 per year for each surface system. The data will be transferred through semi-annual submittal and annual report, which include some preliminary annual analysis. This scenario will normally be used in year 2 to next to the last year of monitoring. THIS IS PLACED IN A PAIRED SITUATION IF THE CONTROL AND TREATMENT ARE ON DIFFERENT LANDOWNERS FIELDS THEN A JOINT CONTRACT WILL BE NECESSARY.

**Before Situation:**

The agricultural operation prior to installing this practice will have an existing system for collecting water quality data but not have been operating with a long enough time frame to measure practice effectiveness.

**After Situation:**

This practice scenario after installation of the WQ monitoring stations, provides for the data collection, analysis, semiannual submittal, and annual report for one control and two treatment sites. The operator will be able to collect field level water quality data of sufficient quality to measure loss of nutrients as listed in 201.

**Feature Measure:** Measuring site

**Scenario Unit::** Each

**Scenario Typical Size:** 1

**Cost Details:**

**Practice:** 201 - Edge-of-Field Water Quality Monitoringâ€“ Data Collection and Evaluation

**Scenario** #45 - Data Collect Surface Last Year with two treatment sites

**Scenario Description:**

This practice scenario provides for the use of an edge-of-field WQ monitoring station(s) for surface run-off for one control and two treatment sites with an average of 20 samples per year per station. The scenario requires the collection and analysis of edge-of-field water quality data along with a comprehensive report to statistically prove relationship between select conservation practices and water quality. The data will be transferred through semi-annual submittal and annual report and a comprehensive report of practice effectiveness. This scenario will be used in the last year of monitoring. THIS IS PLACED IN A PAIRED SITUATION IF THE CONTROL AND TREATMENT ARE ON DIFFERENT LANDOWNERS FIELDS THEN A JOINT CONTRACT WILL BE NECESSARY.

**Before Situation:**

The agricultural operation prior to installing this practice will have an existing system for collecting water quality data but not have been operating with a long enough time frame to measure practice effectiveness.

**After Situation:**

This practice scenario after installation of the WQ monitoring stations, provides for the data collection, analysis, semiannual submittal, and annual report for one control and two treatment sites. The operator will be able to collect field level water quality data of sufficient quality to measure loss of nutrients as listed in 201 to provide a comprehensive report of statistical testing of data collected during to complete monitoring period.

**Feature Measure:** Measuring site

**Scenario Unit::** Each

**Scenario Typical Size:** 1

**Cost Details:**

**Practice:** 201 - Edge-of-Field Water Quality Monitoringâ€“ Data Collection and Evaluation

**Scenario** #46 - Data Collect Tile Year 1 with two treatment sites and QAPP

**Scenario Description:**

This practice scenario provides for the design and use of an edge-of-field WQ monitoring station(s) for tile and subsurface drainage run-off for one control and two treatment sites with an average of 40 samples per year per station. A subsurface system also requires the addition of a surface sampling system at the same outlet to capture overland flow with 20 samples per year. Without the surface system then not all runoff is captured for calculating a true event mean concentration as per the 201 Standard. The scenario requires the creation of a survey to site monitoring stations, preparation of monitoring plan and a quality assurance project plan (QAPP) to detail how data will be collected, handled and analyzed, provides for the data collection, analysis, semiannual report, and annual report. This scenario will normally be used in year 1 of the contract when a monitoring plan and QAPP need to be prepared prior to installation under Edge-of-Field Water Quality Monitoring - System Installation (202). THIS IS PLACED IN A PAIRED SITUATION IF THE CONTROL AND TREATMENT ARE ON DIFFERENT LANDOWNERS FIELDS THEN A JOINT CONTRACT WILL BE NECESSARY.

**Before Situation:**

The agricultural operation prior to installing this practice will not have a plan or quality assurance project plan prepared for installing equipment nor collecting data for sediment and nutrients leaving the edge of field.

**After Situation:**

This practice scenario after installation of the WQ monitoring stations, provides for the data collection, analysis, semiannual report, and annual report for one control and two treatment sites. This scenario will normally be used in year 1 of the contract when a monitoring plan and QAPP have not been prepared prior to installation under Edge-of-Field Water Quality Monitoring - System Installation (202). The operator will be able to collect field level water quality data of sufficient quality to measure loss of nutrients as listed in 201.

**Feature Measure:** Measuring site

**Scenario Unit::** Each

**Scenario Typical Size:** 1

**Cost Details:**

**Practice:** 201 - Edge-of-Field Water Quality Monitoringâ€“ Data Collection and Evaluation

**Scenario** #47 - Data Collect Tile Year 1 less QAPP (pre-install information) with two treatment sites

**Scenario Description:**

This practice scenario provides for the design and use of an edge-of-field WQ monitoring station(s) for tile and subsurface drainage run-off for one control and two treatment sites with an average of 40 samples per year per station. A subsurface system also requires the addition of a surface sampling system at the same outlet to capture overland flow with 20 samples per year. Without the surface system then not all runoff is captured for calculating a true event mean concentration as per the 201 Standard. The data will be transferred through semi-annual submittal and annual reports, which include some preliminary annual analysis. This scenario will normally be used in year 1 of the contract when a monitoring plan and QAPP will not be prepared as this is for an existing monitoring system be accepted as meeting both Activity 201 and 202. THIS IS PLACED IN A PAIRED SITUATION IF THE CONTROL AND TREATMENT ARE ON DIFFERENT LANDOWNERS FIELDS THEN A JOINT CONTRACT WILL BE NECESSARY.

**Before Situation:**

The agricultural operation prior to installing this practice will have an existing system for collecting water quality data but not have been operating with a long enough time frame to measure practice effectiveness.

**After Situation:**

This practice scenario after installation of the WQ monitoring stations, provides for the data collection, analysis, semiannual submittal, and annual report for one control and two treatment sites. This scenario will normally be used in year 1 of the contract when a monitoring plan and QAPP have been prepared as part of an existing monitoring system installation where the QAPP and monitoring plan meets Activity 201 requirements and no major changes are needed to meet Activity 202 requirements. The operator will be able to collect field level water quality data of sufficient quality to measure loss of nutrients as listed in 201.

**Feature Measure:** Measuring site

**Scenario Unit::** Each

**Scenario Typical Size:** 1

**Cost Details:**

**Practice:** 201 - Edge-of-Field Water Quality Monitoringâ€“ Data Collection and Evaluation

**Scenario** #48 - Data Collect Tile Last Year with two treatment sites

**Scenario Description:**

This practice scenario provides for the design and use of an edge-of-field WQ monitoring station(s) for tile and subsurface drainage run-off for one control and two treatment sites with an average of 40 samples per year per station. A subsurface system also requires the addition of a surface sampling system at the same outlet to capture overland flow with 20 samples per year. Without the surface system then not all runoff is captured for calculating a true event mean concentration as per the 201 Standard. The scenario requires the collection and analysis of edge-of-field water quality data along with a comprehensive report to statistically prove relationship between select conservation practices and water quality. The data will be transferred through semi-annual submittal and annual report and a comprehensive report of practice effectiveness. This scenario will be used in the last year of monitoring. THIS IS PLACED IN A PAIRED SITUATION IF THE CONTROL AND TREATMENT ARE ON DIFFERENT LANDOWNERS FIELDS THEN A JOINT CONTRACT WILL BE NECESSARY.

**Before Situation:**

The agricultural operation prior to installing this practice will have an existing system for collecting water quality data but not have been operating with a long enough time frame to measure practice effectiveness.

**After Situation:**

This practice scenario after installation of the WQ monitoring stations, provides for the data collection, analysis, semiannual submittal, and annual report for one control and two treatment sites. The operator will be able to collect field level water quality data of sufficient quality to measure loss of nutrients as listed in 201 to provide a comprehensive report of statistical testing of data collected during to complete monitoring period.

**Feature Measure:** Measuring site

**Scenario Unit::** Each

**Scenario Typical Size:** 1

**Cost Details:**

**Practice:** 202 - Edge-of-Field Water Quality Monitoringâ€“ System Installation

**Scenario** #24 - System Installation-Surface

**Scenario Description:**

This edge-of-field water quality monitoring system is applicable to a single control or treatment site that has a field defined with surface runoff that can be captured and sampled at the edge of a field before entering a ditch or receiving water body or water course. The component monitoring equipment are associated with a typical system for southern latitudes where winter time heating is not required for sampling. It will allow for installation of automated sampling data collection system with protective housing to reduce potential for vandalism, battery backup for operation during periods when electricity is down or solar panels are not creating an electrical current, and a berm or other directional flow structure to guide the runoff to a sampling flume.

**Before Situation:**

The agricultural operation prior to installing the monitoring equipment is guessing about the effects of the conservation system with regards to meeting practice intent of avoid, controlling, or trapping sediment and nutrients.

**After Situation:**

The agricultural operation after installing the monitoring equipment will be receiving feedback in the form of edge-of-field runoff water quality samples. The samples will allow the operator to understand the relationship between rain/irrigation, practice choice, and nutrient inputs effecting nutrient and sediment loss for the field. Thus, providing an opportunity to make adaptive management changes to the agricultural operation to reduce sediment and nutrient loss and/or profitability.

**Feature Measure:** System installed

**Scenario Unit::** Each

**Scenario Typical Size:** 1

**Cost Details:**

**Practice:** 202 - Edge-of-Field Water Quality Monitoringâ€“ System Installation

**Scenario** #25 - System Installation-Surface Cold Climate

**Scenario Description:**

This edge-of-field water quality monitoring system is applicable to a single control or treatment site that has a field defined with surface runoff that can be captured and sampled at the edge of a field before entering a ditch or receiving water body or water course. The component monitoring equipment are associated with a typical system for northern latitudes where winter time heating is required for sampling. It will allow for installation of automated sampling data collection system with protective housing to reduce potential for vandalism, battery backup for operation during periods when electricity is down or solar panels are not creating an electrical current, a calf hut or other structure with heat is required over the flume to allow sampling under northern latitude winter conditions, and a berm or other directional flow structure to guide the runoff to a sampling flume.

**Before Situation:**

The agricultural operation prior to installing the monitoring equipment is guessing about the effects of the conservation system with regards to meeting practice intent of avoid, controlling, or trapping sediment and nutrients. Nothing is known about the volume or mass of sediment and nutrients leaving the edge of field through the tile or other subsurface drainage system.

**After Situation:**

The agricultural operation after installing the monitoring equipment will be receiving feedback in the form of edge-of-field runoff water quality samples. The samples will allow the operator to understand the relationship between rain/irrigation, practice choice, and nutrient inputs effecting nutrient and sediment loss for the field. Thus, providing an opportunity to make adaptive management changes to the agricultural operation to reduce sediment and nutrient loss and/or profitability.

**Feature Measure:** System installed

**Scenario Unit::** Each

**Scenario Typical Size:** 1

**Cost Details:**

**Practice:** 202 - Edge-of-Field Water Quality Monitoringâ€“ System Installation

**Scenario** #26 - System Installation-Tile

**Scenario Description:**

This edge-of-field water quality monitoring system is applicable to a single control or treatment site that has a field defined with tile or other subsurface drainage runoff that can be captured and sampled at the edge of a field before entering a ditch or receiving water body or water course. The component monitoring equipment are associated with a typical system for southern latitudes where winter time heating is not required for sampling. It will allow for installation of automated sampling data collection system for a subsurface collection and separate surface automated sample collection system with protective housing to reduce potential for vandalism, battery backup for operation during periods when electricity is down or solar panels are not creating an electrical current, an area velocity sensor for pipe flow and estimation of submerged flow, and a berm or other directional flow structure to guide the runoff to a sampling flume.

**Before Situation:**

The agricultural operation prior to installing the monitoring equipment is guessing about the effects of the conservation system with regards to meeting practice intent of avoid, controlling, or trapping sediment and nutrients. Nothing is known about the volume or mass of sediment and nutrients leaving the edge of field through the tile or other subsurface drainage system.

**After Situation:**

The agricultural operation after installing the monitoring equipment will be receiving feedback in the form of edge-of-field runoff water quality samples. The samples will allow the operator to understand the relationship between rain/irrigation, practice choice, and nutrient inputs effecting nutrient and sediment loss for the field. Thus, providing an opportunity to make adaptive management changes to the agricultural operation to reduce sediment and nutrient loss and/or profitability.

**Feature Measure:** System installed

**Scenario Unit::** Each

**Scenario Typical Size:** 1

**Cost Details:**

**Practice:** 202 - Edge-of-Field Water Quality Monitoringâ€“ System Installation

**Scenario** #27 - System Installation-Tile Cold Climate

**Scenario Description:**

This edge-of-field water quality monitoring system is applicable to a single control or treatment site that has a field defined with tile or other subsurface drainage runoff that can be captured and sampled at the edge of a field before entering a ditch or receiving water body or water course. The component monitoring equipment are associated with a typical system for northern latitudes where winter time heating is required for sampling. It will allow for installation of automated sampling data collection system for a subsurface collection and separate surface automated sample collection system with protective housing to reduce potential for vandalism, battery backup for operation during periods when electricity is down or solar panels are not creating an electrical current, an area velocity sensor for pipe flow and estimation of submerged flow, a calf hut or other structure with heat is required over the flume to allow sampling under northern latitude winter conditions and a berm or other directional flow structure to guide the runoff to a sampling flume.

**Before Situation:**

The agricultural operation prior to installing the monitoring equipment is guessing about the effects of the conservation system with regards to meeting practice intent of avoid, controlling, or trapping sediment and nutrients. Nothing is known about the volume or mass of sediment and nutrients leaving the edge of field through the tile or other subsurface drainage system.

**After Situation:**

The agricultural operation after installing the monitoring equipment will be receiving feedback in the form of edge-of-field runoff water quality samples. The samples will allow the operator to understand the relationship between rain/irrigation, practice choice, and nutrient inputs effecting nutrient and sediment loss for the field. Thus, providing an opportunity to make adaptive management changes to the agricultural operation to reduce sediment and nutrient loss and/or profitability.

**Feature Measure:** System installed

**Scenario Unit::** Each

**Scenario Typical Size:** 1

**Cost Details:**

**Practice:** 202 - Edge-of-Field Water Quality Monitoringâ€“ System Installation

**Scenario** #28 - System Installation-Above&Below

**Scenario Description:**

This edge-of-field water quality monitoring system is applicable where a conservation practice has a pre- and post treatment area in the same field drainage with surface or subsurface drainage runoff that can be captured and sampled at the edge of a field before entering a ditch or receiving water body or water course. The component monitoring equipment are associated with a typical system for southern latitudes where winter time heating is not required for sampling. It will allow for installation of automated sampling data collection system with protective housing to reduce potential for vandalism, battery backup for operation during periods when electricity is down or solar panels are not creating an electrical current, and a berm or other directional flow structure to guide the runoff to a sampling flume. The actual installation will different on the subsurface flow by allowing a smaller precalibrated flume with the addition of a velocity sensor meter as in the tile alternative.

**Before Situation:**

The agricultural operation prior to installing the monitoring equipment is guessing about the effects of the conservation system with regards to meeting practice intent of avoid, controlling, or trapping sediment and nutrients.

**After Situation:**

The agricultural operation after installing the monitoring equipment will be receiving feedback in the form of edge-of-field runoff water quality samples. The samples will allow the operator to understand the relationship between rain/irrigation, practice choice, and nutrient inputs effecting nutrient and sediment loss for the field. Thus, providing an opportunity to make adaptive management changes to the agricultural operation to reduce sediment and nutrient loss and/or profitability.

**Feature Measure:** System installed

**Scenario Unit::** Each

**Scenario Typical Size:** 1

**Cost Details:**

**Practice:** 202 - Edge-of-Field Water Quality Monitoringâ€“ System Installation

**Scenario** #29 - System Installation-Above&Below cold climate

**Scenario Description:**

This edge-of-field water quality monitoring system is applicable where a conservation practice has a pre- and post treatment area in the same field drainage with surface or subsurface drainage runoff that can be captured and sampled at the edge of a field before entering a ditch or receiving water body or water course. The component monitoring equipment are associated with a typical system for northern latitudes where winter time heating is required for sampling. It will allow for installation of automated sampling data collection system with protective housing to reduce potential for vandalism, battery backup for operation during periods when electricity is down or solar panels are not creating an electrical current, a calf hut or other structure with heat is required over the flume to allow sampling under northern latitude winter conditions, and a berm or other directional flow structure to guide the runoff to a sampling flume. The actual installation will different on the subsurface flow by allowing a smaller pre-calibrated flume with the addition of a velocity sensor meter as in the tile alternative.

**Before Situation:**

The agricultural operation prior to installing the monitoring equipment is guessing about the effects of the conservation system with regards to meeting practice intent of avoid, controlling, or trapping sediment and nutrients. Nothing is known about the volume or mass of sediment and nutrients leaving the edge of field through the tile or other subsurface drainage system.

**After Situation:**

The agricultural operation after installing the monitoring equipment will be receiving feedback in the form of edge-of-field runoff water quality samples. The samples will allow the operator to understand the relationship between rain/irrigation, practice choice, and nutrient inputs effecting nutrient and sediment loss for the field. Thus, providing an opportunity to make adaptive management changes to the agricultural operation to reduce sediment and nutrient loss and/or profitability.

**Feature Measure:** System installed

**Scenario Unit::** Each

**Scenario Typical Size:** 1

**Cost Details:**

**Practice:** 202 - Edge-of-Field Water Quality Monitoringâ€“ System Installation

**Scenario** #30 - System Installation-Retrofit 1

**Scenario Description:**

This edge-of-field water quality monitoring system is to retrofit an existing system that is being used in associated with the 799 interim practice or comparable system. The retrofit is applicable to a single control or treatment site that has a field defined with surface or subsurface drainage runoff that can be captured and sampled at the edge of a field before entering a ditch or receiving water body or water course. The data represents the installation of an automated and manual backup rain gauge and back-up/solar power supply be added to existing system. It is actually to represent a cost for any system updates that has component costs of $2,400 or less as per the component costs in various scenarios.

**Before Situation:**

The agricultural operation prior to retrofit has an edge-of-field data collection system but it does not meet the present standards for accuracy or reliability as detailed in either or both of Activity 201 and Activity 202.

**After Situation:**

The agricultural operation after installing the monitoring equipment will be receiving feedback in the form of edge-of-field runoff water quality samples. The samples will allow the operator to understand the relationship between rain/irrigation, practice choice, and nutrient inputs effecting nutrient and sediment loss for the field. Thus, providing an opportunity to make adaptive management changes to the agricultural operation to reduce sediment and nutrient loss and/or profitability.

**Feature Measure:** System installed

**Scenario Unit::** Each

**Scenario Typical Size:** 1

**Cost Details:**

**Practice:** 202 - Edge-of-Field Water Quality Monitoringâ€“ System Installation

**Scenario** #31 - System Installation-Retrofit 2

**Scenario Description:**

This edge-of-field water quality monitoring system is to retrofit an existing system that is being used in associated with the 799 interim practice or comparable system. The retrofit is applicable to a single control or treatment site that has a field defined with surface or subsurface drainage runoff that can be captured and sampled at the edge of a field before entering a ditch or receiving water body or water course. The data represents the installation of an automated and manual backup rain gauge, back-up/solar power supply, communications device, and depth (stage) sensor to be added to existing system. It is actually to represent a cost for any system updates that has component costs greater than $2,400 but less than or equal to $7,300 as per the component costs in various scenarios.

**Before Situation:**

The agricultural operation prior to retrofit has an edge-of-field data collection system but it does not meet the present standards for accuracy or reliability as detailed in either or both of Activity 201 and Activity 202.

**After Situation:**

The agricultural operation after installing the monitoring equipment will be receiving feedback in the form of edge-of-field runoff water quality samples. The samples will allow the operator to understand the relationship between rain/irrigation, practice choice, and nutrient inputs effecting nutrient and sediment loss for the field. Thus, providing an opportunity to make adaptive management changes to the agricultural operation to reduce sediment and nutrient loss and/or profitability.

**Feature Measure:** System installed

**Scenario Unit::** Each

**Scenario Typical Size:** 1

**Cost Details:**

**Practice:** 202 - Edge-of-Field Water Quality Monitoringâ€“ System Installation

**Scenario** #32 - System Installation-Retrofit 3

**Scenario Description:**

This edge-of-field water quality monitoring system is to retrofit an existing system that is being used in associated with the 799 interim practice or comparable system. The retrofit is applicable to a single control or treatment site that has a field defined with surface or subsurface drainage runoff that can be captured and sampled at the edge of a field before entering a ditch or receiving water body or water course. The data represents the installation of an automated and manual backup rain gauge, back-up/solar power supply, communications device, pre-calibrated flow control structure, and depth (stage) sensor to be added to existing system. It is actually to represent a cost for any system updates that has component costs greater than $7,300 but less than or equal to $10,500 as per the component costs in various scenarios. Anything above $10,500 will evaluated as a full system replacement as per scenarios for surface or tile (subsurface) drainage.

**Before Situation:**

The agricultural operation prior to retrofit has an edge-of-field data collection system but it does not meet the present standards for accuracy or reliability as detailed in either or both of Activity 201 and Activity 202.

**After Situation:**

The agricultural operation after installing the monitoring equipment will be receiving feedback in the form of edge-of-field runoff water quality samples. The samples will allow the operator to understand the relationship between rain/irrigation, practice choice, and nutrient inputs effecting nutrient and sediment loss for the field. Thus, providing an opportunity to make adaptive management changes to the agricultural operation to reduce sediment and nutrient loss and/or profitability.

**Feature Measure:** System installed

**Scenario Unit::** Each

**Scenario Typical Size:** 1

**Cost Details:**

**Practice:** 202 - Edge-of-Field Water Quality Monitoringâ€“ System Installation

**Scenario** #33 - System Installation-Retrofit Above and Below 1

**Scenario Description:**

This edge-of-field water quality monitoring system is to retrofit an existing above and below monitoring designed system that is being used in associated with the 799 interim practice or comparable system. The retrofit is applicable to an above and below system that has a field defined with surface or subsurface drainage runoff that can be captured and sampled at the edge of a field before entering a ditch or receiving water body or water course. The data represents the installation of an automated and manual backup rain gauge and two back-up/solar power supply be added to existing paired system. It is actually to represent a cost for any system updates that has component costs of $3,300 or less as per the component costs in various scenarios.

**Before Situation:**

The agricultural operation prior to retrofit has an edge-of-field data collection system but it does not meet the present standards for accuracy or reliability as detailed in either or both of Activity 201 and Activity 202.

**After Situation:**

The agricultural operation after installing the monitoring equipment will be receiving feedback in the form of edge-of-field runoff water quality samples. The samples will allow the operator to understand the relationship between rain/irrigation, practice choice, and nutrient inputs effecting nutrient and sediment loss for the field. Thus, providing an opportunity to make adaptive management changes to the agricultural operation to reduce sediment and nutrient loss and/or profitability.

**Feature Measure:** System installed

**Scenario Unit::** Each

**Scenario Typical Size:** 1

**Cost Details:**

**Practice:** 202 - Edge-of-Field Water Quality Monitoringâ€“ System Installation

**Scenario** #34 - System Installation-Retrofit Above 2

**Scenario Description:**

This edge-of-field water quality monitoring system is to retrofit an existing above and below monitoring designed system that is being used in associated with the 799 interim practice or comparable system. The retrofit is applicable to an above and below system that has a field defined with surface or subsurface drainage runoff that can be captured and sampled at the edge of a field before entering a ditch or receiving water body or water course. The data represents the installation of an automated and manual backup rain gauge, two back-up/solar power supplies, two communications devices, and two depth (stage) sensors to be added to existing paired system. It is actually to represent a cost for any system updates that has component costs greater than $3,300 but less than or equal to $13,200 as per the component costs in various scenarios.

**Before Situation:**

The agricultural operation prior to retrofit has an edge-of-field data collection system but it does not meet the present standards for accuracy or reliability as detailed in either or both of Activity 201 and Activity 202.

**After Situation:**

The agricultural operation after installing the monitoring equipment will be receiving feedback in the form of edge-of-field runoff water quality samples. The samples will allow the operator to understand the relationship between rain/irrigation, practice choice, and nutrient inputs effecting nutrient and sediment loss for the field. Thus, providing an opportunity to make adaptive management changes to the agricultural operation to reduce sediment and nutrient loss and/or profitability.

**Feature Measure:** System installed

**Scenario Unit::** Each

**Scenario Typical Size:** 1

**Cost Details:**

**Practice:** 202 - Edge-of-Field Water Quality Monitoringâ€“ System Installation

**Scenario** #35 - System Installation-Retrofit Above 3

**Scenario Description:**

This edge-of-field water quality monitoring system is to retrofit an existing above and below monitoring designed system that is being used in associated with the 799 interim practice or comparable system. The retrofit is applicable to an above and below system that has a field defined with surface or subsurface drainage runoff that can be captured and sampled at the edge of a field before entering a ditch or receiving water body or water course. The data represents the installation of an automated and manual backup rain gauge, two back-up/solar power supplies, two communications devices, two pre-calibrated flumes, and two depth (stage) sensors to be added to existing paired system. It is actually to represent a cost for any system updates that has component costs greater than $13,500 but less than or equal to $20,500 as per the component costs in various scenarios. Anything above a $20,500 will evaluated as a full system replacement as per scenarios for surface or tile (subsurface) drainage.

**Before Situation:**

The agricultural operation prior to retrofit has an edge-of-field data collection system but it does not meet the present standards for accuracy or reliability as detailed in either or both of Activity 201 and Activity 202.

**After Situation:**

The agricultural operation after installing the monitoring equipment will be receiving feedback in the form of edge-of-field runoff water quality samples. The samples will allow the operator to understand the relationship between rain/irrigation, practice choice, and nutrient inputs effecting nutrient and sediment loss for the field. Thus, providing an opportunity to make adaptive management changes to the agricultural operation to reduce sediment and nutrient loss and/or profitability.

**Feature Measure:** System installed

**Scenario Unit::** Each

**Scenario Typical Size:** 1

**Cost Details:**

**Practice:** 297 - Feral Swine Management Conservation Activity - Interim

**Scenario** #3 - Assessment

**Scenario Description:**

200 acre tract (all land uses) on which feral swine have negatively impacted water quality (and associated aquatic organisms), soil health and vegetative conditions onsite. Wildlife habitat has been diminished due to feral swine out-competing native species for the same resources (hard and soft mast, tubers, invertebrates), as well as negatively affecting plant regeneration and production. Some species of native wildlife onsite are at risk from predation by feral swine as well as from diseases carried and transmitted either directly or indirectly by feral swine.This scenario should be selected in Year 1 only. The "Evaluation" Scenario should be selected for all subsequent years for which evalutation is necessary.

**Before Situation:**

Agricultural producer currently has no plan or knowledge of how resource concerns are caused or exacerbated by the presence of feral swine. Within existing land uses, the producer is interested in management of land to reduce impacts caused by feral swine and improve condition of natural resources.

**After Situation:**

As a result of feral swine surveillance (coupled with resource and inventory of baseline conditions), the nature and extent of natural resource concerns caused or exacerbated by the presence of feral swine are understood through resource assessments sufficient to inform development of a plan of action to meet quality criteria for all identified resource concerns.(Note: All management activities directly involving feral swine, such as trapping, euthanasia and disposal of carcasses will be the responsibility of the landowner, APHIS, or other partners. NRCS will have no role in these activities.)

**Feature Measure:** Managment Site

**Scenario Unit::** Each

**Scenario Typical Size:** 1

**Total Scenario Cost:** $846.21

**Scenario Cost/Unit:** $846.21

**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. | Hour | $25.08 | 18 | $451.44 |
| **Materials** | | | | | | |
| Camera, Monitoring, Stationary | 2638 | Motion activated, 8 megapixel, weather proof, stationary camera with infrared capability for night operation. Trigger speed of 1 second or less with SD card storage up to 32 GB (not included in the price). Includes materials and shipping only. | Each | $131.59 | 3 | $394.77 |

**Practice:** 297 - Feral Swine Management Conservation Activity - Interim

**Scenario** #5 - Evaluation

**Scenario Description:**

200 acre tract (all land uses) on which feral swine have negatively impacted water quality (and associated aquatic organisms), soil health and vegetative conditions onsite. Wildlife habitat has been diminished due to feral swine out-competing native species for the same resources (hard and soft mast, tubers, invertebrates), as well as negatively affecting plant regeneration and production. Some species of native wildlife onsite are at risk from predation by feral swine as well as from diseases carried and transmitted either directly or indirectly by feral swine.

**Before Situation:**

Agricultural producer is currently or soon will be implementing feral swine component of a conservation plan but the effectiveness of those activities in improving resource conditions is unknown.

**After Situation:**

Sufficient data and information have been collected to evaluate resource condition relative to baseline conditions and the effectiveness of the feral swine management actions. Necessary adaptive management actions are identified and implemented.(Note: All management activities directly involving feral swine, such as trapping, euthanasia and disposal of carcasses will be the responsibility of the landowner, APHIS, or other partners. NRCS will have no role in these activities.)

**Feature Measure:** Management Site

**Scenario Unit::** Each

**Scenario Typical Size:** 1

**Total Scenario Cost:** $1,003.20

**Scenario Cost/Unit:** $1,003.20

**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. | Hour | $25.08 | 40 | $1,003.20 |

**Practice:** 309 - Agrichemical Handling Facility

**Scenario** #1 - Agrichemical Storage with Handling Pad inside an enclosed building

**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 Foot

**Scenario Typical Size:** 1400

**Total Scenario Cost:** $27,050.12

**Scenario Cost/Unit:** $19.32

**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 Yard | $210.23 | 18 | $3,784.14 |
| Concrete, CIP, formed reinforced | 38 | Steel reinforced concrete formed and cast-in-placed in formed structures such as walls or suspended slabs by chute placement. Typical strength is 3000 to 4000 psi. Includes materials, labor and equipment to transport, place and finish. | Cubic Yard | $326.97 | 10 | $3,269.70 |
| Dozer, 80 HP | 929 | Track mounted Dozer with horsepower range of 60 to 90. Equipment and power unit costs. Labor not included. | Hour | $60.16 | 8 | $481.28 |
| **Labor** | | | | | | |
| Equipment Operators, Heavy | 233 | Includes: Cranes, Hydraulic Excavators >=50 HP, Dozers, Paving Machines, Rock Trenchers, Trenchers >=12", Dump Trucks, Ag Equipment >=150 HP, Scrapers, Water Wagons. | Hour | $23.93 | 8 | $191.44 |
| **Materials** | | | | | | |
| Aggregate, Sand, Graded, Washed | 45 | Sand, typical ASTM C33 gradation, includes materials, equipment and labor to transport and place | Cubic Yard | $30.40 | 22 | $668.80 |
| 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 Foot | $9.25 | 1760 | $16,280.00 |
| Painting, concrete surface, impermeable | 1497 | Painting of concrete surfaces with an impermeable coating. Includes materials and application. | Square Foot | $0.94 | 1400 | $1,316.00 |
| Emergency shower and eye wash station | 1499 | Emergency shower and ewe wash station unit. Materials only. | Each | $592.43 | 1 | $592.43 |
| Pump, Sump, less than 1/4 HP | 2582 | Utility pump, corrosion-resistant, compact and portable, self-priming at 8 ft or more, 300 GPH at 10', electric, manually operated. Includes materials and shipping (pump and motor). | Each | $169.36 | 1 | $169.36 |
| **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 | $64.26 | 1 | $64.26 |

| | | | | | |
|---|---|---|---|---|---|
| Mobilization, medium equipment | 1139 Equipment with 70-150 HP or typical weights between 14,000 and 30,000 pounds. | Each | $232.71 | 1 | $232.71 |

**Practice:** 309 - Agrichemical Handling Facility

**Scenario** #2 - Earthen Liquid Agrichemical Storage with a Handling Pad

**Scenario Description:**

This practice scenario is an agrichemical handling facility for storage of liquid agrichemicals along with a mixing and loading pad. 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), Pumping Plant for Water Control (533), Nutrient Management (590), Pest Management (595), Pond Sealing or Lining Flexible Membrane (521A)

**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 handling facility is constructed for storage of liquid agrichemicals along with a handling pad for mixing and loading operations. The average size of the agrichemical handling facility for proper storage of liquid agrichemicals is in an earthen lined containment with bottom dimensions of 30 ft x 40 ft. A handling pad for mixing and loading is located next to the liquid containment and is 20' 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. This practice will contain agrichemicals and prevent contamination of surface and ground water resources.

**Feature Measure:** Floor surface area of Liquid Contai

**Scenario Unit::** Square Foot

**Scenario Typical Size:** 2000

**Total Scenario Cost:** $5,952.48

**Scenario Cost/Unit:** $2.98

**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 Yard | $210.23 | 15 | $3,153.45 |
| Geotextile, woven | 42 | Woven Geotextile Fabric. Includes materials, equipment and labor | Square Yard | $2.05 | 70 | $143.50 |
| Excavation, Common Earth, side cast, small equipment | 48 | Bulk excavation and side casting of common earth with hydraulic excavator with less than 1 CY capacity. Includes equipment and labor. | Cubic Yard | $1.99 | 235 | $467.65 |
| **Materials** | | | | | | |
| Aggregate, Sand, Graded, Washed | 45 | Sand, typical ASTM C33 gradation, includes materials, equipment and labor to transport and place | Cubic Yard | $30.40 | 13 | $395.20 |
| Aggregate, Gravel, Graded | 46 | Gravel, includes materials, equipment and labor to transport and place. Includes washed and unwashed gravel. | Cubic Yard | $30.82 | 9 | $277.38 |
| Painting, concrete surface, impermeable | 1497 | Painting of concrete surfaces with an impermeable coating. Includes materials and application. | Square Foot | $0.94 | 800 | $752.00 |
| Pump, Sump, less than 1/4 HP | 2582 | Utility pump, corrosion-resistant, compact and portable, self-priming at 8 ft or more, 300 GPH at 10', electric, manually operated. Includes materials and shipping (pump and motor). | Each | $169.36 | 1 | $169.36 |
| **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 | $64.26 | 2 | $128.52 |
| Mobilization, medium equipment | 1139 | Equipment with 70-150 HP or typical weights between 14,000 and 30,000 pounds. | Each | $232.71 | 2 | $465.42 |

**Practice:** 309 - Agrichemical Handling Facility

**Scenario** #3 - Fabricated Liquid Agrichemical Storage with a Handling Pad

**Scenario Description:**

This practice scenario is an agrichemical handling facility for storage of liquid agrichemicals along with a mixing and loading pad. Due to topography, limited site space and/or geological conditions a fabricated structure is needed. 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), Pumping Plant for Water Control (533), Nutrient Management (590), Pest Management (595), Pond Sealing or Lining Flexible Membrane (521A)

**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 handling facility is constructed for storage of liquid agrichemicals along with a handling pad for mixing and loading operations. The average size of the agrichemical handling facility for proper storage of liquid agrichemicals is in fabricated containment that is 30 ft x 40 ft with flexible membrane lined walls. The walls are of modular blocks stacked two for a 4ft wall height on four sides. A handling pad for mixing and loading is located next to the liquid containment and is 16' x 32' with an application equipment length of 28 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. This practice will contain agrichemicals and prevent contamination of surface and ground water resources.

**Feature Measure:** Liquid Containment Area + Handlin

**Scenario Unit::** Square Foot

**Scenario Typical Size:** 1712

**Total Scenario Cost:** $13,716.35

**Scenario Cost/Unit:** $8.01

**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 Yard | $210.23 | 19 | $3,994.37 |
| Concrete, CIP, formed reinforced | 38 | Steel reinforced concrete formed and cast-in-placed in formed structures such as walls or suspended slabs by chute placement. Typical strength is 3000 to 4000 psi. Includes materials, labor and equipment to transport, place and finish. | Cubic Yard | $326.97 | 8 | $2,615.76 |
| Geotextile, woven | 42 | Woven Geotextile Fabric. Includes materials, equipment and labor | Square Yard | $2.05 | 15 | $30.75 |
| Dozer, 80 HP | 929 | Track mounted Dozer with horsepower range of 60 to 90. Equipment and power unit costs. Labor not included. | Hour | $60.16 | 8 | $481.28 |
| Skidsteer, 80 HP | 933 | Skidsteer loader with horsepower range of 60 to 90. Equipment and power unit costs. Labor not included. | Hour | $40.57 | 8 | $324.56 |
| **Materials** | | | | | | |
| Aggregate, Sand, Graded, Washed | 45 | Sand, typical ASTM C33 gradation, includes materials, equipment and labor to transport and place | Cubic Yard | $30.40 | 27 | $820.80 |
| Aggregate, Gravel, Graded | 46 | Gravel, includes materials, equipment and labor to transport and place. Includes washed and unwashed gravel. | Cubic Yard | $30.82 | 4 | $123.28 |
| Block, pre-cast concrete, modular | 1496 | Pre-cast concrete blocks, typically 2ft x 2ft x 6ft , includes installation and delivery. | Cubic Yard | $98.98 | 42 | $4,157.16 |
| Painting, concrete surface, impermeable | 1497 | Painting of concrete surfaces with an impermeable coating. Includes materials and application. | Square Foot | $0.94 | 512 | $481.28 |
| Pump, Sump, less than 1/4 HP | 2582 | Utility pump, corrosion-resistant, compact and portable, self-priming at 8 ft or more, 300 GPH at 10', electric, manually operated. Includes materials and shipping (pump and motor). | Each | $169.36 | 1 | $169.36 |
| **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 | $64.26 | 2 | $128.52 |

| | | | | | | |
|---|---|---|---|---|---|---|
| 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 | $156.52 | 1 | $156.52 |
| Mobilization, medium equipment | 1139 | Equipment with 70-150 HP or typical weights between 14,000 and 30,000 pounds. | Each | $232.71 | 1 | $232.71 |

**Practice:** 309 - Agrichemical Handling Facility

**Scenario** #5 - Agrichemical Handling 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)

**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 Foot

**Scenario Typical Size:** 640

**Total Scenario Cost:** $4,306.77

**Scenario Cost/Unit:** $6.73

**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 Yard | $210.23 | 12 | $2,522.76 |
| Dozer, 80 HP | 929 | Track mounted Dozer with horsepower range of 60 to 90. Equipment and power unit costs. Labor not included. | Hour | $60.16 | 4 | $240.64 |
| **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. | Hour | $18.93 | 4 | $75.72 |
| Equipment Operators, Heavy | 233 | Includes: Cranes, Hydraulic Excavators >=50 HP, Dozers, Paving Machines, Rock Trenchers, Trenchers >=12", Dump Trucks, Ag Equipment >=150 HP, Scrapers, Water Wagons. | Hour | $23.93 | 4 | $95.72 |
| **Materials** | | | | | | |
| Aggregate, Sand, Graded, Washed | 45 | Sand, typical ASTM C33 gradation, includes materials, equipment and labor to transport and place | Cubic Yard | $30.40 | 10 | $304.00 |
| Painting, concrete surface, impermeable | 1497 | Painting of concrete surfaces with an impermeable coating. Includes materials and application. | Square Foot | $0.94 | 640 | $601.60 |
| Pump, Sump, less than 1/4 HP | 2582 | Utility pump, corrosion-resistant, compact and portable, self-priming at 8 ft or more, 300 GPH at 10', electric, manually operated. Includes materials and shipping (pump and motor). | Each | $169.36 | 1 | $169.36 |
| **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 | $64.26 | 1 | $64.26 |
| Mobilization, medium equipment | 1139 | Equipment with 70-150 HP or typical weights between 14,000 and 30,000 pounds. | Each | $232.71 | 1 | $232.71 |

**Practice:** 309 - Agrichemical Handling Facility

**Scenario** #6 - Agrichemical Storage & Handling for Greenhouses

**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 Containment Area + Handli

**Scenario Unit::** Square Foot

**Scenario Typical Size:** 89

**Total Scenario Cost:** $1,986.36

**Scenario Cost/Unit:** $22.32

**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. | Hour | $18.93 | 8 | $151.44 |
| **Materials** | | | | | | |
| 2 Drum Spill Pallet, 66 Gallon | 1610 | Pre fabricated containment basin with a capacity of approximately 66 gal. Materials only. | Each | $290.20 | 1 | $290.20 |
| PVC Containment Basin, 6' x 6' | 1611 | Poly containment basin typically 8" to 12" deep with area dimensions in the range of 6' x 6' or larger. | Square Foot | $21.49 | 64 | $1,375.36 |
| Pump, Sump, less than 1/4 HP | 2582 | Utility pump, corrosion-resistant, compact and portable, self-priming at 8 ft or more, 300 GPH at 10', electric, manually operated. Includes materials and shipping (pump and motor). | Each | $169.36 | 1 | $169.36 |

**Practice:** 309 - Agrichemical Handling Facility

**Scenario** #7 - Agrichemical Storage with Handling Pad in an Existing Building

**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 existing building. The average size of the agrichemical handling facility for storage and mixing and loading is 24 ft x 36 ft with an application equipment length of 30 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 and independent of the existing building. This practice will contain agrichemicals and prevent contamination of surface and ground water resources.

**Feature Measure:** Total Containment Area

**Scenario Unit::** Square Foot

**Scenario Typical Size:** 864

**Total Scenario Cost:** $8,822.12

**Scenario Cost/Unit:** $10.21

**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 Yard | $210.23 | 14 | $2,943.22 |
| Concrete, CIP, formed reinforced | 38 | Steel reinforced concrete formed and cast-in-placed in formed structures such as walls or suspended slabs by chute placement. Typical strength is 3000 to 4000 psi. Includes materials, labor and equipment to transport, place and finish. | Cubic Yard | $326.97 | 8 | $2,615.76 |
| Dozer, 80 HP | 929 | Track mounted Dozer with horsepower range of 60 to 90. Equipment and power unit costs. Labor not included. | Hour | $60.16 | 4 | $240.64 |
| Skidsteer, 80 HP | 933 | Skidsteer loader with horsepower range of 60 to 90. Equipment and power unit costs. Labor not included. | Hour | $40.57 | 10 | $405.70 |
| Demolition, concrete | 1498 | Demolition and disposal of reinforced concrete structures including slabs and walls. Includes labor and equipment. | Cubic Yard | $10.00 | 7 | $70.00 |
| **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. | Hour | $18.93 | 16 | $302.88 |
| Equipment Operators, Light | 232 | Includes: Skid Steer Loaders, Hydraulic Excavators <50 HP, Trenchers <12", Ag Equipment <150 HP, Pickup Trucks, Forklifts, Mulchers | Hour | $21.14 | 10 | $211.40 |
| Equipment Operators, Heavy | 233 | Includes: Cranes, Hydraulic Excavators >=50 HP, Dozers, Paving Machines, Rock Trenchers, Trenchers >=12", Dump Trucks, Ag Equipment >=150 HP, Scrapers, Water Wagons. | Hour | $23.93 | 4 | $95.72 |
| **Materials** | | | | | | |
| Aggregate, Sand, Graded, Washed | 45 | Sand, typical ASTM C33 gradation, includes materials, equipment and labor to transport and place | Cubic Yard | $30.40 | 14 | $425.60 |
| Painting, concrete surface, impermeable | 1497 | Painting of concrete surfaces with an impermeable coating. Includes materials and application. | Square Foot | $0.94 | 864 | $812.16 |
| Pump, Sump, less than 1/4 HP | 2582 | Utility pump, corrosion-resistant, compact and portable, self-priming at 8 ft or more, 300 GPH at 10', electric, manually operated. Includes materials and shipping (pump and motor). | Each | $169.36 | 1 | $169.36 |
| **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 | $64.26 | 1 | $64.26 |
| Mobilization, medium equipment | 1139 | Equipment with 70-150 HP or typical weights between 14,000 and 30,000 pounds. | Each | $232.71 | 2 | $465.42 |

**Practice:** 313 - Waste Storage Facility

**Scenario** #1 - Earthen Storage Facility less than 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 : design storage volume 25,000 ft3; 87'X87' (top); 3:1 inside and outside side slopes; cut/fill ratio = 1.25; total depth = 9.5' (design depth = 8'); (not inclued in volume - 1' freeboard and 0.5' sludge accumulation).

**Feature Measure:** Design Storage Volume

**Scenario Unit::** Cubic Foot

**Scenario Typical Size:** 25000

**Total Scenario Cost:** $7,694.32

**Scenario Cost/Unit:** $0.31

**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 Yard | $3.76 | 806 | $3,030.56 |
| Earthfill, Dumped and Spread | 51 | Earthfill, dumped and spread without compaction effort, includes equipment and labor | Cubic Yard | $3.08 | 578 | $1,780.24 |
| Stripping and stockpiling, topsoil | 1199 | Stripping and stockpiling of topsoil adjacent to stripping area. Includes equipment and labor. | Cubic Yard | $0.81 | 224 | $181.44 |
| 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 Yard | $3.43 | 582 | $1,996.26 |
| **Materials** | | | | | | |
| Structural steel tubing, 2" diameter | 1120 | Structural steel tubing, 2" diameter, 1/8" wall thickness, materials only | Foot | $3.60 | 8 | $28.80 |
| **Mobilization** | | | | | | |
| Mobilization, medium equipment | 1139 | Equipment with 70-150 HP or typical weights between 14,000 and 30,000 pounds. | Each | $232.71 | 1 | $232.71 |
| Mobilization, large equipment | 1140 | Equipment >150HP or typical weights greater than 30,000 pounds or loads requiring over width or over length permits. | Each | $444.31 | 1 | $444.31 |

**Practice:** 313 - Waste Storage Facility

**Scenario** #2 - Earthen Storage Facilitygreater than 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: design storage volume 168,000 ft3; 157'X162' (top); 3:1 inside and outside side slopes; cut/fill ratio = 1.25; total depth = 13' 8" (design depth = 12'); (not inclued in volume - 1' freeboard and 8" sludge accumulation).

**Feature Measure:** Design Storage Volume

**Scenario Unit::** Cubic Foot

**Scenario Typical Size:** 168000

**Total Scenario Cost:** $40,335.37

**Scenario Cost/Unit:** $0.24

**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 Yard | $3.76 | 4375 | $16,450.00 |
| Earthfill, Dumped and Spread | 51 | Earthfill, dumped and spread without compaction effort, includes equipment and labor | Cubic Yard | $3.08 | 3284 | $10,114.72 |
| Stripping and stockpiling, topsoil | 1199 | Stripping and stockpiling of topsoil adjacent to stripping area. Includes equipment and labor. | Cubic Yard | $0.81 | 741 | $600.21 |
| Excavation, common earth, large equipment, 150 ft | 1223 | Bulk excavation of common earth including sand and gravel with dozer >100 HP with average push distance of 150 feet. Includes equipment and labor. | Cubic Yard | $3.43 | 3634 | $12,464.62 |
| **Materials** | | | | | | |
| Structural steel tubing, 2" diameter | 1120 | Structural steel tubing, 2" diameter, 1/8" wall thickness, materials only | Foot | $3.60 | 8 | $28.80 |
| **Mobilization** | | | | | | |
| Mobilization, medium equipment | 1139 | Equipment with 70-150 HP or typical weights between 14,000 and 30,000 pounds. | Each | $232.71 | 1 | $232.71 |
| Mobilization, large equipment | 1140 | Equipment >150HP or typical weights greater than 30,000 pounds or loads requiring over width or over length permits. | Each | $444.31 | 1 | $444.31 |

**Practice:** 313 - Waste Storage Facility

**Scenario** #3 - Earthen Storage FacilityHigh Water Table

**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. Due to high watertable conditions, the earthen embankment is constructed on the soil surface. Earthfill is obtained within five miles off-site. 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), Roof and Covers (367), Solid/Liquid Waste Separation Facility (632), Waste Treatment (629), Subsurface Drain (606), and Underground Outlet (620).

**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: design storage volume 121,200 ft3; 150'X150' (top); 3:1 inside and outside side slopes; embankment topwidth = 10'; compaction ratio = 1.1; total depth = 10' (design depth = 8.5'); (not inclued in volume - 1' freeboard and 0.5' sludge accumulation); embankment volume = 4*160*((10+70)/2)*10*1.1

**Feature Measure:** Design Storage Volume

**Scenario Unit::** Cubic Foot

**Scenario Typical Size:** 121200

**Total Scenario Cost:** $138,134.06

**Scenario Cost/Unit:** $1.14

**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 Yard | $3.76 | 10430 | $39,216.80 |
| Earthfill, Dumped and Spread | 51 | Earthfill, dumped and spread without compaction effort, includes equipment and labor | Cubic Yard | $3.08 | 10430 | $32,124.40 |
| Hydraulic Excavator, 2 CY | 932 | Track mounted hydraulic excavator with bucket capacity range of 1.5 to 2.5 CY. Equipment and power unit costs. Labor not included. | Hour | $149.59 | 97 | $14,510.23 |
| Stripping and stockpiling, topsoil | 1199 | Stripping and stockpiling of topsoil adjacent to stripping area. Includes equipment and labor. | Cubic Yard | $0.81 | 741 | $600.21 |
| Excavation, common earth, large equipment, 150 ft | 1223 | Bulk excavation of common earth including sand and gravel with dozer >100 HP with average push distance of 150 feet. Includes equipment and labor. | Cubic Yard | $3.43 | 9689 | $33,233.27 |
| 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 | $0.30 | 48445 | $14,533.50 |
| **Labor** | | | | | | |
| Equipment Operators, Heavy | 233 | Includes: Cranes, Hydraulic Excavators >=50 HP, Dozers, Paving Machines, Rock Trenchers, Trenchers >=12", Dump Trucks, Ag Equipment >=150 HP, Scrapers, Water Wagons. | Hour | $23.93 | 97 | $2,321.21 |
| **Materials** | | | | | | |
| Structural steel tubing, 2" diameter | 1120 | Structural steel tubing, 2" diameter, 1/8" wall thickness, materials only | Foot | $3.60 | 8 | $28.80 |
| **Mobilization** | | | | | | |
| Mobilization, medium equipment | 1139 | Equipment with 70-150 HP or typical weights between 14,000 and 30,000 pounds. | Each | $232.71 | 1 | $232.71 |
| Mobilization, large equipment | 1140 | Equipment >150HP or typical weights greater than 30,000 pounds or loads requiring over width or over length permits. | Each | $444.31 | 3 | $1,332.93 |

**Practice:** 313 - Waste Storage Facility

**Scenario** #4 - Above Ground Steel/Concrete less than 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 : design storage volume 14,000 ft3, (not included - 1' freeboard); based on 31' X 19' glass lined steel tank

**Feature Measure:** Design Storage Volume

**Scenario Unit::** Cubic Foot

**Scenario Typical Size:** 14000

**Total Scenario Cost:** $90,817.37

**Scenario Cost/Unit:** $6.49

**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 Yard | $210.23 | 12 | $2,522.76 |
| 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 Yard | $326.97 | 16.5 | $5,395.01 |
| Excavation, Common Earth, side cast, small equipment | 48 | Bulk excavation and side casting of common earth with hydraulic excavator with less than 1 CY capacity. Includes equipment and labor. | Cubic Yard | $1.99 | 80 | $159.20 |
| Earthfill, Roller Compacted | 49 | Earthfill, roller or machine compacted, includes equipment and labor | Cubic Yard | $3.76 | 80 | $300.80 |
| **Materials** | | | | | | |
| Aggregate, Gravel, Graded | 46 | Gravel, includes materials, equipment and labor to transport and place. Includes washed and unwashed gravel. | Cubic Yard | $30.82 | 21.5 | $662.63 |
| 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 Foot | $5.82 | 14000 | $81,480.00 |
| **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 | $64.26 | 1 | $64.26 |
| Mobilization, medium equipment | 1139 | Equipment with 70-150 HP or typical weights between 14,000 and 30,000 pounds. | Each | $232.71 | 1 | $232.71 |

**Practice:** 313 - Waste Storage Facility

**Scenario** #5 - Above Ground Steel or 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 : design storage volume 75,000 ft3, (not included - 1' freeboard); based on 73' X 19' glass lined steel tank

**Feature Measure:** Design Storage Volume

**Scenario Unit::** Cubic Foot

**Scenario Typical Size:** 75000

**Total Scenario Cost:** $185,651.11

**Scenario Cost/Unit:** $2.48

**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 Yard | $210.23 | 65 | $13,664.95 |
| Concrete, CIP, formed reinforced | 38 | Steel reinforced concrete formed and cast-in-placed in formed structures such as walls or suspended slabs by chute placement. Typical strength is 3000 to 4000 psi. Includes materials, labor and equipment to transport, place and finish. | Cubic Yard | $326.97 | 39 | $12,751.83 |
| Excavation, Common Earth, side cast, small equipment | 48 | Bulk excavation and side casting of common earth with hydraulic excavator with less than 1 CY capacity. Includes equipment and labor. | Cubic Yard | $1.99 | 250 | $497.50 |
| Earthfill, Roller Compacted | 49 | Earthfill, roller or machine compacted, includes equipment and labor | Cubic Yard | $3.76 | 250 | $940.00 |
| **Materials** | | | | | | |
| Aggregate, Gravel, Graded | 46 | Gravel, includes materials, equipment and labor to transport and place. Includes washed and unwashed gravel. | Cubic Yard | $30.82 | 73 | $2,249.86 |
| 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 Foot | $2.07 | 75000 | $155,250.00 |
| **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 | $64.26 | 1 | $64.26 |
| Mobilization, medium equipment | 1139 | Equipment with 70-150 HP or typical weights between 14,000 and 30,000 pounds. | Each | $232.71 | 1 | $232.71 |

**Practice:** 313 - Waste Storage Facility

**Scenario** #6 - Above Ground Steel or 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 : design storage volume 177,000 ft3, (not included - 1' freeboard); based on 112' X 19' glass lined steel tank

**Feature Measure:** Design Storage Volume

**Scenario Unit::** Cubic Foot

**Scenario Typical Size:** 177000

**Total Scenario Cost:** $350,069.44

**Scenario Cost/Unit:** $1.98

**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 Yard | $210.23 | 152 | $31,954.96 |
| Concrete, CIP, formed reinforced | 38 | Steel reinforced concrete formed and cast-in-placed in formed structures such as walls or suspended slabs by chute placement. Typical strength is 3000 to 4000 psi. Includes materials, labor and equipment to transport, place and finish. | Cubic Yard | $326.97 | 59 | $19,291.23 |
| Earthfill, Roller Compacted | 49 | Earthfill, roller or machine compacted, includes equipment and labor | Cubic Yard | $3.76 | 470 | $1,767.20 |
| 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 Yard | $3.43 | 470 | $1,612.10 |
| **Materials** | | | | | | |
| Aggregate, Gravel, Graded | 46 | Gravel, includes materials, equipment and labor to transport and place. Includes washed and unwashed gravel. | Cubic Yard | $30.82 | 143.5 | $4,422.67 |
| 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 Foot | $1.64 | 177000 | $290,280.00 |
| **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 | $64.26 | 1 | $64.26 |
| Mobilization, medium equipment | 1139 | Equipment with 70-150 HP or typical weights between 14,000 and 30,000 pounds. | Each | $232.71 | 1 | $232.71 |
| Mobilization, large equipment | 1140 | Equipment >150HP or typical weights greater than 30,000 pounds or loads requiring over width or over length permits. | Each | $444.31 | 1 | $444.31 |

**Practice:** 313 - Waste Storage Facility

**Scenario** #7 - Above Ground Steel or Concrete greater than 200K CF storagegreater than 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 : design storage volume 235,000 ft3, (not included - 1' freeboard); based on 129' X 19' glass lined steel tank

**Feature Measure:** Design Storage Volume

**Scenario Unit::** Cubic Foot

**Scenario Typical Size:** 235000

**Total Scenario Cost:** $484,119.08

**Scenario Cost/Unit:** $2.06

**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 Yard | $210.23 | 202 | $42,466.46 |
| Concrete, CIP, formed reinforced | 38 | Steel reinforced concrete formed and cast-in-placed in formed structures such as walls or suspended slabs by chute placement. Typical strength is 3000 to 4000 psi. Includes materials, labor and equipment to transport, place and finish. | Cubic Yard | $326.97 | 68 | $22,233.96 |
| Earthfill, Roller Compacted | 49 | Earthfill, roller or machine compacted, includes equipment and labor | Cubic Yard | $3.76 | 584 | $2,195.84 |
| 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 Yard | $3.43 | 584 | $2,003.12 |
| **Materials** | | | | | | |
| Aggregate, Gravel, Graded | 46 | Gravel, includes materials, equipment and labor to transport and place. Includes washed and unwashed gravel. | Cubic Yard | $30.82 | 181 | $5,578.42 |
| 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 Foot | $1.74 | 235000 | $408,900.00 |
| **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 | $64.26 | 1 | $64.26 |
| Mobilization, medium equipment | 1139 | Equipment with 70-150 HP or typical weights between 14,000 and 30,000 pounds. | Each | $232.71 | 1 | $232.71 |
| Mobilization, large equipment | 1140 | Equipment >150HP or typical weights greater than 30,000 pounds or loads requiring over width or over length permits. | Each | $444.31 | 1 | $444.31 |

**Practice:** 313 - Waste Storage Facility

**Scenario** #8 - Drystack,earthen floor,no wall

**Scenario Description:**

This scenario consists of a dry stack facility with compacted earthen floor without side walls. This scenario is intended for dryer material such as poultry litter. The purpose of this practice is to properly store manure and other agricultural by-products until they can be hauled away from the site for proper disposal or utilization on land at agronomical rates. This scenario is applicable when gelolgical, soil and climate conditions are appropriate for earth floors and are allowed by state and local regulations. This practice will address soil and water quality by reducing the pollution potential to soil, surface water and ground water. Potential Associated practices: 342-Critical Area Planting, 362-Diversion, 561-Heavy Use Area Protection, 367-Roofs and Covers, 558-Roof Runoff Structure, 317-Composting Facility, 633-Waste Recycling, 634-Waste Transfer, 635-Vegetated Treatment Area

**Before Situation:**

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

**After Situation:**

The typical is 4,000 SqFt (40' x 100'). The earthen floor will be prepared by stripping the top 1" of soil and roller compacting it back into floor. 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:** Square Foot Floor Area

**Scenario Unit::** Square Foot

**Scenario Typical Size:** 4000

**Total Scenario Cost:** $1,952.74

**Scenario Cost/Unit:** $0.49

**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 Yard | $3.76 | 148 | $556.48 |
| Excavation, common earth, large equipment, 150 ft | 1223 | Bulk excavation of common earth including sand and gravel with dozer >100 HP with average push distance of 150 feet. Includes equipment and labor. | Cubic Yard | $3.43 | 148 | $507.64 |
| **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 | $444.31 | 2 | $888.62 |

**Practice:** 313 - Waste Storage Facility

**Scenario** #9 - Dry stack, earthen floor, wood or concrete wall

**Scenario Description:**

This scenario consists of a dry stack facility with compacted earthen floor with wooden walls, posts and a concrete curb. This scenario is intended for dryer material such as poultry litter. The purpose of this practice is to properly store manure and other agricultural by-products until they can be hauled away from the site for proper disposal or utilization on land at agronomical rates. This scenario is applicable when geological, soil, and climate conditions are appropriate for earth floors and are allowed by state and local regulations.This practice will address soil and water quality by reducing the pollution potential to soil, surface water and ground water. Potential Associated practices: 342-Critical Area Planting, 362-Diversion, 561-Heavy Use Area Protection, 367-Roofs and Covers, 558-Roof Runoff Structure, 317-Composting Facility, 633-Waste Recycling, 634-Waste Transfer, 635-Vegetated Treatment AreaT

**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. The typical is 4,000 SqFt (40' x 100'). The earthen floor will be prepared by stripping the top 1" of soil and roller compacting it back into floor. Walls are 5" pressure treated wood (2" x 8" boards), 6" x 6" x 8" posts set 4' c-c with 6" concrete curbing. Walls allow for greater storage volume. (Wood walls are 4.5" with 0.5" high concrete curbing.) Walls are along three sides of the facility (both short dimensions and one long dimension). Site preparation includes excavation and compaction of top 1" of material, setting posts, and installing curbing and wooden walls.

**Feature Measure:** Square Foot Floor Area

**Scenario Unit::** Square Foot

**Scenario Typical Size:** 4000

**Total Scenario Cost:** $9,263.98

**Scenario Cost/Unit:** $2.32

**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 Yard | $103.61 | 5.5 | $569.86 |
| Concrete, CIP, formed reinforced | 38 | Steel reinforced concrete formed and cast-in-placed in formed structures such as walls or suspended slabs by chute placement. Typical strength is 3000 to 4000 psi. Includes materials, labor and equipment to transport, place and finish. | Cubic Yard | $326.97 | 2 | $653.94 |
| Earthfill, Roller Compacted | 49 | Earthfill, roller or machine compacted, includes equipment and labor | Cubic Yard | $3.76 | 148 | $556.48 |
| Skidsteer, 80 HP | 933 | Skidsteer loader with horsepower range of 60 to 90. Equipment and power unit costs. Labor not included. | Hour | $40.57 | 12 | $486.84 |
| Auger, Post driver attachment | 934 | Auger or post driver attachment to a tractor or skidsteer. Does not include power unit. Labor not included. | Hour | $6.65 | 12 | $79.80 |
| Excavation, common earth, large equipment, 150 ft | 1223 | Bulk excavation of common earth including sand and gravel with dozer >100 HP with average push distance of 150 feet. Includes equipment and labor. | Cubic Yard | $3.43 | 148 | $507.64 |
| **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. | Hour | $18.93 | 90 | $1,703.70 |
| Equipment Operators, Light | 232 | Includes: Skid Steer Loaders, Hydraulic Excavators <50 HP, Trenchers <12", Ag Equipment <150 HP, Pickup Trucks, Forklifts, Mulchers | Hour | $21.14 | 12 | $253.68 |
| **Materials** | | | | | | |
| Dimension Lumber, Treated | 1044 | Treated dimension lumber with nominal thickness equal or less than 2". Includes lumber and fasteners | Board Foot | $0.89 | 1620 | $1,441.80 |
| Lumber, planks, posts and timbers, treated | 1609 | Treated dimension lumber with nominal thickness greater than 2". Includes lumber and fasteners. Does not include labor. | Board Foot | $1.58 | 1104 | $1,744.32 |
| **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 | $64.26 | 1 | $64.26 |
| 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 | $156.52 | 2 | $313.04 |
| Mobilization, large equipment | 1140 | Equipment >150HP or typical weights greater than 30,000 pounds or loads requiring over width or over length permits. | Each | $444.31 | 2 | $888.62 |

**Practice:** 313 - Waste Storage Facility

**Scenario** #10 - Dry Stack, concrete floor, no wall

**Scenario Description:**

This scenario consists of a dry stack facility with reinforced concrete floor without side walls. This scenario is applicable when geological, soil, climate conditions or state and local regulations prohibit the use of an earthen surface, and requires a hard working surface such as concrete. The purpose of this practice is to properly store manure and other agricultural by-products until they can be hauled away from the site for proper disposal or utilization on land at agronomical rates. This practice will address soil and water quality by reducing the pollution potential to soil, surface water and ground water. Potential Associated practices: 342-Critical Area Planting, 362-Diversion, 561-Heavy Use Area Protection, 367-Roofs and Covers, 558-Roof Runoff Structure, 317-Composting Facility, 633-Waste Recycling, 634-Waste Transfer, 635-Vegetated Treatment Area

**Before 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. The typical is 4,000 SqFt (40' x 100'). The facility floor is 5" reinforced concrete without side walls. Site preparation includes topsoil removal (0.5"), placemnt of compacted gravel (4"), and installing 5" of reinforced concrete.

**Feature Measure:** Square Foot Floor Area

**Scenario Unit::** Square Foot

**Scenario Typical Size:** 4000

**Total Scenario Cost:** $15,257.98

**Scenario Cost/Unit:** $3.81

**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 Yard | $210.23 | 62 | $13,034.26 |
| Excavation, common earth, large equipment, 150 ft | 1223 | Bulk excavation of common earth including sand and gravel with dozer >100 HP with average push distance of 150 feet. Includes equipment and labor. | Cubic Yard | $3.43 | 74 | $253.82 |
| **Materials** | | | | | | |
| Aggregate, Gravel, Graded | 46 | Gravel, includes materials, equipment and labor to transport and place. Includes washed and unwashed gravel. | Cubic Yard | $30.82 | 49.5 | $1,525.59 |
| **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 | $444.31 | 1 | $444.31 |

**Practice:** 313 - Waste Storage Facility

**Scenario** #11 - Dry Stack, concrete floor, wood wall or concrete wall

**Scenario Description:**

This scenario consists of a dry stack facility with reinforced concrete Floor with pressure treated wood walls. This scenario is intended for situations where consistency of manure or geographical conditions prohibit earthen floors. The purpose of this practice is to temporarily, properly store manure and other agricultural by-products until they can be hauled away from the site for proper disposal or utilization on land at agronomical rates. This practice will address soil and water quality by reducing the pollution potential to soil, surface water and ground water. Potential Associated practices: 342-Critical Area Planting, 362-Diversion, 561-Heavy Use Area Protection, 367-Roofs and Covers, 558-Roof Runoff Structure, 317-Composting Facility, 633-Waste Recycling, 634-Waste Transfer, 635-Vegetated Treatment Area

**Before Situation:**

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

**After Situation:**

The typical is 4,000 SqFt (40' x 100'). The facility floor is 5" reinforced concrete with 5" pressure treated wood (2" x 8" boards) walls, 6" x 6" x 8' posts set 4' c-c with 6" concrete curbing. Walls allow for greater storage volume. 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:** Square Foot Floor Area

**Scenario Unit::** Square Foot

**Scenario Typical Size:** 4000

**Total Scenario Cost:** $22,569.22

**Scenario Cost/Unit:** $5.64

**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 Yard | $103.61 | 5.5 | $569.86 |
| Concrete, CIP, slab on grade, reinforced | 37 | Steel reinforced concrete formed and cast-in-placed as a slab on grade by chute placement. Typical strength is 3000 to 4000 psi. Includes materials, labor and equipment to transport, place and finish. | Cubic Yard | $210.23 | 62 | $13,034.26 |
| 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 Yard | $326.97 | 2 | $653.94 |
| Skidsteer, 80 HP | 933 | Skidsteer loader with horsepower range of 60 to 90. Equipment and power unit costs. Labor not included. | Hour | $40.57 | 12 | $486.84 |
| Auger, Post driver attachment | 934 | Auger or post driver attachment to a tractor or skidsteer. Does not include power unit. Labor not included. | Hour | $6.65 | 12 | $79.80 |
| Excavation, common earth, large equipment, 150 ft | 1223 | Bulk excavation of common earth including sand and gravel with dozer >100 HP with average push distance of 150 feet. Includes equipment and labor. | Cubic Yard | $3.43 | 74 | $253.82 |
| **Labor** | | | | | | |
| General Labor | 231 | Labor performed using basic tools such as power tool, shovels, and other tools that do not require extensive training. Ex. pipe layer, herder, concrete placement, materials spreader, flagger, etc. | Hour | $18.93 | 90 | $1,703.70 |
| Equipment Operators, Light | 232 | Includes: Skid Steer Loaders, Hydraulic Excavators <50 HP, Trenchers <12", Ag Equipment <150 HP, Pickup Trucks, Forklifts, Mulchers | Hour | $21.14 | 12 | $253.68 |
| **Materials** | | | | | | |
| Aggregate, Gravel, Graded | 46 | Gravel, includes materials, equipment and labor to transport and place. Includes washed and unwashed gravel. | Cubic Yard | $30.82 | 49.5 | $1,525.59 |
| Dimension Lumber, Treated | 1044 | Treated dimension lumber with nominal thickness equal or less than 2". Includes lumber and fasteners | Board Foot | $0.89 | 1620 | $1,441.80 |
| Lumber, planks, posts and timbers, treated | 1609 | Treated dimension lumber with nominal thickness greater than 2". Includes lumber and fasteners. Does not include labor. | Board Foot | $1.58 | 1104 | $1,744.32 |
| **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 | $64.26 | 1 | $64.26 |
| 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 | $156.52 | 2 | $313.04 |
| Mobilization, large equipment | 1140 | Equipment >150HP or typical weights greater than 30,000 pounds or loads requiring over width or over length permits. | Each | $444.31 | 1 | $444.31 |

**Practice:** 313 - Waste Storage Facility

**Scenario** #12 - Conc Tank, buried less than 5K

**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 lid with several openings for direct loading from heavyuse area, gutter cleaner or gravity pipe. Manure is held for 3 to 14 day on smaller operations or transfered to larger storage facility or direct land applied. Design volume does not include freeboard. This practice will address soil and water quality by reducing the pollution potential to soil, surface water and ground water. Potential Associated Practices: 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 groundwaters, in addition to the use of excessive amounts of fertilizers.

**After Situation:**

Manure and other agricultural by-products are being controlled, by the collection at the source, and stored temporarily, at an environmentally suitable location, until such time that they are disposed of or utilized in a proper manner, typically in accordance with a nutrient management plan. Tank typically 8' deep x 12' wide x 40' long, with a design storage volume of 3,600 cubic feet plus 6" freeboard. Sizing based on manure, other wastes, rainfall, lot runoff, etc. Volume does not include 6" of freeboard. Tanks associated with open lots sized to handle design storm in tank or in combination with lot as per state regulations.

**Feature Measure:** Design Storage Volume

**Scenario Unit::** Cubic Foot

**Scenario Typical Size:** 3600

**Total Scenario Cost:** $18,974.21

**Scenario Cost/Unit:** $5.27

**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 Yard | $210.23 | 8 | $1,681.84 |
| 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 Yard | $326.97 | 36 | $11,770.92 |
| Earthfill, Manually Compacted | 50 | Earthfill, manually compacted, includes equipment and labor | Cubic Yard | $4.95 | 213 | $1,054.35 |
| Earthfill, Dumped and Spread | 51 | Earthfill, dumped and spread without compaction effort, includes equipment and labor | Cubic Yard | $3.08 | 163 | $502.04 |
| 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. | Hour | $103.47 | 19 | $1,965.93 |
| **Labor** | | | | | | |
| Equipment Operators, Heavy | 233 | Includes: Cranes, Hydraulic Excavators >=50 HP, Dozers, Paving Machines, Rock Trenchers, Trenchers >=12", Dump Trucks, Ag Equipment >=150 HP, Scrapers, Water Wagons. | Hour | $23.93 | 19 | $454.67 |
| **Materials** | | | | | | |
| Aggregate, Gravel, Graded | 46 | Gravel, includes materials, equipment and labor to transport and place. Includes washed and unwashed gravel. | Cubic Yard | $30.82 | 9 | $277.38 |
| Waterstop, PVC, ribbed, 3/16" x 6" | 1614 | Waterstop, PVC, ribbed, 3/16" thick by 6"wide. Includes materials, equipment and labor. | Foot | $3.82 | 104 | $397.28 |
| **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 | $64.26 | 3 | $192.78 |
| Mobilization, medium equipment | 1139 | Equipment with 70-150 HP or typical weights between 14,000 and 30,000 pounds. | Each | $232.71 | 1 | $232.71 |

| | | | | | |
|---|---|---|---|---|---|
| Mobilization, large equipment | 1140 Equipment >150HP or typical weights greater than 30,000 pounds or loads requiring over width or over length permits. | Each | $444.31 | 1 | $444.31 |

**Practice:** 313 - Waste Storage Facility

**Scenario** #13 - Conc Tank, buried 5K to15K

**Scenario Description:**

This scenario consists of installing a concrete tank that has a design storage volume from 5,000 to 14,999 CF that is totally or partially buried and has an open top. The tank can also be under an animal facility with the top cover of either slats or solid concrete lid/floor. Design volume does not include freeboard. Potential Associated Practices: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 8' deep, with a bottom area of 1256 SF, and a design storage volume of 9,420 cubic feet plus 6" freeboard. Sizing based on manure, other wastes, rainfall, lot runoff, etc. as appropriate. Volume does not include 6" of freeboard.

**Feature Measure:** Design Storage Volume

**Scenario Unit::** Cubic Foot

**Scenario Typical Size:** 9420

**Total Scenario Cost:** $20,133.36

**Scenario Cost/Unit:** $2.14

**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 Yard | $210.23 | 22 | $4,625.06 |
| Concrete, CIP, formed reinforced | 38 | Steel reinforced concrete formed and cast-in-placed in formed structures such as walls or suspended slabs by chute placement. Typical strength is 3000 to 4000 psi. Includes materials, labor and equipment to transport, place and finish. | Cubic Yard | $326.97 | 26 | $8,501.22 |
| Earthfill, Manually Compacted | 50 | Earthfill, manually compacted, includes equipment and labor | Cubic Yard | $4.95 | 162 | $801.90 |
| Earthfill, Dumped and Spread | 51 | Earthfill, dumped and spread without compaction effort, includes equipment and labor | Cubic Yard | $3.08 | 323 | $994.84 |
| Hydraulic Excavator, 1 CY | 931 | Track mounted hydraulic excavator with bucket capacity range of 0.8 to 1.5 CY. Equipment and power unit costs. Labor not included. | Hour | $103.47 | 25 | $2,586.75 |
| **Labor** | | | | | | |
| Equipment Operators, Heavy | 233 | Includes: Cranes, Hydraulic Excavators >=50 HP, Dozers, Paving Machines, Rock Trenchers, Trenchers >=12", Dump Trucks, Ag Equipment >=150 HP, Scrapers, Water Wagons. | Hour | $23.93 | 25 | $598.25 |
| **Materials** | | | | | | |
| Aggregate, Gravel, Graded | 46 | Gravel, includes materials, equipment and labor to transport and place. Includes washed and unwashed gravel. | Cubic Yard | $30.82 | 22 | $678.04 |
| Waterstop, PVC, ribbed, 3/16" x 6" | 1614 | Waterstop, PVC, ribbed, 3/16" thick by 6"wide. Includes materials, equipment and labor. | Foot | $3.82 | 125 | $477.50 |
| **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 | $64.26 | 3 | $192.78 |
| Mobilization, medium equipment | 1139 | Equipment with 70-150 HP or typical weights between 14,000 and 30,000 pounds. | Each | $232.71 | 1 | $232.71 |
| Mobilization, large equipment | 1140 | Equipment >150HP or typical weights greater than 30,000 pounds or loads requiring over width or over length permits. | Each | $444.31 | 1 | $444.31 |

**Practice:** 313 - Waste Storage Facility

**Scenario** #14 - Conc Tank, Buried 15K to 25K

**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. The design volume does not include freeboard. This practice will address soil and water quality by reducing the pollution potential to soil, surface water and ground water. Potential Associated Practices: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 groundwaters, in addition to the use of excessive amounts of fertilizers.

**After Situation:**

Manure and other agricultural by-products are being controlled, by the collection at the source, and stored temporarily, at an environmentally suitable location, until such time that they are disposed of or utilized in a proper manner, typically in accordance with a nutrient management plan. Tank is typically 8 ft deep, with a bottom area of 2,667 sq.ft., and a design storage volume of 20,000 cubic feet plus 6" freeboard. Size based on design volume of manure, other wastes, rainfall, lot runoff, etc as appropriate and does not include the 6" of freeboard.

**Feature Measure:** Design Storage Volume

**Scenario Unit::** Cubic Foot

**Scenario Typical Size:** 20000

**Total Scenario Cost:** $33,587.03

**Scenario Cost/Unit:** $1.68

**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 Yard | $210.23 | 45 | $9,460.35 |
| Concrete, CIP, formed reinforced | 38 | Steel reinforced concrete formed and cast-in-placed in formed structures such as walls or suspended slabs by chute placement. Typical strength is 3000 to 4000 psi. Includes materials, labor and equipment to transport, place and finish. | Cubic Yard | $326.97 | 37 | $12,097.89 |
| Earthfill, Manually Compacted | 50 | Earthfill, manually compacted, includes equipment and labor | Cubic Yard | $4.95 | 227 | $1,123.65 |
| Earthfill, Dumped and Spread | 51 | Earthfill, dumped and spread without compaction effort, includes equipment and labor | Cubic Yard | $3.08 | 677 | $2,085.16 |
| Hydraulic Excavator, 1 CY | 931 | Track mounted hydraulic excavator with bucket capacity range of 0.8 to 1.5 CY. Equipment and power unit costs. Labor not included. | Hour | $103.47 | 46 | $4,759.62 |
| **Labor** | | | | | | |
| Equipment Operators, Heavy | 233 | Includes: Cranes, Hydraulic Excavators >=50 HP, Dozers, Paving Machines, Rock Trenchers, Trenchers >=12", Dump Trucks, Ag Equipment >=150 HP, Scrapers, Water Wagons. | Hour | $23.93 | 46 | $1,100.78 |
| **Materials** | | | | | | |
| Aggregate, Gravel, Graded | 46 | Gravel, includes materials, equipment and labor to transport and place. Includes washed and unwashed gravel. | Cubic Yard | $30.82 | 45 | $1,386.90 |
| Waterstop, PVC, ribbed, 3/16" x 6" | 1614 | Waterstop, PVC, ribbed, 3/16" thick by 6"wide. Includes materials, equipment and labor. | Foot | $3.82 | 184 | $702.88 |
| **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 | $64.26 | 3 | $192.78 |
| Mobilization, medium equipment | 1139 | Equipment with 70-150 HP or typical weights between 14,000 and 30,000 pounds. | Each | $232.71 | 1 | $232.71 |
| Mobilization, large equipment | 1140 | Equipment >150HP or typical weights greater than 30,000 pounds or loads requiring over width or over length permits. | Each | $444.31 | 1 | $444.31 |

**Practice:** 313 - Waste Storage Facility

**Scenario** #15 - Conc Tank, Buried 25K to 50K

**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. The design volume does not include freeboard. This practice will address soil and water quality by reducing the pollution potential to soil, surface water and ground water. Potential Associated Practices: 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 installed is 10' deep, with a bottom area of 2,947 SF, and a design storage volume of 28,000 cubic feet plus 6" freeboard. Size based on manure, other wastes, rainfall, lot runoff, etc as appropriate. Calculated volume for scenario does not include the 6" of freeboard.

**Feature Measure:** Design Storage Volume

**Scenario Unit::** Cubic Foot

**Scenario Typical Size:** 28000

**Total Scenario Cost:** $38,149.82

**Scenario Cost/Unit:** $1.36

**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 Yard | $210.23 | 49 | $10,301.27 |
| Concrete, CIP, formed reinforced | 38 | Steel reinforced concrete formed and cast-in-placed in formed structures such as walls or suspended slabs by chute placement. Typical strength is 3000 to 4000 psi. Includes materials, labor and equipment to transport, place and finish. | Cubic Yard | $326.97 | 48 | $15,694.56 |
| Earthfill, Manually Compacted | 50 | Earthfill, manually compacted, includes equipment and labor | Cubic Yard | $4.95 | 334 | $1,653.30 |
| Earthfill, Dumped and Spread | 51 | Earthfill, dumped and spread without compaction effort, includes equipment and labor | Cubic Yard | $3.08 | 922 | $2,839.76 |
| 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 Yard | $3.43 | 1263 | $4,332.09 |
| **Materials** | | | | | | |
| Aggregate, Gravel, Graded | 46 | Gravel, includes materials, equipment and labor to transport and place. Includes washed and unwashed gravel. | Cubic Yard | $30.82 | 49 | $1,510.18 |
| Waterstop, PVC, ribbed, 3/16" x 6" | 1614 | Waterstop, PVC, ribbed, 3/16" thick by 6"wide. Includes materials, equipment and labor. | Foot | $3.82 | 193 | $737.26 |
| **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 | $64.26 | 3 | $192.78 |
| Mobilization, large equipment | 1140 | Equipment >150HP or typical weights greater than 30,000 pounds or loads requiring over width or over length permits. | Each | $444.31 | 2 | $888.62 |

**Practice:** 313 - Waste Storage Facility

**Scenario** #16 - Conc Tank, Buried 50K to 75K

**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. The design volume does not include freeboard. This practice will address soil and water quality by reducing the pollution potential to soil, surface water and ground water. Potential Associated Practices: 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 12' deep, with a bottom area of 5,391 SF, and a design storage volume of 62,000 cubic feet plus 6" freeboard. Sizing based on manure, other wastes, rainfall, lot runoff, etc. as appropriate. Volume does not include 6" of freeboard.

**Feature Measure:** Design Storage Volume

**Scenario Unit::** Cubic Foot

**Scenario Typical Size:** 62000

**Total Scenario Cost:** $74,465.10

**Scenario Cost/Unit:** $1.20

**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 Yard | $210.23 | 88 | $18,500.24 |
| 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 Yard | $326.97 | 98 | $32,043.06 |
| Earthfill, Manually Compacted | 50 | Earthfill, manually compacted, includes equipment and labor | Cubic Yard | $4.95 | 661 | $3,271.95 |
| Earthfill, Dumped and Spread | 51 | Earthfill, dumped and spread without compaction effort, includes equipment and labor | Cubic Yard | $3.08 | 2078 | $6,400.24 |
| Excavation, common earth, large equipment, 150 ft | 1223 | Bulk excavation of common earth including sand and gravel with dozer >100 HP with average push distance of 150 feet. Includes equipment and labor. | Cubic Yard | $3.43 | 2739 | $9,394.77 |
| **Materials** | | | | | | |
| Aggregate, Gravel, Graded | 46 | Gravel, includes materials, equipment and labor to transport and place. Includes washed and unwashed gravel. | Cubic Yard | $30.82 | 88 | $2,712.16 |
| Waterstop, PVC, ribbed, 3/16" x 6" | 1614 | Waterstop, PVC, ribbed, 3/16" thick by 6"wide. Includes materials, equipment and labor. | Foot | $3.82 | 261 | $997.02 |
| **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 | $64.26 | 4 | $257.04 |
| Mobilization, large equipment | 1140 | Equipment >150HP or typical weights greater than 30,000 pounds or loads requiring over width or over length permits. | Each | $444.31 | 2 | $888.62 |

**Practice:** 313 - Waste Storage Facility

**Scenario** #17 - Conc Tank, Buried 75K to 110K

**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. The design volume does not include freeboard. This practice will address soil and water quality by reducing the pollution potential to soil, surface water and ground water. Potential Associated Practices: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. This practice will address soil and water quality by reducing the pollution potential to soil, surface water and ground water. Tank typically 12' deep, with a bottom area of 8,044 SF, and a storage capacity of 92,500 cubic feet plus 6" freeboard. Sizing based on manure, other wastes, rainfall, lot runoff, etc. as appropriate. Volume does not include 6" of freeboard.

**Feature Measure:** Design Storage Volume

**Scenario Unit::** Cubic Foot

**Scenario Typical Size:** 92500

**Total Scenario Cost:** $99,107.07

**Scenario Cost/Unit:** $1.07

**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 Yard | $210.23 | 129 | $27,119.67 |
| Concrete, CIP, formed reinforced | 38 | Steel reinforced concrete formed and cast-in-placed in formed structures such as walls or suspended slabs by chute placement. Typical strength is 3000 to 4000 psi. Includes materials, labor and equipment to transport, place and finish. | Cubic Yard | $326.97 | 119 | $38,909.43 |
| Earthfill, Manually Compacted | 50 | Earthfill, manually compacted, includes equipment and labor | Cubic Yard | $4.95 | 790 | $3,910.50 |
| Earthfill, Dumped and Spread | 51 | Earthfill, dumped and spread without compaction effort, includes equipment and labor | Cubic Yard | $3.08 | 3081 | $9,489.48 |
| Excavation, common earth, large equipment, 150 ft | 1223 | Bulk excavation of common earth including sand and gravel with dozer >100 HP with average push distance of 150 feet. Includes equipment and labor. | Cubic Yard | $3.43 | 3871 | $13,277.53 |
| **Materials** | | | | | | |
| Aggregate, Gravel, Graded | 46 | Gravel, includes materials, equipment and labor to transport and place. Includes washed and unwashed gravel. | Cubic Yard | $30.82 | 129 | $3,975.78 |
| Waterstop, PVC, ribbed, 3/16" x 6" | 1614 | Waterstop, PVC, ribbed, 3/16" thick by 6"wide. Includes materials, equipment and labor. | Foot | $3.82 | 318 | $1,214.76 |
| **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 | $64.26 | 5 | $321.30 |
| Mobilization, large equipment | 1140 | Equipment >150HP or typical weights greater than 30,000 pounds or loads requiring over width or over length permits. | Each | $444.31 | 2 | $888.62 |

**Practice:** 313 - Waste Storage Facility

**Scenario** #18 - Conc Tank, Buried 110K or greater

**Scenario Description:**

This scenario consists of installing a concrete tank that has a design storage volume of 110, 000 or more CF. Tank is totally or partially buried and has an open top. Tank can also be under a animal facility with the top cover using slats or concrete lid/floor. The design volume does not include freeboard. This practice will address soil and water quality by reducing the pollution potential to soil, surface water and ground water. Potential Associated Practices: 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 14' deep with a bottom area of 11,304 SF and a design storage volume of 152,600 CF plus 6" freeboard. Sizing based on manure, other wastes, rainfall, lot runoff, etc. as appropriate. Volume does not include 6" of freeboard.

**Feature Measure:** Design Storage Volume

**Scenario Unit::** Cubic Foot

**Scenario Typical Size:** 152600

**Total Scenario Cost:** $152,119.95

**Scenario Cost/Unit:** $1.00

**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 Yard | $210.23 | 217 | $45,619.91 |
| Concrete, CIP, formed reinforced | 38 | Steel reinforced concrete formed and cast-in-placed in formed structures such as walls or suspended slabs by chute placement. Typical strength is 3000 to 4000 psi. Includes materials, labor and equipment to transport, place and finish. | Cubic Yard | $326.97 | 164 | $53,623.08 |
| Earthfill, Manually Compacted | 50 | Earthfill, manually compacted, includes equipment and labor | Cubic Yard | $4.95 | 1304 | $6,454.80 |
| Earthfill, Dumped and Spread | 51 | Earthfill, dumped and spread without compaction effort, includes equipment and labor | Cubic Yard | $3.08 | 5170 | $15,923.60 |
| 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 Yard | $3.43 | 6474 | $22,205.82 |
| **Materials** | | | | | | |
| Aggregate, Gravel, Graded | 46 | Gravel, includes materials, equipment and labor to transport and place. Includes washed and unwashed gravel. | Cubic Yard | $30.82 | 181 | $5,578.42 |
| Waterstop, PVC, ribbed, 3/16" x 6" | 1614 | Waterstop, PVC, ribbed, 3/16" thick by 6"wide. Includes materials, equipment and labor. | Foot | $3.82 | 377 | $1,440.14 |
| **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 | $64.26 | 6 | $385.56 |
| Mobilization, large equipment | 1140 | Equipment >150HP or typical weights greater than 30,000 pounds or loads requiring over width or over length permits. | Each | $444.31 | 2 | $888.62 |

**Practice:** 313 - Waste Storage Facility

**Scenario** #19 - Composted Bedded Pack, Earthen Floor, Concrete Wall

**Scenario Description:**

A composted bedded pack 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: Fence (382), Nutrient Management (590), Waste Transfer (634), Heavy Use Area Protection (561), and Roofs and Covers (367).

**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.Typical design: floor area 4,000 ft2 , (40' X 100'); 4' concrete wall height, 3' footing depth with an earthen floor; 20' openings on each end of structure.

**Feature Measure:** Square Foot Floor Area

**Scenario Unit::** Square Foot

**Scenario Typical Size:** 4000

**Total Scenario Cost:** $15,468.27

**Scenario Cost/Unit:** $3.87

**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 Yard | $326.97 | 42 | $13,732.74 |
| Excavation, Common Earth, side cast, small equipment | 48 | Bulk excavation and side casting of common earth with hydraulic excavator with less than 1 CY capacity. Includes equipment and labor. | Cubic Yard | $1.99 | 34 | $67.66 |
| Earthfill, Roller Compacted | 49 | Earthfill, roller or machine compacted, includes equipment and labor | Cubic Yard | $3.76 | 74 | $278.24 |
| Earthfill, Manually Compacted | 50 | Earthfill, manually compacted, includes equipment and labor | Cubic Yard | $4.95 | 16 | $79.20 |
| Stripping and stockpiling, topsoil | 1199 | Stripping and stockpiling of topsoil adjacent to stripping area. Includes equipment and labor. | Cubic Yard | $0.81 | 102 | $82.62 |
| Excavation, common earth, large equipment, 150 ft | 1223 | Bulk excavation of common earth including sand and gravel with dozer >100 HP with average push distance of 150 feet. Includes equipment and labor. | Cubic Yard | $3.43 | 74 | $253.82 |
| **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 | $64.26 | 1 | $64.26 |
| Mobilization, medium equipment | 1139 | Equipment with 70-150 HP or typical weights between 14,000 and 30,000 pounds. | Each | $232.71 | 2 | $465.42 |
| Mobilization, large equipment | 1140 | Equipment >150HP or typical weights greater than 30,000 pounds or loads requiring over width or over length permits. | Each | $444.31 | 1 | $444.31 |

**Practice:** 314 - Brush Management

**Scenario** #1 - Mechanical

**Scenario Description:**

Removal of small woody vegetation. The practice entails the removal of brush by the use of mechanical cutter, chopper or other light equipment in order to reduce fuel loading and improve ecological site condition. Brush density has exceeded desired levels based on ecological site potential. It has been determined that the brush is a infestation. Typical unit is 40 acres.

**Before Situation:**

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

**After Situation:**

Woody species are removed to achieve the desirable plant community based on species composition, structure, density, and canopy cover or height. Ecological site condition 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::** Acre

**Scenario Typical Size:** 40

**Total Scenario Cost:** $1,618.92

**Scenario Cost/Unit:** $40.47

**Cost Details:**

| Component Name | ID | Description | Unit | Cost | QTY | Total |
|---|---|---|---|---|---|---|
| **Equipment Installation** | | | | | | |
| Truck, Pickup | 939 | Equipment and power unit costs. Labor not included. | Hour | $19.82 | 2 | $39.64 |
| Mechanical cutter, chopper | 943 | Forestry mulcher, flail shredder, hydro axe, brush cutter, etc. Equipment and power unit costs. Labor not included. | Hour | $84.38 | 12 | $1,012.56 |
| **Labor** | | | | | | |
| Equipment Operators, Light | 232 | Includes: Skid Steer Loaders, Hydraulic Excavators <50 HP, Trenchers <12", Ag Equipment <150 HP, Pickup Trucks, Forklifts, Mulchers | Hour | $21.14 | 12 | $253.68 |
| **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 | $156.52 | 2 | $313.04 |

**Practice:** 314 - Brush Management

**Scenario** #2 - Chemical, Spot

**Scenario Description:**

This Practice is for the implementation of brush management on range, pasture or native pasture using spot or 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::** Acre

**Scenario Typical Size:** 40

**Total Scenario Cost:** $2,247.36

**Scenario Cost/Unit:** $56.18

**Cost Details:**

| Component Name | ID | Description | Unit | Cost | QTY | Total |
|---|---|---|---|---|---|---|
| **Equipment Installation** | | | | | | |
| Truck, Pickup | 939 | Equipment and power unit costs. Labor not included. | Hour | $19.82 | 2 | $39.64 |
| 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. | Hour | $54.07 | 4 | $216.28 |
| All terrain vehicles, ATV | 965 | Includes equipment, power unit and labor costs. | Hour | $29.73 | 4 | $118.92 |
| **Materials** | | | | | | |
| Herbicide, Triclopyor | 338 | Refer to WIN-PST for product names and active ingredients. Materials and shipping | Acre | $42.30 | 40 | $1,692.00 |
| 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. | Acre | $1.30 | 40 | $52.00 |
| **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 | $64.26 | 2 | $128.52 |

**Practice:** 314 - Brush Management

**Scenario** #3 - Chemical, Ground Applied, Light

**Scenario Description:**

Apply brush management on 40 acres of pasture thru the use of broadcast application of material using low cost chemical(s) to reduce or remove undesirable deciduous species (brush) in uplands and other areas not in or directly adjacent to streams, ponds, or wetlands. Light competition is defined as woody brush stocking less than 100 stems per acre or height less than 12 inches. .

**Before Situation:**

Plant, animal, or wildlife resource concerns associated with uplands and other areas not in or adjacent to stream, ponds, or wetland on pasture which are adversely affected by brush.

**After Situation:**

A 40 acre unit of pasture where reduction or removal of undesirable deciduous species have been accomplished by broadcast or spot treatment chemical application to address plant, animal, and wildlife resource concerns.

**Feature Measure:** Acres planned

**Scenario Unit::** Acre

**Scenario Typical Size:** 40

**Total Scenario Cost:** $824.35

**Scenario Cost/Unit:** $20.61

**Cost Details:**

| Component Name | ID | Description | Unit | Cost | QTY | Total |
|---|---|---|---|---|---|---|
| **Equipment Installation** | | | | | | |
| Truck, Pickup | 939 | Equipment and power unit costs. Labor not included. | Hour | $19.82 | 2 | $39.64 |
| Chemical, ground application | 948 | Chemical application performed by ground equipment. Includes equipment, power unit and labor costs. | Acre | $5.58 | 40 | $223.20 |
| **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. | Acre | $6.92 | 40 | $276.80 |
| 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. | Acre | $1.30 | 40 | $52.00 |
| **Mobilization** | | | | | | |
| Mobilization, medium equipment | 1139 | Equipment with 70-150 HP or typical weights between 14,000 and 30,000 pounds. | Each | $232.71 | 1 | $232.71 |

**Practice:** 314 - Brush Management

**Scenario** #4 - Chemical, Ground Applied, Medium

**Scenario Description:**

Apply brush management on 40 acres of pasture thru the use of broadcast application of material using medium cost chemical(s) to reduce or remove undesirable deciduous species (brush) in uplands and other areas not in or directly adjacent to streams, ponds, or wetlands. Medium competition is defined as woody brush stocking between 100 to 300 per acre or height less than 36 inches.

**Before Situation:**

Plant, animal, or wildlife resource concerns associated with uplands and other areas not in or adjacent to stream, ponds, or wetland on pasture which are adversely affected by brush.

**After Situation:**

A 40 acre unit of pasture where reduction or removal of undesirable deciduous species have been accomplished by broadcast or spot treatment chemical application to address plant, animal, and wildlife resource concerns.

**Feature Measure:** Acres planned

**Scenario Unit::** Acre

**Scenario Typical Size:** 40

**Total Scenario Cost:** $1,575.15

**Scenario Cost/Unit:** $39.38

**Cost Details:**

| Component Name | ID | Description | Unit | Cost | QTY | Total |
|---|---|---|---|---|---|---|
| **Equipment Installation** | | | | | | |
| Truck, Pickup | 939 | Equipment and power unit costs. Labor not included. | Hour | $19.82 | 2 | $39.64 |
| Chemical, ground application | 948 | Chemical application performed by ground equipment. Includes equipment, power unit and labor costs. | Acre | $5.58 | 40 | $223.20 |
| **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. | Acre | $6.92 | 40 | $276.80 |
| Herbicide, Picloram | 337 | Refer to WIN-PST for product names and active ingredients. Includes materials and shipping only. | Acre | $18.77 | 40 | $750.80 |
| 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. | Acre | $1.30 | 40 | $52.00 |
| **Mobilization** | | | | | | |
| Mobilization, medium equipment | 1139 | Equipment with 70-150 HP or typical weights between 14,000 and 30,000 pounds. | Each | $232.71 | 1 | $232.71 |

**Practice:** 314 - Brush Management

**Scenario** #5 - Chemical, Ground Applied, Heavy

**Scenario Description:**

Apply brush management on 40 acres of pasture thru the use of broadcast application of material using high cost chemical(s) to reduce or remove undesirable deciduous species (brush) in uplands and other areas not in or directly adjacent to streams, ponds, or wetlands. Heavy competition is defined as woody brush stocking more than 300 stems per acre or height greater than 48 inches.

**Before Situation:**

Plant, animal, or wildlife resource concerns associated with uplands and other areas not in or adjacent to stream, ponds, or wetland on pasture which are adversely affected by brush.

**After Situation:**

A 40 acre unit of pasture where reduction or removal of undesirable deciduous species have been accomplished by broadcast or spot treatment chemical application to address plant, animal, and wildlife resource concerns.

**Feature Measure:** Acres planned

**Scenario Unit::** Acre

**Scenario Typical Size:** 40

**Total Scenario Cost:** $2,453.55

**Scenario Cost/Unit:** $61.34

**Cost Details:**

| Component Name | ID | Description | Unit | Cost | QTY | Total |
|---|---|---|---|---|---|---|
| **Equipment Installation** | | | | | | |
| Truck, Pickup | 939 | Equipment and power unit costs. Labor not included. | Hour | $19.82 | 2 | $39.64 |
| Chemical, ground application | 948 | Chemical application performed by ground equipment. Includes equipment, power unit and labor costs. | Acre | $5.58 | 40 | $223.20 |
| **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. | Acre | $6.92 | 40 | $276.80 |
| 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. | Acre | $40.73 | 40 | $1,629.20 |
| 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. | Acre | $1.30 | 40 | $52.00 |
| **Mobilization** | | | | | | |
| Mobilization, medium equipment | 1139 | Equipment with 70-150 HP or typical weights between 14,000 and 30,000 pounds. | Each | $232.71 | 1 | $232.71 |

**Practice:** 314 - Brush Management

**Scenario** #6 - Split-method event series

**Scenario Description:**

The practice entails the control of woody vegetation by treating it up to three times during the multi-year treatment period in order to improve ecological site condition. The brush can be treated with the same method or by a combination of methods. Woody vegetation needs to be treated at least twice in order to fully control it. Generally,herbicide volumes are reduced as the last treatment will kill resprouting stems or those which survived the first treatment or newly sprouted seedlings. Brush density has exceeded desired levels based on ecological site potential.

**Before Situation:**

Area has excessive stands of woody species degrading health and vigor of desireable species promoting noxious and invasive species and degrading wildlife habitat.

**After Situation:**

Woody species are removed to achieve the desirable plant community based on species composition, structure, density, and canopy cover or height. Ecological site condition 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 planned

**Scenario Unit::** Acre

**Scenario Typical Size:** 20

**Total Scenario Cost:** $8,816.50

**Scenario Cost/Unit:** $440.83

**Cost Details:**

| Component Name | ID | Description | Unit | Cost | QTY | Total |
|---|---|---|---|---|---|---|
| **Equipment Installation** | | | | | | |
| Truck, Pickup | 939 | Equipment and power unit costs. Labor not included. | Hour | $19.82 | 6 | $118.92 |
| Mower, Bush Hog | 940 | Equipment and power unit costs. Labor not included. | Hour | $47.22 | 60 | $2,833.20 |
| Chemical, ground application | 948 | Chemical application performed by ground equipment. Includes equipment, power unit and labor costs. | Acre | $5.58 | 60 | $334.80 |
| Tractor, agricultural, 60 HP | 963 | Agricultural tractor with horsepower range of 50 to 90. Equipment and power unit costs. Labor not included. | Hour | $22.54 | 30 | $676.20 |
| **Labor** | | | | | | |
| Equipment Operators, Light | 232 | Includes: Skid Steer Loaders, Hydraulic Excavators <50 HP, Trenchers <12", Ag Equipment <150 HP, Pickup Trucks, Forklifts, Mulchers | Hour | $21.14 | 60 | $1,268.40 |
| 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. | Hour | $34.29 | 10 | $342.90 |
| **Materials** | | | | | | |
| Herbicide, Triclopyor | 338 | Refer to WIN-PST for product names and active ingredients. Materials and shipping | Acre | $42.30 | 60 | $2,538.00 |
| 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. | Acre | $1.30 | 60 | $78.00 |
| **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 | $156.52 | 4 | $626.08 |

**Practice:** 314 - Brush Management

**Scenario** #7 - Forestry, Woody Control Using Broadcast Application of Chemical

**Scenario Description:**

This scenario is a follow-up to mechanical site preparation. The site has a lot of undesirable hardwoods that can have a profusion of sprouts. This practice is a herbicide application to minimize the sprouts. The resource concerns include: Air Quality - airborne chemical drift; Plant Suitability - adaptability to the site; Plant Condition - plant health and vigor

**Before Situation:**

An area that was recently mechanically site prepared has the potential for significant and undesirable woody sprouts. The area needs woody vegetation control to favor the desirable plant species and this willl be accomplished using herbicides. The herbicide(s) can be applied by aerial, ground broadcast or ground individual stems. The specific herbicide needs to be determinded based upon the species comprising the woody vegetation to remove or control.

**After Situation:**

The typical size of the tract is 40 acres, however, larger and smaller acreages do occur. Once the practice has been installed, the number of undesirable woody plants will be reduced and the desirable plant species will be visible and free to grow.

**Feature Measure:** acres

**Scenario Unit::** Acre

**Scenario Typical Size:** 40

**Total Scenario Cost:** $5,070.41

**Scenario Cost/Unit:** $126.76

**Cost Details:**

| Component Name | ID | Description | Unit | Cost | QTY | Total |
|---|---|---|---|---|---|---|
| **Equipment Installation** | | | | | | |
| Truck, Pickup | 939 | Equipment and power unit costs. Labor not included. | Hour | $19.82 | 4 | $79.28 |
| Chemical, ground application | 948 | Chemical application performed by ground equipment. Includes equipment, power unit and labor costs. | Acre | $5.58 | 40 | $223.20 |
| Tractor, agricultural, 120 HP | 962 | Agricultural tractor with horsepower range of 90 to 140. Equipment and power unit costs. Labor not included. | Hour | $52.49 | 8 | $419.92 |
| 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. | Hour | $54.07 | 20 | $1,081.40 |
| All terrain vehicles, ATV | 965 | Includes equipment, power unit and labor costs. | Hour | $29.73 | 8 | $237.84 |
| **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. | Hour | $25.08 | 16 | $401.28 |
| 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. | Hour | $18.93 | 16 | $302.88 |
| Equipment Operators, Light | 232 | Includes: Skid Steer Loaders, Hydraulic Excavators <50 HP, Trenchers <12", Ag Equipment <150 HP, Pickup Trucks, Forklifts, Mulchers | Hour | $21.14 | 16 | $338.24 |
| Supervisor or Manager | 234 | Labor involving supervision or management activities. Includes crew supervisors, foremen and farm/ranch managers time required for adopting new technology, etc. | Hour | $34.29 | 4 | $137.16 |
| **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. | Acre | $15.93 | 10 | $159.30 |
| 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. | Acre | $40.73 | 10 | $407.30 |
| Herbicide, Triclopyor | 338 | Refer to WIN-PST for product names and active ingredients. Materials and shipping | Acre | $42.30 | 10 | $423.00 |
| Herbicide, Sulfometuron-methyl | 340 | Used for the control of annual and perennial grasses and broad leaved weeds in non-crop land. Refer to WIN-PST for product names and active ingredients. Includes materials and shipping only. | Acre | $38.78 | 10 | $387.80 |

| | | | | | | |
|---|---|---|---|---|---|---|
| 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. | Acre | $22.61 | 10 | $226.10 |
| 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. | Acre | $1.30 | 10 | $13.00 |
| **Mobilization** | | | | | | |
| Mobilization, medium equipment | 1139 | Equipment with 70-150 HP or typical weights between 14,000 and 30,000 pounds. | Each | $232.71 | 1 | $232.71 |

**Practice:** 315 - Herbaceous Weed Control

**Scenario** #1 - Mechanical

**Scenario Description:**

Removal of herbaceous weeds of light infestations. The practice entails the removal of herbaceous weeds by the use of mower, brush hog, disc or other light equipment in order to reduce fuel loading and improve ecological site condition. Weed has exceeded desired levels based on ecological site potential. Typical unit is 40 acres.

**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::** Acre

**Scenario Typical Size:** 40

**Total Scenario Cost:** $1,173.00

**Scenario Cost/Unit:** $29.33

**Cost Details:**

| Component Name | ID | Description | Unit | Cost | QTY | Total |
|---|---|---|---|---|---|---|
| **Equipment Installation** | | | | | | |
| Truck, Pickup | 939 | Equipment and power unit costs. Labor not included. | Hour | $19.82 | 2 | $39.64 |
| Mower, Bush Hog | 940 | Equipment and power unit costs. Labor not included. | Hour | $47.22 | 12 | $566.64 |
| **Labor** | | | | | | |
| Equipment Operators, Light | 232 | Includes: Skid Steer Loaders, Hydraulic Excavators <50 HP, Trenchers <12", Ag Equipment <150 HP, Pickup Trucks, Forklifts, Mulchers | Hour | $21.14 | 12 | $253.68 |
| **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 | $156.52 | 2 | $313.04 |

**Practice:** 315 - Herbaceous Weed Control

**Scenario** #2 - Chemical, Spot

**Scenario Description:**

Land unit on which weed control would be beneficial in order to set back the plant community succession, improve the ecological condition, and improve forage conditions for domestic livestock or wildlife. The practice entails the eradication of vegetation by use of weed treatment, either initial or retreatment using hand-carried equipment (such as a backpack and hand-sprayer) to apply chemicals, in order to eliminate noxious weeds, promote forage productivity, and improve ecological condition.

**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::** Acre

**Scenario Typical Size:** 20

**Total Scenario Cost:** $917.20

**Scenario Cost/Unit:** $45.86

**Cost Details:**

| Component Name | ID | Description | Unit | Cost | QTY | Total |
|---|---|---|---|---|---|---|
| **Equipment Installation** | | | | | | |
| Truck, Pickup | 939 | Equipment and power unit costs. Labor not included. | Hour | $19.82 | 1 | $19.82 |
| All terrain vehicles, ATV | 965 | Includes equipment, power unit and labor costs. | Hour | $29.73 | 4 | $118.92 |
| **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. | Acre | $6.92 | 20 | $138.40 |
| 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. | Acre | $15.93 | 20 | $318.60 |
| Herbicide, Imazapic | 335 | Refer to WIN-PST for product names and active ingredients. Includes materials and shipping only. | Acre | $12.86 | 20 | $257.20 |
| **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 | $64.26 | 1 | $64.26 |

**Practice:** 315 - Herbaceous Weed Control

**Scenario** #3 - Chemical, Ground Light

**Scenario Description:**

Land unit on which weed control would be beneficial in order to set back the plant community succession, improve the ecological condition, and improve forage conditions for domestic livestock or wildlife. The practice entails the eradication of (herbaceous weeds) vegetation by use of weed treatment using ground equipment to apply low cost chemicals, in order to eliminate noxious weeds, promote forage productivity, and improve ecological condition.

**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::** Acre

**Scenario Typical Size:** 20

**Total Scenario Cost:** $472.16

**Scenario Cost/Unit:** $23.61

**Cost Details:**

| Component Name | ID | Description | Unit | Cost | QTY | Total |
|---|---|---|---|---|---|---|
| **Equipment Installation** | | | | | | |
| Truck, Pickup | 939 | Equipment and power unit costs. Labor not included. | Hour | $19.82 | 2 | $39.64 |
| Chemical, ground application | 948 | Chemical application performed by ground equipment. Includes equipment, power unit and labor costs. | Acre | $5.58 | 20 | $111.60 |
| **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. | Acre | $6.92 | 20 | $138.40 |
| 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. | Acre | $1.30 | 20 | $26.00 |
| **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 | $156.52 | 1 | $156.52 |

**Practice:** 315 - Herbaceous Weed Control

**Scenario** #4 - Chemical, Ground Medium

**Scenario Description:**

Land unit on which weed control would be beneficial in order to set back the plant community succession, improve the ecological condition, and improve forage conditions for domestic livestock or wildlife. The practice entails the eradication of (herbaceous weeds) vegetation by use of weed treatment using ground equipment to apply medium cost chemicals, in order to eliminate noxious weeds, promote forage productivity, and improve ecological condition.

**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::** Acre

**Scenario Typical Size:** 20

**Total Scenario Cost:** $847.56

**Scenario Cost/Unit:** $42.38

**Cost Details:**

| Component Name | ID | Description | Unit | Cost | QTY | Total |
|---|---|---|---|---|---|---|
| **Equipment Installation** | | | | | | |
| Truck, Pickup | 939 | Equipment and power unit costs. Labor not included. | Hour | $19.82 | 2 | $39.64 |
| Chemical, ground application | 948 | Chemical application performed by ground equipment. Includes equipment, power unit and labor costs. | Acre | $5.58 | 20 | $111.60 |
| **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. | Acre | $6.92 | 20 | $138.40 |
| Herbicide, Picloram | 337 | Refer to WIN-PST for product names and active ingredients. Includes materials and shipping only. | Acre | $18.77 | 20 | $375.40 |
| 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. | Acre | $1.30 | 20 | $26.00 |
| **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 | $156.52 | 1 | $156.52 |

**Practice:** 315 - Herbaceous Weed Control

**Scenario** #5 - Chemical, Ground Heavy

**Scenario Description:**

Land unit on which weed control would be beneficial in order to set back the plant community succession, improve the ecological condition, and improve forage conditions for domestic livestock or wildlife. The practice entails the eradication of (herbaceous weeds) vegetation by use of weed treatment using ground equipment to apply high cost chemicals, in order to eliminate noxious weeds, promote forage productivity, and improve ecological condition.

**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::** Acre

**Scenario Typical Size:** 20

**Total Scenario Cost:** $1,148.36

**Scenario Cost/Unit:** $57.42

**Cost Details:**

| Component Name | ID | Description | Unit | Cost | QTY | Total |
|---|---|---|---|---|---|---|
| **Equipment Installation** | | | | | | |
| Truck, Pickup | 939 | Equipment and power unit costs. Labor not included. | Hour | $19.82 | 2 | $39.64 |
| Chemical, ground application | 948 | Chemical application performed by ground equipment. Includes equipment, power unit and labor costs. | Acre | $5.58 | 20 | $111.60 |
| **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. | Acre | $40.73 | 20 | $814.60 |
| 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. | Acre | $1.30 | 20 | $26.00 |
| **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 | $156.52 | 1 | $156.52 |

**Practice:** 315 - Herbaceous Weed Control

**Scenario** #6 - split-method and event series

**Scenario Description:**

The practice entails the control of herbaceous vegetation by treating it up to three times during the multi-year treatment period in order to improve ecological site condition. The herbs can be treated with the same method or by a combination of methods. Vegetation needs to be treated at least twice in order to fully control it. Generally,herbicide volumes are reduced as the last treatment will kill resprouting stems or those which survived the first treatment or newly sprouted seedlings. Density has exceeded desired levels based on ecological site potential.

**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 planned

**Scenario Unit::** Acre

**Scenario Typical Size:** 20

**Total Scenario Cost:** $3,075.36

**Scenario Cost/Unit:** $153.77

**Cost Details:**

| Component Name | ID | Description | Unit | Cost | QTY | Total |
|---|---|---|---|---|---|---|
| **Equipment Installation** | | | | | | |
| Truck, Pickup | 939 | Equipment and power unit costs. Labor not included. | Hour | $19.82 | 2 | $39.64 |
| Mower, Bush Hog | 940 | Equipment and power unit costs. Labor not included. | Hour | $47.22 | 6 | $283.32 |
| Chemical, ground application | 948 | Chemical application performed by ground equipment. Includes equipment, power unit and labor costs. | Acre | $5.58 | 40 | $223.20 |
| Tractor, agricultural, 60 HP | 963 | Agricultural tractor with horsepower range of 50 to 90. Equipment and power unit costs. Labor not included. | Hour | $22.54 | 12 | $270.48 |
| **Labor** | | | | | | |
| Equipment Operators, Light | 232 | Includes: Skid Steer Loaders, Hydraulic Excavators <50 HP, Trenchers <12", Ag Equipment <150 HP, Pickup Trucks, Forklifts, Mulchers | Hour | $21.14 | 12 | $253.68 |
| **Materials** | | | | | | |
| Herbicide, Triclopyor | 338 | Refer to WIN-PST for product names and active ingredients. Materials and shipping | Acre | $42.30 | 40 | $1,692.00 |
| **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 | $156.52 | 2 | $313.04 |

**Practice:** 315 - Herbaceous Weed Control

**Scenario** #7 - Forestry, Broadcast Spray, Aerial or Ground

**Scenario Description:**

Treatment takes place in areas with grass or other herbaceous vegetation is competing with newly planted trees or shrubs. Area is covered in grass and other herbaceous weeds. Treatment is needed to ensure the successful establishment of desirable tree species. Areas to be treated using aerial application are above average in size to allow for the helicopter to operate efficiently or ground sprayers can be used. The resource concerns include: Watr Quality - contaminants chemicals; Air Quality - airborne chemical drift; Plant Condition - productivity health and vigor

**Before Situation:**

Desirable trees are receiving competition for water and nutrients from grasses and other weedy species. Typical sites have recently been planted with trees and they have an abundant coer of herbaeous vegetation. Herbaceous weed control is conducted soon after the tree seedlings have been planted to enhance their growth and survival.

**After Situation:**

Desirable vegetation is released from competing vegetation. The tupical tract size is approximately 40 acres, but larger and sometimes smaller tract sizes are common. After treatment, the trees are visible and the undesirable vegetation has been reduced providing the trees a better chance of becoming established. The herbaceous vegetation should be reduced and trees should be visible. The siae of the tract and location might determine the application to use but the primary goal is to release the newly established seedlings.

**Feature Measure:** Acres treated

**Scenario Unit::** Acre

**Scenario Typical Size:** 40

**Total Scenario Cost:** $4,294.46

**Scenario Cost/Unit:** $107.36

**Cost Details:**

| Component Name | ID | Description | Unit | Cost | QTY | Total |
|---|---|---|---|---|---|---|
| **Equipment Installation** | | | | | | |
| Truck, Pickup | 939 | Equipment and power unit costs. Labor not included. | Hour | $19.82 | 6 | $118.92 |
| Tractor, agricultural, 60 HP | 963 | Agricultural tractor with horsepower range of 50 to 90. Equipment and power unit costs. Labor not included. | Hour | $22.54 | 20 | $450.80 |
| All terrain vehicles, ATV | 965 | Includes equipment, power unit and labor costs. | Hour | $29.73 | 8 | $237.84 |
| Chemical, aerial application, helicopter | 1991 | Chemical application performed by helicopter on forest only. Includes equipment, mobilization, and labor. | Acre | $31.94 | 20 | $638.80 |
| **Labor** | | | | | | |
| Equipment Operators, Light | 232 | Includes: Skid Steer Loaders, Hydraulic Excavators <50 HP, Trenchers <12", Ag Equipment <150 HP, Pickup Trucks, Forklifts, Mulchers | Hour | $21.14 | 8 | $169.12 |
| 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. | Hour | $34.29 | 4 | $137.16 |
| **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. | Acre | $40.73 | 30 | $1,221.90 |
| Herbicide, Sulfometuron-methyl | 340 | Used for the control of annual and perennial grasses and broad leaved weeds in non-crop land. Refer to WIN-PST for product names and active ingredients. Includes materials and shipping only. | Acre | $38.78 | 30 | $1,163.40 |
| **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 | $156.52 | 1 | $156.52 |

**Practice:** 315 - Herbaceous Weed Control

**Scenario** #8 - Forestry - Band Spraying

**Scenario Description:**

Treatment takes place in areas with grass or other herbaceous vegetation is competing with newly planted trees or shrubs. Area is covered in grass and other herbaceous weeds. Treatment is needed to ensure the successful establishment of desirable tree species. Areas to be treated using aerial application are above average in size to allow for the helicopter to operate efficiently or ground sprayers can be used. The resource concerns include: Watr Quality - contaminants chemicals; Air Quality - airborne chemical drift; Plant Condition - productivity health and vigor

**Before Situation:**

Desirable trees are receiving competition for water and nutrients from grasses and other weedy species. Typical sites have recently been planted with trees and they have an abundant coer of herbaeous vegetation. Herbaceous weed control is conducted soon after the tree seedlings have been planted to enhance their growth and survival.

**After Situation:**

Desirable vegetation is released from competing vegetation. The tupical tract size is approximately 20 acres, but larger and sometimes smaller tract sizes are common. After treatment, the trees are visible and the undesirable vegetation has been reduced providing the trees a better chance of becoming established. The band treatments can be distinguished from the broadcast treatments because only a strip of vegetation around the planted tree seedlings is treated. The band width can vary, but the entire tract is not treated. All chemicals will be used according to the label.

**Feature Measure:** Acres treated

**Scenario Unit::** Acre

**Scenario Typical Size:** 20

**Total Scenario Cost:** $1,542.94

**Scenario Cost/Unit:** $77.15

**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. | Acre | $5.58 | 20 | $111.60 |
| All terrain vehicles, ATV | 965 | Includes equipment, power unit and labor costs. | Hour | $29.73 | 8 | $237.84 |
| **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. | Hour | $18.93 | 8 | $151.44 |
| Supervisor or Manager | 234 | Labor involving supervision or management activities. Includes crew supervisors, foremen and farm/ranch managers time required for adopting new technology, etc. | Hour | $34.29 | 2 | $68.58 |
| **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. | Acre | $40.73 | 8 | $325.84 |
| Herbicide, Sulfometuron-methyl | 340 | Used for the control of annual and perennial grasses and broad leaved weeds in non-crop land. Refer to WIN-PST for product names and active ingredients. Includes materials and shipping only. | Acre | $38.78 | 8 | $310.24 |
| 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. | Acre | $22.61 | 8 | $180.88 |
| **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 | $156.52 | 1 | $156.52 |

**Practice:** 316 - Animal Mortality Facility

**Scenario** #1 - Incineration less than 350 pound per day Chamber

**Scenario Description:**

This scenario consists of installing a manufactured Type IV incinerator designed to handle 350 lbs of average daily mortality for the species and size of the operation. System shall use high temperature (>1,300 degrees F) incineration with a secondary combustion or afterburner chamber prior to flue discharge. After determining average daily mortality in lbs, select smallest incinerator that meets capacity. Payment made per unit of actual chamber size obtained from manufacturers' product literature. This option is not typically least-cost. In most states a roofed static compost pile with concrete floor and bins would be considered least cost. Therefore consider reducing payment rate as per State Conservationist discretion. The purpose of the practice is to address resource concerns related to water quality degradation due to excessive nutrients, organics, and pathogens being transported into surface and groundwater resources. Air quality impacts due to odors will also be addressed, however, in non-attainment areas, certain states may require a higher level of processing such as gasification or other approved methods. Potential Associated Practices: Heavy Use Area Protection (561), Fence (382), Critical Area Planting (342), Access Road (560), Waste Storage Facility (313), Nutrient Management (590), Roofs and Covers (367), Critical Area Planting (342).

**Before 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 incineration, and protection from predators to minimize pathogen survival or spreading. An overall plan covers normal and catastrophic mortality events. Selected method for carcass treatment and disposal meet or are permitted by federal, state, and local laws, rules, regulation. Incinerator installed to handle 350 lbs per day average mortality for a small poultry operation. Included is a concrete slab to set the incinerator on. Ash materials to be stored in suitable containers until land disposal as per the nutrient management plan or landfilled.

**Feature Measure:** Mortality in pounds per day

**Scenario Unit::** Pound

**Scenario Typical Size:** 350

**Total Scenario Cost:** $12,032.11

**Scenario Cost/Unit:** $34.38

**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 Yard | $210.23 | 4 | $840.92 |
| Excavation, Common Earth, side cast, small equipment | 48 | Bulk excavation and side casting of common earth with hydraulic excavator with less than 1 CY capacity. Includes equipment and labor. | Cubic Yard | $1.99 | 8 | $15.92 |
| Hydraulic Excavator, 1 CY | 931 | Track mounted hydraulic excavator with bucket capacity range of 0.8 to 1.5 CY. Equipment and power unit costs. Labor not included. | Hour | $103.47 | 1 | $103.47 |
| **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. | Hour | $18.93 | 1 | $18.93 |
| Equipment Operators, Light | 232 | Includes: Skid Steer Loaders, Hydraulic Excavators <50 HP, Trenchers <12", Ag Equipment <150 HP, Pickup Trucks, Forklifts, Mulchers | Hour | $21.14 | 1 | $21.14 |
| **Materials** | | | | | | |
| Aggregate, Gravel, Graded | 46 | Gravel, includes materials, equipment and labor to transport and place. Includes washed and unwashed gravel. | Cubic Yard | $30.82 | 4 | $123.28 |
| Fuel Tank, Anchored | 1033 | Fuel tank for operating incinerators and/or gasifiers. Materials only. | Gallon | $3.57 | 285 | $1,017.45 |
| Incinerator, 200 lbs/day | 1624 | Poultry and livestock incinerator with an approximate chamber capacity of 200 pounds per day. Includes equipment and after burner only. | Each | $9,658.29 | 1 | $9,658.29 |
| **Mobilization** | | | | | | |
| Mobilization, medium equipment | 1139 | Equipment with 70-150 HP or typical weights between 14,000 and 30,000 pounds. | Each | $232.71 | 1 | $232.71 |

**Practice:** 316 - Animal Mortality Facility

**Scenario** #2 - Incineration 350 to 850 pound per day chamber

**Scenario Description:**

This scenario consists of installing a manufactured Type IV incinerator designed to handle 350 to 850 lbs of average daily mortality for the species and size of the operation. Typically very large poultry or medium sized swine operations (700 lbs used) . System shall use high temperature (>1,300 degrees F) incineration with a secondary combustion or afterburner chamber prior to flue discharge. After determining average daily mortality in lbs, select smallest incinerator that meets capacity. Payment made per unit of actual chamber size obtained from manufacturers' product literature. This option is not typically least-cost. In most states a roofed static pile with concrete floor and bins would be considered least cost. Therefore consider reducing payment rate as per State Conservationist discretion. The purpose of the practice is to address resource concerns related to water quality degradation due to excessive nutrients, organics, and pathogens being transported into surface and groundwater resources. Air quality impacts due to odors are reduced, however, in non-attainment areas, certain states may require a higher level of processing such as gasification or other approved methods. Potential Associated Practices: Heavy Use Area Protection (561), Fence (382), Critical Area Planting (342), Access Road (560), Waste Storage Facility (313), Nutrient Management (590), Roofs and Covers (367), Critical Area Planting (342).

**Before 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 incineration, and protection from predators to minimize pathogen survival or spreading. In non-attainment areas, certain states may require a higher level of processing such as gasification or different methods. An overall plan covers normal and catastrophic mortality events. Selected method for carcass treatment and disposal meet or are permitted by federal, state, and local laws, rules, regulation. Incinerator installed to handle 700 lbs per day average mortality for a medium poultry or swine operation. Included is a concrete slab to set the incinerator on. Ash materials to be stored in suitable containers until land disposal as per the nutrient managment plan or landfilled.

**Feature Measure:** Mortality in pounds per day

**Scenario Unit::** Pound

**Scenario Typical Size:** 850

**Total Scenario Cost:** $13,823.78

**Scenario Cost/Unit:** $16.26

**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 Yard | $210.23 | 4 | $840.92 |
| Excavation, Common Earth, side cast, small equipment | 48 | Bulk excavation and side casting of common earth with hydraulic excavator with less than 1 CY capacity. Includes equipment and labor. | Cubic Yard | $1.99 | 8 | $15.92 |
| Hydraulic Excavator, 1 CY | 931 | Track mounted hydraulic excavator with bucket capacity range of 0.8 to 1.5 CY. Equipment and power unit costs. Labor not included. | Hour | $103.47 | 1 | $103.47 |
| **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. | Hour | $18.93 | 1 | $18.93 |
| Equipment Operators, Light | 232 | Includes: Skid Steer Loaders, Hydraulic Excavators <50 HP, Trenchers <12", Ag Equipment <150 HP, Pickup Trucks, Forklifts, Mulchers | Hour | $21.14 | 1 | $21.14 |
| **Materials** | | | | | | |
| Aggregate, Gravel, Graded | 46 | Gravel, includes materials, equipment and labor to transport and place. Includes washed and unwashed gravel. | Cubic Yard | $30.82 | 4 | $123.28 |
| Fuel Tank, Anchored | 1033 | Fuel tank for operating incinerators and/or gasifiers. Materials only. | Gallon | $3.57 | 285 | $1,017.45 |
| Incinerator, 400 lbs/day | 1625 | Poultry and livestock incinerator with an approximate chamber capacity of 400 pounds per day. Includes equipment and after burner only. | Each | $11,449.96 | 1 | $11,449.96 |
| **Mobilization** | | | | | | |
| Mobilization, medium equipment | 1139 | Equipment with 70-150 HP or typical weights between 14,000 and 30,000 pounds. | Each | $232.71 | 1 | $232.71 |

**Practice:** 316 - Animal Mortality Facility

**Scenario** #3 - Incineration greater than 850 Pound Chamber

**Scenario Description:**

This scenario consists of installing a manufactured Type IV incinerator designed to handle a single 856 to 1,500 mortality. Typically a single dairy cow or multiple heifers or swine. System shall use high temperature (>1,300 degrees F) incineration with a secondary combustion or afterburner chamber prior to flue discharge. Select smallest incinerator that has a bin capacity to handle largest individual mortality. Payment made per unit of actual chamber size obtained from manufacturers' product literature. This option uses a very small footprint, however, it costs 15-20 gallons of diesel fuel per fill. The usage needs to be significant. At 500 cows with replacements, this option would offset a 4,000 SF concrete pad with another 8,000 to 12,000 SF of grassed area. Cost for that option would be for an area of 4,000 ft2 @$4.50 or $18,000 vs. $24,000. This option for small dairy operations would not typically be least-cost. In most states either a roofed or unroofed static pile with concrete floor and walls would be considered least cost. Unless regulations require this or severe site limitations exist, consider reducing payment rate as per State Conservationist discretion. The purpose of the practice is to address resource concerns related to water quality degradation due to excessive nutrients, organics, and pathogens being transported into surface and groundwater resources. Air quality impacts due to odors will also be addressed, however, in non-attainment areas, certain states may require a higher level of processing such as gasification or other approved methods. Potential Associated Practices: Heavy Use Area Protection (561), Fence (382), Critical Area Planting (342), Access Road (560), Waste Storage Facility (313), Nutrient Management (590), Roofs and Covers (367), Critical Area Planting (342).

**Before 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 incineration, and protection from predators to minimize pathogen survival or spreading. An overall plan covers normal and catastrophic mortality events. In non-attainment areas, certain states may require a higher level of processing such as gasification or other approved method. Selected method for carcass treatment and disposal meet or are permitted by federal, state, and local laws, rules, regulations. Incinerator installed to handle a whole 1500 lb dairy cow on a 1,000 cow operation. Included is a concrete slab to set the incinerator on. Ash materials to be stored in suitable containers, a waste storage pit until land disposal as per the nutrient management plan or landfilled. Proper incineration will require between 15 and 25 gallons of diesel fuel per usage.

**Feature Measure:** Mortality in Pounds per day

**Scenario Unit::** Pound

**Scenario Typical Size:** 1500

**Total Scenario Cost:** $15,686.69

**Scenario Cost/Unit:** $10.46

**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 Yard | $210.23 | 4 | $840.92 |
| Excavation, Common Earth, side cast, small equipment | 48 | Bulk excavation and side casting of common earth with hydraulic excavator with less than 1 CY capacity. Includes equipment and labor. | Cubic Yard | $1.99 | 8 | $15.92 |
| Hydraulic Excavator, 1 CY | 931 | Track mounted hydraulic excavator with bucket capacity range of 0.8 to 1.5 CY. Equipment and power unit costs. Labor not included. | Hour | $103.47 | 1 | $103.47 |
| **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. | Hour | $18.93 | 1 | $18.93 |
| Equipment Operators, Light | 232 | Includes: Skid Steer Loaders, Hydraulic Excavators <50 HP, Trenchers <12", Ag Equipment <150 HP, Pickup Trucks, Forklifts, Mulchers | Hour | $21.14 | 1 | $21.14 |
| **Materials** | | | | | | |
| Aggregate, Gravel, Graded | 46 | Gravel, includes materials, equipment and labor to transport and place. Includes washed and unwashed gravel. | Cubic Yard | $30.82 | 4 | $123.28 |
| Fuel Tank, Anchored | 1033 | Fuel tank for operating incinerators and/or gasifiers. Materials only. | Gallon | $3.57 | 285 | $1,017.45 |
| Incinerator, 600 lbs/day | 1626 | Poultry and livestock incinerator with an approximate chamber capacity of 600 pounds per day. Includes equipment and after burner only. | Each | $13,312.87 | 1 | $13,312.87 |
| **Mobilization** | | | | | | |

| | | | | | |
|---|---|---|---|---|---|
| Mobilization, medium equipment | 1139 Equipment with 70-150 HP or typical weights between 14,000 and 30,000 pounds. | Each | $232.71 | 1 | $232.71 |

**Practice:** 316 - Animal Mortality Facility

**Scenario** #4 - Invessel Rotary Drum 250 lbs per day to 400 lbs per day

**Scenario Description:**

This scenario consists of installing a horizontal rotary drum to compost smaller poultry and swine facility mortality. It can handle between 250 and 400 lbs per day of mortality plus equal or higher volumes of carbon material (i.e. wood chips). A secondary composting storage area is required to finish materials. Payment quantity based on interior volume of rotary composter in cubic feet of smallest drum that can process daily mortality as per manufacturers' recommendations. 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. Rotary Drums should be considered when the producer has very limited space for his/her animal mortality facility. If space is not the limiting factor, than scenarios 9 or 11 should be used.Potential Associated Practices: Roofs and Covers (367), Waste Storage Facility (313), Fence (382), Critical Area Planting (342), Nutrient Management (590), Access Road (560), Structure for Water Control (587 ), Diversion (362), Subsurface Drain (606), and Underground Outlet (620).

**Before 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:**

Proper operation results in little to no odors, complete composting, and protection from predators to minimize pathogen survival or spreading. An overall plan covers normal and catastrophic mortality events.Installed a 5' diameter by 22' long rotary drum on two concrete pads that can process 250 lbs of mortality per day. Drum rotation moves and mixes mortality and wood chips. Site preparation includes topsoil removal, gravel pad, and concrete pads and slab at two locations plus small floor and walls to complete composting. Input material reduced by 40-60 percent and put into 4' high, three sided, 20'x 20' concrete bin with 10'x20 concrete pad for secondary composting. Area can be protected by adding Roofs and Covers (367 ) standard.

**Feature Measure:** Pounds of animal mortality per day

**Scenario Unit::** Pound

**Scenario Typical Size:** 250

**Total Scenario Cost:** $40,215.22

**Scenario Cost/Unit:** $160.86

**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 Yard | $103.61 | 4 | $414.44 |
| Concrete, CIP, slab on grade, reinforced | 37 | Steel reinforced concrete formed and cast-in-placed as a slab on grade by chute placement. Typical strength is 3000 to 4000 psi. Includes materials, labor and equipment to transport, place and finish. | Cubic Yard | $210.23 | 4 | $840.92 |
| Concrete, CIP, formed reinforced | 38 | Steel reinforced concrete formed and cast-in-placed in formed structures such as walls or suspended slabs by chute placement. Typical strength is 3000 to 4000 psi. Includes materials, labor and equipment to transport, place and finish. | Cubic Yard | $326.97 | 6 | $1,961.82 |
| Excavation, Common Earth, side cast, small equipment | 48 | Bulk excavation and side casting of common earth with hydraulic excavator with less than 1 CY capacity. Includes equipment and labor. | Cubic Yard | $1.99 | 4 | $7.96 |
| **Materials** | | | | | | |
| Aggregate, Gravel, Graded | 46 | Gravel, includes materials, equipment and labor to transport and place. Includes washed and unwashed gravel. | Cubic Yard | $30.82 | 8 | $246.56 |
| Composter, drum, 12 CY | 1627 | 12 CY drum composter unit. Total capacity range is 10-19 CY. Includes equipment, operation controls, and shipping. Labor not included. | Each | $36,615.00 | 1 | $36,615.00 |
| **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 | $64.26 | 2 | $128.52 |

**Practice:** 316 - Animal Mortality Facility

**Scenario** #5 - Invessel Rotary Drum 401 lbs to 650 lbs per day

**Scenario Description:**

This scenario consists of installing a horizontal rotary drum to compost smaller poultry and swine facility mortality. It can handle between 401 and 650 lbs per day of mortality plus equal or higher volumes of carbon material (i.e. wood chips). A secondary composting storage area is required to finish materials. Payment quantity based on interior volume of rotary composter in cubic feet of smallest drum that can process daily mortality as per manufacturers' recommendations. 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. Rotary Drums should be considered when the producer has very limited space for his/her animal mortality facility. If space is not the limiting factor, than scenarios 9 or 11 should be used.Potential Associated Practices: Roofs and Covers (367), Waste Storage Facility (313), Fence (382), Critical Area Planting (342), Nutrient Management (590), Access Road (560), Structure for Water Control (587 ), Diversion (362), Subsurface Drain (606), and Underground Outlet (620).

**Before 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:**

Proper operation results in little to no odors, complete composting, and protection from predators to minimize pathogen survival or spreading. An overall plan covers normal and catastrophic mortality events.Installed a 5' diameter by 22' long rotary drum on two concrete pads that can process 625 lbs of mortality per day. Drum rotation moves and mixes mortality and wood chips. Site preparation includes topsoil removal, gravel pad, and concrete pads and slab at two locations plus small floor and walls to complete composting. Input material reduced by 40-60 percent and put into 4' high, three sided, 20'x 20' concrete bin with 10'x20 concrete pad for secondary composting. Area can be protected by adding Roofs and Covers (367 ) standard.

**Feature Measure:** Pounds of animal mortality per day

**Scenario Unit::** Pound

**Scenario Typical Size:** 625

**Total Scenario Cost:** $49,830.22

**Scenario Cost/Unit:** $79.73

**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 Yard | $103.61 | 4 | $414.44 |
| Concrete, CIP, slab on grade, reinforced | 37 | Steel reinforced concrete formed and cast-in-placed as a slab on grade by chute placement. Typical strength is 3000 to 4000 psi. Includes materials, labor and equipment to transport, place and finish. | Cubic Yard | $210.23 | 4 | $840.92 |
| Concrete, CIP, formed reinforced | 38 | Steel reinforced concrete formed and cast-in-placed in formed structures such as walls or suspended slabs by chute placement. Typical strength is 3000 to 4000 psi. Includes materials, labor and equipment to transport, place and finish. | Cubic Yard | $326.97 | 6 | $1,961.82 |
| Excavation, Common Earth, side cast, small equipment | 48 | Bulk excavation and side casting of common earth with hydraulic excavator with less than 1 CY capacity. Includes equipment and labor. | Cubic Yard | $1.99 | 4 | $7.96 |
| **Materials** | | | | | | |
| Aggregate, Gravel, Graded | 46 | Gravel, includes materials, equipment and labor to transport and place. Includes washed and unwashed gravel. | Cubic Yard | $30.82 | 8 | $246.56 |
| Composter, drum, 28 CY | 1628 | 28 CY drum composter unit. Total capacity range is 20-29 CY. Includes equipment, operation controls, and shipping. Labor not included. | Each | $46,230.00 | 1 | $46,230.00 |
| **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 | $64.26 | 2 | $128.52 |

**Practice:** 316 - Animal Mortality Facility

**Scenario** #6 - Invessel Rotary Drum greater than or equal to 650 lbs. per day

**Scenario Description:**

This scenario consists of installing a horizontal rotary drum to compost larger poultry and swine facility mortality. It can handle between 651 and 950 lbs per day of mortality plus equal or higher volumes of carbon material (i.e. wood chips). A secondary composting storage area is required to finish materials. Payment quantity based on interior volume of rotary composter in cubic feet of smallest drum that can process daily mortality as per manufacturers' recommendations. 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. Rotary Drums should be considered when the producer has very limited space for his/her animal mortality facility. If space is not the limiting factor, than scenarios 9 or 11 should be used.Potential Associated Practices: Roofs and Covers (367), Waste Storage Facility (313), Fence (382), Critical Area Planting (342), Nutrient Management (590), Access Road (560), Structure for Water Control (587 ), Diversion (362), Subsurface Drain (606), and Underground Outlet (620).

**Before 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:**

Proper operation results in little to no odors, complete composting, and protection from predators to minimize pathogen survival or spreading. An overall plan covers normal and catastrophic mortality events. Installed a 5' diameter by 54' long rotary drum on two concrete pads that can process 800 lbs of mortality per day. Drum rotation moves and mixes mortality and wood chips. Site preparation includes topsoil removal, gravel pad, concrete pads, slab at two locations plus concrete floor and walls to complete composting. Input material reduced by 40-60 percent and put into 4' high, three sided, 30'x 30' concrete bin with 10'x30' concrete pad for secondary composting. Area can be protected by adding Roofs and Covers (367) standard.

**Feature Measure:** Pounds of animal mortality per day

**Scenario Unit::** Pound

**Scenario Typical Size:** 800

**Total Scenario Cost:** $51,699.51

**Scenario Cost/Unit:** $64.62

**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 Yard | $103.61 | 6 | $621.66 |
| Concrete, CIP, slab on grade, reinforced | 37 | Steel reinforced concrete formed and cast-in-placed as a slab on grade by chute placement. Typical strength is 3000 to 4000 psi. Includes materials, labor and equipment to transport, place and finish. | Cubic Yard | $210.23 | 4 | $840.92 |
| Concrete, CIP, formed reinforced | 38 | Steel reinforced concrete formed and cast-in-placed in formed structures such as walls or suspended slabs by chute placement. Typical strength is 3000 to 4000 psi. Includes materials, labor and equipment to transport, place and finish. | Cubic Yard | $326.97 | 9 | $2,942.73 |
| Excavation, Common Earth, side cast, small equipment | 48 | Bulk excavation and side casting of common earth with hydraulic excavator with less than 1 CY capacity. Includes equipment and labor. | Cubic Yard | $1.99 | 4 | $7.96 |
| **Materials** | | | | | | |
| Aggregate, Gravel, Graded | 46 | Gravel, includes materials, equipment and labor to transport and place. Includes washed and unwashed gravel. | Cubic Yard | $30.82 | 15 | $462.30 |
| Composter, drum, 28 CY | 1628 | 28 CY drum composter unit. Total capacity range is 20-29 CY. Includes equipment, operation controls, and shipping. Labor not included. | Each | $46,230.00 | 1 | $46,230.00 |
| **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 | $64.26 | 2 | $128.52 |
| Mobilization, medium equipment | 1139 | Equipment with 70-150 HP or typical weights between 14,000 and 30,000 pounds. | Each | $232.71 | 2 | $465.42 |

**Practice:** 316 - Animal Mortality Facility

**Scenario** #7 - Static pile Earthen pad

**Scenario Description:**

This scenario consists of installing an impervious earthen 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. 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: Pond Sealing or Lining, Bentonite Sealant (521C), 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 (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 earth surface. Site can handle mortality for a 100 cow dairy with associated heifers and calves. On site soils can be recompacted to meet required imperviousness. 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 removal of top 1' and recompacting.

**Feature Measure:** Pad Area

**Scenario Unit::** Square Foot

**Scenario Typical Size:** 2500

**Total Scenario Cost:** $1,793.34

**Scenario Cost/Unit:** $0.72

**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 Yard | $1.99 | 150 | $298.50 |
| Earthfill, Roller Compacted | 49 | Earthfill, roller or machine compacted, includes equipment and labor | Cubic Yard | $3.76 | 150 | $564.00 |
| **Mobilization** | | | | | | |
| Mobilization, medium equipment | 1139 | Equipment with 70-150 HP or typical weights between 14,000 and 30,000 pounds. | Each | $232.71 | 4 | $930.84 |

**Practice:** 316 - Animal Mortality Facility

**Scenario** #8 - Static pile Concrete Pad

**Scenario Description:**

This scenario consists of installing a concrete pad over permeable soils, karst topography, frequently accessed sites or sites with regulatory requirements. Typically associated with large dairy (1,000 cows plus heifers ) or beef animal mortality with an average daily mortality of 175 lbs/day. Area sized to compost animal mortality as a static pile or windrow with equipment around materials. Sufficient carbon based bulking material added to allow natural aeration and a proper C:N ratio. Piles typically turned at least once to go into another heat cycle prior to final disposal, typically land application. Site to be located out of drainage areas, off-site water diverted and any runoff to spread out into a grassed area or vegetated treatment area as per regulations. Potential Associated Practices: Pond Sealing or Lining, Bentonite Sealant (521C), Pond Sealing or Lining, Flexible Membrane (521A), Pond Sealing or Lining, Soil Dispersant (521B), Fence (382), Critical Area Planting (342), Nutrient Management (590), Access Road (560), Structure for Water Control (587), Diversion (362), Subsurface Drain (606), and Underground Outlet (620).

**Before 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 60'x95' concrete surface to process mortality. Concrete 5" thick with light reinforcement. Typical layout is 18' wide piles with 8' wide access area is around each pile or windrow. Site preparation includes topsoil removal, minimal regrading and compaction, installing gravel or sand subbase and then concrete.

**Feature Measure:** Pad Area

**Scenario Unit::** Square Foot

**Scenario Typical Size:** 5700

**Total Scenario Cost:** $22,860.34

**Scenario Cost/Unit:** $4.01

**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 Yard | $210.23 | 90 | $18,920.70 |
| Excavation, Common Earth, side cast, small equipment | 48 | Bulk excavation and side casting of common earth with hydraulic excavator with less than 1 CY capacity. Includes equipment and labor. | Cubic Yard | $1.99 | 220 | $437.80 |
| Earthfill, Roller Compacted | 49 | Earthfill, roller or machine compacted, includes equipment and labor | Cubic Yard | $3.76 | 110 | $413.60 |
| **Materials** | | | | | | |
| Aggregate, Gravel, Graded | 46 | Gravel, includes materials, equipment and labor to transport and place. Includes washed and unwashed gravel. | Cubic Yard | $30.82 | 70 | $2,157.40 |
| **Mobilization** | | | | | | |
| Mobilization, medium equipment | 1139 | Equipment with 70-150 HP or typical weights between 14,000 and 30,000 pounds. | Each | $232.71 | 4 | $930.84 |

**Practice:** 316 - Animal Mortality Facility

**Scenario** #9 - Static pile Wood Bins

**Scenario Description:**

This scenario consists of installing a group of small bins along one side and a long narrow bin on the backside of a concrete pad to compost poultry or small swine mortality in static pile(s) that have sufficient bulking material to allow natural aeration. Piles are turned to go through a second heat cycle prior to final land application. The roofed portion of the facility is addressed with Roofs and Covers (367). Size of facility based on daily mortality and sizing procedures accepted in particular state. Organic sites will require more frequent replacement of lumber. Potential Associated Practices: Roofs and Covers (367), Heavy Use Area Protection (561), Critical Area Planting (342), Nutrient Management (590), Access Road (560), Structure for Water Control (587), Roof Runoff Structure (558), Diversion (362), Subsurface Drain (606), and Underground Outlet (620).

**Before 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. Selected method for carcass treatment and disposal meet or are permitted by federal, state, and local laws, rules, regulation.Install facility on a 18' x 40' concrete pad with 4 bins ( 5' H x 10' W x 6' Length) along the front side and one 8'w by 40' long secondary bin. Bin wall consists of a 1' concrete curb and 4' of treated lumber. Roofed portion is addressed under Roofs and Covers (367). Site preparation includes topsoil removal, installing 4" of gravel, setting posts , installing concrete slab, installing wooden walls and doors. Piles turned to go through a second heat cycle prior to final land application.

**Feature Measure:** Total Bin Area

**Scenario Unit::** Square Foot

**Scenario Typical Size:** 720

**Total Scenario Cost:** $9,161.84

**Scenario Cost/Unit:** $12.72

**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 Yard | $103.61 | 3 | $310.83 |
| Concrete, CIP, slab on grade, reinforced | 37 | Steel reinforced concrete formed and cast-in-placed as a slab on grade by chute placement. Typical strength is 3000 to 4000 psi. Includes materials, labor and equipment to transport, place and finish. | Cubic Yard | $210.23 | 14 | $2,943.22 |
| Concrete, CIP, formed reinforced | 38 | Steel reinforced concrete formed and cast-in-placed in formed structures such as walls or suspended slabs by chute placement. Typical strength is 3000 to 4000 psi. Includes materials, labor and equipment to transport, place and finish. | Cubic Yard | $326.97 | 3 | $980.91 |
| Excavation, Common Earth, side cast, small equipment | 48 | Bulk excavation and side casting of common earth with hydraulic excavator with less than 1 CY capacity. Includes equipment and labor. | Cubic Yard | $1.99 | 40 | $79.60 |
| Skidsteer, 80 HP | 933 | Skidsteer loader with horsepower range of 60 to 90. Equipment and power unit costs. Labor not included. | Hour | $40.57 | 7 | $283.99 |
| Auger, Post driver attachment | 934 | Auger or post driver attachment to a tractor or skidsteer. Does not include power unit. Labor not included. | Hour | $6.65 | 7 | $46.55 |
| **Labor** | | | | | | |
| Skilled Labor | 230 | Labor requiring a high level skill set: Includes carpenters, welders, electricians, conservation professionals involved with data collection, monitoring, and or record keeping, etc. | Hour | $25.08 | 80 | $2,006.40 |
| Equipment Operators, Light | 232 | Includes: Skid Steer Loaders, Hydraulic Excavators <50 HP, Trenchers <12", Ag Equipment <150 HP, Pickup Trucks, Forklifts, Mulchers | Hour | $21.14 | 7 | $147.98 |
| **Materials** | | | | | | |
| Aggregate, Gravel, Graded | 46 | Gravel, includes materials, equipment and labor to transport and place. Includes washed and unwashed gravel. | Cubic Yard | $30.82 | 9 | $277.38 |
| Dimension Lumber, Treated | 1044 | Treated dimension lumber with nominal thickness equal or less than 2". Includes lumber and fasteners | Board Foot | $0.89 | 880 | $783.20 |
| Lumber, planks, posts and timbers, treated | 1609 | Treated dimension lumber with nominal thickness greater than 2". Includes lumber and fasteners. Does not include labor. | Board Foot | $1.58 | 448 | $707.84 |

**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 | $64.26 | 2 | $128.52 |
| Mobilization, medium equipment | 1139 | Equipment with 70-150 HP or typical weights between 14,000 and 30,000 pounds. | Each | $232.71 | 2 | $465.42 |

**Practice:** 316 - Animal Mortality Facility

**Scenario** #10 - Static pile Concrete Bins

**Scenario Description:**

This scenario consists of installing a two or more of concrete bins, open on one end on a concrete pad to compost larger quantities of poultry or mature swine mortality in static pile(s) that have sufficient bulking material to allow natural aeration. Piles are turned to go through a second heat cycle prior to final land application. The roofed portion of the facility is addressed in Cover and Roofs (367). Size of facility based on daily mortality and sizing procedures accepted in particular state. Concrete walled static pile should be considered when facility is directly adjacent to any environmentally sensitive area where any amount of leachate would be detrimental. Potential Associated Practices: Roofs and Cover ( 367 ), Heavy Use Area Protection (561), Critical Area Planting (342), Nutrient Management (590), Access Road (560), Structure for Water Control (587), Roof Runoff Structure (558), Diversion (362), Subsurface Drain (606), and Underground Outlet (620).

**Before 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. Selected method for carcass treatment and disposal meet or are permitted by federal, state, and local laws, rules, regulation. Install a 20' deep by 32' long pad with four bins with 4' high walls and one end open. Open side to have 10' concrete pad due to heavy traffic during loading and movement from bin to bin. Roofed portion is addressed under Roofs and Covers (367). Required Aprons are addressed under Heavy Use Area Protection (561). Site preparation includes topsoil removal, installing 4" of gravel, installing concrete slab for secondary storage, and installing 4' high concrete walls. Piles are turned by moving to adjacent bin to go through a second heat cycle prior to final land application.

**Feature Measure:** Total Bin Area

**Scenario Unit::** Square Foot

**Scenario Typical Size:** 640

**Total Scenario Cost:** $4,575.87

**Scenario Cost/Unit:** $7.15

**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 Yard | $210.23 | 9 | $1,892.07 |
| Concrete, CIP, formed reinforced | 38 | Steel reinforced concrete formed and cast-in-placed in formed structures such as walls or suspended slabs by chute placement. Typical strength is 3000 to 4000 psi. Includes materials, labor and equipment to transport, place and finish. | Cubic Yard | $326.97 | 6 | $1,961.82 |
| Excavation, Common Earth, side cast, small equipment | 48 | Bulk excavation and side casting of common earth with hydraulic excavator with less than 1 CY capacity. Includes equipment and labor. | Cubic Yard | $1.99 | 36 | $71.64 |
| **Materials** | | | | | | |
| Aggregate, Gravel, Graded | 46 | Gravel, includes materials, equipment and labor to transport and place. Includes washed and unwashed gravel. | Cubic Yard | $30.82 | 6 | $184.92 |
| **Mobilization** | | | | | | |
| Mobilization, medium equipment | 1139 | Equipment with 70-150 HP or typical weights between 14,000 and 30,000 pounds. | Each | $232.71 | 2 | $465.42 |

**Practice:** 316 - Animal Mortality Facility

**Scenario** #11 - DS Static pile Concrete Bins

**Scenario Description:**

This scenario consists of installing a two or more of concrete bins, open on one end on a concrete pad to compost larger quantities of poultry or mature swine mortality in static pile(s) that have sufficient bulking material to allow natural aeration. Piles are turned to go through a second heat cycle prior to final land application. The roofed portion of the facility is addressed in Cover and Roofs (367). Size of facility based on daily mortality and sizing procedures accepted in particular state. Concrete walled static pile should be considered when facility is directly adjacent to any environmentally sensitive area, such as being partially in the flood plain, where any amount of leachate would be detrimental. The concrete walls would keep backwater out of bins. Potential Associated Practices: Roofs and Cover ( 367 ), Heavy Use Area Protection (561), Critical Area Planting (342), Nutrient Management (590), Access Road (560), Structure for Water Control (587), Roof Runoff Structure (558), Diversion (362), Subsurface Drain (606), and Underground Outlet (620).

**Before 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. Selected method for carcass treatment and disposal meet or are permitted by federal, state, and local laws, rules, regulation. Install a 20' deep by 50' long pad with four bins with 5' high walls and one end open and 18ft for finished compost storage. 5 ft high wall could reduce the overall size of the structure by allowing higher stacking in fewer bins. Roofed portion is addressed under Roofs and Covers (367). Required Aprons are addressed under Heavy Use Area Protection (561). Site preparation includes topsoil removal, installing 4" of gravel, installing concrete slab for primary and secondary bins and finished compost storage, and installing 5' high concrete walls. Piles are turned by moving to adjacent bin to go through a second heat cycle prior to final land application.

**Feature Measure:** Total Bin Area

**Scenario Unit::** Square Foot

**Scenario Typical Size:** 640

**Total Scenario Cost:** $7,458.62

**Scenario Cost/Unit:** $11.65

**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 Yard | $210.23 | 18.5 | $3,889.26 |
| 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 Yard | $326.97 | 8 | $2,615.76 |
| Excavation, Common Earth, side cast, small equipment | 48 | Bulk excavation and side casting of common earth with hydraulic excavator with less than 1 CY capacity. Includes equipment and labor. | Cubic Yard | $1.99 | 55.6 | $110.64 |
| **Materials** | | | | | | |
| Aggregate, Gravel, Graded | 46 | Gravel, includes materials, equipment and labor to transport and place. Includes washed and unwashed gravel. | Cubic Yard | $30.82 | 12.25 | $377.55 |
| **Mobilization** | | | | | | |
| Mobilization, medium equipment | 1139 | Equipment with 70-150 HP or typical weights between 14,000 and 30,000 pounds. | Each | $232.71 | 2 | $465.42 |

**Practice:** 316 - Animal Mortality Facility

**Scenario** #12 - Mortality Freezer

**Scenario Description:**

This scenario consists of installing a freezer to hold animal mortalities until rendering services becomes available or for safe temporary storage prior to alternative methods can be employed. The purpose of the practice is to address resource concerns related to water quality degradation due to excessive nutrients, organics, and pathogens being transported into surface and groundwater resources. Air quality impacts due to odors will also be addressed, however, in non-attainment areas, certain states may require a higher level of processing such as gasification or other approved methods. Potential Associated Practices: Heavy Use Area Protection (561), Fence (382), Critical Area Planting (342), Access Road (560), Waste Storage Facility (313), Nutrient Management (590), Roofs and Covers (367), Critical Area Planting (342).

**Before Situation:**

Animal mortality is handled 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 handled in a manner that prevents non-point source pollution of excessive nutrients, organics, and pathogens being transported into surface and groundwater resources. Proper operation results in little to no odors, complete incineration, and protection from predators to minimize pathogen survival or spreading. An overall plan covers normal and catastrophic mortality events. Selected method for carcass treatment and disposal meet or are permitted by federal, state, and local laws, rules, regulation. Included is a concrete slab to set the freezer on.

**Feature Measure:** Cubic Foot of freezer Storage capac

**Scenario Unit::** Cubic Foot

**Scenario Typical Size:** 40

**Total Scenario Cost:** $4,956.91

**Scenario Cost/Unit:** $123.92

**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 Yard | $210.23 | 0.5 | $105.12 |
| Backhoe, 80 HP | 926 | Wheel mounted backhoe excavator with horsepower range of 60 to 90. Equipment and power unit costs. Labor not included. | Hour | $50.99 | 4 | $203.96 |
| **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. | Hour | $18.93 | 4 | $75.72 |
| Equipment Operators, Light | 232 | Includes: Skid Steer Loaders, Hydraulic Excavators <50 HP, Trenchers <12", Ag Equipment <150 HP, Pickup Trucks, Forklifts, Mulchers | Hour | $21.14 | 4 | $84.56 |
| **Materials** | | | | | | |
| Freezer, animal mortality, small | 2052 | Freezer to hold animal mortalities until rendering services become available or until treated by other processes. Capacity < 75 cubic feet. Includes labor and equipment. | Each | $3,831.03 | 1 | $3,831.03 |
| **Mobilization** | | | | | | |
| Mobilization, Material, distance > 50 miles | 1043 | Mobilization cost of materials for special cases where the distance from the supplier delivery point to the job site exceeds 50 miles. The costs for shipping by UPS or bulk freight shipping to a location within 50 miles of the job site have already been included in the component price. | Dollar | $1.00 | 500 | $500.00 |
| 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 | $156.52 | 1 | $156.52 |

**Practice:** 317 - Composting Facility

**Scenario** #1 - Composter, with concrete under bins wood or concrete only

**Scenario Description:**

The composting facility, with concrete under bins only, is installed to address water quality concerns and disease vectors resulting from improper waste disposal by providing a dedicated facility for storage and treatment, and by creating a compost product that can be used in multiple ways including land application for enrichment of crop ground. All animal mortality composting shall be done using Practice Standard 316 - Animal Mortality Facility Potential Associated Practices: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, litter and other agricultural by-products are being controlled, by the collection at the source, and stored properly, at an environmentally suitable location, until such time that they are disposed of or utilized in a proper manner, typically in accordance with a nutrient management plan. Install facility on a 18' x 40' concrete pad with 4 bins ( 5' H x 10' W x 6' Length) along the front side and one 8'w by 40' long secondary bin. Bin wall consists of a 1' concrete curb and 4' of treated lumber. Roofed portion is addressed under Roofs and Covers (367). Site preparation includes topsoil removal, installing 4" of gravel, setting posts , installing concrete slab, installing wooden walls and doors. Piles turned to go through a second heat cycle prior to final land application. The bins are constructed on a 5" concrete slab used to store and stabilize manure, litter and other agricultural by-products from a four house complex on any farm.

**Feature Measure:** Square Foot Floor Area

**Scenario Unit::** Square Foot

**Scenario Typical Size:** 720

**Total Scenario Cost:** $9,190.88

**Scenario Cost/Unit:** $12.77

**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 Yard | $103.61 | 3 | $310.83 |
| Concrete, CIP, slab on grade, reinforced | 37 | Steel reinforced concrete formed and cast-in-placed as a slab on grade by chute placement. Typical strength is 3000 to 4000 psi. Includes materials, labor and equipment to transport, place and finish. | Cubic Yard | $210.23 | 14 | $2,943.22 |
| Concrete, CIP, formed reinforced | 38 | Steel reinforced concrete formed and cast-in-placed in formed structures such as walls or suspended slabs by chute placement. Typical strength is 3000 to 4000 psi. Includes materials, labor and equipment to transport, place and finish. | Cubic Yard | $326.97 | 3 | $980.91 |
| Earthfill, Roller Compacted | 49 | Earthfill, roller or machine compacted, includes equipment and labor | Cubic Yard | $3.76 | 40 | $150.40 |
| Skidsteer, 80 HP | 933 | Skidsteer loader with horsepower range of 60 to 90. Equipment and power unit costs. Labor not included. | Hour | $40.57 | 7 | $283.99 |
| Auger, Post driver attachment | 934 | Auger or post driver attachment to a tractor or skidsteer. Does not include power unit. Labor not included. | Hour | $6.65 | 7 | $46.55 |
| 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 Yard | $3.43 | 40 | $137.20 |
| **Labor** | | | | | | |
| General Labor | 231 | Labor performed using basic tools such as power tool, shovels, and other tools that do not require extensive training. Ex. pipe layer, herder, concrete placement, materials spreader, flagger, etc. | Hour | $18.93 | 80 | $1,514.40 |
| Equipment Operators, Light | 232 | Includes: Skid Steer Loaders, Hydraulic Excavators <50 HP, Trenchers <12", Ag Equipment <150 HP, Pickup Trucks, Forklifts, Mulchers | Hour | $21.14 | 7 | $147.98 |
| **Materials** | | | | | | |
| Aggregate, Gravel, Graded | 46 | Gravel, includes materials, equipment and labor to transport and place. Includes washed and unwashed gravel. | Cubic Yard | $30.82 | 9 | $277.38 |

| | | | | | | |
|---|---|---|---|---|---|---|
| Dimension Lumber, Treated | 1044 | Treated dimension lumber with nominal thickness equal or less than 2". Includes lumber and fasteners | Board Foot | $0.89 | 880 | $783.20 |
| Lumber, planks, posts and timbers, treated | 1609 | Treated dimension lumber with nominal thickness greater than 2". Includes lumber and fasteners. Does not include labor. | Board Foot | $1.58 | 448 | $707.84 |
| **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 | $64.26 | 2 | $128.52 |
| 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 | $156.52 | 2 | $313.04 |
| Mobilization, medium equipment | 1139 | Equipment with 70-150 HP or typical weights between 14,000 and 30,000 pounds. | Each | $232.71 | 2 | $465.42 |

**Practice:** 317 - Composting Facility

**Scenario** #2 - Composter, windrow, all weather surface

**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. All animal mortality composting shall be done using Practice Standard 316 - Animal Mortality Facility. Potential Associated Practices: , 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 impervious soil 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 90' x 363' (3/4 acre) on an improved gravel surface. Sub base material sufficiently compacted or improved. 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 6" of compacted gravel.

**Feature Measure:** Square Foot Floor Area

**Scenario Unit::** Square Foot

**Scenario Typical Size:** 32670

**Total Scenario Cost:** $148,575.49

**Scenario Cost/Unit:** $4.55

**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 Yard | $210.23 | 605 | $127,189.15 |
| 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 Yard | $3.43 | 605 | $2,075.15 |
| **Materials** | | | | | | |
| Aggregate, Gravel, Graded | 46 | Gravel, includes materials, equipment and labor to transport and place. Includes washed and unwashed gravel. | Cubic Yard | $30.82 | 605 | $18,646.10 |
| **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 | $64.26 | 1 | $64.26 |
| 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 | $156.52 | 1 | $156.52 |
| Mobilization, large equipment | 1140 | Equipment >150HP or typical weights greater than 30,000 pounds or loads requiring over width or over length permits. | Each | $444.31 | 1 | $444.31 |

**Practice:** 317 - Composting Facility

**Scenario** #3 - Composter, with compacted earth floor, windrow

**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, and climate conditions are appropriate for earth floors and are allowed by state and local regulations. All animal mortality composting shall be done using Practice Standard 316 - Animal Mortality Facility. Potential Associated Practices: n (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 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 scenario consists of removing and compacting back into place the top 1' of soil to create a compacted, impervious earthen floor 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 90' x 363' (3/4 acre) on an improved compacted earthen surface. 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 and re-compaction of top 1' of material.

**Feature Measure:** Square Foot Floor Area

**Scenario Unit::** Square Foot

**Scenario Typical Size:** 32670

**Total Scenario Cost:** $9,376.92

**Scenario Cost/Unit:** $0.29

**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 Yard | $3.76 | 1210 | $4,549.60 |
| 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 Yard | $3.43 | 1210 | $4,150.30 |
| **Mobilization** | | | | | | |
| Mobilization, medium equipment | 1139 | Equipment with 70-150 HP or typical weights between 14,000 and 30,000 pounds. | Each | $232.71 | 1 | $232.71 |
| Mobilization, large equipment | 1140 | Equipment >150HP or typical weights greater than 30,000 pounds or loads requiring over width or over length permits. | Each | $444.31 | 1 | $444.31 |

**Practice:** 318 - Short Term Storage of Animal Waste and Byproducts

**Scenario** #3 - 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 Foot

**Scenario Typical Size:** 12576

**Total Scenario Cost:** $4,119.04

**Scenario Cost/Unit:** $0.33

**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 Yard | $3.76 | 222 | $834.72 |
| **Materials** | | | | | | |
| Poly film, 6 mil. | 245 | 6 mil, polyethylene, black | Square Foot | $0.08 | 222 | $17.76 |
| Earthfill Material, purchased, common | 2060 | Purchased earthfill materials includes both silt or clay. Material only. | Cubic Yard | $12.94 | 234 | $3,027.96 |
| One Species, Cool Season, Introduced Perennial Grass | 2313 | Introduced, cool season perennial grass. Includes material and shipping only. | Acre | $32.72 | 0.18 | $5.89 |
| **Mobilization** | | | | | | |
| Mobilization, medium equipment | 1139 | Equipment with 70-150 HP or typical weights between 14,000 and 30,000 pounds. | Each | $232.71 | 1 | $232.71 |

**Practice:** 321 - Waste Hauling

**Scenario** #14 - Waste Hauling Solid Waste Short Haul

**Scenario Description:**

This scenario describes hauling of animal manure to agricultural land for final utilization. This scenario can only be used for distances up to 15 miles. It is intended to be used in high risk water quality drainage areas or when soil test phosphorus exceeds the allowable limit on fields that have typically been used for manure application. This waste transfer payment is intended to offset additional costs associated with hauling the manure out of the high risk drainage area or transported a longer distance to fields with low soil test phosphorus. Limits of soil test phosphorus for contracting purposes need to meet acceptable state criteria.This practice scenario addresses the water quality concerns for excessive nutrients or degradation of water resources from over application of manure on local fields.

**Before Situation:**

The local drainage area is at high risk for phosphorus leaving the fields in the runoff solution and further manure waste application will likely cause water quality degradation.

**After Situation:**

A spreader trucks is loaded to capacity with 6.3 tons of poultry litter which is hauled a distance of 8 miles to a producer outside of the high risk drainage area to a location where phosphorus levels are in the low risk category according to the Phosphorus Risk index for leaving the fields. Waste is transferred out of the critical drainage area for use as fertilizer on crops and pasture land. A total of 9 trips are made to satisfy the producer's needs.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 and Concrete channel and Transfer conduit scenario 634 - Waste Transfer.

**Feature Measure:** Tons of waste and miles hauled

**Scenario Unit::** Ton-Mile

**Scenario Typical Size:** 454

**Total Scenario Cost:** $49.94

**Scenario Cost/Unit:** $0.11

**Cost Details:**

| Component Name | ID | Description | Unit | Cost | QTY | Total |
|---|---|---|---|---|---|---|
| **Equipment Installation** | | | | | | |
| Manure Hauling, solid manure, transportation | 2031 | Transportation cost of hauling solid manure. Trucking costs based on tons hauled times miles. Includes equipment, power unit and labor. Does not include costs for loading or unloading. | Ton-Mile | $0.11 | 454 | $49.94 |

**Practice:** 321 - Waste Hauling

**Scenario** #15 - Waste Hauling-Solid Waste-Long Haul

**Scenario Description:**

This scenario describes hauling of animal manure or other agricultural waste to agricultural land for final utilization. This scenario can only be used for distances of over 15 miles. It is intended to be used in high risk water quality drainage areas or when soil test phosphorus exceeds the allowable limit on fields that have typically been used for manure application. This waste transfer payment is intended to offset additional costs associated with hauling the manure out of the high risk drainage area or transported a longer distance to fields with low soil test phosphorus. Limits of soil test phosphorus for contracting purposes need to meet acceptable state criteria.This practice scenario addresses the water quality concerns for excessive nutrients or degradation of water resources from over application of manure on local fields.

**Before Situation:**

The local drainage area is at high risk for phosphorus leaving the fields in the runoff solution and further manure waste application will likely cause water quality degradation. There is available land outside the area which has not received agricultural waste in the past and does not measure as high in phosphorus. Producers on this land are willing to try to use manure or agricultural waste as a replacement for commercial fertilizer.

**After Situation:**

A large truck is loaded with 22 tons of agricultural dry-lot cattle manure and transported a distance of 150 miles outside of the high risk drainage area to a location where phosphorus levels are in the low risk category according to the Phosphorus Risk index for leaving the fields. Waste is transferred out of the critical drainage area for use as fertilizer on crops and pasture land according to a CPS 590 Nutrient Management Standard. 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 and Concrete channel and Transfer conduit scenario 634 - Waste Transfer.

**Feature Measure:** Tons of waste hauled times miles

**Scenario Unit::** Ton-Mile

**Scenario Typical Size:** 3300

**Total Scenario Cost:** $363.00

**Scenario Cost/Unit:** $0.11

**Cost Details:**

| Component Name | ID | Description | Unit | Cost | QTY | Total |
|---|---|---|---|---|---|---|
| **Equipment Installation** | | | | | | |
| Manure Hauling, solid manure, transportation | 2031 | Transportation cost of hauling solid manure. Trucking costs based on tons hauled times miles. Includes equipment, power unit and labor. Does not include costs for loading or unloading. | Ton-Mile | $0.11 | 3300 | $363.00 |

**Practice:** 324 - Deep Tillage

**Scenario** #1 - Deep Tillage less than 36 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 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 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, 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, but used to relieve compaction at depths less than 36 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 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::** Acre

**Scenario Typical Size:** 80

**Total Scenario Cost:** $1,691.28

**Scenario Cost/Unit:** $21.14

**Cost Details:**

| Component Name | ID | Description | Unit | Cost | QTY | Total |
|---|---|---|---|---|---|---|
| **Equipment Installation** | | | | | | |
| Truck, Pickup | 939 | Equipment and power unit costs. Labor not included. | Hour | $19.82 | 1 | $19.82 |
| Ripper or subsoiler, 16 to 36 inch depth | 1235 | Deep ripper or subsoiler, (16-36 inches depth) includes tillage implement, power unit and labor. | Acre | $18.13 | 80 | $1,450.40 |
| **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. | Hour | $18.93 | 2 | $37.86 |
| Specialist Labor | 235 | Labor requiring a specialized skill set: Includes Agronomists, Foresters, Biologists, etc. to provide additional technical information during the planning and implementation of the practice. Does not include NRCS or TSP services. | Hour | $91.60 | 2 | $183.20 |

**Practice:** 324 - Deep Tillage

**Scenario** #2 - Deep Tillage more than 36 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 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 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, 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 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, but used to relieve compaction at depths more than 3 feet. 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::** Acre

**Scenario Typical Size:** 80

**Total Scenario Cost:** $4,646.48

**Scenario Cost/Unit:** $58.08

**Cost Details:**

| Component Name | ID | Description | Unit | Cost | QTY | Total |
|---|---|---|---|---|---|---|
| **Equipment Installation** | | | | | | |
| Truck, Pickup | 939 | Equipment and power unit costs. Labor not included. | Hour | $19.82 | 1 | $19.82 |
| Ripper or subsoiler, > 36 inch depth | 1236 | Deep ripper or subsoiler, (>36 inches depth) includes tillage implement, power unit and labor. | Acre | $55.07 | 80 | $4,405.60 |
| **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. | Hour | $18.93 | 2 | $37.86 |
| Specialist Labor | 235 | Labor requiring a specialized skill set: Includes Agronomists, Foresters, Biologists, etc. to provide additional technical information during the planning and implementation of the practice. Does not include NRCS or TSP services. | Hour | $91.60 | 2 | $183.20 |

**Practice:** 325 - High Tunnel System

**Scenario** #17 - Contiguous US

**Scenario Description:**

Used for contiguous US states in areas with low snowfall. A Quonset style (rounded) manufactured frame of tubular steel (30 x 70 ft.) covered with 4-year 4 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 Quonset style high tunnel structure has been installed and the 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 Foot

**Scenario Typical Size:** 2160

**Total Scenario Cost:** $8,212.83

**Scenario Cost/Unit:** $3.80

**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. | Hour | $18.93 | 71 | $1,344.03 |
| **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 Foot | $3.18 | 2160 | $6,868.80 |

**Practice:** 325 - High Tunnel System

**Scenario** #18 - High Tunnel, Low Wind or Snow Load, Intensive Sun

**Scenario Description:**

Use in areas with low expected snow and wind loads. Quonset-style (round) manufactured frame of tubular steel (30 x 72 ft.) covered with 4-year 6 mil plastic. Because of extensive sun intensity, shade cloth is provided. Costs are based on purchase of manufactured kit and landowner installation of structure. Structure must be installed to manufacturer's specifications.Associated practices might include CPS Roof Runoff Structure (588), Underground Outlet (620), Critical Area Planting (342), Mulching (484)

**Before Situation:**

Cropland where extension of the growing season is needed. Primary resource concern addressed will be plant health and vigor. High sun intensity shortens growing season, or decreases crop quality.

**After Situation:**

High Tunnel structure has been installed and the growing season has been extended for 1-4 months on average. Shade cloth protects crops from high intensity of sun, allowing crop production and quality to continue into summer months. Plant health and vigor is improved.

**Feature Measure:** Area of Tunnel Installed

**Scenario Unit::** Square Foot

**Scenario Typical Size:** 2160

**Total Scenario Cost:** $9,296.03

**Scenario Cost/Unit:** $4.30

**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. | Hour | $18.93 | 71 | $1,344.03 |
| **Materials** | | | | | | |
| Hoop House, quonset style, with shade cloth | 2636 | Includes the framework complete with all predrilled steel, hardware and instructions. Includes 6 mil 4-year polyethylene film to cover tunnel, polylock for sides and ends, and knitted shade cloth for a quonset style (round top) hoop house in southern climates. Materials and shipping only, does not include labor. | Square Foot | $3.45 | 2160 | $7,452.00 |
| **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. | Dollar | $1.00 | 500 | $500.00 |

**Practice:** 327 - Conservation Cover

**Scenario** #1 - Grass

**Scenario Description:**

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

**Before Situation:**

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

**After Situation:**

Land covered with permanent non-native grass vegetation has reduced soil erosion, reduced water/sediment runoff, and significant dust emissions are eliminated therefore, air quality is improved. Plants sown for conservation cover may provide cover for beneficial insects and wildlife. This scenario does not apply to plantings for forage production or to critical area plantings.

**Feature Measure:** Area planted

**Scenario Unit::** Acre

**Scenario Typical Size:** 50

**Total Scenario Cost:** $10,723.00

**Scenario Cost/Unit:** $214.46

**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. | Acre | $10.14 | 100 | $1,014.00 |
| Chemical, ground application | 948 | Chemical application performed by ground equipment. Includes equipment, power unit and labor costs. | Acre | $5.58 | 50 | $279.00 |
| Fertilizer, ground application, dry bulk | 950 | Dry bulk fertilizer application performed by ground equipment. Includes equipment, power unit and labor costs. | Acre | $6.25 | 50 | $312.50 |
| Seeding Operation, No Till/Grass Drill | 960 | No Till drill or grass drill for seeding. Includes equipment, power unit and labor costs. | Acre | $19.43 | 50 | $971.50 |
| **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 | $0.75 | 2500 | $1,875.00 |
| 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 | $0.54 | 2500 | $1,350.00 |
| Potassium, K2O | 74 | K2O supplied by Muriate Of Potash. Price is not per pound of total product applied, no conversion is needed. | Pound | $0.46 | 2000 | $920.00 |
| 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. | Acre | $15.93 | 50 | $796.50 |
| One Species, Warm Season, Introduced Perennial Grass (seed or sprigs) | 2323 | Introduced, warm season perennial grass seed or sprig. Includes material and shipping only. | Acre | $64.09 | 50 | $3,204.50 |

**Practice:** 327 - Conservation Cover

**Scenario** #2 - Native Grass

**Scenario Description:**

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

**Before Situation:**

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

**After Situation:**

Land covered with permanent native grass vegetation has reduced soil erosion, reduced water/sediment runoff, and significant dust emissions are eliminated therefore, air quality is improved. Plants sown for conservation cover may provide cover for beneficial insects and wildlife. This scenario does not apply to plantings for forage production or to critical area plantings.

**Feature Measure:** Area planted

**Scenario Unit::** Acre

**Scenario Typical Size:** 50

**Total Scenario Cost:** $7,968.50

**Scenario Cost/Unit:** $159.37

**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. | Acre | $10.14 | 50 | $507.00 |
| Chemical, ground application | 948 | Chemical application performed by ground equipment. Includes equipment, power unit and labor costs. | Acre | $5.58 | 50 | $279.00 |
| Mechanical weed control, Vegetation termination | 957 | Mechanical operations, Includes: Roller/crimper, mower, shredder, etc. Includes equipment, power unit and labor costs. | Acre | $18.68 | 100 | $1,868.00 |
| Seeding Operation, No Till/Grass Drill | 960 | No Till drill or grass drill for seeding. Includes equipment, power unit and labor costs. | Acre | $19.43 | 50 | $971.50 |
| **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. | Acre | $15.93 | 50 | $796.50 |
| One Species, Warm Season, Native Perennial Grass | 2322 | Native, warm season perennial grass. Includes material and shipping only. | Acre | $70.93 | 50 | $3,546.50 |

**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 habitit, manage plant pests, and reduce air quality impacts. 60% conservation cover per acre is typical.

**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. 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 long periods of bare soil. Little to no wildlife/pollinator habitat present.

**After Situation:**

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 significant dust emissions are eliminated therefore, air quality is improved. Plants sown for conservation cover may provide cover for beneficial insects, pollinators, and wildlife.

**Feature Measure:** Area planted

**Scenario Unit::** Acre

**Scenario Typical Size:** 20

**Total Scenario Cost:** $2,067.36

**Scenario Cost/Unit:** $103.37

**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. | Acre | $10.14 | 24 | $243.36 |
| Fertilizer, ground application, dry bulk | 950 | Dry bulk fertilizer application performed by ground equipment. Includes equipment, power unit and labor costs. | Acre | $6.25 | 12 | $75.00 |
| Mechanical weed control, Vegetation termination | 957 | Mechanical operations, Includes: Roller/crimper, mower, shredder, etc. Includes equipment, power unit and labor costs. | Acre | $18.68 | 12 | $224.16 |
| Seeding Operation, No Till/Grass Drill | 960 | No Till drill or grass drill for seeding. Includes equipment, power unit and labor costs. | Acre | $19.43 | 12 | $233.16 |
| **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 | $0.75 | 600 | $450.00 |
| 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 | $0.54 | 600 | $324.00 |
| Potassium, K2O | 74 | K2O supplied by Muriate Of Potash. Price is not per pound of total product applied, no conversion is needed. | Pound | $0.46 | 480 | $220.80 |
| Four Species Mix, Cool Season, Introduced Perennial Grass | 2318 | Introduced, cool season perennial grass. Includes material and shipping only. | Acre | $24.74 | 12 | $296.88 |

**Practice:** 327 - Conservation Cover

**Scenario** #4 - Pollinator Habitat

**Scenario Description:**

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

**Before Situation:**

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

**After Situation:**

Land covered with permanent pollinator habitat including a mix of native grasses, legume, forbs (mix may also include non-native species). This practice may also have reduced soil erosion, reduced water/sediment runoff, and significant dust emissions are eliminated therefore, air quality is improved. Plants sown for pollinator habitat may also provide cover for beneficial insects and wildlife. This scenario does not apply to critical area plantings.

**Feature Measure:** Area planted

**Scenario Unit::** Acre

**Scenario Typical Size:** 1

**Total Scenario Cost:** $392.75

**Scenario Cost/Unit:** $392.75

**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. | Acre | $10.14 | 1 | $10.14 |
| Chemical, ground application | 948 | Chemical application performed by ground equipment. Includes equipment, power unit and labor costs. | Acre | $5.58 | 3 | $16.74 |
| Mechanical weed control, Vegetation termination | 957 | Mechanical operations, Includes: Roller/crimper, mower, shredder, etc. Includes equipment, power unit and labor costs. | Acre | $18.68 | 2 | $37.36 |
| Seeding Operation, No Till/Grass Drill | 960 | No Till drill or grass drill for seeding. Includes equipment, power unit and labor costs. | Acre | $19.43 | 1 | $19.43 |
| **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. | Acre | $15.93 | 3 | $47.79 |
| Native Grass and Forb Mix, for Wildlife (including pollinators) or Ecosystem Restoration | 2335 | Native grass and forb/legume mix, including specialized species. Includes material and shipping only. | Acre | $261.29 | 1 | $261.29 |

**Practice:** 327 - Conservation Cover

**Scenario** #5 - Organic Introduced Mix

**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 habitit, 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. Soil erosion occurs with visible rills present, sediment may be moving offsite into surface water degrading water quality. Soil quality (soil organic matter) declines over time as a result of tillage practices, low residue, and long periods of bare soil. Air quality may be impacted during field operations by the creation of particulates. The system provides little to no wildlife habitat.

**After Situation:**

Organically managed land covered with permanent non-native grass/legume mix vegetation has reduced soil erosion, reduced water/sediment runoff, and significant dust emissions are eliminated therefore, air quality is improved. Plants sown for conservation cover may provide cover for beneficial insects and wildlife. This scenario does not apply to plantings for forage production or to critical area plantings.

**Feature Measure:** Area planted

**Scenario Unit::** Acre

**Scenario Typical Size:** 20

**Total Scenario Cost:** $3,961.60

**Scenario Cost/Unit:** $198.08

**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. | Acre | $10.14 | 60 | $608.40 |
| Fertilizer, ground application, dry bulk | 950 | Dry bulk fertilizer application performed by ground equipment. Includes equipment, power unit and labor costs. | Acre | $6.25 | 20 | $125.00 |
| Mechanical weed control, Vegetation termination | 957 | Mechanical operations, Includes: Roller/crimper, mower, shredder, etc. Includes equipment, power unit and labor costs. | Acre | $18.68 | 40 | $747.20 |
| Seeding Operation, No Till/Grass Drill | 960 | No Till drill or grass drill for seeding. Includes equipment, power unit and labor costs. | Acre | $19.43 | 20 | $388.60 |
| **Materials** | | | | | | |
| Nitrogen, Organic | 266 | ORGANIC Nitrogen | Pound | $0.25 | 1000 | $250.00 |
| Phosphorus, Organic | 267 | ORGANIC Phosphorus | Pound | $0.25 | 1000 | $250.00 |
| Potassium, Organic | 268 | ORGANIC Potassium | Pound | $0.25 | 800 | $200.00 |
| Certified Organic, Three Species Mix, Cool Season, Perennial Grasses and Legumes | 2340 | Certified organic cool season perennial grass and legume mix. Includes material and shipping only. | Acre | $69.62 | 20 | $1,392.40 |

**Practice:** 327 - Conservation Cover

**Scenario** #6 - Organic Native Mix

**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 native vegetation (scenario includes 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 habitit, and reduce air quality impacts. *Certified Organic Native Seed is typically NOT available, therefore non-organic seed components were used.

**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. Soil erosion occurs with visible rills present, sediment may be moving offsite into surface water degrading water quality. Soil quality (soil organic matter) declines over time as a result of tillage practices, low residue, and long periods of bare soil. Air quality may be impacted during field operations by the creation of particulates. The system provides little to no wildlife habitat.

**After Situation:**

Organically manage land covered with permanent native grass/legume mix vegetation has reduced soil erosion, reduced water/sediment runoff, and significant dust emissions are eliminated therefore, air quality is improved. Plants sown for conservation cover may provide cover for beneficial insects and wildlife. This scenario does not apply to plantings for forage production or to critical area plantings.

**Feature Measure:** Area planted

**Scenario Unit::** Acre

**Scenario Typical Size:** 20

**Total Scenario Cost:** $3,510.20

**Scenario Cost/Unit:** $175.51

**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. | Acre | $10.14 | 60 | $608.40 |
| Mechanical weed control, Vegetation termination | 957 | Mechanical operations, Includes: Roller/crimper, mower, shredder, etc. Includes equipment, power unit and labor costs. | Acre | $18.68 | 60 | $1,120.80 |
| Seeding Operation, No Till/Grass Drill | 960 | No Till drill or grass drill for seeding. Includes equipment, power unit and labor costs. | Acre | $19.43 | 20 | $388.60 |
| **Materials** | | | | | | |
| Certified Organic, Three Species Mix, Cool Season, Perennial Grasses and Legumes | 2340 | Certified organic cool season perennial grass and legume mix. Includes material and shipping only. | Acre | $69.62 | 20 | $1,392.40 |

**Practice:** 327 - Conservation Cover

**Scenario** #7 - Organic Pollinator Habitat

**Scenario Description:**

Permanent vegetation, including mix of native grasses, legume, forbs (mix may also include non-native species), established on organically managed 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. *Certified Organic Native Seed is typically NOT available, therefore non-organic seed components were used.

**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. Soil erosion occurs with visible rills present, sediment may be moving offsite into surface water degrading water quality. Soil quality (soil organic matter) declines over time as a result of tillage practices, low residue, and long periods of bare soil. Air quality may be impacted during field operations by the creation of particulates. The system provides little to no wildlife or pollinator habitat.

**After Situation:**

Organically managed land covered with permanent pollinator habitat including a mix of native grasses, legume, forbs (mix may also include non-native species). This practice may also have reduced soil erosion, reduced water/sediment runoff, and significant dust emissions are eliminated therefore, air quality is improved. Plants sown for pollinator habitat may also provide cover for beneficial insects and wildlife. This scenario does not apply to critical area plantings.

**Feature Measure:** Area planted

**Scenario Unit::** Acre

**Scenario Typical Size:** 1

**Total Scenario Cost:** $367.18

**Scenario Cost/Unit:** $367.18

**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. | Acre | $10.14 | 3 | $30.42 |
| Mechanical weed control, Vegetation termination | 957 | Mechanical operations, Includes: Roller/crimper, mower, shredder, etc. Includes equipment, power unit and labor costs. | Acre | $18.68 | 3 | $56.04 |
| Seeding Operation, No Till/Grass Drill | 960 | No Till drill or grass drill for seeding. Includes equipment, power unit and labor costs. | Acre | $19.43 | 1 | $19.43 |
| **Materials** | | | | | | |
| Native Grass and Forb Mix, for Wildlife (including pollinators) or Ecosystem Restoration | 2335 | Native grass and forb/legume mix, including specialized species. Includes material and shipping only. | Acre | $261.29 | 1 | $261.29 |

**Practice:** 327 - Conservation Cover

**Scenario** #9 - Native Grass with Forgone Income

**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 habitit, and reduce air quality impacts.

**Before Situation:**

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

**After Situation:**

Land covered with permanent native grass vegetation has reduced soil erosion, reduced water/sediment runoff, and significant dust emissions are eliminated therefore, air quality is improved. Plants sown for conservation cover may provide cover for beneficial insects and wildlife. This scenario does not apply to plantings for forage production or to critical area plantings.

**Feature Measure:** Area planted

**Scenario Unit::** Acre

**Scenario Typical Size:** 50

**Total Scenario Cost:** $21,054.38

**Scenario Cost/Unit:** $421.09

**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. | Acre | $10.14 | 50 | $507.00 |
| Chemical, ground application | 948 | Chemical application performed by ground equipment. Includes equipment, power unit and labor costs. | Acre | $5.58 | 50 | $279.00 |
| Mechanical weed control, Vegetation termination | 957 | Mechanical operations, Includes: Roller/crimper, mower, shredder, etc. Includes equipment, power unit and labor costs. | Acre | $18.68 | 100 | $1,868.00 |
| Seeding Operation, No Till/Grass Drill | 960 | No Till drill or grass drill for seeding. Includes equipment, power unit and labor costs. | Acre | $19.43 | 50 | $971.50 |
| **Foregone Income** | | | | | | |
| FI, Soybeans Dryland | 1961 | Dryland Soybeans is Primary Crop | Acre | $211.75 | 12.5 | $2,646.88 |
| FI, Cotton Dryland | 1967 | Dryland Cotton is Primary Crop | Acre | $156.16 | 12.5 | $1,952.00 |
| FI, Sorghum Dryland | 1971 | Dryland Sorghum is Primary Crop | Acre | $109.67 | 12.5 | $1,370.88 |
| FI, Rice | 1974 | Rice is Primary Crop | Acre | $569.29 | 12.5 | $7,116.13 |
| **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. | Acre | $15.93 | 50 | $796.50 |
| One Species, Warm Season, Native Perennial Grass | 2322 | Native, warm season perennial grass. Includes material and shipping only. | Acre | $70.93 | 50 | $3,546.50 |

**Practice:** 327 - Conservation Cover

**Scenario** #14 - Interseeding Native Plants

**Scenario Description:**

This practice scenario typically involves interseeding native grasses, legumes, and/or forbs into an existing native plant stand to increase diversity. The typical size of the practice is 20 acres. Increased plant diversity will improve wildlife habitat, pollinator habitat, and overall soil health.

**Before Situation:**

The site has an established native plant cover. Typically, little diversity exists in the plant community, with 1-2 grass species dominating the stand. Wildlife populations are healthy, some pollinator habitat is being provided, and soil health is improving.

**After Situation:**

With the introduction of additional native plant species, wildlife populations improve considerably, pollinator habitat is improved and exists for a longer period of time, and soil health improves at a faster pace.

**Feature Measure:** Area Planted

**Scenario Unit::** Acre

**Scenario Typical Size:** 20

**Total Scenario Cost:** $630.83

**Scenario Cost/Unit:** $31.54

**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. | Acre | $19.43 | 1 | $19.43 |
| **Materials** | | | | | | |
| Three Species Mix, Warm Season, Annual Grasses and Legumes | 2326 | Warm season annual grass and legume mix. Includes material and shipping only. | Acre | $61.14 | 10 | $611.40 |

**Practice:** 328 - Conservation Crop Rotation

**Scenario** #1 - Standard Rotation

**Scenario Description:**

In this region this practice may be part of a conservation management system 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 acquire the technical knowledge and skills necessary to effectively implement a conservation crop rotation on a typical 100 ac cropland farm. No foregone income. Cost represents typical situations for conventional (non-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 establish that provides additional high residue and/or perennial crops that reduce erosion, improve soil quality, and break pest cycles.

**Feature Measure:** Area planted

**Scenario Unit::** Acre

**Scenario Typical Size:** 100

**Total Scenario Cost:** $1,371.60

**Scenario Cost/Unit:** $13.72

**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. | Hour | $34.29 | 40 | $1,371.60 |

**Practice:** 328 - Conservation Crop Rotation

**Scenario** #2 - Irrigated to Dryland Rotation

**Scenario Description:**

In this region this practice may be part of a conservation management system to primarily convert from an irrigated cropping system to dryland farming. In addition to improving water use efficiency the rotation may 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 acquire the technical knowledge and skills necessary to effectively implement a conservation crop rotation on a typical 200 cropland farm. There is foregone income involved with this conversion from irrigated to dryland farming due to lower yields and net return. Cost represents typical situations for conventional (non-organic) producers converting from irrigated cropping to dryland farming.

**Before Situation:**

This rotation consisted of growing row crop grains that received a significant (more than half) of the required water via irrigation. The water demands are impacting the area's water availability. Erosion, soil condition, and future water availability are the major concerns.

**After Situation:**

The dryland rotation, using the same crops or a rotation that grows crops over different periods, will be part of a management system capable of utilizing available rainfall and soil moisture more efficiently and controling wind and water erosion. Corn yields will be expected to be reduced from 150 to 80 bu/acre.

**Feature Measure:** Area planted

**Scenario Unit::** Acre

**Scenario Typical Size:** 200

**Total Scenario Cost:** $19,913.70

**Scenario Cost/Unit:** $99.57

**Cost Details:**

| Component Name | ID | Description | Unit | Cost | QTY | Total |
|---|---|---|---|---|---|---|
| **Foregone Income** | | | | | | |
| FI, Corn Irrigated | 1960 | Irrigated Corn is Primary Crop | Acre | $522.93 | 33 | $17,256.69 |
| FI, Soybeans Dryland | 1961 | Dryland Soybeans is Primary Crop | Acre | $211.75 | -33 | ($6,987.75) |
| FI, Soybeans Irrigated | 1962 | Irrigated Soybeans is Primary Crop | Acre | $261.53 | 33 | $8,630.49 |
| FI, Cotton Dryland | 1967 | Dryland Cotton is Primary Crop | Acre | $156.16 | -34 | ($5,309.44) |
| FI, Cotton Irrigated | 1968 | Irrigated Cotton is Primary Crop | Acre | $262.18 | 34 | $8,914.12 |
| FI, Sorghum Dryland | 1971 | Dryland Sorghum is Primary Crop | Acre | $109.67 | -33 | ($3,619.11) |
| **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. | Hour | $34.29 | 30 | $1,028.70 |

**Practice:** 328 - Conservation Crop Rotation

**Scenario** #3 - Organic Rotation

**Scenario Description:**

Scenario Description: In this region this practice may be part of a conservation management system 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 acquire the technical knowledge and skills necessary to effectively implement a conservation crop rotation on a typical 100 cropland farm. No foregone income. Cost represents typical situations for organic producers.

**Before Situation:**

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

**After Situation:**

The rotation established transitions the rotation from a conventional system to an organic system. The rotation is planned that compliments erosion control, nutrient cycling, soil organic matter, and pest management via crop rotation.

**Feature Measure:** Area planted

**Scenario Unit::** Acre

**Scenario Typical Size:** 100

**Total Scenario Cost:** $1,371.60

**Scenario Cost/Unit:** $13.72

**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. | Hour | $34.29 | 40 | $1,371.60 |

**Practice:** 328 - Conservation Crop Rotation

**Scenario** #4 - Specialty Crops

**Scenario Description:**

In this region a rotation of specialty crops (fruits and vegetable) are produced as part of a conservation management system to: 1) Reduce sheet, rill plant pest pressures,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 conventional (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 reduce erosion, improve soil quality, and break pest cycles. 1) Reduce sheet, rill plant pest pressures,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::** Acre

**Scenario Typical Size:** 50

**Total Scenario Cost:** $1,714.50

**Scenario Cost/Unit:** $34.29

**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. | Hour | $34.29 | 50 | $1,714.50 |

**Practice:** 328 - Conservation Crop Rotation

**Scenario** #5 - Organic Specialty Crops

**Scenario Description:**

In this region a rotation of specialty crops (fruits and vegetable) are produced as part of a conservation management system to: In this region a rotation of specialty crops (fruits and vegetable) are produced as part of a conservation management system 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 acquire the technical knowledge and skills necessary to effectively implement a conservation crop rotation on a typical 4 acre specialty crop farm. No foregone income. Cost represents typical situations for 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 reduce erosion, improve soil quality, and break pest cycles. And 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::** Acre

**Scenario Typical Size:** 4

**Total Scenario Cost:** $2,743.20

**Scenario Cost/Unit:** $685.80

**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. | Hour | $34.29 | 80 | $2,743.20 |

**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 (conservation tilled) system on 100 acres of cropland. This involves managing the amount, orientation and distribution of crop and other plant residue on the soil surface year round while limiting soil-disturbing activities used to grow and harvest crops in systems. The practice is used to reduce sheet and rill erosion, reduce wind erosion, improve soil quality, reduce CO2 losses from the soil, reduce energy use, increase plant available moisture and provide food and escape cover for wildlife. The no-till/strip-till system includes chemical weed control (rather than cultivation) and may also include a period of chemical fallow. System is applicable in both irrigated and non-irrigated fields.

**Before Situation:**

Row crops or small grains are grown and harvested. Full width tillage is performed prior to planting and weed control during crop production is typically cultivation and chemical application. Fields are disked immediately following harvest, with additional operations in some fields to facilitate drainage or additional weed control. Residue amounts after tillage operations average 10% or less, resulting in bare soil being exposed to wind erosion and/or intense rainfall during the fall, winter, and early spring. Any crop residue that is present degrades and sediment/nutrient runoff from fields increases during rainfall events. Sheet and rill erosion occurs with visible rills by spring. Soil health (soil organic matter) declines over time as a result of tillage practices, low residue, and long periods of bare soil. This system will typically have a negative Soil Conditioning Index (SCI) and a high Soil Tillage Intensity Rating (STIR).

**After Situation:**

Managing crop residue on the surface of a field (typical 100 acre) year around according to the 329 practice plan while limiting soil disturbing activities to those which place nutrients, and plant crops that meet the minimum criteria in the 329 practice standard. All crops are seeded/planted with a no-till drill or no-till/strip-till planter, which minimizes soil disturbance while establishing good seed-soil contact. All residues are to be maintained on the soil surface in a uniform distribution over the entire field and not burned or removed. Crop residues provide soil surface cover throughout the year. Runoff and erosion are reduced and no rills are visible on the soil surface. Wind erosion is reduced by standing residues and surface cover. Over time, soil health is improved due to the additional biomass (crop residues), ground cover, and soil infiltration. Crop residues and/or cover crop residues left on the soil surface may maximize weed control by increasing allelopathic and mulching effect, and provides cover for wildlife. The practice would require reducing soil disturbance and erosion and increasing biomass returned to the soil in sufficient amounts to achieve increased SCI and decreased STIR.

**Feature Measure:** Area planted

**Scenario Unit::** Acre

**Scenario Typical Size:** 100

**Total Scenario Cost:** $1,829.00

**Scenario Cost/Unit:** $18.29

**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. | Acre | $19.43 | 50 | $971.50 |
| Seeding Operation, No Till/Strip Till Planter | 1230 | No Till/Strip Till row planters for seeding. Includes all costs for equipment, power unit, and labor. | Acre | $17.15 | 50 | $857.50 |

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

**Scenario** #3 - No Till Adaptive Management

**Scenario Description:**

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

**Before Situation:**

Row crops or small grains are grown and harvested. Full width tillage is performed prior to planting and weed control during crop production is typically cultivation and chemical application. Fields are disked immediately following harvest, with additional operations in some fields to facilitate drainage or additional weed control. Residue amounts after tillage operations average 10% or less, resulting in bare soil being exposed to wind erosion and/or intense rainfall during the fall, winter, and early spring. Any crop residue that is present degrades and sediment/nutrient runoff from fields increases during rainfall events. Sheet and rill erosion occurs with visible rills by spring. Soil health (soil organic matter) declines over time as a result of tillage practices, low residue, and long periods of bare soil. This system will typically have a negative Soil Conditioning Index (SCI) and a high Soil Tillage Intensity Rating (STIR). The producer is considering using no till technology, but is unsure how to manage on their operation or needs to improve the management of no till to be successful.

**After Situation:**

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

**Feature Measure:** <Unknown>

**Scenario Unit::** Acre

**Scenario Typical Size:** 10

**Total Scenario Cost:** $3,498.80

**Scenario Cost/Unit:** $349.88

**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. | Acre | $19.43 | 5 | $97.15 |
| Seeding Operation, No Till/Strip Till Planter | 1230 | No Till/Strip Till row planters for seeding. Includes all costs for equipment, power unit, and labor. | Acre | $17.15 | 5 | $85.75 |
| **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. | Hour | $18.93 | 30 | $567.90 |
| 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. | Hour | $91.60 | 30 | $2,748.00 |

**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 implementing and following contour farming 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 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 parallel to the slope. This row arrangement usually results in longer rows with less time used for turning. Annual erosion rates for the rotation exceeds tolerance levels. Excessive runoff leads to sedimentation of waterways.. .

**After Situation:**

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 operator is properly following contour methods. Soil erosion rates are reduced by nearly half and may be below tolerance depending on the rotation. Likewise, sedimentation has be significantly reduced.

**Feature Measure:** acre

**Scenario Unit::** Acre

**Scenario Typical Size:** 30

**Total Scenario Cost:** $228.39

**Scenario Cost/Unit:** $7.61

**Cost Details:**

| Component Name | ID | Description | Unit | Cost | QTY | Total |
|---|---|---|---|---|---|---|
| **Equipment Installation** | | | | | | |
| Truck, Pickup | 939 | Equipment and power unit costs. Labor not included. | Hour | $19.82 | 1 | $19.82 |
| **Labor** | | | | | | |
| Equipment Operators, Light | 232 | Includes: Skid Steer Loaders, Hydraulic Excavators <50 HP, Trenchers <12", Ag Equipment <150 HP, Pickup Trucks, Forklifts, Mulchers | Hour | $21.14 | 5 | $105.70 |
| 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. | Hour | $34.29 | 3 | $102.87 |

**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:**

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. 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 operator is 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::** Acre

**Scenario Typical Size:** 10

**Total Scenario Cost:** $228.39

**Scenario Cost/Unit:** $22.84

**Cost Details:**

| Component Name | ID | Description | Unit | Cost | QTY | Total |
|---|---|---|---|---|---|---|
| **Equipment Installation** | | | | | | |
| Truck, Pickup | 939 | Equipment and power unit costs. Labor not included. | Hour | $19.82 | 1 | $19.82 |
| **Labor** | | | | | | |
| Equipment Operators, Light | 232 | Includes: Skid Steer Loaders, Hydraulic Excavators <50 HP, Trenchers <12", Ag Equipment <150 HP, Pickup Trucks, Forklifts, Mulchers | Hour | $21.14 | 5 | $105.70 |
| 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. | Hour | $34.29 | 3 | $102.87 |

**Practice:** 332 - Contour Buffer Strips

**Scenario** #1 - 332-Native, Inc Forgone

**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.

**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 potenially 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 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 charactaristics necessary to control water erosion to tolerable levels in the cropped area of the field.

**Feature Measure:** number of acres

**Scenario Unit::** Acre

**Scenario Typical Size:** 1

**Total Scenario Cost:** $482.73

**Scenario Cost/Unit:** $482.73

**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. | Acre | $5.58 | 1 | $5.58 |
| Seeding Operation, No Till/Grass Drill | 960 | No Till drill or grass drill for seeding. Includes equipment, power unit and labor costs. | Acre | $19.43 | 1 | $19.43 |
| **Foregone Income** | | | | | | |
| FI, Corn Dryland | 1959 | Dryland Corn is Primary Crop | Acre | $405.66 | 0.25 | $101.42 |
| FI, Soybeans Dryland | 1961 | Dryland Soybeans is Primary Crop | Acre | $211.75 | 0.25 | $52.94 |
| FI, Cotton Dryland | 1967 | Dryland Cotton is Primary Crop | Acre | $156.16 | 0.25 | $39.04 |
| FI, Sorghum Dryland | 1971 | Dryland Sorghum is Primary Crop | Acre | $109.67 | 0.25 | $27.42 |
| **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. | Acre | $15.93 | 1 | $15.93 |
| Three plus Species Mix, Warm Season, Native Perennial | 2327 | Native, warm season perennial grass. Includes material and shipping only. | Acre | $220.98 | 1 | $220.98 |

**Practice:** 332 - Contour Buffer Strips

**Scenario** #2 - 332-Introduced, Inc Forgone

**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 contour buffer strips is taken out of production.

**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 potenially 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 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 charactaristics necessary to control water erosion to tolerable levels in the cropped area of the field.

**Feature Measure:** Number of acres

**Scenario Unit::** Acre

**Scenario Typical Size:** 1

**Total Scenario Cost:** $411.54

**Scenario Cost/Unit:** $411.54

**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. | Acre | $5.58 | 1 | $5.58 |
| Seeding Operation, No Till/Grass Drill | 960 | No Till drill or grass drill for seeding. Includes equipment, power unit and labor costs. | Acre | $19.43 | 1 | $19.43 |
| **Foregone Income** | | | | | | |
| FI, Corn Dryland | 1959 | Dryland Corn is Primary Crop | Acre | $405.66 | 0.25 | $101.42 |
| FI, Soybeans Dryland | 1961 | Dryland Soybeans is Primary Crop | Acre | $211.75 | 0.25 | $52.94 |
| FI, Cotton Dryland | 1967 | Dryland Cotton is Primary Crop | Acre | $156.16 | 0.25 | $39.04 |
| FI, Sorghum Dryland | 1971 | Dryland Sorghum is Primary Crop | Acre | $109.67 | 0.25 | $27.42 |
| **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 | $0.54 | 30 | $16.20 |
| 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 | $0.54 | 50 | $27.00 |
| Sulfate of Potash | 263 | Approved for Organic Systems - Muriate of Potash | Pound | $0.85 | 50 | $42.50 |
| 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. | Acre | $15.93 | 1 | $15.93 |
| One Species, Warm Season, Introduced Perennial Grass (seed or sprigs) | 2323 | Introduced, warm season perennial grass seed or sprig. Includes material and shipping only. | Acre | $64.09 | 1 | $64.09 |

**Practice:** 332 - Contour Buffer Strips

**Scenario** #3 - 332-Wildlife/Pollinator, Inc Forgone

**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:**

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 potenially 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 water erosion resource needs AND provide the targeted wildlife/pollinators the necessary food and/or cover AND any other 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 site; not function as a host for diseases of a field crop and; have physical charactaristics necessary to control sheet and rill erosion to tolerable levels on the cropped area of the field.

**Feature Measure:** Number of acres

**Scenario Unit::** Acre

**Scenario Typical Size:** 1

**Total Scenario Cost:** $361.40

**Scenario Cost/Unit:** $361.40

**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. | Acre | $5.58 | 1 | $5.58 |
| Seeding Operation, No Till/Grass Drill | 960 | No Till drill or grass drill for seeding. Includes equipment, power unit and labor costs. | Acre | $19.43 | 1 | $19.43 |
| **Foregone Income** | | | | | | |
| FI, Corn Dryland | 1959 | Dryland Corn is Primary Crop | Acre | $405.66 | 0.25 | $101.42 |
| FI, Soybeans Dryland | 1961 | Dryland Soybeans is Primary Crop | Acre | $211.75 | 0.25 | $52.94 |
| FI, Cotton Dryland | 1967 | Dryland Cotton is Primary Crop | Acre | $156.16 | 0.25 | $39.04 |
| FI, Sorghum Dryland | 1971 | Dryland Sorghum is Primary Crop | Acre | $109.67 | 0.25 | $27.42 |
| **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 | $0.54 | 50 | $27.00 |
| Potassium, K2O | 74 | K2O supplied by Muriate Of Potash. Price is not per pound of total product applied, no conversion is needed. | Pound | $0.46 | 50 | $23.00 |
| 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. | Acre | $15.93 | 1 | $15.93 |
| Four Species Mix, Cool Season, Introduced Perennial (2 grasses, 2 legumes) | 2317 | Cool season grass and legume mix. Includes material and shipping only. | Acre | $49.65 | 1 | $49.65 |

**Practice:** 332 - Contour Buffer Strips

**Scenario** #4 - 332-Organic Seed, Inc Forgone

**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 certified organic seed. The area of the field border is taken out of production.

**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 potenially 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:**

Certified organic grass and legume seed will be planted in strips in the field to meet the resource needs and producer objectives. Minimum widths shall be based on NRCS local design criteria specific to the purpose for installing the practice. Species shall be selected that do not function as a host for diseases of a field crop and have physical charactaristics necessary to control water erosion to tolerable levels in the cropped area of the field.

**Feature Measure:** Number of Acres

**Scenario Unit::** Acre

**Scenario Typical Size:** 1

**Total Scenario Cost:** $465.35

**Scenario Cost/Unit:** $465.35

**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. | Acre | $64.13 | 1 | $64.13 |
| Tillage, Primary | 946 | Includes heavy disking (offset) or chisel plow. Includes equipment, power unit and labor costs. | Acre | $15.10 | 1 | $15.10 |
| Seeding Operation, No Till/Grass Drill | 960 | No Till drill or grass drill for seeding. Includes equipment, power unit and labor costs. | Acre | $19.43 | 1 | $19.43 |
| **Foregone Income** | | | | | | |
| FI, Organic, Corn Dryland | 2232 | Organic Dryland Corn is Primary Crop | Acre | $471.34 | 0.25 | $117.84 |
| FI, Organic, Soybeans Dryland | 2234 | Organic Dryland Soybeans is Primary Crop | Acre | $260.12 | 0.25 | $65.03 |
| FI, Organic, Cotton Dryland | 2240 | Organic Dryland Cotton is Primary Crop | Acre | $209.00 | 0.25 | $52.25 |
| FI, Organic, Sorghum Dryland | 2244 | Organic Dryland Sorghum is Primary Crop | Acre | $117.80 | 0.25 | $29.45 |
| **Materials** | | | | | | |
| Nitrogen, Organic | 266 | ORGANIC Nitrogen | Pound | $0.25 | 30 | $7.50 |
| Phosphorus, Organic | 267 | ORGANIC Phosphorus | Pound | $0.25 | 50 | $12.50 |
| Potassium, Organic | 268 | ORGANIC Potassium | Pound | $0.25 | 50 | $12.50 |
| Certified Organic, Three Species Mix, Cool Season, Perennial Grasses and Legumes | 2340 | Certified organic cool season perennial grass and legume mix. Includes material and shipping only. | Acre | $69.62 | 1 | $69.62 |

**Practice:** 338 - Prescribed Burning

**Scenario** #1 - Herbaceous

**Scenario Description:**

Applying a prescribed burn according to designed burn plan and NRCS Prescribed Burning (338) standard and specifications in order to safely control undesirable species, improve wildlife habitat, improve plant productivity and/or quality, facilitate grazing distribution and maintain ecological processes for native warm season grasses. This scenario is based on a burn area under the following conditions: herbaceous cover, not woody.

**Before Situation:**

Desirable plant composition is lacking due to reduced plant vigor and/or invasive species.

**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::** Acre

**Scenario Typical Size:** 80

**Total Scenario Cost:** $2,589.26

**Scenario Cost/Unit:** $32.37

**Cost Details:**

| Component Name | ID | Description | Unit | Cost | QTY | Total |
|---|---|---|---|---|---|---|
| **Equipment Installation** | | | | | | |
| Truck, Pickup | 939 | Equipment and power unit costs. Labor not included. | Hour | $19.82 | 16 | $317.12 |
| All terrain vehicles, ATV | 965 | Includes equipment, power unit and labor costs. | Hour | $29.73 | 16 | $475.68 |
| Water tank, portable | 1602 | Portable water tank transported in a pick up truck. Typically with 200 gallon capacity includes tank with pump, hose and sprayer. Does not include the pickup truck. Equipment only. | Hour | $2.20 | 8 | $17.60 |
| **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. | Hour | $25.08 | 24 | $601.92 |
| 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. | Hour | $34.29 | 8 | $274.32 |
| Specialist Labor | 235 | Labor requiring a specialized skill set: Includes Agronomists, Foresters, Biologists, etc. to provide additional technical information during the planning and implementation of the practice. Does not include NRCS or TSP services. | Hour | $91.60 | 8 | $732.80 |
| **Materials** | | | | | | |
| Fuel, ignition fuel mixture | 1596 | Mixture of gasoline and diesel for ignition of prescribed burns. Materials only. | Gallon | $4.13 | 10 | $41.30 |
| **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 | $64.26 | 2 | $128.52 |

**Practice:** 338 - Prescribed Burning

**Scenario** #2 - Forest Light

**Scenario Description:**

Write site specific burn plan and apply a prescribed burn according to this designed burn plan and NRCS Prescribed Burning (338) standard and specifications. Typically this will not be the first burn to occur on the site. This prescribed burn will safely consume small debris, herbaceous material and/or leaf litter.

**Before Situation:**

A primary burn has occurred within the last 5 years. Site has accumulation of small debris, herbaceous material and/or leaf litter. Typically this occurs in a open forest stand.

**After Situation:**

Litter, small debris and slash are consumed; small seedlings may be killed. Residual larger trees have little to no scorching. Post treatment fire danger is significantly reduced with increased herbaceous material rejuvenated for wildlife and erosion control.

**Feature Measure:** Acres planned

**Scenario Unit::** Acre

**Scenario Typical Size:** 80

**Total Scenario Cost:** $3,331.71

**Scenario Cost/Unit:** $41.65

**Cost Details:**

| Component Name | ID | Description | Unit | Cost | QTY | Total |
|---|---|---|---|---|---|---|
| **Equipment Installation** | | | | | | |
| Truck, Pickup | 939 | Equipment and power unit costs. Labor not included. | Hour | $19.82 | 16 | $317.12 |
| All terrain vehicles, ATV | 965 | Includes equipment, power unit and labor costs. | Hour | $29.73 | 16 | $475.68 |
| Water tank, portable | 1602 | Portable water tank transported in a pick up truck. Typically with 200 gallon capacity includes tank with pump, hose and sprayer. Does not include the pickup truck. Equipment only. | Hour | $2.20 | 16 | $35.20 |
| **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. | Hour | $25.08 | 32 | $802.56 |
| 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. | Hour | $34.29 | 12 | $411.48 |
| 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. | Hour | $91.60 | 12 | $1,099.20 |
| **Materials** | | | | | | |
| Fuel, ignition fuel mixture | 1596 | Mixture of gasoline and diesel for ignition of prescribed burns. Materials only. | Gallon | $4.13 | 15 | $61.95 |
| **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 | $64.26 | 2 | $128.52 |

**Practice:** 338 - Prescribed Burning

**Scenario** #3 - Forest Heavy

**Scenario Description:**

Write site specific burn plan and apply a prescribed burn according to this designed burn plan and NRCS Prescribed Burning (338) standard and specifications in order to safely control undesirable species, reduce fuel load, improve wildlife habitat, improve plant productivity and/or quality, facilitate grazing distribution and maintain ecological processes.

**Before Situation:**

Area to be burned has a heavy fuel load, undesirable species and/or may be overstocked. Site has little to no herbaceous material.

**After Situation:**

Area has been burned to remove competing brush and undesirable species, adjust density and forest slash. Some bare ground is exposed to promote herbaceous growth.

**Feature Measure:** Acres planned

**Scenario Unit::** Acre

**Scenario Typical Size:** 80

**Total Scenario Cost:** $4,679.07

**Scenario Cost/Unit:** $58.49

**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 | $45.80 | 1 | $45.80 |
| **Equipment Installation** | | | | | | |
| Dozer, 80 HP | 929 | Track mounted Dozer with horsepower range of 60 to 90. Equipment and power unit costs. Labor not included. | Hour | $60.16 | 8 | $481.28 |
| Truck, Pickup | 939 | Equipment and power unit costs. Labor not included. | Hour | $19.82 | 16 | $317.12 |
| All terrain vehicles, ATV | 965 | Includes equipment, power unit and labor costs. | Hour | $29.73 | 16 | $475.68 |
| Trailer, water tank | 1598 | Mobile 5,000 gal water tank mounted on a trailer. Equipment only. Does not include towing equipment. | Hour | $17.96 | 8 | $143.68 |
| Water tank, portable | 1602 | Portable water tank transported in a pick up truck. Typically with 200 gallon capacity includes tank with pump, hose and sprayer. Does not include the pickup truck. Equipment only. | Hour | $2.20 | 8 | $17.60 |
| **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. | Hour | $25.08 | 32 | $802.56 |
| 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. | Hour | $34.29 | 8 | $274.32 |
| Specialist Labor | 235 | Labor requiring a specialized skill set: Includes Agronomists, Foresters, Biologists, etc. to provide additional technical information during the planning and implementation of the practice. Does not include NRCS or TSP services. | Hour | $91.60 | 16 | $1,465.60 |
| **Materials** | | | | | | |
| Fuel, ignition fuel mixture | 1596 | Mixture of gasoline and diesel for ignition of prescribed burns. Materials only. | Gallon | $4.13 | 20 | $82.60 |
| **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 | $64.26 | 2 | $128.52 |
| Mobilization, large equipment | 1140 | Equipment >150HP or typical weights greater than 30,000 pounds or loads requiring over width or over length permits. | Each | $444.31 | 1 | $444.31 |

**Practice:** 340 - Cover Crop

**Scenario** #1 - Cover Crop-Chemical Kill

**Scenario Description:**

Typically a small grain or small grain-legume mix (may also use forage sorghum, radishes, turnips, buckwheat, etc) will be planted as a cover crop immediately after harvest of a row crop, and will be followed by a row crop that will utilize the residue as a mulch. This scenario assumes that seed will be planted with a 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 a 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. 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:**

Typically, within 30 days after harvest of row crop, fields are planted with a small grain or small grain-legume mix cover crop, typically rye or rye and and 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::** Acre

**Scenario Typical Size:** 40

**Total Scenario Cost:** $3,801.60

**Scenario Cost/Unit:** $95.04

**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. | Acre | $5.58 | 40 | $223.20 |
| Seeding Operation, No Till/Grass Drill | 960 | No Till drill or grass drill for seeding. Includes equipment, power unit and labor costs. | Acre | $19.43 | 40 | $777.20 |
| **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. | Acre | $15.93 | 40 | $637.20 |
| Two Species Mix, Cool Season Annual (1 grass and 1 legume) | 2314 | Cool season annual grass and legume mix. Includes material and shipping only. | Acre | $54.10 | 40 | $2,164.00 |

**Practice:** 340 - Cover Crop

**Scenario** #4 - Orchard/Vineyard Annual Cover Crop

**Scenario Description:**

Orchard or Vineyard annual cover crop is planted which is destroyed by field operations occuring spring through fall. Cover crops are used to reduce erosion from wind and water, increase soil organic matter content, capture and recycle or redistribute nutrients in the soil profile, promote biological nitrogen fixation and reduce energy use, increase biodiversity, suppress weeds, manage soil moisture, and minimize and reduce soil compaction. Planted annually in orchards and vineyards. 60% cover crop per acre.

**Before Situation:**

Orchards or vineyards 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. 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 long periods of bare soil.

**After Situation:**

Orchard or Vineyard areas between vine/tree rows are planted with an annual cover crop mix in the early fall. The cover crops are killed by typical farming operations before the next fall. Cover crop residues are left on the surface. Root systems are left intact in non-tilled systems. Soil quality benefits are accrued by reducing soil erosion, re-establishing soil porosity, and adding organic matter to the soil.

**Feature Measure:** Area planted

**Scenario Unit::** Acre

**Scenario Typical Size:** 10

**Total Scenario Cost:** $518.90

**Scenario Cost/Unit:** $51.89

**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. | Acre | $19.43 | 10 | $194.30 |
| **Materials** | | | | | | |
| Two Species Mix, Cool Season Annual (1 grass and 1 legume) | 2314 | Cool season annual grass and legume mix. Includes material and shipping only. | Acre | $54.10 | 6 | $324.60 |

**Practice:** 340 - Cover Crop

**Scenario** #5 - Organic Cover Crop

**Scenario Description:**

Typically a small grain or small grain-legume mix (may also use forage sorghum, radishes, turnips, buckwheat, etc) will be planted as a cover crop immediately after harvest of an organically grown crop, and will be followed by an organically grown crop that will utilize the residue as a mulch. This scenario assumes that seed will be planted with a 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.), prior to planting the subsequent crop. This scenario REQUIRES use of Certified Organic Seed.

**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:**

Typically, 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::** Acre

**Scenario Typical Size:** 25

**Total Scenario Cost:** $3,426.75

**Scenario Cost/Unit:** $137.07

**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. | Acre | $18.68 | 25 | $467.00 |
| Seeding Operation, No Till/Grass Drill | 960 | No Till drill or grass drill for seeding. Includes equipment, power unit and labor costs. | Acre | $19.43 | 25 | $485.75 |
| **Materials** | | | | | | |
| Certified Organic, Two Species Mix, Cool Season, Annual Grasses and Legumes | 2339 | Certified organic cool season annual grass and legume mix. Includes material and shipping only. | Acre | $98.96 | 25 | $2,474.00 |

**Practice:** 340 - Cover Crop

**Scenario** #6 - Cover Crop Adaptive Mgt

**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 specie, evaluate different termination methods or timings, using a legume vs no legume for nitrogen credits). This will be done following the interim guidance for cover crop adaptive management to be issued to all field offices.

**Before Situation:**

Row crops such as corn, soybeans, or cotton are grown and harvested in mid-late fall. Fields are disked immediately following harvest, with rows in some fields being hipped for drainage. Residue amounts after harvest average 30% or less, resulting in bare soil being exposed to wind erosion and/or intense rainfall during the fall, winter, and early spring. Over the winter residue degrades and sediment/nutrient runoff from fields increases. Sheet and rill erosion occurs with visible rills by spring. 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:**

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 and the Interim Guidance for Cover Crop Adaptive Management to be issued to all field offices for FY15. 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:** Area planted

**Scenario Unit::** Acre

**Scenario Typical Size:** 10

**Total Scenario Cost:** $4,266.30

**Scenario Cost/Unit:** $426.63

**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. | Acre | $5.58 | 10 | $55.80 |
| Seeding Operation, No Till/Grass Drill | 960 | No Till drill or grass drill for seeding. Includes equipment, power unit and labor costs. | Acre | $19.43 | 10 | $194.30 |
| **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. | Hour | $18.93 | 30 | $567.90 |
| 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. | Hour | $91.60 | 30 | $2,748.00 |
| **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. | Acre | $15.93 | 10 | $159.30 |
| Two Species Mix, Cool Season Annual (1 grass and 1 legume) | 2314 | Cool season annual grass and legume mix. Includes material and shipping only. | Acre | $54.10 | 10 | $541.00 |

**Practice:** 340 - Cover Crop

**Scenario** #7 - Chemical Kill On Beds

**Scenario Description:**

Typically a forage radish type will be planted as a cover crop, on beds or rows, immediately after harvest of a row crop. The radish cover crop will be followed by a row crop that will utilize the residue as a mulch and nutrients that have been "scavenged." This scenario assumes that seed will be planted with a no-till drill and the seeding rate will be halved, as furrows will not be planted. 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 a minimum of 3 weeks 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. 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:**

Typically, within 30 days after harvest of row crop, radish are planted on beds. The average field size is 40 acres. Typically, this 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. Wind erosion is reduced by standing residues. Soil compaction is reduced. The cover crop is terminated with an approved herbicide prior to spring planting as late as feasible to maximize plant biomass production. The seed heads may be shred and the residue spread over the soil surface. Over time, soil health is improved due to the additional biomass, ground cover, soil infiltration, and plant diversity introduced to the cropping system.

**Feature Measure:** Acres Planted

**Scenario Unit::** Acre

**Scenario Typical Size:** 40

**Total Scenario Cost:** $2,423.40

**Scenario Cost/Unit:** $60.59

**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. | Acre | $5.58 | 40 | $223.20 |
| Seeding Operation, No Till/Grass Drill | 960 | No Till drill or grass drill for seeding. Includes equipment, power unit and labor costs. | Acre | $19.43 | 40 | $777.20 |
| **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. | Acre | $15.93 | 40 | $637.20 |
| One Species, Cool Season, Annual Grass or Legume | 2311 | Cool season annual grass or legume. Includes material and shipping only. | Acre | $39.29 | 20 | $785.80 |

**Practice:** 342 - Critical Area Planting

**Scenario** #1 - Grass/legume mix-normal tillage

**Scenario Description:**

Establishment of permanent vegetation on a site that is void or nearly void of vegetation due to a natural occurrence or a newly constructed conservation practice. Costs include seedbed preparation with typical tillage implements, grass/legume seed, companion crop, and fertilizer and lime with application.

**Before Situation:**

Areas that are void or nearly void of vegetation, resulting in bare soil being exposed to erosive processes. The exposed areas may be caused from recent natural occurrences (fire, flood, wind, etc.) or due to newly constructed conservation practices such as waterways, terraces, water and sediment basins or dams. The exposed areas will be subject to wind erosion, sheet and rill erosion, or visible rills may have already occurred. Runoff from the area flows into streams, water courses or other water bodies causing degradation to the receiving waters. The soil typically has a pH imbalance and low fertility.

**After Situation:**

This typical 1.0 acre critical area is stabilized by applying fertilizer, lime and seed. Soil amendments will be incorporated at an depth of six inches to improve fertility and ensure establishment of permanent vegetative cover. Apply 30 lbs of nitrogen, 60 lbs of phosphate, and 60 lbs of potash, along with an application of 2 tons of lime. Prepare a firm, weed free seedbed so that proper germination and stand establishment are ensured. Once the seedbed has been prepared, drill the following mixture for a vegetative cover: Smooth Bromegrass (15 lbs/ac), and Red Clover (8 lbs/ac) with a nurse crop of oats at a seeding rate of 48 lbs per acre.

**Feature Measure:** area seeded

**Scenario Unit::** Acre

**Scenario Typical Size:** 1

**Total Scenario Cost:** $353.79

**Scenario Cost/Unit:** $353.79

**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. | Acre | $10.14 | 2 | $20.28 |
| Fertilizer, ground application, dry bulk | 950 | Dry bulk fertilizer application performed by ground equipment. Includes equipment, power unit and labor costs. | Acre | $6.25 | 1 | $6.25 |
| Seeding Operation, No Till/Grass Drill | 960 | No Till drill or grass drill for seeding. Includes equipment, power unit and labor costs. | Acre | $19.43 | 1 | $19.43 |
| Cultipacking | 1100 | Includes equipment, power unit and labor costs. | Acre | $7.64 | 1 | $7.64 |
| **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 | $0.54 | 30 | $16.20 |
| 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 | $0.54 | 50 | $27.00 |
| Potassium, K2O | 74 | K2O supplied by Muriate Of Potash. Price is not per pound of total product applied, no conversion is needed. | Pound | $0.46 | 50 | $23.00 |
| Lime, ENM | 75 | Fertilizer: Limestone Spread on field. | Ton | $84.95 | 2 | $169.90 |
| One Species, Warm Season, Introduced Perennial Grass (seed or sprigs) | 2323 | Introduced, warm season perennial grass seed or sprig. Includes material and shipping only. | Acre | $64.09 | 1 | $64.09 |

**Practice:** 342 - Critical Area Planting

**Scenario** #2 - Organic Grass/legume mix-normal tillage

**Scenario Description:**

Establishment of permanent vegetation on a site that is void or nearly void of vegetation due to a natural occurrence or a newly constructed conservation practice. Costs include seedbed preparation with typical tillage implements, grass/legume seed, companion crop, and fertilizer and lime with application. Certified organic seed and fertilizer based upon NOP approved fertilizer inputs will be used where available.

**Before Situation:**

Areas that are void or nearly void of vegetation, resulting in bare soil being exposed to erosive processes. The exposed areas may be caused from recent natural occurrences (fire, flood, etc) or due to newly constructed conservation practices such as waterways, terraces, water and sediment basins or dams. The exposed areas will be subject to wind erosion, sheet and rill erosion, or visible rills may have already occurred. Runoff from the area flows into streams, water courses or other water bodies causing degradation to the receiving waters. The soil typically has a pH imbalance and low fertility.

**After Situation:**

This typical 1.0 acre critical area is stabilized by applying fertilizer, lime and seed. Soil amendments will be incorporated at an depth of six inches to improve fertility and ensure establishment of permanent vegetative cover. The plant nutrients will supplied by a blend of organic soil amendments. Apply 30 lbs of nitrogen, 60 lbs of phosphate, and 60 lbs of potash, along with an application of 2 tons of lime. Prepare a firm, weed free seedbed so that proper germination and stand establishment are ensured. Once the seedbed has been prepared, drill the following mixture for a vegetative cover: Smooth Bromegrass (15 lbs/ac) and Red Clover (8 lbs/ac) with a nurse crop of oats at a seeding rate of 48 lbs per acre. Organic seed will be used where available. Manure may be used in lieu of a commercially blended product as long as the manure is tested and the correct quantity of manure is calculated such that the specified 30-60-60 N-P2O5-K2O requirement is met.

**Feature Measure:** area seeded

**Scenario Unit::** Acre

**Scenario Typical Size:** 1

**Total Scenario Cost:** $320.09

**Scenario Cost/Unit:** $320.09

**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. | Acre | $10.14 | 2 | $20.28 |
| Fertilizer, ground application, dry bulk | 950 | Dry bulk fertilizer application performed by ground equipment. Includes equipment, power unit and labor costs. | Acre | $6.25 | 1 | $6.25 |
| Seeding Operation, No Till/Grass Drill | 960 | No Till drill or grass drill for seeding. Includes equipment, power unit and labor costs. | Acre | $19.43 | 1 | $19.43 |
| Cultipacking | 1100 | Includes equipment, power unit and labor costs. | Acre | $7.64 | 1 | $7.64 |
| **Materials** | | | | | | |
| Lime, ENM | 75 | Fertilizer: Limestone Spread on field. | Ton | $84.95 | 2 | $169.90 |
| Nitrogen, Organic | 266 | ORGANIC Nitrogen | Pound | $0.25 | 30 | $7.50 |
| Phosphorus, Organic | 267 | ORGANIC Phosphorus | Pound | $0.25 | 50 | $12.50 |
| Potassium, Organic | 268 | ORGANIC Potassium | Pound | $0.25 | 50 | $12.50 |
| One Species, Warm Season, Introduced Perennial Grass (seed or sprigs) | 2323 | Introduced, warm season perennial grass seed or sprig. Includes material and shipping only. | Acre | $64.09 | 1 | $64.09 |

**Practice:** 342 - Critical Area Planting

**Scenario** #3 - Native seeding - normal tillage

**Scenario Description:**

Establishment of permanent vegetation on a site that is void or nearly void of vegetation due to a natural occurrence or a newly constructed conservation practice. Costs include seedbed preparation with typical tillage implements, native grass seed, and fertilizer and lime with application.

**Before Situation:**

Areas that are void or nearly void of vegetation, resulting in bare soil being exposed to erosive processes. The exposed areas may be caused from recent natural occurrences (fire, flood, etc) or due to newly constructed conservation practices such as waterways, terraces, water and sediment basins or dams. The exposed areas will be subject to wind erosion, sheet and rill erosion, or visible rills may have already occurred. Runoff from the area flows into streams, water courses or other water bodies causing degradation to the receiving waters. The soil typically has a pH imbalance and low fertility.

**After Situation:**

This typical 1.0 acre critical area is stabilized by applying fertilizer, lime and seed. Soil amendments will be incorporated at an depth of six inches to improve fertility and ensure establishment of permanent vegetative cover. Apply 60 lbs of phosphate and 60 lbs of potash, along with an application of 2 tons of lime. Prepare a firm, weed free seedbed so that proper germination and stand establishment are ensured. Once the seedbed has been prepared, drill the following mixture for a vegetative cover: Big Bluestem (14 lbs/ac) and Switchgrass (2 lbs/ac) with a nurse crop of oats at a seeding rate of 32 lbs per acre.

**Feature Measure:** area seeded

**Scenario Unit::** Acre

**Scenario Typical Size:** 1

**Total Scenario Cost:** $344.43

**Scenario Cost/Unit:** $344.43

**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. | Acre | $10.14 | 2 | $20.28 |
| Fertilizer, ground application, dry bulk | 950 | Dry bulk fertilizer application performed by ground equipment. Includes equipment, power unit and labor costs. | Acre | $6.25 | 1 | $6.25 |
| Seeding Operation, No Till/Grass Drill | 960 | No Till drill or grass drill for seeding. Includes equipment, power unit and labor costs. | Acre | $19.43 | 1 | $19.43 |
| Cultipacking | 1100 | Includes equipment, power unit and labor costs. | Acre | $7.64 | 1 | $7.64 |
| **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 | $0.54 | 50 | $27.00 |
| Potassium, K2O | 74 | K2O supplied by Muriate Of Potash. Price is not per pound of total product applied, no conversion is needed. | Pound | $0.46 | 50 | $23.00 |
| Lime, ENM | 75 | Fertilizer: Limestone Spread on field. | Ton | $84.95 | 2 | $169.90 |
| One Species, Warm Season, Native Perennial Grass | 2322 | Native, warm season perennial grass. Includes material and shipping only. | Acre | $70.93 | 1 | $70.93 |

**Practice:** 342 - Critical Area Planting

**Scenario** #4 - Grass/legume mix-moderate grading

**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 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. 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:**

This typical 1.0 acre critical area is stabilized by grading and shaping the small gullies with a dozer (4 hours) and then applying fertilizer, lime and seed. Soil amendments will be incorporated at an depth of six inches to improve fertility and ensure establishment of permanent vegetative cover. Apply 30 lbs of nitrogen, 60 lbs of phosphate, and 60 lbs of potash, along with an application of 2 tons of lime. Prepare a firm, weed free seedbed so that proper germination and stand establishment are ensured. Once the seedbed has been prepared, drill the following mixture for a vegetative cover: Smooth Bromegrass (15 lbs/ac) and Red Clover (8 lbs/ac) with a nurse crop of oats at a seeding rate of 48 lbs per acre.

**Feature Measure:** area seeded

**Scenario Unit::** Acre

**Scenario Typical Size:** 1

**Total Scenario Cost:** $1,134.46

**Scenario Cost/Unit:** $1,134.46

**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. | Hour | $60.16 | 4 | $240.64 |
| Tillage, Light | 945 | Includes light disking (tandem) or field cultivator. Includes equipment, power unit and labor costs. | Acre | $10.14 | 2 | $20.28 |
| Fertilizer, ground application, dry bulk | 950 | Dry bulk fertilizer application performed by ground equipment. Includes equipment, power unit and labor costs. | Acre | $6.25 | 1 | $6.25 |
| Seeding Operation, No Till/Grass Drill | 960 | No Till drill or grass drill for seeding. Includes equipment, power unit and labor costs. | Acre | $19.43 | 1 | $19.43 |
| Cultipacking | 1100 | Includes equipment, power unit and labor costs. | Acre | $7.64 | 1 | $7.64 |
| **Labor** | | | | | | |
| Equipment Operators, Heavy | 233 | Includes: Cranes, Hydraulic Excavators >=50 HP, Dozers, Paving Machines, Rock Trenchers, Trenchers >=12", Dump Trucks, Ag Equipment >=150 HP, Scrapers, Water Wagons. | Hour | $23.93 | 4 | $95.72 |
| **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 | $0.54 | 30 | $16.20 |
| 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 | $0.54 | 50 | $27.00 |
| Potassium, K2O | 74 | K2O supplied by Muriate Of Potash. Price is not per pound of total product applied, no conversion is needed. | Pound | $0.46 | 50 | $23.00 |
| Lime, ENM | 75 | Fertilizer: Limestone Spread on field. | Ton | $84.95 | 2 | $169.90 |
| One Species, Warm Season, Introduced Perennial Grass (seed or sprigs) | 2323 | Introduced, warm season perennial grass seed or sprig. Includes material and shipping only. | Acre | $64.09 | 1 | $64.09 |
| **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 | $444.31 | 1 | $444.31 |

**Practice:** 342 - Critical Area Planting

**Scenario** #5 - Native seeding-moderate grading

**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 small gullies, seedbed preparation with typical tillage implements, native grass 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. 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:**

This typical 1.0 acre critical area is stabilized by grading and shaping the small gullies with a dozer (4 hours) and then applying fertilizer, lime and seed. Soil amendments will be incorporated at an depth of six inches to improve fertility and ensure establishment of permanent vegetative cover. Apply 60 lbs of phosphate and 60 lbs of potash, along with an application of 2 tons of lime. Prepare a firm, weed free seedbed so that proper germination and stand establishment are ensured. Once the seedbed has been prepared, drill the following mixture for a vegetative cover: Big Bluestem (14 lbs/ac) and Switchgrass (2 lbs/ac) with a nurse crop of oats at a seeding rate of 32 lbs per acre.

**Feature Measure:** area seeded

**Scenario Unit::** Acre

**Scenario Typical Size:** 1

**Total Scenario Cost:** $1,125.10

**Scenario Cost/Unit:** $1,125.10

**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. | Hour | $60.16 | 4 | $240.64 |
| Tillage, Light | 945 | Includes light disking (tandem) or field cultivator. Includes equipment, power unit and labor costs. | Acre | $10.14 | 2 | $20.28 |
| Fertilizer, ground application, dry bulk | 950 | Dry bulk fertilizer application performed by ground equipment. Includes equipment, power unit and labor costs. | Acre | $6.25 | 1 | $6.25 |
| Seeding Operation, No Till/Grass Drill | 960 | No Till drill or grass drill for seeding. Includes equipment, power unit and labor costs. | Acre | $19.43 | 1 | $19.43 |
| Cultipacking | 1100 | Includes equipment, power unit and labor costs. | Acre | $7.64 | 1 | $7.64 |
| **Labor** | | | | | | |
| Equipment Operators, Heavy | 233 | Includes: Cranes, Hydraulic Excavators >=50 HP, Dozers, Paving Machines, Rock Trenchers, Trenchers >=12", Dump Trucks, Ag Equipment >=150 HP, Scrapers, Water Wagons. | Hour | $23.93 | 4 | $95.72 |
| **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 | $0.54 | 50 | $27.00 |
| Potassium, K2O | 74 | K2O supplied by Muriate Of Potash. Price is not per pound of total product applied, no conversion is needed. | Pound | $0.46 | 50 | $23.00 |
| Lime, ENM | 75 | Fertilizer: Limestone Spread on field. | Ton | $84.95 | 2 | $169.90 |
| One Species, Warm Season, Native Perennial Grass | 2322 | Native, warm season perennial grass. Includes material and shipping only. | Acre | $70.93 | 1 | $70.93 |
| **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 | $444.31 | 1 | $444.31 |

**Practice:** 342 - Critical Area Planting

**Scenario** #6 - Grass/legume mix-heavy grading

**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:**

This typical 1.0 acre critical area is stabilized by grading and shaping the moderate to severe gullies with a dozer (8 hours) and then applying fertilizer, lime and seed. Soil amendments will be incorporated at an depth of six inches to improve fertility and ensure establishment of permanent vegetative cover. Apply 30 lbs of nitrogen, 60 lbs of phosphate, and 60 lbs of potash, along with an application of 2 tons of lime. Prepare a firm, weed free seedbed so that proper germination and stand establishment are ensured. Once the seedbed has been prepared, drill the following mixture for a vegetative cover: Smooth Bromegrass (15 lbs/ac) and Red Clover (8 lbs/ac) with a nurse crop of oats at a seeding rate of 48 lbs per acre.

**Feature Measure:** area seeded

**Scenario Unit::** Acre

**Scenario Typical Size:** 1

**Total Scenario Cost:** $1,470.82

**Scenario Cost/Unit:** $1,470.82

**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. | Hour | $60.16 | 8 | $481.28 |
| Tillage, Light | 945 | Includes light disking (tandem) or field cultivator. Includes equipment, power unit and labor costs. | Acre | $10.14 | 2 | $20.28 |
| Fertilizer, ground application, dry bulk | 950 | Dry bulk fertilizer application performed by ground equipment. Includes equipment, power unit and labor costs. | Acre | $6.25 | 1 | $6.25 |
| Seeding Operation, No Till/Grass Drill | 960 | No Till drill or grass drill for seeding. Includes equipment, power unit and labor costs. | Acre | $19.43 | 1 | $19.43 |
| Cultipacking | 1100 | Includes equipment, power unit and labor costs. | Acre | $7.64 | 1 | $7.64 |
| **Labor** | | | | | | |
| Equipment Operators, Heavy | 233 | Includes: Cranes, Hydraulic Excavators >=50 HP, Dozers, Paving Machines, Rock Trenchers, Trenchers >=12", Dump Trucks, Ag Equipment >=150 HP, Scrapers, Water Wagons. | Hour | $23.93 | 8 | $191.44 |
| **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 | $0.54 | 30 | $16.20 |
| 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 | $0.54 | 50 | $27.00 |
| Potassium, K2O | 74 | K2O supplied by Muriate Of Potash. Price is not per pound of total product applied, no conversion is needed. | Pound | $0.46 | 50 | $23.00 |
| Lime, ENM | 75 | Fertilizer: Limestone Spread on field. | Ton | $84.95 | 2 | $169.90 |
| One Species, Warm Season, Introduced Perennial Grass (seed or sprigs) | 2323 | Introduced, warm season perennial grass seed or sprig. Includes material and shipping only. | Acre | $64.09 | 1 | $64.09 |
| **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 | $444.31 | 1 | $444.31 |

**Practice:** 342 - Critical Area Planting

**Scenario** #7 - Native seeding-heavy grading

**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:**

This typical 1.0 acre critical area is stabilized by grading and shaping the moderate to severe gullies with a dozer (8 hours) and then applying fertilizer, lime and seed. Soil amendments will be incorporated at an depth of six inches to improve fertility and ensure establishment of permanent vegetative cover. Apply 60 lbs of phosphate and 60 lbs of potash, along with an application of 2 tons of lime. Prepare a firm, weed free seedbed so that proper germination and stand establishment are ensured. Once the seedbed has been prepared, drill the following mixture for a vegetative cover: Big Bluestem (14 lbs/ac) and Switchgrass (2 lbs/ac) with a nurse crop of oats at a seeding rate of 32 lbs per acre.

**Feature Measure:** area seeded

**Scenario Unit::** Acre

**Scenario Typical Size:** 1

**Total Scenario Cost:** $1,694.17

**Scenario Cost/Unit:** $1,694.17

**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. | Hour | $60.16 | 8 | $481.28 |
| Tillage, Light | 945 | Includes light disking (tandem) or field cultivator. Includes equipment, power unit and labor costs. | Acre | $10.14 | 2 | $20.28 |
| Fertilizer, ground application, dry bulk | 950 | Dry bulk fertilizer application performed by ground equipment. Includes equipment, power unit and labor costs. | Acre | $6.25 | 1 | $6.25 |
| Seeding Operation, No Till/Grass Drill | 960 | No Till drill or grass drill for seeding. Includes equipment, power unit and labor costs. | Acre | $19.43 | 1 | $19.43 |
| Cultipacking | 1100 | Includes equipment, power unit and labor costs. | Acre | $7.64 | 1 | $7.64 |
| **Labor** | | | | | | |
| Equipment Operators, Heavy | 233 | Includes: Cranes, Hydraulic Excavators >=50 HP, Dozers, Paving Machines, Rock Trenchers, Trenchers >=12", Dump Trucks, Ag Equipment >=150 HP, Scrapers, Water Wagons. | Hour | $23.93 | 8 | $191.44 |
| **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 | $0.54 | 50 | $27.00 |
| Potassium, K2O | 74 | K2O supplied by Muriate Of Potash. Price is not per pound of total product applied, no conversion is needed. | Pound | $0.46 | 50 | $23.00 |
| Lime, ENM | 75 | Fertilizer: Limestone Spread on field. | Ton | $84.95 | 2 | $169.90 |
| One Species, Warm Season, Native Perennial Grass | 2322 | Native, warm season perennial grass. Includes material and shipping only. | Acre | $70.93 | 1 | $70.93 |
| **Mobilization** | | | | | | |
| Mobilization, medium equipment | 1139 | Equipment with 70-150 HP or typical weights between 14,000 and 30,000 pounds. | Each | $232.71 | 1 | $232.71 |
| Mobilization, large equipment | 1140 | Equipment >150HP or typical weights greater than 30,000 pounds or loads requiring over width or over length permits. | Each | $444.31 | 1 | $444.31 |

**Practice:** 342 - Critical Area Planting

**Scenario** #8 - seeding-heavy grading around chicken houses

**Scenario Description:**

repair highly erodied slopes around Poulrty houses, or any other structure, where storm water runoff has caused heavy erosion to occur. Typical site is around Poulrty houses where there is a vertical drop of 30"avg. and an existing slope of 2:1. Costs include a dozer for grading and shaping of moderate to severe gullies.

**Before Situation:**

Areas that are severly eroded due to storm water runnoff over bare soils. 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.

**After Situation:**

This typical 0.5 acre area is stabilized by removing top 1 foot of existing soil and compacting into place hauled earthfill to establish a 3:1 or flatter final slope. Then applying fertilizer, lime and seed. Soil amendments will be incorporated at an depth of six inches to improve fertility and ensure establishment of permanent vegetative cover. Prepare a firm, weed free seedbed so that proper germination and stand establishment are ensured. Once the seedbed has been prepared, drill the recommended mixture for a vegetative cover:

**Feature Measure:** Area Seeded

**Scenario Unit::** Acre

**Scenario Typical Size:** 0.5

**Total Scenario Cost:** $9,617.08

**Scenario Cost/Unit:** $19,234.15

**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. | Hour | $112.82 | 64 | $7,220.48 |
| Tillage, Primary | 946 | Includes heavy disking (offset) or chisel plow. Includes equipment, power unit and labor costs. | Acre | $15.10 | 0.5 | $7.55 |
| Lime application | 953 | Lime application performed by ground equipment. Includes equipment, power unit and labor costs. | Acre | $9.50 | 0.5 | $4.75 |
| **Labor** | | | | | | |
| Equipment Operators, Heavy | 233 | Includes: Cranes, Hydraulic Excavators >=50 HP, Dozers, Paving Machines, Rock Trenchers, Trenchers >=12", Dump Trucks, Ag Equipment >=150 HP, Scrapers, Water Wagons. | Hour | $23.93 | 64 | $1,531.52 |
| **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 | $0.54 | 50 | $27.00 |
| Potassium, K2O | 74 | K2O supplied by Muriate Of Potash. Price is not per pound of total product applied, no conversion is needed. | Pound | $0.46 | 50 | $23.00 |
| Lime, ENM | 75 | Fertilizer: Limestone Spread on field. | Ton | $84.95 | 2 | $169.90 |
| One Species, Warm Season, Introduced Perennial Grass (seed or sprigs) | 2323 | Introduced, warm season perennial grass seed or sprig. Includes material and shipping only. | Acre | $64.09 | 0.5 | $32.05 |
| **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 | $156.52 | 1 | $156.52 |
| Mobilization, large equipment | 1140 | Equipment >150HP or typical weights greater than 30,000 pounds or loads requiring over width or over length permits. | Each | $444.31 | 1 | $444.31 |

**Practice:** 345 - Residue and Tillage Management, Reduced Till

**Scenario** #1 - Chemical Fallow - Sugarcane

**Scenario Description:**

In sugarcane, cultivation activities that typically take place during the period between the last ratoon harvest and field preparation activities for planting sugarcane (fallow period) will all be replaced the use of herbicides. After fall burning of residue, herbicides will be used exclusively to control problem weeds like bermudagrass and to terminate resprouting sugarcane. Residue remaining after the fall/winter burn, along with the root system, will help to maintain soil structure, reduce erosion, and reduce sedimentation.

**Before Situation:**

After the last ratoon sugarcane harvest, weeds are usually controlled with aggressive tillage in the winter, spring, and summer leading up to ground preparation activities for the new crop of sugarcane. Tillage events destroy the soil structure and accelerate residue decomposition, leading to excessive erosion and sedimentation.

**After Situation:**

After harvest and a low-medium intensity burn, no tillage activities will take place until plant cane seedbed preparation activities in the late summer and early fall. Herbicides will be used exclusively to both suppress problem weeds and terminate the existing sugarcane crop. Erosion will be significantly reduced, soil structure will be better maintained, and sedimentation will be reduced.

**Feature Measure:** <Unknown>

**Scenario Unit::** Acre

**Scenario Typical Size:** 60

**Total Scenario Cost:** $1,004.40

**Scenario Cost/Unit:** $16.74

**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. | Acre | $5.58 | 180 | $1,004.40 |

**Practice:** 345 - Residue and Tillage Management, Reduced Till

**Scenario** #2 - Mulch till-Drill Only

**Scenario Description:**

Mulch-till is managing the amount, orientation and distribution of crop and other plant residue on the soil surface year round while limiting the soil-disturbing activities used to grow crops in systems where the entire field surface is tilled by the planter/drill or tillage tools prior to planting. This practice includes tillage methods commonly referred to as mulch tillage or chiseling and disking. It applies to stubble mulching on summer-fallowed land, to tillage for annually planted crops and to tillage for planted crops and to tillage for planting perennial crops. All residue shall be uniformly spread or managed over the surface throughout critical wind erosion period. All residue shall be uniformly distributed over the entire field and not burned or removed. These periods of intensive tillage have led to excessive soil loss, often above the Soil Loss Tolerance (T), due to the loss of critical crop residue. The RUSLE2 or WEPS model will be used to review the farming operation and determine if enough residue is being retained, throughout the rotation, to keep soil loss below T. The producer will then remove operations, or select alternate operations, to reduce erosion below T.

**Before Situation:**

Row crops such as corn, soybeans, or cotton are grown and harvested in mid-late fall. Fields are disked immediately following harvest, with rows in some fields being hipped for drainage. Residue amounts after harvest average 30% or less, resulting in bare soil being exposed to wind erosion and/or intense rainfall during the fall, winter, and early spring. Over the winter residue degrades and sediment/nutrient runoff from fields increases. Sheet and rill erosion occurs with visible rills by spring. Spring tillage and seedbed preparation activities occur as early as possible in the late winter and early spring. Weed control is accomplished primarily through tillage, requiring multiple operations. Runoff from the fields flows into streams, water courses or other water bodies causing degradation to the receiving waters. Soil health (soil organic matter) declines over time as a result of tillage practices, low residue monocultures, and long periods of bare soil.

**After Situation:**

Mulch tillage applies to all cropland and other lands where crops are planed. This scenario includes the use of a high distubance drill, such as a hoe drill that disturbs a large percentage of soil surface using the planting operation. In warmer areas, winter weeds or cover crops grow throughout the winter months. The residue that remains on the soil surface provides soil cover during late fall, throughout the winter, and into the early spring. Runoff and erosion are reduced. Wind erosion is reduced by standing residues. Winter weeds or the cover crop is terminated with planting or a roller-crimper, shredding, or a combination of these methods prior to spring planting as late as feasible. Over time, soil health is improved due to the additional biomass, ground cover, soil infiltration, and plant diversity in the cropping system.

**Feature Measure:** Area planted

**Scenario Unit::** Acre

**Scenario Typical Size:** 100

**Total Scenario Cost:** $1,943.00

**Scenario Cost/Unit:** $19.43

**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. | Acre | $19.43 | 100 | $1,943.00 |

**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 interim guidance for mulch till adaptive management to be issued to all field offices for FY15.

**Before Situation:**

Row crops such as corn, soybeans, or cotton are grown and harvested in mid-late fall. Fields are disked immediately following harvest, with rows in some fields being hipped for drainage. Residue amounts after harvest average 30% or less, resulting in bare soil being exposed to wind erosion and/or intense rainfall during the fall, winter, and early spring. Over the winter residue degrades and sediment/nutrient runoff from fields increases. Sheet and rill erosion occurs with visible rills by spring. Spring tillage and seedbed preparation activities occur as early as possible in the late winter and early spring. Weed control is accomplished primarily through tillage, requiring multiple operations. Runoff from the fields flows into streams, water courses or other water bodies causing degradation to the receiving waters. Soil health (soil organic matter) declines over time as a result of tillage practices, low residue monocultures, and long periods of bare soil. The producer is considering using mulch till technology, but is unsure how to manage on their operation or needs to improve the management of mulch till to be successful.

**After Situation:**

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

**Feature Measure:** Area planted

**Scenario Unit::** Acre

**Scenario Typical Size:** 15

**Total Scenario Cost:** $4,243.20

**Scenario Cost/Unit:** $282.88

**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. | Acre | $10.14 | 15 | $152.10 |
| Tillage, Primary | 946 | Includes heavy disking (offset) or chisel plow. Includes equipment, power unit and labor costs. | Acre | $15.10 | 15 | $226.50 |
| Seeding Operation, No Till/Grass Drill | 960 | No Till drill or grass drill for seeding. Includes equipment, power unit and labor costs. | Acre | $19.43 | 15 | $291.45 |
| Seeding Operation, No Till/Strip Till Planter | 1230 | No Till/Strip Till row planters for seeding. Includes all costs for equipment, power unit, and labor. | Acre | $17.15 | 15 | $257.25 |
| **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. | Hour | $18.93 | 30 | $567.90 |
| 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. | Hour | $91.60 | 30 | $2,748.00 |

**Practice:** 345 - Residue and Tillage Management, Reduced Till

**Scenario** #40 - Mulch till-Basic

**Scenario Description:**

Mulch-till is managing the amount, orientation and distribution of crop and other plant residue on the soil surface year round while limiting the soil-disturbing activities used to grow crops in systems where the entire field surface is tilled by the planter/drill or tillage tools prior to planting. This practice includes tillage methods commonly referred to as mulch tillage or chiseling and disking. It applies to stubble mulching on summer-fallowed land, to tillage for annually planted crops and to tillage for planted crops and to tillage for planting perennial crops. All residue shall be uniformly spread or managed over the surface throughout critical wind erosion period. All residue shall be uniformly distributed over the entire field and not burned or removed. These periods of intensive tillage have led to excessive soil loss, often above the Soil Loss Tolerance (T), due to the loss of critical crop residue. The RUSLE2 or WEPS model will be used to review the farming operation and determine if enough residue is being retained, throughout the rotation, to keep soil loss below T. The producer will then remove operations, or select alternate operations, to reduce erosion below T.

**Before Situation:**

Row crops such as corn, soybeans, or cotton are grown and harvested in mid-late fall. Fields are disked immediately following harvest, with rows in some fields being hipped for drainage. Residue amounts after harvest average 30% or less, resulting in bare soil being exposed to wind erosion and/or intense rainfall during the fall, winter, and early spring. Over the winter residue degrades and sediment/nutrient runoff from fields increases. Sheet and rill erosion occurs with visible rills by spring. Spring tillage and seedbed preparation activities occur as early as possible in the late winter and early spring. Weed control is accomplished primarily through tillage, requiring multiple operations. Runoff from the fields flows into streams, water courses or other water bodies causing degradation to the receiving waters. Soil health (soil organic matter) declines over time as a result of tillage practices, low residue monocultures, and long periods of bare soil.

**After Situation:**

Mulch tillage applies to all cropland and other lands where crops are planed. It applies to stubble mulching on summer fallowed land to tillage for annually planted crops and to tillage for plating perennial crops. It also includes some planting operation such as hoe drill, air seeder and no-till drill that disturbs a large percentage of soil surface using the planting operation. Tillage occurs after crop harvest. In warmer areas, winter weeds or cover crops grow throughout the winter months. The residue that remains on the soil surface provides soil cover during late fall, throughout the winter, and into the early spring. Runoff and erosion are reduced. Wind erosion is reduced by standing residues. Winter weeds or the cover crop is terminated with tillage, a roller-crimper, shredding, or a combination of these methods prior to spring planting as late as feasible. Over time, soil health is improved due to the additional biomass, ground cover, soil infiltration, and plant diversity in the cropping system.

**Feature Measure:** Area planted

**Scenario Unit::** Acre

**Scenario Typical Size:** 100

**Total Scenario Cost:** $4,353.00

**Scenario Cost/Unit:** $43.53

**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. | Acre | $10.14 | 100 | $1,014.00 |
| Tillage, Primary | 946 | Includes heavy disking (offset) or chisel plow. Includes equipment, power unit and labor costs. | Acre | $15.10 | 100 | $1,510.00 |
| Seeding Operation, No Till/Grass Drill | 960 | No Till drill or grass drill for seeding. Includes equipment, power unit and labor costs. | Acre | $19.43 | 50 | $971.50 |
| Seeding Operation, No Till/Strip Till Planter | 1230 | No Till/Strip Till row planters for seeding. Includes all costs for equipment, power unit, and labor. | Acre | $17.15 | 50 | $857.50 |

**Practice:** 350 - Sediment Basin

**Scenario** #1 - Excavated volume

**Scenario Description:**

An excavated sediment basin in an existing drainage way on a farm for purpose of trapping sediment and preserving the capacity of reservoirs, ditches, canals, diversions, waterways and streams and to prevent undesirable deposition on bottom lands and other developed lands. The sediment basin is created solely by excavation and impounds less than 3 feet against the embankment or spoil. Excavated material is spoiled, not placed in a designed embankment. Earthen spillway is constructed as needed. Resource concerns addressed include excessive suspended sediment and turbidity in surface water, damage from sediment deposition, and reduced capacity of conveyances by sediment deposition. Surface water causes the sediment (and potentially pesticides and nutrients) to be transported into the riparian areas and water bodies downstream.

**Before Situation:**

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

**After Situation:**

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

**Feature Measure:** Excavated volume

**Scenario Unit::** Cubic Yard

**Scenario Typical Size:** 1500

**Total Scenario Cost:** $3,377.96

**Scenario Cost/Unit:** $2.25

**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. | Hour | $112.82 | 23 | $2,594.86 |
| **Labor** | | | | | | |
| Equipment Operators, Heavy | 233 | Includes: Cranes, Hydraulic Excavators >=50 HP, Dozers, Paving Machines, Rock Trenchers, Trenchers >=12", Dump Trucks, Ag Equipment >=150 HP, Scrapers, Water Wagons. | Hour | $23.93 | 23 | $550.39 |
| **Mobilization** | | | | | | |
| Mobilization, medium equipment | 1139 | Equipment with 70-150 HP or typical weights between 14,000 and 30,000 pounds. | Each | $232.71 | 1 | $232.71 |

**Practice:** 350 - Sediment Basin

**Scenario** #2 - Embankment earthen basin with no pipe

**Scenario Description:**

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

**Before Situation:**

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

**After Situation:**

The typical sediment basin is constructed by excavating the pool area, constructing the auxiliary spillway, preparing the foundation as designed, and using 1500 cubic yards to create an embankment. The embankment will be designed and constructed according the pond standard (378). The product of the storage times the effective height of the dam is less than 3,000. The effective height of the dam is 35 feet or less. The sediment storage capacity should be a minimum of 900 cubic feet per acre of disturbed area. The detention storage should be a minimum of 3600 cubic feet per acre of drainage area. The earthen auxiliary spillway will be constructed as designed based on Pond standard (378). No principal spillway will be used. Associated practice(s): Other practices that may need to be implemented along with sediment basin to address all of the site specific resource concerns include: Critical Area Planting (342) and Mulching (484) where necessary to prevent erosion following construction activities, Structure for Water Control (587) if using a dewatering device, Pond Sealing or Lining (521A,521B,521C,521D).

**Feature Measure:** Embankment volume

**Scenario Unit::** Cubic Yard

**Scenario Typical Size:** 1500

**Total Scenario Cost:** $3,377.96

**Scenario Cost/Unit:** $2.25

**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. | Hour | $112.82 | 23 | $2,594.86 |
| **Labor** | | | | | | |
| Equipment Operators, Heavy | 233 | Includes: Cranes, Hydraulic Excavators >=50 HP, Dozers, Paving Machines, Rock Trenchers, Trenchers >=12", Dump Trucks, Ag Equipment >=150 HP, Scrapers, Water Wagons. | Hour | $23.93 | 23 | $550.39 |
| **Mobilization** | | | | | | |
| Mobilization, medium equipment | 1139 | Equipment with 70-150 HP or typical weights between 14,000 and 30,000 pounds. | Each | $232.71 | 1 | $232.71 |

**Practice:** 350 - Sediment Basin

**Scenario** #3 - Embankment earthen basin with pipe

**Scenario Description:**

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

**Before Situation:**

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

**After Situation:**

The typical sediment basin is constructed by excavating the pool area, constructing the auxiliary spillway, preparing the foundation as designed, and using 1500 cubic yards to create an embankment. The embankment will be designed and constructed according the Pond standard (378). The product of the storage times the effective height of the dam is less than 3,000. The effective height of the dam is 35 feet or less. The sediment storage capacity should be a minimum of 900 cubic feet per acre of disturbed area. The detention storage should be a minimum of 3600 cubic feet per acre of drainage area. The principal spillway is created using an approved conduit material and filter diaphragm. The earthen auxiliary spillway will be constructed as designed based on Pond standard (378). Associated practice(s): Other practices that may need to be implemented along with sediment basin to address all of the site specific resource concerns include: Critical Area Planting (342) and Mulching (484) where necessary to prevent erosion following construction activities, Structure for Water Control (587) if using a dewatering device, Pond Sealing or Lining (521A,521B,521C,521D).

**Feature Measure:** Embankment volume

**Scenario Unit::** Cubic Yard

**Scenario Typical Size:** 1500

**Total Scenario Cost:** $7,838.84

**Scenario Cost/Unit:** $5.23

**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 Yard | $326.97 | 3 | $980.91 |
| Dozer, 140 HP | 927 | Track mounted Dozer with horsepower range of 125 to 160. Equipment and power unit costs. Labor not included. | Hour | $112.82 | 23 | $2,594.86 |
| **Labor** | | | | | | |
| Skilled Labor | 230 | Labor requiring a high level skill set: Includes carpenters, welders, electricians, conservation professionals involved with data collection, monitoring, and or record keeping, etc. | Hour | $25.08 | 8 | $200.64 |
| Equipment Operators, Heavy | 233 | Includes: Cranes, Hydraulic Excavators >=50 HP, Dozers, Paving Machines, Rock Trenchers, Trenchers >=12", Dump Trucks, Ag Equipment >=150 HP, Scrapers, Water Wagons. | Hour | $23.93 | 23 | $550.39 |
| **Materials** | | | | | | |
| Aggregate, Sand, Graded, Washed | 45 | Sand, typical ASTM C33 gradation, includes materials, equipment and labor to transport and place | Cubic Yard | $30.40 | 19.6 | $595.84 |
| Aggregate, Gravel, Graded | 46 | Gravel, includes materials, equipment and labor to transport and place. Includes washed and unwashed gravel. | Cubic Yard | $30.82 | 1.6 | $49.31 |
| Pipe, PVC, 10", SCH 80 | 1351 | Materials: - 10" - PVC - SCH 80 - ASTM D1785 | Foot | $21.59 | 98 | $2,115.82 |
| Pipe, PVC, 12", SCH 80 | 1352 | Materials: - 12" - PVC - SCH 80 - ASTM D1785 | Foot | $29.69 | 8 | $237.52 |
| 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 | $2.38 | 118 | $280.84 |
| **Mobilization** | | | | | | |
| Mobilization, medium equipment | 1139 | Equipment with 70-150 HP or typical weights between 14,000 and 30,000 pounds. | Each | $232.71 | 1 | $232.71 |

**Practice:** 351 - Well Decommissioning

**Scenario** #1 - Shallow Well less than 20 feet 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. 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 or hand dug well that is less than 20 feet deep and inactive, abandoned, or unusable and provides a potential conduit for pesticides or nutrients to enter an aquifer. Assume 30 inch diameter casing.

**After Situation:**

Well is permanently sealed to prevent potential contamination of aquifer. 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::** Foot

**Scenario Typical Size:** 15

**Total Scenario Cost:** $2,356.82

**Scenario Cost/Unit:** $157.12

**Cost Details:**

| Component Name | ID | Description | Unit | Cost | QTY | Total |
|---|---|---|---|---|---|---|
| **Equipment Installation** | | | | | | |
| Earthfill, Manually Compacted | 50 | Earthfill, manually compacted, includes equipment and labor | Cubic Yard | $4.95 | 2.7 | $13.37 |
| Hydraulic Excavator, 2 CY | 932 | Track mounted hydraulic excavator with bucket capacity range of 1.5 to 2.5 CY. Equipment and power unit costs. Labor not included. | Hour | $149.59 | 1 | $149.59 |
| Grout pump | 1334 | Grout pump with tremie pipe. Equipment and power unit costs. Labor not included. | Hour | $15.31 | 2 | $30.62 |
| **Labor** | | | | | | |
| Skilled Labor | 230 | Labor requiring a high level skill set: Includes carpenters, welders, electricians, conservation professionals involved with data collection, monitoring, and or record keeping, etc. | Hour | $25.08 | 2 | $50.16 |
| **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 Yard | $609.23 | 2.7 | $1,644.92 |
| Chlorine | 1335 | Liquid chlorine bleach. Includes materials only. | Gallon | $2.74 | 1 | $2.74 |
| **Mobilization** | | | | | | |
| Mobilization, medium equipment | 1139 | Equipment with 70-150 HP or typical weights between 14,000 and 30,000 pounds. | Each | $232.71 | 2 | $465.42 |

**Practice:** 351 - Well Decommissioning

**Scenario** #2 - Shallow Well greater than 20 feet 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. 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 or hand dug well that is greater than 20 feet deep and inactive, abandoned, or unusable and provides a potential conduit for pesticides or nutrients to enter an aquifer. Assume 30 inch diameter casing.

**After Situation:**

Well is permanently sealed to prevent potential contamination of aquifer. 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::** Foot

**Scenario Typical Size:** 30

**Total Scenario Cost:** $4,487.88

**Scenario Cost/Unit:** $149.60

**Cost Details:**

| Component Name | ID | Description | Unit | Cost | QTY | Total |
|---|---|---|---|---|---|---|
| **Equipment Installation** | | | | | | |
| Earthfill, Manually Compacted | 50 | Earthfill, manually compacted, includes equipment and labor | Cubic Yard | $4.95 | 5.5 | $27.23 |
| Hydraulic Excavator, 2 CY | 932 | Track mounted hydraulic excavator with bucket capacity range of 1.5 to 2.5 CY. Equipment and power unit costs. Labor not included. | Hour | $149.59 | 3 | $448.77 |
| Grout pump | 1334 | Grout pump with tremie pipe. Equipment and power unit costs. Labor not included. | Hour | $15.31 | 3 | $45.93 |
| **Labor** | | | | | | |
| Skilled Labor | 230 | Labor requiring a high level skill set: Includes carpenters, welders, electricians, conservation professionals involved with data collection, monitoring, and or record keeping, etc. | Hour | $25.08 | 3 | $75.24 |
| Equipment Operators, Heavy | 233 | Includes: Cranes, Hydraulic Excavators >=50 HP, Dozers, Paving Machines, Rock Trenchers, Trenchers >=12", Dump Trucks, Ag Equipment >=150 HP, Scrapers, Water Wagons. | Hour | $23.93 | 3 | $71.79 |
| **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 Yard | $609.23 | 5.5 | $3,350.77 |
| Chlorine | 1335 | Liquid chlorine bleach. Includes materials only. | Gallon | $2.74 | 1 | $2.74 |
| **Mobilization** | | | | | | |
| Mobilization, medium equipment | 1139 | Equipment with 70-150 HP or typical weights between 14,000 and 30,000 pounds. | Each | $232.71 | 2 | $465.42 |

**Practice:** 351 - Well Decommissioning

**Scenario** #3 - Drilled well less than 300 feet deep with casing removed

**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:**

Drilled well that is less than 300 feet deep and inactive, abandoned, or unusable and provides a potential conduit for pesticides or nutrients to enter an aquifer. Typical well has 6 inch diameter casing.

**After Situation:**

Well is permanently sealed to prevent potential contamination of aquifer. 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::** Foot

**Scenario Typical Size:** 200

**Total Scenario Cost:** $7,776.87

**Scenario Cost/Unit:** $38.88

**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. | Hour | $149.59 | 8 | $1,196.72 |
| Grout pump | 1334 | Grout pump with tremie pipe. Equipment and power unit costs. Labor not included. | Hour | $15.31 | 8 | $122.48 |
| Hydrofracture Rig with Operator | 1818 | Equipment and power unit costs including mechanical packer equipment. Labor included. | Hour | $446.55 | 8 | $3,572.40 |
| **Labor** | | | | | | |
| Equipment Operators, Heavy | 233 | Includes: Cranes, Hydraulic Excavators >=50 HP, Dozers, Paving Machines, Rock Trenchers, Trenchers >=12", Dump Trucks, Ag Equipment >=150 HP, Scrapers, Water Wagons. | Hour | $23.93 | 8 | $191.44 |
| **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 Yard | $609.23 | 1.5 | $913.85 |
| Chlorine | 1335 | Liquid chlorine bleach. Includes materials only. | Gallon | $2.74 | 1 | $2.74 |
| **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 | $444.31 | 4 | $1,777.24 |

**Practice:** 351 - Well Decommissioning

**Scenario** #4 - Drilled well greater than 300 feet 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. 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:**

Drilled well that is greater than 300 feet deep and inactive, abandoned, or unusable and provides a potential conduit for pesticides or nutrients to enter an aquifer. Typical well has 6 inch diameter casing.

**After Situation:**

Well is permanently sealed to prevent potential contamination of aquifer. 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::** Foot

**Scenario Typical Size:** 500

**Total Scenario Cost:** $11,664.17

**Scenario Cost/Unit:** $23.33

**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. | Hour | $149.59 | 12 | $1,795.08 |
| Grout pump | 1334 | Grout pump with tremie pipe. Equipment and power unit costs. Labor not included. | Hour | $15.31 | 12 | $183.72 |
| Hydrofracture Rig with Operator | 1818 | Equipment and power unit costs including mechanical packer equipment. Labor included. | Hour | $446.55 | 12 | $5,358.60 |
| **Labor** | | | | | | |
| Equipment Operators, Heavy | 233 | Includes: Cranes, Hydraulic Excavators >=50 HP, Dozers, Paving Machines, Rock Trenchers, Trenchers >=12", Dump Trucks, Ag Equipment >=150 HP, Scrapers, Water Wagons. | Hour | $23.93 | 12 | $287.16 |
| **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 Yard | $609.23 | 3.7 | $2,254.15 |
| Chlorine | 1335 | Liquid chlorine bleach. Includes materials only. | Gallon | $2.74 | 3 | $8.22 |
| **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 | $444.31 | 4 | $1,777.24 |

**Practice:** 351 - Well Decommissioning

**Scenario** #5 - Decomissioning a drilled well less than 300 feet deep without casing removal

**Scenario Description:**

A well permit holder will seal and permanently close an inactive, abandoned, or unusable irrigatio 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. Does not require removal of entire casing depth.

**Before Situation:**

Drilled irrigation well that is less than 300 feet deep and inactive, abandoned, or unusable and provides a potential conduit for pesticides or nutrients to enter an aquifer. Typical well has 6 inch diameter casing.

**After Situation:**

Irrigation well is permanently sealed to prevent potential contamination of aquifer. 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::** Foot

**Scenario Typical Size:** 200

**Total Scenario Cost:** $1,261.82

**Scenario Cost/Unit:** $6.31

**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. | Hour | $50.99 | 1 | $50.99 |
| Grout pump | 1334 | Grout pump with tremie pipe. Equipment and power unit costs. Labor not included. | Hour | $15.31 | 1 | $15.31 |
| **Labor** | | | | | | |
| Skilled Labor | 230 | Labor requiring a high level skill set: Includes carpenters, welders, electricians, conservation professionals involved with data collection, monitoring, and or record keeping, etc. | Hour | $25.08 | 1 | $25.08 |
| Equipment Operators, Light | 232 | Includes: Skid Steer Loaders, Hydraulic Excavators <50 HP, Trenchers <12", Ag Equipment <150 HP, Pickup Trucks, Forklifts, Mulchers | Hour | $21.14 | 1 | $21.14 |
| **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 Yard | $609.23 | 1.5 | $913.85 |
| Chlorine | 1335 | Liquid chlorine bleach. Includes materials only. | Gallon | $2.74 | 1 | $2.74 |
| **Mobilization** | | | | | | |
| Mobilization, medium equipment | 1139 | Equipment with 70-150 HP or typical weights between 14,000 and 30,000 pounds. | Each | $232.71 | 1 | $232.71 |

**Practice:** 355 - Groundwater Testing

**Scenario** #5 - 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

**Total Scenario Cost:** $213.39

**Scenario Cost/Unit:** $213.39

**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. | Hour | $18.93 | 0.5 | $9.47 |
| **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 | $41.52 | 1 | $41.52 |
| 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 | $162.40 | 1 | $162.40 |

**Practice:** 355 - Groundwater Testing

**Scenario** #6 - 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

**Total Scenario Cost:** $50.99

**Scenario Cost/Unit:** $50.99

**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. | Hour | $18.93 | 0.5 | $9.47 |
| **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 | $41.52 | 1 | $41.52 |

**Practice:** 355 - Groundwater Testing

**Scenario** #7 - 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

**Total Scenario Cost:** $260.74

**Scenario Cost/Unit:** $260.74

**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. | Hour | $18.93 | 0.5 | $9.47 |
| **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 | $41.52 | 1 | $41.52 |
| 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 | $209.75 | 1 | $209.75 |

**Practice:** 356 - Dike

**Scenario** #1 - Material haul Less Than 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. Cost Estimate is based on an earthen dike assumed 1000 lineal feet, Class II (6 ft. in height, 8 ft. top width, 2H:1V side slopes) with a material haul distance of less than 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 Yard

**Scenario Typical Size:** 4500

**Total Scenario Cost:** $18,485.64

**Scenario Cost/Unit:** $4.11

**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 Yard | $3.76 | 4500 | $16,920.00 |
| **Mobilization** | | | | | | |
| Mobilization, medium equipment | 1139 | Equipment with 70-150 HP or typical weights between 14,000 and 30,000 pounds. | Each | $232.71 | 1 | $232.71 |
| Mobilization, large equipment | 1140 | Equipment >150HP or typical weights greater than 30,000 pounds or loads requiring over width or over length permits. | Each | $444.31 | 3 | $1,332.93 |

**Practice:** 356 - Dike

**Scenario** #2 - Material haul Greater Than 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. Cost Estimate is based on an earthen dike assumed 1000 lineal feet, Class II (6 ft. in height, 8 ft. top width, 2H:1V side slopes) with a material haul distance of greater than 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 Yard

**Scenario Typical Size:** 4500

**Total Scenario Cost:** $21,185.64

**Scenario Cost/Unit:** $4.71

**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 Yard | $3.76 | 4500 | $16,920.00 |
| 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 | $0.30 | 9000 | $2,700.00 |
| **Mobilization** | | | | | | |
| Mobilization, medium equipment | 1139 | Equipment with 70-150 HP or typical weights between 14,000 and 30,000 pounds. | Each | $232.71 | 1 | $232.71 |
| Mobilization, large equipment | 1140 | Equipment >150HP or typical weights greater than 30,000 pounds or loads requiring over width or over length permits. | Each | $444.31 | 3 | $1,332.93 |

**Practice:** 356 - Dike

**Scenario** #3 - Shallow Water Area

**Scenario Description:**

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. Cost estimate is based on a 2,640 foot long 3 ft high earthen dike (Class III) with a top width of 10 ft and having 3H:1V side slopes used to create a wetland or other shallow water area. Associated practices include, but are not limited to: PS327 Conservation Cover, PS656 Constructed Wetland, PS 342 Critical Area Planting, (378) Ponds, (382) Fence, (464) Irrigation Land Levelling, (500) Obstruction Removal, (528) Prescribed Grazing, (587) Structure for Water Control, (620) Underground Outlet, (645) Upland Wildlife Management, (658) Wetland Creation, (659) Wetland Enhancement, (657) Wetland Restoration, (644) Wetland Wildlife Habitat Management.

**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.

**After Situation:**

A 2,640 foot long Class III dike is constructed with an average height of 3 feet, top width of 10 feet, and 3:1 side slopes. The water level is controlled by a stable earthen structure, and environmental benefit provided.

**Feature Measure:** Volume of Earthfill (including volu

**Scenario Unit::** Cubic Yard

**Scenario Typical Size:** 5573

**Total Scenario Cost:** $22,520.12

**Scenario Cost/Unit:** $4.04

**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 Yard | $3.76 | 5573 | $20,954.48 |
| **Mobilization** | | | | | | |
| Mobilization, medium equipment | 1139 | Equipment with 70-150 HP or typical weights between 14,000 and 30,000 pounds. | Each | $232.71 | 1 | $232.71 |
| Mobilization, large equipment | 1140 | Equipment >150HP or typical weights greater than 30,000 pounds or loads requiring over width or over length permits. | Each | $444.31 | 3 | $1,332.93 |

**Practice:** 359 - Waste Treatment Lagoon

**Scenario** #1 - Waste Treatment Lagoon

**Scenario Description:**

A waste treatment lagoon is a component of a waste management system that provides biological treatment of manure and other byproducts of animal agricultural operations by reducing the pollution potential. Resource concern addressed is water quality by reducing the pollution potential to surface and groundwater by treating and storing liquid waste. Earthen lagoon liners are addressed with another standard.Potential Associated Practices: Pond Sealing or Lining, Bentonite Sealant (521C), Pond Sealing or Lining, Compacted Clay Treatment (521D), Pond Sealing or Lining, Flexible Membrane (521A), Pond Sealing or Lining, Soil Dispersant (521B), Fence (382), Critical Area Planting (342), Nutrient Management (590), Waste Transfer (634), Heavy Use Area Protection (561), and Solid/Liquid Waste Separation Facility (632).

**Before Situation:**

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

**After Situation:**

A waste treatment lagoon constructed from on-site material provides an environmentally safe facility for storing manure and other agricultural waste by-products. This facility provides the landowner a means of storing and treating waste until it can be utilized in a proper manner in accordance with a nutrient management plan.Typical design size : Design Volume 439,440 ft3; 260' X 208' (top); 3:1 inside and outside side slopes; cut/fill ratio = 1.25; total depth = 13'; 1' freeboard (not included in design volume)

**Feature Measure:** Design Storage Volume

**Scenario Unit::** Cubic Foot

**Scenario Typical Size:** 439440

**Total Scenario Cost:** $92,304.26

**Scenario Cost/Unit:** $0.21

**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 Yard | $3.76 | 9102 | $34,223.52 |
| Earthfill, Dumped and Spread | 51 | Earthfill, dumped and spread without compaction effort, includes equipment and labor | Cubic Yard | $3.08 | 8101 | $24,951.08 |
| Stripping and stockpiling, topsoil | 1199 | Stripping and stockpiling of topsoil adjacent to stripping area. Includes equipment and labor. | Cubic Yard | $0.81 | 1389 | $1,125.09 |
| Excavation, common earth, large equipment, 150 ft | 1223 | Bulk excavation of common earth including sand and gravel with dozer >100 HP with average push distance of 150 feet. Includes equipment and labor. | Cubic Yard | $3.43 | 9125 | $31,298.75 |
| **Materials** | | | | | | |
| Structural steel tubing, 2" diameter | 1120 | Structural steel tubing, 2" diameter, 1/8" wall thickness, materials only | Foot | $3.60 | 8 | $28.80 |
| **Mobilization** | | | | | | |
| Mobilization, medium equipment | 1139 | Equipment with 70-150 HP or typical weights between 14,000 and 30,000 pounds. | Each | $232.71 | 1 | $232.71 |
| Mobilization, large equipment | 1140 | Equipment >150HP or typical weights greater than 30,000 pounds or loads requiring over width or over length permits. | Each | $444.31 | 1 | $444.31 |

**Practice:** 359 - Waste Treatment Lagoon

**Scenario** #2 - Waste Impoundment Facility Renovation Solids Removal

**Scenario Description:**

A waste treatment lagoon is a component of a waste management system that provides biological treatment of manure and other byproducts of animal agricultural operations by reducing the pollution potential. During the life of the structure , the solid/liquid waste was removed down to 2 ft of the bottom in order to not damage the liners. The Renovation of Waste Storage Structure, Waste Storage Ponds or Lagoons that have served its design life and filled with solids and is a potential environmental hazard. Resource concern addressed is water quality by reducing the pollution potential to surface and groundwater by treating and storing liquid waste. Earthen lagoon liners are addressed with another standard.Potential Associated Practices: Pond Sealing or Lining, Bentonite Sealant (521C), Pond Sealing or Lining, Compacted Clay Treatment (521D), Pond Sealing or Lining, Flexible Membrane (521A), Pond Sealing or Lining, Soil Dispersant (521B), Fence (382), Critical Area Planting (342), Nutrient Management (590), Waste Transfer (634), Heavy Use Area Protection (561), and Solid/Liquid Waste Separation Facility (632) Closure of Waste Impoiundment (360).

**Before Situation:**

An active facility with a waste treatment lagoon has reached or surpassed the design life of the structure. Though the structre is currently not causing an environmental hazard, the capacite has been reduced by the accumulation of solids between 40% and 100% capacity has been reached. Lagoon or holding pond has been in operation and liquids removed with only agitation of the manure. The outside embankment has erosion from traffic and erosion threatening the structural stability.

**After Situation:**

This scenario assumes a waste treatment lagoon, with top dimensions of 110 ft x 110 ft, 8 ft total depth with 2:1 side slopes. The total structural storage volume equals 71,371 cubic feet. The volume of solid waste to be removed from the bottom 2 ft. equals 13860 cubic feet. In order to suspend solids for removal water is added and agitated. The volume of earthwork (earthfill and shaping) required to redress the slopes is 200 cubic yards. Renovating of a liquid waste treatment 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). The embankment will be retuned to it's as-built deminsions or as needed for structural stability. The disturbed areas shall be vegetated in accordance with Critical Area Planting (342). Rehabilitation 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 is restored to it's former capacity and strength.

**Feature Measure:** Cubic Feet of Solids Removed

**Scenario Unit::** Cubic Foot

**Scenario Typical Size:** 13860

**Total Scenario Cost:** $6,721.96

**Scenario Cost/Unit:** $0.48

**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 Yard | $3.76 | 200 | $752.00 |
| Hydraulic Excavator, 1 CY | 931 | Track mounted hydraulic excavator with bucket capacity range of 0.8 to 1.5 CY. Equipment and power unit costs. Labor not included. | Hour | $103.47 | 3 | $310.41 |
| 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 Foot | $0.30 | 13860 | $4,158.00 |
| **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. | Hour | $18.93 | 4 | $75.72 |
| Equipment Operators, Heavy | 233 | Includes: Cranes, Hydraulic Excavators >=50 HP, Dozers, Paving Machines, Rock Trenchers, Trenchers >=12", Dump Trucks, Ag Equipment >=150 HP, Scrapers, Water Wagons. | Hour | $23.93 | 3 | $71.79 |
| **Mobilization** | | | | | | |
| Mobilization, medium equipment | 1139 | Equipment with 70-150 HP or typical weights between 14,000 and 30,000 pounds. | Each | $232.71 | 2 | $465.42 |
| Mobilization, large equipment | 1140 | Equipment >150HP or typical weights greater than 30,000 pounds or loads requiring over width or over length permits. | Each | $444.31 | 2 | $888.62 |

**Practice:** 360 - Waste Facility Closure

**Scenario** #1 - Poultry House Soil Remediation

**Scenario Description:**

This practice scenario includes the remediation of the soil in an abandoned poultry structures previously used to store poultry waste (litter) on an earthen floor.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:**

The abandoned poultry house has a damaged roof exposing the earthen floor of the structure to rainfall. Rainfall and nutrients on the floor of the house pose a risk to surface water from contaminated runoff or to ground water from seepage into the underlying soils.

**After Situation:**

This scenario is based on a 40' wide x 400' long poultry house with 1 foot depth of nutrient laden soil to remediate (16,000 CF). Payment under this scenario includes only activities associated with the soil remediation. Soil remediation activities in this scenario include removing the nutrient enriched soil found in the first 7 inches of soil beneath the litter floor and mixing wood chips with the remaining 5 inches of soil. Nutrient level testing and field application of the removed soil shall be performed according to nutrient planning in conformance with Nutrient Management, Code 590. The remaining 5 inches of soil will be remediated in-situ by mixing in wood chips, at a rate of 33% of the volume of remaining soil, for the purpose of nitrogen sequestration. Additional soil will be hauled in (estimated at 110% of the soil volume that was removed for field application) to backfill the depression. Shaping and crowning of the soil material on the disturbed area and critical area seeding will be done to provide drainage, complete the site remediation and establish vegetation. Operation and maintenance of the site will include nutrient testing the following year to determine if the nutrients in the mixed soil have been remediated and surface and ground water resource concerns have been addressed. In this scenario, samples at four (4) locations will be taken at 6, 12, 18 and 24 inches at the end of Year 1.

**Feature Measure:** Cubic feet of soil remediated

**Scenario Unit::** Cubic Foot

**Scenario Typical Size:** 16000

**Total Scenario Cost:** $10,897.78

**Scenario Cost/Unit:** $0.68

**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 Yard | $3.08 | 380 | $1,170.40 |
| Hydraulic Excavator, 1 CY | 931 | Track mounted hydraulic excavator with bucket capacity range of 0.8 to 1.5 CY. Equipment and power unit costs. Labor not included. | Hour | $103.47 | 31 | $3,207.57 |
| Manure, compost, application | 955 | Loading, hauling and spreading manure/compost by ground equipment. Includes equipment, power unit and labor costs. | Hour | $98.54 | 19 | $1,872.26 |
| Tractor, agricultural, 120 HP | 962 | Agricultural tractor with horsepower range of 90 to 140. Equipment and power unit costs. Labor not included. | Hour | $52.49 | 1 | $52.49 |
| Aggregate, Wood Chips | 1098 | Includes materials, equipment and labor | Cubic Yard | $19.17 | 82 | $1,571.94 |
| Front End Loader, 185 HP | 1619 | Wheeled front end loader with horsepower range of 160 to 210. Equipment and power unit costs. Labor not included. | Hour | $85.22 | 6 | $511.32 |
| **Labor** | | | | | | |
| Equipment Operators, Light | 232 | Includes: Skid Steer Loaders, Hydraulic Excavators <50 HP, Trenchers <12", Ag Equipment <150 HP, Pickup Trucks, Forklifts, Mulchers | Hour | $21.14 | 1 | $21.14 |
| Equipment Operators, Heavy | 233 | Includes: Cranes, Hydraulic Excavators >=50 HP, Dozers, Paving Machines, Rock Trenchers, Trenchers >=12", Dump Trucks, Ag Equipment >=150 HP, Scrapers, Water Wagons. | Hour | $23.93 | 31 | $741.83 |
| **Materials** | | | | | | |
| Test, Soil Test, Standard | 299 | Includes materials, shiping, labor, and equipment costs. | Each | $10.13 | 16 | $162.08 |
| **Mobilization** | | | | | | |
| Mobilization, medium equipment | 1139 | Equipment with 70-150 HP or typical weights between 14,000 and 30,000 pounds. | Each | $232.71 | 3 | $698.13 |
| Mobilization, large equipment | 1140 | Equipment >150HP or typical weights greater than 30,000 pounds or loads requiring over width or over length permits. | Each | $444.31 | 2 | $888.62 |

**Practice:** 360 - Waste Facility Closure

**Scenario** #2 - Feedlot Closure

**Scenario Description:**

This practice scenario includes the remediation of the soil on an abandoned feedlot previously used to feed animals on a bare earthen lot.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:**

The feedlot is abandoned. Vegetation has not been reestablished. The high level of nutrients in the soil is preventing volunteer establishment of native vegetation. Rainfall and nutrients on the bare earth feedlot pose a risk to surface water from contaminated runoff or to ground water from seepage into the underlying soils.

**After Situation:**

This scenario is based on a 3 acre feedlot. Surveys and testing have determined the manure pack averages 8 inches in depth and the level of nutirients in the 4 inches of soil below the manure pack is too high to treat insitu with vegetation. Payment under this scenario includes only activities associated with the soil remediation. Soil remediation activities in this scenario include removing the nutrient enriched manure pack and soil, an average of 12 inches below the existing surface (130,680 CF). The excavated surface will be vegetated with a mix of salt tolerant plants in conformance with Critical Area Planting, Code 342. Nutrient level testing and field application of the removed soil shall be performed according to nutrient planning in conformance with Nutrient Management, Code 590. Shaping and crowning of the soil material on the disturbed area and critical area seeding will be done to provide drainage, complete the site remediation and establish vegetation. Operation and maintenance of the site will include nutrient testing the following year to determine if the soil has been remediated and surface and ground water resource concerns have been addressed. In this scenario, samples at four (4) locations will be taken at 6, 12, 18 and 24 inches at the end of Year 1. Fence and feedbunk removal is to be performed under Obatruction Removal, Code 500.

**Feature Measure:** Cubic feet of soil remediated

**Scenario Unit::** Cubic Foot

**Scenario Typical Size:** 130680

**Total Scenario Cost:** $32,230.76

**Scenario Cost/Unit:** $0.25

**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. | Hour | $103.47 | 40 | $4,138.80 |
| Manure, compost, application | 955 | Loading, hauling and spreading manure/compost by ground equipment. Includes equipment, power unit and labor costs. | Hour | $98.54 | 269 | $26,507.26 |
| **Labor** | | | | | | |
| Equipment Operators, Heavy | 233 | Includes: Cranes, Hydraulic Excavators >=50 HP, Dozers, Paving Machines, Rock Trenchers, Trenchers >=12", Dump Trucks, Ag Equipment >=150 HP, Scrapers, Water Wagons. | Hour | $23.93 | 40 | $957.20 |
| **Materials** | | | | | | |
| Test, Soil Test, Standard | 299 | Includes materials, shiping, labor, and equipment costs. | Each | $10.13 | 16 | $162.08 |
| **Mobilization** | | | | | | |
| Mobilization, medium equipment | 1139 | Equipment with 70-150 HP or typical weights between 14,000 and 30,000 pounds. | Each | $232.71 | 2 | $465.42 |

**Practice:** 360 - Waste Facility Closure

**Scenario** #3 - Demolition of Concrete Waste Storage Structure

**Scenario Description:**

This practice scenario includes the demolition of a 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 environmental sustainability by the potential for impacts to water and air quality.

**After Situation:**

This scenario assumes a concrete waste storage structure, with top dimensions of 60 ft x 60 ft with 10 ft vertical walls. The walls are 8 inches thick and the concrete floor is 5 inches thick and the footing for the wall is 12 inches wide by 24 inches deep. The total structural storage volume equals 36,000 cubic feet. The total volume of concrete to be demolished is 3,100 cubic feet ([2 X (60 ft + 60 ft) X 10ft X 8in /12 in/ft] + [60 ft X 60 ft X 5in /12 in/ft] + {2x(60ft+ 60ft)x12in/12in/ftx24 in/12in/ft)}). The volume of waste to be removed approximately equals 50% of the structural volume (50% X 36,000 = 18,000 CF). The volume of earthwork (earthfill and/or excavation, final grading) required is approximately 50% of the structural volume. 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:** Cubic Feet of concrete to be demol

**Scenario Unit::** Cubic Foot

**Scenario Typical Size:** 3580

**Total Scenario Cost:** $8,421.77

**Scenario Cost/Unit:** $2.35

**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 Yard | $3.76 | 667 | $2,507.92 |
| Hydraulic Excavator, 1 CY | 931 | Track mounted hydraulic excavator with bucket capacity range of 0.8 to 1.5 CY. Equipment and power unit costs. Labor not included. | Hour | $103.47 | 10 | $1,034.70 |
| Manure, compost, injection | 956 | Loading, hauling and injecting manure/compost by ground equipment. Includes equipment, power unit and labor costs. | Gallon | $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 Yard | $10.00 | 133 | $1,330.00 |
| 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 | $0.30 | 1330 | $399.00 |
| **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. | Hour | $18.93 | 10 | $189.30 |
| Equipment Operators, Heavy | 233 | Includes: Cranes, Hydraulic Excavators >=50 HP, Dozers, Paving Machines, Rock Trenchers, Trenchers >=12", Dump Trucks, Ag Equipment >=150 HP, Scrapers, Water Wagons. | Hour | $23.93 | 10 | $239.30 |
| **Mobilization** | | | | | | |
| Mobilization, medium equipment | 1139 | Equipment with 70-150 HP or typical weights between 14,000 and 30,000 pounds. | Each | $232.71 | 4 | $930.84 |
| Mobilization, large equipment | 1140 | Equipment >150HP or typical weights greater than 30,000 pounds or loads requiring over width or over length permits. | Each | $444.31 | 1 | $444.31 |

**Practice:** 360 - Waste Facility Closure

**Scenario** #4 - Liquid Waste Impoundment Closure with 75percent Liquids and 25percent 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 Foot

**Scenario Typical Size:** 63851

**Total Scenario Cost:** $14,691.44

**Scenario Cost/Unit:** $0.23

**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 Yard | $1.99 | 709 | $1,410.91 |
| Earthfill, Roller Compacted | 49 | Earthfill, roller or machine compacted, includes equipment and labor | Cubic Yard | $3.76 | 473 | $1,778.48 |
| Hydraulic Excavator, 1 CY | 931 | Track mounted hydraulic excavator with bucket capacity range of 0.8 to 1.5 CY. Equipment and power unit costs. Labor not included. | Hour | $103.47 | 12 | $1,241.64 |
| Manure, compost, injection | 956 | Loading, hauling and injecting manure/compost by ground equipment. Includes equipment, power unit and labor costs. | Gallon | $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 Foot | $0.30 | 15963 | $4,788.90 |
| **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. | Hour | $18.93 | 12 | $227.16 |
| Equipment Operators, Heavy | 233 | Includes: Cranes, Hydraulic Excavators >=50 HP, Dozers, Paving Machines, Rock Trenchers, Trenchers >=12", Dump Trucks, Ag Equipment >=150 HP, Scrapers, Water Wagons. | Hour | $23.93 | 12 | $287.16 |
| **Mobilization** | | | | | | |
| Mobilization, medium equipment | 1139 | Equipment with 70-150 HP or typical weights between 14,000 and 30,000 pounds. | Each | $232.71 | 4 | $930.84 |
| Mobilization, large equipment | 1140 | Equipment >150HP or typical weights greater than 30,000 pounds or loads requiring over width or over length permits. | Each | $444.31 | 1 | $444.31 |

**Practice:** 360 - Waste Facility Closure

**Scenario** #5 - Liquid Waste Impoundment Closure with 50percent Liquids and 50percent 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 50% liquid/slurry waste and 50% 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 50% if the structural volume (50% X 63,851 CF = 31,925 CF). The volume of solid waste to be removed approximately equals 50% of the structural volume (50% X 63,851 = 31,925 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 Foot

**Scenario Typical Size:** 63851

**Total Scenario Cost:** $18,286.03

**Scenario Cost/Unit:** $0.29

**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 Yard | $1.99 | 709 | $1,410.91 |
| Earthfill, Roller Compacted | 49 | Earthfill, roller or machine compacted, includes equipment and labor | Cubic Yard | $3.76 | 473 | $1,778.48 |
| Hydraulic Excavator, 1 CY | 931 | Track mounted hydraulic excavator with bucket capacity range of 0.8 to 1.5 CY. Equipment and power unit costs. Labor not included. | Hour | $103.47 | 12 | $1,241.64 |
| Manure, compost, injection | 956 | Loading, hauling and injecting manure/compost by ground equipment. Includes equipment, power unit and labor costs. | Gallon | $0.01 | 238803 | $2,388.03 |
| 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 Foot | $0.30 | 31925 | $9,577.50 |
| **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. | Hour | $18.93 | 12 | $227.16 |
| Equipment Operators, Heavy | 233 | Includes: Cranes, Hydraulic Excavators >=50 HP, Dozers, Paving Machines, Rock Trenchers, Trenchers >=12", Dump Trucks, Ag Equipment >=150 HP, Scrapers, Water Wagons. | Hour | $23.93 | 12 | $287.16 |
| **Mobilization** | | | | | | |
| Mobilization, medium equipment | 1139 | Equipment with 70-150 HP or typical weights between 14,000 and 30,000 pounds. | Each | $232.71 | 4 | $930.84 |
| Mobilization, large equipment | 1140 | Equipment >150HP or typical weights greater than 30,000 pounds or loads requiring over width or over length permits. | Each | $444.31 | 1 | $444.31 |

**Practice:** 360 - Waste Facility Closure

**Scenario** #6 - Liquid Waste Impoundment Closure with 25percent Liquids and 75percent 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 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% if the structural volume (25% X 63,851 CF = 15,9635 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 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 Foot

**Scenario Typical Size:** 63851

**Total Scenario Cost:** $21,880.91

**Scenario Cost/Unit:** $0.34

**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 Yard | $1.99 | 709 | $1,410.91 |
| Earthfill, Roller Compacted | 49 | Earthfill, roller or machine compacted, includes equipment and labor | Cubic Yard | $3.76 | 473 | $1,778.48 |
| Hydraulic Excavator, 1 CY | 931 | Track mounted hydraulic excavator with bucket capacity range of 0.8 to 1.5 CY. Equipment and power unit costs. Labor not included. | Hour | $103.47 | 12 | $1,241.64 |
| Manure, compost, injection | 956 | Loading, hauling and injecting manure/compost by ground equipment. Includes equipment, power unit and labor costs. | Gallon | $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 Foot | $0.30 | 47888 | $14,366.40 |
| **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. | Hour | $18.93 | 12 | $227.16 |
| Equipment Operators, Heavy | 233 | Includes: Cranes, Hydraulic Excavators >=50 HP, Dozers, Paving Machines, Rock Trenchers, Trenchers >=12", Dump Trucks, Ag Equipment >=150 HP, Scrapers, Water Wagons. | Hour | $23.93 | 12 | $287.16 |
| **Mobilization** | | | | | | |
| Mobilization, medium equipment | 1139 | Equipment with 70-150 HP or typical weights between 14,000 and 30,000 pounds. | Each | $232.71 | 4 | $930.84 |
| Mobilization, large equipment | 1140 | Equipment >150HP or typical weights greater than 30,000 pounds or loads requiring over width or over length permits. | Each | $444.31 | 1 | $444.31 |

**Practice:** 360 - Waste Facility Closure

**Scenario** #7 - Liquid Waste Impoundment Closure with 0 percent Liquids and 100percent 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 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 (63,851 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 Foot

**Scenario Typical Size:** 63851

**Total Scenario Cost:** $25,243.09

**Scenario Cost/Unit:** $0.40

**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 Yard | $1.99 | 709 | $1,410.91 |
| Earthfill, Roller Compacted | 49 | Earthfill, roller or machine compacted, includes equipment and labor | Cubic Yard | $3.76 | 473 | $1,778.48 |
| Hydraulic Excavator, 1 CY | 931 | Track mounted hydraulic excavator with bucket capacity range of 0.8 to 1.5 CY. Equipment and power unit costs. Labor not included. | Hour | $103.47 | 12 | $1,241.64 |
| 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 Foot | $0.30 | 63851 | $19,155.30 |
| **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. | Hour | $18.93 | 12 | $227.16 |
| Equipment Operators, Heavy | 233 | Includes: Cranes, Hydraulic Excavators >=50 HP, Dozers, Paving Machines, Rock Trenchers, Trenchers >=12", Dump Trucks, Ag Equipment >=150 HP, Scrapers, Water Wagons. | Hour | $23.93 | 12 | $287.16 |
| **Mobilization** | | | | | | |
| Mobilization, medium equipment | 1139 | Equipment with 70-150 HP or typical weights between 14,000 and 30,000 pounds. | Each | $232.71 | 3 | $698.13 |
| Mobilization, large equipment | 1140 | Equipment >150HP or typical weights greater than 30,000 pounds or loads requiring over width or over length permits. | Each | $444.31 | 1 | $444.31 |

**Practice:** 360 - Waste Facility Closure

**Scenario** #8 - Liquid Waste Impoundment Conversion to Fresh Water Storage with 75percent Liquids and 25percent 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 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/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 Foot

**Scenario Typical Size:** 63851

**Total Scenario Cost:** $11,360.41

**Scenario Cost/Unit:** $0.18

**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 Yard | $3.76 | 118 | $443.68 |
| Hydraulic Excavator, 1 CY | 931 | Track mounted hydraulic excavator with bucket capacity range of 0.8 to 1.5 CY. Equipment and power unit costs. Labor not included. | Hour | $103.47 | 8 | $827.76 |
| Manure, compost, injection | 956 | Loading, hauling and injecting manure/compost by ground equipment. Includes equipment, power unit and labor costs. | Gallon | $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 Foot | $0.30 | 15963 | $4,788.90 |
| **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. | Hour | $18.93 | 8 | $151.44 |
| Equipment Operators, Heavy | 233 | Includes: Cranes, Hydraulic Excavators >=50 HP, Dozers, Paving Machines, Rock Trenchers, Trenchers >=12", Dump Trucks, Ag Equipment >=150 HP, Scrapers, Water Wagons. | Hour | $23.93 | 8 | $191.44 |
| **Mobilization** | | | | | | |
| Mobilization, medium equipment | 1139 | Equipment with 70-150 HP or typical weights between 14,000 and 30,000 pounds. | Each | $232.71 | 4 | $930.84 |
| Mobilization, large equipment | 1140 | Equipment >150HP or typical weights greater than 30,000 pounds or loads requiring over width or over length permits. | Each | $444.31 | 1 | $444.31 |

**Practice:** 360 - Waste Facility Closure

**Scenario** #9 - Liquid Waste Impoundment Conversion to Fresh Water Storage with 50percent Liquids and 50petcent 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 50% liquid/slurry waste and 50% 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 50% of the structural volume (50% X 63,851 CF = 31,925 CF). The volume of solid waste to be removed approximately equals 50% of the structural volume (50% X 63,851 = 31,925 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 Foot

**Scenario Typical Size:** 63851

**Total Scenario Cost:** $14,955.00

**Scenario Cost/Unit:** $0.23

**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 Yard | $3.76 | 118 | $443.68 |
| Hydraulic Excavator, 1 CY | 931 | Track mounted hydraulic excavator with bucket capacity range of 0.8 to 1.5 CY. Equipment and power unit costs. Labor not included. | Hour | $103.47 | 8 | $827.76 |
| Manure, compost, injection | 956 | Loading, hauling and injecting manure/compost by ground equipment. Includes equipment, power unit and labor costs. | Gallon | $0.01 | 238803 | $2,388.03 |
| 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 Foot | $0.30 | 31925 | $9,577.50 |
| **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. | Hour | $18.93 | 8 | $151.44 |
| Equipment Operators, Heavy | 233 | Includes: Cranes, Hydraulic Excavators >=50 HP, Dozers, Paving Machines, Rock Trenchers, Trenchers >=12", Dump Trucks, Ag Equipment >=150 HP, Scrapers, Water Wagons. | Hour | $23.93 | 8 | $191.44 |
| **Mobilization** | | | | | | |
| Mobilization, medium equipment | 1139 | Equipment with 70-150 HP or typical weights between 14,000 and 30,000 pounds. | Each | $232.71 | 4 | $930.84 |
| Mobilization, large equipment | 1140 | Equipment >150HP or typical weights greater than 30,000 pounds or loads requiring over width or over length permits. | Each | $444.31 | 1 | $444.31 |

**Practice:** 360 - Waste Facility Closure

**Scenario** #10 - Liquid Waste Impoundment Conversion to Fresh Water Storage with 25percent Liquids and 75percent 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 Foot

**Scenario Typical Size:** 63851

**Total Scenario Cost:** $18,549.88

**Scenario Cost/Unit:** $0.29

**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 Yard | $3.76 | 118 | $443.68 |
| Hydraulic Excavator, 1 CY | 931 | Track mounted hydraulic excavator with bucket capacity range of 0.8 to 1.5 CY. Equipment and power unit costs. Labor not included. | Hour | $103.47 | 8 | $827.76 |
| Manure, compost, injection | 956 | Loading, hauling and injecting manure/compost by ground equipment. Includes equipment, power unit and labor costs. | Gallon | $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 Foot | $0.30 | 47888 | $14,366.40 |
| **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. | Hour | $18.93 | 8 | $151.44 |
| Equipment Operators, Heavy | 233 | Includes: Cranes, Hydraulic Excavators >=50 HP, Dozers, Paving Machines, Rock Trenchers, Trenchers >=12", Dump Trucks, Ag Equipment >=150 HP, Scrapers, Water Wagons. | Hour | $23.93 | 8 | $191.44 |
| **Mobilization** | | | | | | |
| Mobilization, medium equipment | 1139 | Equipment with 70-150 HP or typical weights between 14,000 and 30,000 pounds. | Each | $232.71 | 4 | $930.84 |
| Mobilization, large equipment | 1140 | Equipment >150HP or typical weights greater than 30,000 pounds or loads requiring over width or over length permits. | Each | $444.31 | 1 | $444.31 |

**Practice:** 360 - Waste Facility Closure

**Scenario** #11 - Liquid Waste Impoundment Conversion to Fresh Water Storage with 0 percent Liquids and 100percent 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 Foot

**Scenario Typical Size:** 63851

**Total Scenario Cost:** $21,912.06

**Scenario Cost/Unit:** $0.34

**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 Yard | $3.76 | 118 | $443.68 |
| Hydraulic Excavator, 1 CY | 931 | Track mounted hydraulic excavator with bucket capacity range of 0.8 to 1.5 CY. Equipment and power unit costs. Labor not included. | Hour | $103.47 | 8 | $827.76 |
| 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 Foot | $0.30 | 63851 | $19,155.30 |
| **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. | Hour | $18.93 | 8 | $151.44 |
| Equipment Operators, Heavy | 233 | Includes: Cranes, Hydraulic Excavators >=50 HP, Dozers, Paving Machines, Rock Trenchers, Trenchers >=12", Dump Trucks, Ag Equipment >=150 HP, Scrapers, Water Wagons. | Hour | $23.93 | 8 | $191.44 |
| **Mobilization** | | | | | | |
| Mobilization, medium equipment | 1139 | Equipment with 70-150 HP or typical weights between 14,000 and 30,000 pounds. | Each | $232.71 | 3 | $698.13 |
| Mobilization, large equipment | 1140 | Equipment >150HP or typical weights greater than 30,000 pounds or loads requiring over width or over length permits. | Each | $444.31 | 1 | $444.31 |

**Practice:** 362 - Diversion

**Scenario** #1 - Diversion

**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, 500 feet long installed on a field slope of 5 percent and requires 1 CY excavation per LF. Channel my be level or gradient and ridge may be vegetated or farmed. The quantity of excavation and fill is balanced.

**Before 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 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:** Diversion Fill Volume

**Scenario Unit::** Cubic Yard

**Scenario Typical Size:** 500

**Total Scenario Cost:** $1,334.15

**Scenario Cost/Unit:** $2.67

**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 Yard | $1.99 | 500 | $995.00 |
| **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. | Hour | $18.93 | 2 | $37.86 |
| Supervisor or Manager | 234 | Labor involving supervision or management activities. Includes crew supervisors, foremen and farm/ranch managers time required for adopting new technology, etc. | Hour | $34.29 | 2 | $68.58 |
| **Mobilization** | | | | | | |
| Mobilization, medium equipment | 1139 | Equipment with 70-150 HP or typical weights between 14,000 and 30,000 pounds. | Each | $232.71 | 1 | $232.71 |

**Practice:** 362 - Diversion

**Scenario** #2 - Water Bars_Dips

**Scenario Description:**

An earthen channel constructed across long slopes with supporting ridge on lower side, to divert runoff off roads/travel ways, and away from gullies, critical erosion areas, construction areas or other sensitive areas in order to prevent concentrated flow down slopes. Outlet may be waterway, culvert, underground outlet. or other suitable stable outlet. Estimated cost is based on a 500 ft section access road and firebreak having a width of 14 ft and slope of 12%. In order to prevent gully erosion a system of 13 water bars and rolling dips each with a 3 ft top width, 4H:1V slope, average height of 1.5 ft and, 20 linear feet (total of 260 LF) are constructed including one on the top where the grade breaks. The quantity of excavation and fill is balanced.

**Before Situation:**

Excessive sedimentation and soil erosion as a result of gully, rill and sheet erosion which exceeds "T" from farm fields and other locations. Eroded soil is trasported via concentrated flow from natural gullies and ruts from vechile and/or animal traffic directly to a stream at the base of the slope.

**After Situation:**

Walter bars and rolling dips are installed along the road at approximately every 5 ft of verticle change and at the top of the hill using a dozer. Field system meets "T" or "clean" storm water runoff is diverted to stable outlets such as prevent concentrated flow along the road. 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::** Foot

**Scenario Typical Size:** 260

**Total Scenario Cost:** $737.25

**Scenario Cost/Unit:** $2.84

**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. | Hour | $60.16 | 6 | $360.96 |
| **Labor** | | | | | | |
| Equipment Operators, Heavy | 233 | Includes: Cranes, Hydraulic Excavators >=50 HP, Dozers, Paving Machines, Rock Trenchers, Trenchers >=12", Dump Trucks, Ag Equipment >=150 HP, Scrapers, Water Wagons. | Hour | $23.93 | 6 | $143.58 |
| **Mobilization** | | | | | | |
| Mobilization, medium equipment | 1139 | Equipment with 70-150 HP or typical weights between 14,000 and 30,000 pounds. | Each | $232.71 | 1 | $232.71 |

**Practice:** 366 - Anaerobic Digester

**Scenario** #8 - Small Plug Flow less than 1000 AU

**Scenario Description:**

A plug flow anaerobic digester can be part of a waste management system. It provides biological treatment of the waste in the absence of oxygen. This process for manure and other 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 plug flow digester with less than 1,000 animal units. Selection of digester type will be based on effluent consistency. Energy generation is not included with this scenario.Potential Associated Practices: Fence (382), Critical Area Planting (342), Nutrient Management (590), Waste Transfer (634), Heavy Use Area Protection (561), Roof and Covers (367), 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.A plug flow digester is typically constructed of concrete with vertical side walls and solid or flexible top. The typical scenario also includes items necessary to maintain mesophylic or thermophylic temperatures for bacterial activity (i.e. piping and boiler or other heat source).Typical Design Scenario: 910 animal units (650 - 1,400 lbs dairy cows).

**Feature Measure:** Animals Units Contributing to Dige

**Scenario Unit::** Animal Unit

**Scenario Typical Size:** 910

**Total Scenario Cost:** $649,840.53

**Scenario Cost/Unit:** $714.11

**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 | $45.80 | 2 | $91.60 |
| **Equipment Installation** | | | | | | |
| Plug Flow, Small (less than 1,000 animal units) | 2478 | Concrete plug flow 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 operat | Each | $649,007.65 | 1 | $649,007.65 |
| **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 | $64.26 | 1 | $64.26 |
| Mobilization, medium equipment | 1139 | Equipment with 70-150 HP or typical weights between 14,000 and 30,000 pounds. | Each | $232.71 | 1 | $232.71 |
| Mobilization, large equipment | 1140 | Equipment >150HP or typical weights greater than 30,000 pounds or loads requiring over width or over length permits. | Each | $444.31 | 1 | $444.31 |

**Practice:** 366 - Anaerobic Digester

**Scenario** #9 - Medium Plug Flow 1000-2000 AU

**Scenario Description:**

A plug flow anaerobic digester can be part of a waste management system. It provides biological treatment of the waste in the absence of oxygen. This process for manure and other 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 plug flow digesters with livestock operations between 1,000 and 2,000 animal units. Selection of digester type will be based on effluent consistency. Energy generation is not included with this scenario.Potential Associated Practices: Fence (382), Critical Area Planting (342), Nutrient Management (590), Waste Transfer (634), Heavy Use Area Protection (561), Roof and Covers (367), 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.A plug flow digester is typically constructed of concrete with vertical side walls and solid or flexible top. The typical scenario also includes items necessary to maintain mesophylic or thermophylic temperatures for bacterial activity (i.e. piping and boiler or other heat source). Typical design scenario: 1,750 animal units (1,250 - 1,400 lbs dairy cows).

**Feature Measure:** Animals Units Contributing to Dige

**Scenario Unit::** Animal Unit

**Scenario Typical Size:** 1750

**Total Scenario Cost:** $889,574.25

**Scenario Cost/Unit:** $508.33

**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 | $45.80 | 2 | $91.60 |
| **Equipment Installation** | | | | | | |
| Plug Flow, Medium (between 1,000 and 2,000 animal units) | 2479 | Concrete plug flow 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 operat | Each | $888,508.66 | 1 | $888,508.66 |
| **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 | $64.26 | 1 | $64.26 |
| Mobilization, medium equipment | 1139 | Equipment with 70-150 HP or typical weights between 14,000 and 30,000 pounds. | Each | $232.71 | 2 | $465.42 |
| Mobilization, large equipment | 1140 | Equipment >150HP or typical weights greater than 30,000 pounds or loads requiring over width or over length permits. | Each | $444.31 | 1 | $444.31 |

**Practice:** 366 - Anaerobic Digester

**Scenario** #11 - Large Plug Flow greater than 2000 AU

**Scenario Description:**

A plug flow anaerobic digester can be part of a waste management system. It provides biological treatment of the waste in the absence of oxygen. This process for manure and other 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 plug flow digesters with more than 2,000 animal units. Selection of digester type will be based on effluent consistency. Energy generation is not included with this scenario.Potential Associated Practices: Fence (382), Critical Area Planting (342), Nutrient Management (590), Waste Transfer (634), Heavy Use Area Protection (561), Roof and Covers (367), 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.A plug flow digester is typically constructed of concrete with vertical side walls and solid or flexible top. The typical scenario also includes items necessary to maintain mesophylic or thermophylic temperatures for bacterial activity (i.e. piping and boiler or other heat source). Typical Design Scenario: 3,920 animal units (2,800 - 1,400 lbs dairy cows).

**Feature Measure:** Animals Units Contributing to Dige

**Scenario Unit::** Animal Unit

**Scenario Typical Size:** 3920

**Total Scenario Cost:** $1,331,081.33

**Scenario Cost/Unit:** $339.56

**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 | $45.80 | 2 | $91.60 |
| **Equipment Installation** | | | | | | |
| Plug Flow, Large (more than 2,000 animal units) | 2480 | Concrete plug flow 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. Sized for large livestock operations (>2000 AU) includes material, labor, and equipment. | Each | $1,329,783.03 | 1 | $1,329,783.03 |
| **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 | $64.26 | 1 | $64.26 |
| Mobilization, medium equipment | 1139 | Equipment with 70-150 HP or typical weights between 14,000 and 30,000 pounds. | Each | $232.71 | 3 | $698.13 |
| Mobilization, large equipment | 1140 | Equipment >150HP or typical weights greater than 30,000 pounds or loads requiring over width or over length permits. | Each | $444.31 | 1 | $444.31 |

**Practice:** 366 - Anaerobic Digester

**Scenario** #12 - Small Complete Mix less than 1000 AU

**Scenario Description:**

A complete mix anaerobic digester can be part of a waste management system. It provides biological treatment of the waste in the absence of oxygen. This process for manure and other 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 complete mix systems with less than 1,000 animal units. Selection of digester type will be based on effluent consistency. Energy generation is not included with this scenario.Potential Associated Practices: Fence (382), Critical Area Planting (342), Nutrient Management (590), Waste Transfer (634), Heavy Use Area Protection (561), Roof and Covers (367), 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.A complete mix digester is typically a round above ground structure constructed of concrete or steel. The typical scenario also includes items necessary to maintain mesophylic or thermophylic temperatures for bacterial activity (i.e. piping and boiler or other heat source). Typical Design Scenario: 1,039 animal units (742 - 1,400 lbs dairy cows).

**Feature Measure:** Animals Units Contributing to Dige

**Scenario Unit::** Animal Unit

**Scenario Typical Size:** 1039

**Total Scenario Cost:** $745,493.91

**Scenario Cost/Unit:** $717.51

**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 | $45.80 | 2 | $91.60 |
| **Equipment Installation** | | | | | | |
| Complete Mix, Small (less than 1,000 animal units) | 2481 | A complete mix flow anaerobic digester includes the containment facility, agitation or stirring equipment, and any necessary 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. Sized for smaller livestock operations (<1000 AU) includes material, labor, and equipment. | Each | $744,661.03 | 1 | $744,661.03 |
| **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 | $64.26 | 1 | $64.26 |
| Mobilization, medium equipment | 1139 | Equipment with 70-150 HP or typical weights between 14,000 and 30,000 pounds. | Each | $232.71 | 1 | $232.71 |
| Mobilization, large equipment | 1140 | Equipment >150HP or typical weights greater than 30,000 pounds or loads requiring over width or over length permits. | Each | $444.31 | 1 | $444.31 |

**Practice:** 366 - Anaerobic Digester

**Scenario** #13 - Medium Complete Mix 1000-2500 AU

**Scenario Description:**

A complete mix anaerobic digester can be part of a waste management system. It provides biological treatment of the waste in the absence of oxygen. This process for manure and other 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 complete mix systems between 1,000 and 2,500 animal units. Selection of digester type will be based on effluent consistency. Energy generation is not included with this scenario.Potential Associated Practices: Fence (382), Critical Area Planting (342), Nutrient Management (590), Waste Transfer (634), Heavy Use Area Protection (561), Roof and Covers (367), 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.A complete mix digester is typically a round above ground structure constructed of concrete or steel. The typical scenario also includes items necessary to maintain mesophylic or thermophylic temperatures for bacterial activity (i.e. piping and boiler or other heat source). Typical Design Scenario: 1,890 animal units (1,350 - 1,400 lbs dairy cows).

**Feature Measure:** Animals Units Contributing to Dige

**Scenario Unit::** Animal Unit

**Scenario Typical Size:** 1890

**Total Scenario Cost:** $1,300,774.62

**Scenario Cost/Unit:** $688.24

**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 | $45.80 | 2 | $91.60 |
| **Equipment Installation** | | | | | | |
| Complete Mix, Medium (between 1,000 and 2,500 animal units) | 2482 | A complete mix flow anaerobic digester includes the containment facility, agitation or stirring equipment, and any necessary 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. Sized for medium sized livestock operations (1000-2500 AU) includes material, labor, and equipment. | Each | $1,299,709.03 | 1 | $1,299,709.03 |
| **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 | $64.26 | 1 | $64.26 |
| Mobilization, medium equipment | 1139 | Equipment with 70-150 HP or typical weights between 14,000 and 30,000 pounds. | Each | $232.71 | 2 | $465.42 |
| Mobilization, large equipment | 1140 | Equipment >150HP or typical weights greater than 30,000 pounds or loads requiring over width or over length permits. | Each | $444.31 | 1 | $444.31 |

**Practice:** 366 - Anaerobic Digester

**Scenario** #14 - Large Complete Mix greater than 2,500 AU

**Scenario Description:**

A complete mix anaerobic digester can be part of a waste management system. It provides biological treatment of the waste in the absence of oxygen. This process for manure and other 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 complete mix systems with more than 2,500 animal units. Selection of digester type will be based on effluent consistency. Energy generation is not included with this scenario.Potential Associated Practices: Fence (382), Critical Area Planting (342), Nutrient Management (590), Waste Transfer (634), Heavy Use Area Protection (561), Roof and Covers (367), 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. A complete mix digester is typically a round above ground structure constructed of concrete or steel. The typical scenario also includes items necessary to maintain mesophylic or thermophylic temperatures for bacterial activity (i.e. piping and boiler or other heat source). Typical Design Scenario: 3,220 animal units (2,300 - 1,400 lbs dairy cows).

**Feature Measure:** Animals Units Contributing to Dige

**Scenario Unit::** Animal Unit

**Scenario Typical Size:** 3220

**Total Scenario Cost:** $1,510,776.24

**Scenario Cost/Unit:** $469.19

**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 | $45.80 | 2 | $91.60 |
| **Equipment Installation** | | | | | | |
| Complete Mix, Large (more than 2,500 animal units) | 2483 | A complete mix flow anaerobic digester includes the containment facility, agitation or stirring equipment, and any necessary 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. Sized for large sized livestock operations (> 2000 AU) includes material, labor, and equipment. | Each | $1,509,477.94 | 1 | $1,509,477.94 |
| **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 | $64.26 | 1 | $64.26 |
| Mobilization, medium equipment | 1139 | Equipment with 70-150 HP or typical weights between 14,000 and 30,000 pounds. | Each | $232.71 | 3 | $698.13 |
| Mobilization, large equipment | 1140 | Equipment >150HP or typical weights greater than 30,000 pounds or loads requiring over width or over length permits. | Each | $444.31 | 1 | $444.31 |

**Practice:** 366 - Anaerobic Digester

**Scenario** #15 - 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 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 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), 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.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 Dige

**Scenario Unit::** Animal Unit

**Scenario Typical Size:** 1000

**Total Scenario Cost:** $108,342.77

**Scenario Cost/Unit:** $108.34

**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 | $45.80 | 1 | $45.80 |
| **Equipment Installation** | | | | | | |
| Covered Lagoon (not including the lagoon or the associated cover) | 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 | $108,000.00 | 1 | $108,000.00 |
| **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 | $64.26 | 1 | $64.26 |
| Mobilization, medium equipment | 1139 | Equipment with 70-150 HP or typical weights between 14,000 and 30,000 pounds. | Each | $232.71 | 1 | $232.71 |

**Practice:** 367 - Roofs and Covers

**Scenario** #1 - Flexible Roof

**Scenario Description:**

A flexible membrane or fabric-like roof placed on a steel truss hoop-like supports and supporting foundation. Manure is stored as a liquid in basins, tanks, and as a solid on concrete and earthen surfaces. Excess precipitation can cause premature filling of storages or cause nutrients to leach from solid manure piles leading to uncontrolled runoff as well as odor issues. Associated practices include Waste Storage Facility (313), Animal Mortality Facility (316), Composting Facility (317), Roof Runoff Structure (558), and Waste Treatment (629).

**Before Situation:**

Applicable where the exclusion of precipitation from an animal waste storage and/or treatment facility will improve of an existing or planned system. Manure is stored as a liquid in basins, tanks, and as a solid on concrete and earthen surfaces. Excess precipitation can cause premature filling of storages or cause nutrients to leach from solid manure piles leading to uncontrolled runoff as well as odor issues.

**After Situation:**

A flexible membrane or fabric-like roof placed on a steel truss hoop-like supports and supporting foundation. Roof or cover will be engineered and installed in accordance with appropriate building codes and permits. Typical size is 1,000 square feet and is over an approved animal waste management facility as a component of a CNMP. It is designed to prevent precipitation to allow proper management of animal waste streams (manure or compost streams), thus mitigating the negative factors from the "before practice implementation".

**Feature Measure:** Footprint of the building

**Scenario Unit::** Square Foot

**Scenario Typical Size:** 1000

**Total Scenario Cost:** $8,333.94

**Scenario Cost/Unit:** $8.33

**Cost Details:**

| Component Name | ID | Description | Unit | Cost | QTY | Total |
|---|---|---|---|---|---|---|
| **Materials** | | | | | | |
| Roof, Hoop Truss Arch Structure, less than 30' wide | 1667 | Hoop Truss Arch Structure with fabric cover - less than 30' width, includes materials, equipment, and installation. Does not include foundation preparation. | Square Foot | $7.74 | 1000 | $7,740.00 |
| **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 | $64.26 | 2 | $128.52 |
| Mobilization, medium equipment | 1139 | Equipment with 70-150 HP or typical weights between 14,000 and 30,000 pounds. | Each | $232.71 | 2 | $465.42 |

**Practice:** 367 - Roofs and Covers

**Scenario** #2 - Timber or Steel Sheet Roof

**Scenario Description:**

A timber framed building with a timber or steel "sheet" roof and supporting foundation. Manure is stored as a liquid in basins, tanks, and as a solid on concrete and earthen surfaces. Excess precipitation can cause premature filling of storages or cause nutrients to leach from solid manure piles leading to uncontrolled runoff as well as odor issues. Associated practices include Waste Storage Facility (313), Animal Mortality Facility (316), Composting Facility (317), Agrichemical Handling Facility (309), Roof Runoff Structure (558), and Waste Treatment (629).

**Before Situation:**

Applicable where the exclusion of precipitation from an animal waste storage and/or treatment facility will improve of an existing or planned system. Manure is stored as a liquid in basins, tanks, and as a solid on concrete and earthen surfaces. Excess precipitation can cause premature filling of storages or cause nutrients to leach from solid manure piles leading to uncontrolled runoff as well as odor issues.

**After Situation:**

A timber framed building with a timber or steel "sheet" roof and supporting foundation. Engineered and installed in accordance with appropriate building codes and permits. Typical size is 1,000 square feet and is over an approved animal waste management facility as a component of a CNMP. It is designed to prevent precipitation to allow proper management of animal waste streams (manure or compost streams), thus mitigating the negative factors from the "before practice implementation".

**Feature Measure:** Footprint of building

**Scenario Unit::** Square Foot

**Scenario Typical Size:** 1000

**Total Scenario Cost:** $8,821.23

**Scenario Cost/Unit:** $8.82

**Cost Details:**

| Component Name | ID | Description | Unit | Cost | QTY | Total |
|---|---|---|---|---|---|---|
| **Materials** | | | | | | |
| Roof, Post Frame Building, 30' to 60' wide | 1676 | Post Frame Building, no sides, - 30' to 60' width. Building sites with expected snow loads up to 30 lbs per square foot and wind exposure in semi protected areas (wooded or terrain with numerous closely spaced obstructions). Includes materials, shipping, equipment, and installation. Does not include foundation preparation. | Square Foot | $8.46 | 1000 | $8,460.00 |
| **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 | $64.26 | 2 | $128.52 |
| Mobilization, medium equipment | 1139 | Equipment with 70-150 HP or typical weights between 14,000 and 30,000 pounds. | Each | $232.71 | 1 | $232.71 |

**Practice:** 367 - Roofs and Covers

**Scenario** #3 - Timber or Steel Sheet Roof Mono Slope

**Scenario Description:**

A timber framed building with a timber or steel "sheet" roof and supporting foundation. Manure is stored as a liquid in basins, tanks, and as a solid on concrete and earthen surfaces. Excess precipitation can cause premature filling of storages or cause nutrients to leach from solid manure piles leading to uncontrolled runoff as well as odor issues. Associated practices include Waste Storage Facility (313), Animal Mortality Facility (316), Composting Facility (317), Agrichemical Handling Facility (309), Roof Runoff Structure (558), and Waste Treatment (629).

**Before Situation:**

Applicable where the exclusion of precipitation from an animal waste storage and/or treatment facility will improve of an existing or planned system. Manure is stored as a liquid in basins, tanks, and as a solid on concrete and earthen surfaces. Excess precipitation can cause premature filling of storages or cause nutrients to leach from solid manure piles leading to uncontrolled runoff as well as odor issues.

**After Situation:**

A timber framed building with a timber or steel "sheet" roof and supporting foundation. Engineered and installed in accordance with appropriate building codes and permits. Typical size is 1,000 square feet and is over an approved animal waste management facility as a component of a CNMP. It is designed to prevent precipitation to allow proper management of animal waste streams (manure or compost streams), thus mitigating the negative factors from the "before practice implementation".

**Feature Measure:** Footprint of building

**Scenario Unit::** Square Foot

**Scenario Typical Size:** 1000

**Total Scenario Cost:** $7,293.94

**Scenario Cost/Unit:** $7.29

**Cost Details:**

| Component Name | ID | Description | Unit | Cost | QTY | Total |
|---|---|---|---|---|---|---|
| **Materials** | | | | | | |
| Roof, Steel Frame Monoslope Building, greater than 60' wide | 1677 | Steel Frame Monoslope Building, greater than 60' width, includes materials, equipment, and installation. Does not include foundation preparation. | Square Foot | $6.70 | 1000 | $6,700.00 |
| **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 | $64.26 | 2 | $128.52 |
| Mobilization, medium equipment | 1139 | Equipment with 70-150 HP or typical weights between 14,000 and 30,000 pounds. | Each | $232.71 | 2 | $465.42 |

**Practice:** 367 - Roofs and Covers

**Scenario** #4 - Steel Frame and Roof

**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 includes Waste Storage Facility (313), Animal Mortality Facility (316), Composting Facility (317), Roof Runoff Structure (558), and Waste Treatment (629).

**Before Situation:**

Applicable where the exclusion of precipitation from an animal waste storage and/or treatment facility will improve of an existing or planned system. Manure is stored as a liquid in basins, tanks, and as a solid on concrete and earthen surfaces. Excess precipitation can cause premature filling of storages or cause nutrients to leach from solid manure piles leading to uncontrolled runoff as well as odor issues.

**After Situation:**

A steel framed building with steel "sheet" roof and supporting foundation. Engineered and installed in accordance with appropriate building codes and permits. Typical size is 10,000 square feet and is over an approved animal waste management facility as a component of a CNMP. It is designed to prevent precipitation to allow proper management of animal waste streams (manure or compost streams), thus mitigating the negative factors from the "before practice implementation".

**Feature Measure:** Footprint of building

**Scenario Unit::** Square Foot

**Scenario Typical Size:** 10000

**Total Scenario Cost:** $67,593.94

**Scenario Cost/Unit:** $6.76

**Cost Details:**

| Component Name | ID | Description | Unit | Cost | QTY | Total |
|---|---|---|---|---|---|---|
| **Materials** | | | | | | |
| Roof, Steel Frame Monoslope Building, greater than 60' wide | 1677 | Steel Frame Monoslope Building, greater than 60' width, includes materials, equipment, and installation. Does not include foundation preparation. | Square Foot | $6.70 | 10000 | $67,000.00 |
| **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 | $64.26 | 2 | $128.52 |
| Mobilization, medium equipment | 1139 | Equipment with 70-150 HP or typical weights between 14,000 and 30,000 pounds. | Each | $232.71 | 2 | $465.42 |

**Practice:** 367 - Roofs and Covers

**Scenario** #5 - Flexible Membrane Cover

**Scenario Description:**

A fabricated rigid, semi-rigid, or flexible membrane over a waste storage or treatment facility. The membrane will cover the entire surface of a waste storage or treatment facility (e.g. waste treatment lagoon or anaerobic digester). Cover will exclude precipitation and/or capture biogas for controlled release for flaring or anaerobic digestion. 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 agricultural waste storage to improve air quality, and/or biogas production and capture for energy use are part of the existing or planned animal waste management system.

**After Situation:**

A fabricated rigid, semi-rigid, or flexible membrane over a waste storage or treatment facility. The membrane will cover the entire surface of a waste storage or treatment facility (e.g. waste treatment lagoon or anaerobic digester).

**Feature Measure:** Surface of Membrane

**Scenario Unit::** Square Foot

**Scenario Typical Size:** 10000

**Total Scenario Cost:** $79,194.85

**Scenario Cost/Unit:** $7.92

**Cost Details:**

| Component Name | ID | Description | Unit | Cost | QTY | Total |
|---|---|---|---|---|---|---|
| **Equipment Installation** | | | | | | |
| Earthfill, Manually Compacted | 50 | Earthfill, manually compacted, includes equipment and labor | Cubic Yard | $4.95 | 40 | $198.00 |
| Skidsteer, 80 HP | 933 | Skidsteer loader with horsepower range of 60 to 90. Equipment and power unit costs. Labor not included. | Hour | $40.57 | 20 | $811.40 |
| Track Loader, 95HP | 935 | Equipment and power unit costs. Labor not included. | Hour | $80.20 | 16 | $1,283.20 |
| Trencher, 8" | 936 | Equipment and power unit costs. Labor not included. | Hour | $81.72 | 8 | $653.76 |
| **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. | Hour | $25.08 | 16 | $401.28 |
| 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. | Hour | $18.93 | 32 | $605.76 |
| Equipment Operators, Light | 232 | Includes: Skid Steer Loaders, Hydraulic Excavators <50 HP, Trenchers <12", Ag Equipment <150 HP, Pickup Trucks, Forklifts, Mulchers | Hour | $21.14 | 28 | $591.92 |
| Equipment Operators, Heavy | 233 | Includes: Cranes, Hydraulic Excavators >=50 HP, Dozers, Paving Machines, Rock Trenchers, Trenchers >=12", Dump Trucks, Ag Equipment >=150 HP, Scrapers, Water Wagons. | Hour | $23.93 | 16 | $382.88 |
| **Materials** | | | | | | |
| Synthetic Liner, 40 mil | 1387 | Synthetic 40 mil HDPE, LLDPE, EPDM, etc membrane liner material. Includes materials and shipping only. | Square Yard | $6.12 | 12000 | $73,440.00 |
| **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 | $64.26 | 2 | $128.52 |
| Mobilization, medium equipment | 1139 | Equipment with 70-150 HP or typical weights between 14,000 and 30,000 pounds. | Each | $232.71 | 3 | $698.13 |

**Practice:** 367 - Roofs and Covers

**Scenario** #6 - Permeable Composite or Inorganic Cover

**Scenario Description:**

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

**Before Situation:**

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

**After Situation:**

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

**Feature Measure:** Storage Surface Area at Normal Ful

**Scenario Unit::** Square Foot

**Scenario Typical Size:** 10000

**Total Scenario Cost:** $77,941.56

**Scenario Cost/Unit:** $7.79

**Cost Details:**

| Component Name | ID | Description | Unit | Cost | QTY | Total |
|---|---|---|---|---|---|---|
| **Materials** | | | | | | |
| Composite Cover, floating cover, > 5,000 square feet | 1860 | Composite material that is used to cover open storages with an area greater than 5,000 sf. Example, Hexa-Cover. Materials only. | Square Foot | $7.75 | 10000 | $77,500.00 |
| **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 | $64.26 | 2 | $128.52 |
| 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 | $156.52 | 2 | $313.04 |

**Practice:** 374 - FARMSTEAD ENERGY IMPROVEMENT

**Scenario** #1 - Ventilation, Exhaust

**Scenario Description:**

Replacement of a conventional exhaust fan with high volume, low speed, efficient exhaust fan. Fans being installed should be models previously tested by BESS Lab or the Air Movement and Control Association and be in top 20 percentile of fans tested. Practice certification will be through receipts and pictures from the applicant. Typical scenario is replacement of old fan with 54" 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

**Scenario Unit::** Each

**Scenario Typical Size:** 1

**Total Scenario Cost:** $1,127.77

**Scenario Cost/Unit:** $1,127.77

**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. | Hour | $25.08 | 3 | $75.24 |
| **Materials** | | | | | | |
| Fan, exhaust, 54" High Efficiency | 1188 | 54 inch high efficiency exhaust fan, controls, wiring, and associated appurtenances. Materials only. | Each | $1,052.53 | 1 | $1,052.53 |

**Practice:** 374 - FARMSTEAD ENERGY IMPROVEMENT

**Scenario** #2 - Ventilation, HAF

**Scenario Description:**

A system of fans are installed to create a horizontal air circulation pattern; the new system promotes efficient heat and moisture distribution. In a typical 10,000 square foot greenhouse, 10 HAF fans are needed. Fan performance meets Energy Audit efficiency criteria as tested by AMCA or BESS Labs.

**Before Situation:**

Inefficent air circulation system in a greenhouse.

**After Situation:**

High-efficiency air circulation system which reduces energy use. The new equipment will provide suitable air quality and reduce overall power requirements (kW) compared to the existing system as evidenced in an energy audit. Associated practices/activities: may include 122-AgEMP - HQ, and other activities within 374-Farmstead Energy Improvement. The resource concern is inefficient use of energy in the farm operation which increases dependence on non-renewable energy sources and can be addressed through improved energy efficiency. Any improvements are based on a Type 2 energy audit meeting the requirements of ASABE S612.

**Feature Measure:** Each

**Scenario Unit::** Each

**Scenario Typical Size:** 1

**Total Scenario Cost:** $201.05

**Scenario Cost/Unit:** $201.05

**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. | Hour | $25.08 | 2 | $50.16 |
| **Materials** | | | | | | |
| Fan, HAF, 1/10 to 1/15 HP | 1189 | High efficiency Horizontal Air Flow (HAF) fan, controls, wiring, and associated appurtenances. Materials only. | Each | $150.89 | 1 | $150.89 |

**Practice:** 374 - FARMSTEAD ENERGY IMPROVEMENT

**Scenario** #3 - Plate Cooler

**Scenario Description:**

The installation of all stainless steel dual pass plate cooler, type 316 stainless steel. Practice certification will be through receipts and pictures from the applicant.

**Before 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 Plate Cooler

**Scenario Unit::** Each

**Scenario Typical Size:** 1

**Total Scenario Cost:** $6,751.50

**Scenario Cost/Unit:** $6,751.50

**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. | Hour | $25.08 | 8 | $200.64 |
| **Materials** | | | | | | |
| Plate Cooler, 750 - 999 gal/hr capacity | 1178 | Stainless Steel, dual pass plate cooler with 750 - 999 gallon/hour capacity. Includes materials and shipping only. | Each | $6,550.86 | 1 | $6,550.86 |

**Practice:** 374 - FARMSTEAD ENERGY IMPROVEMENT

**Scenario** #4 - Scroll Compressor

**Scenario Description:**

Install a new scroll compressor, associated controls, wiring, and materials to retrofit an existing refrigeration system. A new condenser is not included in this typical scenario. Typical scenario includes a new 5 horsepower scroll compressor.

**Before Situation:**

Inefficient reciprocating compressor as a key component of the refrigeration system used to cool milk. The compressor is a critical part of a milk cooling system, affecting milk quality, system reliability, and system efficiency.

**After 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:** Nameplate Power

**Scenario Unit::** Horsepower

**Scenario Typical Size:** 5

**Total Scenario Cost:** $4,144.90

**Scenario Cost/Unit:** $828.98

**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. | Hour | $25.08 | 4 | $100.32 |
| **Materials** | | | | | | |
| Scroll Compressor - 5 HP | 1183 | Scroll compressor, 5 Horsepower, controls, wiring, and appurtenances. Materials only. | Each | $4,044.58 | 1 | $4,044.58 |

**Practice:** 374 - FARMSTEAD ENERGY IMPROVEMENT

**Scenario** #5 - Variable Speed Drive, greater than 5 HP

**Scenario Description:**

The typical scenario consists of a variable speed drive (VSD) and appurtances, such as hook-ups, control panels, wiring, control blocks, filters, switches, pads, etc. attached to an electric motor used to drive a ventilation fan, irrigation pumps, vacuum pump, or similar equipment involved with agricultural production. The motor size, on which the VSD is added, is larger than 5 HP.

**Before 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:** Nameplate Power of the Attached

**Scenario Unit::** Horsepower

**Scenario Typical Size:** 50

**Total Scenario Cost:** $11,864.14

**Scenario Cost/Unit:** $237.28

**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. | Hour | $25.08 | 8 | $200.64 |
| **Materials** | | | | | | |
| Variable Speed Drive, 50 HP | 1288 | Variable speed drive for 50 Horsepower electric motor. Does not include motor. Materials only. | Horsepower | $233.27 | 50 | $11,663.50 |

**Practice:** 374 - FARMSTEAD ENERGY IMPROVEMENT

**Scenario** #6 - 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

**Total Scenario Cost:** $1,419.42

**Scenario Cost/Unit:** $1,419.42

**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. | Hour | $25.08 | 8 | $200.64 |
| **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 | $627.96 | 1 | $627.96 |
| Switches and Controls, programmable controller | 1193 | Programmable logic controller (with or without wireless telecommunications) commonly used to control pumps and irrigation systems | Each | $160.35 | 1 | $160.35 |
| 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 | $430.47 | 1 | $430.47 |

**Practice:** 374 - FARMSTEAD ENERGY IMPROVEMENT

**Scenario** #7 - Motor Upgrade, greater than 100 HP

**Scenario Description:**

The typical scenario consists of replacing an existing electric motor used to drive a ventilation fan, irrigation pumps, vacuum pump, or similar equipment involved with agricultural production with a new, high efficiency motor. The motor size is larger than 100 horsepower.

**Before 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:** Nameplate Power of Motor

**Scenario Unit::** Horsepower

**Scenario Typical Size:** 150

**Total Scenario Cost:** $15,867.13

**Scenario Cost/Unit:** $105.78

**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. | Hour | $25.08 | 16 | $401.28 |
| **Materials** | | | | | | |
| Motor, electric, NEMA Premium, 100 HP | 1174 | Premium NEMA approved electric motor, 100 Horsepower and all required appurtenances. Includes materials and shipping only. | Each | $7,647.59 | 0.5 | $3,823.80 |
| Motor, electric, NEMA Premium, 200 HP | 1175 | Premium NEMA approved electric motor, 200 Horsepower and all required appurtenances. Includes materials and shipping only. | Each | $23,284.10 | 0.5 | $11,642.05 |

**Practice:** 374 - FARMSTEAD ENERGY IMPROVEMENT

**Scenario** #8 - Motor Upgrade, 10 to 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:** Nameplate Power of Motor

**Scenario Unit::** Horsepower

**Scenario Typical Size:** 50

**Total Scenario Cost:** $6,322.70

**Scenario Cost/Unit:** $126.45

**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. | Hour | $25.08 | 8 | $200.64 |
| **Materials** | | | | | | |
| Motor, electric, NEMA Premium, 50 HP | 1173 | Premium NEMA approved electric motor, 50 Horsepower and all required appurtenances. Includes materials and shipping only. | Each | $6,122.06 | 1 | $6,122.06 |

**Practice:** 374 - FARMSTEAD ENERGY IMPROVEMENT

**Scenario** #9 - Motor Upgrade, 1 to 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:** Nameplate Power of Motor

**Scenario Unit::** Horsepower

**Scenario Typical Size:** 5

**Total Scenario Cost:** $866.75

**Scenario Cost/Unit:** $173.35

**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. | Hour | $25.08 | 4 | $100.32 |
| **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 | $766.43 | 1 | $766.43 |

**Practice:** 374 - FARMSTEAD ENERGY IMPROVEMENT

**Scenario** #10 - Motor Upgrade, up to 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:** Nameplate Power of Motor

**Scenario Unit::** Horsepower

**Scenario Typical Size:** 1

**Total Scenario Cost:** $569.85

**Scenario Cost/Unit:** $569.85

**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. | Hour | $25.08 | 4 | $100.32 |
| **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 | $469.53 | 1 | $469.53 |

**Practice:** 374 - FARMSTEAD ENERGY IMPROVEMENT

**Scenario** #12 - Heating (Building)

**Scenario Description:**

Replace existing low efficiency heaters with new high efficiency heaters. High-efficiency heating systems include any heating unit with efficiency rating of 80%+ for fuel oil and 90%+ for natural gas and propane. Applications may be air heating/building environment and hydronic (boiler) heating for agricultural operations, including under bench, or root zone heating. An alternative to heater replacement might be the addition of climate control system and electronic temperature controls with +/- 1 degree F differential, to reduce the annual run time.

**Before 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.

**Feature Measure:** Rated Heat Output

**Scenario Unit::** 1,000 BTU/Hour

**Scenario Typical Size:** 750

**Total Scenario Cost:** $9,191.28

**Scenario Cost/Unit:** $12.26

**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. | Hour | $25.08 | 16 | $401.28 |
| **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 | $11.72 | 750 | $8,790.00 |

**Practice:** 374 - FARMSTEAD ENERGY IMPROVEMENT

**Scenario** #13 - Heating - Attic Heat Recovery vents

**Scenario Description:**

Install actuated inlets or automatic latching gravity inlets that draw warmer, drier air from the attic to assist with moisture and heat control when ventiliation fans are being operated in poultry houses and swine barns. Other systems to transfer heat, as detailed in ASABE S612-compliant energy audit may also be used. Based on a 40' x 500' poultry house.

**Before Situation:**

Heated buildings with attic spaces but no means to transfer heat between the heated space, attic, and ambient (outside) air when relative conditions allow for reduced energy use.

**After Situation:**

Attic vents or inlets allow dry warm air from the attic to cirulated through out the building. By using pre-warmed air from the attic less energy is needed for heating 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 inlet

**Scenario Unit::** Each

**Scenario Typical Size:** 14

**Total Scenario Cost:** $2,148.36

**Scenario Cost/Unit:** $153.45

**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. | Hour | $25.08 | 24 | $601.92 |
| **Materials** | | | | | | |
| Inlet, Attic Ceiling | 2414 | Poultry house attic air inlets. Includes materials only. | Each | $110.46 | 14 | $1,546.44 |

**Practice:** 374 - FARMSTEAD ENERGY IMPROVEMENT

**Scenario** #14 - Drying, Grain Dryer

**Scenario Description:**

A replacement continuous dryer rated for an appropriatle rated bushel/per hour capacity for the operation that includes a microcomputer-based control system that adjusts the amount of time the crop remains in the dryer in order to achieve a consistent and accurate moisture content in the dried product. Alternate types of replacement dryers which reduce energy use are acceptable as evidenced by the energy audit. The typical operation requires a rated capacity of 860 bushels per hour.

**Before Situation:**

Wet crop is loaded in the top of a horizontal, continuous dryer. Dried crop is augured from the bottom of the dryer. The heated air from the unit's burners passes from the burner plenum through the grain. An on-farm energy audit has identified inefficient manual control of the dryer where the operator controls the plenum temperature and the discharge auger speed to achieve the desired final moisture content. Moisture content is based on measurement of grain leaving the dryer. The plenum temperature setting depends on the moisture content of crop with a typical value of 220 F. The burner cycles on and off, automatically, as necessary to maintain the plenum temperature selected by the operator.

**After Situation:**

Energy use is reduced through installation of a more efficient continuous dryer that uses a microcomputer-based controller to reduce overdrying and total time of operation. Associated practices/activities may include: 122-AgEMP - HQ, and other activities within 374-Farmstead Energy Improvement. The resource concern is inefficient use of energy in the farm operation which increases dependence on non-renewable energy sources and can be addressed through improved energy efficiency. Any improvements are based on a Type 2 energy audit meeting the requirements of ASABE S612.

**Feature Measure:** Rated capacity of the dryer

**Scenario Unit::** Bushel per Hour

**Scenario Typical Size:** 860

**Total Scenario Cost:** $80,737.32

**Scenario Cost/Unit:** $93.88

**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. | Hour | $25.08 | 16 | $401.28 |
| **Materials** | | | | | | |
| Grain dryer, Axial, 12' | 1158 | Grain dryer, 12 foot Axial with rated capacity of 460 bushels/hour. Materials only. | Bushel per Hour | $98.47 | 172 | $16,936.84 |
| Grain dryer, Axial, 16' | 1159 | Grain dryer, 16 foot Axial with rated capacity of 600 bushels/hour. Materials only. | Bushel per Hour | $85.02 | 172 | $14,623.44 |
| Grain dryer, Centrifugal, 20' | 1160 | Grain dryer, 20 foot Centrifugal with rated capacity of 785 bushels/hour. Materials only. | Bushel per Hour | $90.94 | 172 | $15,641.68 |
| Grain dryer, Centrifugal, 24' | 1161 | Grain dryer, 24 foot Centrifugal with rated capacity of 860 bushels/hr. Materials only. | Bushel per Hour | $97.40 | 172 | $16,752.80 |
| Grain dryer, Axial 28' | 1162 | Grain dryer, 28 foot Axial with rated capacity of 990 bushels/hr. Materials only. | Bushel per Hour | $95.24 | 172 | $16,381.28 |

**Practice:** 374 - FARMSTEAD ENERGY IMPROVEMENT

**Scenario** #15 - Air Cooling, Evaporative Cooling System

**Scenario Description:**

A typical scenario is the addition of evaporative cooling to existing ventalation fans on poultry houses. The increased cooling from the evaporative cooling units will result in reduced cooling equipment operation and increased animal health.

**Before Situation:**

Cooling fans run very often and animal health suffers.

**After Situation:**

A more effective and efficient cooling system can be created through addition of an evaporative cooling system. 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. Typical house size is 24000 sq. feet. Scenario based on evaporation unit running 65 ft down both walls and 5.5 ft tall = 715 sf

**Feature Measure:** Square Feet of Cooling Surface

**Scenario Unit::** Square Foot

**Scenario Typical Size:** 715

**Total Scenario Cost:** $16,107.35

**Scenario Cost/Unit:** $22.53

**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. | Hour | $25.08 | 5 | $125.40 |
| 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. | Hour | $18.93 | 5 | $94.65 |
| **Materials** | | | | | | |
| Evaporative Cooling System, Large | 2400 | Energy efficient cooling systems installed in ventilated livestock confinement or greenhouses for temperature control. Complete system with cooling pads, aluminum distribution and end panels, 1/3 HP submersible sump pump and plumbing kit. Greater than 90 square feet. Includes material only. | Square Foot | $22.22 | 715 | $15,887.30 |

**Practice:** 374 - FARMSTEAD ENERGY IMPROVEMENT

**Scenario** #16 - Air Cooling, Baffle Curtain

**Scenario Description:**

Installation of vertically-hanging curtains in the truss space (typically on the sides of the trusses) which effectively reduces the cross section for air flow during tunnel ventilation. Reducing the cross section for air flow reduces the needed tunnel fan capacity while achieving the minimum air speed. Curtains do not require any insulation value but must be durable in the broiler house environment. Curtains are typically installed 30 to 50 ft apart. Payment covers curtain material, fabrication, hanging accessories, and installation labor.

**Before Situation:**

A broiler house has open-truss construction. Nothing blocks the longitudinal air flow through the truss space during tunnel ventilation. The house requires a large total capacity of tunnel exhaust fans to achieve required minimum air speed during tunnel ventilation.

**After Situation:**

The broiler house has lower warm-season operational energy inputs and costs. 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 Baffle Curtain

**Scenario Unit::** Each

**Scenario Typical Size:** 1

**Total Scenario Cost:** $429.54

**Scenario Cost/Unit:** $429.54

**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. | Hour | $18.93 | 8 | $151.44 |
| **Materials** | | | | | | |
| Curtain , 7-Layer, R3 Insulated | 2427 | Seven layer insulated curtain with an R-value of 3 for a livestock building. Typical curtain size is 4' x 270'. The curtain's two outer layers are vinyl and polyethylene and the five inner layers are composed of insulating materials with air trapping fibers and a vapor barrier. Does not include mounting accessories, assumes it is replacing a non-insulated curtain. | Square Foot | $2.06 | 135 | $278.10 |

**Practice:** 378 - Pond

**Scenario** #1 - Excavated Pit

**Scenario Description:**

A low-hazard water impoundment structure on agricultural lands to improve water quality and to provide water for livestock, fish and wildlife, recreation, fire control, crop and orchard irrigation, and other related uses. Pond is created solely by excavation and impounds less than 3 feet against the embankment or spoil. Excavated material is spoiled, not placed in a designed embankment. Earthen spillway is constructed as needed. The resource concerns addressed include inadequate livestock water, excessive suspended sediment and turbidity in surface water, damage from sediment deposition, and reduced capacity of conveyances by sediment deposition.

**Before Situation:**

Area exists where water could naturally pool or run off to create a pond for livestock, wildlife, fire control or irrigation. Failure of the pond will not result in loss of life; damage to homes, commercial or industrial buildings, main highways, or railroads; or in interruption of the use or service of public utilities.

**After Situation:**

The typical pond is constructed by excavating 3100 cubic yards and spreading the spoil outside the pool area using a dozer or similar excavation equipment. Vegetation will be completed under critical area planting (342). Other associated practices include 382, 516, 521A, 533, 614, 587, 396.

**Feature Measure:** Excavated Volume

**Scenario Unit::** Cubic Yard

**Scenario Typical Size:** 1500

**Total Scenario Cost:** $5,064.67

**Scenario Cost/Unit:** $3.38

**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. | Hour | $112.82 | 15 | $1,692.30 |
| 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. | Hour | $103.47 | 20 | $2,069.40 |
| **Labor** | | | | | | |
| Equipment Operators, Heavy | 233 | Includes: Cranes, Hydraulic Excavators >=50 HP, Dozers, Paving Machines, Rock Trenchers, Trenchers >=12", Dump Trucks, Ag Equipment >=150 HP, Scrapers, Water Wagons. | Hour | $23.93 | 35 | $837.55 |
| **Mobilization** | | | | | | |
| Mobilization, medium equipment | 1139 | Equipment with 70-150 HP or typical weights between 14,000 and 30,000 pounds. | Each | $232.71 | 2 | $465.42 |

**Practice:** 378 - Pond

**Scenario** #2 - Embankment Pond without Pipe

**Scenario Description:**

A water impoundment structure on agricultural land to improve water quality or to provide water for livestock, fish and wildlife, recreation, fire control, crop and orchard irrigation, and other related uses. An earthen embankment will be constructed with an earthen auxiliary spillway. The resource concerns addressed include inadequate livestock water, excessive suspended sediment and turbidity in surface water, damage from sediment deposition, and reduced capacity of conveyances by sediment deposition.

**Before Situation:**

Area exists where water could naturally pool or run off to create a pond for livestock, wildlife, fire control or irrigation. Failure of the embankment will not result in loss of life or damages of any kind.

**After Situation:**

The typical pond 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 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 Yard

**Scenario Typical Size:** 1500

**Total Scenario Cost:** $6,024.15

**Scenario Cost/Unit:** $4.02

**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 Yard | $3.76 | 1500 | $5,640.00 |
| **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. | Hour | $18.93 | 8 | $151.44 |
| **Mobilization** | | | | | | |
| Mobilization, medium equipment | 1139 | Equipment with 70-150 HP or typical weights between 14,000 and 30,000 pounds. | Each | $232.71 | 1 | $232.71 |

**Practice:** 378 - Pond

**Scenario** #3 - Embankment Pond with Pipe

**Scenario Description:**

A low-hazard water impoundment structure on agricultural land to improve water quality and to provide water for livestock, fish and wildlife, recreation, fire control, crop and orchard irrigation, and other related uses. An earthen embankment will be constructed with a principle spillway conduit and earthen auxiliary spillway, as designed. The resource concerns addressed include inadequate livestock water, excessive suspended sediment and turbidity in surface water, damage from sediment deposition, and reduced capacity of conveyances by sediment deposition.

**Before Situation:**

Area exists where water could naturally pool or run off to create a pond for livestock, wildlife, fire control or irrigation. Failure of the embankment will not result in loss of life or damages of any kind.

**After Situation:**

The typical low hazard pond is constructed by excavating the pool area, constructing the auxiliary spillway, preparing the foundation as designed, and using 2000 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 Yard

**Scenario Typical Size:** 2000

**Total Scenario Cost:** $11,516.08

**Scenario Cost/Unit:** $5.76

**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 Yard | $326.97 | 3 | $980.91 |
| Excavation, Common Earth, side cast, small equipment | 48 | Bulk excavation and side casting of common earth with hydraulic excavator with less than 1 CY capacity. Includes equipment and labor. | Cubic Yard | $1.99 | 1.6 | $3.18 |
| Earthfill, Roller Compacted | 49 | Earthfill, roller or machine compacted, includes equipment and labor | Cubic Yard | $3.76 | 2000 | $7,520.00 |
| **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. | Hour | $25.08 | 8 | $200.64 |
| 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. | Hour | $18.93 | 40 | $757.20 |
| **Materials** | | | | | | |
| Aggregate, Sand, Graded, Washed | 45 | Sand, typical ASTM C33 gradation, includes materials, equipment and labor to transport and place | Cubic Yard | $30.40 | 19.6 | $595.84 |
| Pipe, PVC, dia. < 18", weight priced | 1323 | Polyvinyl Chloride (PVC) pressure rated pipe priced by the weight of the pipe materials for pipes with diameters less than 18". Materials only. | Pound | $1.80 | 628 | $1,130.40 |
| 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 | $2.38 | 40 | $95.20 |
| **Mobilization** | | | | | | |
| Mobilization, medium equipment | 1139 | Equipment with 70-150 HP or typical weights between 14,000 and 30,000 pounds. | Each | $232.71 | 1 | $232.71 |

**Practice:** 380 - Windbreak/Shelterbelt Establishment

**Scenario** #1 - Shrubs, potted

**Scenario Description:**

Use the shrub, conifer, and hardwood scenarios of this practice to design windbreak as needed. Usually, a multi-row windbreak of low growing shrubs (outside row), tall growing hardwoods (inside row), and conifers (middle row) can provide multiple benefits. For multiple rows, planting should be staggered in adjacent rows. Consider using evergreen conifers when planting around confined animal operations for odor control. Windbreaks in and around pastures provide shade to livestock. Windbreaks can be as wide as needed but common sizes can be as wide as 5 rows or as narrow as 1 row. Can be mix of shrub, hardwood, or conifer as well as a mix of species. Spacing of trees within the rows should be kept relatively wide to promote low branching and wide crown development (4 to 6 ft for shrubs and 10 to 12 ft for trees). A larger windbreak provides more opportunity for species diversity. An example would be mast trees and shrubs for food, and dense growing conifers, deciduous trees and shrubs for shelter and cover. Space trees from 10 to 15 feet apart and shrubs 3 to 13 feet apart depending on the species and its growth habits. The minimum spacing between rows for multiple row plantings is 12 feet, and the maximum spacing is 20 feet. Rows should be 4 ft wider than equipment used for maintenance.This practice is typically applied to crop, pasture or confined animal operations. Resource Concerns to be addressed may include: Soil Erosion (wind); Excess/Insufficient Water (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); Inadequate shelter for Livestock (cover/shelter); or Objectionable Odors (air quality).

**Before Situation:**

Agricultural field, livestock paddock, feedlot or farmstead needing protection from wind, additional wildlife food and cover, livestock shelter or management of objectionsble odors.

**After Situation:**

Wind velocity suitably reduced to reduce soil erosion, or to manage objectionable odors. Additional livestock shelter, or wildlife food and cover is provided.

**Feature Measure:** length of windbreak row(s)

**Scenario Unit::** Each

**Scenario Typical Size:** 100

**Total Scenario Cost:** $1,789.28

**Scenario Cost/Unit:** $17.89

**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. | Hour | $6.65 | 8 | $53.20 |
| Tractor, agricultural, 60 HP | 963 | Agricultural tractor with horsepower range of 50 to 90. Equipment and power unit costs. Labor not included. | Hour | $22.54 | 8 | $180.32 |
| **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. | Hour | $18.93 | 8 | $151.44 |
| Supervisor or Manager | 234 | Labor involving supervision or management activities. Includes crew supervisors, foremen and farm/ranch managers time required for adopting new technology, etc. | Hour | $34.29 | 8 | $274.32 |
| **Materials** | | | | | | |
| Shrub, seedling or transplant, potted or B&B, 2-3 gal. | 1527 | Potted or balled and burlapped shrub, 2-3 gal. Includes materials and shipping only. | Each | $9.21 | 100 | $921.00 |
| Wire flags | 1586 | Small vinyl flags attached to wire stakes, typically, 36" in length, for marking tree rows | Each | $0.09 | 100 | $9.00 |
| **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. | Dollar | $1.00 | 200 | $200.00 |

**Practice:** 380 - Windbreak/Shelterbelt Establishment

**Scenario** #2 - conifer trees, container

**Scenario Description:**

Use the shrub, conifer, and hardwood scenarios of this practice to design windbreak as needed. Usually, a multi-row windbreak of low growing shrubs (outside row), tall growing hardwoods (inside row), and conifers (middle row) can provide multiple benefits. For multiple rows, planting should be staggered in adjacent rows. Consider using evergreen conifers when planting around confined animal operations for odor control. Windbreaks in and around pastures provide shade to livestock. Windbreaks can be as wide as needed but common sizes can be as wide as 5 rows or as narrow as 1 row. Can be mix of shrub, hardwood, or conifer as well as a mix of species. Spacing of trees within the rows should be kept relatively wide to promote low branching and wide crown development (4 to 6 ft for shrubs and 10 to 12 ft for trees). A larger windbreak provides more opportunity for species diversity. An example would be mast trees and shrubs for food, and dense growing conifers, deciduous trees and shrubs for shelter and cover. Space trees from 10 to 15 feet apart and shrubs 3 to 13 feet apart depending on the species and its growth habits. The minimum spacing between rows for multiple row plantings is 12 feet, and the maximum spacing is 20 feet. Rows should be 4 ft wider than equipment used for maintenance.This practice is typically applied to crop, pasture or confined animal operations. Resource Concerns to be addressed may include: Soil Erosion (wind); Excess/Insufficient Water (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); Inadequate shelter for Livestock (cover/shelter); or Objectionable Odors (air quality).

**Before Situation:**

Agricultural field, livestock paddock, feedlot or farmstead needing protection from wind, additional wildlife food and cover, livestock shelter or management of objectionsble odors.

**After Situation:**

Wind velocity suitably reduced to reduce soil erosion, or to manage objectionable odors. Additional livestock shelter, or wildlife food and cover.

**Feature Measure:** length of windbreak row(s)

**Scenario Unit::** Each

**Scenario Typical Size:** 50

**Total Scenario Cost:** $298.02

**Scenario Cost/Unit:** $5.96

**Cost Details:**

| Component Name | ID | Description | Unit | Cost | QTY | Total |
|---|---|---|---|---|---|---|
| **Equipment Installation** | | | | | | |
| Hand tools, tree planting | 1590 | Various hand tools for digging holes and planting trees such as augers, dibble bars, planting shovel, hoe-dad. Equipment only. Labor not included. | Hour | $12.04 | 2 | $24.08 |
| **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. | Hour | $18.93 | 2 | $37.86 |
| Supervisor or Manager | 234 | Labor involving supervision or management activities. Includes crew supervisors, foremen and farm/ranch managers time required for adopting new technology, etc. | Hour | $34.29 | 2 | $68.58 |
| **Materials** | | | | | | |
| Tree, conifer, seedling, containerized, 4 cu. in. | 1516 | Containerized conifer stock, 4 cubic inches (e.g., "4a" plug), 1.1" x 5.2". Includes materials and shipping only. | Each | $0.26 | 50 | $13.00 |
| Wire flags | 1586 | Small vinyl flags attached to wire stakes, typically, 36" in length, for marking tree rows | Each | $0.09 | 50 | $4.50 |
| **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. | Dollar | $1.00 | 150 | $150.00 |

**Practice:** 380 - Windbreak/Shelterbelt Establishment

**Scenario** #3 - Hardwood trees, potted

**Scenario Description:**

Use the shrub, conifer, and hardwood scenarios of this practice to design windbreak as needed. Usually, a multi-row windbreak of low growing shrubs (outside row), tall growing hardwoods (inside row), and conifers (middle row) can provide multiple benefits. For multiple rows, planting should be staggered in adjacent rows. Consider using evergreen conifers when planting around confined animal operations for odor control. Windbreaks in and around pastures provide shade to livestock. Windbreaks can be as wide as needed but common sizes can be as wide as 5 rows or as narrow as 1 row. Can be mix of shrub, hardwood, or conifer as well as a mix of species. Spacing of trees within the rows should be kept relatively wide to promote low branching and wide crown development (4 to 6 ft for shrubs and 10 to 12 ft for trees). A larger windbreak provides more opportunity for species diversity. An example would be mast trees and shrubs for food, and dense growing conifers, deciduous trees and shrubs for shelter and cover. Space trees from 10 to 15 feet apart and shrubs 3 to 13 feet apart depending on the species and its growth habits. The minimum spacing between rows for multiple row plantings is 12 feet, and the maximum spacing is 20 feet. Rows should be 4 ft wider than equipment used for maintenance.This practice is typically applied to crop, pasture or confined animal operations. Resource Concerns to be addressed may include: Soil Erosion (wind); Excess/Insufficient Water (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); Inadequate shelter for Livestock (cover/shelter); or Objectionable Odors (air quality).

**Before Situation:**

Agricultural field, livestock paddock, feedlot or farmstead needing protection from wind, additional wildlife food and cover, livestock shelter or management of objectionsble odors.

**After Situation:**

Wind velocity suitably reduced to reduce soil erosion, or to manage objectionable odors. Additional livestock shelter or wildlife food and cover is created.

**Feature Measure:** length of windbreak row(s)

**Scenario Unit::** Each

**Scenario Typical Size:** 50

**Total Scenario Cost:** $918.64

**Scenario Cost/Unit:** $18.37

**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. | Hour | $6.65 | 4 | $26.60 |
| Tractor, agricultural, 60 HP | 963 | Agricultural tractor with horsepower range of 50 to 90. Equipment and power unit costs. Labor not included. | Hour | $22.54 | 4 | $90.16 |
| **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. | Hour | $18.93 | 4 | $75.72 |
| 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. | Hour | $34.29 | 4 | $137.16 |
| **Materials** | | | | | | |
| Tree, hardwood, seedling or transplant, potted or B&B, 2-3 gal. | 1532 | Potted or balled and burlapped hardwood tree, 2-3 gal. Includes materials and shipping only. | Each | $7.69 | 50 | $384.50 |
| Wire flags | 1586 | Small vinyl flags attached to wire stakes, typically, 36" in length, for marking tree rows | Each | $0.09 | 50 | $4.50 |
| **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. | Dollar | $1.00 | 200 | $200.00 |

**Practice:** 380 - Windbreak/Shelterbelt Establishment

**Scenario** #4 - Conifer-bareroot

**Scenario Description:**

Use the shrub, conifer, and hardwood scenarios of this practice to design windbreak as needed. Usually, a multi-row windbreak of low growing shrubs (outside row), tall growing hardwoods (inside row), and conifers (middle row) can provide multiple benefits. For multiple rows, planting should be staggered in adjacent rows. Consider using evergreen conifers when planting around confined animal operations for odor control. Windbreaks in and around pastures provide shade to livestock. Windbreaks can be as wide as needed but common sizes can be as wide as 5 rows or as narrow as 1 row. Can be mix of shrub, hardwood, or conifer as well as a mix of species. Spacing of trees within the rows should be kept relatively wide to promote low branching and wide crown development (4 to 6 ft for shrubs and 10 to 12 ft for trees). A larger windbreak provides more opportunity for species diversity. An example would be mast trees and shrubs for food, and dense growing conifers, deciduous trees and shrubs for shelter and cover. Space trees from 10 to 15 feet apart and shrubs 3 to 13 feet apart depending on the species and its growth habits. The minimum spacing between rows for multiple row plantings is 12 feet, and the maximum spacing is 20 feet. Rows should be 4 ft wider than equipment used for maintenance.This practice is typically applied to crop, pasture or confined animal operations. Resource Concerns to be addressed may include: Soil Erosion (wind); Excess/Insufficient Water (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); Inadequate shelter for Livestock (cover/shelter); or Objectionable Odors (air quality).

**Before Situation:**

Agricultural field, livestock paddock, feedlot or farmstead needing protection from wind, additional wildlife food and cover, livestock shelter or management of objectionsble odors.

**After Situation:**

Wind velocity suitably reduced to reduce soil erosion, or to manage objectionable odors. Additional livestock shelter or wildlife food and cover is created.

**Feature Measure:** length of windbreak row(s)

**Scenario Unit::** Each

**Scenario Typical Size:** 132

**Total Scenario Cost:** $148.44

**Scenario Cost/Unit:** $1.12

**Cost Details:**

| Component Name | ID | Description | Unit | Cost | QTY | Total |
|---|---|---|---|---|---|---|
| **Equipment Installation** | | | | | | |
| Hand tools, tree planting | 1590 | Various hand tools for digging holes and planting trees such as augers, dibble bars, planting shovel, hoe-dad. Equipment only. Labor not included. | Hour | $12.04 | 2 | $24.08 |
| **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. | Hour | $18.93 | 2 | $37.86 |
| Supervisor or Manager | 234 | Labor involving supervision or management activities. Includes crew supervisors, foremen and farm/ranch managers time required for adopting new technology, etc. | Hour | $34.29 | 2 | $68.58 |
| **Materials** | | | | | | |
| Tree, conifer, seedling, bare root, 1-0 | 1512 | Bare root conifer trees, 1-0 (1 year old). Includes materials and shipping only. | Each | $0.06 | 132 | $7.92 |
| **Mobilization** | | | | | | |
| Mobilization, Material, distance > 50 miles | 1043 | Mobilization cost of materials for special cases where the distance from the supplier delivery point to the job site exceeds 50 miles. The costs for shipping by UPS or bulk freight shipping to a location within 50 miles of the job site have already been included in the component price. | Dollar | $1.00 | 10 | $10.00 |

**Practice:** 380 - Windbreak/Shelterbelt Establishment

**Scenario** #5 - Hardwood_ bareroot

**Scenario Description:**

Use the shrub, conifer, and hardwood scenarios of this practice to design windbreak as needed. Usually, a multi-row windbreak of low growing shrubs (outside row), tall growing hardwoods (inside row), and conifers (middle row) can provide multiple benefits. For multiple rows, planting should be staggered in adjacent rows. Consider using evergreen conifers when planting around confined animal operations for odor control. Windbreaks in and around pastures provide shade to livestock. Windbreaks can be as wide as needed but common sizes can be as wide as 5 rows or as narrow as 1 row. Can be mix of shrub, hardwood, or conifer as well as a mix of species. Spacing of trees within the rows should be kept relatively wide to promote low branching and wide crown development (4 to 6 ft for shrubs and 10 to 12 ft for trees). A larger windbreak provides more opportunity for species diversity. An example would be mast trees and shrubs for food, and dense growing conifers, deciduous trees and shrubs for shelter and cover. Space trees from 10 to 15 feet apart and shrubs 3 to 13 feet apart depending on the species and its growth habits. The minimum spacing between rows for multiple row plantings is 12 feet, and the maximum spacing is 20 feet. Rows should be 4 ft wider than equipment used for maintenance.This practice is typically applied to crop, pasture or confined animal operations. Resource Concerns to be addressed may include: Soil Erosion (wind); Excess/Insufficient Water (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); Inadequate shelter for Livestock (cover/shelter); or Objectionable Odors (air quality).

**Before Situation:**

Agricultural field, livestock paddock, feedlot or farmstead needing protection from wind, additional wildlife food and cover, livestock shelter or management of objectionsble odors.

**After Situation:**

Wind velocity suitably reduced to reduce soil erosion, or to manage objectionable odors. Additional livestock shelter or wildlife food and cover is created.

**Feature Measure:** length of windbreak row(s)

**Scenario Unit::** Each

**Scenario Typical Size:** 132

**Total Scenario Cost:** $176.16

**Scenario Cost/Unit:** $1.33

**Cost Details:**

| Component Name | ID | Description | Unit | Cost | QTY | Total |
|---|---|---|---|---|---|---|
| **Equipment Installation** | | | | | | |
| Hand tools, tree planting | 1590 | Various hand tools for digging holes and planting trees such as augers, dibble bars, planting shovel, hoe-dad. Equipment only. Labor not included. | Hour | $12.04 | 2 | $24.08 |
| **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. | Hour | $18.93 | 2 | $37.86 |
| Supervisor or Manager | 234 | Labor involving supervision or management activities. Includes crew supervisors, foremen and farm/ranch managers time required for adopting new technology, etc. | Hour | $34.29 | 2 | $68.58 |
| **Materials** | | | | | | |
| Tree, hardwood, seedling or transplant, bare root, 6-18" | 1509 | Bare root hardwood trees 6-18" tall. Includes materials and shipping only. | Each | $0.27 | 132 | $35.64 |
| **Mobilization** | | | | | | |
| Mobilization, Material, distance > 50 miles | 1043 | Mobilization cost of materials for special cases where the distance from the supplier delivery point to the job site exceeds 50 miles. The costs for shipping by UPS or bulk freight shipping to a location within 50 miles of the job site have already been included in the component price. | Dollar | $1.00 | 10 | $10.00 |

**Practice:** 380 - Windbreak/Shelterbelt Establishment

**Scenario** #6 - Shrub-bareroot

**Scenario Description:**

Use the shrub, conifer, and hardwood scenarios of this practice to design windbreak as needed. Usually, a multi-row windbreak of low growing shrubs (outside row), tall growing hardwoods (inside row), and conifers (middle row) can provide multiple benefits. For multiple rows, planting should be staggered in adjacent rows. Consider using evergreen conifers when planting around confined animal operations for odor control. Windbreaks in and around pastures provide shade to livestock. Windbreaks can be as wide as needed but common sizes can be as wide as 5 rows or as narrow as 1 row. Can be mix of shrub, hardwood, or conifer as well as a mix of species. Spacing of trees within the rows should be kept relatively wide to promote low branching and wide crown development (4 to 6 ft for shrubs and 10 to 12 ft for trees). A larger windbreak provides more opportunity for species diversity. An example would be mast trees and shrubs for food, and dense growing conifers, deciduous trees and shrubs for shelter and cover. Space trees from 10 to 15 feet apart and shrubs 3 to 13 feet apart depending on the species and its growth habits. The minimum spacing between rows for multiple row plantings is 12 feet, and the maximum spacing is 20 feet. Rows should be 4 ft wider than equipment used for maintenance.This practice is typically applied to crop, pasture or confined animal operations. Resource Concerns to be addressed may include: Soil Erosion (wind); Excess/Insufficient Water (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); Inadequate shelter for Livestock (cover/shelter); or Objectionable Odors (air quality).

**Before Situation:**

Agricultural field, livestock paddock, feedlot or farmstead needing protection from wind, additional wildlife food and cover, livestock shelter or management of objectionsble odors.

**After Situation:**

Wind velocity suitably reduced to reduce soil erosion, or to manage objectionable odors. Additional livestock shelter or wildlife food and cover is created.

**Feature Measure:** length of windbreak row(s)

**Scenario Unit::** Each

**Scenario Typical Size:** 264

**Total Scenario Cost:** $400.08

**Scenario Cost/Unit:** $1.52

**Cost Details:**

| Component Name | ID | Description | Unit | Cost | QTY | Total |
|---|---|---|---|---|---|---|
| **Equipment Installation** | | | | | | |
| Hand tools, tree planting | 1590 | Various hand tools for digging holes and planting trees such as augers, dibble bars, planting shovel, hoe-dad. Equipment only. Labor not included. | Hour | $12.04 | 2 | $24.08 |
| **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. | Hour | $18.93 | 4 | $75.72 |
| 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. | Hour | $34.29 | 4 | $137.16 |
| **Materials** | | | | | | |
| Shrub, seedling or transplant, bare root, 18"-36" | 1507 | Bare root hardwood trees 18-36" tall. Includes materials and shipping only. | Each | $0.58 | 264 | $153.12 |
| **Mobilization** | | | | | | |
| Mobilization, Material, distance > 50 miles | 1043 | Mobilization cost of materials for special cases where the distance from the supplier delivery point to the job site exceeds 50 miles. The costs for shipping by UPS or bulk freight shipping to a location within 50 miles of the job site have already been included in the component price. | Dollar | $1.00 | 10 | $10.00 |

**Practice:** 381 - Silvopasture Establishment

**Scenario** #1 - Establish Trees

**Scenario Description:**

Establishment of trees into an existing pasture that contains adequate native or introduced forage.

**Before Situation:**

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 to 400 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::** Each

**Scenario Typical Size:** 4000

**Total Scenario Cost:** $795.60

**Scenario Cost/Unit:** $0.20

**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. | Hour | $22.54 | 8 | $180.32 |
| Mechanical tree planter | 1600 | Mechanical tree planter. Requires a pulling unit of either tractor or small dozer depending upon site conditions. Does not include labor. | Hour | $6.84 | 8 | $54.72 |
| **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. | Hour | $18.93 | 8 | $151.44 |
| Equipment Operators, Light | 232 | Includes: Skid Steer Loaders, Hydraulic Excavators <50 HP, Trenchers <12", Ag Equipment <150 HP, Pickup Trucks, Forklifts, Mulchers | Hour | $21.14 | 8 | $169.12 |
| **Materials** | | | | | | |
| Tree, conifer, seedling, bare root, 1-0 | 1512 | Bare root conifer trees, 1-0 (1 year old). Includes materials and shipping only. | Each | $0.06 | 4000 | $240.00 |

**Practice:** 381 - Silvopasture Establishment

**Scenario** #2 - Thin Forest

**Scenario Description:**

Reduce density of existing forest stand (pine or hardwood, native or planted) so as to achieve 35 to 45 percent canopy cover followed by establishment of native grasses. Typically, forest sites require thinning and tillage to provide a favorable seedbed for the establishment of forages. Use heavy equipment (usually bull dozers, masticator, or mulcher & not typical farming equipment) to reduce the stocking level of a stand of desirable trees.

**Before Situation:**

Forest stand with 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, Inadequate Livestock Shelter, and Forage Quality and Palatability,

**After Situation:**

The stand is thinned 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. The soil is prepared for planting using chemical and mechanical means. All Resource Concerns listed above are adressed.

**Feature Measure:** Acres of silvopasture established

**Scenario Unit::** Acre

**Scenario Typical Size:** 10

**Total Scenario Cost:** $3,790.11

**Scenario Cost/Unit:** $379.01

**Cost Details:**

| Component Name | ID | Description | Unit | Cost | QTY | Total |
|---|---|---|---|---|---|---|
| **Equipment Installation** | | | | | | |
| Truck, Pickup | 939 | Equipment and power unit costs. Labor not included. | Hour | $19.82 | 8 | $158.56 |
| Mechanical cutter, chopper | 943 | Forestry mulcher, flail shredder, hydro axe, brush cutter, etc. Equipment and power unit costs. Labor not included. | Hour | $84.38 | 24 | $2,025.12 |
| **Labor** | | | | | | |
| Equipment Operators, Heavy | 233 | Includes: Cranes, Hydraulic Excavators >=50 HP, Dozers, Paving Machines, Rock Trenchers, Trenchers >=12", Dump Trucks, Ag Equipment >=150 HP, Scrapers, Water Wagons. | Hour | $23.93 | 24 | $574.32 |
| Specialist Labor | 235 | Labor requiring a specialized skill set: Includes Agronomists, Foresters, Biologists, etc. to provide additional technical information during the planning and implementation of the practice. Does not include NRCS or TSP services. | Hour | $91.60 | 8 | $732.80 |
| **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. | Acre | $6.66 | 10 | $66.60 |
| **Mobilization** | | | | | | |
| Mobilization, medium equipment | 1139 | Equipment with 70-150 HP or typical weights between 14,000 and 30,000 pounds. | Each | $232.71 | 1 | $232.71 |

**Practice:** 381 - Silvopasture Establishment

**Scenario** #3 - Establish Native Grass

**Scenario Description:**

Establishment of native grasses into an existing or planted stand of trees.

**Before Situation:**

Existing forest stand (pine or hardwood, native or planted) with 35 to 45 percent canopy cover or newly planted stand of trees with 200 to 400 trees 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::** Acre

**Scenario Typical Size:** 10

**Total Scenario Cost:** $5,304.50

**Scenario Cost/Unit:** $530.45

**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. | Acre | $10.14 | 10 | $101.40 |
| Tillage, Primary | 946 | Includes heavy disking (offset) or chisel plow. Includes equipment, power unit and labor costs. | Acre | $15.10 | 10 | $151.00 |
| Chemical, ground application | 948 | Chemical application performed by ground equipment. Includes equipment, power unit and labor costs. | Acre | $5.58 | 10 | $55.80 |
| Fertilizer, ground application, dry bulk | 950 | Dry bulk fertilizer application performed by ground equipment. Includes equipment, power unit and labor costs. | Acre | $6.25 | 10 | $62.50 |
| Lime application | 953 | Lime application performed by ground equipment. Includes equipment, power unit and labor costs. | Acre | $9.50 | 10 | $95.00 |
| Seeding Operation, No Till/Grass Drill | 960 | No Till drill or grass drill for seeding. Includes equipment, power unit and labor costs. | Acre | $19.43 | 10 | $194.30 |
| Cultipacking | 1100 | Includes equipment, power unit and labor costs. | Acre | $7.64 | 10 | $76.40 |
| **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 | $0.54 | 500 | $270.00 |
| Potassium, K2O | 74 | K2O supplied by Muriate Of Potash. Price is not per pound of total product applied, no conversion is needed. | Pound | $0.46 | 500 | $230.00 |
| Lime, ENM | 75 | Fertilizer: Limestone Spread on field. | Ton | $84.95 | 20 | $1,699.00 |
| 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. | Acre | $15.93 | 10 | $159.30 |
| Three plus Species Mix, Warm Season, Native Perennial | 2327 | Native, warm season perennial grass. Includes material and shipping only. | Acre | $220.98 | 10 | $2,209.80 |

**Practice:** 381 - Silvopasture Establishment

**Scenario** #4 - Establish Introduced Grass

**Scenario Description:**

Establishment of introduced grasses into an existing stand of trees that is already at an adequate density .

**Before Situation:**

Forest stand (pine or hardwood, native or planted) with 35 to 45 percent canopy cover for warm season introduced grasses or 60 percnet canopy cover for cool season introduced grasses. 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 warm season introduced grasses or introduced 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::** Acre

**Scenario Typical Size:** 10

**Total Scenario Cost:** $3,811.70

**Scenario Cost/Unit:** $381.17

**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. | Acre | $10.14 | 10 | $101.40 |
| Tillage, Primary | 946 | Includes heavy disking (offset) or chisel plow. Includes equipment, power unit and labor costs. | Acre | $15.10 | 10 | $151.00 |
| Chemical, ground application | 948 | Chemical application performed by ground equipment. Includes equipment, power unit and labor costs. | Acre | $5.58 | 10 | $55.80 |
| Fertilizer, ground application, dry bulk | 950 | Dry bulk fertilizer application performed by ground equipment. Includes equipment, power unit and labor costs. | Acre | $6.25 | 10 | $62.50 |
| Lime application | 953 | Lime application performed by ground equipment. Includes equipment, power unit and labor costs. | Acre | $9.50 | 10 | $95.00 |
| Seeding Operation, Broadcast, Ground | 959 | Broadcast seed via ground operation. May require post tillage operation to incorporate seed. Includes equipment, power unit and labor costs. | Acre | $11.48 | 10 | $114.80 |
| Cultipacking | 1100 | Includes equipment, power unit and labor costs. | Acre | $7.64 | 10 | $76.40 |
| **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 | $0.75 | 400 | $300.00 |
| 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 | $0.54 | 500 | $270.00 |
| Potassium, K2O | 74 | K2O supplied by Muriate Of Potash. Price is not per pound of total product applied, no conversion is needed. | Pound | $0.46 | 500 | $230.00 |
| Lime, ENM | 75 | Fertilizer: Limestone Spread on field. | Ton | $84.95 | 20 | $1,699.00 |
| 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. | Acre | $15.93 | 10 | $159.30 |
| Four Species Mix, Cool Season, Introduced Perennial (2 grasses, 2 legumes) | 2317 | Cool season grass and legume mix. Includes material and shipping only. | Acre | $49.65 | 10 | $496.50 |

**Practice:** 382 - Fence

**Scenario** #1 - Barbed/Smooth Wire

**Scenario Description:**

Multi-strand, Barbed or Smooth Wire - Installation of fence will allow for implementation of grazing management that allows for an adequate rest and recovery period, protection of sensitive area, improved water quality, reduction of noxious and invasive weeds. Constructed using fencing materials rather than a pre-manufactured gate.

**Before Situation:**

On grazing lands health and vigor are negatively impacted by poor grazing distribution, timing of grazing and inadequate rest and recovery periods. Water quality is impacted by increased erosion and runoff, cattle access to water bodies is uncontrolled. Reduced vegetative cover increases the opportunity for encroachment of noxious and invasive weeds.

**After Situation:**

Installation of fence will allow for implementation of grazing management that allows for an adequate rest and recovery period, protection of sensitive area, improved water quality, reduction of noxious and invasive weeds. Fence includes posts, wire, fasteners, gates, etc... Four strand wire is commonly installed. Fence will be installed with wildlife friendly considerations.

**Feature Measure:** Length of Fence

**Scenario Unit::** Foot

**Scenario Typical Size:** 2640

**Total Scenario Cost:** $6,409.74

**Scenario Cost/Unit:** $2.43

**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. | Hour | $6.65 | 40 | $266.00 |
| Truck, Pickup | 939 | Equipment and power unit costs. Labor not included. | Hour | $19.82 | 20 | $396.40 |
| Tractor, agricultural, 60 HP | 963 | Agricultural tractor with horsepower range of 50 to 90. Equipment and power unit costs. Labor not included. | Hour | $22.54 | 40 | $901.60 |
| **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. | Hour | $18.93 | 96 | $1,817.28 |
| Equipment Operators, Light | 232 | Includes: Skid Steer Loaders, Hydraulic Excavators <50 HP, Trenchers <12", Ag Equipment <150 HP, Pickup Trucks, Forklifts, Mulchers | Hour | $21.14 | 40 | $845.60 |
| **Materials** | | | | | | |
| Wire, Barbed, Galvanized, 12.5 Gauge, 1,320' roll | 1 | Galvanized 12.5 gauge, 1,320' roll. Includes materials and shipping only. | Each | $71.19 | 8 | $569.52 |
| Post, Wood, CCA treated, 4" x 8' | 10 | Wood Post, Line 4" X 8', CCA Treated. Includes materials and shipping only. | Each | $8.06 | 6 | $48.36 |
| Post, Wood, CCA treated, 6" x 8' | 12 | Wood Post, End 6" X 8', CCA Treated. Includes materials and shipping only. | Each | $15.10 | 12 | $181.20 |
| Post, Steel T, 1.33 lbs, 6' | 15 | Steel Post, Studded 6' - 1.33 lb. Includes materials and shipping only. | Each | $6.68 | 130 | $868.40 |
| Gate, Pipe, 10" | 1056 | 6 rail tube gate, 16 gauge. Includes materials and shipping only. | Each | $147.30 | 2 | $294.60 |
| **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 | $64.26 | 1 | $64.26 |
| 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 | $156.52 | 1 | $156.52 |

**Practice:** 382 - Fence

**Scenario** #2 - Woven Wire

**Scenario Description:**

Woven - Installation of fence will allow for implementation of a grazing management that allows for an adequate rest and recovery period, protection of sensitive area, improved water quality, reduction of noxious and invasive weeds. Woven wire is typically used in applications with sheep, goats, hogs, wildlife exclusion, shelterbelt/tree protection, etc. Constructed using fencing materials rather than a pre-manufactured gate.

**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 is impacted by increased erosion and runoff, livestock access to water bodies is uncontrolled. Reduced vegetative cover increases opportunity for encroachment of noxious and invasive weeds.

**After Situation:**

Installation of fence will allow for implementation of a rotational grazing plan that allows for an adequate rest and recovery period, protection of sensitive area, improved water quality, reduction of noxious and invasive weeds. Woven wire fence includes posts, wire, fasteners, gates, etc... Woven wire is typically used in applications with sheep, goats, hogs, wildlife exclusion, shelterbelt/tree protection, etc.

**Feature Measure:** Length of Fence

**Scenario Unit::** Foot

**Scenario Typical Size:** 2640

**Total Scenario Cost:** $7,924.94

**Scenario Cost/Unit:** $3.00

**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. | Hour | $6.65 | 40 | $266.00 |
| Truck, Pickup | 939 | Equipment and power unit costs. Labor not included. | Hour | $19.82 | 10 | $198.20 |
| Tractor, agricultural, 60 HP | 963 | Agricultural tractor with horsepower range of 50 to 90. Equipment and power unit costs. Labor not included. | Hour | $22.54 | 40 | $901.60 |
| **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. | Hour | $18.93 | 96 | $1,817.28 |
| Equipment Operators, Light | 232 | Includes: Skid Steer Loaders, Hydraulic Excavators <50 HP, Trenchers <12", Ag Equipment <150 HP, Pickup Trucks, Forklifts, Mulchers | Hour | $21.14 | 40 | $845.60 |
| **Materials** | | | | | | |
| Wire, Barbed, Galvanized, 12.5 Gauge, 1,320' roll | 1 | Galvanized 12.5 gauge, 1,320' roll. Includes materials and shipping only. | Each | $71.19 | 4 | $284.76 |
| Wire, Woven, Galvanized, 12.5 Gauge, 32" | 3 | Galvanized 12.5 gauge, 32" - 330' roll. Includes materials and shipping only. | Each | $175.97 | 8 | $1,407.76 |
| Post, Wood, CCA treated, 3-4" x 7' | 9 | Wood Post, Line 3-4" X 7', CCA Treated. Includes materials and shipping only. | Each | $6.26 | 6 | $37.56 |
| Post, Wood, CCA treated, 6" x 8' | 12 | Wood Post, End 6" X 8', CCA Treated. Includes materials and shipping only. | Each | $15.10 | 12 | $181.20 |
| Post, Steel T, 1.33 lbs, 6' | 15 | Steel Post, Studded 6' - 1.33 lb. Includes materials and shipping only. | Each | $6.68 | 220 | $1,469.60 |
| Gate, Pipe, 10" | 1056 | 6 rail tube gate, 16 gauge. Includes materials and shipping only. | Each | $147.30 | 2 | $294.60 |
| **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 | $64.26 | 1 | $64.26 |
| 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 | $156.52 | 1 | $156.52 |

**Practice:** 382 - Fence

**Scenario** #3 - Electric

**Scenario Description:**

Electric - Installation of fence will allow for implementation of a grazing management that allows for an adequate rest and recovery period, protection of sensitive area, improved water quality, reduction of noxious and invasive weeds.

**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 strand wire is commonly installed. Fence will be installed with wildlife friendly considerations.

**Feature Measure:** Length of Fence

**Scenario Unit::** Foot

**Scenario Typical Size:** 1320

**Total Scenario Cost:** $1,913.61

**Scenario Cost/Unit:** $1.45

**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. | Hour | $6.65 | 2 | $13.30 |
| Tractor, agricultural, 60 HP | 963 | Agricultural tractor with horsepower range of 50 to 90. Equipment and power unit costs. Labor not included. | Hour | $22.54 | 2 | $45.08 |
| **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. | Hour | $18.93 | 8 | $151.44 |
| **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 | $114.08 | 1 | $114.08 |
| Post, Wood, CCA treated, 5" x 8' | 11 | Wood Post, End 5" X 8', CCA Treated. Includes materials and shipping only. | Each | $11.26 | 4 | $45.04 |
| Post, Fiberglass, 7/8" X 6' | 18 | Fiberglass line post, 7/8" diameter X 6' length. Includes materials and shipping only. | Each | $9.92 | 27 | $267.84 |
| Electric, Ground Rods | 20 | Electric, Ground Rod for electric fence. Includes materials and shipping only. | Each | $10.51 | 7 | $73.57 |
| Electric, Ground Rod Clamps | 21 | Electric, Ground Rod Clamps for electric fence. Includes materials and shipping only. | Each | $1.81 | 7 | $12.67 |
| Electric, Lightening Diverter | 22 | Electric, Lightening diverter for electric fence. Includes materials and shipping only. | Each | $10.27 | 1 | $10.27 |
| Electric, Insulated cable | 23 | Electric, Insulated cable for electric fence. Typically in spools of 100 to 200 feet. Includes materials and shipping only. | Each | $29.98 | 30 | $899.40 |
| Electric, Power Surge Protector | 24 | Electric, Power Surge Protector for electric fence. Includes materials and shipping only. | Each | $9.64 | 1 | $9.64 |
| Electric, Tester | 26 | Electric, Tester for electric fence. Includes materials and shipping only. | Each | $41.14 | 1 | $41.14 |
| Electric, Energizer, 3-4 joule | 28 | Electric, Energizer, 3-4 joule for electric fence. Includes materials and shipping only. | Each | $230.14 | 1 | $230.14 |

## USDA - Natural Resources Conservation Service

**Arkansas**

**Practice:** 382 - Fence

**Scenario** #55 - Electric 3+ Wires

**Scenario Description:**

Electric - Installation of 3+ wire electric 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 strand wire is commonly installed. Fence will be installed with wildlife friendly considerations.

**Feature Measure:** Length of Fence

**Scenario Unit::** Foot

**Scenario Typical Size:** 1320

**Total Scenario Cost:** $2,421.23

**Scenario Cost/Unit:** $1.83

**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. | Hour | $6.65 | 4 | $26.60 |
| Tractor, agricultural, 60 HP | 963 | Agricultural tractor with horsepower range of 50 to 90. Equipment and power unit costs. Labor not included. | Hour | $22.54 | 4 | $90.16 |
| **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. | Hour | $18.93 | 20 | $378.60 |
| **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 | $114.08 | 2 | $228.16 |
| Post, Wood, CCA treated, 4" x 8' | 10 | Wood Post, Line 4" X 8', CCA Treated. Includes materials and shipping only. | Each | $8.06 | 4 | $32.24 |
| Post, Wood, CCA treated, 6" x 8' | 12 | Wood Post, End 6" X 8', CCA Treated. Includes materials and shipping only. | Each | $15.10 | 8 | $120.80 |
| Post, Fiberglass, 7/8" X 6' | 18 | Fiberglass line post, 7/8" diameter X 6' length. Includes materials and shipping only. | Each | $9.92 | 27 | $267.84 |
| Electric, Ground Rods | 20 | Electric, Ground Rod for electric fence. Includes materials and shipping only. | Each | $10.51 | 7 | $73.57 |
| Electric, Ground Rod Clamps | 21 | Electric, Ground Rod Clamps for electric fence. Includes materials and shipping only. | Each | $1.81 | 7 | $12.67 |
| Electric, Lightening Diverter | 22 | Electric, Lightening diverter for electric fence. Includes materials and shipping only. | Each | $10.27 | 1 | $10.27 |
| Electric, Insulated cable | 23 | Electric, Insulated cable for electric fence. Typically in spools of 100 to 200 feet. Includes materials and shipping only. | Each | $29.98 | 30 | $899.40 |
| Electric, Power Surge Protector | 24 | Electric, Power Surge Protector for electric fence. Includes materials and shipping only. | Each | $9.64 | 1 | $9.64 |
| Electric, Tester | 26 | Electric, Tester for electric fence. Includes materials and shipping only. | Each | $41.14 | 1 | $41.14 |
| Electric, Energizer, 3-4 joule | 28 | Electric, Energizer, 3-4 joule for electric fence. Includes materials and shipping only. | Each | $230.14 | 1 | $230.14 |

**Practice:** 382 - Fence

**Scenario** #56 - Electric 1-2 Wire(s)

**Scenario Description:**

Electric - Installation of 1-2 wire electric 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 strand wire is commonly installed. Fence will be installed with wildlife friendly considerations.

**Feature Measure:** Length of Fence

**Scenario Unit::** Foot

**Scenario Typical Size:** 1320

**Total Scenario Cost:** $1,913.61

**Scenario Cost/Unit:** $1.45

**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. | Hour | $6.65 | 2 | $13.30 |
| Tractor, agricultural, 60 HP | 963 | Agricultural tractor with horsepower range of 50 to 90. Equipment and power unit costs. Labor not included. | Hour | $22.54 | 2 | $45.08 |
| **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. | Hour | $18.93 | 8 | $151.44 |
| **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 | $114.08 | 1 | $114.08 |
| Post, Wood, CCA treated, 5" x 8' | 11 | Wood Post, End 5" X 8', CCA Treated. Includes materials and shipping only. | Each | $11.26 | 4 | $45.04 |
| Post, Fiberglass, 7/8" X 6' | 18 | Fiberglass line post, 7/8" diameter X 6' length. Includes materials and shipping only. | Each | $9.92 | 27 | $267.84 |
| Electric, Ground Rods | 20 | Electric, Ground Rod for electric fence. Includes materials and shipping only. | Each | $10.51 | 7 | $73.57 |
| Electric, Ground Rod Clamps | 21 | Electric, Ground Rod Clamps for electric fence. Includes materials and shipping only. | Each | $1.81 | 7 | $12.67 |
| Electric, Lightening Diverter | 22 | Electric, Lightening diverter for electric fence. Includes materials and shipping only. | Each | $10.27 | 1 | $10.27 |
| Electric, Insulated cable | 23 | Electric, Insulated cable for electric fence. Typically in spools of 100 to 200 feet. Includes materials and shipping only. | Each | $29.98 | 30 | $899.40 |
| Electric, Power Surge Protector | 24 | Electric, Power Surge Protector for electric fence. Includes materials and shipping only. | Each | $9.64 | 1 | $9.64 |
| Electric, Tester | 26 | Electric, Tester for electric fence. Includes materials and shipping only. | Each | $41.14 | 1 | $41.14 |
| Electric, Energizer, 3-4 joule | 28 | Electric, Energizer, 3-4 joule for electric fence. Includes materials and shipping only. | Each | $230.14 | 1 | $230.14 |

**Practice:** 383 - Fuel Break

**Scenario** #1 - Grinder

**Scenario Description:**

Dwelling or structure exists in or adjacent to a overstocked forest standwith higher than normal wildfire threat. Fuel Break installation requires tree thinning, treating woody residue, pruning and mowing to remove wildfire hazard to stand and structure. Treating woody residue (piling/burning, crushing, grinding or off-site removal) and mowing are mostly mechanized with some hand treatment. Resource concerns are degraded plant condition - wildfire hazard, excess biomass accumulation & undesirable productivity and health.

**Before Situation:**

Stand condition creates conditions conducive to wildfire movement across the landscape. Higher than normal fuel load is created by tree crowns touching, trees retaining limbs down to understory vegetation (creating a "ladder" for fire movement into the overstory), understory vegetation (brush and grasses), and existing woody residue. Slope of terrain increases fire hazard. Existing conditions can be rated as a high to severe fire hazard. Dwelling or structure and forest stand is at risk of loss if a wildfire should occur.

**After Situation:**

Fuel Break is installed around structure to reduce intensity and rate of spread of a wildfire. Defensible space is provided for the structure. Existing trees should survive a wildfire. Width of fue break can vary from 30' to 250' depending on slope and fuel type. Trees are thinned so as to have at least 20' between the edge of the crowns. Trees are pruned so as not to have any branches within 15' of the ground. All woody residue (thinned trees, branches and brush) are mostly ground up but some is piled/burned, hauled of site or lopped/scattered) understory vegetation is cut down to less than 1 foot in height. Cut stumps have been chemically treated to control sprouting.

**Feature Measure:** Area of Treatment

**Scenario Unit::** Acre

**Scenario Typical Size:** 4

**Total Scenario Cost:** $2,637.78

**Scenario Cost/Unit:** $659.45

**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. | Hour | $84.38 | 16 | $1,350.08 |
| 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. | Hour | $54.07 | 3 | $162.21 |
| Pruning tools, hand tools | 1318 | Pruning tools, hand tools, shears, loppers, pole saw, handsaw. Material costs only. Labor not included. | Hour | $4.94 | 16 | $79.04 |
| **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. | Hour | $18.93 | 16 | $302.88 |
| Equipment Operators, Heavy | 233 | Includes: Cranes, Hydraulic Excavators >=50 HP, Dozers, Paving Machines, Rock Trenchers, Trenchers >=12", Dump Trucks, Ag Equipment >=150 HP, Scrapers, Water Wagons. | Hour | $23.93 | 16 | $382.88 |
| **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. | Acre | $15.93 | 4 | $63.72 |
| **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 | $64.26 | 1 | $64.26 |
| Mobilization, medium equipment | 1139 | Equipment with 70-150 HP or typical weights between 14,000 and 30,000 pounds. | Each | $232.71 | 1 | $232.71 |

**Practice:** 384 - Woody Residue Treatment

**Scenario** #1 - Wood Residue Treament

**Scenario Description:**

The use of 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. Methods of treatment: Lopping and scatter: Lopping is the cutting of limbs, branches, treetops, small diameter trees, or other woody plant residue into lengths so that the remaining slash will lie close to the ground. Scattering is the spreading of lopped slash evenly over the ground so that the remaining slash will lie close to the ground. Piling and burning: Piling is placing, laying, heaping or stacking of slash into piles to facilitate intended burning. Burning is igniting piled slash under prescribed conditions to reduce the amount and continuity of fuels. Chipping: This method includes the mechanical conversion of slash to chips and chunks of varying sizes to distribute on site or utilized offsite as landscape mulch. Crushing: This method involves the use of heavy ground-based equipment that crushes/grinds slash to a depth not exceeding 1 foot. Resource concerns include: Excessive plant pest pressure, Potential emissions of particulate matter, Wildfire hazard from excessive biomass accumulation, and Habitat degradation. If the land is being prepared for tree planting, use Tree/Shrub Site Preparation instead.

**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.The clean up should allow the forest land to be utilized as is intended and reduce the risk of catastrophic wild fire. Installation of the practice should be complete within 3 years of the event.

**Feature Measure:** Acres of affected forest

**Scenario Unit::** Acre

**Scenario Typical Size:** 20

**Total Scenario Cost:** $9,014.72

**Scenario Cost/Unit:** $450.74

**Cost Details:**

| Component Name | ID | Description | Unit | Cost | QTY | Total |
|---|---|---|---|---|---|---|
| **Equipment Installation** | | | | | | |
| Chainsaw | 937 | Equipment and power unit costs. Labor not included. | Hour | $3.97 | 10 | $39.70 |
| Truck, Pickup | 939 | Equipment and power unit costs. Labor not included. | Hour | $19.82 | 10 | $198.20 |
| Log skidder | 942 | Equipment and power unit costs. Labor not included. | Hour | $116.00 | 20 | $2,320.00 |
| Mechanical cutter, chopper | 943 | Forestry mulcher, flail shredder, hydro axe, brush cutter, etc. Equipment and power unit costs. Labor not included. | Hour | $84.38 | 40 | $3,375.20 |
| **Labor** | | | | | | |
| General Labor | 231 | Labor performed using basic tools such as power tool, shovels, and other tools that do not require extensive training. Ex. pipe layer, herder, concrete placement, materials spreader, flagger, etc. | Hour | $18.93 | 40 | $757.20 |
| Equipment Operators, Heavy | 233 | Includes: Cranes, Hydraulic Excavators >=50 HP, Dozers, Paving Machines, Rock Trenchers, Trenchers >=12", Dump Trucks, Ag Equipment >=150 HP, Scrapers, Water Wagons. | Hour | $23.93 | 60 | $1,435.80 |
| **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 | $444.31 | 2 | $888.62 |

**Practice:** 384 - Woody Residue Treatment

**Scenario** #2 - Woody debris - Silviculture light

**Scenario Description:**

Treating an area of forest slash to reduce hazardous fuels and remove diseased or damaged trees due to insects or high winds while improving the organic matter, water quality and wildife habitat. Slash is treated both with hand (chainsaws, lopping, cutting, etc.) and mechanically (masticating, chipping, etc.). Typically done using both hand and light equipment. The resource concerns addressed include wildfire hazards from excessive debris, excessive down woody material to harbor insects and disease, plant health and vigor and inadequate wildlife habitat.

**Before Situation:**

Excessive woody material resulting from a heavy infestation of insects, disease or wind storms. The woody material is a wildlfire hazard, pest hazard and may negatively impact the residual plant health and vigor and wildlife habitat.

**After Situation:**

Wildfire and pest issues are reduced with the woody debris cut, shreaded, or chipped and spread out in better contact with the ground. The ground contact will spead up its decomposition improving the organic matter in the soil and allow the residual trees to benefit from these nutrients. Wildlife habitat is enhanced as sunlight can reach the forest floor where the former debris covered the site. Twenty acres is the typical scenario but larger or smaller acreages may be impacted.

**Feature Measure:** acres treated

**Scenario Unit::** Acre

**Scenario Typical Size:** 20

**Total Scenario Cost:** $3,082.08

**Scenario Cost/Unit:** $154.10

**Cost Details:**

| Component Name | ID | Description | Unit | Cost | QTY | Total |
|---|---|---|---|---|---|---|
| **Equipment Installation** | | | | | | |
| Chainsaw | 937 | Equipment and power unit costs. Labor not included. | Hour | $3.97 | 24 | $95.28 |
| Mechanical cutter, chopper | 943 | Forestry mulcher, flail shredder, hydro axe, brush cutter, etc. Equipment and power unit costs. Labor not included. | Hour | $84.38 | 24 | $2,025.12 |
| **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. | Hour | $18.93 | 24 | $454.32 |
| Equipment Operators, Light | 232 | Includes: Skid Steer Loaders, Hydraulic Excavators <50 HP, Trenchers <12", Ag Equipment <150 HP, Pickup Trucks, Forklifts, Mulchers | Hour | $21.14 | 24 | $507.36 |

**Practice:** 384 - Woody Residue Treatment

**Scenario** #3 - Orchard/Vinyard - Woody debris treatment

**Scenario Description:**

Woody debris created in an orchard/vineyard due to high winds, storms or insects/disease 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, plant health and vigor by reducing the risk of insects and disease and human by improving access and removing hazards.

**Before Situation:**

Wood waste created in an orchard or vinyard due to weather related storms or insects and disease 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.

**After Situation:**

Treatment of orchard or vinyard debris is chipped and removed from the site which results in the reduction in air pollutants, improvement in access, and the reduction of sites that can harbor pests improving plant health and vigor.

**Feature Measure:** Acres of orchard/vineyard with slas

**Scenario Unit::** Acre

**Scenario Typical Size:** 20

**Total Scenario Cost:** $1,859.76

**Scenario Cost/Unit:** $92.99

**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. | Hour | $40.57 | 8 | $324.56 |
| Brush Chipper, 6" capacity | 938 | Brush Chipper, 6" capacity, typically 35 HP. Includes chipper and power unit. Labor not included. | Hour | $19.33 | 8 | $154.64 |
| Truck, dump, 8 CY | 1401 | Dump truck for moving bulk material. Typically capacity is 12 ton or 8 cubic yards. Includes equipment only. | Hour | $52.36 | 8 | $418.88 |
| **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. | Hour | $18.93 | 24 | $454.32 |
| Equipment Operators, Light | 232 | Includes: Skid Steer Loaders, Hydraulic Excavators <50 HP, Trenchers <12", Ag Equipment <150 HP, Pickup Trucks, Forklifts, Mulchers | Hour | $21.14 | 24 | $507.36 |

**Practice:** 386 - Field Border

**Scenario** #1 - Field Border-Native, Inc Forgone

**Scenario Description:**

A strip of permanent vegetation established at the edge or around the perimeter of a field. This practice may also apply to recreation land or other land uses where agronomic crops including forages are grown. Practice includes seedbed prep and planting of native species. The area of the field border is taken out of production.

**Before 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:**

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 charactaristics necessary to control wind and water erosion to tolerable levels on the field border area.

**Feature Measure:** number of acres

**Scenario Unit::** Acre

**Scenario Typical Size:** 1

**Total Scenario Cost:** $544.64

**Scenario Cost/Unit:** $544.64

**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. | Acre | $5.58 | 1 | $5.58 |
| Seeding Operation, No Till/Grass Drill | 960 | No Till drill or grass drill for seeding. Includes equipment, power unit and labor costs. | Acre | $19.43 | 1 | $19.43 |
| **Foregone Income** | | | | | | |
| FI, Corn Dryland | 1959 | Dryland Corn is Primary Crop | Acre | $405.66 | 0.25 | $101.42 |
| FI, Soybeans Dryland | 1961 | Dryland Soybeans is Primary Crop | Acre | $211.75 | 0.25 | $52.94 |
| FI, Cotton Dryland | 1967 | Dryland Cotton is Primary Crop | Acre | $156.16 | 0.25 | $39.04 |
| FI, Sorghum Dryland | 1971 | Dryland Sorghum is Primary Crop | Acre | $109.67 | 0.25 | $27.42 |
| **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. | Acre | $15.93 | 1 | $15.93 |
| Untreated Conventional Seed, Three plus Species Mix, Warm Season Perennial Grass | 2344 | Untreated conventional wWarm season perennial grass mix. May contain seed that are not available as certified organic. Includes material and shipping only. | Acre | $282.89 | 1 | $282.89 |

**Practice:** 386 - Field Border

**Scenario** #2 - Field Border, Introduced, Inc Forgone

**Scenario Description:**

A strip of permanent vegetation established at the edge or around the perimeter of a field. This practice may also apply to recreation land or other land uses where agronomic crops including forages are grown. Practice includes seedbed prep and planting of introduced species. The area of the field border is taken out of production.

**Before 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:**

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 charactaristics necessary to control wind and water erosion to tolerable levels on the field border area.

**Feature Measure:** Number of acres

**Scenario Unit::** Acre

**Scenario Typical Size:** 1

**Total Scenario Cost:** $593.29

**Scenario Cost/Unit:** $593.29

**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. | Acre | $5.58 | 1 | $5.58 |
| Seeding Operation, No Till/Grass Drill | 960 | No Till drill or grass drill for seeding. Includes equipment, power unit and labor costs. | Acre | $19.43 | 1 | $19.43 |
| **Foregone Income** | | | | | | |
| FI, Corn Dryland | 1959 | Dryland Corn is Primary Crop | Acre | $405.66 | 0.25 | $101.42 |
| FI, Soybeans Irrigated | 1962 | Irrigated Soybeans is Primary Crop | Acre | $261.53 | 0.25 | $65.38 |
| FI, Cotton Dryland | 1967 | Dryland Cotton is Primary Crop | Acre | $156.16 | 0.25 | $39.04 |
| FI, Sorghum Dryland | 1971 | Dryland Sorghum is Primary Crop | Acre | $109.67 | 0.25 | $27.42 |
| **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 | $0.54 | 30 | $16.20 |
| 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 | $0.54 | 20 | $10.80 |
| Potassium, K2O | 74 | K2O supplied by Muriate Of Potash. Price is not per pound of total product applied, no conversion is needed. | Pound | $0.46 | 20 | $9.20 |
| 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. | Acre | $15.93 | 1 | $15.93 |
| Untreated Conventional Seed, Three plus Species Mix, Warm Season Perennial Grass | 2344 | Untreated conventional wWarm season perennial grass mix. May contain seed that are not available as certified organic. Includes material and shipping only. | Acre | $282.89 | 1 | $282.89 |

**Practice:** 386 - Field Border

**Scenario** #3 - Field Border-Pollinator, Inc Forgone

**Scenario Description:**

A strip of permanent vegetation established at the edge or around the perimeter of a field. This practice may also apply to recreation land or other land uses where agronomic crops including forages are grown. Practice includes seedbed prep and planting of pollinator friendly herbaceous species. The area of the field border is taken out of production.

**Before 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:**

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 charactaristics necessary to control wind and water erosion to tolerable levels on the field border area.

**Feature Measure:** Number of acres

**Scenario Unit::** Acre

**Scenario Typical Size:** 1

**Total Scenario Cost:** $523.04

**Scenario Cost/Unit:** $523.04

**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. | Acre | $5.58 | 1 | $5.58 |
| Seeding Operation, No Till/Grass Drill | 960 | No Till drill or grass drill for seeding. Includes equipment, power unit and labor costs. | Acre | $19.43 | 1 | $19.43 |
| **Foregone Income** | | | | | | |
| FI, Corn Dryland | 1959 | Dryland Corn is Primary Crop | Acre | $405.66 | 0.25 | $101.42 |
| FI, Soybeans Dryland | 1961 | Dryland Soybeans is Primary Crop | Acre | $211.75 | 0.25 | $52.94 |
| FI, Cotton Dryland | 1967 | Dryland Cotton is Primary Crop | Acre | $156.16 | 0.25 | $39.04 |
| FI, Sorghum Dryland | 1971 | Dryland Sorghum is Primary Crop | Acre | $109.67 | 0.25 | $27.42 |
| **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. | Acre | $15.93 | 1 | $15.93 |
| Untreated Conventional Seed, Pollinator Mix, Native Perennial Grasses and Forbs | 2346 | Untreated conventional native perennial grass and legume pollinator mix. May contain seed that are not available as certified organic. Includes material and shipping only. | Acre | $261.29 | 1 | $261.29 |

**Practice:** 386 - Field Border

**Scenario** #4 - Field Border-Organic Seed, Inc Forgone

**Scenario Description:**

A strip of permanent vegetation established at the edge or around the perimeter of a field. This practice may also apply to recreation land or other land uses where agronomic crops including forages are grown. Practice includes seedbed prep and planting of organic seed for herbaceous species. The area of the field border is taken out of production.

**Before 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:**

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. Organic 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, not function as a host for diseases of a field crop and have physical charactaristics necessary to control wind and water erosion to tolerable levels on the field border area.

**Feature Measure:** Number of Acres

**Scenario Unit::** Acre

**Scenario Typical Size:** 1

**Total Scenario Cost:** $456.35

**Scenario Cost/Unit:** $456.35

**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. | Acre | $64.13 | 1 | $64.13 |
| Tillage, Primary | 946 | Includes heavy disking (offset) or chisel plow. Includes equipment, power unit and labor costs. | Acre | $15.10 | 1 | $15.10 |
| Seeding Operation, No Till/Grass Drill | 960 | No Till drill or grass drill for seeding. Includes equipment, power unit and labor costs. | Acre | $19.43 | 1 | $19.43 |
| **Foregone Income** | | | | | | |
| FI, Organic, Corn Dryland | 2232 | Organic Dryland Corn is Primary Crop | Acre | $471.34 | 0.25 | $117.84 |
| FI, Organic, Soybeans Dryland | 2234 | Organic Dryland Soybeans is Primary Crop | Acre | $260.12 | 0.25 | $65.03 |
| FI, Organic, Cotton Dryland | 2240 | Organic Dryland Cotton is Primary Crop | Acre | $209.00 | 0.25 | $52.25 |
| FI, Organic, Sorghum Dryland | 2244 | Organic Dryland Sorghum is Primary Crop | Acre | $117.80 | 0.25 | $29.45 |
| **Materials** | | | | | | |
| Manure | 264 | Organic matter can be used as organic fertilizer in agriculture | Ton | $23.50 | 1 | $23.50 |
| Certified Organic, Three Species Mix, Cool Season, Perennial Grasses and Legumes | 2340 | Certified organic cool season perennial grass and legume mix. Includes material and shipping only. | Acre | $69.62 | 1 | $69.62 |

**Practice:** 386 - Field Border

**Scenario** #5 - Field Border-Native

**Scenario Description:**

A strip of permanent vegetation established at the edge or around the perimeter of a field. This practice may also apply to recreation land or other land uses where agronomic crops including forages are grown. Practice includes seedbed prep and planting of native species. The area of the field border is taken out of production.

**Before 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:**

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 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. Native species shall be selected that do not function as a host for diseases of a field crop and have physical charactaristics necessary to control wind and water erosion to tolerable levels on the field border area.

**Feature Measure:** number of acres

**Scenario Unit::** Acre

**Scenario Typical Size:** 1

**Total Scenario Cost:** $323.83

**Scenario Cost/Unit:** $323.83

**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. | Acre | $5.58 | 1 | $5.58 |
| Seeding Operation, No Till/Grass Drill | 960 | No Till drill or grass drill for seeding. Includes equipment, power unit and labor costs. | Acre | $19.43 | 1 | $19.43 |
| **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. | Acre | $15.93 | 1 | $15.93 |
| Untreated Conventional Seed, Three plus Species Mix, Warm Season Perennial Grass | 2344 | Untreated conventional wWarm season perennial grass mix. May contain seed that are not available as certified organic. Includes material and shipping only. | Acre | $282.89 | 1 | $282.89 |

**Practice:** 386 - Field Border

**Scenario** #6 - Field Border, Introduced

**Scenario Description:**

A strip of permanent vegetation established at the edge or around the perimeter of a field. This practice may also apply to recreation land or other land uses where agronomic crops including forages are grown. Practice includes seedbed prep and planting of introduced species. The area of the field border is taken out of production.

**Before 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:**

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. Introduced species of grasses, legumes, forbs or shrubs shall be selected that are adapted to site, will not function as a host for diseases of a field crop and have physical charactaristics necessary to control wind and water erosion to tolerable levels on the field border area.

**Feature Measure:** Number of acres

**Scenario Unit::** Acre

**Scenario Typical Size:** 1

**Total Scenario Cost:** $360.03

**Scenario Cost/Unit:** $360.03

**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. | Acre | $5.58 | 1 | $5.58 |
| Seeding Operation, No Till/Grass Drill | 960 | No Till drill or grass drill for seeding. Includes equipment, power unit and labor costs. | Acre | $19.43 | 1 | $19.43 |
| **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 | $0.54 | 30 | $16.20 |
| 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 | $0.54 | 20 | $10.80 |
| Potassium, K2O | 74 | K2O supplied by Muriate Of Potash. Price is not per pound of total product applied, no conversion is needed. | Pound | $0.46 | 20 | $9.20 |
| 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. | Acre | $15.93 | 1 | $15.93 |
| Untreated Conventional Seed, Three plus Species Mix, Warm Season Perennial Grass | 2344 | Untreated conventional wWarm season perennial grass mix. May contain seed that are not available as certified organic. Includes material and shipping only. | Acre | $282.89 | 1 | $282.89 |

**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. 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:**

This practice when applied around a field may support and connect other buffer practices within and between fields. Pollinator herbaceous plantings will provide plants which flower throughout the growing season. This provides a source of nectar for adult pollinators and a diversity of herbaceous material for immature pollinator life stages and for nesting. Minimum field border widths shall be based on NRCS local design criteria specific to the purpose for installing the practice. Species selected shall meet the pollinator habitat requirements of the state and be adapted to site, not function as a host for diseases of a field crop and have physical charactaristics necessary to control wind and water erosion to tolerable levels on the field border area.

**Feature Measure:** Number of acres

**Scenario Unit::** Acre

**Scenario Typical Size:** 1

**Total Scenario Cost:** $323.83

**Scenario Cost/Unit:** $323.83

**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. | Acre | $5.58 | 1 | $5.58 |
| Seeding Operation, No Till/Grass Drill | 960 | No Till drill or grass drill for seeding. Includes equipment, power unit and labor costs. | Acre | $19.43 | 1 | $19.43 |
| **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. | Acre | $15.93 | 1 | $15.93 |
| Untreated Conventional Seed, Three plus Species Mix, Warm Season Perennial Grass | 2344 | Untreated conventional wWarm season perennial grass mix. May contain seed that are not available as certified organic. Includes material and shipping only. | Acre | $282.89 | 1 | $282.89 |

**Practice:** 386 - Field Border

**Scenario** #8 - Field Border-Organic Seed

**Scenario Description:**

A strip of permanent vegetation established at the edge or around the perimeter of a field. This practice may also apply to recreation land or other land uses where agronomic crops including forages are grown. Practice includes seedbed prep and planting of organic seed for herbaceous species. The area of the field border is taken out of production.

**Before 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:**

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. Organic 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, not function as a host for diseases of a field crop and have physical charactaristics necessary to control wind and water erosion to tolerable levels on the field border area.

**Feature Measure:** Number of Acres

**Scenario Unit::** Acre

**Scenario Typical Size:** 1

**Total Scenario Cost:** $168.28

**Scenario Cost/Unit:** $168.28

**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. | Acre | $64.13 | 1 | $64.13 |
| Tillage, Primary | 946 | Includes heavy disking (offset) or chisel plow. Includes equipment, power unit and labor costs. | Acre | $15.10 | 1 | $15.10 |
| Seeding Operation, No Till/Grass Drill | 960 | No Till drill or grass drill for seeding. Includes equipment, power unit and labor costs. | Acre | $19.43 | 1 | $19.43 |
| **Materials** | | | | | | |
| Certified Organic, Three Species Mix, Cool Season, Perennial Grasses and Legumes | 2340 | Certified organic cool season perennial grass and legume mix. Includes material and shipping only. | Acre | $69.62 | 1 | $69.62 |

**Practice:** 386 - Field Border

**Scenario** #9 - Field Border-Shrubs, Inc. Forgone

**Scenario Description:**

A strip of permanent vegetation and shrubs 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 herbaceous (Native warm season grasses (NWSG), legumes and forbs) and woody 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:**

This practice when applied around a field will support and connect other buffer practices within and between fields. Herbaceous plantings will be established to meet Field Border specifications and in addition shrubs will be established around the field edges to the extent needed to meet the resource needs and producer objectives. Minimum field border widths shall be based on NRCS local design criteria specific to the purpose for installing the practice. Shrub species selected shall be adapted to site, not function as a host for diseases of a field crop and have physical charactaristics necessary to control wind and water erosion to tolerable levels on the field border area.

**Feature Measure:** Number of Acres

**Scenario Unit::** Acre

**Scenario Typical Size:** 1

**Total Scenario Cost:** $671.09

**Scenario Cost/Unit:** $671.09

**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. | Acre | $5.58 | 1 | $5.58 |
| Seeding Operation, No Till/Grass Drill | 960 | No Till drill or grass drill for seeding. Includes equipment, power unit and labor costs. | Acre | $19.43 | 1 | $19.43 |
| Hand tools, tree planting | 1590 | Various hand tools for digging holes and planting trees such as augers, dibble bars, planting shovel, hoe-dad. Equipment only. Labor not included. | Hour | $12.04 | 2 | $24.08 |
| **Foregone Income** | | | | | | |
| FI, Corn Dryland | 1959 | Dryland Corn is Primary Crop | Acre | $405.66 | 0.25 | $101.42 |
| FI, Soybeans Dryland | 1961 | Dryland Soybeans is Primary Crop | Acre | $211.75 | 0.25 | $52.94 |
| FI, Cotton Dryland | 1967 | Dryland Cotton is Primary Crop | Acre | $156.16 | 0.25 | $39.04 |
| FI, Sorghum Dryland | 1971 | Dryland Sorghum is Primary Crop | Acre | $109.67 | 0.25 | $27.42 |
| **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. | Hour | $18.93 | 2 | $37.86 |
| **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. | Acre | $15.93 | 1 | $15.93 |
| Shrub, seedling or transplant, bare root, 18"-36" | 1507 | Bare root hardwood trees 18-36" tall. Includes materials and shipping only. | Each | $0.58 | 160 | $92.80 |
| Untreated Conventional Seed, Three plus Species Mix, Warm Season Perennial Grass | 2344 | Untreated conventional wWarm season perennial grass mix. May contain seed that are not available as certified organic. Includes material and shipping only. | Acre | $282.89 | 0.9 | $254.60 |

**Practice:** 386 - Field Border

**Scenario** #10 - Field Border-Shrubs

**Scenario Description:**

A strip of permanent vegetation and shrubs 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 herbaceous (Native warm season grasses (NWSG), legumes and forbs) and woody 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:**

This practice when applied around a field will support and connect other buffer practices within and between fields. Herbaceous plantings will be established to meet Field Border specifications and in addition shrubs will be established around the field edges to the extent needed to meet the resource needs and producer objectives. Minimum field border widths shall be based on NRCS local design criteria specific to the purpose for installing the practice. Shrub species selected shall be adapted to site, not function as a host for diseases of a field crop and have physical charactaristics necessary to control wind and water erosion to tolerable levels on the field border area.

**Feature Measure:** Number of Acres

**Scenario Unit::** Acre

**Scenario Typical Size:** 1

**Total Scenario Cost:** $450.28

**Scenario Cost/Unit:** $450.28

**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. | Acre | $5.58 | 1 | $5.58 |
| Seeding Operation, No Till/Grass Drill | 960 | No Till drill or grass drill for seeding. Includes equipment, power unit and labor costs. | Acre | $19.43 | 1 | $19.43 |
| Hand tools, tree planting | 1590 | Various hand tools for digging holes and planting trees such as augers, dibble bars, planting shovel, hoe-dad. Equipment only. Labor not included. | Hour | $12.04 | 2 | $24.08 |
| **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. | Hour | $18.93 | 2 | $37.86 |
| **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. | Acre | $15.93 | 1 | $15.93 |
| Shrub, seedling or transplant, bare root, 18"-36" | 1507 | Bare root hardwood trees 18-36" tall. Includes materials and shipping only. | Each | $0.58 | 160 | $92.80 |
| Untreated Conventional Seed, Three plus Species Mix, Warm Season Perennial Grass | 2344 | Untreated conventional wWarm season perennial grass mix. May contain seed that are not available as certified organic. Includes material and shipping only. | Acre | $282.89 | 0.9 | $254.60 |

**Practice:** 390 - Riparian Herbaceous Cover

**Scenario** #1 - Native Warm Season Grass

**Scenario Description:**

Native Warm Season Grasses with naturally regenerated 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 native warm season grasses 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) and legumes, and/or forbs are expected to naturally regenerate on-site. 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 Cove

**Scenario Unit::** Acre

**Scenario Typical Size:** 0.5

**Total Scenario Cost:** $143.80

**Scenario Cost/Unit:** $287.60

**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. | Acre | $10.14 | 1 | $10.14 |
| Seeding Operation, No Till/Grass Drill | 960 | No Till drill or grass drill for seeding. Includes equipment, power unit and labor costs. | Acre | $19.43 | 1 | $19.43 |
| **Labor** | | | | | | |
| Equipment Operators, Light | 232 | Includes: Skid Steer Loaders, Hydraulic Excavators <50 HP, Trenchers <12", Ag Equipment <150 HP, Pickup Trucks, Forklifts, Mulchers | Hour | $21.14 | 1 | $21.14 |
| **Materials** | | | | | | |
| One Species, Native Forb, Low Cost | 2329 | Native forb. Includes material and shipping only. | Acre | $186.18 | 0.5 | $93.09 |

**Practice:** 390 - Riparian Herbaceous Cover

**Scenario** #2 - Native Warm Season Grass w/ Forbs

**Scenario Description:**

Planting Native 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 native 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 Cove

**Scenario Unit::** Acre

**Scenario Typical Size:** 0.5

**Total Scenario Cost:** $233.62

**Scenario Cost/Unit:** $467.23

**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. | Acre | $10.14 | 1 | $10.14 |
| Seeding Operation, No Till/Grass Drill | 960 | No Till drill or grass drill for seeding. Includes equipment, power unit and labor costs. | Acre | $19.43 | 1 | $19.43 |
| **Labor** | | | | | | |
| Equipment Operators, Light | 232 | Includes: Skid Steer Loaders, Hydraulic Excavators <50 HP, Trenchers <12", Ag Equipment <150 HP, Pickup Trucks, Forklifts, Mulchers | Hour | $21.14 | 1 | $21.14 |
| **Materials** | | | | | | |
| One Species, Native Forb, Low/Moderate Cost | 2330 | Native forb. Includes material and shipping only. | Acre | $406.46 | 0.45 | $182.91 |

**Practice:** 391 - Riparian Forest Buffer

**Scenario** #1 - Hardwood with Pasture Foregone Income

**Scenario Description:**

Establish a buffer of hardwood trees into a suitably prepared pasture site to restore riparian plant communities and associated benefits. The buffer will be located adjacent to and up-gradient from a watercourse or water body extending a minimum of 35 feet wide. The planting will consist of hand planted bare-root deciduous trees. Generally, planting spacing is at 12' x 12'; however, other spacing may be used depending on the objectives. Resource concerns to be addressed are Soil Erosion - excessive bank erosion; Water Quality - excess sediment and organics in surface waters and elevated temperature; Degraded Plant Condition - inadequate structure and composition; and Inadequate Habitat for Fish and Wildlife - habitat degradation.

**Before 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 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::** Acre

**Scenario Typical Size:** 5

**Total Scenario Cost:** $1,672.68

**Scenario Cost/Unit:** $334.54

**Cost Details:**

| Component Name | ID | Description | Unit | Cost | QTY | Total |
|---|---|---|---|---|---|---|
| **Equipment Installation** | | | | | | |
| All terrain vehicles, ATV | 965 | Includes equipment, power unit and labor costs. | Hour | $29.73 | 8 | $237.84 |
| Hand tools, tree planting | 1590 | Various hand tools for digging holes and planting trees such as augers, dibble bars, planting shovel, hoe-dad. Equipment only. Labor not included. | Hour | $12.04 | 16 | $192.64 |
| **Foregone Income** | | | | | | |
| FI, Grazing AUMs | 2079 | Grazing is the Primary Land Use | Animal Unit Month | $16.00 | 10 | $160.00 |
| **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. | Hour | $18.93 | 16 | $302.88 |
| 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. | Hour | $34.29 | 8 | $274.32 |
| **Materials** | | | | | | |
| Tree, hardwood, seedling or transplant, bare root, 6-18" | 1509 | Bare root hardwood trees 6-18" tall. Includes materials and shipping only. | Each | $0.27 | 1500 | $405.00 |
| **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. | Dollar | $1.00 | 100 | $100.00 |

**Practice:** 391 - Riparian Forest Buffer

**Scenario** #2 - Hardwood with Row Crop Foregone Income

**Scenario Description:**

Establish a buffer of hardwood into a suitably prepared row crop site to restore riparian plant communities and associated benefits. The buffer will be located adjacent to and up-gradient from a watercourse or water body extending a minimum of 35 feet wide. The planting will consist of hand planted bare-root deciduous trees. Generally, planting spacing is at 12' x 12'; however, other spacing may be used depending on the objectives. Resource concerns to be addressed are Soil Erosion - excessive bank erosion; Water Quality - excess sediment and organics in surface waters and elevated temperature; Degraded Plant Condition - inadequate structure and composition; and Inadequate Habitat for Fish and Wildlife - habitat degradation.

**Before 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 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::** Acre

**Scenario Typical Size:** 5

**Total Scenario Cost:** $2,571.43

**Scenario Cost/Unit:** $514.29

**Cost Details:**

| Component Name | ID | Description | Unit | Cost | QTY | Total |
|---|---|---|---|---|---|---|
| **Equipment Installation** | | | | | | |
| All terrain vehicles, ATV | 965 | Includes equipment, power unit and labor costs. | Hour | $29.73 | 8 | $237.84 |
| Hand tools, tree planting | 1590 | Various hand tools for digging holes and planting trees such as augers, dibble bars, planting shovel, hoe-dad. Equipment only. Labor not included. | Hour | $12.04 | 16 | $192.64 |
| **Foregone Income** | | | | | | |
| FI, Soybeans Dryland | 1961 | Dryland Soybeans is Primary Crop | Acre | $211.75 | 5 | $1,058.75 |
| **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. | Hour | $18.93 | 16 | $302.88 |
| 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. | Hour | $34.29 | 8 | $274.32 |
| **Materials** | | | | | | |
| Tree, hardwood, seedling or transplant, bare root, 6-18" | 1509 | Bare root hardwood trees 6-18" tall. Includes materials and shipping only. | Each | $0.27 | 1500 | $405.00 |
| **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. | Dollar | $1.00 | 100 | $100.00 |

**Practice:** 391 - Riparian Forest Buffer

**Scenario** #3 - Hardwood Seedlings, Bare-root

**Scenario Description:**

Establish deciduous trees into a suitably prepared site to restore riparian plant communities and associated benefits. The tree planting will be located adjacent to a planned buffer of hardwood trees that is immediately adjacent to the stream and up-gradient from a watercourse or water body. The planting will consist of hand planted deciduous trees. Generally, spacing for deciduous tree planting is 12' x 12'; however, other spacings may be used depending on the objective. Resource concerns to be addressed are Soil Erosion - excessive bank erosion; Water Quality - excess sediment and organics in surface waters and elevated temperature; Degraded Plant Condition - inadequate structure and composition; and Inadequate Habitat for Fish and Wildlife - habitat degradation.

**Before 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::** Each

**Scenario Typical Size:** 1500

**Total Scenario Cost:** $1,089.02

**Scenario Cost/Unit:** $0.73

**Cost Details:**

| Component Name | ID | Description | Unit | Cost | QTY | Total |
|---|---|---|---|---|---|---|
| **Equipment Installation** | | | | | | |
| Hand tools, tree planting | 1590 | Various hand tools for digging holes and planting trees such as augers, dibble bars, planting shovel, hoe-dad. Equipment only. Labor not included. | Hour | $12.04 | 10 | $120.40 |
| **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. | Hour | $18.93 | 10 | $189.30 |
| Supervisor or Manager | 234 | Labor involving supervision or management activities. Includes crew supervisors, foremen and farm/ranch managers time required for adopting new technology, etc. | Hour | $34.29 | 8 | $274.32 |
| **Materials** | | | | | | |
| Tree, hardwood, seedling or transplant, bare root, 6-18" | 1509 | Bare root hardwood trees 6-18" tall. Includes materials and shipping only. | Each | $0.27 | 1500 | $405.00 |
| **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. | Dollar | $1.00 | 100 | $100.00 |

**Practice:** 391 - Riparian Forest Buffer

**Scenario** #4 - Pine Seedlings, Bare-root

**Scenario Description:**

Establish pine trees as part of a planned forest buffer into a suitably prepared site to restore riparian plant communities and associated benefits. The buffer will be located adjacent to and up-gradient from a watercourse or water body extending a minimum of 35 feet wide. The planting will consist of hand planted pine seedlings outside the 35' buffer imediately adjacent to the stream which must be hardwood. Planting spacing is generally at 6' x 12'; however, other spacings may be used depending on the objective. Resource concerns to be addressed are Soil Erosion - excessive bank erosion; Water Quality - excess sediment and organics in surface waters and elevated temperature; Degraded Plant Condition - inadequate structure and composition; and Inadequate Habitat for Fish and Wildlife - habitat degradation.

**Before 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 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:** Number planted

**Scenario Unit::** Each

**Scenario Typical Size:** 3000

**Total Scenario Cost:** $864.02

**Scenario Cost/Unit:** $0.29

**Cost Details:**

| Component Name | ID | Description | Unit | Cost | QTY | Total |
|---|---|---|---|---|---|---|
| **Equipment Installation** | | | | | | |
| Hand tools, tree planting | 1590 | Various hand tools for digging holes and planting trees such as augers, dibble bars, planting shovel, hoe-dad. Equipment only. Labor not included. | Hour | $12.04 | 10 | $120.40 |
| **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. | Hour | $18.93 | 10 | $189.30 |
| Supervisor or Manager | 234 | Labor involving supervision or management activities. Includes crew supervisors, foremen and farm/ranch managers time required for adopting new technology, etc. | Hour | $34.29 | 8 | $274.32 |
| **Materials** | | | | | | |
| Tree, conifer, seedling, bare root, 1-0 | 1512 | Bare root conifer trees, 1-0 (1 year old). Includes materials and shipping only. | Each | $0.06 | 3000 | $180.00 |
| **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. | Dollar | $1.00 | 100 | $100.00 |

**Practice:** 391 - Riparian Forest Buffer

**Scenario** #5 - Shrub Seedlings, Bare-root

**Scenario Description:**

Establish shrub seedlings as part of a planned forest buffer into a suitably prepared site to restore riparian plant communities and associated benefits. The buffer will be located adjacent to and up-gradient from a watercourse or water body extending a minimum of 35 feet wide. The planting will consist of hand planted shrub seedlings outside the 35' hardwood buffer imediately adjacent to the stream. Generally, planting for shrubs will be done at 6' x 6' spacing. However, other spacings may be used depending on the objective. Resource concerns to be addressed are Soil Erosion - excessive bank erosion; Water Quality - excess sediment and organics in surface waters and elevated temperature; Degraded Plant Condition - inadequate structure and composition; and Inadequate Habitat for Fish and Wildlife - habitat degradation.

**Before 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:** Number planted

**Scenario Unit::** Each

**Scenario Typical Size:** 1000

**Total Scenario Cost:** $1,154.02

**Scenario Cost/Unit:** $1.15

**Cost Details:**

| Component Name | ID | Description | Unit | Cost | QTY | Total |
|---|---|---|---|---|---|---|
| **Equipment Installation** | | | | | | |
| Hand tools, tree planting | 1590 | Various hand tools for digging holes and planting trees such as augers, dibble bars, planting shovel, hoe-dad. Equipment only. Labor not included. | Hour | $12.04 | 10 | $120.40 |
| **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. | Hour | $18.93 | 10 | $189.30 |
| Supervisor or Manager | 234 | Labor involving supervision or management activities. Includes crew supervisors, foremen and farm/ranch managers time required for adopting new technology, etc. | Hour | $34.29 | 8 | $274.32 |
| **Materials** | | | | | | |
| Shrub, seedling or transplant, bare root, 6-18" | 1506 | Bare root hardwood trees 6-18" tall. Includes materials and shipping only. | Each | $0.47 | 1000 | $470.00 |
| **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. | Dollar | $1.00 | 100 | $100.00 |

**Practice:** 391 - Riparian Forest Buffer

**Scenario** #6 - Mark Riparian Forest Buffer in existing Forest

**Scenario Description:**

Forest land use planning may require creation of forested riparian buffers along existing watercourses to meet best management practice criteria. These buffers, termed streamside management zones (SMZ), will be located adjacent to and upgrade from perennial, intermittent, or ephemeral watercourses within a forest stand. They will extend a minimum of 35 feet from edge of the watercourse either on one-side or both sides. Resource concerns to be addressed are Soil Erosion - excessive bank erosion; Water Quality - excess sediment and organics in surface waters and elevated temperature; Degraded Plant Condition - inadequate structure and composition; and Inadequate Habitat for Fish and Wildlife - habitat degradation.

**Before Situation:**

Typical sites include overstocked tree conditions adjacent to the water course that shade out ground cover vegetation increasing surface flow. Active bank erosion is depositing sediment, nutrients and organics in the watercourse. The resulting sediment is creating habitat degradation locally and farther down watercourse.

**After Situation:**

The SMZ boundaries are planned and identified with paint prior to any overstocking reduction intervention. The identified boundaries provide watercourse protection during harvesting operation and allow for planned forest stand improvement within the SMZ area.

**Feature Measure:** Length of boundary

**Scenario Unit::** Foot

**Scenario Typical Size:** 3000

**Total Scenario Cost:** $442.12

**Scenario Cost/Unit:** $0.15

**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. | Hour | $18.93 | 4 | $75.72 |
| 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. | Hour | $91.60 | 4 | $366.40 |

**Practice:** 391 - Riparian Forest Buffer

**Scenario** #13 - Planting Cuttings

**Scenario Description:**

Establish deciduous trees into a suitably prepared site to restore riparian plant communities and associated benefits. The tree planting will be located adjacent to a planned buffer of hardwood trees that is immediately adjacent to the stream and up-gradient from a watercourse or water body. The planting will consist of hand planted cuttings of deciduous trees. Generally, spacing for deciduous tree planting is 12' x 12'; however, other spacings may be used depending on the objective. Resource concerns to be addressed are Soil Erosion - excessive bank erosion; Water Quality - excess sediment and organics in surface waters and elevated temperature; Degraded Plant Condition - inadequate structure and composition; and Inadequate Habitat for Fish and Wildlife - habitat degradation.

**Before Situation:**

Typical sites include stream banks or waterbodies with little or no woody vegetatoin adjacent to the water course. Active bank erosion is depositing sediment, nutrients and organics in the watercourse. The resulting sediment is creating habitat degradation locally and farther down watercourse.

**After Situation:**

The stream bank is planted with hardwood species that grow from cuttings to help stabilize the soil, protect the stream bank from further erosion. The cuttings will also provide wildlife habitat and shade the stream or waterbody to keep the water cooler that when exposed to full sunlight. Cuttings should be used on sites where they would normally grow. The planted cuttings will address the listed resource concerns.

**Feature Measure:** Area of planting

**Scenario Unit::** Each

**Scenario Typical Size:** 3000

**Total Scenario Cost:** $2,034.10

**Scenario Cost/Unit:** $0.68

**Cost Details:**

| Component Name | ID | Description | Unit | Cost | QTY | Total |
|---|---|---|---|---|---|---|
| **Equipment Installation** | | | | | | |
| Hand tools, tree planting | 1590 | Various hand tools for digging holes and planting trees such as augers, dibble bars, planting shovel, hoe-dad. Equipment only. Labor not included. | Hour | $12.04 | 16 | $192.64 |
| **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. | Hour | $18.93 | 16 | $302.88 |
| 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. | Hour | $34.29 | 2 | $68.58 |
| **Materials** | | | | | | |
| Cuttings, woody, medium size | 1308 | Woody cuttings, live stakes or whips typically 1/4" to 1" diameter and 24" to 48" long. Includes materials and shipping only. | Each | $0.49 | 3000 | $1,470.00 |

**Practice:** 393 - Filter Strip

**Scenario** #1 - Filter Strip, Native species: Forgone Income

**Scenario Description:**

A strip or area of native herbaceous vegetation situated between cropland, grazing land or disturbed land and sensitive areas. Practice includes seedbed prep and planting of native species. The area of the filter strip is taken out of production.

**Before 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 planned filter strip will be established and mainatined per the practice plan that will meet the criteria for the planned purpose(s). The vegetation will consist of native species. The filter strip will have adequate width to filter the planned pollutants. The practice includes seedbed preparation, seeding, and operation and maintenance to maintain the vegetation and the function of the filter strip. Species selected shall be able to withstand partial burial by sediment and tolerant of herbicides used on contribution area while protecting environmentally-sensitive areas. The area of the filter strip is taken out of production.

**Feature Measure:** number of acres

**Scenario Unit::** Acre

**Scenario Typical Size:** 1

**Total Scenario Cost:** $373.59

**Scenario Cost/Unit:** $373.59

**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. | Acre | $5.58 | 1 | $5.58 |
| Seeding Operation, No Till/Grass Drill | 960 | No Till drill or grass drill for seeding. Includes equipment, power unit and labor costs. | Acre | $19.43 | 1 | $19.43 |
| **Foregone Income** | | | | | | |
| FI, Soybeans Dryland | 1961 | Dryland Soybeans is Primary Crop | Acre | $211.75 | 0.25 | $52.94 |
| FI, Cotton Dryland | 1967 | Dryland Cotton is Primary Crop | Acre | $156.16 | 0.25 | $39.04 |
| FI, Sorghum Dryland | 1971 | Dryland Sorghum is Primary Crop | Acre | $109.67 | 0.25 | $27.42 |
| FI, Rice | 1974 | Rice is Primary Crop | Acre | $569.29 | 0.25 | $142.32 |
| **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. | Acre | $15.93 | 1 | $15.93 |
| Untreated Conventional Seed, One Species, Warm Season, Native Perennial Grass | 2341 | Untreated conventional native, warm season perennial grass. May contain seed that are not available as certified organic. Includes material and shipping only. | Acre | $70.93 | 1 | $70.93 |

**Practice:** 393 - Filter Strip

**Scenario** #2 - Filter Strip, Introduced species: Forgone Income

**Scenario Description:**

A strip or area of Introduced herbaceous vegetation situated between cropland, grazing land or disturbed land and sensitive areas. 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 planned filter strip will be established and mainatined per the practice plan that will meet the criteria for the planned purpose(s). The vegetation will consist of introduced species. The filter strip will have adequate width to filter the planned pollutants. The practice includes seedbed preparation, seeding, and operation and maintenance to maintain the vegetation and the function of the filter strip. Species selected shall be able to withstand partial burial by sediment and tolerant of herbicides used on contribution area while protecting environmentally-sensitive areas. The area of the filter strip is taken out of production.

**Feature Measure:** Number of acres

**Scenario Unit::** Acre

**Scenario Typical Size:** 1

**Total Scenario Cost:** $432.95

**Scenario Cost/Unit:** $432.95

**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. | Acre | $5.58 | 1 | $5.58 |
| Seeding Operation, No Till/Grass Drill | 960 | No Till drill or grass drill for seeding. Includes equipment, power unit and labor costs. | Acre | $19.43 | 1 | $19.43 |
| **Foregone Income** | | | | | | |
| FI, Soybeans Dryland | 1961 | Dryland Soybeans is Primary Crop | Acre | $211.75 | 0.25 | $52.94 |
| FI, Cotton Dryland | 1967 | Dryland Cotton is Primary Crop | Acre | $156.16 | 0.25 | $39.04 |
| FI, Sorghum Dryland | 1971 | Dryland Sorghum is Primary Crop | Acre | $109.67 | 0.25 | $27.42 |
| FI, Rice | 1974 | Rice is Primary Crop | Acre | $569.29 | 0.25 | $142.32 |
| **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 | $0.54 | 30 | $16.20 |
| 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 | $0.54 | 50 | $27.00 |
| Potassium, K2O | 74 | K2O supplied by Muriate Of Potash. Price is not per pound of total product applied, no conversion is needed. | Pound | $0.46 | 50 | $23.00 |
| 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. | Acre | $15.93 | 1 | $15.93 |
| One Species, Warm Season, Introduced Perennial Grass (seed or sprigs) | 2323 | Introduced, warm season perennial grass seed or sprig. Includes material and shipping only. | Acre | $64.09 | 1 | $64.09 |

**Practice:** 393 - Filter Strip

**Scenario** #3 - Filter Strip, Native Species w/ Land Shaping: Forgone Income

**Scenario Description:**

A strip or area of Native herbaceous vegetation situated between cropland, grazing land or disturbed land and sensitive areas. Practice includes seedbed prep and planting of native species. The area of the filter strip is taken out of production.

**Before 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 planned filter strip will be established and mainatined per the practice plan that will meet the criteria for the planned purpose(s). The vegetation will consist of native species. The filter strip will have adequate width to filter the planned pollutants. The practice includes seedbed preparation (including any shaping needed to ensure even entry of water into the strip), seeding, and operation and maintenance to maintain the vegetation and the function of the filter strip. Species selected shall be able to withstand partial burial by sediment and tolerant of herbicides used on contribution area while protecting environmentally-sensitive areas. The area of the filter strip is taken out of production.

**Feature Measure:** Number of acres

**Scenario Unit::** Acre

**Scenario Typical Size:** 1

**Total Scenario Cost:** $541.77

**Scenario Cost/Unit:** $541.77

**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. | Hour | $60.16 | 2 | $120.32 |
| Chemical, ground application | 948 | Chemical application performed by ground equipment. Includes equipment, power unit and labor costs. | Acre | $5.58 | 1 | $5.58 |
| Seeding Operation, No Till/Grass Drill | 960 | No Till drill or grass drill for seeding. Includes equipment, power unit and labor costs. | Acre | $19.43 | 1 | $19.43 |
| **Foregone Income** | | | | | | |
| FI, Soybeans Dryland | 1961 | Dryland Soybeans is Primary Crop | Acre | $211.75 | 0.25 | $52.94 |
| FI, Cotton Dryland | 1967 | Dryland Cotton is Primary Crop | Acre | $156.16 | 0.25 | $39.04 |
| FI, Sorghum Dryland | 1971 | Dryland Sorghum is Primary Crop | Acre | $109.67 | 0.25 | $27.42 |
| FI, Rice | 1974 | Rice is Primary Crop | Acre | $569.29 | 0.25 | $142.32 |
| **Labor** | | | | | | |
| Equipment Operators, Heavy | 233 | Includes: Cranes, Hydraulic Excavators >=50 HP, Dozers, Paving Machines, Rock Trenchers, Trenchers >=12", Dump Trucks, Ag Equipment >=150 HP, Scrapers, Water Wagons. | Hour | $23.93 | 2 | $47.86 |
| **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. | Acre | $15.93 | 1 | $15.93 |
| Untreated Conventional Seed, One Species, Warm Season, Native Perennial Grass | 2341 | Untreated conventional native, warm season perennial grass. May contain seed that are not available as certified organic. Includes material and shipping only. | Acre | $70.93 | 1 | $70.93 |

**Practice:** 393 - Filter Strip

**Scenario** #4 - Filter Strip, Introduced Species w/ Land Shaping: Forgone Income

**Scenario Description:**

A strip or area of herbaceous vegetation, introduced species, situated between cropland, grazing land or disturbed land and sensitive areas. Practice includes seedbed prep, land shaping and planting of approved 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 planned filter strip will be established and mainatined per the practice plan that will meet the criteria for the planned purpose(s). The vegetation will consist of introduced species. The filter strip will have adequate width to filter the planned pollutants. The practice includes seedbed preparation (including any shaping needed to ensure even entry of water into the strip), seeding, and operation and maintenance to maintain the vegetation and the function of the filter strip. Species selected shall be able to withstand partial burial by sediment and tolerant of herbicides used on contribution area while protecting environmentally-sensitive areas. The area of the filter strip is taken out of production.

**Feature Measure:** Number of acres

**Scenario Unit::** Acre

**Scenario Typical Size:** 1

**Total Scenario Cost:** $601.13

**Scenario Cost/Unit:** $601.13

**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. | Hour | $60.16 | 2 | $120.32 |
| Chemical, ground application | 948 | Chemical application performed by ground equipment. Includes equipment, power unit and labor costs. | Acre | $5.58 | 1 | $5.58 |
| Seeding Operation, No Till/Grass Drill | 960 | No Till drill or grass drill for seeding. Includes equipment, power unit and labor costs. | Acre | $19.43 | 1 | $19.43 |
| **Foregone Income** | | | | | | |
| FI, Soybeans Dryland | 1961 | Dryland Soybeans is Primary Crop | Acre | $211.75 | 0.25 | $52.94 |
| FI, Cotton Dryland | 1967 | Dryland Cotton is Primary Crop | Acre | $156.16 | 0.25 | $39.04 |
| FI, Sorghum Dryland | 1971 | Dryland Sorghum is Primary Crop | Acre | $109.67 | 0.25 | $27.42 |
| FI, Rice | 1974 | Rice is Primary Crop | Acre | $569.29 | 0.25 | $142.32 |
| **Labor** | | | | | | |
| Equipment Operators, Heavy | 233 | Includes: Cranes, Hydraulic Excavators >=50 HP, Dozers, Paving Machines, Rock Trenchers, Trenchers >=12", Dump Trucks, Ag Equipment >=150 HP, Scrapers, Water Wagons. | Hour | $23.93 | 2 | $47.86 |
| **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 | $0.54 | 30 | $16.20 |
| 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 | $0.54 | 50 | $27.00 |
| Potassium, K2O | 74 | K2O supplied by Muriate Of Potash. Price is not per pound of total product applied, no conversion is needed. | Pound | $0.46 | 50 | $23.00 |
| 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. | Acre | $15.93 | 1 | $15.93 |
| One Species, Warm Season, Introduced Perennial Grass (seed or sprigs) | 2323 | Introduced, warm season perennial grass seed or sprig. Includes material and shipping only. | Acre | $64.09 | 1 | $64.09 |

**Practice:** 393 - Filter Strip

**Scenario** #5 - Filter Strip, Native species

**Scenario Description:**

A strip or area of native herbaceous vegetation situated between cropland, grazing land or disturbed land and sensitive areas. Practice includes seedbed prep and planting of native species.

**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 planned filter strip will be established and mainatined per the practice plan that will meet the criteria for the planned purpose(s). The vegetation will consist of native species. The filter strip will have adequate width to filter the planned pollutants. The practice includes seedbed preparation, seeding, and operation and maintenance to maintain the vegetation and the function of the filter strip. Species selected shall be able to withstand partial burial by sediment and tolerant of herbicides used on contribution area while protecting environmentally-sensitive areas.

**Feature Measure:** number of acres

**Scenario Unit::** Acre

**Scenario Typical Size:** 1

**Total Scenario Cost:** $111.87

**Scenario Cost/Unit:** $111.87

**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. | Acre | $5.58 | 1 | $5.58 |
| Seeding Operation, No Till/Grass Drill | 960 | No Till drill or grass drill for seeding. Includes equipment, power unit and labor costs. | Acre | $19.43 | 1 | $19.43 |
| **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. | Acre | $15.93 | 1 | $15.93 |
| Untreated Conventional Seed, One Species, Warm Season, Native Perennial Grass | 2341 | Untreated conventional native, warm season perennial grass. May contain seed that are not available as certified organic. Includes material and shipping only. | Acre | $70.93 | 1 | $70.93 |

**Practice:** 393 - Filter Strip

**Scenario** #6 - Filter Strip, Introduced species

**Scenario Description:**

A strip or area of Introduced herbaceous vegetation situated between cropland, grazing land or disturbed land and sensitive areas. 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 non-ag properties. Water Quality resource concerns are associated with this practice.

**After Situation:**

The planned filter strip will be established and mainatined per the practice plan that will meet the criteria for the planned purpose(s). The vegetation will consist of introduced species. The filter strip will have adequate width to filter the planned pollutants. The practice includes seedbed preparation, seeding, and operation and maintenance to maintain the vegetation and the function of the filter strip. Species selected shall be able to withstand partial burial by sediment and tolerant of herbicides used on contribution area while protecting environmentally-sensitive areas.

**Feature Measure:** Number of acres

**Scenario Unit::** Acre

**Scenario Typical Size:** 1

**Total Scenario Cost:** $171.23

**Scenario Cost/Unit:** $171.23

**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. | Acre | $5.58 | 1 | $5.58 |
| Seeding Operation, No Till/Grass Drill | 960 | No Till drill or grass drill for seeding. Includes equipment, power unit and labor costs. | Acre | $19.43 | 1 | $19.43 |
| **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 | $0.54 | 30 | $16.20 |
| 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 | $0.54 | 50 | $27.00 |
| Potassium, K2O | 74 | K2O supplied by Muriate Of Potash. Price is not per pound of total product applied, no conversion is needed. | Pound | $0.46 | 50 | $23.00 |
| 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. | Acre | $15.93 | 1 | $15.93 |
| One Species, Warm Season, Introduced Perennial Grass (seed or sprigs) | 2323 | Introduced, warm season perennial grass seed or sprig. Includes material and shipping only. | Acre | $64.09 | 1 | $64.09 |

**Practice:** 393 - Filter Strip

**Scenario** #7 - Native Species Filter Strip w/ Land Shaping

**Scenario Description:**

A strip or area of Native herbaceous vegetation situated between cropland, grazing land or disturbed land and sensitive areas. Practice includes seedbed prep and planting of native species.

**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 planned filter strip will be established and mainatined per the practice plan that will meet the criteria for the planned purpose(s). The vegetation will consist of native species. The filter strip will have adequate width to filter the planned pollutants. The practice includes seedbed preparation (including any shaping needed to ensure even entry of water into the strip), seeding, and operation and maintenance to maintain the vegetation and the function of the filter strip. Species selected shall be able to withstand partial burial by sediment and tolerant of herbicides used on contribution area while protecting environmentally-sensitive areas.

**Feature Measure:** Number of acres

**Scenario Unit::** Acre

**Scenario Typical Size:** 1

**Total Scenario Cost:** $280.05

**Scenario Cost/Unit:** $280.05

**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. | Hour | $60.16 | 2 | $120.32 |
| Chemical, ground application | 948 | Chemical application performed by ground equipment. Includes equipment, power unit and labor costs. | Acre | $5.58 | 1 | $5.58 |
| Seeding Operation, No Till/Grass Drill | 960 | No Till drill or grass drill for seeding. Includes equipment, power unit and labor costs. | Acre | $19.43 | 1 | $19.43 |
| **Labor** | | | | | | |
| Equipment Operators, Heavy | 233 | Includes: Cranes, Hydraulic Excavators >=50 HP, Dozers, Paving Machines, Rock Trenchers, Trenchers >=12", Dump Trucks, Ag Equipment >=150 HP, Scrapers, Water Wagons. | Hour | $23.93 | 2 | $47.86 |
| **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. | Acre | $15.93 | 1 | $15.93 |
| Untreated Conventional Seed, One Species, Warm Season, Native Perennial Grass | 2341 | Untreated conventional native, warm season perennial grass. May contain seed that are not available as certified organic. Includes material and shipping only. | Acre | $70.93 | 1 | $70.93 |

**Practice:** 393 - Filter Strip

**Scenario** #8 - Introduced Species Filter Strip w/ Land Shaping

**Scenario Description:**

A strip or area of herbaceous vegetation, introduced species, situated between cropland, grazing land or disturbed land and sensitive areas. Practice includes seedbed prep, land shaping and planting of approved 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 non-ag properties. Water Quality resource concerns are associated with this practice.

**After Situation:**

The planned filter strip will be established and mainatined per the practice plan that will meet the criteria for the planned purpose(s). The vegetation will consist of introduced species. The filter strip will have adequate width to filter the planned pollutants. The practice includes seedbed preparation (including any shaping needed to ensure even entry of water into the strip), seeding, and operation and maintenance to maintain the vegetation and the function of the filter strip. Species selected shall be able to withstand partial burial by sediment and tolerant of herbicides used on contribution area while protecting environmentally-sensitive areas.

**Feature Measure:** Number of acres

**Scenario Unit::** Acre

**Scenario Typical Size:** 1

**Total Scenario Cost:** $339.41

**Scenario Cost/Unit:** $339.41

**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. | Hour | $60.16 | 2 | $120.32 |
| Chemical, ground application | 948 | Chemical application performed by ground equipment. Includes equipment, power unit and labor costs. | Acre | $5.58 | 1 | $5.58 |
| Seeding Operation, No Till/Grass Drill | 960 | No Till drill or grass drill for seeding. Includes equipment, power unit and labor costs. | Acre | $19.43 | 1 | $19.43 |
| **Labor** | | | | | | |
| Equipment Operators, Heavy | 233 | Includes: Cranes, Hydraulic Excavators >=50 HP, Dozers, Paving Machines, Rock Trenchers, Trenchers >=12", Dump Trucks, Ag Equipment >=150 HP, Scrapers, Water Wagons. | Hour | $23.93 | 2 | $47.86 |
| **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 | $0.54 | 30 | $16.20 |
| 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 | $0.54 | 50 | $27.00 |
| Potassium, K2O | 74 | K2O supplied by Muriate Of Potash. Price is not per pound of total product applied, no conversion is needed. | Pound | $0.46 | 50 | $23.00 |
| 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. | Acre | $15.93 | 1 | $15.93 |
| One Species, Warm Season, Introduced Perennial Grass (seed or sprigs) | 2323 | Introduced, warm season perennial grass seed or sprig. Includes material and shipping only. | Acre | $64.09 | 1 | $64.09 |

**Practice:** 394 - Firebreak

**Scenario** #1 - Bare Soil - Light Equipment

**Scenario Description:**

Installation of a bare-ground firebreak of a minimum width of 10' 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::** Foot

**Scenario Typical Size:** 3000

**Total Scenario Cost:** $508.08

**Scenario Cost/Unit:** $0.17

**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. | Hour | $60.16 | 6 | $360.96 |
| Tillage, Light | 945 | Includes light disking (tandem) or field cultivator. Includes equipment, power unit and labor costs. | Acre | $10.14 | 2 | $20.28 |
| **Labor** | | | | | | |
| Equipment Operators, Light | 232 | Includes: Skid Steer Loaders, Hydraulic Excavators <50 HP, Trenchers <12", Ag Equipment <150 HP, Pickup Trucks, Forklifts, Mulchers | Hour | $21.14 | 6 | $126.84 |

**Practice:** 394 - Firebreak

**Scenario** #2 - Bare Soil - Medium Slope

**Scenario Description:**

Use of medium equipment such as dozers to blade, disk, plow, etc. bare-soil firebreaks on slopes less than 15% along the boundary line or edge of the forest. All necessary water bars and/or wing ditches must be installed according to specifications to control erosion. Payment calculated for one erosion control structure every 80 ft. in. addition to cost of fire break. This practice implemented ONLY in the areas where the slope meet these requirements. Firebreak should average at least 15 feet wide (not to be less than 10' wide)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::** Foot

**Scenario Typical Size:** 4000

**Total Scenario Cost:** $8,301.29

**Scenario Cost/Unit:** $2.08

**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. | Hour | $112.82 | 24 | $2,707.68 |
| Truck, Pickup | 939 | Equipment and power unit costs. Labor not included. | Hour | $19.82 | 7 | $138.74 |
| All terrain vehicles, ATV | 965 | Includes equipment, power unit and labor costs. | Hour | $29.73 | 24 | $713.52 |
| 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. | Foot | $2.32 | 1500 | $3,480.00 |
| **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. | Hour | $18.93 | 24 | $454.32 |
| Equipment Operators, Heavy | 233 | Includes: Cranes, Hydraulic Excavators >=50 HP, Dozers, Paving Machines, Rock Trenchers, Trenchers >=12", Dump Trucks, Ag Equipment >=150 HP, Scrapers, Water Wagons. | Hour | $23.93 | 24 | $574.32 |
| **Mobilization** | | | | | | |
| Mobilization, medium equipment | 1139 | Equipment with 70-150 HP or typical weights between 14,000 and 30,000 pounds. | Each | $232.71 | 1 | $232.71 |

**Practice:** 394 - Firebreak

**Scenario** #3 - Bare soil - Steep Slope

**Scenario Description:**

Use of equipment such as dozers to blade bare-soil firebreaks 15' wide on slopes greater than 15% along the boundary line or edge of the forest. All necessary water bars and/or wing ditches must be installed according to specifications to control erosion with same equipment. Payment calculated for one erosion control structure every 40 ft. in. addition to cost of fire break. This practice implemented ONLY in the areas where the slope meet these requirements. Firebreak should average at least 15 feet wide (not to be less than 10' wide)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::** Foot

**Scenario Typical Size:** 4000

**Total Scenario Cost:** $13,284.39

**Scenario Cost/Unit:** $3.32

**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. | Hour | $112.82 | 32 | $3,610.24 |
| Truck, Pickup | 939 | Equipment and power unit costs. Labor not included. | Hour | $19.82 | 8 | $158.56 |
| All terrain vehicles, ATV | 965 | Includes equipment, power unit and labor costs. | Hour | $29.73 | 32 | $951.36 |
| 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. | Foot | $2.32 | 3000 | $6,960.00 |
| **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. | Hour | $18.93 | 32 | $605.76 |
| Equipment Operators, Heavy | 233 | Includes: Cranes, Hydraulic Excavators >=50 HP, Dozers, Paving Machines, Rock Trenchers, Trenchers >=12", Dump Trucks, Ag Equipment >=150 HP, Scrapers, Water Wagons. | Hour | $23.93 | 32 | $765.76 |
| **Mobilization** | | | | | | |
| Mobilization, medium equipment | 1139 | Equipment with 70-150 HP or typical weights between 14,000 and 30,000 pounds. | Each | $232.71 | 1 | $232.71 |

**Practice:** 394 - Firebreak

**Scenario** #4 - Vegetated - Light Equipment

**Scenario Description:**

Establishing a 30 - 50 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::** Foot

**Scenario Typical Size:** 4000

**Total Scenario Cost:** $1,751.80

**Scenario Cost/Unit:** $0.44

**Cost Details:**

| Component Name | ID | Description | Unit | Cost | QTY | Total |
|---|---|---|---|---|---|---|
| **Equipment Installation** | | | | | | |
| Truck, Pickup | 939 | Equipment and power unit costs. Labor not included. | Hour | $19.82 | 4 | $79.28 |
| Mower, Bush Hog | 940 | Equipment and power unit costs. Labor not included. | Hour | $47.22 | 4 | $188.88 |
| Tillage, Light | 945 | Includes light disking (tandem) or field cultivator. Includes equipment, power unit and labor costs. | Acre | $10.14 | 4 | $40.56 |
| Tillage, Primary | 946 | Includes heavy disking (offset) or chisel plow. Includes equipment, power unit and labor costs. | Acre | $15.10 | 4 | $60.40 |
| Chemical, ground application | 948 | Chemical application performed by ground equipment. Includes equipment, power unit and labor costs. | Acre | $5.58 | 4 | $22.32 |
| Fertilizer, ground application, dry bulk | 950 | Dry bulk fertilizer application performed by ground equipment. Includes equipment, power unit and labor costs. | Acre | $6.25 | 4 | $25.00 |
| Lime application | 953 | Lime application performed by ground equipment. Includes equipment, power unit and labor costs. | Acre | $9.50 | 4 | $38.00 |
| Seeding Operation, Broadcast, Ground | 959 | Broadcast seed via ground operation. May require post tillage operation to incorporate seed. Includes equipment, power unit and labor costs. | Acre | $11.48 | 4 | $45.92 |
| Seeding Operation, No Till/Grass Drill | 960 | No Till drill or grass drill for seeding. Includes equipment, power unit and labor costs. | Acre | $19.43 | 4 | $77.72 |
| **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. | Hour | $18.93 | 8 | $151.44 |
| **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 | $0.75 | 160 | $120.00 |
| 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 | $0.54 | 200 | $108.00 |
| Potassium, K2O | 74 | K2O supplied by Muriate Of Potash. Price is not per pound of total product applied, no conversion is needed. | Pound | $0.46 | 200 | $92.00 |
| Lime, ENM | 75 | Fertilizer: Limestone Spread on field. | Ton | $84.95 | 4 | $339.80 |
| Herbicide, Picloram | 337 | Refer to WIN-PST for product names and active ingredients. Includes materials and shipping only. | Acre | $18.77 | 4 | $75.08 |

| | | | | | | |
|---|---|---|---|---|---|---|
| One Species, Cool Season, Introduced Perennial Grass | 2313 | Introduced, cool season perennial grass. Includes material and shipping only. | Acre | $32.72 | 4 | $130.88 |
| **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 | $156.52 | 1 | $156.52 |

**Practice:** 394 - Firebreak

**Scenario** #5 - Vegetated - Medium slope

**Scenario Description:**

Forest or grassland with a 30' wide firebreak cleared with dozer along the boundary line or edge of the forest with slope greater than 5% but less than 15% and planted with cool season native grasses. All necessary water bars and/or wing ditches must be installed according to Fire Break Practice 394 specifications to control erosion. Payment calculated for one erosion control structure every 80 ft. in addition to cost of fire break. This practice implemented ONLY in the areas where the slope meet these requirements. Cool season grasses must be established according to Critical Area Planting Practice 342. Warm Season grasses MUST NOT be used!

**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:** <Unknown>

**Scenario Unit::** Foot

**Scenario Typical Size:** 4000

**Total Scenario Cost:** $9,769.67

**Scenario Cost/Unit:** $2.44

**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. | Hour | $112.82 | 24 | $2,707.68 |
| Truck, Pickup | 939 | Equipment and power unit costs. Labor not included. | Hour | $19.82 | 8 | $158.56 |
| Tillage, Light | 945 | Includes light disking (tandem) or field cultivator. Includes equipment, power unit and labor costs. | Acre | $10.14 | 4 | $40.56 |
| Tillage, Primary | 946 | Includes heavy disking (offset) or chisel plow. Includes equipment, power unit and labor costs. | Acre | $15.10 | 4 | $60.40 |
| Chemical, ground application | 948 | Chemical application performed by ground equipment. Includes equipment, power unit and labor costs. | Acre | $5.58 | 4 | $22.32 |
| Fertilizer, ground application, dry bulk | 950 | Dry bulk fertilizer application performed by ground equipment. Includes equipment, power unit and labor costs. | Acre | $6.25 | 4 | $25.00 |
| Lime application | 953 | Lime application performed by ground equipment. Includes equipment, power unit and labor costs. | Acre | $9.50 | 4 | $38.00 |
| Seeding Operation, Broadcast, Ground | 959 | Broadcast seed via ground operation. May require post tillage operation to incorporate seed. Includes equipment, power unit and labor costs. | Acre | $11.48 | 4 | $45.92 |
| 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. | Foot | $2.32 | 1800 | $4,176.00 |
| **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. | Hour | $18.93 | 24 | $454.32 |
| Equipment Operators, Heavy | 233 | Includes: Cranes, Hydraulic Excavators >=50 HP, Dozers, Paving Machines, Rock Trenchers, Trenchers >=12", Dump Trucks, Ag Equipment >=150 HP, Scrapers, Water Wagons. | Hour | $23.93 | 24 | $574.32 |
| **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 | $0.75 | 160 | $120.00 |
| 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 | $0.54 | 200 | $108.00 |
| Potassium, K2O | 74 | K2O supplied by Muriate Of Potash. Price is not per pound of total product applied, no conversion is needed. | Pound | $0.46 | 200 | $92.00 |

| | | | | | | |
|---|---|---|---|---|---|---|
| Lime, ENM | 75 | Fertilizer: Limestone Spread on field. | Ton | $84.95 | 4 | $339.80 |
| Herbicide, Picloram | 337 | Refer to WIN-PST for product names and active ingredients. Includes materials and shipping only. | Acre | $18.77 | 4 | $75.08 |
| One Species, Cool Season, Introduced Perennial Grass | 2313 | Introduced, cool season perennial grass. Includes material and shipping only. | Acre | $32.72 | 4 | $130.88 |
| **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 | $156.52 | 1 | $156.52 |
| Mobilization, large equipment | 1140 | Equipment >150HP or typical weights greater than 30,000 pounds or loads requiring over width or over length permits. | Each | $444.31 | 1 | $444.31 |

**Practice:** 394 - Firebreak

**Scenario** #6 - Vegetative - Steep Slope

**Scenario Description:**

Forest or grassland with a 30' wide firebreak cleared with dozer along the boundary line or edge of the forest with slope greater than 15% and planted with cool season native grasses. All necessary water bars and/or wing ditches must be installed according to Fire Break Practice 394 specifications to control erosion. Payment calculated for one erosion control structure every 40 ft. in addition to cost of fire break. This practice implemented ONLY in the areas where the slope meet these requirements. Cool season grasses must be established according to Critical Area Planting Practice 342. Warm Season grasses MUST NOT be used

**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:** <Unknown>

**Scenario Unit::** Foot

**Scenario Typical Size:** 4000

**Total Scenario Cost:** $14,959.11

**Scenario Cost/Unit:** $3.74

**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. | Hour | $112.82 | 32 | $3,610.24 |
| Truck, Pickup | 939 | Equipment and power unit costs. Labor not included. | Hour | $19.82 | 8 | $158.56 |
| Tillage, Light | 945 | Includes light disking (tandem) or field cultivator. Includes equipment, power unit and labor costs. | Acre | $10.14 | 4 | $40.56 |
| Tillage, Primary | 946 | Includes heavy disking (offset) or chisel plow. Includes equipment, power unit and labor costs. | Acre | $15.10 | 4 | $60.40 |
| Chemical, ground application | 948 | Chemical application performed by ground equipment. Includes equipment, power unit and labor costs. | Acre | $5.58 | 4 | $22.32 |
| Fertilizer, ground application, dry bulk | 950 | Dry bulk fertilizer application performed by ground equipment. Includes equipment, power unit and labor costs. | Acre | $6.25 | 4 | $25.00 |
| Lime application | 953 | Lime application performed by ground equipment. Includes equipment, power unit and labor costs. | Acre | $9.50 | 4 | $38.00 |
| Seeding Operation, Broadcast, Ground | 959 | Broadcast seed via ground operation. May require post tillage operation to incorporate seed. Includes equipment, power unit and labor costs. | Acre | $11.48 | 4 | $45.92 |
| 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. | Foot | $2.32 | 3500 | $8,120.00 |
| **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. | Hour | $18.93 | 32 | $605.76 |
| Equipment Operators, Heavy | 233 | Includes: Cranes, Hydraulic Excavators >=50 HP, Dozers, Paving Machines, Rock Trenchers, Trenchers >=12", Dump Trucks, Ag Equipment >=150 HP, Scrapers, Water Wagons. | Hour | $23.93 | 32 | $765.76 |
| **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 | $0.75 | 160 | $120.00 |
| 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 | $0.54 | 200 | $108.00 |
| Potassium, K2O | 74 | K2O supplied by Muriate Of Potash. Price is not per pound of total product applied, no conversion is needed. | Pound | $0.46 | 200 | $92.00 |

| | | | | | | |
|---|---|---|---|---|---|---|
| Lime, ENM | 75 | Fertilizer: Limestone Spread on field. | Ton | $84.95 | 4 | $339.80 |
| Herbicide, Picloram | 337 | Refer to WIN-PST for product names and active ingredients. Includes materials and shipping only. | Acre | $18.77 | 4 | $75.08 |
| One Species, Cool Season, Introduced Perennial Grass | 2313 | Introduced, cool season perennial grass. Includes material and shipping only. | Acre | $32.72 | 4 | $130.88 |
| **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 | $156.52 | 1 | $156.52 |
| Mobilization, large equipment | 1140 | Equipment >150HP or typical weights greater than 30,000 pounds or loads requiring over width or over length permits. | Each | $444.31 | 1 | $444.31 |

**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 the 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 21 tons of rock for a total of 126 tons. The check dams are underlain with geotextile fabric. Disturbed areas are protected with permanent vegetative cover. Addresses resource concerns such as water quality degradation and soil erosion-concentrated flow erosion.

**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:** Tons of rock installed

**Scenario Unit::** Ton

**Scenario Typical Size:** 126

**Total Scenario Cost:** $5,505.82

**Scenario Cost/Unit:** $43.70

**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 Yard | $1.45 | 160 | $232.00 |
| **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. | Hour | $18.93 | 8 | $151.44 |
| **Materials** | | | | | | |
| Rock Riprap, Placed with geotextile | 44 | Rock Riprap, placed with geotextile, includes materials, equipment and labor to transport and place | Cubic Yard | $55.44 | 84 | $4,656.96 |
| **Mobilization** | | | | | | |
| Mobilization, medium equipment | 1139 | Equipment with 70-150 HP or typical weights between 14,000 and 30,000 pounds. | Each | $232.71 | 2 | $465.42 |

**Practice:** 410 - Grade Stabilization Structure

**Scenario** #2 - Embankment, Pipe <= 6"

**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 Yard

**Scenario Typical Size:** 2000

**Total Scenario Cost:** $9,942.72

**Scenario Cost/Unit:** $4.97

**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 Yard | $3.76 | 2000 | $7,520.00 |
| Earthfill, Manually Compacted | 50 | Earthfill, manually compacted, includes equipment and labor | Cubic Yard | $4.95 | 20 | $99.00 |
| Hydraulic Excavator, 1 CY | 931 | Track mounted hydraulic excavator with bucket capacity range of 0.8 to 1.5 CY. Equipment and power unit costs. Labor not included. | Hour | $103.47 | 5 | $517.35 |
| **Labor** | | | | | | |
| Skilled Labor | 230 | Labor requiring a high level skill set: Includes carpenters, welders, electricians, conservation professionals involved with data collection, monitoring, and or record keeping, etc. | Hour | $25.08 | 20 | $501.60 |
| 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. | Hour | $18.93 | 10 | $189.30 |
| Equipment Operators, Heavy | 233 | Includes: Cranes, Hydraulic Excavators >=50 HP, Dozers, Paving Machines, Rock Trenchers, Trenchers >=12", Dump Trucks, Ag Equipment >=150 HP, Scrapers, Water Wagons. | Hour | $23.93 | 5 | $119.65 |
| **Materials** | | | | | | |
| Pipe, PVC, 6", SCH 40 | 980 | Materials: - 6" - PVC - SCH 40 - ASTM D1785 | Foot | $6.63 | 80 | $530.40 |
| **Mobilization** | | | | | | |
| Mobilization, medium equipment | 1139 | Equipment with 70-150 HP or typical weights between 14,000 and 30,000 pounds. | Each | $232.71 | 2 | $465.42 |

## USDA - Natural Resources Conservation Service

**Arkansas**

**Practice:** 410 - Grade Stabilization Structure

**Scenario** #3 - Embankment, Pipe 8"-12"

**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" pace, 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 Yard

**Scenario Typical Size:** 2500

**Total Scenario Cost:** $14,784.63

**Scenario Cost/Unit:** $5.91

**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 Yard | $3.76 | 2500 | $9,400.00 |
| Earthfill, Manually Compacted | 50 | Earthfill, manually compacted, includes equipment and labor | Cubic Yard | $4.95 | 29 | $143.55 |
| Hydraulic Excavator, 1 CY | 931 | Track mounted hydraulic excavator with bucket capacity range of 0.8 to 1.5 CY. Equipment and power unit costs. Labor not included. | Hour | $103.47 | 10 | $1,034.70 |
| **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. | Hour | $25.08 | 30 | $752.40 |
| 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. | Hour | $18.93 | 30 | $567.90 |
| Equipment Operators, Heavy | 233 | Includes: Cranes, Hydraulic Excavators >=50 HP, Dozers, Paving Machines, Rock Trenchers, Trenchers >=12", Dump Trucks, Ag Equipment >=150 HP, Scrapers, Water Wagons. | Hour | $23.93 | 10 | $239.30 |
| **Materials** | | | | | | |
| Aggregate, Sand, Graded, Washed | 45 | Sand, typical ASTM C33 gradation, includes materials, equipment and labor to transport and place | Cubic Yard | $30.40 | 3 | $91.20 |
| Pipe, PVC, 2", SCH 40 | 976 | Materials: - 2" - PVC - SCH 40 - ASTM D1785 | Foot | $1.38 | 60 | $82.80 |
| Pipe, PVC, 10", SCH 80 | 1351 | Materials: - 10" - PVC - SCH 80 - ASTM D1785 | Foot | $21.59 | 90 | $1,943.10 |
| **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 | $64.26 | 1 | $64.26 |
| Mobilization, medium equipment | 1139 | Equipment with 70-150 HP or typical weights between 14,000 and 30,000 pounds. | Each | $232.71 | 2 | $465.42 |

**Practice:** 410 - Grade Stabilization Structure

**Scenario** #4 - Embankment, Pipe >12"

**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 Yard

**Scenario Typical Size:** 2500

**Total Scenario Cost:** $18,092.28

**Scenario Cost/Unit:** $7.24

**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 Yard | $103.61 | 1 | $103.61 |
| Concrete, CIP, formed reinforced | 38 | Steel reinforced concrete formed and cast-in-placed in formed structures such as walls or suspended slabs by chute placement. Typical strength is 3000 to 4000 psi. Includes materials, labor and equipment to transport, place and finish. | Cubic Yard | $326.97 | 2 | $653.94 |
| Earthfill, Roller Compacted | 49 | Earthfill, roller or machine compacted, includes equipment and labor | Cubic Yard | $3.76 | 2500 | $9,400.00 |
| Earthfill, Manually Compacted | 50 | Earthfill, manually compacted, includes equipment and labor | Cubic Yard | $4.95 | 129 | $638.55 |
| Hydraulic Excavator, 1 CY | 931 | Track mounted hydraulic excavator with bucket capacity range of 0.8 to 1.5 CY. Equipment and power unit costs. Labor not included. | Hour | $103.47 | 13 | $1,345.11 |
| **Labor** | | | | | | |
| Skilled Labor | 230 | Labor requiring a high level skill set: Includes carpenters, welders, electricians, conservation professionals involved with data collection, monitoring, and or record keeping, etc. | Hour | $25.08 | 38 | $953.04 |
| 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. | Hour | $18.93 | 42 | $795.06 |
| Equipment Operators, Heavy | 233 | Includes: Cranes, Hydraulic Excavators >=50 HP, Dozers, Paving Machines, Rock Trenchers, Trenchers >=12", Dump Trucks, Ag Equipment >=150 HP, Scrapers, Water Wagons. | Hour | $23.93 | 13 | $311.09 |
| **Materials** | | | | | | |
| Rock Riprap, Placed with geotextile | 44 | Rock Riprap, placed with geotextile, includes materials, equipment and labor to transport and place | Cubic Yard | $55.44 | 14 | $776.16 |
| Dimension Lumber, Treated | 1044 | Treated dimension lumber with nominal thickness equal or less than 2". Includes lumber and fasteners | Board Foot | $0.89 | 30 | $26.70 |
| Steel, Plate, 1/8" | 1047 | Flat Steel Plate, 1/8" thick, materials only. | Square Foot | $3.79 | 82 | $310.78 |
| Pipe, Steel, 12", Std Wt, USED | 1356 | Materials: - USED - 12" - Steel Std Wt | Foot | $22.66 | 90 | $2,039.40 |

| | | | | | | |
|---|---|---|---|---|---|---|
| Pipe, Steel, 16", Std Wt, USED | 1357 | Materials: - USED - 16" - Steel Std Wt | Foot | $29.88 | 7 | $209.16 |
| **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 | $64.26 | 1 | $64.26 |
| Mobilization, medium equipment | 1139 | Equipment with 70-150 HP or typical weights between 14,000 and 30,000 pounds. | Each | $232.71 | 2 | $465.42 |

**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" pace, 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 Yard

**Scenario Typical Size:** 2500

**Total Scenario Cost:** $22,284.63

**Scenario Cost/Unit:** $8.91

**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 Yard | $3.76 | 2500 | $9,400.00 |
| Earthfill, Manually Compacted | 50 | Earthfill, manually compacted, includes equipment and labor | Cubic Yard | $4.95 | 29 | $143.55 |
| Hydraulic Excavator, 1 CY | 931 | Track mounted hydraulic excavator with bucket capacity range of 0.8 to 1.5 CY. Equipment and power unit costs. Labor not included. | Hour | $103.47 | 10 | $1,034.70 |
| 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 | $0.30 | 25000 | $7,500.00 |
| **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. | Hour | $25.08 | 30 | $752.40 |
| 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. | Hour | $18.93 | 30 | $567.90 |
| Equipment Operators, Heavy | 233 | Includes: Cranes, Hydraulic Excavators >=50 HP, Dozers, Paving Machines, Rock Trenchers, Trenchers >=12", Dump Trucks, Ag Equipment >=150 HP, Scrapers, Water Wagons. | Hour | $23.93 | 10 | $239.30 |
| **Materials** | | | | | | |
| Aggregate, Sand, Graded, Washed | 45 | Sand, typical ASTM C33 gradation, includes materials, equipment and labor to transport and place | Cubic Yard | $30.40 | 3 | $91.20 |
| Pipe, PVC, 2", SCH 40 | 976 | Materials: - 2" - PVC - SCH 40 - ASTM D1785 | Foot | $1.38 | 60 | $82.80 |
| Pipe, PVC, 10", SCH 80 | 1351 | Materials: - 10" - PVC - SCH 80 - ASTM D1785 | Foot | $21.59 | 90 | $1,943.10 |
| **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 | $64.26 | 1 | $64.26 |

| | | | | | |
|---|---|---|---|---|---|
| Mobilization, medium equipment | 1139 | Equipment with 70-150 HP or typical weights between 14,000 and 30,000 pounds. | Each | $232.71 | 2 | $465.42 |

**Practice:** 410 - Grade Stabilization Structure

**Scenario** #6 - Plastic PipeDrop, Riser Less than 18 inches

**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 installed at the edge of field through an earthen berm to convey water from a higher elevation to a lower elevation with causing gully erosion. Payment rate is based upon the riser diameter in (inches) 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 3 ft high 12" SDR 51, PVC riser with a 40 ft long 10 inch barrel (12 inches x 40' = 480 Diameter Inch - Foot. 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, causing soil loss, and reducing channel capacity.

**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, and collection ditches need to be "mopped out" less often to mainain capacity. 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 Diameter (in) x Berrel Length

**Scenario Unit::** Diameter Inch Foot

**Scenario Typical Size:** 480

**Total Scenario Cost:** $783.81

**Scenario Cost/Unit:** $1.63

**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 Yard | $103.61 | 0.1 | $10.36 |
| Trenching, Earth, loam, 24" x 48" | 54 | Trenching, earth, loam, 24" wide x 48" depth, includes equipment and labor for trenching and backfilling | Foot | $2.67 | 40 | $106.80 |
| **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. | Hour | $18.93 | 4 | $75.72 |
| **Materials** | | | | | | |
| Pipe, PVC, dia. < 18", weight priced | 1323 | Polyvinyl Chloride (PVC) pressure rated pipe priced by the weight of the pipe materials for pipes with diameters less than 18". Materials only. | Pound | $1.80 | 189 | $340.20 |
| Coupling, PVC, Tee, 12x10, SDR 51 | 2364 | Materials: - Tee, 12"x10" - PVC - SDR 51 - ASTM F2658 | Each | $250.73 | 1 | $250.73 |

**Practice:** 410 - Grade Stabilization Structure

**Scenario** #7 - Plastic PipeDrop, Riser 18 inches and larger

**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 installed at the edge of field through an earthen berm to convey water from a higher elevation to a lower elevation with causing gully erosion. Payment rate is based upon the riser diameter in (inches) 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 3 ft high 18" SDR 51, PVC riser with a 40 ft long 15 inch barrel (18 inches x 40' = 720 Diameter Inch - Foot. 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, causing soil loss, and reducing channel capacity.

**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, and collection ditches need to be "mopped out" less often to mainain capacity. 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 Diameter (in) x Berrel Length

**Scenario Unit::** Diameter Inch Foot

**Scenario Typical Size:** 720

**Total Scenario Cost:** $1,376.12

**Scenario Cost/Unit:** $1.91

**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 Yard | $103.61 | 0.1 | $10.36 |
| Trenching, Earth, loam, 24" x 48" | 54 | Trenching, earth, loam, 24" wide x 48" depth, includes equipment and labor for trenching and backfilling | Foot | $2.67 | 40 | $106.80 |
| **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. | Hour | $18.93 | 4 | $75.72 |
| **Materials** | | | | | | |
| Pipe, PVC, dia. < 18", weight priced | 1323 | Polyvinyl Chloride (PVC) pressure rated pipe priced by the weight of the pipe materials for pipes with diameters less than 18". Materials only. | Pound | $1.80 | 288 | $518.40 |
| Pipe, PVC, dia. => 18", weight priced | 1958 | Polyvinyl Chloride (PVC) Pipe priced by the weight of the pipe materials for pipes with diameters equal to or greater than 18". Materials only. | Pound | $0.80 | 43 | $34.40 |
| Coupling, PVC, Tee, 18x15, SDR 51 | 2365 | Materials: - Tee, 18"x15" - PVC - SDR 51 - ASTM F2658 | Each | $630.44 | 1 | $630.44 |

**Practice:** 410 - Grade Stabilization Structure

**Scenario** #8 - Low overfall Structure Less Than 36 inches

**Scenario Description:**

Install a pipe(all material types) under 36 inches in diameter, with a low overfall header, to convey water under roads or other barriers. A typicalscenario would be an 18 inch diameter pipe, 40 feet in length. The work includes site preparation, acquiring a pipe, and altering the pipe to create a low overfall header. This alteration includes applying a cap or partial cap to the inlet end of the pipe and removing a portion of the top of the pipe from the inlet end such that a weir inlet is formed along the newly cut cap and extending horizontally down the sides of the pipe the length necessary to provide adequate weir capacity. Primary use locations are field outlets and sugarcane field cross drain outlets, where erosion can,has occur(ed), in a situation where overfall is low.

**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::** Diameter Inch Foot

**Scenario Typical Size:** 720

**Total Scenario Cost:** $1,994.16

**Scenario Cost/Unit:** $2.77

**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 Yard | $1.99 | 5 | $9.95 |
| Earthfill, Manually Compacted | 50 | Earthfill, manually compacted, includes equipment and labor | Cubic Yard | $4.95 | 20 | $99.00 |
| Portable Welder | 1407 | Portable field welder. Equipment only. Labor not included. | Hour | $18.57 | 2 | $37.14 |
| **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. | Hour | $25.08 | 2 | $50.16 |
| 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. | Hour | $18.93 | 3 | $56.79 |
| **Materials** | | | | | | |
| Pipe, Steel, 18", Std Wt, USED | 1358 | Materials: - USED - 18" - Steel Std Wt | Foot | $37.42 | 40 | $1,496.80 |
| Steel, Plate, 3/8" | 1375 | Flat steel plate, 3/8" thickness. Materials only. | Square Foot | $11.61 | 1 | $11.61 |
| **Mobilization** | | | | | | |
| Mobilization, medium equipment | 1139 | Equipment with 70-150 HP or typical weights between 14,000 and 30,000 pounds. | Each | $232.71 | 1 | $232.71 |

**Practice:** 410 - Grade Stabilization Structure

**Scenario** #9 - 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 Diameter in inches 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", 6' tall riser and a 40' long 30" barrel (Riser Diameter x Barrel Length = 36 inches x 40ft = 1440 Inch-Feet). 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 Diameter (In) x Barrel Length

**Scenario Unit::** Diameter Inch Foot

**Scenario Typical Size:** 1440

**Total Scenario Cost:** $3,900.55

**Scenario Cost/Unit:** $2.71

**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 Yard | $3.76 | 100 | $376.00 |
| Earthfill, Manually Compacted | 50 | Earthfill, manually compacted, includes equipment and labor | Cubic Yard | $4.95 | 20 | $99.00 |
| Hydraulic Excavator, 1 CY | 931 | Track mounted hydraulic excavator with bucket capacity range of 0.8 to 1.5 CY. Equipment and power unit costs. Labor not included. | Hour | $103.47 | 4 | $413.88 |
| **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. | Hour | $25.08 | 11 | $275.88 |
| General Labor | 231 | Labor performed using basic tools such as power tool, shovels, and other tools that do not require extensive training. Ex. pipe layer, herder, concrete placement, materials spreader, flagger, etc. | Hour | $18.93 | 10 | $189.30 |
| Equipment Operators, Heavy | 233 | Includes: Cranes, Hydraulic Excavators >=50 HP, Dozers, Paving Machines, Rock Trenchers, Trenchers >=12", Dump Trucks, Ag Equipment >=150 HP, Scrapers, Water Wagons. | Hour | $23.93 | 4 | $95.72 |
| **Materials** | | | | | | |
| Steel, Plate, 1/8" | 1047 | Flat Steel Plate, 1/8" thick, materials only. | Square Foot | $3.79 | 30 | $113.70 |
| Steel, Plate, 3/8" | 1375 | Flat steel plate, 3/8" thickness. Materials only. | Square Foot | $11.61 | 9 | $104.49 |
| Pipe, CMP, 30", 12 Gauge | 1824 | 30" Corrugated Metal Pipe, Galvanized, Uncoated, 16 gage. Material cost only. | Foot | $36.10 | 40 | $1,444.00 |
| Pipe, CMP, 36", 12 Gauge | 1825 | 36" Corrugated Metal Pipe, Galvanized, Uncoated, 16 gage. Material cost only. | Foot | $43.15 | 6 | $258.90 |
| **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 | $64.26 | 1 | $64.26 |
| Mobilization, medium equipment | 1139 | Equipment with 70-150 HP or typical weights between 14,000 and 30,000 pounds. | Each | $232.71 | 2 | $465.42 |

**Practice:** 410 - Grade Stabilization Structure

**Scenario** #10 - 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 Foot

**Scenario Typical Size:** 90

**Total Scenario Cost:** $7,155.66

**Scenario Cost/Unit:** $79.51

**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 Yard | $326.97 | 9 | $2,942.73 |
| Geotextile, woven | 42 | Woven Geotextile Fabric. Includes materials, equipment and labor | Square Yard | $2.05 | 9 | $18.45 |
| Excavation, Common Earth, side cast, small equipment | 48 | Bulk excavation and side casting of common earth with hydraulic excavator with less than 1 CY capacity. Includes equipment and labor. | Cubic Yard | $1.99 | 40 | $79.60 |
| Earthfill, Roller Compacted | 49 | Earthfill, roller or machine compacted, includes equipment and labor | Cubic Yard | $3.76 | 75 | $282.00 |
| Hydraulic Excavator, 1 CY | 931 | Track mounted hydraulic excavator with bucket capacity range of 0.8 to 1.5 CY. Equipment and power unit costs. Labor not included. | Hour | $103.47 | 5 | $517.35 |
| **Labor** | | | | | | |
| Skilled Labor | 230 | Labor requiring a high level skill set: Includes carpenters, welders, electricians, conservation professionals involved with data collection, monitoring, and or record keeping, etc. | Hour | $25.08 | 10 | $250.80 |
| 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. | Hour | $18.93 | 30 | $567.90 |
| Equipment Operators, Heavy | 233 | Includes: Cranes, Hydraulic Excavators >=50 HP, Dozers, Paving Machines, Rock Trenchers, Trenchers >=12", Dump Trucks, Ag Equipment >=150 HP, Scrapers, Water Wagons. | Hour | $23.93 | 5 | $119.65 |
| **Materials** | | | | | | |
| Aggregate, Gravel, Graded | 46 | Gravel, includes materials, equipment and labor to transport and place. Includes washed and unwashed gravel. | Cubic Yard | $30.82 | 3 | $92.46 |
| Rock Riprap, graded, angular, material and shipping | 1200 | Graded Rock Riprap for all gradation ranges. Includes materials and delivery only. | Ton | $22.52 | 11 | $247.72 |
| Corrugated Steel, 12 Gauge, galvanized | 1376 | Corrugated Steel, 12 gauge, 3" by 1" corrugations, galvanized, meets ASTM A 929. Materials only. | Square Foot | $7.32 | 212 | $1,551.84 |
| Pipe, CMP, 12", 14 Gauge | 1377 | 12" - Corrugated Steel Pipe. Galvanized, uncoated. 14 Gauge. Materials only. | Foot | $9.87 | 2 | $19.74 |

**Mobilization**

| | | | | | |
|---|---|---|---|---|---|
| Mobilization, medium equipment | 1139 | Equipment with 70-150 HP or typical weights between 14,000 and 30,000 pounds. | Each | $232.71 | 2 | $465.42 |

**Practice:** 410 - Grade Stabilization Structure

**Scenario** #11 - Rock Drop Structures

**Scenario Description:**

A Straight Drop structure constructed of rock riprap held in place by galvanized wire, such as, gabion baskets, fence panels, or "sausage" baskets. These structures are used to stabilized the grade and control erosion in natural or artificial channels, to prevent the formation or advancing of gullies, and to enhance environmental quality and reduce pollution hazards. Applied in areas where the concentration and flow velocity of water require structures to stabilize the grade in channels or to control gully erosion. Cost estimate is based upon a gabion wall structure with a drop of 3ft and weir length of 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 Foot

**Scenario Typical Size:** 48

**Total Scenario Cost:** $3,016.13

**Scenario Cost/Unit:** $62.84

**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 | $2.05 | 23 | $47.15 |
| Excavation, Common Earth, side cast, small equipment | 48 | Bulk excavation and side casting of common earth with hydraulic excavator with less than 1 CY capacity. Includes equipment and labor. | Cubic Yard | $1.99 | 7 | $13.93 |
| Earthfill, Roller Compacted | 49 | Earthfill, roller or machine compacted, includes equipment and labor | Cubic Yard | $3.76 | 40 | $150.40 |
| Hydraulic Excavator, 1 CY | 931 | Track mounted hydraulic excavator with bucket capacity range of 0.8 to 1.5 CY. Equipment and power unit costs. Labor not included. | Hour | $103.47 | 5 | $517.35 |
| Tractor, agricultural, 210 HP | 1201 | Agricultural tractor with horsepower range of 190 to 240. Equipment and power unit costs. Labor not included. | Hour | $97.41 | 3 | $292.23 |
| **Labor** | | | | | | |
| General Labor | 231 | Labor performed using basic tools such as power tool, shovels, and other tools that do not require extensive training. Ex. pipe layer, herder, concrete placement, materials spreader, flagger, etc. | Hour | $18.93 | 10 | $189.30 |
| Equipment Operators, Heavy | 233 | Includes: Cranes, Hydraulic Excavators >=50 HP, Dozers, Paving Machines, Rock Trenchers, Trenchers >=12", Dump Trucks, Ag Equipment >=150 HP, Scrapers, Water Wagons. | Hour | $23.93 | 5 | $119.65 |
| Supervisor or Manager | 234 | Labor involving supervision or management activities. Includes crew supervisors, foremen and farm/ranch managers time required for adopting new technology, etc. | Hour | $34.29 | 10 | $342.90 |
| **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 Yard | $125.40 | 7 | $877.80 |
| **Mobilization** | | | | | | |
| Mobilization, medium equipment | 1139 | Equipment with 70-150 HP or typical weights between 14,000 and 30,000 pounds. | Each | $232.71 | 2 | $465.42 |

**Practice:** 410 - Grade Stabilization Structure

**Scenario** #12 - 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

**Total Scenario Cost:** $4,756.62

**Scenario Cost/Unit:** $4,756.62

**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 | $2.05 | 11 | $22.55 |
| Excavation, Common Earth, side cast, small equipment | 48 | Bulk excavation and side casting of common earth with hydraulic excavator with less than 1 CY capacity. Includes equipment and labor. | Cubic Yard | $1.99 | 10 | $19.90 |
| Earthfill, Roller Compacted | 49 | Earthfill, roller or machine compacted, includes equipment and labor | Cubic Yard | $3.76 | 40 | $150.40 |
| Hydraulic Excavator, 1 CY | 931 | Track mounted hydraulic excavator with bucket capacity range of 0.8 to 1.5 CY. Equipment and power unit costs. Labor not included. | Hour | $103.47 | 12 | $1,241.64 |
| Chainsaw | 937 | Equipment and power unit costs. Labor not included. | Hour | $3.97 | 4 | $15.88 |
| Truck, Pickup | 939 | Equipment and power unit costs. Labor not included. | Hour | $19.82 | 1 | $19.82 |
| Tractor, agricultural, 210 HP | 1201 | Agricultural tractor with horsepower range of 190 to 240. Equipment and power unit costs. Labor not included. | Hour | $97.41 | 20 | $1,948.20 |
| Trailer, flatbed, small | 1505 | Small flatbed trailer (typically less than 30' in length) pulled by a pickup to transport materials and equipment. Truck not included. | Hour | $14.46 | 1 | $14.46 |
| **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. | Hour | $18.93 | 20 | $378.60 |
| Equipment Operators, Light | 232 | Includes: Skid Steer Loaders, Hydraulic Excavators <50 HP, Trenchers <12", Ag Equipment <150 HP, Pickup Trucks, Forklifts, Mulchers | Hour | $21.14 | 1 | $21.14 |
| Equipment Operators, Heavy | 233 | Includes: Cranes, Hydraulic Excavators >=50 HP, Dozers, Paving Machines, Rock Trenchers, Trenchers >=12", Dump Trucks, Ag Equipment >=150 HP, Scrapers, Water Wagons. | Hour | $23.93 | 12 | $287.16 |
| 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. | Hour | $34.29 | 5 | $171.45 |
| **Mobilization** | | | | | | |
| Mobilization, medium equipment | 1139 | Equipment with 70-150 HP or typical weights between 14,000 and 30,000 pounds. | Each | $232.71 | 2 | $465.42 |

**Practice:** 410 - Grade Stabilization Structure

**Scenario** #13 - GSS lower cfs, lower fill

**Scenario Description:**

An earthen embankment with a principle spillway pipe < 15 inches in diameter with lower cfs (<=5 cfs)and lower fill (< 300 cuyds). 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 50 cubic yards, 12" smooth steel principle spillway with a 30 ft barrel. A small 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:** Each

**Scenario Unit::** Each

**Scenario Typical Size:** 1

**Total Scenario Cost:** $1,478.91

**Scenario Cost/Unit:** $1,478.91

**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 Yard | $3.76 | 50 | $188.00 |
| Hydraulic Excavator, 1 CY | 931 | Track mounted hydraulic excavator with bucket capacity range of 0.8 to 1.5 CY. Equipment and power unit costs. Labor not included. | Hour | $103.47 | 1.25 | $129.34 |
| **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. | Hour | $25.08 | 1 | $25.08 |
| 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. | Hour | $18.93 | 1 | $18.93 |
| Equipment Operators, Heavy | 233 | Includes: Cranes, Hydraulic Excavators >=50 HP, Dozers, Paving Machines, Rock Trenchers, Trenchers >=12", Dump Trucks, Ag Equipment >=150 HP, Scrapers, Water Wagons. | Hour | $23.93 | 1.25 | $29.91 |
| **Materials** | | | | | | |
| Rock Riprap, Placed with geotextile | 44 | Rock Riprap, placed with geotextile, includes materials, equipment and labor to transport and place | Cubic Yard | $55.44 | 2 | $110.88 |
| Pipe, Steel, 12", Std Wt, USED | 1356 | Materials: - USED - 12" - Steel Std Wt | Foot | $22.66 | 30 | $679.80 |
| **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 | $64.26 | 1 | $64.26 |
| Mobilization, medium equipment | 1139 | Equipment with 70-150 HP or typical weights between 14,000 and 30,000 pounds. | Each | $232.71 | 1 | $232.71 |

**Practice:** 410 - Grade Stabilization Structure

**Scenario** #14 - GSS lower cfs, med fill

**Scenario Description:**

An earthen embankment with a principle spillway pipe < 15 inches with lower cfs (<=5 cfs)and med fill (300 to 1200 cuyds). 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 1000 cubic yards, 12" smooth steel principle spillway with a 45 ft barrel. 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:** Each

**Scenario Unit::** Each

**Scenario Typical Size:** 1

**Total Scenario Cost:** $6,764.84

**Scenario Cost/Unit:** $6,764.84

**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 Yard | $3.76 | 1000 | $3,760.00 |
| Hydraulic Excavator, 1 CY | 931 | Track mounted hydraulic excavator with bucket capacity range of 0.8 to 1.5 CY. Equipment and power unit costs. Labor not included. | Hour | $103.47 | 5 | $517.35 |
| **Labor** | | | | | | |
| Skilled Labor | 230 | Labor requiring a high level skill set: Includes carpenters, welders, electricians, conservation professionals involved with data collection, monitoring, and or record keeping, etc. | Hour | $25.08 | 6 | $150.48 |
| 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. | Hour | $18.93 | 6 | $113.58 |
| Equipment Operators, Heavy | 233 | Includes: Cranes, Hydraulic Excavators >=50 HP, Dozers, Paving Machines, Rock Trenchers, Trenchers >=12", Dump Trucks, Ag Equipment >=150 HP, Scrapers, Water Wagons. | Hour | $23.93 | 5 | $119.65 |
| **Materials** | | | | | | |
| Rock Riprap, Placed with geotextile | 44 | Rock Riprap, placed with geotextile, includes materials, equipment and labor to transport and place | Cubic Yard | $55.44 | 10 | $554.40 |
| Pipe, Steel, 12", Std Wt, USED | 1356 | Materials: - USED - 12" - Steel Std Wt | Foot | $22.66 | 45 | $1,019.70 |
| **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 | $64.26 | 1 | $64.26 |
| Mobilization, medium equipment | 1139 | Equipment with 70-150 HP or typical weights between 14,000 and 30,000 pounds. | Each | $232.71 | 2 | $465.42 |

**Practice:** 410 - Grade Stabilization Structure

**Scenario** #15 - GSS lower cfs, higher fill

**Scenario Description:**

An earthen embankment with a principle spillway pipe <15 inches with lower cfs (<=5 cfs)and higher fill (>1200-2500 cuyds). 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 2000 cubic yards, 12" smooth steel principle spillway with a 50 ft barrel. 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:** Each

**Scenario Unit::** Each

**Scenario Typical Size:** 1

**Total Scenario Cost:** $12,132.47

**Scenario Cost/Unit:** $12,132.47

**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 Yard | $3.76 | 2200 | $8,272.00 |
| Hydraulic Excavator, 1 CY | 931 | Track mounted hydraulic excavator with bucket capacity range of 0.8 to 1.5 CY. Equipment and power unit costs. Labor not included. | Hour | $103.47 | 7 | $724.29 |
| **Labor** | | | | | | |
| Skilled Labor | 230 | Labor requiring a high level skill set: Includes carpenters, welders, electricians, conservation professionals involved with data collection, monitoring, and or record keeping, etc. | Hour | $25.08 | 7 | $175.56 |
| 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. | Hour | $18.93 | 7 | $132.51 |
| Equipment Operators, Heavy | 233 | Includes: Cranes, Hydraulic Excavators >=50 HP, Dozers, Paving Machines, Rock Trenchers, Trenchers >=12", Dump Trucks, Ag Equipment >=150 HP, Scrapers, Water Wagons. | Hour | $23.93 | 7 | $167.51 |
| **Materials** | | | | | | |
| Rock Riprap, Placed with geotextile | 44 | Rock Riprap, placed with geotextile, includes materials, equipment and labor to transport and place | Cubic Yard | $55.44 | 18 | $997.92 |
| Pipe, Steel, 12", Std Wt, USED | 1356 | Materials: - USED - 12" - Steel Std Wt | Foot | $22.66 | 50 | $1,133.00 |
| **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 | $64.26 | 1 | $64.26 |
| Mobilization, medium equipment | 1139 | Equipment with 70-150 HP or typical weights between 14,000 and 30,000 pounds. | Each | $232.71 | 2 | $465.42 |

**Practice:** 410 - Grade Stabilization Structure

**Scenario** #16 - GSS med cfs, lower fill

**Scenario Description:**

An earthen embankment with a principle spillway pipe 15 to 22 inches with med cfs (>5-10 cfs)and lower fill (<300 cuyds). 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 150 cubic yards, 18" smooth steel principle spillway with a 40 ft barrel. 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:** Each

**Scenario Unit::** Each

**Scenario Typical Size:** 1

**Total Scenario Cost:** $3,437.35

**Scenario Cost/Unit:** $3,437.35

**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 Yard | $3.76 | 150 | $564.00 |
| Hydraulic Excavator, 1 CY | 931 | Track mounted hydraulic excavator with bucket capacity range of 0.8 to 1.5 CY. Equipment and power unit costs. Labor not included. | Hour | $103.47 | 3 | $310.41 |
| **Labor** | | | | | | |
| Skilled Labor | 230 | Labor requiring a high level skill set: Includes carpenters, welders, electricians, conservation professionals involved with data collection, monitoring, and or record keeping, etc. | Hour | $25.08 | 3 | $75.24 |
| General Labor | 231 | Labor performed using basic tools such as power tool, shovels, and other tools that do not require extensive training. Ex. pipe layer, herder, concrete placement, materials spreader, flagger, etc. | Hour | $18.93 | 3 | $56.79 |
| Equipment Operators, Heavy | 233 | Includes: Cranes, Hydraulic Excavators >=50 HP, Dozers, Paving Machines, Rock Trenchers, Trenchers >=12", Dump Trucks, Ag Equipment >=150 HP, Scrapers, Water Wagons. | Hour | $23.93 | 3 | $71.79 |
| **Materials** | | | | | | |
| Rock Riprap, Placed with geotextile | 44 | Rock Riprap, placed with geotextile, includes materials, equipment and labor to transport and place | Cubic Yard | $55.44 | 6 | $332.64 |
| Pipe, Steel, 18", Std Wt, USED | 1358 | Materials: - USED - 18" - Steel Std Wt | Foot | $37.42 | 40 | $1,496.80 |
| **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 | $64.26 | 1 | $64.26 |
| Mobilization, medium equipment | 1139 | Equipment with 70-150 HP or typical weights between 14,000 and 30,000 pounds. | Each | $232.71 | 2 | $465.42 |

**Practice:** 410 - Grade Stabilization Structure

**Scenario** #17 - GSS med cfs, med fill

**Scenario Description:**

An earthen embankment with a principle spillway pipe 15 to 22 inches with med cfs (>5-10 cfs)and med fill (300 - 1200 cuyds). 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 1200 cubic yards, 18" smooth steel principle spillway with a 45 ft barrel. 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:** Each

**Scenario Unit::** Each

**Scenario Typical Size:** 1

**Total Scenario Cost:** $8,352.45

**Scenario Cost/Unit:** $8,352.45

**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 Yard | $3.76 | 1200 | $4,512.00 |
| Hydraulic Excavator, 1 CY | 931 | Track mounted hydraulic excavator with bucket capacity range of 0.8 to 1.5 CY. Equipment and power unit costs. Labor not included. | Hour | $103.47 | 6 | $620.82 |
| **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. | Hour | $25.08 | 7 | $175.56 |
| 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. | Hour | $18.93 | 7 | $132.51 |
| Equipment Operators, Heavy | 233 | Includes: Cranes, Hydraulic Excavators >=50 HP, Dozers, Paving Machines, Rock Trenchers, Trenchers >=12", Dump Trucks, Ag Equipment >=150 HP, Scrapers, Water Wagons. | Hour | $23.93 | 6 | $143.58 |
| **Materials** | | | | | | |
| Rock Riprap, Placed with geotextile | 44 | Rock Riprap, placed with geotextile, includes materials, equipment and labor to transport and place | Cubic Yard | $55.44 | 10 | $554.40 |
| Pipe, Steel, 18", Std Wt, USED | 1358 | Materials: - USED - 18" - Steel Std Wt | Foot | $37.42 | 45 | $1,683.90 |
| **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 | $64.26 | 1 | $64.26 |
| Mobilization, medium equipment | 1139 | Equipment with 70-150 HP or typical weights between 14,000 and 30,000 pounds. | Each | $232.71 | 2 | $465.42 |

**Practice:** 410 - Grade Stabilization Structure

**Scenario** #18 - GSS med cfs, higher fill

**Scenario Description:**

An earthen embankment with a principle spillway pipe 15 to 22 inches with med cfs (>5-10 cfs)and higher fill (>1200-2500 cuyds). 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 2500 cubic yards, 18" smooth steel principle spillway with a 80 ft barrel. 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:** Each

**Scenario Unit::** Each

**Scenario Typical Size:** 1

**Total Scenario Cost:** $15,442.74

**Scenario Cost/Unit:** $15,442.74

**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 Yard | $3.76 | 2500 | $9,400.00 |
| Hydraulic Excavator, 1 CY | 931 | Track mounted hydraulic excavator with bucket capacity range of 0.8 to 1.5 CY. Equipment and power unit costs. Labor not included. | Hour | $103.47 | 9 | $931.23 |
| **Labor** | | | | | | |
| Skilled Labor | 230 | Labor requiring a high level skill set: Includes carpenters, welders, electricians, conservation professionals involved with data collection, monitoring, and or record keeping, etc. | Hour | $25.08 | 6 | $150.48 |
| 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. | Hour | $18.93 | 6 | $113.58 |
| Equipment Operators, Heavy | 233 | Includes: Cranes, Hydraulic Excavators >=50 HP, Dozers, Paving Machines, Rock Trenchers, Trenchers >=12", Dump Trucks, Ag Equipment >=150 HP, Scrapers, Water Wagons. | Hour | $23.93 | 9 | $215.37 |
| **Materials** | | | | | | |
| Rock Riprap, Placed with geotextile | 44 | Rock Riprap, placed with geotextile, includes materials, equipment and labor to transport and place | Cubic Yard | $55.44 | 20 | $1,108.80 |
| Pipe, Steel, 18", Std Wt, USED | 1358 | Materials: - USED - 18" - Steel Std Wt | Foot | $37.42 | 80 | $2,993.60 |
| **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 | $64.26 | 1 | $64.26 |
| Mobilization, medium equipment | 1139 | Equipment with 70-150 HP or typical weights between 14,000 and 30,000 pounds. | Each | $232.71 | 2 | $465.42 |

**Practice:** 410 - Grade Stabilization Structure

**Scenario** #19 - GSS higher cfs, lower fill

**Scenario Description:**

An earthen embankment with a principle spillway pipe 22 to 34 inches with higher cfs (>10-20 cfs)and lower fill (<300 cuyds). 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 275 cubic yards, 24" smooth steel principle spillway with a 45 ft barrel. 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:** Each

**Scenario Unit::** Each

**Scenario Typical Size:** 1

**Total Scenario Cost:** $5,091.51

**Scenario Cost/Unit:** $5,091.51

**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 Yard | $3.76 | 275 | $1,034.00 |
| Hydraulic Excavator, 1 CY | 931 | Track mounted hydraulic excavator with bucket capacity range of 0.8 to 1.5 CY. Equipment and power unit costs. Labor not included. | Hour | $103.47 | 4 | $413.88 |
| **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. | Hour | $25.08 | 7 | $175.56 |
| 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. | Hour | $18.93 | 7 | $132.51 |
| Equipment Operators, Heavy | 233 | Includes: Cranes, Hydraulic Excavators >=50 HP, Dozers, Paving Machines, Rock Trenchers, Trenchers >=12", Dump Trucks, Ag Equipment >=150 HP, Scrapers, Water Wagons. | Hour | $23.93 | 5 | $119.65 |
| **Materials** | | | | | | |
| Rock Riprap, Placed with geotextile | 44 | Rock Riprap, placed with geotextile, includes materials, equipment and labor to transport and place | Cubic Yard | $55.44 | 7 | $388.08 |
| Pipe, Steel, 24", Std Wt, USED | 1360 | Materials: - USED - 24" - Steel Std Wt | Foot | $51.07 | 45 | $2,298.15 |
| **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 | $64.26 | 1 | $64.26 |
| Mobilization, medium equipment | 1139 | Equipment with 70-150 HP or typical weights between 14,000 and 30,000 pounds. | Each | $232.71 | 2 | $465.42 |

**Practice:** 410 - Grade Stabilization Structure

**Scenario** #20 - GSS higher cfs, med fill

**Scenario Description:**

An earthen embankment with a principle spillway pipe 22 to 34 inches with higher cfs (>10-20 cfs)and med fill (>300 to 1500 cuyds). 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 1400 cubic yards, 24" smooth steel principle spillway with a 45 ft barrel. 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:** Each

**Scenario Unit::** Each

**Scenario Typical Size:** 1

**Total Scenario Cost:** $9,829.58

**Scenario Cost/Unit:** $9,829.58

**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 Yard | $3.76 | 1400 | $5,264.00 |
| Hydraulic Excavator, 1 CY | 931 | Track mounted hydraulic excavator with bucket capacity range of 0.8 to 1.5 CY. Equipment and power unit costs. Labor not included. | Hour | $103.47 | 6 | $620.82 |
| **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. | Hour | $25.08 | 7 | $175.56 |
| 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. | Hour | $18.93 | 7 | $132.51 |
| Equipment Operators, Heavy | 233 | Includes: Cranes, Hydraulic Excavators >=50 HP, Dozers, Paving Machines, Rock Trenchers, Trenchers >=12", Dump Trucks, Ag Equipment >=150 HP, Scrapers, Water Wagons. | Hour | $23.93 | 6 | $143.58 |
| **Materials** | | | | | | |
| Rock Riprap, Placed with geotextile | 44 | Rock Riprap, placed with geotextile, includes materials, equipment and labor to transport and place | Cubic Yard | $55.44 | 12 | $665.28 |
| Pipe, Steel, 24", Std Wt, USED | 1360 | Materials: - USED - 24" - Steel Std Wt | Foot | $51.07 | 45 | $2,298.15 |
| **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 | $64.26 | 1 | $64.26 |
| Mobilization, medium equipment | 1139 | Equipment with 70-150 HP or typical weights between 14,000 and 30,000 pounds. | Each | $232.71 | 2 | $465.42 |

**Practice:** 410 - Grade Stabilization Structure

**Scenario** #21 - GSS higher cfs, higher fill

**Scenario Description:**

An earthen embankment with a principle spillway pipe 22 to 34 inches with higher cfs (>10-20 cfs)and higher fill (> 1500-2800 cuyds). 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 2750 cubic yards, 24" smooth steel principle spillway with a 110 ft barrel. 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:** Each

**Scenario Unit::** Each

**Scenario Typical Size:** 1

**Total Scenario Cost:** $18,867.21

**Scenario Cost/Unit:** $18,867.21

**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 Yard | $3.76 | 2750 | $10,340.00 |
| Hydraulic Excavator, 1 CY | 931 | Track mounted hydraulic excavator with bucket capacity range of 0.8 to 1.5 CY. Equipment and power unit costs. Labor not included. | Hour | $103.47 | 4 | $413.88 |
| **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. | Hour | $25.08 | 9 | $225.72 |
| General Labor | 231 | Labor performed using basic tools such as power tool, shovels, and other tools that do not require extensive training. Ex. pipe layer, herder, concrete placement, materials spreader, flagger, etc. | Hour | $18.93 | 9 | $170.37 |
| Equipment Operators, Heavy | 233 | Includes: Cranes, Hydraulic Excavators >=50 HP, Dozers, Paving Machines, Rock Trenchers, Trenchers >=12", Dump Trucks, Ag Equipment >=150 HP, Scrapers, Water Wagons. | Hour | $23.93 | 10 | $239.30 |
| **Materials** | | | | | | |
| Rock Riprap, Placed with geotextile | 44 | Rock Riprap, placed with geotextile, includes materials, equipment and labor to transport and place | Cubic Yard | $55.44 | 24 | $1,330.56 |
| Pipe, Steel, 24", Std Wt, USED | 1360 | Materials: - USED - 24" - Steel Std Wt | Foot | $51.07 | 110 | $5,617.70 |
| **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 | $64.26 | 1 | $64.26 |
| Mobilization, medium equipment | 1139 | Equipment with 70-150 HP or typical weights between 14,000 and 30,000 pounds. | Each | $232.71 | 2 | $465.42 |

**Practice:** 410 - Grade Stabilization Structure

**Scenario** #22 - GSS xhigh cfs, xhigh fill

**Scenario Description:**

An earthen embankment with a principle spillway pipe greater than 34 inches with highest cfs (>20 cfs)and extra high fill (>2800 cuyds). 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 3000 cubic yards, 36" smooth steel principle spillway with a 130 ft barrel. 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:** Each

**Scenario Unit::** Each

**Scenario Typical Size:** 1

**Total Scenario Cost:** $29,036.39

**Scenario Cost/Unit:** $29,036.39

**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 Yard | $3.76 | 3000 | $11,280.00 |
| Hydraulic Excavator, 1 CY | 931 | Track mounted hydraulic excavator with bucket capacity range of 0.8 to 1.5 CY. Equipment and power unit costs. Labor not included. | Hour | $103.47 | 15 | $1,552.05 |
| **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. | Hour | $25.08 | 15 | $376.20 |
| General Labor | 231 | Labor performed using basic tools such as power tool, shovels, and other tools that do not require extensive training. Ex. pipe layer, herder, concrete placement, materials spreader, flagger, etc. | Hour | $18.93 | 15 | $283.95 |
| Equipment Operators, Heavy | 233 | Includes: Cranes, Hydraulic Excavators >=50 HP, Dozers, Paving Machines, Rock Trenchers, Trenchers >=12", Dump Trucks, Ag Equipment >=150 HP, Scrapers, Water Wagons. | Hour | $23.93 | 15 | $358.95 |
| **Materials** | | | | | | |
| Rock Riprap, Placed with geotextile | 44 | Rock Riprap, placed with geotextile, includes materials, equipment and labor to transport and place | Cubic Yard | $55.44 | 24 | $1,330.56 |
| Pipe, Steel, 36", Std Wt, USED | 1362 | Materials: - USED - 36" - Steel Std Wt | Foot | $102.50 | 130 | $13,325.00 |
| **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 | $64.26 | 1 | $64.26 |
| Mobilization, medium equipment | 1139 | Equipment with 70-150 HP or typical weights between 14,000 and 30,000 pounds. | Each | $232.71 | 2 | $465.42 |

**Practice:** 410 - Grade Stabilization Structure

**Scenario** #23 - Multiple Low Overfall Structures Less Than 36 inches

**Scenario Description:**

Install a pipe(all material types) under 36 inches in diameter, with a low overfall header, to convey water under roads or other barriers. A typicalscenario would be an 18 inch diameter pipe, 40 feet in length. The work includes site preparation, acquiring a pipe, and altering the pipe to create a low overfall header. This alteration includes applying a cap or partial cap to the inlet end of the pipe and removing a portion of the top of the pipe from the inlet end such that a weir inlet is formed along the newly cut cap and extending horizontally down the sides of the pipe the length necessary to provide adequate weir capacity. Primary use locations are field outlets and sugarcane field cross drain outlets, where erosion can,has occur(ed), in a situation where overfall is low. When contract contains more than 5 of this type structure, use this scenario for number 6 and after.

**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:** Each

**Scenario Unit::** Each

**Scenario Typical Size:** 1

**Total Scenario Cost:** $1,679.94

**Scenario Cost/Unit:** $1,679.94

**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 Yard | $1.99 | 5 | $9.95 |
| Earthfill, Manually Compacted | 50 | Earthfill, manually compacted, includes equipment and labor | Cubic Yard | $4.95 | 20 | $99.00 |
| Portable Welder | 1407 | Portable field welder. Equipment only. Labor not included. | Hour | $18.57 | 1 | $18.57 |
| **Labor** | | | | | | |
| Skilled Labor | 230 | Labor requiring a high level skill set: Includes carpenters, welders, electricians, conservation professionals involved with data collection, monitoring, and or record keeping, etc. | Hour | $25.08 | 1 | $25.08 |
| 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. | Hour | $18.93 | 1 | $18.93 |
| **Materials** | | | | | | |
| Pipe, Steel, 18", Std Wt, USED | 1358 | Materials: - USED - 18" - Steel Std Wt | Foot | $37.42 | 40 | $1,496.80 |
| Steel, Plate, 3/8" | 1375 | Flat steel plate, 3/8" thickness. Materials only. | Square Foot | $11.61 | 1 | $11.61 |

**Practice:** 410 - Grade Stabilization Structure

**Scenario** #24 - Straight Pipe Less Than 30 inches HDPE

**Scenario Description:**

Install a new HDPE culvert under 30 inches in diameter 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. 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:**

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:**

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::** Diameter Inch Foot

**Scenario Typical Size:** 960

**Total Scenario Cost:** $1,438.98

**Scenario Cost/Unit:** $1.50

**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 Yard | $1.99 | 5 | $9.95 |
| Earthfill, Manually Compacted | 50 | Earthfill, manually compacted, includes equipment and labor | Cubic Yard | $4.95 | 45 | $222.75 |
| **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. | Hour | $18.93 | 10 | $189.30 |
| **Materials** | | | | | | |
| Rock Riprap, Placed with geotextile | 44 | Rock Riprap, placed with geotextile, includes materials, equipment and labor to transport and place | Cubic Yard | $55.44 | 2 | $110.88 |
| Aggregate, Gravel, Graded | 46 | Gravel, includes materials, equipment and labor to transport and place. Includes washed and unwashed gravel. | Cubic Yard | $30.82 | 5 | $154.10 |
| Pipe, HDPE, CPT, Double Wall, Soil Tight, 24" | 1246 | Pipe, Corrugated HDPE Double Wall, 24" diameter with soil tight joints - AASHTO M294. Material cost only. | Foot | $18.80 | 40 | $752.00 |

**Practice:** 410 - Grade Stabilization Structure

**Scenario** #25 - Straight Pipe Less Than 30 inches SSP

**Scenario Description:**

Install a new HDPE culvert under 30 inches in diameter 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. 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:**

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:**

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::** Diameter Inch Foot

**Scenario Typical Size:** 960

**Total Scenario Cost:** $3,195.20

**Scenario Cost/Unit:** $3.33

**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 Yard | $1.99 | 5 | $9.95 |
| Earthfill, Manually Compacted | 50 | Earthfill, manually compacted, includes equipment and labor | Cubic Yard | $4.95 | 45 | $222.75 |
| **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. | Hour | $18.93 | 10 | $189.30 |
| **Materials** | | | | | | |
| Rock Riprap, Placed with geotextile | 44 | Rock Riprap, placed with geotextile, includes materials, equipment and labor to transport and place | Cubic Yard | $55.44 | 2 | $110.88 |
| Aggregate, Gravel, Graded | 46 | Gravel, includes materials, equipment and labor to transport and place. Includes washed and unwashed gravel. | Cubic Yard | $30.82 | 5 | $154.10 |
| Pipe, Steel, 24", Std Wt, USED | 1360 | Materials: - USED - 24" - Steel Std Wt | Foot | $51.07 | 40 | $2,042.80 |
| **Mobilization** | | | | | | |
| Mobilization, medium equipment | 1139 | Equipment with 70-150 HP or typical weights between 14,000 and 30,000 pounds. | Each | $232.71 | 2 | $465.42 |

**Practice:** 412 - Grassed Waterway

**Scenario** #1 - Base Waterway

**Scenario Description:**

Typical practice is 1200 ' long, 12' bottom, 8:1 side slopes, 1.5' depth, half excavation. A grass waterway that is a shaped or graded channel and is established with suitable vegetation to carry surface water at a non-erosive velocity to a stable outlet. This practice addresses Concentrated Flow Erosion (Classic Gully & Ephemeral Erosion) and Excessive Sediment in surface waters. Waterway area measured from top of bank to top of bank. Seeding area is 20% greater than waterway area to account for disturbed areas. Costs include excavation 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. 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 1200 ' long, 12' bottom, 8:1 side slopes, 1.5' 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:** Acre of Waterway

**Scenario Unit::** Acre

**Scenario Typical Size:** 1

**Total Scenario Cost:** $1,502.72

**Scenario Cost/Unit:** $1,502.72

**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 Yard | $1.45 | 800 | $1,160.00 |
| **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. | Hour | $18.93 | 4 | $75.72 |
| 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. | Hour | $34.29 | 1 | $34.29 |
| **Mobilization** | | | | | | |
| Mobilization, medium equipment | 1139 | Equipment with 70-150 HP or typical weights between 14,000 and 30,000 pounds. | Each | $232.71 | 1 | $232.71 |

**Practice:** 412 - Grassed Waterway

**Scenario** #2 - Grass Waterway with Checks

**Scenario Description:**

Typical practice is 1200 ' long, 12' bottom, 8:1 side slopes, 1.5' depth, half excavation. A grass waterway that is a shaped or graded channel and is established with suitable vegetation to carry surface water at a non-erosive velocity to a stable outlet. Fabric or stone checks are installed every 100 feet along the length of the waterway perpendicular to waterflow and are 2/3 the waterway top width to reduce maintenance and provide temporary protection until vegetation is established. Fabric Checks are installed 18" deep with 12" laid over on the surface. (Alternatively, rock checks could be installed). This practice addresses Concentrated Flow Erosion (Classic Gully & Ephemeral Erosion) and Excessive Sediment in surface waters. Waterway area measured from top of bank to top of bank. Seeding area is 20% greater than waterway area to account for disturbed areas. Costs include excavation 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. 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 1200 ' long, 12' bottom, 8:1 side slopes, 1.5' depth. Fabric checks are installed every 100 feet along the length of the waterway. The practice is installed using a dozer. Fabric or stone checks are installed with small backhoe and labor. Use Critical Area Planting (342) for establishment of waterway vegetation. If erosion control blankets or mulching for seedbed establishment/protection are needed, use conservation practice Mulching (484). Drainage tile, if needed, will be installed accoring to Subsurface Drain (606). Outlets, if needed will be installed using Structure for Water Control (587). If inlet Structures are needed with the drainage tile, then those will be installed using Underground Outlet (620).

**Feature Measure:** Acre of Waterway

**Scenario Unit::** Acre

**Scenario Typical Size:** 1

**Total Scenario Cost:** $2,292.69

**Scenario Cost/Unit:** $2,292.69

**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 Yard | $1.99 | 33 | $65.67 |
| Earthfill, Manually Compacted | 50 | Earthfill, manually compacted, includes equipment and labor | Cubic Yard | $4.95 | 33 | $163.35 |
| Excavation, common earth, large equipment, 50 ft | 1222 | Bulk excavation of common earth including sand and gravel with dozer >100 HP with average push distance of 50 feet. Includes equipment and labor. | Cubic Yard | $1.45 | 800 | $1,160.00 |
| **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. | Hour | $18.93 | 12 | $227.16 |
| 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. | Hour | $34.29 | 2 | $68.58 |
| **Materials** | | | | | | |
| Geotextile, non-woven, light weight | 1209 | Non-woven less than 8 ounce/square yard geotextile with staple anchoring. Materials and shipping only. | Square Yard | $1.17 | 132 | $154.44 |
| **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 | $64.26 | 1 | $64.26 |
| 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 | $156.52 | 1 | $156.52 |
| Mobilization, medium equipment | 1139 | Equipment with 70-150 HP or typical weights between 14,000 and 30,000 pounds. | Each | $232.71 | 1 | $232.71 |

**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 9 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 - ten foot intervals (this will vary with species selection and density goals). Native 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. A locally adapted mixture of 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 tracts 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 and width of Hedgerow

**Scenario Unit::** Foot

**Scenario Typical Size:** 660

**Total Scenario Cost:** $1,007.10

**Scenario Cost/Unit:** $1.53

**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. | Acre | $15.10 | 0.33 | $4.98 |
| Seeding Operation, No Till/Grass Drill | 960 | No Till drill or grass drill for seeding. Includes equipment, power unit and labor costs. | Acre | $19.43 | 0.33 | $6.41 |
| Tractor, agricultural, 120 HP | 962 | Agricultural tractor with horsepower range of 90 to 140. Equipment and power unit costs. Labor not included. | Hour | $52.49 | 2 | $104.98 |
| Hand tools, tree planting | 1590 | Various hand tools for digging holes and planting trees such as augers, dibble bars, planting shovel, hoe-dad. Equipment only. Labor not included. | Hour | $12.04 | 2 | $24.08 |
| **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. | Hour | $18.93 | 2 | $37.86 |
| Equipment Operators, Light | 232 | Includes: Skid Steer Loaders, Hydraulic Excavators <50 HP, Trenchers <12", Ag Equipment <150 HP, Pickup Trucks, Forklifts, Mulchers | Hour | $21.14 | 2 | $42.28 |
| **Materials** | | | | | | |
| Shrub, seedling or transplant, bare root, 18"-36" | 1507 | Bare root hardwood trees 18-36" tall. Includes materials and shipping only. | Each | $0.58 | 166 | $96.28 |
| Tree, hardwood, seedling or transplant, bare root, 16-36" | 1510 | Bare root hardwood trees 18-36" tall. Includes materials and shipping only. | Each | $0.31 | 66 | $20.46 |
| Tree shelter, solid tube type, 3-1/4" x 36" | 1561 | 3-1/4" x 36" tree tube for protection from animal damage. Materials only. | Each | $2.68 | 166 | $444.88 |
| Two Species Mix, Warm Season, Native Perennial Grass | 2325 | Native, warm season perennial grass. Includes material and shipping only. | Acre | $94.57 | 0.33 | $31.21 |
| Three Species Mix, Native Forb | 2333 | Native forb mix. Includes material and shipping only. | Acre | $586.90 | 0.33 | $193.68 |

**Practice:** 422 - Hedgerow Planting

**Scenario** #2 - 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: corridors for 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. 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 at least 3 native warm season grasses and forbs 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. Site not suited to conifer or hardwood trees or site lacking needed tree components.

**After Situation:**

Inadequate habitat for fish and wildlife is addressed for needs identified in the resource assessment. Habitat patches are connected by corridors of dense hedgerow vegetation. Food resources in crop fields are made availble by their proximity to hedgerow cover. Planting may include fruit and seed bearing species, improving food supply, depending on needs being addressed. Site not suited to conifer or hardwood trees or Site not lacking needed tree components.

**Feature Measure:** Length and width of Hedgerow

**Scenario Unit::** Foot

**Scenario Typical Size:** 660

**Total Scenario Cost:** $816.37

**Scenario Cost/Unit:** $1.24

**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. | Acre | $15.10 | 0.33 | $4.98 |
| Seeding Operation, No Till/Grass Drill | 960 | No Till drill or grass drill for seeding. Includes equipment, power unit and labor costs. | Acre | $19.43 | 0.33 | $6.41 |
| Tractor, agricultural, 120 HP | 962 | Agricultural tractor with horsepower range of 90 to 140. Equipment and power unit costs. Labor not included. | Hour | $52.49 | 2 | $104.98 |
| Hand tools, tree planting | 1590 | Various hand tools for digging holes and planting trees such as augers, dibble bars, planting shovel, hoe-dad. Equipment only. Labor not included. | Hour | $12.04 | 2 | $24.08 |
| **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. | Hour | $18.93 | 2 | $37.86 |
| Equipment Operators, Light | 232 | Includes: Skid Steer Loaders, Hydraulic Excavators <50 HP, Trenchers <12", Ag Equipment <150 HP, Pickup Trucks, Forklifts, Mulchers | Hour | $21.14 | 2 | $42.28 |
| **Materials** | | | | | | |
| Shrub, seedling or transplant, bare root, 18"-36" | 1507 | Bare root hardwood trees 18-36" tall. Includes materials and shipping only. | Each | $0.58 | 166 | $96.28 |
| Tree shelter, solid tube type, 3-1/4" x 36" | 1561 | 3-1/4" x 36" tree tube for protection from animal damage. Materials only. | Each | $2.68 | 166 | $444.88 |
| One Species, Warm Season, Native Perennial Grass | 2322 | Native, warm season perennial grass. Includes material and shipping only. | Acre | $70.93 | 0.33 | $23.41 |
| Two Species Mix, Warm Season, Native Perennial Grass | 2325 | Native, warm season perennial grass. Includes material and shipping only. | Acre | $94.57 | 0.33 | $31.21 |

**Practice:** 422 - Hedgerow Planting

**Scenario** #3 - Wildlife, Trees - Shrubs only

**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: corridors for 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 - ten foot intervals (this will vary with species selection and density goals). 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 corridors of 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 and width of Hedgerow

**Scenario Unit::** Foot

**Scenario Typical Size:** 660

**Total Scenario Cost:** $712.29

**Scenario Cost/Unit:** $1.08

**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. | Acre | $15.10 | 1 | $15.10 |
| Tractor, agricultural, 120 HP | 962 | Agricultural tractor with horsepower range of 90 to 140. Equipment and power unit costs. Labor not included. | Hour | $52.49 | 1 | $52.49 |
| Hand tools, tree planting | 1590 | Various hand tools for digging holes and planting trees such as augers, dibble bars, planting shovel, hoe-dad. Equipment only. Labor not included. | Hour | $12.04 | 2 | $24.08 |
| **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. | Hour | $18.93 | 2 | $37.86 |
| Equipment Operators, Light | 232 | Includes: Skid Steer Loaders, Hydraulic Excavators <50 HP, Trenchers <12", Ag Equipment <150 HP, Pickup Trucks, Forklifts, Mulchers | Hour | $21.14 | 1 | $21.14 |
| **Materials** | | | | | | |
| Shrub, seedling or transplant, bare root, 18"-36" | 1507 | Bare root hardwood trees 18-36" tall. Includes materials and shipping only. | Each | $0.58 | 166 | $96.28 |
| Tree, hardwood, seedling or transplant, bare root, 16-36" | 1510 | Bare root hardwood trees 18-36" tall. Includes materials and shipping only. | Each | $0.31 | 66 | $20.46 |
| Tree shelter, solid tube type, 3-1/4" x 36" | 1561 | 3-1/4" x 36" tree tube for protection from animal damage. Materials only. | Each | $2.68 | 166 | $444.88 |

**Practice:** 422 - Hedgerow Planting

**Scenario** #4 - Wildlife - Trees-Shrubs-NWSG

**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: corridors for 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 - ten foot intervals (this will vary with species selection and density goals). A mix of at least 3 native warm season grasses (NWSG) and forbs 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 corridors of 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 and width of Hedgerow

**Scenario Unit::** Foot

**Scenario Typical Size:** 660

**Total Scenario Cost:** $836.83

**Scenario Cost/Unit:** $1.27

**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. | Acre | $15.10 | 0.33 | $4.98 |
| Seeding Operation, No Till/Grass Drill | 960 | No Till drill or grass drill for seeding. Includes equipment, power unit and labor costs. | Acre | $19.43 | 0.33 | $6.41 |
| Tractor, agricultural, 120 HP | 962 | Agricultural tractor with horsepower range of 90 to 140. Equipment and power unit costs. Labor not included. | Hour | $52.49 | 2 | $104.98 |
| Hand tools, tree planting | 1590 | Various hand tools for digging holes and planting trees such as augers, dibble bars, planting shovel, hoe-dad. Equipment only. Labor not included. | Hour | $12.04 | 2 | $24.08 |
| **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. | Hour | $18.93 | 2 | $37.86 |
| Equipment Operators, Light | 232 | Includes: Skid Steer Loaders, Hydraulic Excavators <50 HP, Trenchers <12", Ag Equipment <150 HP, Pickup Trucks, Forklifts, Mulchers | Hour | $21.14 | 2 | $42.28 |
| **Materials** | | | | | | |
| Shrub, seedling or transplant, bare root, 18"-36" | 1507 | Bare root hardwood trees 18-36" tall. Includes materials and shipping only. | Each | $0.58 | 166 | $96.28 |
| Tree, hardwood, seedling or transplant, bare root, 16-36" | 1510 | Bare root hardwood trees 18-36" tall. Includes materials and shipping only. | Each | $0.31 | 66 | $20.46 |
| Tree shelter, solid tube type, 3-1/4" x 36" | 1561 | 3-1/4" x 36" tree tube for protection from animal damage. Materials only. | Each | $2.68 | 166 | $444.88 |
| One Species, Warm Season, Native Perennial Grass | 2322 | Native, warm season perennial grass. Includes material and shipping only. | Acre | $70.93 | 0.33 | $23.41 |
| Two Species Mix, Warm Season, Native Perennial Grass | 2325 | Native, warm season perennial grass. Includes material and shipping only. | Acre | $94.57 | 0.33 | $31.21 |

**Practice:** 422 - Hedgerow Planting

**Scenario** #5 - Visual-Odor Screen

**Scenario Description:**

Where aesthetics and/or air quality is a resource concern, vegetative barriers are needed to provide visual and/or odor screens. This scenario also 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 year round cover and seasonal foods by establishing a diverse mixture of plants. Typical installation is in or at the edge of ag fields, farm headquarters, and/or confined livestock facilities. Two offset rows of evergreen conifers are planted at 10 ft. intervals to provide a year round visual and/or odor screen. 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). 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 desired. If a fence is needed to facilitate establishment use practice 382, Fence.

**Before Situation:**

Line of Sight and/or unpleasant odors are unimpeded due to lack of protective vegetative cover. Wildlife have inadequate escape/roosting and feeding cover.

**After Situation:**

Year round protective cover provides visual and/or odor screens as well as wildlife escape/roosting habitat and seasonal foods.

**Feature Measure:** Length and width of Hedgerow

**Scenario Unit::** Foot

**Scenario Typical Size:** 660

**Total Scenario Cost:** $699.75

**Scenario Cost/Unit:** $1.06

**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. | Acre | $15.10 | 1 | $15.10 |
| Tractor, agricultural, 120 HP | 962 | Agricultural tractor with horsepower range of 90 to 140. Equipment and power unit costs. Labor not included. | Hour | $52.49 | 1 | $52.49 |
| Hand tools, tree planting | 1590 | Various hand tools for digging holes and planting trees such as augers, dibble bars, planting shovel, hoe-dad. Equipment only. Labor not included. | Hour | $12.04 | 2 | $24.08 |
| **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. | Hour | $18.93 | 2 | $37.86 |
| Equipment Operators, Light | 232 | Includes: Skid Steer Loaders, Hydraulic Excavators <50 HP, Trenchers <12", Ag Equipment <150 HP, Pickup Trucks, Forklifts, Mulchers | Hour | $21.14 | 1 | $21.14 |
| **Materials** | | | | | | |
| Shrub, seedling or transplant, bare root, 18"-36" | 1507 | Bare root hardwood trees 18-36" tall. Includes materials and shipping only. | Each | $0.58 | 166 | $96.28 |
| Tree, conifer, seedling, bare root, 1-0 | 1512 | Bare root conifer trees, 1-0 (1 year old). Includes materials and shipping only. | Each | $0.06 | 132 | $7.92 |
| Tree shelter, solid tube type, 3-1/4" x 36" | 1561 | 3-1/4" x 36" tree tube for protection from animal damage. Materials only. | Each | $2.68 | 166 | $444.88 |

**Practice:** 430 - Irrigation Pipeline

**Scenario** #1 - PVC, Iron Pipe Size, Less Than 2in Micro

**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 1 ½-inch. Construct 260' of 1-inch, Class 125 (SDR-32.5), PVC pipeline with appurtenances, installed below ground with a minimum of 2 feet of ground cover. 260' of 1½ inch, Class 125 (SDR-32.5) PVC pipe weighs 0.227 lb/ft, or a total of 59.02 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:**

Pipeline installed to convey and/or distribute water to micro-irrigation systems, minimizing non-beneficial water use, reducing soil erosion, and/or reducing energy use.

**Feature Measure:** Length of Pipe

**Scenario Unit::** Foot

**Scenario Typical Size:** 260

**Total Scenario Cost:** $1,186.14

**Scenario Cost/Unit:** $4.56

**Cost Details:**

| Component Name | ID | Description | Unit | Cost | QTY | Total |
|---|---|---|---|---|---|---|
| **Equipment Installation** | | | | | | |
| Trencher, 8" | 936 | Equipment and power unit costs. Labor not included. | Hour | $81.72 | 6 | $490.32 |
| **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. | Hour | $18.93 | 6 | $113.58 |
| **Materials** | | | | | | |
| Pipe, PVC, dia. < 18", weight priced | 1323 | Polyvinyl Chloride (PVC) pressure rated pipe priced by the weight of the pipe materials for pipes with diameters less than 18". Materials only. | Pound | $1.80 | 64.9 | $116.82 |
| **Mobilization** | | | | | | |
| Mobilization, medium equipment | 1139 | Equipment with 70-150 HP or typical weights between 14,000 and 30,000 pounds. | Each | $232.71 | 2 | $465.42 |

**Practice:** 430 - Irrigation Pipeline

**Scenario** #2 - PVC, Iron Pipe Size, 2in - less than 4in Micro

**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 3-inch. Construct 260 feet of 3-inch, Class 125 (SDR-32.5), PVC pipeline with appurtenances, installed below ground with a minimum of 2 feet of ground cover. The unit is weight of pipe material in pounds. 260 feet of 3-inch, Class 125 (SDR-32.5) PVC pipe weighs .730 lb/ft, or a total of 189.8 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:**

Pipeline installed to convey and/or distribute water to micro-irrigation systems, minimizing non-beneficial water use, reducing soil erosion, and/or reducing energy use.

**Feature Measure:** Length of Pipe

**Scenario Unit::** Foot

**Scenario Typical Size:** 260

**Total Scenario Cost:** $1,445.12

**Scenario Cost/Unit:** $5.56

**Cost Details:**

| Component Name | ID | Description | Unit | Cost | QTY | Total |
|---|---|---|---|---|---|---|
| **Equipment Installation** | | | | | | |
| Trencher, 8" | 936 | Equipment and power unit costs. Labor not included. | Hour | $81.72 | 6 | $490.32 |
| **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. | Hour | $18.93 | 6 | $113.58 |
| **Materials** | | | | | | |
| Pipe, PVC, dia. < 18", weight priced | 1323 | Polyvinyl Chloride (PVC) pressure rated pipe priced by the weight of the pipe materials for pipes with diameters less than 18". Materials only. | Pound | $1.80 | 208.78 | $375.80 |
| **Mobilization** | | | | | | |
| Mobilization, medium equipment | 1139 | Equipment with 70-150 HP or typical weights between 14,000 and 30,000 pounds. | Each | $232.71 | 2 | $465.42 |

**Practice:** 430 - Irrigation Pipeline

**Scenario** #3 - PVC, Iron Pipe Size, 4in - 6in Micro

**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 5-inch. Construct 260 feet of 5-inch, Class 125 (SDR-32.5), PVC pipeline with appurtenances, installed below ground with a minimum of 2 feet of ground cover. The unit is weight of pipe material in pounds. 260 feet of 5-inch, Class 125 (SDR-32.5) PVC pipe weighs 1.810 lb/ft, or a total of 470.6 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:**

Pipeline installed to convey and/or distribute water to micro-irrigation systems, minimizing non-beneficial water use, reducing soil erosion, and/or reducing energy use.

**Feature Measure:** Length of Pipe

**Scenario Unit::** Foot

**Scenario Typical Size:** 260

**Total Scenario Cost:** $2,001.11

**Scenario Cost/Unit:** $7.70

**Cost Details:**

| Component Name | ID | Description | Unit | Cost | QTY | Total |
|---|---|---|---|---|---|---|
| **Equipment Installation** | | | | | | |
| Trencher, 8" | 936 | Equipment and power unit costs. Labor not included. | Hour | $81.72 | 6 | $490.32 |
| **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. | Hour | $18.93 | 6 | $113.58 |
| **Materials** | | | | | | |
| Pipe, PVC, dia. < 18", weight priced | 1323 | Polyvinyl Chloride (PVC) pressure rated pipe priced by the weight of the pipe materials for pipes with diameters less than 18". Materials only. | Pound | $1.80 | 517.66 | $931.79 |
| **Mobilization** | | | | | | |
| Mobilization, medium equipment | 1139 | Equipment with 70-150 HP or typical weights between 14,000 and 30,000 pounds. | Each | $232.71 | 2 | $465.42 |

**Practice:** 430 - Irrigation Pipeline

**Scenario** #4 - PVC, Iron Pipe Size, 8in Micro

**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 8-inch. Construct 260 feet of 8-inch, Class 125 (SDR-32.5), PVC pipeline with appurtenances, installed below ground with a minimum of 2 feet of ground cover. The unit is weight of pipe material in pounds. 260 feet of 8-inch, Class 125 (SDR-32.5) PVC pipe weighs 4.348 lb/ft, or a total of 1130.5 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:**

Pipeline installed to convey and/or distribute water to micro-irrigation systems, minimizing non-beneficial water use, reducing soil erosion, and/or reducing energy use.

**Feature Measure:** Length of Pipe

**Scenario Unit::** Foot

**Scenario Typical Size:** 260

**Total Scenario Cost:** $3,118.90

**Scenario Cost/Unit:** $12.00

**Cost Details:**

| Component Name | ID | Description | Unit | Cost | QTY | Total |
|---|---|---|---|---|---|---|
| **Equipment Installation** | | | | | | |
| Trenching, Earth, 12" x 48" | 53 | Trenching, earth, 12" wide x 48" depth, includes equipment and labor for trenching and backfilling | Foot | $1.16 | 260 | $301.60 |
| **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. | Hour | $18.93 | 6 | $113.58 |
| **Materials** | | | | | | |
| Pipe, PVC, dia. < 18", weight priced | 1323 | Polyvinyl Chloride (PVC) pressure rated pipe priced by the weight of the pipe materials for pipes with diameters less than 18". Materials only. | Pound | $1.80 | 1243.5 | $2,238.30 |
| **Mobilization** | | | | | | |
| Mobilization, medium equipment | 1139 | Equipment with 70-150 HP or typical weights between 14,000 and 30,000 pounds. | Each | $232.71 | 2 | $465.42 |

**Practice:** 430 - Irrigation Pipeline

**Scenario** #5 - PVC, Iron Pipe Size, 6in - 8in Sprinkler

**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 360 feet of 8-inch, Class 160 (SDR-26), PVC pipeline with appurtenances, installed below ground with a minimum of 2 feet of ground cover. The unit is weight of pipe material in pounds. 360 feet of 8-inch, Class 160 (SDR-26) PVC pipe weighs 5.401 lb/ft, or a total of 1944.4 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:**

Pipeline installed to convey and/or distribute water to Sprinkler-irrigation systems, minimizing non-beneficial water use, reducing soil erosion, and/or reducing energy use.

**Feature Measure:** Length of Pipe

**Scenario Unit::** Foot

**Scenario Typical Size:** 360

**Total Scenario Cost:** $4,903.23

**Scenario Cost/Unit:** $13.62

**Cost Details:**

| Component Name | ID | Description | Unit | Cost | QTY | Total |
|---|---|---|---|---|---|---|
| **Equipment Installation** | | | | | | |
| Trenching, Earth, 12" x 48" | 53 | Trenching, earth, 12" wide x 48" depth, includes equipment and labor for trenching and backfilling | Foot | $1.16 | 360 | $417.60 |
| **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. | Hour | $18.93 | 9 | $170.37 |
| **Materials** | | | | | | |
| Pipe, PVC, dia. < 18", weight priced | 1323 | Polyvinyl Chloride (PVC) pressure rated pipe priced by the weight of the pipe materials for pipes with diameters less than 18". Materials only. | Pound | $1.80 | 2138.8 | $3,849.84 |
| **Mobilization** | | | | | | |
| Mobilization, medium equipment | 1139 | Equipment with 70-150 HP or typical weights between 14,000 and 30,000 pounds. | Each | $232.71 | 2 | $465.42 |

**Practice:** 430 - Irrigation Pipeline

**Scenario** #6 - PVC, Iron Pipe Size, 10in Sprinkler

**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 360 feet of 10-inch, Class 160 (SDR-26), PVC pipeline with appurtenances, installed below ground with a minimum of 2 feet of ground cover. The unit is weight of pipe material in pounds. 360 feet of 10-inch, Class 160 (SDR-26) PVC pipe weighs 8.376 lb/ft, or a total of 3015.4 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:**

Pipeline installed to convey and/or distribute water to Sprinkler-irrigation systems, minimizing non-beneficial water use, reducing soil erosion, and/or reducing energy use.

**Feature Measure:** Length of Pipe

**Scenario Unit::** Foot

**Scenario Typical Size:** 360

**Total Scenario Cost:** $7,023.81

**Scenario Cost/Unit:** $19.51

**Cost Details:**

| Component Name | ID | Description | Unit | Cost | QTY | Total |
|---|---|---|---|---|---|---|
| **Equipment Installation** | | | | | | |
| Trenching, Earth, 12" x 48" | 53 | Trenching, earth, 12" wide x 48" depth, includes equipment and labor for trenching and backfilling | Foot | $1.16 | 360 | $417.60 |
| **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. | Hour | $18.93 | 9 | $170.37 |
| **Materials** | | | | | | |
| Pipe, PVC, dia. < 18", weight priced | 1323 | Polyvinyl Chloride (PVC) pressure rated pipe priced by the weight of the pipe materials for pipes with diameters less than 18". Materials only. | Pound | $1.80 | 3316.9 | $5,970.42 |
| **Mobilization** | | | | | | |
| Mobilization, medium equipment | 1139 | Equipment with 70-150 HP or typical weights between 14,000 and 30,000 pounds. | Each | $232.71 | 2 | $465.42 |

**Practice:** 430 - Irrigation Pipeline

**Scenario** #7 - PVC, Plastic Irrigation Pipe, less than or equal to 10in

**Scenario Description:**

Description: Below ground installation of PVC (Plastic Irrigation Pipe) pipeline. PVC (PIP) is manufactured in sizes (nominal diameter) from 4-inch to 27-inch; typical practice sizes range from 4-inch to 24-inch; and typical scenario size is 8-inch. Construct 1/4 mile (1,320 feet) of 8-inch, Class 50 (SDR-81.0), PVC PIP with appurtenances, installed below ground with a minimum of 2 feet of ground cover. The unit is weight of pipe in pounds. 1,320 feet of 8-inch, Class 50 (SDR-81.0) PVC PIP weighs 2.515 lb/ft, or a total of 3319.8 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:**

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:** Length of pipe

**Scenario Unit::** Foot

**Scenario Typical Size:** 1320

**Total Scenario Cost:** $9,478.50

**Scenario Cost/Unit:** $7.18

**Cost Details:**

| Component Name | ID | Description | Unit | Cost | QTY | Total |
|---|---|---|---|---|---|---|
| **Equipment Installation** | | | | | | |
| Trenching, Earth, 12" x 48" | 53 | Trenching, earth, 12" wide x 48" depth, includes equipment and labor for trenching and backfilling | Foot | $1.16 | 1320 | $1,531.20 |
| **Labor** | | | | | | |
| General Labor | 231 | Labor performed using basic tools such as power tool, shovels, and other tools that do not require extensive training. Ex. pipe layer, herder, concrete placement, materials spreader, flagger, etc. | Hour | $18.93 | 48 | $908.64 |
| **Materials** | | | | | | |
| Pipe, PVC, dia. < 18", weight priced | 1323 | Polyvinyl Chloride (PVC) pressure rated pipe priced by the weight of the pipe materials for pipes with diameters less than 18". Materials only. | Pound | $1.80 | 3651.8 | $6,573.24 |
| **Mobilization** | | | | | | |
| Mobilization, medium equipment | 1139 | Equipment with 70-150 HP or typical weights between 14,000 and 30,000 pounds. | Each | $232.71 | 2 | $465.42 |

**Practice:** 430 - Irrigation Pipeline

**Scenario** #8 - PVC, Plastic Irrigation Pipe, 12in

**Scenario Description:**

Description: Below ground installation of PVC (Plastic Irrigation Pipe) pipeline. PVC (PIP) is manufactured in sizes (nominal diameter) from 4-inch to 27-inch; typical practice sizes range from 4-inch to 24-inch; and typical scenario size is 12-inch. Construct 1/4 mile (1,320 feet) of 12-inch, Class 80 (SDR-51.0) , PVC PIP with appurtenances, installed below ground with a minimum of 2 feet of ground cover. The unit is weight of pipe in pounds. 1,320 feet of 12-inch, Class 80 (SDR-51.0) PVC PIP weighs 5.654 lb/ft, or a total of 7,463 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:**

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:** Length of pipe

**Scenario Unit::** Foot

**Scenario Typical Size:** 1320

**Total Scenario Cost:** $19,674.66

**Scenario Cost/Unit:** $14.91

**Cost Details:**

| Component Name | ID | Description | Unit | Cost | QTY | Total |
|---|---|---|---|---|---|---|
| **Equipment Installation** | | | | | | |
| Trenching, Earth, loam, 24" x 48" | 54 | Trenching, earth, loam, 24" wide x 48" depth, includes equipment and labor for trenching and backfilling | Foot | $2.67 | 1320 | $3,524.40 |
| **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. | Hour | $18.93 | 48 | $908.64 |
| **Materials** | | | | | | |
| Pipe, PVC, dia. < 18", weight priced | 1323 | Polyvinyl Chloride (PVC) pressure rated pipe priced by the weight of the pipe materials for pipes with diameters less than 18". Materials only. | Pound | $1.80 | 8209 | $14,776.20 |
| **Mobilization** | | | | | | |
| Mobilization, medium equipment | 1139 | Equipment with 70-150 HP or typical weights between 14,000 and 30,000 pounds. | Each | $232.71 | 2 | $465.42 |

**Practice:** 430 - Irrigation Pipeline

**Scenario** #9 - PVC, Plastic Irrigation Pipe, 15in

**Scenario Description:**

Description: Below ground installation of PVC (Plastic Irrigation Pipe) pipeline. PVC (PIP) is manufactured in sizes (nominal diameter) from 4-inch to 27-inch; typical practice sizes range from 4-inch to 24-inch; and typical scenario size is 15-inch. Construct 1/4 mile (1,320 feet) of 15-inch, Class 80 (SDR-51.0) , PVC PIP with appurtenances, installed below ground with a minimum of 2 feet of ground cover. The unit is weight of pipe in pounds. 1,320 feet of 15-inch, Class 80 (SDR-51.0) PVC PIP weighs 8.874 lb/ft, or a total of 11,713.7 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:**

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:** Length of pipe

**Scenario Unit::** Foot

**Scenario Typical Size:** 1320

**Total Scenario Cost:** $28,091.46

**Scenario Cost/Unit:** $21.28

**Cost Details:**

| Component Name | ID | Description | Unit | Cost | QTY | Total |
|---|---|---|---|---|---|---|
| **Equipment Installation** | | | | | | |
| Trenching, Earth, loam, 24" x 48" | 54 | Trenching, earth, loam, 24" wide x 48" depth, includes equipment and labor for trenching and backfilling | Foot | $2.67 | 1320 | $3,524.40 |
| **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. | Hour | $18.93 | 48 | $908.64 |
| **Materials** | | | | | | |
| Pipe, PVC, dia. < 18", weight priced | 1323 | Polyvinyl Chloride (PVC) pressure rated pipe priced by the weight of the pipe materials for pipes with diameters less than 18". Materials only. | Pound | $1.80 | 12885 | $23,193.00 |
| **Mobilization** | | | | | | |
| Mobilization, medium equipment | 1139 | Equipment with 70-150 HP or typical weights between 14,000 and 30,000 pounds. | Each | $232.71 | 2 | $465.42 |

**Practice:** 430 - Irrigation Pipeline

**Scenario** #10 - PVC, Plastic Irrigation Pipe, 18in

**Scenario Description:**

Description: Below ground installation of PVC (Plastic Irrigation Pipe) pipeline. PVC (PIP) is manufactured in sizes (nominal diameter) from 4-inch to 27-inch; typical practice sizes range from 4-inch to 24-inch; and typical scenario size is 18-inch. Construct 1/4 mile (1,320 feet) of 18-inch, Class 80 (SDR-51.0) , PVC PIP with appurtenances, installed below ground with a minimum of 3 feet of ground cover. The unit is weight of pipe in pounds. 1,320 feet of 18-inch, Class 80 (SDR-51.0) PVC PIP weighs 13.67 lb/ft, or a total of 18,044.40 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:**

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:** Length of pipe

**Scenario Unit::** Foot

**Scenario Typical Size:** 1320

**Total Scenario Cost:** $40,626.66

**Scenario Cost/Unit:** $30.78

**Cost Details:**

| Component Name | ID | Description | Unit | Cost | QTY | Total |
|---|---|---|---|---|---|---|
| **Equipment Installation** | | | | | | |
| Trenching, Earth, loam, 24" x 48" | 54 | Trenching, earth, loam, 24" wide x 48" depth, includes equipment and labor for trenching and backfilling | Foot | $2.67 | 1320 | $3,524.40 |
| **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. | Hour | $18.93 | 48 | $908.64 |
| **Materials** | | | | | | |
| Pipe, PVC, dia. < 18", weight priced | 1323 | Polyvinyl Chloride (PVC) pressure rated pipe priced by the weight of the pipe materials for pipes with diameters less than 18". Materials only. | Pound | $1.80 | 19849 | $35,728.20 |
| **Mobilization** | | | | | | |
| Mobilization, medium equipment | 1139 | Equipment with 70-150 HP or typical weights between 14,000 and 30,000 pounds. | Each | $232.71 | 2 | $465.42 |

**Practice:** 430 - Irrigation Pipeline

**Scenario** #11 - PVC, Plastic Irrigation Pipe, 21in or Greater

**Scenario Description:**

Description: Below ground installation of PVC (Plastic Irrigation Pipe) pipeline. PVC (PIP) is manufactured in sizes (nominal diameter) from 4-inch to 27-inch; typical practice sizes range from 4-inch to 24-inch; and typical scenario size is 21-inch. Construct 1/4 mile (1,320 feet) of 21-inch, Class 80 (SDR-51.0), PVC PIP with appurtenances, installed below ground with a minimum of 2 feet of ground cover. The unit is weight of pipe in pounds. 1,320 feet of 21-inch, Class 80 (SDR-51.0) PVC PIP weighs 19.01 lb/ft, or a total of 25,009 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:**

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:** Length of pipe

**Scenario Unit::** Foot

**Scenario Typical Size:** 1320

**Total Scenario Cost:** $51,115.26

**Scenario Cost/Unit:** $38.72

**Cost Details:**

| Component Name | ID | Description | Unit | Cost | QTY | Total |
|---|---|---|---|---|---|---|
| **Equipment Installation** | | | | | | |
| Trenching, Earth, loam, 24" x 48" | 54 | Trenching, earth, loam, 24" wide x 48" depth, includes equipment and labor for trenching and backfilling | Foot | $2.67 | 1320 | $3,524.40 |
| **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. | Hour | $18.93 | 48 | $908.64 |
| **Materials** | | | | | | |
| Pipe, steel, smooth wall, galvanized, weight priced | 1381 | Steel manufactured into galvanized smooth wall pipe | Pound | $1.68 | 27510 | $46,216.80 |
| **Mobilization** | | | | | | |
| Mobilization, medium equipment | 1139 | Equipment with 70-150 HP or typical weights between 14,000 and 30,000 pounds. | Each | $232.71 | 2 | $465.42 |

**Practice:** 430 - Irrigation Pipeline

**Scenario** #12 - Steel, IPS, Stream or Road Crossing Sleeve

**Scenario Description:**

Description: Steel (Iron Pipe Size) sleeve for PVC underground pipeline, either crossing a stream or crossing a county, city, state road. Steel (IPS) is manufactured in sizes (nominal diameter) from ½-inch to 36-inch; typical practice sizes range from 2-inch to 18-inch; and typical scenario size is 18-inch. Construct 60 ft of 18-inch, Schedule 10, Galvanized Steel Pipe across a stream as a sleeve for a PVC underground pipeline. The unit is the weight of pipe material in pounds. 60 feet of 18-inch, Schedule 10, Galvanized Steel Pipe weighs 47.39 lb/ft, for total of 2843.4 pounds. 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 section needed to cross a stream or a road that is needing a steel sleeve for protection 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:** Length of Pipe

**Scenario Unit::** Foot

**Scenario Typical Size:** 60

**Total Scenario Cost:** $6,115.81

**Scenario Cost/Unit:** $101.93

**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. | Hour | $50.99 | 4 | $203.96 |
| Dozer, 80 HP | 929 | Track mounted Dozer with horsepower range of 60 to 90. Equipment and power unit costs. Labor not included. | Hour | $60.16 | 4 | $240.64 |
| Truck, Pickup | 939 | Equipment and power unit costs. Labor not included. | Hour | $19.82 | 2 | $39.64 |
| Portable Welder | 1407 | Portable field welder. Equipment only. Labor not included. | Hour | $18.57 | 4 | $74.28 |
| **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. | Hour | $25.08 | 4 | $100.32 |
| Equipment Operators, Heavy | 233 | Includes: Cranes, Hydraulic Excavators >=50 HP, Dozers, Paving Machines, Rock Trenchers, Trenchers >=12", Dump Trucks, Ag Equipment >=150 HP, Scrapers, Water Wagons. | Hour | $23.93 | 4 | $95.72 |
| Equipment Operators, Heavy | 233 | Includes: Cranes, Hydraulic Excavators >=50 HP, Dozers, Paving Machines, Rock Trenchers, Trenchers >=12", Dump Trucks, Ag Equipment >=150 HP, Scrapers, Water Wagons. | Hour | $23.93 | 4 | $95.72 |
| **Materials** | | | | | | |
| Pipe, smooth steel, weight priced | 1325 | Smooth Steel pipe priced by the weight of the pipe materials. Materials only. | Pound | $1.77 | 2843.4 | $5,032.82 |
| **Mobilization** | | | | | | |
| Mobilization, medium equipment | 1139 | Equipment with 70-150 HP or typical weights between 14,000 and 30,000 pounds. | Each | $232.71 | 1 | $232.71 |

**Practice:** 430 - Irrigation Pipeline

**Scenario** #13 - Steel, IPS, RoadXing Sleeve with Boring

**Scenario Description:**

Description: Steel (Iron Pipe Size) sleeve for PVC underground pipeline. Steel (IPS) is manufactured in sizes (nominal diameter) from ½-inch to 36-inch; typical practice sizes range from 2-inch to 18-inch; and typical scenario size is 18-inch. Bore across a county road, state highway or interstate with 60 ft of 18-inch, Schedule 10, Galvanized Steel Pipe as a sleeve for a PVC underground pipeline. The unit is the weight of pipe material in pounds. 60 feet of 18-inch, Schedule 10, Galvanized Steel Pipe weighs 47.39 lb/ft, for total of 2843.4 pounds. 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:** Length of Pipe

**Scenario Unit::** Foot

**Scenario Typical Size:** 60

**Total Scenario Cost:** $10,700.79

**Scenario Cost/Unit:** $178.35

**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. | Hour | $50.99 | 6 | $305.94 |
| Truck, Pickup | 939 | Equipment and power unit costs. Labor not included. | Hour | $19.82 | 2 | $39.64 |
| Horizontal Boring, Greater Than 3" diameter | 1132 | Includes equipment, labor and setup. | Foot | $78.07 | 60 | $4,684.20 |
| Portable Welder | 1407 | Portable field welder. Equipment only. Labor not included. | Hour | $18.57 | 6 | $111.42 |
| **Labor** | | | | | | |
| Skilled Labor | 230 | Labor requiring a high level skill set: Includes carpenters, welders, electricians, conservation professionals involved with data collection, monitoring, and or record keeping, etc. | Hour | $25.08 | 6 | $150.48 |
| Equipment Operators, Heavy | 233 | Includes: Cranes, Hydraulic Excavators >=50 HP, Dozers, Paving Machines, Rock Trenchers, Trenchers >=12", Dump Trucks, Ag Equipment >=150 HP, Scrapers, Water Wagons. | Hour | $23.93 | 6 | $143.58 |
| **Materials** | | | | | | |
| Pipe, smooth steel, weight priced | 1325 | Smooth Steel pipe priced by the weight of the pipe materials. Materials only. | Pound | $1.77 | 2843.4 | $5,032.82 |
| **Mobilization** | | | | | | |
| Mobilization, medium equipment | 1139 | Equipment with 70-150 HP or typical weights between 14,000 and 30,000 pounds. | Each | $232.71 | 1 | $232.71 |

**Practice:** 430 - Irrigation Pipeline

**Scenario** #14 - Stand Pipe, Steel,IPS

**Scenario Description:**

Description: New or replacement of Steel (Iron Pipe Size) stand or manifold. Steel (IPS) is manufactured in sizes (nominal diameter) from ½-inch to 36-inch; typical practice sizes range from 16-inch to 36-inch; and typical scenario size is 30-inch. Fabricate and install 8 ft of 30-inch, Schedule 10, Galvanized Steel Pipe stand/manifold at a well, relift pump or within a pipeline . The unit is the weight of pipe material in pounds. 8 feet of 30-inch, Schedule 10, Galvanized Steel Pipe weighs 98.93 lb/ft, for total of 791.4 pounds. Appurtenances include: fittings, air vents, and pressure relief valves, and are included in the cost of pipe material (additional 10% of pipe material quantity). 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:**

An old undersizes stand pipe/manifold in need of replacing or no stand pipe/manifold currently in place.

**After Situation:**

Stand pipe/Manifold installed either at a well, relift or at a junction of several underground pipelines.

**Feature Measure:** Length of Pipe

**Scenario Unit::** Foot

**Scenario Typical Size:** 8

**Total Scenario Cost:** $2,543.34

**Scenario Cost/Unit:** $317.92

**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. | Hour | $50.99 | 6 | $305.94 |
| Truck, Pickup | 939 | Equipment and power unit costs. Labor not included. | Hour | $19.82 | 2 | $39.64 |
| Portable Welder | 1407 | Portable field welder. Equipment only. Labor not included. | Hour | $18.57 | 6 | $111.42 |
| **Labor** | | | | | | |
| Skilled Labor | 230 | Labor requiring a high level skill set: Includes carpenters, welders, electricians, conservation professionals involved with data collection, monitoring, and or record keeping, etc. | Hour | $25.08 | 6 | $150.48 |
| Equipment Operators, Heavy | 233 | Includes: Cranes, Hydraulic Excavators >=50 HP, Dozers, Paving Machines, Rock Trenchers, Trenchers >=12", Dump Trucks, Ag Equipment >=150 HP, Scrapers, Water Wagons. | Hour | $23.93 | 6 | $143.58 |
| **Materials** | | | | | | |
| Steel, Plate, 1/8" | 1047 | Flat Steel Plate, 1/8" thick, materials only. | Square Foot | $3.79 | 4.91 | $18.61 |
| Pipe, smooth steel, weight priced | 1325 | Smooth Steel pipe priced by the weight of the pipe materials. Materials only. | Pound | $1.77 | 870.6 | $1,540.96 |
| **Mobilization** | | | | | | |
| Mobilization, medium equipment | 1139 | Equipment with 70-150 HP or typical weights between 14,000 and 30,000 pounds. | Each | $232.71 | 1 | $232.71 |

**Practice:** 430 - Irrigation Pipeline

**Scenario** #15 - Dog Leg, Steel, IPS

**Scenario Description:**

Description: New or replacement of Steel (Iron Pipe Size) stand or manifold. Steel (IPS) is manufactured in sizes (nominal diameter) from ½-inch to 36-inch; typical practice sizes range from 10-inch to 18-inch; and typical scenario size is 12-inch. Fabricate and install 12 ft of 12-inch, Schedule 10, Galvanized Steel Pipe dogleg/z pipe at a well or relift pump. The unit is the weight of pipe material in pounds. 12 feet of 12-inch, Schedule 10, Galvanized Steel Pipe weighs 24.16 lb/ft, for total of 289.9 pounds. Appurtenances include: fittings, air vents, and pressure relief valves, and are included in the cost of pipe material (additional 10% of pipe material quantity).

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:**

Irrigation Water is supplied from a well or pump that is either too small, old or in a depleted ground water area and an alternative irrigation sources is needed to supply water to the crops.

**After Situation:**

A new irrigation pump is being installed and a transition of a dogleg (Z pipe) is needed to connect the pump to existing or new undergroud pipe.

**Feature Measure:** Length of Pipe

**Scenario Unit::** Foot

**Scenario Typical Size:** 18

**Total Scenario Cost:** $1,830.54

**Scenario Cost/Unit:** $101.70

**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. | Hour | $50.99 | 6 | $305.94 |
| Truck, Pickup | 939 | Equipment and power unit costs. Labor not included. | Hour | $19.82 | 2 | $39.64 |
| Portable Welder | 1407 | Portable field welder. Equipment only. Labor not included. | Hour | $18.57 | 6 | $111.42 |
| **Labor** | | | | | | |
| Skilled Labor | 230 | Labor requiring a high level skill set: Includes carpenters, welders, electricians, conservation professionals involved with data collection, monitoring, and or record keeping, etc. | Hour | $25.08 | 6 | $150.48 |
| Equipment Operators, Heavy | 233 | Includes: Cranes, Hydraulic Excavators >=50 HP, Dozers, Paving Machines, Rock Trenchers, Trenchers >=12", Dump Trucks, Ag Equipment >=150 HP, Scrapers, Water Wagons. | Hour | $23.93 | 6 | $143.58 |
| **Materials** | | | | | | |
| Pipe, smooth steel, weight priced | 1325 | Smooth Steel pipe priced by the weight of the pipe materials. Materials only. | Pound | $1.77 | 478.4 | $846.77 |
| **Mobilization** | | | | | | |
| Mobilization, medium equipment | 1139 | Equipment with 70-150 HP or typical weights between 14,000 and 30,000 pounds. | Each | $232.71 | 1 | $232.71 |

**Practice:** 430 - Irrigation Pipeline

**Scenario** #16 - Dog Leg, PVC, IPS

**Scenario Description:**

Description: New or replacement of PVC (Iron Pipe Size) dogleg. PVC (IPS) is manufactured in sizes (nominal diameter) from ½-inch to 36-inch; typical practice sizes range from 10-inch to 18-inch; and typical scenario size is 12-inch. Fabricate and install 25 ft of 12-inch, Schedule 40, PVC IPS dogleg/z pipe at a well or relift pump. The unit is the weight of pipe material in pounds. 25 feet of 12-inch, Schedule 40, PVC weighs 10.110 lb/ft, for total of 252.75 pounds. Appurtenances include: fittings, air vents, and pressure relief valves, and are included in the cost of pipe material (additional 10% of pipe material quantity). 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:**

Irrigation Water is supplied from a well or pump that is either too small, old or in a depleted ground water area and an alternative irrigation sources is needed to supply water to the crops.

**After Situation:**

A new irrigation pump is being installed and a transition of a dogleg (Z pipe) is needed to connect the pump to existing or new undergroud pipe.

**Feature Measure:** Length of Pipe

**Scenario Unit::** Foot

**Scenario Typical Size:** 25

**Total Scenario Cost:** $1,301.60

**Scenario Cost/Unit:** $52.06

**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. | Hour | $50.99 | 6 | $305.94 |
| Truck, Pickup | 939 | Equipment and power unit costs. Labor not included. | Hour | $19.82 | 6 | $118.92 |
| **Labor** | | | | | | |
| Equipment Operators, Heavy | 233 | Includes: Cranes, Hydraulic Excavators >=50 HP, Dozers, Paving Machines, Rock Trenchers, Trenchers >=12", Dump Trucks, Ag Equipment >=150 HP, Scrapers, Water Wagons. | Hour | $23.93 | 6 | $143.58 |
| **Materials** | | | | | | |
| Pipe, PVC, dia. < 18", weight priced | 1323 | Polyvinyl Chloride (PVC) pressure rated pipe priced by the weight of the pipe materials for pipes with diameters less than 18". Materials only. | Pound | $1.80 | 278.03 | $500.45 |
| **Mobilization** | | | | | | |
| Mobilization, medium equipment | 1139 | Equipment with 70-150 HP or typical weights between 14,000 and 30,000 pounds. | Each | $232.71 | 1 | $232.71 |

**Practice:** 430 - Irrigation Pipeline

**Scenario** #17 - Intake or Res Discharge, Steel, IPS

**Scenario Description:**

Description: New Steel (Iron Pipe Size) pipe either directly discharging from a pump or from a stand pipe into an above ground reservoir or dual intake pipe for an above gorund reservoir with tailwater pit design or for relift pump in an overly tall embankment. Steel (IPS) is manufactured in sizes (nominal diameter) from ½-inch to 36-inch; typical practice sizes range from 10-inch to 18-inch; and typical scenario size is 12-inch. Fabricate and install 12 ft of 12-inch, "USED" Steel pipe. The unit is the length of pipe material in feet. Appurtenances include: fittings, air vents, and pressure relief valves, and are included in the cost of pipe material (additional 10% of pipe material quantity). 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:**

Irrigation Water is supplied from a well or pump that is either too small, old or in a depleted ground water area and an alternative irrigation sources is needed to supply water to the crops.

**After Situation:**

A pump is installed that will capture excess irrgation and rainfall and lift it into an embankment reservoir. A steel pipe is needed to convey this water directly from the pump or from the stand pipe and discharge it into the embankment reservoir.

**Feature Measure:** Length of Pipe

**Scenario Unit::** Foot

**Scenario Typical Size:** 100

**Total Scenario Cost:** $3,012.63

**Scenario Cost/Unit:** $30.13

**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. | Hour | $50.99 | 4 | $203.96 |
| Truck, Pickup | 939 | Equipment and power unit costs. Labor not included. | Hour | $19.82 | 2 | $39.64 |
| Portable Welder | 1407 | Portable field welder. Equipment only. Labor not included. | Hour | $18.57 | 4 | $74.28 |
| **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. | Hour | $25.08 | 4 | $100.32 |
| Equipment Operators, Heavy | 233 | Includes: Cranes, Hydraulic Excavators >=50 HP, Dozers, Paving Machines, Rock Trenchers, Trenchers >=12", Dump Trucks, Ag Equipment >=150 HP, Scrapers, Water Wagons. | Hour | $23.93 | 4 | $95.72 |
| **Materials** | | | | | | |
| Pipe, Steel, 12", Std Wt, USED | 1356 | Materials: - USED - 12" - Steel Std Wt | Foot | $22.66 | 100 | $2,266.00 |
| **Mobilization** | | | | | | |
| Mobilization, medium equipment | 1139 | Equipment with 70-150 HP or typical weights between 14,000 and 30,000 pounds. | Each | $232.71 | 1 | $232.71 |

**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 Yard

**Scenario Typical Size:** 4500

**Total Scenario Cost:** $21,114.98

**Scenario Cost/Unit:** $4.69

**Cost Details:**

| Component Name | ID | Description | Unit | Cost | QTY | Total |
|---|---|---|---|---|---|---|
| **Equipment Installation** | | | | | | |
| 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 Yard | $3.61 | 4500 | $16,245.00 |
| **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. | Hour | $18.93 | 16 | $302.88 |
| 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. | Hour | $34.29 | 8 | $274.32 |
| **Materials** | | | | | | |
| Pipe, HDPE, CPT, Double Wall, Soil Tight, 12" | 1244 | Pipe, Corrugated HDPE Double Wall, 12" diameter with soil tight joints - AASHTO M294. Material cost only. | Foot | $7.25 | 36 | $261.00 |
| Pipe, HDPE, CPT, Double Wall, Soil Tight, 18" | 1245 | Pipe, Corrugated HDPE Double Wall, 18" diameter with soil tight joints - AASHTO M294. Material cost only. | Foot | $11.18 | 120 | $1,341.60 |
| Screw gate, cast iron, 18" diameter, 10/0 head | 1917 | 18" diameter cast iron screw (canal) gate rated at 10 seating head 0 feet unseating head. Materials only. | Each | $1,056.34 | 1 | $1,056.34 |
| Coupling, HDPE CPT Dual Wall, Tee, 18"x18"x12" | 1921 | Tee, 18"x18"x12" - HDPE CPT Tee. Materials only. | Each | $279.80 | 1 | $279.80 |
| **Mobilization** | | | | | | |
| Mobilization, medium equipment | 1139 | Equipment with 70-150 HP or typical weights between 14,000 and 30,000 pounds. | Each | $232.71 | 2 | $465.42 |
| Mobilization, large equipment | 1140 | Equipment >150HP or typical weights greater than 30,000 pounds or loads requiring over width or over length permits. | Each | $444.31 | 2 | $888.62 |

**Practice:** 436 - Irrigation Reservoir

**Scenario** #2 - Embankment Dam with Off-Site Borrow

**Scenario Description:**

The reservoir, created by an embankment built across a natural depression, with an 18" diameter principal spillway through the embankment, is controlled by a canal-style gate. It will be built with approximately 4,500 cubic yards of material from off the site. It will be about 19.9 feet high and 200 feet long and hold approximately 1,000,000 gallons (3 Ac-Ft.). 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: 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:**

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 off-site sources.

**Feature Measure:** Volume of Compacted Eartfill

**Scenario Unit::** Cubic Yard

**Scenario Typical Size:** 4500

**Total Scenario Cost:** $37,359.98

**Scenario Cost/Unit:** $8.30

**Cost Details:**

| Component Name | ID | Description | Unit | Cost | QTY | Total |
|---|---|---|---|---|---|---|
| **Equipment Installation** | | | | | | |
| 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 Yard | $3.61 | 4500 | $16,245.00 |
| 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 Yard | $3.61 | 4500 | $16,245.00 |
| **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. | Hour | $18.93 | 16 | $302.88 |
| 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. | Hour | $34.29 | 8 | $274.32 |
| **Materials** | | | | | | |
| Pipe, HDPE, CPT, Double Wall, Soil Tight, 12" | 1244 | Pipe, Corrugated HDPE Double Wall, 12" diameter with soil tight joints - AASHTO M294. Material cost only. | Foot | $7.25 | 36 | $261.00 |
| Pipe, HDPE, CPT, Double Wall, Soil Tight, 18" | 1245 | Pipe, Corrugated HDPE Double Wall, 18" diameter with soil tight joints - AASHTO M294. Material cost only. | Foot | $11.18 | 120 | $1,341.60 |
| Screw gate, cast iron, 18" diameter, 10/0 head | 1917 | 18" diameter cast iron screw (canal) gate rated at 10 seating head 0 feet unseating head. Materials only. | Each | $1,056.34 | 1 | $1,056.34 |
| Coupling, HDPE CPT Dual Wall, Tee, 18"x18"x12" | 1921 | Tee, 18"x18"x12" - HDPE CPT Tee. Materials only. | Each | $279.80 | 1 | $279.80 |
| **Mobilization** | | | | | | |
| Mobilization, medium equipment | 1139 | Equipment with 70-150 HP or typical weights between 14,000 and 30,000 pounds. | Each | $232.71 | 2 | $465.42 |
| Mobilization, large equipment | 1140 | Equipment >150HP or typical weights greater than 30,000 pounds or loads requiring over width or over length permits. | Each | $444.31 | 2 | $888.62 |

**Practice:** 436 - Irrigation Reservoir

**Scenario** #3 - Delta Embankment Reservoir

**Scenario Description:**

This is a very large embankment reservoir with a 18" diameter drain pipe 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 a top width of 12ft and centerline length of embankment of 5,280 feet. Average fill of 10 feet and the side slopes will be no steeper than 3 H to 1 V inside and out. It will be built with approximately 105,000 cubic yards of on-site material. It will have a maximum water depth of 8 feet with 2 feet of freeboard and no auxiliary spillway. Volume is approximately 320 ac-ft (104,500,000 gallons). Critical Area Planting and Mulching is required.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 rectangular 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 Compacted Earthfill

**Scenario Unit::** Cubic Yard

**Scenario Typical Size:** 105000

**Total Scenario Cost:** $191,438.41

**Scenario Cost/Unit:** $1.82

**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. | Hour | $176.61 | 30 | $5,298.30 |
| Hydraulic Excavator, 2 CY | 932 | Track mounted hydraulic excavator with bucket capacity range of 1.5 to 2.5 CY. Equipment and power unit costs. Labor not included. | Hour | $149.59 | 4 | $598.36 |
| Truck, Pickup | 939 | Equipment and power unit costs. Labor not included. | Hour | $19.82 | 2 | $39.64 |
| Stripping and stockpiling, topsoil | 1199 | Stripping and stockpiling of topsoil adjacent to stripping area. Includes equipment and labor. | Cubic Yard | $0.81 | 12907 | $10,454.67 |
| Tractor, agricultural, 360 HP | 1205 | Agricultural tractor with horsepower range of 340 to 390. Equipment and power unit costs. Labor not included. | Hour | $142.41 | 630 | $89,718.30 |
| Scraper, pull, 15 CY | 1207 | Pull type earthmoving scraper with 15 CY capacity. Does not include pulling equipment or labor. Add Tractor or Dozer, 260 HP typically required for single scraper. | Hour | $20.98 | 630 | $13,217.40 |
| Portable Welder | 1407 | Portable field welder. Equipment only. Labor not included. | Hour | $18.57 | 8 | $148.56 |
| Scraper, pull, 18 CY | 2093 | Pull type earthmoving scraper with 18 CY capacity. Does not include pulling equipment or labor. Add Tractor or Dozer, 260 HP typically required for single scraper. | Hour | $23.71 | 630 | $14,937.30 |
| **Foregone Income** | | | | | | |
| FI, Rice | 1974 | Rice is Primary Crop | Acre | $569.29 | 40 | $22,771.60 |
| **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. | Hour | $25.08 | 8 | $200.64 |
| 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. | Hour | $18.93 | 16 | $302.88 |
| Equipment Operators, Heavy | 233 | Includes: Cranes, Hydraulic Excavators >=50 HP, Dozers, Paving Machines, Rock Trenchers, Trenchers >=12", Dump Trucks, Ag Equipment >=150 HP, Scrapers, Water Wagons. | Hour | $23.93 | 630 | $15,075.90 |
| Equipment Operators, Heavy | 233 | Includes: Cranes, Hydraulic Excavators >=50 HP, Dozers, Paving Machines, Rock Trenchers, Trenchers >=12", Dump Trucks, Ag Equipment >=150 HP, Scrapers, Water Wagons. | Hour | $23.93 | 4 | $95.72 |

| | | | | | | |
|---|---|---|---|---|---|---|
| Equipment Operators, Heavy | 233 | Includes: Cranes, Hydraulic Excavators >=50 HP, Dozers, Paving Machines, Rock Trenchers, Trenchers >=12", Dump Trucks, Ag Equipment >=150 HP, Scrapers, Water Wagons. | Hour | $23.93 | 15 | $358.95 |
| Supervisor or Manager | 234 | Labor involving supervision or management activities. Includes crew supervisors, foremen and farm/ranch managers time required for adopting new technology, etc. | Hour | $34.29 | 16 | $548.64 |
| **Materials** | | | | | | |
| Pipe, Steel, 18", Std Wt | 1366 | Materials: - 18" - Steel Std Wt | Foot | $134.65 | 100 | $13,465.00 |
| Screw gate, cast iron, 18" diameter, 10/0 head | 1917 | 18" diameter cast iron screw (canal) gate rated at 10 seating head 0 feet unseating head. Materials only. | Each | $1,056.34 | 1 | $1,056.34 |
| Catwalk, metal | 1918 | Metal pedestrian walk way giving access to the valve on a structure, typically 3' wide with railing. Materials only. | Foot | $58.35 | 50 | $2,917.50 |
| **Mobilization** | | | | | | |
| Mobilization, medium equipment | 1139 | Equipment with 70-150 HP or typical weights between 14,000 and 30,000 pounds. | Each | $232.71 | 1 | $232.71 |

**Practice:** 436 - Irrigation Reservoir

**Scenario** #4 - Delta Embankment Reservoir with Hauling

**Scenario Description:**

This is a very large embankment reservoir with a 18" diameter drain pipe 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 a top width of 12ft and centerline length of embankment of 5,280 feet. Average fill of 10 feet and the side slopes will be no steeper than 3 H to 1 V inside and out. It will be built with approximately 105,000 cubic yards of on-site material. It will have a maximum water depth of 8 feet with 2 feet of freeboard and no auxiliary spillway. Volume is approximately 320 ac-ft (104,500,000 gallons). Critical Area Planting and Mulching is required.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 rectangular 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 Compacted Earthfill

**Scenario Unit::** Cubic Yard

**Scenario Typical Size:** 105000

**Total Scenario Cost:** $218,542.51

**Scenario Cost/Unit:** $2.08

**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. | Hour | $60.16 | 15 | $902.40 |
| Hydraulic Excavator, 2 CY | 932 | Track mounted hydraulic excavator with bucket capacity range of 1.5 to 2.5 CY. Equipment and power unit costs. Labor not included. | Hour | $149.59 | 4 | $598.36 |
| Truck, Pickup | 939 | Equipment and power unit costs. Labor not included. | Hour | $19.82 | 2 | $39.64 |
| Stripping and stockpiling, topsoil | 1199 | Stripping and stockpiling of topsoil adjacent to stripping area. Includes equipment and labor. | Cubic Yard | $0.81 | 12907 | $10,454.67 |
| Tractor, agricultural, 360 HP | 1205 | Agricultural tractor with horsepower range of 340 to 390. Equipment and power unit costs. Labor not included. | Hour | $142.41 | 630 | $89,718.30 |
| Scraper, pull, 15 CY | 1207 | Pull type earthmoving scraper with 15 CY capacity. Does not include pulling equipment or labor. Add Tractor or Dozer, 260 HP typically required for single scraper. | Hour | $20.98 | 630 | $13,217.40 |
| Portable Welder | 1407 | Portable field welder. Equipment only. Labor not included. | Hour | $18.57 | 8 | $148.56 |
| 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 | $0.30 | 105000 | $31,500.00 |
| Scraper, pull, 18 CY | 2093 | Pull type earthmoving scraper with 18 CY capacity. Does not include pulling equipment or labor. Add Tractor or Dozer, 260 HP typically required for single scraper. | Hour | $23.71 | 630 | $14,937.30 |
| **Foregone Income** | | | | | | |
| FI, Rice | 1974 | Rice is Primary Crop | Acre | $569.29 | 40 | $22,771.60 |
| **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. | Hour | $25.08 | 8 | $200.64 |
| 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. | Hour | $18.93 | 16 | $302.88 |

| | | | | | | |
|---|---|---|---|---|---|---|
| Equipment Operators, Heavy | 233 | Includes: Cranes, Hydraulic Excavators >=50 HP, Dozers, Paving Machines, Rock Trenchers, Trenchers >=12", Dump Trucks, Ag Equipment >=150 HP, Scrapers, Water Wagons. | Hour | $23.93 | 630 | $15,075.90 |
| Equipment Operators, Heavy | 233 | Includes: Cranes, Hydraulic Excavators >=50 HP, Dozers, Paving Machines, Rock Trenchers, Trenchers >=12", Dump Trucks, Ag Equipment >=150 HP, Scrapers, Water Wagons. | Hour | $23.93 | 4 | $95.72 |
| Equipment Operators, Heavy | 233 | Includes: Cranes, Hydraulic Excavators >=50 HP, Dozers, Paving Machines, Rock Trenchers, Trenchers >=12", Dump Trucks, Ag Equipment >=150 HP, Scrapers, Water Wagons. | Hour | $23.93 | 15 | $358.95 |
| Supervisor or Manager | 234 | Labor involving supervision or management activities. Includes crew supervisors, foremen and farm/ranch managers time required for adopting new technology, etc. | Hour | $34.29 | 16 | $548.64 |
| **Materials** | | | | | | |
| Pipe, Steel, 18", Std Wt | 1366 | Materials: - 18" - Steel Std Wt | Foot | $134.65 | 100 | $13,465.00 |
| Screw gate, cast iron, 18" diameter, 10/0 head | 1917 | 18" diameter cast iron screw (canal) gate rated at 10 seating head 0 feet unseating head. Materials only. | Each | $1,056.34 | 1 | $1,056.34 |
| Catwalk, metal | 1918 | Metal pedestrian walk way giving access to the valve on a structure, typically 3' wide with railing. Materials only. | Foot | $58.35 | 50 | $2,917.50 |
| **Mobilization** | | | | | | |
| Mobilization, medium equipment | 1139 | Equipment with 70-150 HP or typical weights between 14,000 and 30,000 pounds. | Each | $232.71 | 1 | $232.71 |

**Practice:** 436 - Irrigation Reservoir

**Scenario** #5 - Reservoir Machine Compacted

**Scenario Description:**

Due to the nature of the alluvial soils in the area, especially the high clay content soils, extra compaction is required to work the material into a proper density and to avoid macropores. This is an on-farm storage reservoir constructed from on-site borrow to construct levees above the natural grade. Water is pumped from on-farm drainage (storm runoff, irrigation return flows) into the structure. Typically, the runoff is temporarily stored in a adjacent tailwater channel. The levees are constructed with a 12 foot top and a 4 foot berm at full pool conditions to prevent wave action erosion. The levees are typically built 8 feet above ground with a two to three foot cut in the reservoir bottom. Typical size is 50,000 to 60,000 cuyds of earthfuill. An auxiliary spillway is set at the berm elevation to prevent water level rises above the berm. Critical Area Planting and Mulching is required. 25 acres is typical size.Resource Concern: Aquifer Overdraft, Excess nutrients in surface 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 irrigation system relies on pumped groundwater from an aquifer that is being mined (aquifer overdraft). Farm runoff containing nutients and sediments is not captured.

**After Situation:**

The on-farm storage reservoir will accumulate and store on-farm runoff during the winter and early spring for use as irrigation water during the growing season as irrigation water, reducing groundwater demand by 75%, reducing storm runoff from the farm by 50% and reducing nutrient delivery similarly.

**Feature Measure:** Volume of Compacted Earthfill

**Scenario Unit::** Cubic Yard

**Scenario Typical Size:** 55000

**Total Scenario Cost:** $236,914.41

**Scenario Cost/Unit:** $4.31

**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 Yard | $3.76 | 55000 | $206,800.00 |
| **Foregone Income** | | | | | | |
| FI, Rice | 1974 | Rice is Primary Crop | Acre | $569.29 | 25 | $14,232.25 |
| **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. | Hour | $18.93 | 16 | $302.88 |
| 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. | Hour | $34.29 | 16 | $548.64 |
| **Materials** | | | | | | |
| Pipe, Steel, 18", Std Wt | 1366 | Materials: - 18" - Steel Std Wt | Foot | $134.65 | 100 | $13,465.00 |
| **Mobilization** | | | | | | |
| Mobilization, medium equipment | 1139 | Equipment with 70-150 HP or typical weights between 14,000 and 30,000 pounds. | Each | $232.71 | 1 | $232.71 |
| Mobilization, large equipment | 1140 | Equipment >150HP or typical weights greater than 30,000 pounds or loads requiring over width or over length permits. | Each | $444.31 | 3 | $1,332.93 |

**Practice:** 436 - Irrigation Reservoir

**Scenario** #6 - Delta Tailwater Pit

**Scenario Description:**

A new excavated pit is constructed to collect the excess irrigation water to create a pumping pool and storage area so the water can be recovered and reused. Typical pit cross section is trapezoidal with 20 ft bottom x 10 ft depth, with 2:1 side slopes, and 1575 ft length. The total yardage of earthwork is 21,613 cy.Resource concerns that will be addressed: Excess/Insufficent Water - inefficient use of irrigation water; Water Quality Degradation - excessive sediments in surface waters; Water Quality Degradation - Excess nutrients in surface and ground water; Degradation Plant Condition - undesireable plant prductivity and health.Assoicated practices: 533 - Pumping Plants; 410 - Grade Stabilization Structure; 587 - Structure for water control; 449 - Irrigation Water Management

**Before Situation:**

Excess irrigation water collects at lower ends of field and backs up into crops and causes plant stress or causes erosion and travels off farm in a drainage ditch causing water quality issues in lower watersheds.

**After Situation:**

Excess irrigation water is collected and directed into a recovery system where the water can be recycled and reused for irrigation. Sedimentation has a chance to settle out of the water allowing for less sediment to travel down stream.

**Feature Measure:** Volume of Earth Excavated

**Scenario Unit::** Cubic Yard

**Scenario Typical Size:** 21613

**Total Scenario Cost:** $42,521.20

**Scenario Cost/Unit:** $1.97

**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. | Hour | $176.61 | 40 | $7,064.40 |
| Tractor, agricultural, 360 HP | 1205 | Agricultural tractor with horsepower range of 340 to 390. Equipment and power unit costs. Labor not included. | Hour | $142.41 | 145 | $20,649.45 |
| Scraper, pull, 15 CY | 1207 | Pull type earthmoving scraper with 15 CY capacity. Does not include pulling equipment or labor. Add Tractor or Dozer, 260 HP typically required for single scraper. | Hour | $20.98 | 290 | $6,084.20 |
| **Foregone Income** | | | | | | |
| FI, Rice | 1974 | Rice is Primary Crop | Acre | $569.29 | 3.62 | $2,060.83 |
| **Labor** | | | | | | |
| General Labor | 231 | Labor performed using basic tools such as power tool, shovels, and other tools that do not require extensive training. Ex. pipe layer, herder, concrete placement, materials spreader, flagger, etc. | Hour | $18.93 | 40 | $757.20 |
| Equipment Operators, Heavy | 233 | Includes: Cranes, Hydraulic Excavators >=50 HP, Dozers, Paving Machines, Rock Trenchers, Trenchers >=12", Dump Trucks, Ag Equipment >=150 HP, Scrapers, Water Wagons. | Hour | $23.93 | 170 | $4,068.10 |
| Supervisor or Manager | 234 | Labor involving supervision or management activities. Includes crew supervisors, foremen and farm/ranch managers time required for adopting new technology, etc. | Hour | $34.29 | 40 | $1,371.60 |
| **Mobilization** | | | | | | |
| Mobilization, medium equipment | 1139 | Equipment with 70-150 HP or typical weights between 14,000 and 30,000 pounds. | Each | $232.71 | 2 | $465.42 |

**Practice:** 436 - Irrigation Reservoir

**Scenario** #7 - Steel Tank

**Scenario Description:**

A 20,000 Gallon, above ground, enclosed fabricated Steel or bottomless Corrugated Metal (with plastic liner and cover) tank with fittings, is installed on 6" of well compacted drain rock support pad with sand padding (CM tank), to store water from a reliable source for irrigation of an area less than 5 acres. The scenario assumes the typical dimensions of the tank are 24 feet in diameter and 6 feet tall. The scenario also assumes a 28 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 the cost for pumps, pipe, or fittings for the pipeline. 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, enclosed fabricated steel or bottomless corrugated metal tank (with plastic liner and cover), capable of withstanding the elements, is used to accumulate and store water between irrigation cycles for a 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 very large roof area, a water ram , or a pump drawing water from a stream.

**Feature Measure:** Volume of Tank Storage

**Scenario Unit::** Gallon

**Scenario Typical Size:** 20000

**Total Scenario Cost:** $28,820.67

**Scenario Cost/Unit:** $1.44

**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. | Hour | $40.57 | 10 | $405.70 |
| Plate compactor | 1915 | Manually guided vibratroy plate compactor. Equipment only. | Hour | $4.61 | 16 | $73.76 |
| **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. | Hour | $18.93 | 80 | $1,514.40 |
| Equipment Operators, Heavy | 233 | Includes: Cranes, Hydraulic Excavators >=50 HP, Dozers, Paving Machines, Rock Trenchers, Trenchers >=12", Dump Trucks, Ag Equipment >=150 HP, Scrapers, Water Wagons. | Hour | $23.93 | 16 | $382.88 |
| 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. | Hour | $34.29 | 40 | $1,371.60 |
| **Materials** | | | | | | |
| Aggregate, Sand, Graded, Washed | 45 | Sand, typical ASTM C33 gradation, includes materials, equipment and labor to transport and place | Cubic Yard | $30.40 | 8 | $243.20 |
| Aggregate, Gravel, Ungraded, Quarry Run | 1099 | Includes materials, equipment and labor | Cubic Yard | $21.24 | 12 | $254.88 |
| Tank, Corrugated Metal Storage, 20,000 gallon | 1920 | 20,000 gallon capacity enclosed corrugated Metal Storage tank. Includes delivery to the site and anchoring material. | Each | $23,980.31 | 1 | $23,980.31 |
| **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 | $64.26 | 2 | $128.52 |
| Mobilization, medium equipment | 1139 | Equipment with 70-150 HP or typical weights between 14,000 and 30,000 pounds. | Each | $232.71 | 2 | $465.42 |

**Practice:** 436 - Irrigation Reservoir

**Scenario** #8 - 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::** Gallon

**Scenario Typical Size:** 3000

**Total Scenario Cost:** $4,986.26

**Scenario Cost/Unit:** $1.66

**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. | Hour | $40.57 | 6 | $243.42 |
| Plate compactor | 1915 | Manually guided vibratroy plate compactor. Equipment only. | Hour | $4.61 | 4 | $18.44 |
| **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. | Hour | $18.93 | 32 | $605.76 |
| Equipment Operators, Heavy | 233 | Includes: Cranes, Hydraulic Excavators >=50 HP, Dozers, Paving Machines, Rock Trenchers, Trenchers >=12", Dump Trucks, Ag Equipment >=150 HP, Scrapers, Water Wagons. | Hour | $23.93 | 6 | $143.58 |
| Supervisor or Manager | 234 | Labor involving supervision or management activities. Includes crew supervisors, foremen and farm/ranch managers time required for adopting new technology, etc. | Hour | $34.29 | 16 | $548.64 |
| **Materials** | | | | | | |
| Tank, Poly Enclosed Storage, >1,000 | 1075 | Water storage tanks. Includes materials and shipping only. | Gallon | $0.93 | 3000 | $2,790.00 |
| Aggregate, Gravel, Ungraded, Quarry Run | 1099 | Includes materials, equipment and labor | Cubic Yard | $21.24 | 2 | $42.48 |
| **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 | $64.26 | 2 | $128.52 |
| Mobilization, medium equipment | 1139 | Equipment with 70-150 HP or typical weights between 14,000 and 30,000 pounds. | Each | $232.71 | 2 | $465.42 |

**Practice:** 436 - Irrigation Reservoir

**Scenario** #9 - 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::** Gallon

**Scenario Typical Size:** 10000

**Total Scenario Cost:** $10,797.84

**Scenario Cost/Unit:** $1.08

**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. | Hour | $40.57 | 8 | $324.56 |
| Plate compactor | 1915 | Manually guided vibratroy plate compactor. Equipment only. | Hour | $4.61 | 4 | $18.44 |
| **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. | Hour | $18.93 | 40 | $757.20 |
| Equipment Operators, Heavy | 233 | Includes: Cranes, Hydraulic Excavators >=50 HP, Dozers, Paving Machines, Rock Trenchers, Trenchers >=12", Dump Trucks, Ag Equipment >=150 HP, Scrapers, Water Wagons. | Hour | $23.93 | 8 | $191.44 |
| Supervisor or Manager | 234 | Labor involving supervision or management activities. Includes crew supervisors, foremen and farm/ranch managers time required for adopting new technology, etc. | Hour | $34.29 | 24 | $822.96 |
| **Materials** | | | | | | |
| Aggregate, Gravel, Ungraded, Quarry Run | 1099 | Includes materials, equipment and labor | Cubic Yard | $21.24 | 6 | $127.44 |
| Tank, Fiberglass Enclosed Storage, 10,000 gallon | 1919 | 10,000 gallon capacity enclosed fiberglass water storage tank. Includes tank anchoring materials and delivery. | Each | $7,961.86 | 1 | $7,961.86 |
| **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 | $64.26 | 2 | $128.52 |
| Mobilization, medium equipment | 1139 | Equipment with 70-150 HP or typical weights between 14,000 and 30,000 pounds. | Each | $232.71 | 2 | $465.42 |

**Practice:** 441 - Irrigation System, Microirrigation

**Scenario** #1 - 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 or 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 systemResource Concerns: Insufficient Water - Inefficient use of irrigation water, Degraded Plant Condition - Undesirable plantproductivity 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 60 acre cropland or hayland field. The system lateral (thinwall dripperline or tape) spacing would 40 inches. 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 60 acres.

**Feature Measure:** Acres in System

**Scenario Unit::** Acre

**Scenario Typical Size:** 60

**Total Scenario Cost:** $113,468.56

**Scenario Cost/Unit:** $1,891.14

**Cost Details:**

| Component Name | ID | Description | Unit | Cost | QTY | Total |
|---|---|---|---|---|---|---|
| **Equipment Installation** | | | | | | |
| Micro Irrigation, chemical injection equipment | 1987 | Chemical Injector Pump, plus chemigation check valve, injector ports, and appurtenances, Installation included. | Each | $1,470.45 | 1 | $1,470.45 |
| **Materials** | | | | | | |
| Pipe, PVC, dia. < 18", weight priced | 1323 | Polyvinyl Chloride (PVC) pressure rated pipe priced by the weight of the pipe materials for pipes with diameters less than 18". Materials only. | Pound | $1.80 | 4800 | $8,640.00 |
| Flow Meter, with Electronic Index | 1452 | 10 inch Turbine Irrigation flow meter, with Electronic Index, Rate and Volume, permanently installed. Materials only. | Each | $3,652.10 | 1 | $3,652.10 |
| Micro Irrigation, Media Filter, 30" to 48" Dia. tank, Equipped for Automatic Flush | 1482 | Sand or media filter for Micro irrigation system. Includes plumbing, connections and automatic controller. Unit is complete and installed. Unit price per filter, not per filter station. | Each | $5,211.81 | 3 | $15,635.43 |
| 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 | $336.75 | 1 | $336.75 |
| 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 | $1,323.03 | 1 | $1,323.03 |
| 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 instalation. | Foot | $0.10 | 824108 | $82,410.80 |

**Practice:** 441 - Irrigation System, Microirrigation

**Scenario** #2 - Surface PE Orchard or Vineyard

**Scenario Description:**

A micro-irrigation system, utilizing surface PE tubing (can be placed on trelis or above ground) with emitters (emitters are already installed in the pipe or will be purchased to be installed in the field into the pipe) to provide irrigation for vineyards and orchards grown in a grid pattern. The typical system is a permanent system, installed on a 60 acre field on the ground surface. The field has a tree spacing of 50 feet x 50 feet. PE tubing is laid on each side of the tree row. Lateral lengths are 630 feet and there are 156 laterals. This system utilizes emitters at each plant as the water application device. This system typically includes a 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 Pump, Power source, Water source (well or reservoir). Resource Concerns: Insufficient Water - Inefficient use of irrigation water, Degraded Plant Condition - Undesirable plantproductivity 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, 587 - Structure for Water Control, 610 - Salinity & Sodic Soil Management, 328-Conservation Crop Rotation, and 590 Nutrient Management.

**Before Situation:**

A field has an inefficient surface flood 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 vineyard. 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::** Acre

**Scenario Typical Size:** 60

**Total Scenario Cost:** $73,236.08

**Scenario Cost/Unit:** $1,220.60

**Cost Details:**

| Component Name | ID | Description | Unit | Cost | QTY | Total |
|---|---|---|---|---|---|---|
| **Equipment Installation** | | | | | | |
| Trenching, Earth, 12" x 48" | 53 | Trenching, earth, 12" wide x 48" depth, includes equipment and labor for trenching and backfilling | Foot | $1.16 | 8100 | $9,396.00 |
| Micro Irrigation, chemical injection equipment | 1987 | Chemical Injector Pump, plus chemigation check valve, injector ports, and appurtenances, Installation included. | Each | $1,470.45 | 1 | $1,470.45 |
| **Materials** | | | | | | |
| Pipe, PVC, dia. < 18", weight priced | 1323 | Polyvinyl Chloride (PVC) pressure rated pipe priced by the weight of the pipe materials for pipes with diameters less than 18". Materials only. | Pound | $1.80 | 2592 | $4,665.60 |
| Flow Meter, with Electronic Index | 1452 | 10 inch Turbine Irrigation flow meter, with Electronic Index, Rate and Volume, permanently installed. Materials only. | Each | $3,652.10 | 1 | $3,652.10 |
| Micro Irrigation, Media Filter, 30" to 48" Dia. tank, Equipped for Automatic Flush | 1482 | Sand or media filter for Micro irrigation system. Includes plumbing, connections and automatic controller. Unit is complete and installed. Unit price per filter, not per filter station. | Each | $5,211.81 | 3 | $15,635.43 |
| 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 | $336.75 | 1 | $336.75 |
| 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 | $1,323.03 | 1 | $1,323.03 |
| 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. | Foot | $0.34 | 108108 | $36,756.72 |

**Practice:** 441 - Irrigation System, Microirrigation

**Scenario** #3 - 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 Pump, power source, 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 plantproductivity 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 acre irrigated field with lateral spacing of 2 feet.

**Feature Measure:** Acres in System

**Scenario Unit::** Acre

**Scenario Typical Size:** 1

**Total Scenario Cost:** $2,322.98

**Scenario Cost/Unit:** $2,322.98

**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. | Hour | $18.93 | 4 | $75.72 |
| **Materials** | | | | | | |
| Pipe, HDPE, smooth wall, weight priced | 1379 | High Density Polyethylene (HDPE) compound manufactured into smooth wall pipe. Materials only. | Pound | $2.13 | 49 | $104.37 |
| 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. | Foot | $0.07 | 23958 | $1,677.06 |
| 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 | $152.79 | 1 | $152.79 |
| **Mobilization** | | | | | | |
| Mobilization, small equipment | 1138 | Equipment <70 HP but can"t be transported by a pick-up truck or with typical weights between 3,500 to 14,000 pounds. | Each | $156.52 | 2 | $313.04 |

## USDA - Natural Resources Conservation Service

**Arkansas**

**Practice:** 441 - Irrigation System, Microirrigation

**Scenario** #4 - 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 Pump, power source, 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 plantproductivity 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 20 acre irrigated field with lateral spacing of 2 feet.

**Feature Measure:** Acres in System

**Scenario Unit::** Acre

**Scenario Typical Size:** 20

**Total Scenario Cost:** $54,208.97

**Scenario Cost/Unit:** $2,710.45

**Cost Details:**

| Component Name | ID | Description | Unit | Cost | QTY | Total |
|---|---|---|---|---|---|---|
| **Equipment Installation** | | | | | | |
| Trenching, Earth, 12" x 48" | 53 | Trenching, earth, 12" wide x 48" depth, includes equipment and labor for trenching and backfilling | Foot | $1.16 | 1320 | $1,531.20 |
| Micro Irrigation, chemical injection equipment | 1987 | Chemical Injector Pump, plus chemigation check valve, injector ports, and appurtenances, Installation included. | Each | $1,470.45 | 1 | $1,470.45 |
| **Labor** | | | | | | |
| General Labor | 231 | Labor performed using basic tools such as power tool, shovels, and other tools that do not require extensive training. Ex. pipe layer, herder, concrete placement, materials spreader, flagger, etc. | Hour | $18.93 | 32 | $605.76 |
| **Materials** | | | | | | |
| Pipe, PVC, 3", SCH 40 | 977 | Materials: - 3" - PVC - SCH 40 - ASTM D1785 | Foot | $2.84 | 1320 | $3,748.80 |
| Valve, Air Vacuum Release, Manual | 1041 | Materials for <2" Manual Air/Vacuum Relief Valve | Each | $32.73 | 2 | $65.46 |
| 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 | $1,323.03 | 2 | $2,646.06 |
| Ball Valve, 4" | 1726 | 4" ball valve, metal body. Materials only. | Each | $320.66 | 6 | $1,923.96 |
| Water Meter, Microirrigation, <= 2â€, with Volume Totalizer | 2437 | Microirrigation water meter less than or equal to 2 inch diameter, with volume totalizer. Includes materials only. | Each | $286.05 | 1 | $286.05 |
| Micro Irrigation, Media Filter, 12â€ to 24â€ 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 | $2,025.62 | 4 | $8,102.48 |
| Pressure Regulator | 2468 | Materials for pressure regulator less than or equal to 2" diameter. | Each | $13.71 | 4 | $54.84 |
| 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. | Foot | $0.07 | 479160 | $33,541.20 |
| **Mobilization** | | | | | | |

| | | | | | |
|---|---|---|---|---|---|
| Mobilization, medium equipment | 1139 Equipment with 70-150 HP or typical weights between 14,000 and 30,000 pounds. | Each | $232.71 | 1 | $232.71 |

**Practice:** 441 - Irrigation System, Microirrigation

**Scenario** #5 - Microjet

**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, sand media/screen/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. Resource Concerns: Insufficient Water - Inefficient use of irrigation water, Degraded Plant Condition - Undesirable plantproductivity 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::** Acre

**Scenario Typical Size:** 60

**Total Scenario Cost:** $174,805.76

**Scenario Cost/Unit:** $2,913.43

**Cost Details:**

| Component Name | ID | Description | Unit | Cost | QTY | Total |
|---|---|---|---|---|---|---|
| **Equipment Installation** | | | | | | |
| Micro Irrigation, chemical injection equipment | 1987 | Chemical Injector Pump, plus chemigation check valve, injector ports, and appurtenances, Installation included. | Each | $1,470.45 | 1 | $1,470.45 |
| **Materials** | | | | | | |
| Pipe, PVC, dia. < 18", weight priced | 1323 | Polyvinyl Chloride (PVC) pressure rated pipe priced by the weight of the pipe materials for pipes with diameters less than 18". Materials only. | Pound | $1.80 | 4800 | $8,640.00 |
| Flow Meter, with Electronic Index | 1452 | 10 inch Turbine Irrigation flow meter, with Electronic Index, Rate and Volume, permanently installed. Materials only. | Each | $3,652.10 | 1 | $3,652.10 |
| Micro Irrigation, Media Filter, 30" to 48" Dia. tank, Equipped for Automatic Flush | 1482 | Sand or media filter for Micro irrigation system. Includes plumbing, connections and automatic controller. Unit is complete and installed. Unit price per filter, not per filter station. | Each | $5,211.81 | 3 | $15,635.43 |
| 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 | $336.75 | 1 | $336.75 |
| 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 | $1,323.03 | 1 | $1,323.03 |
| 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. | Foot | $1.00 | 143748 | $143,748.00 |

**Practice:** 441 - Irrigation System, Microirrigation

**Scenario** #6 - Hoop House System

**Scenario Description:**

A micro-irrigation system, utilizing surface PE tubing (can be placed on trelis or above ground) with emitters to provide irrigation for specialty crop grown in hoop houses. The typical system is a permanent system, installed in a 30' x 96' house with 24" rows with emitters on 12" spacing. This system typically includes a 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 Pump, Power source, Water source (well or reservoir). Resource Concerns: Insufficient Water - Inefficient use of irrigation water, Degraded Plant Condition - Undesirable plantproductivity 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:**

Irrigation of hoop house crops is done using manual irrigation methods such as a garden hose or water pail. Requires a great amount of time and many times plants are over watered in areas and underwaterd in others. Inefficient use of irrigation water is a concern.

**After Situation:**

A micro irrigation system is in place that provides uniform water distribution throughout the house so that all crops will receive adaquete and timely irrigation water.

**Feature Measure:** Area of house

**Scenario Unit::** Square Foot

**Scenario Typical Size:** 2880

**Total Scenario Cost:** $470.63

**Scenario Cost/Unit:** $0.16

**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. | Hour | $18.93 | 4 | $75.72 |
| **Materials** | | | | | | |
| 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 | $49.31 | 1 | $49.31 |
| 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 Foot | $0.12 | 2880 | $345.60 |

**Practice:** 442 - Sprinkler System

**Scenario** #1 - 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::** Foot

**Scenario Typical Size:** 1300

**Total Scenario Cost:** $98,737.49

**Scenario Cost/Unit:** $75.95

**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 | $6,441.55 | 1 | $6,441.55 |
| Irrigation, Center pivot system with appurtenances, variable cost portion | 318 | Variable cost portion of the center pivot system with appurtenances. This portion includes the following items: pivot point, pipe, towers, pad, controls, sprinklers, installation. | Foot | $70.54 | 1300 | $91,702.00 |
| **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 | $64.26 | 2 | $128.52 |
| Mobilization, medium equipment | 1139 | Equipment with 70-150 HP or typical weights between 14,000 and 30,000 pounds. | Each | $232.71 | 2 | $465.42 |

**Practice:** 442 - Sprinkler System

**Scenario** #2 - 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::** Foot

**Scenario Typical Size:** 1280

**Total Scenario Cost:** $126,807.90

**Scenario Cost/Unit:** $99.07

**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. | Acre | $1,660.71 | 76 | $126,213.96 |
| **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 | $64.26 | 2 | $128.52 |
| Mobilization, medium equipment | 1139 | Equipment with 70-150 HP or typical weights between 14,000 and 30,000 pounds. | Each | $232.71 | 2 | $465.42 |

**Practice:** 442 - Sprinkler System

**Scenario** #3 - Wheel Line System

**Scenario Description:**

A 1,280 foot wheel line (also called side roll, wheelmove, or lateral-roll) with 7 foot diameter wheels and five inch diameter supply pipeline. A wheel line consists of the mover, lateral pipe, wheels, sprinklers, couplers, and connectors to the mainline supply.Resource concerns include: Soil Erosion (Concentrated flow erosion e.g. irrigation induced), Insufficient Water (Inefficient use of irrigation water), Water Quality Degradation (Excess nutrients in surface and ground waters, Excessive salts in surface and ground waters, Excess pathogens and chemicals from manure, bio-solids or compost applications), Inefficient Energy Use (Equipment and facilities e.g. pumping)Associated Practices: Irrigation Pipeline (430), Pumping Plant (533), Irrigation Water Management (449)

**Before Situation:**

Cropland that 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. Parts of the field are over-irrigated, and other sections are under-irrigated. 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 1,280 foot wheel line with 7 foot diameter wheels and five inch diameter supply pipeline. Sprinklers are spaced along the wheel line at 40-foot intervals and risers are spaced at 60-foot increments along the mainline. The wheel line irrigates 40 acres of cropland.The wheel line improves distribution uniformity. Irrigation application efficiency improves to 75%. Water application rates meet the consumptive use of the crop and matches soil intake rates in order to prevent irrigation induced erosion, runoff, and deep percolation.

**Feature Measure:** Length of Wheel Line Lateral

**Scenario Unit::** Foot

**Scenario Typical Size:** 1280

**Total Scenario Cost:** $21,869.18

**Scenario Cost/Unit:** $17.09

**Cost Details:**

| Component Name | ID | Description | Unit | Cost | QTY | Total |
|---|---|---|---|---|---|---|
| **Materials** | | | | | | |
| Irrigation, Wheel line with appurtenances, fixed price portion. | 325 | Fixed cost portion of the wheel line system with appurtenances. This portion includes the following items: mover, pipe, sprinklers, wheels, installation. | Each | $4,365.74 | 1 | $4,365.74 |
| Irrigation, Wheel line with appurtenances, variable price portion. | 326 | Variable cost portion of the wheel line system with appurtenances. This portion includes the following items: pipe, sprinklers, wheels, installation. Does not include a mover. | Foot | $13.43 | 1280 | $17,190.40 |
| **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 | $156.52 | 2 | $313.04 |

**Practice:** 442 - Sprinkler System

**Scenario** #4 - 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 system is installed on 10 acres or less. The installed solid set system has 3-4 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::** Acre

**Scenario Typical Size:** 10

**Total Scenario Cost:** $48,045.22

**Scenario Cost/Unit:** $4,804.52

**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. | Acre | $4,791.67 | 10 | $47,916.70 |
| **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 | $64.26 | 2 | $128.52 |

**Practice:** 442 - Sprinkler System

**Scenario** #5 - Traveling Gun System, less than 2" 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 3 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

**Total Scenario Cost:** $8,692.17

**Scenario Cost/Unit:** $8,692.17

**Cost Details:**

| Component Name | ID | Description | Unit | Cost | QTY | Total |
|---|---|---|---|---|---|---|
| **Materials** | | | | | | |
| Irrigation, Traveling Gun System with <= 2" Nominal size hose, and appurtenances light duty | 1478 | Irrigation, Traveling Gun System with <= 2" Nominal size hose with appurtenances. This includes the sprinkler gun, traveler cart, hard hose, reel, connections, controls, and installation. Normal hose length 500' | Inch Diameter | $8,692.17 | 1 | $8,692.17 |

**Practice:** 442 - Sprinkler System

**Scenario** #6 - Traveling Gun System, 2" to 3" 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

**Total Scenario Cost:** $23,425.92

**Scenario Cost/Unit:** $23,425.92

**Cost Details:**

| Component Name | ID | Description | Unit | Cost | QTY | Total |
|---|---|---|---|---|---|---|
| **Materials** | | | | | | |
| Irrigation, Traveling Gun System, > 2" to 3 " Nominal size hose | 1479 | Irrigation, Traveling Gun System with 2.3 to 3 " Nominal size hose with appurtenances. This includes the sprinkler gun, traveler cart, hard hose, reel, connections, controls, and installation. Normal hose length 1000'. | Inch Diameter | $7,808.64 | 3 | $23,425.92 |

**Practice:** 442 - Sprinkler System

**Scenario** #7 - Traveling Gun System, greater than 3" 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

**Total Scenario Cost:** $46,349.79

**Scenario Cost/Unit:** $46,349.79

**Cost Details:**

| Component Name | ID | Description | Unit | Cost | QTY | Total |
|---|---|---|---|---|---|---|
| **Materials** | | | | | | |
| Irrigation, Traveling Gun System, > 3" Nominal size hose | 1762 | Irrigation, Traveling Gun System with > 3" Nominal size hose with appurtenances. This includes the sprinkler gun, traveler cart, hard hose, reel, connections, controls, and installation. Normal hose length 1300' | Each | $46,349.79 | 1 | $46,349.79 |

**Practice:** 442 - Sprinkler System

**Scenario** #8 - 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

**Total Scenario Cost:** $3,594.50

**Scenario Cost/Unit:** $256.75

**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 | $247.57 | 14 | $3,465.98 |
| **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 | $64.26 | 2 | $128.52 |

**Practice:** 442 - Sprinkler System

**Scenario** #9 - Renovation of Existing Sprinkler System

**Scenario Description:**

Center Pivot and Linear Move sprinkler systems are used in large crop fields with fairly regular field borders and flat topography. The scenario involves changing nozzles on center pivot or lateral move irrigation systems to low-pressure systems to improve efficiency of water use and reduce energy use. This scenario is intended for cropland areas where the objective is water conservation. A typical scenario assumes a 1300 LF span, including end booms renozzled with low-pressure nozzles.Resource concerns include: Soil Erosion (Concentrated flow erosion e.g. irrigation induced), Insufficient Water (Inefficient use of irrigation water), Water Quality Degradation (Excess nutrients in surface and ground waters, Excessive salts in surface and ground waters, Excess pathogens and chemicals from manure, bio-solids or compost applications), Inefficient Energy Use (Equipment and facilities e.g. pumping)Associated Practices: Irrigation Pipeline (430), Pumping Plant (533), Irrigation Water Management (449)

**Before Situation:**

A center pivot or lateral move system has high pressure sprinklers. The nozzles are worn and water is applied non-uniformly. Water runs off the field and degrades the receiving waters. Deep percolation in some parts of the field degrades the ground water quality. The runoff from the field causes soil erosion. The high pressure requirement for the system requires excess energy use.

**After Situation:**

A Center Pivot or Linear Move sprinkler system with a span of 1300 linear feet is re-nozzled with low-pressure nozzles. The irrigation water is applied efficiently and uniformly to maintain adequate soil moisture for optimum plant growth. Runoff and deep percolation are eliminated, and the surface and ground water is no longer degraded. The irrigation induced soil erosion caused by runoff is also eliminated. The lower pressure requirements of the sprinklers reduces the energy used by the pump.

**Feature Measure:** Length of Lateral Retrofitted

**Scenario Unit::** Foot

**Scenario Typical Size:** 1300

**Total Scenario Cost:** $17,717.52

**Scenario Cost/Unit:** $13.63

**Cost Details:**

| Component Name | ID | Description | Unit | Cost | QTY | Total |
|---|---|---|---|---|---|---|
| **Materials** | | | | | | |
| Irrigation, Sprinkler Package, Renozzle or Retrofit, with drops and pressure regulators | 1480 | Sprinkler Package - Rennovation including sprinkler nozzle addition, and/or replacement, including new pressure regulators and drops. | Foot | $13.53 | 1300 | $17,589.00 |
| **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 | $64.26 | 2 | $128.52 |

**Practice:** 443 - Irrigation System, Surface and Subsurface

**Scenario** #1 - Surge Valve & Controller

**Scenario Description:**

This scenario would typically include installation and utilization of a 10-inch surge valve with automated controller (including all appurtenances) and installation labor needed to convert from a conventional surface irrigated system to a surge irrigation system. Typical field size is 80 acres. The surge valve will be used with PVC Gated Pipe or PE Gated Tubing to convey and distribute irrigation water to alternating irrigation sets in a timed surge cycle that results in a reduced surging irrigation application. The surging action increases rate of advance along set length, reduces deep percolation at upper end of field, increases uniformity of application along row length, and on lower intake soils can significantly reduce runoff losses. The result is improved irrigation efficiency, reduced leaching and erosion losses, and conserved energy. This scenario does not include gated pipe or associated practices.Resource Concerns: Insufficient Water - Inefficient use of irrigation water, and Degraded Plant Condition - Undesirable plantproductivity and health, Water Quality Degradation- Excess nutrients in surface and ground waters, Water Quality Degradation - Excessive sediment in surface waters, and Inefficient Energy Use - Equipment and facilitiesAssociated Practices: 464-Irrigation Land leveling, 533-Pumping Plant, 449- Irrigation Water Management, 430 - Irrigation Pipeline, 328-Conservation Crop Rotation, and 590 Nutrient Management.

**Before Situation:**

Unacceptable irrigation application uniformity along existing surface irrigation system furrow or border length caused by excessive run length or soil infiltration rate when operated with continuous inflow on existing system. System is over irrigated in attempt to adequately irrigate low end of field.

**After Situation:**

A surge surface irrigation system is in place. After implementation, distribution uniformity and irrigation efficiency is improved, by reducing irrigation application volume and deep percolation losses. Runoff reductions, reduced energy use, and air quality improvements can also result.

**Feature Measure:** Number of Surge Valves

**Scenario Unit::** Each

**Scenario Typical Size:** 1

**Total Scenario Cost:** $2,327.11

**Scenario Cost/Unit:** $2,327.11

**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. | Hour | $18.93 | 2 | $37.86 |
| **Materials** | | | | | | |
| Surge Valve And Controller | 1477 | Surge Valve and Controller, with appurtenances. Material cost includes valve, controller, all appurtenances, and mobilization. | Each | $2,289.25 | 1 | $2,289.25 |

**Practice:** 443 - Irrigation System, Surface and Subsurface

**Scenario** #2 - Aluminum Gated Pipe

**Scenario Description:**

Installation of surface Aluminum gated pipe to efficiently convey and distribute irrigation water in irrigation furrows, borders, or contour levees. A typical scenario would include 1,320 feet of 10-inch Aluminum gated pipe, with 40 inch gate spacing used to irrigate 60 acres. Appurtenances include: gates, couplings, fittings, in-line valves, pressure relief valves, and air vent valves. Does not include flow meters, or a permanent inlet structure with or without filtration.Resource Concerns: Insufficient Water - Inefficient use of irrigation water, and Degraded Plant Condition - Undesirable Plantproductivity and health.Associated Practices: 464-Irrigation Land leveling, 533-Pumping Plant, 449- Irrigation Water Management, 430 - Irrigation Pipeline, 328-Conservation Crop Rotation, and 590 Nutrient Management.,

**Before Situation:**

Typical before situation would include conveyance of water to surface irrigation distribution points with earthen ditches and distribution to individual furrows, borders, or contour levies by siphon tubes. The existing system would experience significant seepage ditch losses, and poor distribution uniformity.

**After Situation:**

The installation will improve distribution uniformity, irrigation efficiency, and eliminate or reduce ditch seepage.

**Feature Measure:** Length of Pipe

**Scenario Unit::** Foot

**Scenario Typical Size:** 1320

**Total Scenario Cost:** $12,518.04

**Scenario Cost/Unit:** $9.48

**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. | Hour | $18.93 | 10 | $189.30 |
| **Materials** | | | | | | |
| Pipe, aluminum, smooth wall, weight priced | 1382 | Aluminum manufactured into smooth wall pipe | Pound | $4.59 | 2686 | $12,328.74 |

**Practice:** 443 - Irrigation System, Surface and Subsurface

**Scenario** #3 - Polyvinyl Chloride (PVC) Gated Pipe

**Scenario Description:**

Installation of surface PVC gated pipe to efficiently convey and distribute irrigation water in irrigation furrows, borders, or contour levees. A typical scenario would include 1,320 feet of 10-inch PVC gated pipe, with 40 inch gate spacing used to irrigate 60 acres. Appurtenances include: gates, couplings, fittings, in-line valves, pressure relief valves, and air vent valves. Does not include flow meters, or a permanent inlet structure with or without filtration.Resource Concerns: Insufficient Water - Inefficient use of irrigation water, and Degraded Plant Condition - Undesirable Plantproductivity and health.Associated Practices: 464-Irrigation Land leveling, 533-Pumping Plant, 449- Irrigation Water Management, 430 - Irrigation Pipeline, 328-Conservation Crop Rotation, and 590 Nutrient Management.,

**Before Situation:**

Typical before situation would include conveyance of water to surface irrigation distribution points with earthen ditches and distribution to individual furrows, borders, or contour levees by siphon tubes. The existing system would experience significant seepage ditch losses, and poor distribution uniformity.

**After Situation:**

The installation will improve distribution uniformity, irrigation efficiency, and eliminate or reduce ditch seepage.

**Feature Measure:** Length of Pipe

**Scenario Unit::** Foot

**Scenario Typical Size:** 1320

**Total Scenario Cost:** $6,762.90

**Scenario Cost/Unit:** $5.12

**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. | Hour | $18.93 | 10 | $189.30 |
| **Materials** | | | | | | |
| Pipe, PVC, dia. < 18", weight priced | 1323 | Polyvinyl Chloride (PVC) pressure rated pipe priced by the weight of the pipe materials for pipes with diameters less than 18". Materials only. | Pound | $1.80 | 3652 | $6,573.60 |

**Practice:** 443 - Irrigation System, Surface and Subsurface

**Scenario** #4 - Poly Irrigation Tubing

**Scenario Description:**

This practice includes installation of thin wall Polyethylene (PE) irrigation tubing with 2½-inch gates, or gated pipe installed in shallow above ground trenches to replace above ground canals used to deliver water to individual basins within a contour levee or basin surface irrigation system. The typical scenario will use 1,320 feet of 15-inch, 10 mil, PE irrigation tubing (a 1,320-foot roll weighs 250 pounds) with 100 2½-inch gates spaced approximately 13 feet apart, installed in shallow above ground trenches to replace above ground canals used to deliver water to individual basins within a 40-acre irrigated field. Resource Concerns: Insufficient Water - Inefficient use of irrigation water, and Degraded Plant Condition - Undesirable plantproductivity and health, Water Quality Degradation- Excess nutrients in surface and ground waters, Water Quality Degradation - Excessive sediment in surface waters, and Inefficient Energy Use - Equipment and facilitiesAssociated Practices: 464-Irrigation Land leveling, 533-Pumping Plant, 449- Irrigation Water Management, 430 - Irrigation Pipeline, 328-Conservation Crop Rotation, and 590-Nutrient Management.

**Before Situation:**

Typical before situation would include a contour levee or basin surface irrigation system. Irrigation water is delivered to individual basins in a 40-acre rice field split into paddies using irrigation canals and field ditches.

**After Situation:**

After implementation irrigation efficiency is improved, while reducing irrigation application volume, runoff, evaporation losses, and cold water damage to crops. Reduced energy use and air quality improvements can also result.

**Feature Measure:** Length of Pipe

**Scenario Unit::** Foot

**Scenario Typical Size:** 1320

**Total Scenario Cost:** $696.80

**Scenario Cost/Unit:** $0.53

**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. | Hour | $18.93 | 10 | $189.30 |
| **Materials** | | | | | | |
| Pipe, PE, collapsible, weight priced | 1385 | Polyethylene (PE) compound manufactured into collapsible tubing | Pound | $1.33 | 250 | $332.50 |
| Flap gate, plastic, 2½" | 1424 | 2 1/2" plastic flap gate for poly irrigation tubing. Materials only. | Each | $1.75 | 100 | $175.00 |

**Practice:** 449 - Irrigation Water Management

**Scenario** #1 - Basic IWM 30 acres or less

**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. Phaucet Program could be used where poly pipe is utilized. 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, 433-Irrigation Water Measurement, 434-Soil Moisture Measurement, 433- Irrigation Flow Measurement.

**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::** Acre

**Scenario Typical Size:** 30

**Total Scenario Cost:** $822.96

**Scenario Cost/Unit:** $27.43

**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. | Hour | $34.29 | 24 | $822.96 |

**Practice:** 449 - Irrigation Water Management

**Scenario** #2 - Basic IWM more than 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. Phaucet Program could be used where poly pipe is utilized. 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, 433-Irrigation Water Measurement, 434-Soil Moisture Measurement, 433- Irrigation Flow Measurement.

**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::** Acre

**Scenario Typical Size:** 125

**Total Scenario Cost:** $1,248.72

**Scenario Cost/Unit:** $9.99

**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. | Hour | $18.93 | 8 | $151.44 |
| Supervisor or Manager | 234 | Labor involving supervision or management activities. Includes crew supervisors, foremen and farm/ranch managers time required for adopting new technology, etc. | Hour | $34.29 | 32 | $1,097.28 |

**Practice:** 449 - Irrigation Water Management

**Scenario** #3 - Intermediate IWM 30 acres or less

**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). The use of programs such as Phaucet or Pipe Planner for poly pipe will be use for improving of irrigation application. 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, 443-Irrigation System Surface and Subsurface, 433-Irrigation Water Measurement, 434-Soil Moisture Measurement, 433- Irrigation Flow Measurement.

**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::** Acre

**Scenario Typical Size:** 30

**Total Scenario Cost:** $1,097.28

**Scenario Cost/Unit:** $36.58

**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. | Hour | $34.29 | 32 | $1,097.28 |

**Practice:** 449 - Irrigation Water Management

**Scenario** #4 - Intermediate IWM more than 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). The use of programs such as Phaucet or Pipe Planner for poly pipe will be use for improving of irrigation application. 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, 443-Irrigation System Surface and Subsurface, 433-Irrigation Water Measurement, 434-Soil Moisture Measurement, 433- Irrigation Flow Measurement.

**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::** Acre

**Scenario Typical Size:** 125

**Total Scenario Cost:** $1,598.76

**Scenario Cost/Unit:** $12.79

**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. | Hour | $18.93 | 12 | $227.16 |
| 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. | Hour | $34.29 | 40 | $1,371.60 |

**Practice:** 449 - Irrigation Water Management

**Scenario** #5 - Advanced IWM 30 acres or less

**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. The use of programs such as Phaucet or Pipe Planner for poly pipe will be use for improving of irrigation application. 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, 443-Irrigation System Surface and Subsurface, 433-Irrigation Water Measurement, 434-Soil Moisture Measurement, 433- Irrigation Flow Measurement.

**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::** Acre

**Scenario Typical Size:** 30

**Total Scenario Cost:** $1,371.60

**Scenario Cost/Unit:** $45.72

**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. | Hour | $34.29 | 40 | $1,371.60 |

**Practice:** 449 - Irrigation Water Management

**Scenario** #6 - Advanced IWM more than 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. The use of programs such as Phaucet or Pipe Planner for poly pipe will be use for improving of irrigation application. 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, 443-Irrigation System Surface and Subsurface, 433-Irrigation Water Measurement, 434-Soil Moisture Measurement, 433- Irrigation Flow Measurement.

**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::** Acre

**Scenario Typical Size:** 125

**Total Scenario Cost:** $1,948.80

**Scenario Cost/Unit:** $15.59

**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. | Hour | $18.93 | 16 | $302.88 |
| 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. | Hour | $34.29 | 48 | $1,645.92 |

**Practice:** 449 - Irrigation Water Management

**Scenario** #7 - IWM Device_YR1

**Scenario Description:**

This practice includes the installation of an Irrrigation Water Management device such as soil moisture sensors(tensiometers, gyp blocks, capacitance sensors etc), atmometers, water level sensors, etc, that are installed and read to determine various information to be used by the cooperator in improving irrigater management. This level of instrumentation requires manual reading. Note: flowmeter (587) and surge valve (443) are separate practices and are not to be used as an IWM device under this practice.The installation includes the purchase of IWM device, installation of equipment, and labor to install and read sensors or device. Typical Scenario involves installation of resistance sensor blocks in a 80 acre field of irrigated cropland. In typical scenario, producer periodically monitors soil moisture sensors during the growing season. Meters used to read sensors may be portable. Resource Concerns: Insufficient Water - Inefficient use of irrigation water, and Degraded Plant Condition - Undesirable plantproductivity and health, and Inefficient Energy Use - Equipment and facilities.Associated Practices: 449- Irrigation Water Management, 587- Structure for water Control, 328-Conservation Crop Rotation, and 590-Nutrient Management.

**Before Situation:**

In the typical scenario, producer uses manual methods to evaluate parameter, such as feel method to estimate soil moisture for scheduling irrigation.

**After Situation:**

In typical scenario, producer uses instrumentation in lieu of manual methods and 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

**Total Scenario Cost:** $2,243.83

**Scenario Cost/Unit:** $1,121.92

**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. | Hour | $18.93 | 8 | $151.44 |
| Supervisor or Manager | 234 | Labor involving supervision or management activities. Includes crew supervisors, foremen and farm/ranch managers time required for adopting new technology, etc. | Hour | $34.29 | 32 | $1,097.28 |
| **Materials** | | | | | | |
| 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 | $287.17 | 1 | $287.17 |
| Soil Moisture Meter | 1455 | Soil Moisture Sensor Reader. Equipment only. | Each | $285.50 | 1 | $285.50 |
| Soil Moisture Sensor | 1456 | Soil moisture resistance sensor W/10' cables. Equipment only. | Each | $36.74 | 8 | $293.92 |
| **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 | $64.26 | 2 | $128.52 |

**Practice:** 449 - Irrigation Water Management

**Scenario** #8 - IWM Device with Data Recorder_YR1

**Scenario Description:**

This practice includes the installation of an Irrrigation Water Management device such as soil moisture sensors(tensiometers, gyp blocks, capacitance sensors etc), atmometers, water level sensors, etc, with built-in data recording capability that are installed and read by datalogger/laptop to determine various information to be used by the cooperator in improving irrigater management. Note: flowmeter (587) and surge valve (443) are separate practices and are not to be used as an IWM device under this practice.The practice installation includes the purchase of IWM device, installation equipment (probe or auger), and a data logger to log continuous parameter data that can be downloaded to a personal computer and associated graphing software. 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. Resource Concerns: Insufficient Water - Inefficient use of irrigation water, and Degraded Plant Condition - Undesirable plantproductivity and health, and Inefficient Energy Use - Equipment and facilities. Associated Practices: 449-Irrigation Water Management, 587-Structure for water Control, 328-Conservation Crop Rotation, and 590-Nutrient Management.

**Before Situation:**

In the typical scenario, producer uses manual methods to evaluate parameter, such as feel method to estimate soil moisture for scheduling irrigation.

**After Situation:**

In typical scenario, producer uses recording instrumentation in lieu of manual methods and 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

**Total Scenario Cost:** $3,501.37

**Scenario Cost/Unit:** $1,750.69

**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. | Hour | $18.93 | 12 | $227.16 |
| 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. | Hour | $34.29 | 40 | $1,371.60 |
| **Materials** | | | | | | |
| 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 | $287.17 | 1 | $287.17 |
| Data Logger | 1453 | Data Logger W/Graphic Output for water management. Materials only. | Each | $596.50 | 2 | $1,193.00 |
| Soil Moisture Sensor | 1456 | Soil moisture resistance sensor W/10' cables. Equipment only. | Each | $36.74 | 8 | $293.92 |
| **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 | $64.26 | 2 | $128.52 |

**Practice:** 449 - Irrigation Water Management

**Scenario** #9 - IWM Device w. Telemetry_YR1

**Scenario Description:**

This practice includes the installation of an Irrrigation Water Management device such as soil moisture sensors(tensiometers, gyp blocks, capacitance sensors etc), atmometers, water level sensors, etc, with a telemetry system to transmit continuous parameter data that can be utilized on tablets, smartphones, laptops, or personal computer and associated graphing software to evaluate various parameters to be used by the cooperator in improving irrigation water management in real time. Note: flowmeter (587) and surge valve (443) are separate practices and are not to be used as an IWM device under this practice.The practice installation includes the purchase of IWM device, installation equipment (probe or auger), and a telemetry system to transmit continuous parameter data that can be utilized on an electronic device (tablet, smartphone, laptop, pc) and associated graphing software. 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. Resource Concerns: Insufficient Water - Inefficient use of irrigation water, and Degraded Plant Condition - Undesirable plantproductivity and health, and Inefficient Energy Use - Equipment and facilities. Associated Practices: 449- Irrigation Water Management, 587-Structure for water Control, 328-Conservation Crop Rotation, and 590-Nutrient Management.

**Before Situation:**

In the typical scenario, producer uses manual methods to evaluate parameter, such as feel method to estimate soil moisture for scheduling irrigation.

**After Situation:**

In typical scenario, producer uses instrumentation with real-time, continuous telemetry in lieu of manual methods and has installed four sensors at each monitoring site to a depth of four feet with one sensor representing each foot of depth. Producer utilizes continuously transmitted soil moisture measurements in analysis software that are used to schedule irrigation more effectively resulting in improved irrigation water managment and reduced energy use.

**Feature Measure:** Number of Sensors in field

**Scenario Unit::** Each

**Scenario Typical Size:** 2

**Total Scenario Cost:** $4,337.85

**Scenario Cost/Unit:** $2,168.93

**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. | Hour | $18.93 | 16 | $302.88 |
| 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. | Hour | $34.29 | 48 | $1,645.92 |
| **Materials** | | | | | | |
| 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 | $287.17 | 1 | $287.17 |
| 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 | $1,679.44 | 1 | $1,679.44 |
| Soil Moisture Sensor | 1456 | Soil moisture resistance sensor W/10' cables. Equipment only. | Each | $36.74 | 8 | $293.92 |
| **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 | $64.26 | 2 | $128.52 |

**Practice:** 449 - Irrigation Water Management

**Scenario** #10 - Rice Intermittent Flood All Season

**Scenario Description:**

Managing water levels in rice fields for the entire growing season to minimize greenhouse gas production according to an irrigation water management plan developed in cooperation with university and/or water district personnel. Typical irrigation water management will include managing water levels in the field to "dry down" between full flood conditions to a saturated soil condition prior to re-flooding the field. Records are kept for flooding operations. Irrigation return flows will be reduced also, decreasing groundwater demand and decreasing exports improving water quality. Energy use should alos be reduced.Resource Concerns: Excessive Greenhouse Gas , CH4 (methane); Excessive Greenhouse Gas, CO2 (carbon dioxide) or Excessive Greenhouse Gas, N2O (nitrous oxide). Insufficient Water Supply-Inefficient use of irrigation water; and Inefficient Energy Use-Equipment and facilities.Associated Practices: 410 - Grade Stablization Structure; 430 - Irrigation Pipeline; 464 - Irrigation Land Leveling; 443 - Irrigation System, Surface and Subsurface; 587-Structure for water Control; and 590-Nutrient Management.

**Before Situation:**

Farmer maintains continuous flood on rice fields during the growing season. Significant greenhouse gases are produced. Water and nutrients are lost if rainfall occurs during the growing season.

**After Situation:**

Farmer floods fields and allows the fields to "dry-down" until little of no water is standing in the field but the soil is maintained in a saturated condition. The fields are then re-flooded and the cycle is repeated throughout the growing season. Greenhouse gas production is reduced. Water and nutrients are conserved.

**Feature Measure:** Irrigated Acres Managed

**Scenario Unit::** Acre

**Scenario Typical Size:** 40

**Total Scenario Cost:** $1,347.09

**Scenario Cost/Unit:** $33.68

**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. | Hour | $25.08 | 25 | $627.00 |
| 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. | Hour | $34.29 | 21 | $720.09 |

**Practice:** 449 - Irrigation Water Management

**Scenario** #11 - Early Dry Down

**Scenario Description:**

Managing water levels in rice fields at the end of the growing season to minimize greenhouse gas production according to an irrigation water management plan developed in cooperation with university and/or water district personnel. Typical irrigation water management will include managing the field to an early "dry down" at the end of the growing season based on plant growth stage. Records are kept for end of season flooding operations. Irrigation return flows will be reduced also, decreasing groundwater demand and decreasing exports improving water quality. Energy use should alos be reduced.Resource Concerns: Excessive Greenhouse Gas, CH4 (methane); Excessive Greenhouse Gas, CO2 (carbon dioxide) or Excessive Greenhouse Gas, N2O (nitrous oxide), Insufficient Water Supply-Inefficient use of irrigation water; and Inefficient Energy Use-Equipment and facilities.Associated Practices: 410 - Grade Stablization Structure; 430 - Irrigation Pipeline; 464 - Irrigation Land Leveling; 443 - Irrigation System, Surface and Subsurface; 587-Structure for water Control; and 590-Nutrient Management.

**Before Situation:**

Farmer maintains continuous flood on rice fields during the growing season until rice is ready for harvest. Levees are cut and the fields are drained. Significant greenhouse gases are produced. Water and nutrients are lost if rainfall occurs during the growing season and at the end of the growing season.

**After Situation:**

Farmer floods fields and maintains flood during the growing season. Near the end of the growing season, no additional water is added and the field is allowed to dry down. Greenhouse gas production is reduced. Water and nutrients are conserved.

**Feature Measure:** Irrigated Acres Managed

**Scenario Unit::** Acre

**Scenario Typical Size:** 40

**Total Scenario Cost:** $643.86

**Scenario Cost/Unit:** $16.10

**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. | Hour | $25.08 | 12 | $300.96 |
| 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. | Hour | $34.29 | 10 | $342.90 |

**Practice:** 450 - Anionic Polyacrylamide (PAM) Application

**Scenario** #1 - 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

**Total Scenario Cost:** $1,052.76

**Scenario Cost/Unit:** $4.39

**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. | Hour | $18.93 | 12 | $227.16 |
| **Materials** | | | | | | |
| Anionic Polyacrylamide (PAM) | 1279 | Water Soluble PAM, granular bulk, for mixing with irrigation water. Includes materials and shipping only. | Pound | $3.44 | 240 | $825.60 |

**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::** Acre

**Scenario Typical Size:** 10

**Total Scenario Cost:** $9,223.11

**Scenario Cost/Unit:** $922.31

**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. | Hour | $176.61 | 40 | $7,064.40 |
| **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. | Hour | $18.93 | 40 | $757.20 |
| Equipment Operators, Heavy | 233 | Includes: Cranes, Hydraulic Excavators >=50 HP, Dozers, Paving Machines, Rock Trenchers, Trenchers >=12", Dump Trucks, Ag Equipment >=150 HP, Scrapers, Water Wagons. | Hour | $23.93 | 40 | $957.20 |
| **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 | $444.31 | 1 | $444.31 |

**Practice:** 460 - Land Clearing

**Scenario** #3 - Clearing for GSS

**Scenario Description:**

Site preparation of a gully with track hoe, dozer or equivalent equipment to install a structural conservation practice, typically a 410 grade stabilization structure. Typical scenario is approximately 1 acres of trees and shrubs to be cleared on a high bank adjacent to a water body and/or gully. Woody debris removal often necessary. Does not address excavation required for practice installation. The resource concern is determined by the conservation objective met with the final practice applied to the field.

**Before Situation:**

Wooded field edge of approximately 1.0 acres, with moderate density evenly spaced tree canopy on a high bank adjacent to a gully or water body. Fallen trees must often be removed.

**After Situation:**

Crew uses 160 HP dozer or track hoe to clear trees and prepare site for conservation practice installation, 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::** Acre

**Scenario Typical Size:** 1

**Total Scenario Cost:** $2,013.62

**Scenario Cost/Unit:** $2,013.62

**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. | Hour | $112.82 | 7 | $789.74 |
| Skidsteer, 80 HP | 933 | Skidsteer loader with horsepower range of 60 to 90. Equipment and power unit costs. Labor not included. | Hour | $40.57 | 4 | $162.28 |
| **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. | Hour | $18.93 | 7 | $132.51 |
| Equipment Operators, Light | 232 | Includes: Skid Steer Loaders, Hydraulic Excavators <50 HP, Trenchers <12", Ag Equipment <150 HP, Pickup Trucks, Forklifts, Mulchers | Hour | $21.14 | 4 | $84.56 |
| Equipment Operators, Heavy | 233 | Includes: Cranes, Hydraulic Excavators >=50 HP, Dozers, Paving Machines, Rock Trenchers, Trenchers >=12", Dump Trucks, Ag Equipment >=150 HP, Scrapers, Water Wagons. | Hour | $23.93 | 7 | $167.51 |
| **Mobilization** | | | | | | |
| Mobilization, medium equipment | 1139 | Equipment with 70-150 HP or typical weights between 14,000 and 30,000 pounds. | Each | $232.71 | 1 | $232.71 |
| Mobilization, large equipment | 1140 | Equipment >150HP or typical weights greater than 30,000 pounds or loads requiring over width or over length permits. | Each | $444.31 | 1 | $444.31 |

**Practice:** 462 - Precision Land Forming

**Scenario** #1 - Low Shaping

**Scenario Description:**

The land surface is shaped or leveled to a specific elevation and grade for various land uses. Cuts and fills are small. The resource concerns are EXCESS / INSUFFICIENT WATER -( Ponding, Flooding) and SOIL EROSION -(Sheet, Rill)

**Before Situation:**

The field has minor topographic issues or problems with surface drainage or erosion which can be corrected without land leveling or land smoothing. Site conditions require attention to elevation and grade. Typical situation is a 40 acre field. Material to be moved and or placed typically is between 60 - 124 cubic yards per acre.

**After Situation:**

Land has been shaped to the required elevations and grades. Resource concerns have been treated. Associated practices, like plantings or drainage water management practices, would be contracted seperately as needed.

**Feature Measure:** Volume of Earth Moved

**Scenario Unit::** Acre

**Scenario Typical Size:** 40

**Total Scenario Cost:** $7,632.14

**Scenario Cost/Unit:** $190.80

**Cost Details:**

| Component Name | ID | Description | Unit | Cost | QTY | Total |
|---|---|---|---|---|---|---|
| **Equipment Installation** | | | | | | |
| Tractor, agricultural, 360 HP | 1205 | Agricultural tractor with horsepower range of 340 to 390. Equipment and power unit costs. Labor not included. | Hour | $142.41 | 36 | $5,126.76 |
| Scraper, pull, 15 CY | 1207 | Pull type earthmoving scraper with 15 CY capacity. Does not include pulling equipment or labor. Add Tractor or Dozer, 260 HP typically required for single scraper. | Hour | $20.98 | 36 | $755.28 |
| **Labor** | | | | | | |
| Equipment Operators, Heavy | 233 | Includes: Cranes, Hydraulic Excavators >=50 HP, Dozers, Paving Machines, Rock Trenchers, Trenchers >=12", Dump Trucks, Ag Equipment >=150 HP, Scrapers, Water Wagons. | Hour | $23.93 | 36 | $861.48 |
| **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 | $444.31 | 2 | $888.62 |

**Practice:** 462 - Precision Land Forming

**Scenario** #2 - Medium Shaping

**Scenario Description:**

The land surface is shaped or leveled to a specific elevation and grade for various land uses. Cuts and fills are small. The resource concerns are EXCESS / INSUFFICIENT WATER -( Ponding, Flooding) and SOIL EROSION -(Sheet, Rill)

**Before Situation:**

The field has minor topographic issues or problems with surface drainage or erosion which can be corrected without land leveling or land smoothing. Site conditions require attention to elevation and grade. Typical situation is a 40 acre field. Material to be moved and or placed typically is between 125 - 200 cubic yards per acre.

**After Situation:**

Land has been shaped to the required elevations and grades. Resource concerns have been treated. Associated practices, like plantings or drainage water management practices, would be contracted seperately as needed.

**Feature Measure:** Volume of Earth Moved

**Scenario Unit::** Acre

**Scenario Typical Size:** 40

**Total Scenario Cost:** $9,879.98

**Scenario Cost/Unit:** $247.00

**Cost Details:**

| Component Name | ID | Description | Unit | Cost | QTY | Total |
|---|---|---|---|---|---|---|
| **Equipment Installation** | | | | | | |
| Tractor, agricultural, 360 HP | 1205 | Agricultural tractor with horsepower range of 340 to 390. Equipment and power unit costs. Labor not included. | Hour | $142.41 | 48 | $6,835.68 |
| Scraper, pull, 15 CY | 1207 | Pull type earthmoving scraper with 15 CY capacity. Does not include pulling equipment or labor. Add Tractor or Dozer, 260 HP typically required for single scraper. | Hour | $20.98 | 48 | $1,007.04 |
| **Labor** | | | | | | |
| Equipment Operators, Heavy | 233 | Includes: Cranes, Hydraulic Excavators >=50 HP, Dozers, Paving Machines, Rock Trenchers, Trenchers >=12", Dump Trucks, Ag Equipment >=150 HP, Scrapers, Water Wagons. | Hour | $23.93 | 48 | $1,148.64 |
| **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 | $444.31 | 2 | $888.62 |

**Practice:** 462 - Precision Land Forming

**Scenario** #3 - High Shaping

**Scenario Description:**

The land surface is shaped or leveled to a specific elevation and grade for various land uses. Cuts and fills are small. The resource concerns are EXCESS / INSUFFICIENT WATER -( Ponding, Flooding) and SOIL EROSION -(Sheet, Rill)

**Before Situation:**

The field has minor topographic issues or problems with surface drainage or erosion which can be corrected without land leveling or land smoothing. Site conditions require attention to elevation and grade. Typical situation is a 40 acre field. Material to be moved and or placed typically is between 201 - 250 cubic yards per acre.

**After Situation:**

Land has been shaped to the required elevations and grades. Resource concerns have been treated. Associated practices, like plantings or drainage water management practices, would be contracted seperately as needed.

**Feature Measure:** Volume of Earth Moved

**Scenario Unit::** Acre

**Scenario Typical Size:** 40

**Total Scenario Cost:** $15,124.94

**Scenario Cost/Unit:** $378.12

**Cost Details:**

| Component Name | ID | Description | Unit | Cost | QTY | Total |
|---|---|---|---|---|---|---|
| **Equipment Installation** | | | | | | |
| Tractor, agricultural, 360 HP | 1205 | Agricultural tractor with horsepower range of 340 to 390. Equipment and power unit costs. Labor not included. | Hour | $142.41 | 76 | $10,823.16 |
| Scraper, pull, 15 CY | 1207 | Pull type earthmoving scraper with 15 CY capacity. Does not include pulling equipment or labor. Add Tractor or Dozer, 260 HP typically required for single scraper. | Hour | $20.98 | 76 | $1,594.48 |
| **Labor** | | | | | | |
| Equipment Operators, Heavy | 233 | Includes: Cranes, Hydraulic Excavators >=50 HP, Dozers, Paving Machines, Rock Trenchers, Trenchers >=12", Dump Trucks, Ag Equipment >=150 HP, Scrapers, Water Wagons. | Hour | $23.93 | 76 | $1,818.68 |
| **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 | $444.31 | 2 | $888.62 |

**Practice:** 462 - Precision Land Forming

**Scenario** #4 - Site Stabilization

**Scenario Description:**

The site contains a gully or other site specific topographic problem. Site conditions require attention to elevation and grade. Resource concerns are EXCESS / INSUFFICIENT WATER -( Ponding, Flooding) and SOIL EROSION -(Sheet, Rill)

**Before Situation:**

The site, commonly a crop field or CAFO, has localized gully or topographic issues causing drainage or erosion problems. Typical situation is a gully 10 feet wide and 5 feet deep.

**After Situation:**

Land has been shaped to the required elevations and grades. Resource concerns have been treated. Associated practices, like plantings or drainage water management practices, would be contracted seperately as needed.

**Feature Measure:** Cubic yards of material placed

**Scenario Unit::** Cubic Yard

**Scenario Typical Size:** 6000

**Total Scenario Cost:** $12,172.71

**Scenario Cost/Unit:** $2.03

**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 Yard | $1.99 | 6000 | $11,940.00 |
| **Mobilization** | | | | | | |
| Mobilization, medium equipment | 1139 | Equipment with 70-150 HP or typical weights between 14,000 and 30,000 pounds. | Each | $232.71 | 1 | $232.71 |

**Practice:** 464 - Irrigation Land Leveling

**Scenario** #1 - Irrigation Land Leveling with stockpiling

**Scenario Description:**

This is scenario will level a typical 40 acres of irrigated crop land surface to enhance uniform flow of surface water to improve irrigation efficiency using dirtpans/carry-all/pan-scraper equipment and includes stripping and stockpiling. The typical volume of earth moved is 100 to 500 cubic yards per acre. Resource Concern: Excess/Insufficient - Inefficient Use of Irrigation Water Associated Conservation Practices: 433 - Irrigation System, Surface and Subsurface; 607 - Surface Drain, Field Ditch; 388 - Irrigation Field Ditch; 449 - Irrigation Water Management; or 587 - Structure for Water Control.

**Before Situation:**

Irregular field surface reduces uniformity of surface application and thus irrigation efficiency by localized ponding and/or excess runoff/runon.

**After Situation:**

Cropland will be reshaped to provide uniform distribution of irrigation water in order to promote irrigation efficiencies. Stockpiling assists in retaining field soil quality.

**Feature Measure:** Volume of Earth Moved

**Scenario Unit::** Cubic Yard

**Scenario Typical Size:** 14000

**Total Scenario Cost:** $18,207.57

**Scenario Cost/Unit:** $1.30

**Cost Details:**

| Component Name | ID | Description | Unit | Cost | QTY | Total |
|---|---|---|---|---|---|---|
| **Equipment Installation** | | | | | | |
| Stripping and stockpiling, topsoil | 1199 | Stripping and stockpiling of topsoil adjacent to stripping area. Includes equipment and labor. | Cubic Yard | $0.81 | 2800 | $2,268.00 |
| Tractor, agricultural, 260 HP | 1204 | Agricultural tractor with horsepower range of 240 to 290. Equipment and power unit costs. Labor not included. | Hour | $111.18 | 85 | $9,450.30 |
| Scraper, pull, 15 CY | 1207 | Pull type earthmoving scraper with 15 CY capacity. Does not include pulling equipment or labor. Add Tractor or Dozer, 260 HP typically required for single scraper. | Hour | $20.98 | 170 | $3,566.60 |
| **Labor** | | | | | | |
| Equipment Operators, Heavy | 233 | Includes: Cranes, Hydraulic Excavators >=50 HP, Dozers, Paving Machines, Rock Trenchers, Trenchers >=12", Dump Trucks, Ag Equipment >=150 HP, Scrapers, Water Wagons. | Hour | $23.93 | 85 | $2,034.05 |
| **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 | $444.31 | 2 | $888.62 |

**Practice:** 464 - Irrigation Land Leveling

**Scenario** #2 - Land Leveling 125 to 205 cy per ac

**Scenario Description:**

This is scenario will level a typical 80 acres of irrigated crop land surface to enhance uniform flow of surface water to improve irrigation efficiency using dirtpans/carry-all/pan-scraper equipment. The typical volume of earth moved is 190 cubic yards per acre. Resource Concern: Excess/Insufficient - Inefficient Use of Irrigation Water

Associated Conservation Practices: 433 - Irrigation System, Surface and Subsurface; 607 - Surface Drain, Field Ditch; 388 - Irrigation Field Ditch; 449 - Irrigation Water Management; or 587 - Structure for Water Control.

**Before Situation:**

Irregular field surface reduces uniformity of surface application and thus irrigation efficiency by localized ponding and/or excess runoff/runon.

**After Situation:**

Cropland will be reshaped to provide uniform distribution of irrigation water in order to promote irrigation efficiencies.

**Feature Measure:** Acres of Land Levelled

**Scenario Unit::** Acre

**Scenario Typical Size:** 80

**Total Scenario Cost:** $27,358.95

**Scenario Cost/Unit:** $341.99

**Cost Details:**

| Component Name | ID | Description | Unit | Cost | QTY | Total |
|---|---|---|---|---|---|---|
| **Equipment Installation** | | | | | | |
| Tractor, agricultural, 260 HP | 1204 | Agricultural tractor with horsepower range of 240 to 290. Equipment and power unit costs. Labor not included. | Hour | $111.18 | 152 | $16,899.36 |
| Scraper, pull, 15 CY | 1207 | Pull type earthmoving scraper with 15 CY capacity. Does not include pulling equipment or labor. Add Tractor or Dozer, 260 HP typically required for single scraper. | Hour | $20.98 | 304 | $6,377.92 |
| **Labor** | | | | | | |
| Equipment Operators, Heavy | 233 | Includes: Cranes, Hydraulic Excavators >=50 HP, Dozers, Paving Machines, Rock Trenchers, Trenchers >=12", Dump Trucks, Ag Equipment >=150 HP, Scrapers, Water Wagons. | Hour | $23.93 | 152 | $3,637.36 |
| **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 | $444.31 | 1 | $444.31 |

**Practice:** 464 - Irrigation Land Leveling

**Scenario** #3 - Land Leveling over 205 cy per ac

**Scenario Description:**

This is scenario will level a typical 80 acres of irrigated crop land surface to enhance uniform flow of surface water to improve irrigation efficiency using dirtpans/carry-all/pan-scraper equipment. The typical volume of earth moved is 260 cubic yards per acre. Resource Concern: Excess/Insufficient - Inefficient Use of Irrigation Water

Associated Conservation Practices: 433 - Irrigation System, Surface and Subsurface; 607 - Surface Drain, Field Ditch; 388 - Irrigation Field Ditch; 449 - Irrigation Water Management; or 587 - Structure for Water Control.

**Before Situation:**

Irregular field surface reduces uniformity of surface application and thus irrigation efficiency by localized ponding and/or excess runoff/runon.

**After Situation:**

Cropland will be reshaped to provide uniform distribution of irrigation water in order to promote irrigation efficiencies.

**Feature Measure:** Acres of Land Levelled

**Scenario Unit::** Acre

**Scenario Typical Size:** 80

**Total Scenario Cost:** $37,274.87

**Scenario Cost/Unit:** $465.94

**Cost Details:**

| Component Name | ID | Description | Unit | Cost | QTY | Total |
|---|---|---|---|---|---|---|
| **Equipment Installation** | | | | | | |
| Tractor, agricultural, 260 HP | 1204 | Agricultural tractor with horsepower range of 240 to 290. Equipment and power unit costs. Labor not included. | Hour | $111.18 | 208 | $23,125.44 |
| Scraper, pull, 15 CY | 1207 | Pull type earthmoving scraper with 15 CY capacity. Does not include pulling equipment or labor. Add Tractor or Dozer, 260 HP typically required for single scraper. | Hour | $20.98 | 416 | $8,727.68 |
| **Labor** | | | | | | |
| Equipment Operators, Heavy | 233 | Includes: Cranes, Hydraulic Excavators >=50 HP, Dozers, Paving Machines, Rock Trenchers, Trenchers >=12", Dump Trucks, Ag Equipment >=150 HP, Scrapers, Water Wagons. | Hour | $23.93 | 208 | $4,977.44 |
| **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 | $444.31 | 1 | $444.31 |

**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 topographic 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::** Acre

**Scenario Typical Size:** 40

**Total Scenario Cost:** $2,773.75

**Scenario Cost/Unit:** $69.34

**Cost Details:**

| Component Name | ID | Description | Unit | Cost | QTY | Total |
|---|---|---|---|---|---|---|
| **Equipment Installation** | | | | | | |
| Tractor, agricultural, 160 HP | 1203 | Agricultural tractor with horsepower range of 140 to 190. Equipment and power unit costs. Labor not included. | Hour | $72.45 | 25 | $1,811.25 |
| 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. | Hour | $14.57 | 25 | $364.25 |
| **Labor** | | | | | | |
| Equipment Operators, Heavy | 233 | Includes: Cranes, Hydraulic Excavators >=50 HP, Dozers, Paving Machines, Rock Trenchers, Trenchers >=12", Dump Trucks, Ag Equipment >=150 HP, Scrapers, Water Wagons. | Hour | $23.93 | 25 | $598.25 |

**Practice:** 466 - Land Smoothing

**Scenario** #2 - Continuous Surface Land Smoothing

**Scenario Description:**

This is scenario will smooth a typical 40 acres of irrigated crop land surface to enhance uniform flow of surface water to improve irrigation efficiency using dirtpans/carry-all/pan-scraper equipment. The typical volume of earth moved is 100 to 350 cubic yards per acre. Resource Concern: Excess/Insufficient - Inefficient Use of Irrigation Water Associated Conservation Practices: 433 - Irrigation System, Surface and Subsurface; 607 - Surface Drain, Field Ditch; 388 - Irrigation Field Ditch; 449 - Irrigation Water Management; or 587 - Structure for Water Control.

**Before Situation:**

Irregular field surface reduces uniformity of surface application and thus irrigation efficiency by localized ponding and/or excess runoff/runon.

**After Situation:**

A vaiable row slope and cross row slope is used to optain the optimum design of the surface so that minimum movement of soil is needed. Water can then move along the natural flow of the ground without causing ponding with in the row.

**Feature Measure:** Yards of earth moved

**Scenario Unit::** Cubic Yard

**Scenario Typical Size:** 9000

**Total Scenario Cost:** $10,653.25

**Scenario Cost/Unit:** $1.18

**Cost Details:**

| Component Name | ID | Description | Unit | Cost | QTY | Total |
|---|---|---|---|---|---|---|
| **Equipment Installation** | | | | | | |
| Tractor, agricultural, 360 HP | 1205 | Agricultural tractor with horsepower range of 340 to 390. Equipment and power unit costs. Labor not included. | Hour | $142.41 | 54.5 | $7,761.35 |
| Scraper, pull, 15 CY | 1207 | Pull type earthmoving scraper with 15 CY capacity. Does not include pulling equipment or labor. Add Tractor or Dozer, 260 HP typically required for single scraper. | Hour | $20.98 | 54.5 | $1,143.41 |
| **Labor** | | | | | | |
| Equipment Operators, Heavy | 233 | Includes: Cranes, Hydraulic Excavators >=50 HP, Dozers, Paving Machines, Rock Trenchers, Trenchers >=12", Dump Trucks, Ag Equipment >=150 HP, Scrapers, Water Wagons. | Hour | $23.93 | 54.5 | $1,304.19 |
| **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 | $444.31 | 1 | $444.31 |

**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.

**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 Foot

**Scenario Typical Size:** 4500

**Total Scenario Cost:** $2,908.69

**Scenario Cost/Unit:** $0.65

**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 Yard | $1.99 | 90 | $179.10 |
| **Foregone Income** | | | | | | |
| FI, Soybeans Irrigated | 1962 | Irrigated Soybeans is Primary Crop | Acre | $261.53 | 0.1 | $26.15 |
| **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. | Hour | $34.29 | 2 | $68.58 |
| **Materials** | | | | | | |
| Turf reinforcement mat | 1212 | Synthetic turf reinforcement mat with staple anchoring. Includes materials, equipment and labor. | Square Yard | $4.49 | 535 | $2,402.15 |
| **Mobilization** | | | | | | |
| Mobilization, medium equipment | 1139 | Equipment with 70-150 HP or typical weights between 14,000 and 30,000 pounds. | Each | $232.71 | 1 | $232.71 |

**Practice:** 468 - Lined Waterway or Outlet

**Scenario** #2 - Rock Lined - 12 inch

**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). 1/2 the channel is excavated, before excavation for riprap. Excess excavation is spoiled in the immediate area. Riprap is installed over 100% of the width of the waterway to prevent scour. Cost include excavation, spoiling of excess material, geotextile underlayment and installing 9" Rock Riprap. Lined waterway width is measured from top of bank to top of bank.

**Before 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. 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:** Square Foot of Waterway

**Scenario Unit::** Square Foot

**Scenario Typical Size:** 4500

**Total Scenario Cost:** $12,317.55

**Scenario Cost/Unit:** $2.74

**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 Yard | $1.99 | 295 | $587.05 |
| **Foregone Income** | | | | | | |
| FI, Soybeans Irrigated | 1962 | Irrigated Soybeans is Primary Crop | Acre | $261.53 | 0.1 | $26.15 |
| **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. | Hour | $18.93 | 2 | $37.86 |
| Supervisor or Manager | 234 | Labor involving supervision or management activities. Includes crew supervisors, foremen and farm/ranch managers time required for adopting new technology, etc. | Hour | $34.29 | 2 | $68.58 |
| **Materials** | | | | | | |
| Rock Riprap, Placed with geotextile | 44 | Rock Riprap, placed with geotextile, includes materials, equipment and labor to transport and place | Cubic Yard | $55.44 | 205 | $11,365.20 |
| **Mobilization** | | | | | | |
| Mobilization, medium equipment | 1139 | Equipment with 70-150 HP or typical weights between 14,000 and 30,000 pounds. | Each | $232.71 | 1 | $232.71 |

**Practice:** 468 - Lined Waterway or Outlet

**Scenario** #3 - Rock Lined - 24 inch

**Scenario Description:**

Install 300 ' long by 15' wide by 1.5' deep trapezoidal or parabolic shaped waterway lined with riprap (D100 = 18", Velocity ~ 11 ft/sec). 1/2 the channel is excavated, before excavation for riprap. Excess excavation is spoiled in the immediate area. Riprap is installed over 100% of the width of the waterway to prevent scour. Cost include excavation, spoiling of excess material, geotextile underlayment and installing 18" Rock Riprap. Lined waterway width is measured from top of bank to top of bank.

**Before 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. 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:** Square Foot of Waterway

**Scenario Unit::** Square Foot

**Scenario Typical Size:** 4500

**Total Scenario Cost:** $27,249.35

**Scenario Cost/Unit:** $6.06

**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 Yard | $1.99 | 555 | $1,104.45 |
| **Foregone Income** | | | | | | |
| FI, Soybeans Irrigated | 1962 | Irrigated Soybeans is Primary Crop | Acre | $261.53 | 0.1 | $26.15 |
| **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. | Hour | $18.93 | 2 | $37.86 |
| Supervisor or Manager | 234 | Labor involving supervision or management activities. Includes crew supervisors, foremen and farm/ranch managers time required for adopting new technology, etc. | Hour | $34.29 | 2 | $68.58 |
| **Materials** | | | | | | |
| Rock Riprap, Placed with geotextile | 44 | Rock Riprap, placed with geotextile, includes materials, equipment and labor to transport and place | Cubic Yard | $55.44 | 465 | $25,779.60 |
| **Mobilization** | | | | | | |
| Mobilization, medium equipment | 1139 | Equipment with 70-150 HP or typical weights between 14,000 and 30,000 pounds. | Each | $232.71 | 1 | $232.71 |

**Practice:** 468 - Lined Waterway or Outlet

**Scenario** #4 - 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 Foot

**Scenario Typical Size:** 4500

**Total Scenario Cost:** $21,131.10

**Scenario Cost/Unit:** $4.70

**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 Yard | $210.23 | 80 | $16,818.40 |
| 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 Yard | $1.99 | 280 | $557.20 |
| **Foregone Income** | | | | | | |
| FI, Soybeans Irrigated | 1962 | Irrigated Soybeans is Primary Crop | Acre | $261.53 | 0.1 | $26.15 |
| **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. | Hour | $18.93 | 2 | $37.86 |
| Supervisor or Manager | 234 | Labor involving supervision or management activities. Includes crew supervisors, foremen and farm/ranch managers time required for adopting new technology, etc. | Hour | $34.29 | 2 | $68.58 |
| **Materials** | | | | | | |
| Aggregate, Gravel, Graded | 46 | Gravel, includes materials, equipment and labor to transport and place. Includes washed and unwashed gravel. | Cubic Yard | $30.82 | 110 | $3,390.20 |
| **Mobilization** | | | | | | |
| Mobilization, medium equipment | 1139 | Equipment with 70-150 HP or typical weights between 14,000 and 30,000 pounds. | Each | $232.71 | 1 | $232.71 |

**Practice:** 468 - Lined Waterway or Outlet

**Scenario** #5 - Membrane

**Scenario Description:**

Install 300 ' long by 15' wide by 1.5' deep trapezoidal or parabolic shaped waterway lined with a synthetic membrane. 1/2 the channel is excavated. Excess excavation is spoiled in the immediate area. Membrane is installed over 100% of the width of the waterway to prevent scour. Cost include excavation, spoiling of excess material, and furnishing and installing synthetic membrane and geotextile underlayment. 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:**

Membrane lined waterway is 300 ' long by 15' wide by 1.5' deep. The practice is installed using a hydraulic excavator. Membrane liner and 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:** Square Foot of Waterway

**Scenario Unit::** Square Foot

**Scenario Typical Size:** 4500

**Total Scenario Cost:** $31,206.45

**Scenario Cost/Unit:** $6.93

**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 | $2.05 | 535 | $1,096.75 |
| Excavation, Common Earth, side cast, small equipment | 48 | Bulk excavation and side casting of common earth with hydraulic excavator with less than 1 CY capacity. Includes equipment and labor. | Cubic Yard | $1.99 | 90 | $179.10 |
| **Foregone Income** | | | | | | |
| FI, Soybeans Irrigated | 1962 | Irrigated Soybeans is Primary Crop | Acre | $261.53 | 0.1 | $26.15 |
| **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. | Hour | $18.93 | 12 | $227.16 |
| 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. | Hour | $34.29 | 2 | $68.58 |
| **Materials** | | | | | | |
| Synthetic Liner, 40 mil | 1387 | Synthetic 40 mil HDPE, LLDPE, EPDM, etc membrane liner material. Includes materials and shipping only. | Square Yard | $6.12 | 4800 | $29,376.00 |
| **Mobilization** | | | | | | |
| Mobilization, medium equipment | 1139 | Equipment with 70-150 HP or typical weights between 14,000 and 30,000 pounds. | Each | $232.71 | 1 | $232.71 |

**Practice:** 468 - Lined Waterway or Outlet

**Scenario** #6 - Concrete Block

**Scenario Description:**

Install 36' long (including inlet and outlet aprons) by 15' wide by 1.5' deep trapezoidal shaped waterway or chute lined with concrete blocks. 1/2 the channel is excavated. Excess excavation is spoiled in the immediate area. 8"x8"x16" standard concrete blocks are installed over 100% of the width of the waterway/chute to prevent scour. Cost include excavation, spoiling of excess material, 3" stone subgrade, geotextile and furnishing and installing standard concrete blocks. 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:**

Conccrete block lined waterway or chute is 36 ' long by 15' wide by 1.5' deep. Chute is installed on a 3 to 1 slope. The practice is installed using a hydraulic excavator. Geotextile and concrete blocks are 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 Foot

**Scenario Typical Size:** 540

**Total Scenario Cost:** $2,189.68

**Scenario Cost/Unit:** $4.05

**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 | $2.05 | 65 | $133.25 |
| Excavation, Common Earth, side cast, small equipment | 48 | Bulk excavation and side casting of common earth with hydraulic excavator with less than 1 CY capacity. Includes equipment and labor. | Cubic Yard | $1.99 | 32 | $63.68 |
| **Foregone Income** | | | | | | |
| FI, Soybeans Irrigated | 1962 | Irrigated Soybeans is Primary Crop | Acre | $261.53 | 0.01 | $2.62 |
| **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. | Hour | $18.93 | 24 | $454.32 |
| Supervisor or Manager | 234 | Labor involving supervision or management activities. Includes crew supervisors, foremen and farm/ranch managers time required for adopting new technology, etc. | Hour | $34.29 | 2 | $68.58 |
| **Materials** | | | | | | |
| Aggregate, Gravel, Graded | 46 | Gravel, includes materials, equipment and labor to transport and place. Includes washed and unwashed gravel. | Cubic Yard | $30.82 | 6 | $184.92 |
| Block, concrete | 253 | Concrete block, hollow, normal weight, 3500 psi. Includes both full and partial sizes. Material only | Each | $1.64 | 640 | $1,049.60 |
| **Mobilization** | | | | | | |
| Mobilization, medium equipment | 1139 | Equipment with 70-150 HP or typical weights between 14,000 and 30,000 pounds. | Each | $232.71 | 1 | $232.71 |

**Practice:** 472 - Access Control

**Scenario** #1 - Cave Gate

**Scenario Description:**
Installing a barred metal gate to exclude human access to sensitive cave species in a karst area. Access control is needed to treat the wildlife resource concern.

**Before Situation:**
The cave is currently unprotected from human access, and bats are susceptible to white nose syndrone infection. T&E bat species could easily be impacted by this fungus.

**After Situation:**
Sensitive cave species are protected from human traffic and fungal infection.

**Feature Measure:** A 165 sq ft metal gate with bars 5.7

**Scenario Unit::** Square Foot

**Scenario Typical Size:** 165

**Total Scenario Cost:** $12,897.03

**Scenario Cost/Unit:** $78.16

**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. | Hour | $25.08 | 35 | $877.80 |
| 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. | Hour | $18.93 | 16 | $302.88 |
| **Materials** | | | | | | |
| Bat Gate | 1129 | Bat Gate Assembly, Includes materials, equipment and labor. | Square Foot | $69.19 | 165 | $11,416.35 |
| **Mobilization** | | | | | | |
| Mobilization, Material, distance > 50 miles | 1043 | Mobilization cost of materials for special cases where the distance from the supplier delivery point to the job site exceeds 50 miles. The costs for shipping by UPS or bulk freight shipping to a location within 50 miles of the job site have already been included in the component price. | Dollar | $1.00 | 300 | $300.00 |

**Practice:** 484 - Mulching

**Scenario** #1 - Natural Material - Full Coverage

**Scenario Description:**

Application of straw mulch or other other state approved natural material to reduce erosion and facilitate the establishment of vegetative cover. Mulch provides full coverage and is typically used with critical area planting. Assumes 125 bales/acre (3 bales/1000 sq ft)

**Before Situation:**

Typical scenario ranges from a 0.1 to 1.0 acre disturbed site around a newly constructed structural practice. The potential for soil erosion is high and mulch is needed to stabilize the soil and facilitate the establishment of vegetative cover.

**After 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.

**Feature Measure:** Area Covered by Mulch

**Scenario Unit::** Acre

**Scenario Typical Size:** 1

**Total Scenario Cost:** $506.44

**Scenario Cost/Unit:** $506.44

**Cost Details:**

| Component Name | ID | Description | Unit | Cost | QTY | Total |
|---|---|---|---|---|---|---|
| **Equipment Installation** | | | | | | |
| Truck, Pickup | 939 | Equipment and power unit costs. Labor not included. | Hour | $19.82 | 0.5 | $9.91 |
| **Labor** | | | | | | |
| General Labor | 231 | Labor performed using basic tools such as power tool, shovels, and other tools that do not require extensive training. Ex. pipe layer, herder, concrete placement, materials spreader, flagger, etc. | Hour | $18.93 | 10 | $189.30 |
| **Materials** | | | | | | |
| Straw | 1237 | Small grain straw (non organic and certified organic). Includes materials only. | Ton | $122.89 | 2.5 | $307.23 |

**Practice:** 484 - Mulching

**Scenario** #2 - Erosion Control Blanket

**Scenario Description:**

Installation of erosion control blanket on critical areas with steep slopes, grassed waterways or diversions.. Blanket is typically made of coconut coir, wood fiber, straw and is typically covered on both sides with polypropylene netting. Used to help control erosion and establish vegetative cover.

**Before Situation:**

There are areas of concentrated flow or very steep eroding areas needing a high level of erosion protection. Soil erosion is a concern and there is little to no vegetation.

**After Situation:**

The erosion control blanket is placed on concentrated flow or steep areas and secured with ground stables. Soil erosion is minimized and vegetative cover is established.

**Feature Measure:** Area Covered by Mulch

**Scenario Unit::** Square Foot

**Scenario Typical Size:** 5000

**Total Scenario Cost:** $839.64

**Scenario Cost/Unit:** $0.17

**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. | Hour | $18.93 | 8 | $151.44 |
| **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 | $1.24 | 555 | $688.20 |

**Practice:** 484 - Mulching

**Scenario** #3 - 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 on actual area covered by mulching material.

**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 and energy use associated with irrigation is decreased.

**Feature Measure:** Area Covered by Mulch

**Scenario Unit::** Acre

**Scenario Typical Size:** 1

**Total Scenario Cost:** $9,922.00

**Scenario Cost/Unit:** $9,922.00

**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 | $2.05 | 4840 | $9,922.00 |

**Practice:** 484 - Mulching

**Scenario** #4 - Tree and Shrub

**Scenario Description:**

Barrier fabric or other suitable natural or synthetic mulch is installed with a new tree and shrub planting to support establishment. Typically used during the installation of conservation practices. Rate is per tree/shrub and assumes 1 square yard of barrier fabric and 5 staples/tree.

**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:**

Barrier fabric squares are installed with 5 sod staples each, around individual trees and shrubs to aid establishment. Soil moisture conserved to aid tree/shrub growth establishment.

**Feature Measure:** Number of Trees Mulched

**Scenario Unit::** Each

**Scenario Typical Size:** 100

**Total Scenario Cost:** $205.00

**Scenario Cost/Unit:** $2.05

**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 | $2.05 | 100 | $205.00 |

**Practice:** 490 - Tree/Shrub Site Preparation

**Scenario** #1 - Chemical - Ground Application on Open Field

**Scenario Description:**

This practice involves the use of various herbicides applied using ground-based machinery (farming equipment) in order to remove undesirable vegetation and improve site conditions for establishing trees and/or shrubs. Typical sites include abandoned fields, pastures, rangelands, or agricultural fields. This practice is typically used to address the following resource concerns: degraded plant condition - undesirable plant productivity and health and inadequate structure and composition. Treatment can be done before or after planting.

**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.

**Feature Measure:** Area of Treatment

**Scenario Unit::** Acre

**Scenario Typical Size:** 40

**Total Scenario Cost:** $1,846.63

**Scenario Cost/Unit:** $46.17

**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. | Acre | $8.96 | 40 | $358.40 |
| **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. | Hour | $34.29 | 8 | $274.32 |
| **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. | Acre | $1.30 | 40 | $52.00 |
| Herbicide, Sulfometuron methyl & Hexazinone | 1282 | Broad spectrum herbicide for residual weed control for christmas trees and other trees. Refer to WIN-PST for product names and active ingredients. Includes materials and shipping only. | Acre | $23.23 | 40 | $929.20 |
| **Mobilization** | | | | | | |
| Mobilization, medium equipment | 1139 | Equipment with 70-150 HP or typical weights between 14,000 and 30,000 pounds. | Each | $232.71 | 1 | $232.71 |

**Practice:** 490 - Tree/Shrub Site Preparation

**Scenario** #2 - Chemical - Ground Band Spray

**Scenario Description:**

This practice involves the use of various herbicides applied using ground-based machinery (farming equipment & ATV's) in order to remove undesirable vegetation and improve site conditions for establishing trees and/or shrubs by spraying strips and not the whole tract. (Whole field is counted, but approximately one third of the fiield is treated). Typical sites include abandoned fields, pastures, rangelands, or agricultural fields. This practice is typically used to address the following resource concerns: degraded plant condition - undesirable plant productivity and health and inadequate structure and composition. Treatment can be done before or after planting.

**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 in strips (usually 2 ft on each side of planted row). Site conditions are favorable for successful establishment of trees and/or shrubs.

**Feature Measure:** Area of Treatment

**Scenario Unit::** Acre

**Scenario Typical Size:** 40

**Total Scenario Cost:** $1,660.44

**Scenario Cost/Unit:** $41.51

**Cost Details:**

| Component Name | ID | Description | Unit | Cost | QTY | Total |
|---|---|---|---|---|---|---|
| **Equipment Installation** | | | | | | |
| All terrain vehicles, ATV | 965 | Includes equipment, power unit and labor costs. | Hour | $29.73 | 8 | $237.84 |
| **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. | Hour | $18.93 | 8 | $151.44 |
| Supervisor or Manager | 234 | Labor involving supervision or management activities. Includes crew supervisors, foremen and farm/ranch managers time required for adopting new technology, etc. | Hour | $34.29 | 8 | $274.32 |
| **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. | Acre | $40.73 | 13 | $529.49 |
| 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. | Acre | $22.61 | 13 | $293.93 |
| 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. | Acre | $1.30 | 13 | $16.90 |
| **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 | $156.52 | 1 | $156.52 |

**Practice:** 490 - Tree/Shrub Site Preparation

**Scenario** #3 - Chemical - Ground Application on Harvested Forest

**Scenario Description:**

This practice involves the use of various herbicides applied using ground-based machinery (dozers or skidders and NOT typical farm equipment) in order to remove undesirable vegetation and improve site conditions for establishing trees and/or shrubs. Typical sites include 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. Treatment can be done before or after planting.

**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.

**Feature Measure:** Area of Treatment

**Scenario Unit::** Acre

**Scenario Typical Size:** 40

**Total Scenario Cost:** $7,017.51

**Scenario Cost/Unit:** $175.44

**Cost Details:**

| Component Name | ID | Description | Unit | Cost | QTY | Total |
|---|---|---|---|---|---|---|
| **Equipment Installation** | | | | | | |
| Chemical, ground application, wildland | 1313 | Chemical application performed by ground equipment. Includes forestry application methods that include heavy equipment such as skidders. Includes material, equipment, power unit and labor costs. | Acre | $106.37 | 40 | $4,254.80 |
| **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. | Acre | $15.93 | 40 | $637.20 |
| 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. | Acre | $40.73 | 40 | $1,629.20 |
| 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. | Acre | $1.30 | 40 | $52.00 |
| **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 | $444.31 | 1 | $444.31 |

**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. Treatment can be done before or after planting.

**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.

**Feature Measure:** Area of Treatment

**Scenario Unit::** Acre

**Scenario Typical Size:** 40

**Total Scenario Cost:** $3,870.32

**Scenario Cost/Unit:** $96.76

**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. | Acre | $31.94 | 40 | $1,277.60 |
| **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. | Hour | $34.29 | 8 | $274.32 |
| **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. | Acre | $15.93 | 40 | $637.20 |
| 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. | Acre | $40.73 | 40 | $1,629.20 |
| 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. | Acre | $1.30 | 40 | $52.00 |

**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. Treatment can be done before or after planting.

**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.

**Feature Measure:** area of treatment

**Scenario Unit::** Acre

**Scenario Typical Size:** 10

**Total Scenario Cost:** $1,716.50

**Scenario Cost/Unit:** $171.65

**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. | Hour | $54.07 | 24 | $1,297.68 |
| **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. | Hour | $34.29 | 8 | $274.32 |
| **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. | Acre | $14.45 | 10 | $144.50 |

**Practice:** 490 - Tree/Shrub Site Preparation

**Scenario** #6 - Mechanical - Heavy, shearing and windrowing

**Scenario Description:**

This practice involves the use of heavy machinery (usually bull dozers & not typical farming equipment) to treat an area in order to improve site conditions for establishing trees and/or shrubs. Usually vegetation and/or debries is sheared and raked or pushed to form piles or windrows. Typical sites include trees and brush cover that is not appropriate to the site or does not provide 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. Treatment must be done before planting.

**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 on site. Noxious and invasive species may also be present on the site. Adequate planter access is impossible with existing conditions. If left untreated, seedlings can not be planted properly at the proper density. Existing competition will cause 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. Site conditions are favorable for successful establishment of trees and/or shrubs.

**Feature Measure:** Area of Treatment

**Scenario Unit::** Acre

**Scenario Typical Size:** 40

**Total Scenario Cost:** $16,502.42

**Scenario Cost/Unit:** $412.56

**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. | Acre | $200.08 | 40 | $8,003.20 |
| 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. | Acre | $173.12 | 40 | $6,924.80 |
| **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. | Hour | $34.29 | 20 | $685.80 |
| **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 | $444.31 | 2 | $888.62 |

**Practice:** 490 - Tree/Shrub Site Preparation

**Scenario** #7 - Mechanical-Ripping/chopping

**Scenario Description:**

This practice involves the use of heavy machinery (usually bull dozers & not typical farming equipment) to rip/cut/lift underground root systems 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 does not provide 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. Treatment must be done before planting.

**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 knocked down with heavy tillage equipment used to breakup and lift root systems, breakup compaction (<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.

**Feature Measure:** Area of Treatment

**Scenario Unit::** Acre

**Scenario Typical Size:** 40

**Total Scenario Cost:** $6,527.83

**Scenario Cost/Unit:** $163.20

**Cost Details:**

| Component Name | ID | Description | Unit | Cost | QTY | Total |
|---|---|---|---|---|---|---|
| **Equipment Installation** | | | | | | |
| 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. | Acre | $145.23 | 40 | $5,809.20 |
| **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. | Hour | $34.29 | 8 | $274.32 |
| **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 | $444.31 | 1 | $444.31 |

**Practice:** 490 - Tree/Shrub Site Preparation

**Scenario** #8 - Mechanical-Dragging

**Scenario Description:**

This practice involves the use of heavy machinery (usually bull dozers or log skidders with a heavy drag) to knock down existing vegetation 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 does not provide 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. Treatment must be done before planting.

**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.

**After Situation:**

Undesirable vegetation has been knocked down, thus enhancing the conditions for planting and survival of trees and/or shrubs. Site conditions are favorable for successful establishment of trees and/or shrubs.

**Feature Measure:** Area of Treatment

**Scenario Unit::** Acre

**Scenario Typical Size:** 40

**Total Scenario Cost:** $3,283.83

**Scenario Cost/Unit:** $82.10

**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. | Acre | $64.13 | 40 | $2,565.20 |
| **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. | Hour | $34.29 | 8 | $274.32 |
| **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 | $444.31 | 1 | $444.31 |

**Practice:** 490 - Tree/Shrub Site Preparation

**Scenario** #9 - Mechanical - Light, Mow/Disk

**Scenario Description:**

This practice involves the use of light/moderate machinery(typcially tractors used in normal farming operations) to clear above ground vegetation (disk or bush hog) in order to improve site conditions for establishing trees and/or shrubs. Typical sites include abandoned fields, pastures, rangelands, or agricultural fields. 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. Treatment can be done before or after planting.

**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.

**After Situation:**

Undesirable vegetation has been removed using a bush hog and/or disk to cut and/or knock down existing vegetation, thus enhancing the conditions for planting and survival of trees and/or shrubs. Site conditions are favorable for successful establishment of trees and/or shrubs.

**Feature Measure:** Area of Treatment

**Scenario Unit::** Acre

**Scenario Typical Size:** 40

**Total Scenario Cost:** $1,599.91

**Scenario Cost/Unit:** $40.00

**Cost Details:**

| Component Name | ID | Description | Unit | Cost | QTY | Total |
|---|---|---|---|---|---|---|
| **Equipment Installation** | | | | | | |
| Mower, Bush Hog | 940 | Equipment and power unit costs. Labor not included. | Hour | $47.22 | 20 | $944.40 |
| **Labor** | | | | | | |
| Equipment Operators, Light | 232 | Includes: Skid Steer Loaders, Hydraulic Excavators <50 HP, Trenchers <12", Ag Equipment <150 HP, Pickup Trucks, Forklifts, Mulchers | Hour | $21.14 | 20 | $422.80 |
| **Mobilization** | | | | | | |
| Mobilization, medium equipment | 1139 | Equipment with 70-150 HP or typical weights between 14,000 and 30,000 pounds. | Each | $232.71 | 1 | $232.71 |

**Practice:** 490 - Tree/Shrub Site Preparation

**Scenario** #10 - Mechanical - Light ripping

**Scenario Description:**

This practice involves the use of light/moderate machinery(typcially tractors used in normal farming operations) to subsoil (open field rip) in order to improve site conditions for establishing trees and/or shrubs. Typical sites include abandoned fields, pastures, rangelands, or agricultural fields. 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. Treatment must be done before planting.

**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:**

Soil compaction has been alleviated by using a farm tractor pulling ripper to breakup plow pans (<18" deep), thus enhancing the conditions for planting and survival of trees and/or shrubs by allowing penetration of moisture and roots to grow properly. Site conditions are favorable for successful establishment of trees and/or shrubs.

**Feature Measure:** Area of Treatment

**Scenario Unit::** Acre

**Scenario Typical Size:** 40

**Total Scenario Cost:** $1,232.23

**Scenario Cost/Unit:** $30.81

**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. | Acre | $18.13 | 40 | $725.20 |
| **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. | Hour | $34.29 | 8 | $274.32 |
| **Mobilization** | | | | | | |
| Mobilization, medium equipment | 1139 | Equipment with 70-150 HP or typical weights between 14,000 and 30,000 pounds. | Each | $232.71 | 1 | $232.71 |

**Practice:** 511 - Forage Harvest Management

**Scenario** #1 - 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 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. 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::** Acre

**Scenario Typical Size:** 30

**Total Scenario Cost:** $577.98

**Scenario Cost/Unit:** $19.27

**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 | $45.80 | 1 | $45.80 |
| **Foregone Income** | | | | | | |
| FI, Grazing AUMs | 2079 | Grazing is the Primary Land Use | Animal Unit Month | $16.00 | 30 | $480.00 |
| **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. | Hour | $25.08 | 1 | $25.08 |
| **Materials** | | | | | | |
| Test, Plant Tissue Test | 301 | Tissue analysis for crops. Includes materials and shipping only. | Each | $27.10 | 1 | $27.10 |

**Practice:** 511 - Forage Harvest Management

**Scenario** #2 - Phosphorus Mining

**Scenario Description:**

Harvesting forages to remove excess phosphorus from hay fields (30-acre fields harvested three times a year). Forage must be removed through hay or green chop. Fields cannot be grazed or hay fed on the acreage. Fields that have a phosphorus loading in excess of 500 lbs of P/acre qualify for funding. Litter cannot be applied, commercial nutrients will be used to supply other forage needs. Resource concerns that will be addressed include soil quality and water quality.

**Before Situation:**

Forage harvest is normally by grazing. Excess Phosphorus build up (greater than 500 lbs.) in soil due to manure application. Phosphorus remains in the field through the continued cycle of adding additional phosphorus through manure application. Phosphorus that is taken up by plants is re-deposited on the land through the digestion of anaimals grazing.

**After Situation:**

Phosphorus is removed from the field through the harvesting and removal of forage, no grazing allowed. Forage is utilized off the farm or on areas with out a Phosphorus build up. The end result is needed nutrients are supplied for forage growth (N and K) based on Soil Test recommendations with out adding additional phosphorus to the soil. Existing soil phosphorus content is reduced by removing forage from the field. Grazing oppertunities are reduced and water quality is improved as well as forage quality.

**Feature Measure:** Reduced Phosphorus in Soil

**Scenario Unit::** Acre

**Scenario Typical Size:** 30

**Total Scenario Cost:** $1,290.84

**Scenario Cost/Unit:** $43.03

**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 | $16.00 | 30 | $480.00 |
| **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. | Hour | $25.08 | 28 | $702.24 |
| **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 | $0.54 | 150 | $81.00 |
| Potassium, K2O | 74 | K2O supplied by Muriate Of Potash. Price is not per pound of total product applied, no conversion is needed. | Pound | $0.46 | 60 | $27.60 |

**Practice:** 512 - Forage and Biomass Planting

**Scenario** #1 - Native Perennial Grass (1 sp)

**Scenario Description:**

Establish or reseed adapted perennial native grasses to improve or maintain livestock/wildlife nutrition and health, extend the length of the grazing season, and provide soil cover to reduce erosion. Used for either conventional or no-till seeding of native grasses for pasture, hayland, and wildlife openings. This practice may be utilized for organic or regular production. This scenario assumes fertilizer, seed, equipment and labor for seed bed prep, tillage, seeding ,and spreading.

**Before Situation:**

Poorly managed/degraded pasture land or cropland being converted to pasture and/or hay.

**After Situation:**

Suitable species are established to improve forage quality and quantity and reduce soil erosion on cropland ,hayland, pasture, and/or biomass production.

**Feature Measure:** Acres of Forage and Biomass Planti

**Scenario Unit::** Acre

**Scenario Typical Size:** 30

**Total Scenario Cost:** $11,297.78

**Scenario Cost/Unit:** $376.59

**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. | Acre | $5.58 | 30 | $167.40 |
| Fertilizer, ground application, dry bulk | 950 | Dry bulk fertilizer application performed by ground equipment. Includes equipment, power unit and labor costs. | Acre | $6.25 | 30 | $187.50 |
| Lime application | 953 | Lime application performed by ground equipment. Includes equipment, power unit and labor costs. | Acre | $9.50 | 30 | $285.00 |
| Seeding Operation, No Till/Grass Drill | 960 | No Till drill or grass drill for seeding. Includes equipment, power unit and labor costs. | Acre | $19.43 | 30 | $582.90 |
| **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. | Hour | $18.93 | 8 | $151.44 |
| **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 | $0.54 | 1500 | $810.00 |
| Potassium, K2O | 74 | K2O supplied by Muriate Of Potash. Price is not per pound of total product applied, no conversion is needed. | Pound | $0.46 | 1500 | $690.00 |
| Lime, ENM | 75 | Fertilizer: Limestone Spread on field. | Ton | $84.95 | 60 | $5,097.00 |
| Test, Soil Test, Standard | 299 | Includes materials, shiping, labor, and equipment costs. | Each | $10.13 | 1 | $10.13 |
| 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. | Acre | $15.93 | 30 | $477.90 |
| 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. | Acre | $15.93 | 30 | $477.90 |
| One Species, Warm Season, Native Perennial Grass | 2322 | Native, warm season perennial grass. Includes material and shipping only. | Acre | $70.93 | 30 | $2,127.90 |
| **Mobilization** | | | | | | |
| Mobilization, medium equipment | 1139 | Equipment with 70-150 HP or typical weights between 14,000 and 30,000 pounds. | Each | $232.71 | 1 | $232.71 |

**Practice:** 512 - Forage and Biomass Planting

**Scenario** #2 - Native Perennial 1 species Low Input

**Scenario Description:**

Establish or reseed adapted perennial native grasses to improve or maintain livestock/wildlife nutrition and health, extend the length of the grazing season, and provide soil cover to reduce erosion. Used for either conventional or no-till seeding of native grasses for pasture, hayland, and wildlife openings. This practice may be utilized for organic or regular production. This scenario assumes fertility and pH are not needed. Seed, equipment and labor for seed bed prep, tillage, seeding ,and spreading are included.

**Before Situation:**

Poorly managed/degraded pasture land or cropland being converted to pasture and/or hay.

**After Situation:**

Suitable species are established to improve forage quality and quantity and reduce soil erosion on cropland ,hayland, pasture, and/or biomass production.

**Feature Measure:** Acres of Forgage and Biomass Plan

**Scenario Unit::** Acre

**Scenario Typical Size:** 30

**Total Scenario Cost:** $3,750.38

**Scenario Cost/Unit:** $125.01

**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. | Acre | $5.58 | 30 | $167.40 |
| Seeding Operation, No Till/Grass Drill | 960 | No Till drill or grass drill for seeding. Includes equipment, power unit and labor costs. | Acre | $19.43 | 30 | $582.90 |
| **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. | Hour | $18.93 | 8 | $151.44 |
| **Materials** | | | | | | |
| Test, Soil Test, Standard | 299 | Includes materials, shiping, labor, and equipment costs. | Each | $10.13 | 1 | $10.13 |
| 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. | Acre | $15.93 | 30 | $477.90 |
| One Species, Warm Season, Native Perennial Grass | 2322 | Native, warm season perennial grass. Includes material and shipping only. | Acre | $70.93 | 30 | $2,127.90 |
| **Mobilization** | | | | | | |
| Mobilization, medium equipment | 1139 | Equipment with 70-150 HP or typical weights between 14,000 and 30,000 pounds. | Each | $232.71 | 1 | $232.71 |

**Practice:** 512 - Forage and Biomass Planting

**Scenario** #3 - Native Perennial 2 or more species

**Scenario Description:**

Establish or reseed with 2 or more adapted perennial native warm season grasses to improve or maintain livestock/wildlife nutrition and health, extend the length of the grazing season, and provide soil cover to reduce erosion. Used for either conventional or no-till seeding of perennial native warm season grasses for pasture, hayland, and wildlife openings. This practice may be utilized for organic or regular production. This scenario assumes fertilizer, seed, equipment and labor for seed bed prep, tillage, seeding ,and spreading.

**Before Situation:**

Existing stand of perennial grasses or monoculture or no grasses present. Resource concerns may include undesireable plant productivity and health, inadequate feed and forage for livestock, soil erosion and soil quality.

**After Situation:**

Suitable NWSG species are established to improve forage quality and quantity and reduce soil erosion on cropland, hayland, pasture and/or biomass production.

**Feature Measure:** Acres of Forage and Biomass Planti

**Scenario Unit::** Acre

**Scenario Typical Size:** 30

**Total Scenario Cost:** $15,915.98

**Scenario Cost/Unit:** $530.53

**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. | Acre | $10.14 | 30 | $304.20 |
| Chemical, ground application | 948 | Chemical application performed by ground equipment. Includes equipment, power unit and labor costs. | Acre | $5.58 | 30 | $167.40 |
| Lime application | 953 | Lime application performed by ground equipment. Includes equipment, power unit and labor costs. | Acre | $9.50 | 30 | $285.00 |
| Seeding Operation, No Till/Grass Drill | 960 | No Till drill or grass drill for seeding. Includes equipment, power unit and labor costs. | Acre | $19.43 | 30 | $582.90 |
| **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. | Hour | $18.93 | 8 | $151.44 |
| **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 | $0.54 | 1500 | $810.00 |
| Potassium, K2O | 74 | K2O supplied by Muriate Of Potash. Price is not per pound of total product applied, no conversion is needed. | Pound | $0.46 | 1500 | $690.00 |
| Lime, ENM | 75 | Fertilizer: Limestone Spread on field. | Ton | $84.95 | 60 | $5,097.00 |
| Test, Soil Test, Standard | 299 | Includes materials, shiping, labor, and equipment costs. | Each | $10.13 | 1 | $10.13 |
| 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. | Acre | $15.93 | 30 | $477.90 |
| 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. | Acre | $15.93 | 30 | $477.90 |
| Three plus Species Mix, Warm Season, Native Perennial | 2327 | Native, warm season perennial grass. Includes material and shipping only. | Acre | $220.98 | 30 | $6,629.40 |
| **Mobilization** | | | | | | |
| Mobilization, medium equipment | 1139 | Equipment with 70-150 HP or typical weights between 14,000 and 30,000 pounds. | Each | $232.71 | 1 | $232.71 |

**Practice:** 512 - Forage and Biomass Planting

**Scenario** #4 - Native Perennial 2 or more species with Low Input

**Scenario Description:**

Establish or reseed with two or more adapted perennial native warm season grasses to improve or maintain livestock/wildlife nutrition and health, extend the length of the grazing season, and provide soil cover to reduce erosion. Used for either conventional or no-till seeding of perennial native warm season grasses for pasture, hayland, and wildlife openings. This practice may be utilized for organic or regular production. This scenario assumes fertility and pH are not needed. Seed, equipment and labor for seed bed prep, tillage, seeding ,and spreading are included.

**Before Situation:**

Existing stand of perennial grasses or monoculture or no grasses present. Resource concerns may include undesireable plant productivity and health, inadequate feed and forage for livestock, soil erosion and soil quality.

**After Situation:**

Suitable NWSG species are established to improve forage quality and quantity and reduce soil erosion on cropland, hayland, pasture and/or biomass production.

**Feature Measure:** Acres of Forgage and Biomass Plan

**Scenario Unit::** Acre

**Scenario Typical Size:** 30

**Total Scenario Cost:** $8,556.08

**Scenario Cost/Unit:** $285.20

**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. | Acre | $10.14 | 30 | $304.20 |
| Chemical, ground application | 948 | Chemical application performed by ground equipment. Includes equipment, power unit and labor costs. | Acre | $5.58 | 30 | $167.40 |
| Seeding Operation, No Till/Grass Drill | 960 | No Till drill or grass drill for seeding. Includes equipment, power unit and labor costs. | Acre | $19.43 | 30 | $582.90 |
| **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. | Hour | $18.93 | 8 | $151.44 |
| **Materials** | | | | | | |
| Test, Soil Test, Standard | 299 | Includes materials, shiping, labor, and equipment costs. | Each | $10.13 | 1 | $10.13 |
| 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. | Acre | $15.93 | 30 | $477.90 |
| Three plus Species Mix, Warm Season, Native Perennial | 2327 | Native, warm season perennial grass. Includes material and shipping only. | Acre | $220.98 | 30 | $6,629.40 |
| **Mobilization** | | | | | | |
| Mobilization, medium equipment | 1139 | Equipment with 70-150 HP or typical weights between 14,000 and 30,000 pounds. | Each | $232.71 | 1 | $232.71 |

**Practice:** 512 - Forage and Biomass Planting

**Scenario** #5 - Introduced Cool Season Grasses

**Scenario Description:**

Establish or reseed adapted perennial introduced cool season grasses and legumes to improve or maintain livestock/wildlife nutrition and health, extend the length of the grazing season, and provide soil cover to reduce erosion. Used for either conventional or no-till seeding of perennial introduced cool season grasses for pasture, hayland, and wildlife openings. This practice may be utilized for organic or regular production. This scenario assumes fertilizer, seed, equipment and labor for seed bed prep, tillage, seeding ,and spreading.

**Before Situation:**

Poor or nonexistent stand of grass species. Resource concerns may include undesireable plant productivity and health, inadequate feed and forage for livestock, soil erosion and soil quality.

**After Situation:**

Suitable species are established to improve forage quality and quantity and reduce soil erosion on cropland ,hayland, pasture, and/or biomass production.

**Feature Measure:** Acres of Forgage and Biomass Plan

**Scenario Unit::** Acre

**Scenario Typical Size:** 30

**Total Scenario Cost:** $10,253.48

**Scenario Cost/Unit:** $341.78

**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. | Acre | $10.14 | 30 | $304.20 |
| Chemical, ground application | 948 | Chemical application performed by ground equipment. Includes equipment, power unit and labor costs. | Acre | $5.58 | 30 | $167.40 |
| Fertilizer, ground application, dry bulk | 950 | Dry bulk fertilizer application performed by ground equipment. Includes equipment, power unit and labor costs. | Acre | $6.25 | 30 | $187.50 |
| Seeding Operation, No Till/Grass Drill | 960 | No Till drill or grass drill for seeding. Includes equipment, power unit and labor costs. | Acre | $19.43 | 30 | $582.90 |
| **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. | Hour | $18.93 | 8 | $151.44 |
| **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 | $0.75 | 1200 | $900.00 |
| 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 | $0.54 | 1500 | $810.00 |
| Potassium, K2O | 74 | K2O supplied by Muriate Of Potash. Price is not per pound of total product applied, no conversion is needed. | Pound | $0.46 | 1500 | $690.00 |
| Lime, ENM | 75 | Fertilizer: Limestone Spread on field. | Ton | $84.95 | 60 | $5,097.00 |
| Test, Soil Test, Standard | 299 | Includes materials, shiping, labor, and equipment costs. | Each | $10.13 | 1 | $10.13 |
| 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. | Acre | $15.93 | 30 | $477.90 |
| Four Species Mix, Cool Season, Introduced Perennial (2 grasses, 2 legumes) | 2319 | Cool season, introduced grass and legume mix. Includes material and shipping only. | Acre | $21.41 | 30 | $642.30 |
| **Mobilization** | | | | | | |
| Mobilization, medium equipment | 1139 | Equipment with 70-150 HP or typical weights between 14,000 and 30,000 pounds. | Each | $232.71 | 1 | $232.71 |

**Practice:** 512 - Forage and Biomass Planting

**Scenario** #6 - Introduced Cool Season Grasses with Legumes with Low Input

**Scenario Description:**

Establish or reseed adapted perennial introduced cool season grasses and legumes to improve or maintain livestock/wildlife nutrition and health, extend the length of the grazing season, and provide soil cover to reduce erosion. Used for either conventional or no-till seeding of perennial introduced cool season grasses for pasture, hayland, and wildlife openings. This practice may be utilized for organic or regular production. This scenario assumes fertility and pH are not needed. Seed, equipment and labor for seed bed prep, tillage, seeding ,and spreading are included.

**Before Situation:**

Poor or nonexistent stand of grass species. Resource concerns may include undesireable plant productivity and health, inadequate feed and forage for livestock, soil erosion and soil quality.

**After Situation:**

Suitable species are established to improve forage quality and quantity and reduce soil erosion on cropland ,hayland, pasture, and/or biomass production.

**Feature Measure:** Acres of Forgage and Biomass Plan

**Scenario Unit::** Acre

**Scenario Typical Size:** 30

**Total Scenario Cost:** $2,568.98

**Scenario Cost/Unit:** $85.63

**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. | Acre | $10.14 | 30 | $304.20 |
| Chemical, ground application | 948 | Chemical application performed by ground equipment. Includes equipment, power unit and labor costs. | Acre | $5.58 | 30 | $167.40 |
| Seeding Operation, No Till/Grass Drill | 960 | No Till drill or grass drill for seeding. Includes equipment, power unit and labor costs. | Acre | $19.43 | 30 | $582.90 |
| **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. | Hour | $18.93 | 8 | $151.44 |
| **Materials** | | | | | | |
| Test, Soil Test, Standard | 299 | Includes materials, shiping, labor, and equipment costs. | Each | $10.13 | 1 | $10.13 |
| 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. | Acre | $15.93 | 30 | $477.90 |
| Four Species Mix, Cool Season, Introduced Perennial (2 grasses, 2 legumes) | 2319 | Cool season, introduced grass and legume mix. Includes material and shipping only. | Acre | $21.41 | 30 | $642.30 |
| **Mobilization** | | | | | | |
| Mobilization, medium equipment | 1139 | Equipment with 70-150 HP or typical weights between 14,000 and 30,000 pounds. | Each | $232.71 | 1 | $232.71 |

**Practice:** 512 - Forage and Biomass Planting

**Scenario** #7 - Introduced Warm Season Grasses

**Scenario Description:**

Establish or reseed adapted introduced warm season grasses to improve or maintain livestock/wildlife nutrition and health, extend the length of the grazing season, and provide soil cover to reduce erosion. Used for either conventional or no-till seeding of perennial introduced warm season grasses for pasture, hayland, and wildlife openings. This practice may be utilized for organic or regular production. This scenario assumes fertilizer, seed, equipment and labor for seed bed prep, tillage, seeding ,and spreading.

**Before Situation:**

Existing stand of perennial grasses or monoculture or no grasses present. Resource concerns may include undesireable plant productivity and health, inadequate feed and forage for livestock, soil erosion and soil quality.

**After Situation:**

Suitable species are established to improve forage quality and quantity and reduce soil erosionon cropland ,hayland, pasture, and/or biomass production.

**Feature Measure:** Acres of Forgage and Biomass Plan

**Scenario Unit::** Acre

**Scenario Typical Size:** 30

**Total Scenario Cost:** $11,533.88

**Scenario Cost/Unit:** $384.46

**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. | Acre | $10.14 | 30 | $304.20 |
| Chemical, ground application | 948 | Chemical application performed by ground equipment. Includes equipment, power unit and labor costs. | Acre | $5.58 | 30 | $167.40 |
| Fertilizer, ground application, dry bulk | 950 | Dry bulk fertilizer application performed by ground equipment. Includes equipment, power unit and labor costs. | Acre | $6.25 | 30 | $187.50 |
| Seeding Operation, No Till/Grass Drill | 960 | No Till drill or grass drill for seeding. Includes equipment, power unit and labor costs. | Acre | $19.43 | 30 | $582.90 |
| **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. | Hour | $18.93 | 8 | $151.44 |
| **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 | $0.75 | 1200 | $900.00 |
| 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 | $0.54 | 1500 | $810.00 |
| Potassium, K2O | 74 | K2O supplied by Muriate Of Potash. Price is not per pound of total product applied, no conversion is needed. | Pound | $0.46 | 1500 | $690.00 |
| Lime, ENM | 75 | Fertilizer: Limestone Spread on field. | Ton | $84.95 | 60 | $5,097.00 |
| Test, Soil Test, Standard | 299 | Includes materials, shiping, labor, and equipment costs. | Each | $10.13 | 1 | $10.13 |
| 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. | Acre | $15.93 | 30 | $477.90 |
| One Species, Warm Season, Introduced Perennial Grass (seed or sprigs) | 2323 | Introduced, warm season perennial grass seed or sprig. Includes material and shipping only. | Acre | $64.09 | 30 | $1,922.70 |
| **Mobilization** | | | | | | |
| Mobilization, medium equipment | 1139 | Equipment with 70-150 HP or typical weights between 14,000 and 30,000 pounds. | Each | $232.71 | 1 | $232.71 |

**Practice:** 512 - Forage and Biomass Planting

**Scenario** #8 - Introduced Warm Season Grasses with Low Input

**Scenario Description:**

Establish or reseed adapted introduced warm season grasses to improve or maintain livestock/wildlife nutrition and health, extend the length of the grazing season, and provide soil cover to reduce erosion. Used for either conventional or no-till seeding of perennial introduced warm season grasses for pasture, hayland, and wildlife openings. This practice may be utilized for organic or regular production. This scenario assumes fertility and pH are not needed. Seed, equipment and labor for seed bed prep, tillage, seeding ,and spreading are included.

**Before Situation:**

Existing stand of perennial grasses or monoculture or no grasses present. Resource concerns may include undesireable plant productivity and health, inadequate feed and forage for livestock, soil erosion and soil quality.

**After Situation:**

Suitable species are established to improve forage quality and quantity and reduce soil erosionon cropland ,hayland, pasture, and/or biomass production.

**Feature Measure:** Acres of Forgage and Biomass Plan

**Scenario Unit::** Acre

**Scenario Typical Size:** 30

**Total Scenario Cost:** $3,849.38

**Scenario Cost/Unit:** $128.31

**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. | Acre | $10.14 | 30 | $304.20 |
| Chemical, ground application | 948 | Chemical application performed by ground equipment. Includes equipment, power unit and labor costs. | Acre | $5.58 | 30 | $167.40 |
| Seeding Operation, No Till/Grass Drill | 960 | No Till drill or grass drill for seeding. Includes equipment, power unit and labor costs. | Acre | $19.43 | 30 | $582.90 |
| **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. | Hour | $18.93 | 8 | $151.44 |
| **Materials** | | | | | | |
| Test, Soil Test, Standard | 299 | Includes materials, shiping, labor, and equipment costs. | Each | $10.13 | 1 | $10.13 |
| 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. | Acre | $15.93 | 30 | $477.90 |
| One Species, Warm Season, Introduced Perennial Grass (seed or sprigs) | 2323 | Introduced, warm season perennial grass seed or sprig. Includes material and shipping only. | Acre | $64.09 | 30 | $1,922.70 |
| **Mobilization** | | | | | | |
| Mobilization, medium equipment | 1139 | Equipment with 70-150 HP or typical weights between 14,000 and 30,000 pounds. | Each | $232.71 | 1 | $232.71 |

**Practice:** 512 - Forage and Biomass Planting

**Scenario** #9 - Sprigging

**Scenario Description:**

Sprigging new grasses with sprigging application for the purpose of providing forage, increasing plant diversity, soil quality and fertility, and plant health. This practice may be utilized for organic or regular production. This scenario assumes fertilizer, sprigs, equipment and labor for seed bed prep, tillage, sprigging ,and spreading.

**Before Situation:**

Poor or nonexistent stand of grass species. Resource concerns may include undesireable plant productivity and health, inadequate feed and forage for livestock, soil erosion and soil quality.

**After Situation:**

Suitable species are established to improve forage quality and quantity and reduce soil erosion on cropland ,hayland, pasture, and/or biomass production.

**Feature Measure:** Acres of Forage and Biomass Planti

**Scenario Unit::** Acre

**Scenario Typical Size:** 30

**Total Scenario Cost:** $12,955.28

**Scenario Cost/Unit:** $431.84

**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. | Acre | $10.14 | 30 | $304.20 |
| Chemical, ground application | 948 | Chemical application performed by ground equipment. Includes equipment, power unit and labor costs. | Acre | $5.58 | 30 | $167.40 |
| Fertilizer, ground application, dry bulk | 950 | Dry bulk fertilizer application performed by ground equipment. Includes equipment, power unit and labor costs. | Acre | $6.25 | 30 | $187.50 |
| Ground sprigging | 1101 | Includes costs for equipment, power unit and labor. | Acre | $66.81 | 30 | $2,004.30 |
| **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. | Hour | $18.93 | 8 | $151.44 |
| **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 | $0.75 | 1200 | $900.00 |
| 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 | $0.54 | 1500 | $810.00 |
| Potassium, K2O | 74 | K2O supplied by Muriate Of Potash. Price is not per pound of total product applied, no conversion is needed. | Pound | $0.46 | 1500 | $690.00 |
| Lime, ENM | 75 | Fertilizer: Limestone Spread on field. | Ton | $84.95 | 60 | $5,097.00 |
| Test, Soil Test, Standard | 299 | Includes materials, shiping, labor, and equipment costs. | Each | $10.13 | 1 | $10.13 |
| 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. | Acre | $15.93 | 30 | $477.90 |
| One Species, Warm Season, Introduced Perennial Grass (seed or sprigs) | 2323 | Introduced, warm season perennial grass seed or sprig. Includes material and shipping only. | Acre | $64.09 | 30 | $1,922.70 |
| **Mobilization** | | | | | | |
| Mobilization, medium equipment | 1139 | Equipment with 70-150 HP or typical weights between 14,000 and 30,000 pounds. | Each | $232.71 | 1 | $232.71 |

**Practice:** 512 - Forage and Biomass Planting

**Scenario** #10 - Overseeding Legumes with low input

**Scenario Description:**

Establishment of legumes for the purpose of increasing plant diversity, soil quality and fertility, and plant health and enhancing the quality of forage. This practice may be utilized for organic or regular production. This scenario assumes fertilizer, seed, equipment and labor for seed bed prep, tillage, seeding ,and spreading.

**Before Situation:**

Existing stand of perennial grasses or monoculture with no legumes present .

**After Situation:**

Legumes will be maintained through proper grazing management and improve plant diversity and soil quality.

**Feature Measure:** Acres of Forgage and Biomass Plan

**Scenario Unit::** Acre

**Scenario Typical Size:** 30

**Total Scenario Cost:** $3,136.28

**Scenario Cost/Unit:** $104.54

**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. | Acre | $10.14 | 30 | $304.20 |
| Chemical, ground application | 948 | Chemical application performed by ground equipment. Includes equipment, power unit and labor costs. | Acre | $5.58 | 30 | $167.40 |
| Fertilizer, ground application, dry bulk | 950 | Dry bulk fertilizer application performed by ground equipment. Includes equipment, power unit and labor costs. | Acre | $6.25 | 30 | $187.50 |
| Seeding Operation, No Till/Grass Drill | 960 | No Till drill or grass drill for seeding. Includes equipment, power unit and labor costs. | Acre | $19.43 | 30 | $582.90 |
| **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. | Hour | $18.93 | 8 | $151.44 |
| **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 | $0.54 | 1500 | $810.00 |
| Potassium, K2O | 74 | K2O supplied by Muriate Of Potash. Price is not per pound of total product applied, no conversion is needed. | Pound | $0.46 | 1500 | $690.00 |
| Test, Soil Test, Standard | 299 | Includes materials, shiping, labor, and equipment costs. | Each | $10.13 | 1 | $10.13 |
| **Mobilization** | | | | | | |
| Mobilization, medium equipment | 1139 | Equipment with 70-150 HP or typical weights between 14,000 and 30,000 pounds. | Each | $232.71 | 1 | $232.71 |

**Practice:** 512 - Forage and Biomass Planting

**Scenario** #43 - Overseeding Legumes

**Scenario Description:**

Establishment of legumes for the purpose of increasing plant diversity, soil quality and fertility, and plant health and enhancing the quality of forage. This practice may be utilized for organic or regular production. This scenario assumes fertilizer, seed, equipment and labor for seed bed prep, tillage, seeding ,and spreading.

**Before Situation:**

Existing stand of perennial grasses or monoculture with no legumes present .

**After Situation:**

Legumes will be maintained through proper grazing management and improve plant diversity and soil quality.

**Feature Measure:** Acres of Forgage and Biomass Plan

**Scenario Unit::** Acre

**Scenario Typical Size:** 30

**Total Scenario Cost:** $8,233.28

**Scenario Cost/Unit:** $274.44

**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. | Acre | $10.14 | 30 | $304.20 |
| Chemical, ground application | 948 | Chemical application performed by ground equipment. Includes equipment, power unit and labor costs. | Acre | $5.58 | 30 | $167.40 |
| Fertilizer, ground application, dry bulk | 950 | Dry bulk fertilizer application performed by ground equipment. Includes equipment, power unit and labor costs. | Acre | $6.25 | 30 | $187.50 |
| Seeding Operation, No Till/Grass Drill | 960 | No Till drill or grass drill for seeding. Includes equipment, power unit and labor costs. | Acre | $19.43 | 30 | $582.90 |
| **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. | Hour | $18.93 | 8 | $151.44 |
| **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 | $0.54 | 1500 | $810.00 |
| Potassium, K2O | 74 | K2O supplied by Muriate Of Potash. Price is not per pound of total product applied, no conversion is needed. | Pound | $0.46 | 1500 | $690.00 |
| Lime, ENM | 75 | Fertilizer: Limestone Spread on field. | Ton | $84.95 | 60 | $5,097.00 |
| Test, Soil Test, Standard | 299 | Includes materials, shiping, labor, and equipment costs. | Each | $10.13 | 1 | $10.13 |
| **Mobilization** | | | | | | |
| Mobilization, medium equipment | 1139 | Equipment with 70-150 HP or typical weights between 14,000 and 30,000 pounds. | Each | $232.71 | 1 | $232.71 |

**Practice:** 516 - Livestock Pipeline

**Scenario** #1 - PVC IPS Less than 1.5 inches

**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 1-inch to 4-inch; and typical scenario size is 1-inch. Construct 1,320 feet of 1-inch, Schedule 40, PVC Pipeline with appurtenances, installed below ground with a minimum 1.5 feet of ground cover. The scenario unit is weight of pipe material in pounds. 1,320 feet of 1-inch, Schedule 40, PVC pipe weighs 0.240 lb/ft, or a total of 317 pounds. Appurtenances include: couplings, fittings, thrust blocks, gate valves (2), air release valves (2), drain valve (1), and pressure relief valve (1), and are included in the cost of pipe material (additional 10% of pipe material quantity). Revegetation is not included.Resource Concerns: Inadequate Livestock Water, Inefficient Energy Use. Associated Practices: Critical Area Planting (342), Pumping Plant (533), Watering Facility (614), and Water Harvesting Catchment (636).

**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::** Foot

**Scenario Typical Size:** 1320

**Total Scenario Cost:** $2,850.18

**Scenario Cost/Unit:** $2.16

**Cost Details:**

| Component Name | ID | Description | Unit | Cost | QTY | Total |
|---|---|---|---|---|---|---|
| **Equipment Installation** | | | | | | |
| Trenching, Earth, 12" x 48" | 53 | Trenching, earth, 12" wide x 48" depth, includes equipment and labor for trenching and backfilling | Foot | $1.16 | 1320 | $1,531.20 |
| **Labor** | | | | | | |
| General Labor | 231 | Labor performed using basic tools such as power tool, shovels, and other tools that do not require extensive training. Ex. pipe layer, herder, concrete placement, materials spreader, flagger, etc. | Hour | $18.93 | 12 | $227.16 |
| **Materials** | | | | | | |
| Pipe, PVC, dia. < 18", weight priced | 1323 | Polyvinyl Chloride (PVC) pressure rated pipe priced by the weight of the pipe materials for pipes with diameters less than 18". Materials only. | Pound | $1.80 | 348 | $626.40 |
| **Mobilization** | | | | | | |
| Mobilization, medium equipment | 1139 | Equipment with 70-150 HP or typical weights between 14,000 and 30,000 pounds. | Each | $232.71 | 2 | $465.42 |

**Practice:** 516 - Livestock Pipeline

**Scenario** #2 - PVC IPS 1.5 inches - 2.5 inches

**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 1-inch to 4-inch; and typical scenario size is 1½-inch. Construct 1,320 feet of 1½-inch, Schedule 40, PVC Pipeline with appurtenances, installed below ground with a minimum 1.5 feet of ground cover. The scenario unit is weight of pipe material in pounds. 1,320 feet of 1½-inch, Schedule 40, PVC pipe weighs 0.501 lb/ft, or a total of 661 pounds. Appurtenances include: couplings, fittings, thrust blocks, gate valves (2), air release valves (2), drain valve (1), and pressure relief valve (1), and are included in the cost of pipe material (additional 10% of pipe material quantity). Revegetation is not included.Resource Concerns: Inadequate Livestock Water, Inefficient Energy Use. Associated Practices: Critical Area Planting (342), Pumping Plant (533), Watering Facility (614), and Water Harvesting Catchment (636).

**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::** Foot

**Scenario Typical Size:** 1320

**Total Scenario Cost:** $3,532.38

**Scenario Cost/Unit:** $2.68

**Cost Details:**

| Component Name | ID | Description | Unit | Cost | QTY | Total |
|---|---|---|---|---|---|---|
| **Equipment Installation** | | | | | | |
| Trenching, Earth, 12" x 48" | 53 | Trenching, earth, 12" wide x 48" depth, includes equipment and labor for trenching and backfilling | Foot | $1.16 | 1320 | $1,531.20 |
| **Labor** | | | | | | |
| General Labor | 231 | Labor performed using basic tools such as power tool, shovels, and other tools that do not require extensive training. Ex. pipe layer, herder, concrete placement, materials spreader, flagger, etc. | Hour | $18.93 | 12 | $227.16 |
| **Materials** | | | | | | |
| Pipe, PVC, dia. < 18", weight priced | 1323 | Polyvinyl Chloride (PVC) pressure rated pipe priced by the weight of the pipe materials for pipes with diameters less than 18". Materials only. | Pound | $1.80 | 727 | $1,308.60 |
| **Mobilization** | | | | | | |
| Mobilization, medium equipment | 1139 | Equipment with 70-150 HP or typical weights between 14,000 and 30,000 pounds. | Each | $232.71 | 2 | $465.42 |

**Practice:** 516 - Livestock Pipeline

**Scenario** #3 - PVC IPS 3 inches and greater

**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 1-inch to 4-inch; and typical scenario size is 3-inch. Construct 1,320 feet of 3-inch, Schedule 40, PVC Pipeline with appurtenances, installed below ground with a minimum 1.5 feet of ground cover. The scenario unit is weight of pipe material in pounds. 1,320 feet of 3-inch, Schedule 40, PVC pipe weighs 1.390 lb/ft, or a total of 1,835 pounds. Appurtenances include: couplings, fittings, thrust blocks, gate valves (2), air release valves (2), drain valve (1), and pressure relief valve (1), and are included in the cost of pipe material (additional 10% of pipe material quantity). Revegetation is not included.Resource Concerns: Inadequate Livestock Water, Inefficient Energy Use. Associated Practices: Critical Area Planting (342), Pumping Plant (533), Watering Facility (614), and Water Harvesting Catchment (636).

**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::** Foot

**Scenario Typical Size:** 1320

**Total Scenario Cost:** $6,007.62

**Scenario Cost/Unit:** $4.55

**Cost Details:**

| Component Name | ID | Description | Unit | Cost | QTY | Total |
|---|---|---|---|---|---|---|
| **Equipment Installation** | | | | | | |
| Trenching, Earth, 12" x 48" | 53 | Trenching, earth, 12" wide x 48" depth, includes equipment and labor for trenching and backfilling | Foot | $1.16 | 1320 | $1,531.20 |
| **Labor** | | | | | | |
| General Labor | 231 | Labor performed using basic tools such as power tool, shovels, and other tools that do not require extensive training. Ex. pipe layer, herder, concrete placement, materials spreader, flagger, etc. | Hour | $18.93 | 20 | $378.60 |
| **Materials** | | | | | | |
| Pipe, PVC, dia. < 18", weight priced | 1323 | Polyvinyl Chloride (PVC) pressure rated pipe priced by the weight of the pipe materials for pipes with diameters less than 18". Materials only. | Pound | $1.80 | 2018 | $3,632.40 |
| **Mobilization** | | | | | | |
| Mobilization, medium equipment | 1139 | Equipment with 70-150 HP or typical weights between 14,000 and 30,000 pounds. | Each | $232.71 | 2 | $465.42 |

**Practice:** 516 - Livestock Pipeline

**Scenario** #4 - Subsurface HDPE 1.5in or less

**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 1-inch to 2-inch. This Scenario is based on 1/4 mile (1,320 feet) of 1½-inch, Class 200 (SDR-9.0, PE4708), HDPE Pipeline with appurtenances, installed below ground with a minimum 1.5 feet of ground cover. The scenario unit is Length of pipe material in feet. Appurtenances include: fittings, anchors, thrust blocks, gate valves (2), air release valves (2), drain valve (1), and pressure relief valve (1), and are included in the cost of pipe material (additional 10% of pipe material quantity). Revegetation is not included.Resource Concerns: Inadequate Livestock Water, Inefficient Energy Use. Associated Practices: Critical Area Planting (342), Pumping Plant (533), Watering Facility (614), and Water Harvesting Catchment (636).

**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::** Foot

**Scenario Typical Size:** 1320

**Total Scenario Cost:** $3,659.49

**Scenario Cost/Unit:** $2.77

**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") | Foot | $1.02 | 1320 | $1,346.40 |
| Fuser for HDPE Pipe | 1383 | Fusing machine for 1" to 12" diameter HDPE pipe joints. Equipment costs only. Does not include labor. | Hour | $23.79 | 8 | $190.32 |
| **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. | Hour | $18.93 | 8 | $151.44 |
| **Materials** | | | | | | |
| Pipe, HDPE, smooth wall, weight priced | 1379 | High Density Polyethylene (HDPE) compound manufactured into smooth wall pipe. Materials only. | Pound | $2.13 | 707 | $1,505.91 |
| **Mobilization** | | | | | | |
| Mobilization, medium equipment | 1139 | Equipment with 70-150 HP or typical weights between 14,000 and 30,000 pounds. | Each | $232.71 | 2 | $465.42 |

**Practice:** 516 - Livestock Pipeline

**Scenario** #5 - Subsurface HDPE Greater than 1.5in

**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 1-inch to 2-inch. This Scenario is based on 1/4 mile (1,320 feet) of 2-inch, Class 200 (SDR-9.0, PE4708), HDPE Pipeline with appurtenances, installed below ground with a minimum 1.5 feet of ground cover. The scenario unit is Length of pipe material in feet. Appurtenances include: fittings, anchors, thrust blocks, gate valves (2), air release valves (2), drain valve (1), and pressure relief valve (1), and are included in the cost of pipe material (additional 10% of pipe material quantity). Revegetation is not included.Resource Concerns: Inadequate Livestock Water, Inefficient Energy Use. Associated Practices: Critical Area Planting (342), Pumping Plant (533), Watering Facility (614), and Water Harvesting Catchment (636).

**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::** Foot

**Scenario Typical Size:** 1320

**Total Scenario Cost:** $4,513.62

**Scenario Cost/Unit:** $3.42

**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") | Foot | $1.02 | 1320 | $1,346.40 |
| Fuser for HDPE Pipe | 1383 | Fusing machine for 1" to 12" diameter HDPE pipe joints. Equipment costs only. Does not include labor. | Hour | $23.79 | 8 | $190.32 |
| **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. | Hour | $18.93 | 8 | $151.44 |
| **Materials** | | | | | | |
| Pipe, HDPE, smooth wall, weight priced | 1379 | High Density Polyethylene (HDPE) compound manufactured into smooth wall pipe. Materials only. | Pound | $2.13 | 1108 | $2,360.04 |
| **Mobilization** | | | | | | |
| Mobilization, medium equipment | 1139 | Equipment with 70-150 HP or typical weights between 14,000 and 30,000 pounds. | Each | $232.71 | 2 | $465.42 |

**Practice:** 516 - Livestock Pipeline

**Scenario** #6 - 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 1-inch to 4-inch; and typical scenario size is 1¼-inch. Construct 400 feet of 1¼-inch, Class 200 (SDR-9.0, PE4708), HDPE Pipeline with appurtenances, installed on the ground surface. Typical size range of pipe installed: 1-inch to 4-inch. The scenario unit is weight of pipe material in pounds. 400 feet of 1¼-inch, Class 200 (SDR-9.0, PE4708), HDPE pipe weighs 0.362 lb/ft, or a total of 145 pounds. Appurtenances include: couplings, fittings, anchors, gate valves (1), air release valves (1), and pressure relief valve (1), and are included in the cost of pipe material (additional 5% of pipe material quantity). Revegetation is not included.Resource Concerns: Inadequate Livestock Water, Inefficient Energy Use. Associated Practices: Critical Area Planting (342), Pumping Plant (533), Watering Facility (614), and Water Harvesting Catchment (636).

**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::** Foot

**Scenario Typical Size:** 400

**Total Scenario Cost:** $575.58

**Scenario Cost/Unit:** $1.44

**Cost Details:**

| Component Name | ID | Description | Unit | Cost | QTY | Total |
|---|---|---|---|---|---|---|
| **Equipment Installation** | | | | | | |
| Fuser for HDPE Pipe | 1383 | Fusing machine for 1" to 12" diameter HDPE pipe joints. Equipment costs only. Does not include labor. | Hour | $23.79 | 2 | $47.58 |
| **Labor** | | | | | | |
| General Labor | 231 | Labor performed using basic tools such as power tool, shovels, and other tools that do not require extensive training. Ex. pipe layer, herder, concrete placement, materials spreader, flagger, etc. | Hour | $18.93 | 4 | $75.72 |
| **Materials** | | | | | | |
| Pipe, HDPE, smooth wall, weight priced | 1379 | High Density Polyethylene (HDPE) compound manufactured into smooth wall pipe. Materials only. | Pound | $2.13 | 152 | $323.76 |
| **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 | $64.26 | 2 | $128.52 |

**Practice:** 521A - Pond Sealing or Lining, Flexible Membrane

**Scenario** #1 - Flexible Membrane - Uncovered without liner drainage or venting

**Scenario Description:**

Installation of a flexible geosynthetic membrane liner, uncovered, to reduce seepage from ponds or waste storage impoundment structures. Practice implementation includes a geotextile or soil cushion to protect the liner from subgrade damage. Associated practices include PS378 Pond, PS313 Waste Storage Facility.

**Before Situation:**

In-place soils at site exhibit seepage rates in excess of acceptable limits.

**After Situation:**

Water conservation and enviromental protection provided by limiting seepage losses from ponds or waste storage impoundments.

**Feature Measure:** Surface area of Liner Material (incl

**Scenario Unit::** Square Yard

**Scenario Typical Size:** 2420

**Total Scenario Cost:** $34,315.72

**Scenario Cost/Unit:** $14.18

**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 | $2.05 | 2420 | $4,961.00 |
| Earthfill, Roller Compacted | 49 | Earthfill, roller or machine compacted, includes equipment and labor | Cubic Yard | $3.76 | 807 | $3,034.32 |
| **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. | Hour | $25.08 | 40 | $1,003.20 |
| 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. | Hour | $91.60 | 32 | $2,931.20 |
| **Materials** | | | | | | |
| Synthetic Liner, 40 mil | 1387 | Synthetic 40 mil HDPE, LLDPE, EPDM, etc membrane liner material. Includes materials and shipping only. | Square Yard | $6.12 | 2420 | $14,810.40 |
| Geonet | 1778 | Geosynthetic drainage liner, typically HDPE of 300 mil thickness. Includes materials and shipping only. | Square Yard | $3.13 | 2420 | $7,574.60 |
| **Mobilization** | | | | | | |
| Mobilization, Material, distance > 50 miles | 1043 | Mobilization cost of materials for special cases where the distance from the supplier delivery point to the job site exceeds 50 miles. The costs for shipping by UPS or bulk freight shipping to a location within 50 miles of the job site have already been included in the component price. | Dollar | $1.00 | 1 | $1.00 |

**Practice:** 521A - Pond Sealing or Lining, Flexible Membrane

**Scenario** #2 - Flexible Membrane - Uncovered with liner drainage or venting

**Scenario Description:**

Installation of a flexible geosynthetic membrane liner, uncovered, to reduce seepage from ponds or waste storage impoundment structures. Practice implementation includes a geotextile or soil cushion to protect the liner from subgrade damage, and liner drainage or venting. Associated practices include PS378 Pond, PS313 Waste Storage Facility.

**Before Situation:**

In-place soils at site exhibit seepage rates in excess of acceptable limits.

**After Situation:**

Water conservation and enviromental protection provided by limiting seepage losses from ponds or waste storage impoundments.

**Feature Measure:** Surface area of Liner Material (incl

**Scenario Unit::** Square Yard

**Scenario Typical Size:** 2420

**Total Scenario Cost:** $31,281.40

**Scenario Cost/Unit:** $12.93

**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 | $2.05 | 2420 | $4,961.00 |
| **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. | Hour | $25.08 | 40 | $1,003.20 |
| 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. | Hour | $91.60 | 32 | $2,931.20 |
| **Materials** | | | | | | |
| Synthetic Liner, 40 mil | 1387 | Synthetic 40 mil HDPE, LLDPE, EPDM, etc membrane liner material. Includes materials and shipping only. | Square Yard | $6.12 | 2420 | $14,810.40 |
| Geonet | 1778 | Geosynthetic drainage liner, typically HDPE of 300 mil thickness. Includes materials and shipping only. | Square Yard | $3.13 | 2420 | $7,574.60 |
| **Mobilization** | | | | | | |
| Mobilization, Material, distance > 50 miles | 1043 | Mobilization cost of materials for special cases where the distance from the supplier delivery point to the job site exceeds 50 miles. The costs for shipping by UPS or bulk freight shipping to a location within 50 miles of the job site have already been included in the component price. | Dollar | $1.00 | 1 | $1.00 |

**Practice:** 521A - Pond Sealing or Lining, Flexible Membrane

**Scenario** #5 - Flexible Membrane - Covered without liner drainage or venting and with Hauling

**Scenario Description:**

Installation of a flexible geosynthetic membrane liner to reduce seepage from ponds or waste storage impoundment structures. Cost estimate is based on 1 foot of soil cover for liner protection, and a geotextile or soil cushion to protect liner from subgrade damage. No suitable compactable material is onsite and must be purchased from offsite location. Distance is withing 50 miles.. Associated practices include PS378 Pond, PS313 Waste Storage Facility.

**Before Situation:**

In-place soils at site exhibit seepage rates in excess of acceptable limits.

**After Situation:**

Water conservation and enviromental protection provided by limiting seepage losses from ponds or waste storage impoundments.

**Feature Measure:** Surface area of Liner Material (incl

**Scenario Unit::** Square Yard

**Scenario Typical Size:** 2420

**Total Scenario Cost:** $26,741.12

**Scenario Cost/Unit:** $11.05

**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 | $2.05 | 2420 | $4,961.00 |
| Earthfill, Roller Compacted | 49 | Earthfill, roller or machine compacted, includes equipment and labor | Cubic Yard | $3.76 | 807 | $3,034.32 |
| **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. | Hour | $25.08 | 40 | $1,003.20 |
| 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. | Hour | $91.60 | 32 | $2,931.20 |
| **Materials** | | | | | | |
| Synthetic Liner, 40 mil | 1387 | Synthetic 40 mil HDPE, LLDPE, EPDM, etc membrane liner material. Includes materials and shipping only. | Square Yard | $6.12 | 2420 | $14,810.40 |
| **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. | Dollar | $1.00 | 1 | $1.00 |

**Practice:** 521A - Pond Sealing or Lining, Flexible Membrane

**Scenario** #6 - Flexible Membrane - Covered with liner drainage or venting and Hauling

**Scenario Description:**

Installation of a flexible geosynthetic membrane liner to reduce seepage from ponds or waste storage impoundment structures. Cost estimate is based on 1 foot of soil cover for liner protection, a geotextile or soil cushion to protect liner from subgrade damage, and liner drainage or venting. No suitable compactable material is onsite and must be purchased from offsite location. Distance is withing 50 miles. Associated practices include PS378 Pond, PS313 Waste Storage Facility.

**Before Situation:**

In-place soils at site exhibit seepage rates in excess of acceptable limits.

**After Situation:**

Water conservation and enviromental protection provided by limiting seepage losses from ponds or waste storage impoundments.

**Feature Measure:** Surface area of Liner Material (incl

**Scenario Unit::** Square Yard

**Scenario Typical Size:** 2420

**Total Scenario Cost:** $19,504.32

**Scenario Cost/Unit:** $8.06

**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 | $2.05 | 2420 | $4,961.00 |
| Earthfill, Roller Compacted | 49 | Earthfill, roller or machine compacted, includes equipment and labor | Cubic Yard | $3.76 | 807 | $3,034.32 |
| **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. | Hour | $25.08 | 40 | $1,003.20 |
| 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. | Hour | $91.60 | 32 | $2,931.20 |
| **Materials** | | | | | | |
| Geonet | 1778 | Geosynthetic drainage liner, typically HDPE of 300 mil thickness. Includes materials and shipping only. | Square Yard | $3.13 | 2420 | $7,574.60 |

**Practice:** 521B - Pond Sealing or Lining, Soil Dispersant

**Scenario** #1 - Uncovered, Compacted soil liner, Soil Dispersant

**Scenario Description:**

Construction of a compacted soil liner, treated with a soil dispersant, to reduce seepage from ponds or waste storage impoundment structures. Practice implementation includes incorporation of the dispersant with the soil liner under proper moisture conditions and compaction to the designed liner thickness. Practice implementation may require filter compatibility with the subgrade (graded filter or geotextile). Associated practice PS378, PS313.

**Before Situation:**

In-place soils at site exhibit seepage rates in excess of acceptable limits. Soils are suitable for treatment with dispersants.

**After Situation:**

Water conservation and environmental protection provided by limiting seepage losses from ponds or waste storage impoundments.

**Feature Measure:** Volume of Liner Material

**Scenario Unit::** Cubic Yard

**Scenario Typical Size:** 1613

**Total Scenario Cost:** $10,266.66

**Scenario Cost/Unit:** $6.36

**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 Yard | $3.76 | 1613 | $6,064.88 |
| Tractor, agricultural, 120 HP | 962 | Agricultural tractor with horsepower range of 90 to 140. Equipment and power unit costs. Labor not included. | Hour | $52.49 | 6 | $314.94 |
| **Labor** | | | | | | |
| Equipment Operators, Light | 232 | Includes: Skid Steer Loaders, Hydraulic Excavators <50 HP, Trenchers <12", Ag Equipment <150 HP, Pickup Trucks, Forklifts, Mulchers | Hour | $21.14 | 6 | $126.84 |
| 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. | Hour | $34.29 | 8 | $274.32 |
| Specialist Labor | 235 | Labor requiring a specialized skill set: Includes Agronomists, Foresters, Biologists, etc. to provide additional technical information during the planning and implementation of the practice. Does not include NRCS or TSP services. | Hour | $91.60 | 2 | $183.20 |
| **Materials** | | | | | | |
| Soil Dispersant | 1490 | Soil Amendment (tetrasodium pyrophosphate (TSPP), sodium tripolyphosphate (STPP), or soda ash or approved equivalent) | Ton | $469.95 | 6.53 | $3,068.77 |
| **Mobilization** | | | | | | |
| Mobilization, Material, distance > 50 miles | 1043 | Mobilization cost of materials for special cases where the distance from the supplier delivery point to the job site exceeds 50 miles. The costs for shipping by UPS or bulk freight shipping to a location within 50 miles of the job site have already been included in the component price. | Dollar | $1.00 | 1 | $1.00 |
| Mobilization, medium equipment | 1139 | Equipment with 70-150 HP or typical weights between 14,000 and 30,000 pounds. | Each | $232.71 | 1 | $232.71 |

**Practice:** 521B - Pond Sealing or Lining, Soil Dispersant

**Scenario** #2 - Covered, Compacted soil liner, Soil Dispersant

**Scenario Description:**

Construction of a compacted soil liner, treated with a soil dispersant, to reduce seepage from ponds or waste storage impoundment structures. Practice implementation includes incorporation of the dispersant with the soil liner under proper moisture conditions, compaction to the designed liner thickness, and placement of soil cover over the treated liner. Practice implementation may require filter compatibility with the subgrade (graded filter or geotextile). Associated practice PS378, PS313.

**Before Situation:**

In-place soils at site exhibit seepage rates in excess of acceptable limits. Soils are suitable for treatment with dispersants.

**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 Yard

**Scenario Typical Size:** 3226

**Total Scenario Cost:** $16,331.54

**Scenario Cost/Unit:** $5.06

**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 Yard | $3.76 | 3226 | $12,129.76 |
| Tractor, agricultural, 120 HP | 962 | Agricultural tractor with horsepower range of 90 to 140. Equipment and power unit costs. Labor not included. | Hour | $52.49 | 6 | $314.94 |
| **Labor** | | | | | | |
| Equipment Operators, Light | 232 | Includes: Skid Steer Loaders, Hydraulic Excavators <50 HP, Trenchers <12", Ag Equipment <150 HP, Pickup Trucks, Forklifts, Mulchers | Hour | $21.14 | 6 | $126.84 |
| 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. | Hour | $34.29 | 8 | $274.32 |
| Specialist Labor | 235 | Labor requiring a specialized skill set: Includes Agronomists, Foresters, Biologists, etc. to provide additional technical information during the planning and implementation of the practice. Does not include NRCS or TSP services. | Hour | $91.60 | 2 | $183.20 |
| **Materials** | | | | | | |
| Soil Dispersant | 1490 | Soil Amendment (tetrasodium pyrophosphate (TSPP), sodium tripolyphosphate (STPP), or soda ash or approved equivalent) | Ton | $469.95 | 6.53 | $3,068.77 |
| **Mobilization** | | | | | | |
| Mobilization, Material, distance > 50 miles | 1043 | Mobilization cost of materials for special cases where the distance from the supplier delivery point to the job site exceeds 50 miles. The costs for shipping by UPS or bulk freight shipping to a location within 50 miles of the job site have already been included in the component price. | Dollar | $1.00 | 1 | $1.00 |
| Mobilization, medium equipment | 1139 | Equipment with 70-150 HP or typical weights between 14,000 and 30,000 pounds. | Each | $232.71 | 1 | $232.71 |

**Practice:** 521C - Pond Sealing or Lining, Bentonite Sealant

**Scenario** #1 - Bentonite Treatment - Uncovered

**Scenario Description:**

Construction of a compacted soil liner, treated with bentonite, to reduce seepage from ponds or waste storage impoundment structures. Practice implementation includes incorporation of the bentonite with the soil under proper moisture conditions, compaction to the designed liner thickness. Practice implementation may require filter compatibility with the subgrade (graded filter or geotextile). Associated practice PS378, PS313.

**Before Situation:**

In-place soils at site exhibit seepage rates in excess of acceptable limits. Soils are suitable for treatment with dispersants.

**After Situation:**

Water conservation and environmental protection provided by limiting seepage losses from ponds or waste storage impoundments.

**Feature Measure:** Volume of Liner Material

**Scenario Unit::** Cubic Yard

**Scenario Typical Size:** 1613

**Total Scenario Cost:** $98,935.08

**Scenario Cost/Unit:** $61.34

**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 Yard | $3.76 | 1613 | $6,064.88 |
| Tractor, agricultural, 120 HP | 962 | Agricultural tractor with horsepower range of 90 to 140. Equipment and power unit costs. Labor not included. | Hour | $52.49 | 6 | $314.94 |
| **Labor** | | | | | | |
| Equipment Operators, Light | 232 | Includes: Skid Steer Loaders, Hydraulic Excavators <50 HP, Trenchers <12", Ag Equipment <150 HP, Pickup Trucks, Forklifts, Mulchers | Hour | $21.14 | 6 | $126.84 |
| 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. | Hour | $34.29 | 2 | $68.58 |
| Specialist Labor | 235 | Labor requiring a specialized skill set: Includes Agronomists, Foresters, Biologists, etc. to provide additional technical information during the planning and implementation of the practice. Does not include NRCS or TSP services. | Hour | $91.60 | 2 | $183.20 |
| **Materials** | | | | | | |
| Bentonite | 41 | Bentonite, includes materials (50# bag) | Each | $17.59 | 5227 | $91,942.93 |
| **Mobilization** | | | | | | |
| Mobilization, Material, distance > 50 miles | 1043 | Mobilization cost of materials for special cases where the distance from the supplier delivery point to the job site exceeds 50 miles. The costs for shipping by UPS or bulk freight shipping to a location within 50 miles of the job site have already been included in the component price. | Dollar | $1.00 | 1 | $1.00 |
| Mobilization, medium equipment | 1139 | Equipment with 70-150 HP or typical weights between 14,000 and 30,000 pounds. | Each | $232.71 | 1 | $232.71 |

**Practice:** 521C - Pond Sealing or Lining, Bentonite Sealant

**Scenario** #2 - Bentonite Treatment - Covered

**Scenario Description:**

Construction of a compacted soil liner, treated with bentonite, to reduce seepage from ponds or waste storage impoundment structures. Practice implementation includes incorporation of the bentonite with the soil under proper moisture conditions, compaction to the designed liner thickness, and placement of soil cover over the treated liner. Practice implementation may require filter compatibility with the subgrade (graded filter or geotextile). Associated practice PS378, PS313.

**Before Situation:**

In-place soils at site exhibit seepage rates in excess of acceptable limits. Soils are suitable for treatment with bentonite.

**After Situation:**

Water conservation and environmental protection provided by limiting seepage losses from ponds or waste storage impoundments.

**Feature Measure:** Volume of Liner Material (includes

**Scenario Unit::** Cubic Yard

**Scenario Typical Size:** 1613

**Total Scenario Cost:** $105,003.72

**Scenario Cost/Unit:** $65.10

**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 Yard | $3.76 | 3227 | $12,133.52 |
| Tractor, agricultural, 120 HP | 962 | Agricultural tractor with horsepower range of 90 to 140. Equipment and power unit costs. Labor not included. | Hour | $52.49 | 6 | $314.94 |
| **Labor** | | | | | | |
| Equipment Operators, Light | 232 | Includes: Skid Steer Loaders, Hydraulic Excavators <50 HP, Trenchers <12", Ag Equipment <150 HP, Pickup Trucks, Forklifts, Mulchers | Hour | $21.14 | 6 | $126.84 |
| 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. | Hour | $34.29 | 2 | $68.58 |
| Specialist Labor | 235 | Labor requiring a specialized skill set: Includes Agronomists, Foresters, Biologists, etc. to provide additional technical information during the planning and implementation of the practice. Does not include NRCS or TSP services. | Hour | $91.60 | 2 | $183.20 |
| **Materials** | | | | | | |
| Bentonite | 41 | Bentonite, includes materials (50# bag) | Each | $17.59 | 5227 | $91,942.93 |
| **Mobilization** | | | | | | |
| Mobilization, Material, distance > 50 miles | 1043 | Mobilization cost of materials for special cases where the distance from the supplier delivery point to the job site exceeds 50 miles. The costs for shipping by UPS or bulk freight shipping to a location within 50 miles of the job site have already been included in the component price. | Dollar | $1.00 | 1 | $1.00 |
| Mobilization, medium equipment | 1139 | Equipment with 70-150 HP or typical weights between 14,000 and 30,000 pounds. | Each | $232.71 | 1 | $232.71 |

**Practice:** 521D - Pond Sealing or Lining, Compacted Clay Treatment

**Scenario** #1 - Material haul less than or equal to 5 miles

**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. Estimate based on a 5 mile haul. 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. Suitable material is not found on site and it will be necessary to haul over public roads.

**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 Yard

**Scenario Typical Size:** 2420

**Total Scenario Cost:** $23,328.24

**Scenario Cost/Unit:** $9.64

**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 Yard | $3.76 | 2420 | $9,099.20 |
| 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 Yard | $3.43 | 2420 | $8,300.60 |
| 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 | $0.30 | 12100 | $3,630.00 |
| **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. | Hour | $91.60 | 8 | $732.80 |
| **Mobilization** | | | | | | |
| Mobilization, medium equipment | 1139 | Equipment with 70-150 HP or typical weights between 14,000 and 30,000 pounds. | Each | $232.71 | 1 | $232.71 |
| Mobilization, large equipment | 1140 | Equipment >150HP or typical weights greater than 30,000 pounds or loads requiring over width or over length permits. | Each | $444.31 | 3 | $1,332.93 |

**Practice:** 521D - Pond Sealing or Lining, Compacted Clay Treatment

**Scenario** #2 - Material haul greater than 5 miles

**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. Estimate based on a 10 mile haul. 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. It will be necessary to haul over public roads.

**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 Yard

**Scenario Typical Size:** 2420

**Total Scenario Cost:** $33,339.68

**Scenario Cost/Unit:** $13.78

**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 Yard | $1.99 | 2420 | $4,815.80 |
| Earthfill, Roller Compacted | 49 | Earthfill, roller or machine compacted, includes equipment and labor | Cubic Yard | $3.76 | 2420 | $9,099.20 |
| 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 Yard | $3.43 | 2420 | $8,300.60 |
| 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 | $0.30 | 24200 | $7,260.00 |
| **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. | Hour | $91.60 | 8 | $732.80 |
| **Mobilization** | | | | | | |
| Mobilization, medium equipment | 1139 | Equipment with 70-150 HP or typical weights between 14,000 and 30,000 pounds. | Each | $232.71 | 2 | $465.42 |
| Mobilization, large equipment | 1140 | Equipment >150HP or typical weights greater than 30,000 pounds or loads requiring over width or over length permits. | Each | $444.31 | 6 | $2,665.86 |

**Practice:** 521D - Pond Sealing or Lining, Compacted Clay Treatment

**Scenario** #3 - On Farm

**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 borrow is on the landowner's property with no highway travel needed. 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 on the farm if not ajacent to the site. Transportation on public roads and highways is not necessary.

**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 Yard

**Scenario Typical Size:** 2420

**Total Scenario Cost:** $18,288.42

**Scenario Cost/Unit:** $7.56

**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 Yard | $3.76 | 2420 | $9,099.20 |
| 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 Yard | $3.43 | 2420 | $8,300.60 |
| **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 | $444.31 | 2 | $888.62 |

**Practice:** 527 - Karst Sinkhole Treatment

**Scenario** #1 - Linear Opening

**Scenario Description:**

Installing a sinkhole protection cap on a sinkhole with a linear opening. The area around a sinkhole may be unstable and slippage or subsidence may occur. Sinkholes present fall hazards to people and livestock. Sinkholes are direct conduits to groundwater. Nutrient or chemical laden runoff may flow directly into sinkholes polluting groundwater. Sinkholes are routinely used for debris disposal areas by landowners. Associated practices: Critical Area Planting (342), Fence (382), Vertical Drain (630), Obstruction Removal (500) & Filter Strips (393). Unit is linear foot of opening.

**Before Situation:**

Open sinkhole poses threat to people, livestock, & wildlife. Absence of buffer allows nutrients and chemicals to flow into the open sinkhole untreated. Trash & Debris have accumulated in the sinkhole from years of use as a debris disposal areas. Typical Sinkhole treated is 25 feet in length and 10 feet in top width, depth varies.

**After Situation:**

Debris removed and properly disposed of off site. The open crevice is filled with porous material so as not to disrupt the hydrology of the karst system while filtering runoff and increasing safety. Typical Sinkhole treated is 25 feet length and 10 feet top width, depth varies.

**Feature Measure:** Linear foot of opening

**Scenario Unit::** Foot

**Scenario Typical Size:** 25

**Total Scenario Cost:** $5,552.94

**Scenario Cost/Unit:** $222.12

**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 | $2.05 | 80 | $164.00 |
| 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 Yard | $1.99 | 95 | $189.05 |
| Earthfill, Dumped and Spread | 51 | Earthfill, dumped and spread without compaction effort, includes equipment and labor | Cubic Yard | $3.08 | 50 | $154.00 |
| Dozer, 80 HP | 929 | Track mounted Dozer with horsepower range of 60 to 90. Equipment and power unit costs. Labor not included. | Hour | $60.16 | 4 | $240.64 |
| Hydraulic Excavator, 1 CY | 931 | Track mounted hydraulic excavator with bucket capacity range of 0.8 to 1.5 CY. Equipment and power unit costs. Labor not included. | Hour | $103.47 | 8 | $827.76 |
| **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. | Hour | $18.93 | 4 | $75.72 |
| Equipment Operators, Heavy | 233 | Includes: Cranes, Hydraulic Excavators >=50 HP, Dozers, Paving Machines, Rock Trenchers, Trenchers >=12", Dump Trucks, Ag Equipment >=150 HP, Scrapers, Water Wagons. | Hour | $23.93 | 12 | $287.16 |
| **Materials** | | | | | | |
| Aggregate, Gravel, Graded | 46 | Gravel, includes materials, equipment and labor to transport and place. Includes washed and unwashed gravel. | Cubic Yard | $30.82 | 30 | $924.60 |
| Rock Riprap, graded, angular, material and shipping | 1200 | Graded Rock Riprap for all gradation ranges. Includes materials and delivery only. | Ton | $22.52 | 15 | $337.80 |
| Straw | 1237 | Small grain straw (non organic and certified organic). Includes materials only. | Ton | $122.89 | 10 | $1,228.90 |
| Pipe, PVC, Schedule 80, Perforated | 1408 | Materials: 12" Diameter schedule 80 perforated pvc pipe - ASTM D1785 | Foot | $44.53 | 20 | $890.60 |
| **Mobilization** | | | | | | |
| Mobilization, medium equipment | 1139 | Equipment with 70-150 HP or typical weights between 14,000 and 30,000 pounds. | Each | $232.71 | 1 | $232.71 |

**Practice:** 527 - Karst Sinkhole Treatment

**Scenario** #2 - Circular Opening

**Scenario Description:**

Installing a sinkhole protection cap on a circular sinkhole with a vertical opening. The area around a sinkhole may be unstable and slippage or subsidence may occur. Sinkholes present fall hazards to people and livestock. Sinkholes are direct conduits to groundwater. Nutrient or chemical laden runoff may flow directly into sinkholes polluting groundwater. Sinkholes are routinely used for debris disposal areas by landowners. Associated practices: Critical Area Planting (342), Fence (382), Vertical Drain (630), Obstruction Removal (500) & Filter Strips (393). Units are square foot.

**Before Situation:**

Open sinkhole poses threat to people, livestock, & wildlife. Absence of buffer allows nutrients and chemicals to flow into the open sinkhole untreated. Trash & Debris have accumulated in the sinkhole from years of use as a disposal area. Typical Sinkhole treated is 30 feet in diameter and 8 feet in depth.

**After Situation:**

Debris removed and properly disposed of off site. The sinkhole is filled with porous material so as not to disrupt the hydrology of the karst system while filtering runoff and increasing safety.

**Feature Measure:** Square foot of opening

**Scenario Unit::** Square Foot

**Scenario Typical Size:** 706

**Total Scenario Cost:** $5,377.61

**Scenario Cost/Unit:** $7.62

**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 | $2.05 | 140 | $287.00 |
| 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 Yard | $1.99 | 130 | $258.70 |
| Earthfill, Dumped and Spread | 51 | Earthfill, dumped and spread without compaction effort, includes equipment and labor | Cubic Yard | $3.08 | 70 | $215.60 |
| Dozer, 80 HP | 929 | Track mounted Dozer with horsepower range of 60 to 90. Equipment and power unit costs. Labor not included. | Hour | $60.16 | 4 | $240.64 |
| Hydraulic Excavator, 1 CY | 931 | Track mounted hydraulic excavator with bucket capacity range of 0.8 to 1.5 CY. Equipment and power unit costs. Labor not included. | Hour | $103.47 | 10 | $1,034.70 |
| **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. | Hour | $18.93 | 4 | $75.72 |
| Equipment Operators, Heavy | 233 | Includes: Cranes, Hydraulic Excavators >=50 HP, Dozers, Paving Machines, Rock Trenchers, Trenchers >=12", Dump Trucks, Ag Equipment >=150 HP, Scrapers, Water Wagons. | Hour | $23.93 | 14 | $335.02 |
| **Materials** | | | | | | |
| Aggregate, Gravel, Graded | 46 | Gravel, includes materials, equipment and labor to transport and place. Includes washed and unwashed gravel. | Cubic Yard | $30.82 | 36 | $1,109.52 |
| Rock Riprap, graded, angular, material and shipping | 1200 | Graded Rock Riprap for all gradation ranges. Includes materials and delivery only. | Ton | $22.52 | 18 | $405.36 |
| Straw | 1237 | Small grain straw (non organic and certified organic). Includes materials only. | Ton | $122.89 | 6 | $737.34 |
| Pipe, PVC, Schedule 80, Perforated | 1408 | Materials: 12" Diameter schedule 80 perforated pvc pipe - ASTM D1785 | Foot | $44.53 | 10 | $445.30 |
| **Mobilization** | | | | | | |
| Mobilization, medium equipment | 1139 | Equipment with 70-150 HP or typical weights between 14,000 and 30,000 pounds. | Each | $232.71 | 1 | $232.71 |

**Practice:** 528 - Prescribed Grazing

**Scenario** #1 - PCS Very Low Mgmt (Yr 1)

**Scenario Description:**

A baseline pasture condition assessment will be completed by the participant with the assistance of a conservationist using the pasture condition score card. A grazing mgmt plan will be implemented. Participant will monitor the health of the pastures by conducting at least quarterly pasture condition assessments (transects). Participant will record the number of days grazed and rested, stubble heights of forage prior and after grazing, number and size of grazing animals, nutrients/herbicides applied. Participant has 3 years to bring score from 10-15 to 36-45. 1st year only

**Before Situation:**

Pasture is uniformly overgrazed and not deferred/rested from grazing. Desirable species <20% of the stand. Undesirable herbaceous and/or woody plants becoming dominant. <10% of the stand meets the minimum residual grazing height of the desirable species. Yields are 25% below site potential. Compaction severe througout. Pasture contains only one to two species, one functional group.

**After Situation:**

A prescribed grazing schedule, contingency plan that details potential climatic problems and monitoring plan is being followed. Removal of herbage by the grazing animals is inaccordance with production limitations, plant sensitivities and management goals. Frequency of defoliations and season of grazing is based on the rate of growth and physiological condition of the plants.

**Feature Measure:** <Unknown>

**Scenario Unit::** Acre

**Scenario Typical Size:** 40

**Total Scenario Cost:** $4,819.46

**Scenario Cost/Unit:** $120.49

**Cost Details:**

| Component Name | ID | Description | Unit | Cost | QTY | Total |
|---|---|---|---|---|---|---|
| **Equipment Installation** | | | | | | |
| Rangeland/grassland field monitoring kit | 967 | Miscellaneous tools needed to complete rangeland/grassland monitoring. Materials may include camera, clippers, plot frame, scale, tape measure, etc. Includes materials and shipping only. | Each | $48.10 | 1 | $48.10 |
| **Labor** | | | | | | |
| Skilled Labor | 230 | Labor requiring a high level skill set: Includes carpenters, welders, electricians, conservation professionals involved with data collection, monitoring, and or record keeping, etc. | Hour | $25.08 | 20 | $501.60 |
| 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. | Hour | $18.93 | 32 | $605.76 |
| 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. | Hour | $91.60 | 40 | $3,664.00 |

**Practice:** 528 - Prescribed Grazing

**Scenario** #2 - PCS Very Low Mgmt (Yr 2&3)

**Scenario Description:**

2nd and 3rd year of monitoring. Participant will turn in record keeping book which also includes weather data and pictures of livestock and forage.

**Before Situation:**

Pasture is uniformly overgrazed and not deferred/rested from grazing. Desirable species <20% of the stand. Undesirable herbaceous and/or woody plants becoming dominant. <10% of the stand meets the minimum residual grazing height of the desirable species. Yields are 25% below site potential. Compaction severe throughout. Pasture contains only one to two species, one functional group

**After Situation:**

A prescribed grazing schedule, contingency plan that details potential climatic problems and monitoring plan is being followed. Removal of herbage by the grazing animals is in accordance with production limitations, plant sensitivities and management goals. Frequency of defoliations and season of grazing is based on the rate of growth and physiological conditon of the plants.

**Feature Measure:** <Unknown>

**Scenario Unit::** Acre

**Scenario Typical Size:** 40

**Total Scenario Cost:** $1,158.48

**Scenario Cost/Unit:** $28.96

**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. | Hour | $25.08 | 16 | $401.28 |
| 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. | Hour | $18.93 | 40 | $757.20 |

**Practice:** 528 - Prescribed Grazing

**Scenario** #3 - PCS Low Mgmt (Yr 1)

**Scenario Description:**

A baseline pasture condition assessment will be completed by the participant with the assistance of a conservationist using the pasture condition score card. A grazing mgmt plan will be implemented. Participant will monitor the health of the pastures by conducting at least quarterly pasture condition assessments (transects). Participant will record the number of days grazed and rested, stubble height of forage before and after grazing, number & size of grazing animals, nutrients/herbicides applied. Participant has 3 years to bring score from 16-25 to 36-45. Year 1

**Before Situation:**

Pasture is not deferred/rested from grazing. Spot grazing greater than 30%. Desirable species 20-4-% of the stand. 10-15% of the stand meets the minimum residual grazing height of the desirable species. Yields are 10-25% below site potential. Compaction evident throughout. Sheet and rill erosion is evident. Pasture contains two to four species, two functional groups

**After Situation:**

A prescribed grazing schedule, contingency plan that details potential climatic problems and monitoring plan is being followed. Removal of herage by the grazing animals is in accordance with production limitations, plant sensitivities and management goals. Frequency of defoliations and season of grazing is based on the rate of growth and physiological condition of the plants.

**Feature Measure:** <Unknown>

**Scenario Unit::** Acre

**Scenario Typical Size:** 40

**Total Scenario Cost:** $4,137.78

**Scenario Cost/Unit:** $103.44

**Cost Details:**

| Component Name | ID | Description | Unit | Cost | QTY | Total |
|---|---|---|---|---|---|---|
| **Equipment Installation** | | | | | | |
| Rangeland/grassland field monitoring kit | 967 | Miscellaneous tools needed to complete rangeland/grassland monitoring. Materials may include camera, clippers, plot frame, scale, tape measure, etc. Includes materials and shipping only. | Each | $48.10 | 1 | $48.10 |
| **Labor** | | | | | | |
| Skilled Labor | 230 | Labor requiring a high level skill set: Includes carpenters, welders, electricians, conservation professionals involved with data collection, monitoring, and or record keeping, etc. | Hour | $25.08 | 16 | $401.28 |
| 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. | Hour | $18.93 | 40 | $757.20 |
| 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. | Hour | $91.60 | 32 | $2,931.20 |

**Practice:** 528 - Prescribed Grazing

**Scenario** #4 - PCS Low Mgmt (Yr 2&3)

**Scenario Description:**

2nd and 3rd year of monitoring. Participant will turn in record keeping book which also includes weather data and pictures of livestock and forage.

**Before Situation:**

Pasture is not deferred/rested from grazing. Spot grazing greater than 30%. Desirale species 20-40% of the stand. 10-15% of the stand meets the minimum residual grazing height of the desirable species. Yields are 10-25% below site potential. Compaction evident throughout. Sheet and rill erosion is evident. Pasture contains two to four species, two functional groups

**After Situation:**

A prescribed grazing schedule, contingency plan that details potential climatic problems and monitoring plan is being followed. Removal of herbage by the grazing animals is inaccordance with production limitations, plant sensitivities and management goals. Frequency of defoliations and season of grazing is based on the rate of growth and physiological condition of the plants.

**Feature Measure:** <Unknown>

**Scenario Unit::** Acre

**Scenario Typical Size:** 40

**Total Scenario Cost:** $1,058.16

**Scenario Cost/Unit:** $26.45

**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. | Hour | $25.08 | 12 | $300.96 |
| General Labor | 231 | Labor performed using basic tools such as power tool, shovels, and other tools that do not require extensive training. Ex. pipe layer, herder, concrete placement, materials spreader, flagger, etc. | Hour | $18.93 | 40 | $757.20 |

**Practice:** 528 - Prescribed Grazing

**Scenario** #5 - PCS Moderate Mgmt (Year 1)

**Scenario Description:**

A baseline pasture condition assessment will be completed by the participant with the assistance of a conservationist using the pasture condition score card. A grazing mgmt plan will be implemented. Participant will monitor the health of the pastures by conducting at least quarterly pasture condition assessment (transects). Participant will record the number of days grazed and rested, stubble heights of forage before and after grazing, number & size of grazing animals, nutrients/herbicides applied. Participant has 3 years to bring score from 26-35 to 36-45. Year 1

**Before Situation:**

Pasture is not deferred/rested from grazing. Spot grazing is 10-30%. Desirable species 40-60% of the stand. 25-50% of the stand meets the minimum residual grazing height of the desirable species. Yields may be below site potential. Moderate compaction evident throughout. Some service ponding. Pasture contains two to four species, two functional groups and one legume.

**After Situation:**

A prescribed grazing schedule, contingency plan that details potential climatic problems and monitoring plan is being followed. Removal of herbage by the grazing animals is in accordance with production limitations, plant sensitivities and management goals. Frequency of defoliations and season of grazing is based on the rate of growth and physiological condition of the plants.

**Feature Measure:** <Unknown>

**Scenario Unit::** Acre

**Scenario Typical Size:** 40

**Total Scenario Cost:** $1,961.86

**Scenario Cost/Unit:** $49.05

**Cost Details:**

| Component Name | ID | Description | Unit | Cost | QTY | Total |
|---|---|---|---|---|---|---|
| **Equipment Installation** | | | | | | |
| Rangeland/grassland field monitoring kit | 967 | Miscellaneous tools needed to complete rangeland/grassland monitoring. Materials may include camera, clippers, plot frame, scale, tape measure, etc. Includes materials and shipping only. | Each | $48.10 | 1 | $48.10 |
| **Labor** | | | | | | |
| Skilled Labor | 230 | Labor requiring a high level skill set: Includes carpenters, welders, electricians, conservation professionals involved with data collection, monitoring, and or record keeping, etc. | Hour | $25.08 | 28 | $702.24 |
| General Labor | 231 | Labor performed using basic tools such as power tool, shovels, and other tools that do not require extensive training. Ex. pipe layer, herder, concrete placement, materials spreader, flagger, etc. | Hour | $18.93 | 64 | $1,211.52 |

**Practice:** 528 - Prescribed Grazing

**Scenario** #6 - PCS Moderate Mgmt (Yr 2&3)

**Scenario Description:**

2nd and 3rd year of monitoring. Participant will turn in record keeping book which also includes weather data and pictures of livestock and forage.

**Before Situation:**

Pasture is not deferred/rested from grazing. Spot grazing 10-30%. Desirable species 40-60% of the stand. 25-50% of the stand meets the minimum residual grazing height fo the desirable species. Yields may be below site potential. Moderate compaction evident throughout. Some service ponding. Pasture contains two to four species, two functional groups and one legume

**After Situation:**

A prescribed grazing schedule, contingency plan that details potential climatic problems and monitoring plan is being followed. Removal of herbage by the grazing animal is in accordance with production limitations, plant sensitivities and management goals. Frequency of defoliations and season of grazing is based on the rate of growth and physiological conditon of the plants

**Feature Measure:** <Unknown>

**Scenario Unit::** Acre

**Scenario Typical Size:** 40

**Total Scenario Cost:** $654.96

**Scenario Cost/Unit:** $16.37

**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. | Hour | $25.08 | 8 | $200.64 |
| 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. | Hour | $18.93 | 24 | $454.32 |

**Practice:** 528 - Prescribed Grazing

**Scenario** #7 - Medium Intensity 3-7 Day Rotation Frequency

**Scenario Description:**

Design and implementation of a grazing system that will enhance pasture condition and ecosystem function aswell as optimize efficiency and economic return through monitoring (ex:photo points, stubble height after grazing,etc) & record keeping. Livestock graze each pasture from three (3) to seven (7) days in rotation. Rotation is basedon monitoring livestock demand and supply.

**Before Situation:**

Current grazing system exhibits undesirable and inefficient use of forage plants and such use has a negative impacton pasture condition, as well as soil and water resources. Inefficient use results in overgrazing, spot grazing,livestock trailing, concentration areas, uncontrolled access to streams and ponds, ephemeral erosion, gullyerosion, streambank erosion. Stocking rates are higher than the current level of production and efficiency of usecan support without management changes. There is currently no monitoring plan in place to evaluate change onthe landscape.

**After Situation:**

Typical scenario based on a grazing system consisting of a 30 animal unit cow/calf operation (including bull(s),calves and replacement females) on 80 acres. Scenario results in an increase (above the low intensity option) inlabor required to complete the following activities: farm labor to mow or clip pastures; monitor and measureforage growth; complete record keeping; analyze plant growth and animal performance; and make decisions orother management techniques. Management techniques reduce the use of supplemental feed, control weeds, andreduce energy requirements. Prescribed grazing system is designed to protect the health and vigor of the plantcommunities that are in place. Livestock are managed in a way that enhances pasture condition and functionthrough protection of sensitive areas and efficient harvest of forage resources. Runoff, sediment and nutrient lossare reduced by improving plant density, diversity and percent cover. Grazing system success is evaluated throughshort term monitoring and maintaining grazing stop height requirements. Acquisition of technical knowledgeneeded to effectively implement prescribed grazing. Costs and activities are typical for conventional and organicproducers. Associated Practices: (511) Forage Harvest Management, (512) Forage and Biomass Planting, (590)Nutrient Management, (595) Integrated Pest Management, (561) Heavy Use Area Protection, (382) Fence, (614)Watering Facility, (378) Pond, (642) Water Well, (314) Brush Management, (315) Herbaceous Weed Control, (338)Prescribed Burning.

**Feature Measure:** <Unknown>

**Scenario Unit::** Acre

**Scenario Typical Size:** 80

**Total Scenario Cost:** $2,955.30

**Scenario Cost/Unit:** $36.94

**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 | $45.80 | 1 | $45.80 |
| **Equipment Installation** | | | | | | |
| All terrain vehicles, ATV | 965 | Includes equipment, power unit and labor costs. | Hour | $29.73 | 20 | $594.60 |
| 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 | $48.10 | 1 | $48.10 |
| **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. | Hour | $25.08 | 30 | $752.40 |
| 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. | Hour | $18.93 | 80 | $1,514.40 |

**Practice:** 528 - Prescribed Grazing

**Scenario** #8 - High Intensity <3 Day Rotation Frequency

**Scenario Description:**

Design and implementation of a grazing system that will enhance pasture condition and ecosystem function aswell as optimize efficiency and economic return through monitoring (ex:photo points, stubble height after grazing,etc) & record keeping. Livestock graze each pature/paddock from no more than three (3) days in rotation.Rotation is based on monitoring livestock demand and supply.

**Before Situation:**

Current grazing system exhibits undesirable and inefficient use of forage plants and such use has a negative impacton pasture condition, as well as soil and water resources. Inefficient use results in overgrazing, spot grazing,livestock trailing, concentration areas, uncontrolled access to streams and ponds, ephemeral erosion, gullyerosion, streambank erosion. Stocking rates are higher than the current level of production and efficiency of usecan support without management changes. There is currently no monitoring plan in place to evaluate change onthe landscape.

**After Situation:**

Typical scenario based on a grazing system consisting of a 30 animal unit cow/calf operation (including bull(s),calves and replacement females) on 60 acres. Scenario results in an increase (above the medium intensity option)in labor required to complete the following activities: farm labor to mow or clip pastures; monitor stop grazingheights and measure forage growth; complete record keeping; analyze plant growth and animal performance; andmake decisions or other management techniques. Management techniques reduce the use of supplemental feed,control weeds, and reduce energy requirements. Prescribed grazing system is designed to protect the health andvigor of the plant communities that are in place. Livestock are managed in a way that enhances pasture conditionand function through protection of sensitive areas and efficient harvest of forage resources. Runoff, sediment andnutrient loss are reduced by improving plant density, diversity and percent cover. Grazing system success isevaluated through short term monitoring and maintaining grazing stop height requirements. Acquisition oftechnical knowledge needed to effectively implement prescribed grazing. Costs and activities are typical forconventional and organic producers. Associated Practices: (511) Forage Harvest Management, (512) Forage andBiomass Planting, (590) Nutrient Management, (595) Integrated Pest Management, (561) Heavy Use AreaProtection, (382) Fence, (614) Watering Facility, (378) Pond, (642) Water Well, (314) Brush Management, (315)Herbaceous Weed Control, (338) Prescribed Burning.

**Feature Measure:** <Unknown>

**Scenario Unit::** Acre

**Scenario Typical Size:** 60

**Total Scenario Cost:** $4,007.40

**Scenario Cost/Unit:** $66.79

**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 | $45.80 | 1 | $45.80 |
| **Equipment Installation** | | | | | | |
| All terrain vehicles, ATV | 965 | Includes equipment, power unit and labor costs. | Hour | $29.73 | 30 | $891.90 |
| Rangeland/grassland field monitoring kit | 967 | Miscellaneous tools needed to complete rangeland/grassland monitoring. Materials may include camera, clippers, plot frame, scale, tape measure, etc. Includes materials and shipping only. | Each | $48.10 | 1 | $48.10 |
| **Labor** | | | | | | |
| Skilled Labor | 230 | Labor requiring a high level skill set: Includes carpenters, welders, electricians, conservation professionals involved with data collection, monitoring, and or record keeping, etc. | Hour | $25.08 | 45 | $1,128.60 |
| 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. | Hour | $18.93 | 100 | $1,893.00 |

**Practice:** 528 - Prescribed Grazing

**Scenario** #9 - Pasture Deferment - Long Term

**Scenario Description:**

Defer the pasture for 210 days and up to a growing season to provide rest to specific plants such as native grasses. The rest is needed to provide long-term rest to specific plants that would typically decline in plant health, vigor, and availability due to overgrazing. The importance of long-term deferment is critical to the long term success of the plants and meeting the desired life span.

**Before Situation:**

The producer will typically graze the plants before they have sufficient time to become established. Therefore, any plants that emerges will be susceptible to early grazing pressure and possibly overgrazing. Existing herbacesous vegetation will compete against the desired plants and become dominant. The lack of cover reduces the wildlife habitat. No monitoring or record keeping is currently being completed. Plants not adapted or suited, inadequate wildlife cover, soil erosion, and inadequate plant productivity and vigor are common resource concerns.

**After Situation:**

Scenario describes activities completed to restrict grazing for a defined period during the normal grazing period to provide rest to targeted plants. Activities include moving livestock to alternate locations, sampling and analyzing pasture condition, recordkeeping. Forgone Income used represents the acreage of usable forage not utilized during the deferment period as a proportion of the grazing season. Typical size of 120 acre pasture operation with 30 animal units where 50% of the acreage (or 60 acres) is defered from grazing for 210 days. Costsand activities are typical for conventional and organic producers. Associated Practices: (511) Forage Harvest Management, (512) Forage and Biomass Planting, (590) Nutrient Management, (595) Integrated Pest Management, (561) Heavy Use Area Protection, (382) Fence, (614) Watering Facility, (378) Pond, (642) Water Well, (314) Brush Management, (315) Herbaceous Weed Control, (338) Prescribed Burning.

**Feature Measure:** <Unknown>

**Scenario Unit::** Acre

**Scenario Typical Size:** 60

**Total Scenario Cost:** $4,384.32

**Scenario Cost/Unit:** $73.07

**Cost Details:**

| Component Name | ID | Description | Unit | Cost | QTY | Total |
|---|---|---|---|---|---|---|
| **Equipment Installation** | | | | | | |
| Truck, Pickup | 939 | Equipment and power unit costs. Labor not included. | Hour | $19.82 | 8 | $158.56 |
| Trucking, moving livestock to new paddock | 961 | Livestock transportation costs to implement a grazing rotation using a gooseneck trailer 6'8" x 24'. Includes equipment, power unit and labor costs. | Mile | $2.27 | 50 | $113.50 |
| Rangeland/grassland field monitoring kit | 967 | Miscellaneous tools needed to complete rangeland/grassland monitoring. Materials may include camera, clippers, plot frame, scale, tape measure, etc. Includes materials and shipping only. | Each | $48.10 | 1 | $48.10 |
| **Foregone Income** | | | | | | |
| FI, Grazing AUMs | 2079 | Grazing is the Primary Land Use | Animal Unit Month | $16.00 | 210 | $3,360.00 |
| **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. | Hour | $25.08 | 16 | $401.28 |
| 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. | Hour | $18.93 | 16 | $302.88 |

**Practice:** 528 - Prescribed Grazing

**Scenario** #10 - Targeted Grazing

**Scenario Description:**

Defer the pasture for 210 days and up to a growing season to provide rest to specific plants such as native grasses. The rest is needed to provide long-term rest to specific plants that would typically decline in plant health, vigor, and availability due to overgrazing. The importance of long-term deferment is critical to the long term success of the plants and meeting the desired life span.

**Before Situation:**

Management of woody non-herbaceous plant species through the use of livestock that are closely herded 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.

**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:** <Unknown>

**Scenario Unit::** Acre

**Scenario Typical Size:** 40

**Total Scenario Cost:** $1,842.90

**Scenario Cost/Unit:** $46.07

**Cost Details:**

| Component Name | ID | Description | Unit | Cost | QTY | Total |
|---|---|---|---|---|---|---|
| **Equipment Installation** | | | | | | |
| Truck, Pickup | 939 | Equipment and power unit costs. Labor not included. | Hour | $19.82 | 2 | $39.64 |
| Trucking, moving livestock to new paddock | 961 | Livestock transportation costs to implement a grazing rotation using a gooseneck trailer 6'8" x 24'. Includes equipment, power unit and labor costs. | Mile | $2.27 | 50 | $113.50 |
| **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. | Hour | $25.08 | 2 | $50.16 |
| 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. | Hour | $18.93 | 20 | $378.60 |
| **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 | $12.61 | 100 | $1,261.00 |

**Practice:** 533 - Pumping Plant

**Scenario** #1 - Electric-Powered Pump Less than or Equal to 5 HP , no pressure tank

**Scenario Description:**

A 2.5 Hp submersible electric-powered pump is installed in a well or structure; or a close-coupled 2.5 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:** 2.5

**Total Scenario Cost:** $2,337.93

**Scenario Cost/Unit:** $935.17

**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 Yard | $210.23 | 1 | $210.23 |
| Truck, Pickup | 939 | Equipment and power unit costs. Labor not included. | Hour | $19.82 | 1 | $19.82 |
| **Labor** | | | | | | |
| General Labor | 231 | Labor performed using basic tools such as power tool, shovels, and other tools that do not require extensive training. Ex. pipe layer, herder, concrete placement, materials spreader, flagger, etc. | Hour | $18.93 | 6 | $113.58 |
| Supervisor or Manager | 234 | Labor involving supervision or management activities. Includes crew supervisors, foremen and farm/ranch managers time required for adopting new technology, etc. | Hour | $34.29 | 6 | $205.74 |
| **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 | Each | $549.88 | 2.5 | $1,374.70 |
| 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 | $413.86 | 1 | $413.86 |

**Practice:** 533 - Pumping Plant

**Scenario** #2 - Electric-Powered Pump Less than or Equal to 5 HP, with pressure tank

**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. 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

**Total Scenario Cost:** $1,838.93

**Scenario Cost/Unit:** $1,838.93

**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 Yard | $210.23 | 0.25 | $52.56 |
| Truck, Pickup | 939 | Equipment and power unit costs. Labor not included. | Hour | $19.82 | 2 | $39.64 |
| **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. | Hour | $18.93 | 6 | $113.58 |
| Supervisor or Manager | 234 | Labor involving supervision or management activities. Includes crew supervisors, foremen and farm/ranch managers time required for adopting new technology, etc. | Hour | $34.29 | 6 | $205.74 |
| **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 | Each | $549.88 | 1 | $549.88 |
| 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 | $413.86 | 1 | $413.86 |
| Pressure Tank, 40 gallon | 1038 | Pressure Tank, 40 gallon. Includes materials and shipping only. | Each | $463.67 | 1 | $463.67 |

**Practice:** 533 - Pumping Plant

**Scenario** #3 - Electric-Powered Pump >5 HP<=30 hp, with L-pipe

**Scenario Description:**

This is a close-coupled, 3-phase, 20 Hp electric-powered mixed-flow pump mounted in a steel L-pipe for large microirrigation (1,000 gpm and 30 psi) system or a large-sized surface irrigation system (1,200 gpm) or a medium-sized (1,000 gpm and 25 psi) waste transfer system. . The pump lifts water out of a stream, bayou, or tailwater pit through a discharge pipe into an irrigation reservoir directly or irrigation pipeline with either a dog-leg or closed stand pipe connection. 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 or is currently using ground water wells as irrigation supply.

**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:** 20

**Total Scenario Cost:** $17,733.68

**Scenario Cost/Unit:** $886.68

**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 Yard | $210.23 | 2 | $420.46 |
| Hydraulic Excavator, 1 CY | 931 | Track mounted hydraulic excavator with bucket capacity range of 0.8 to 1.5 CY. Equipment and power unit costs. Labor not included. | Hour | $103.47 | 8 | $827.76 |
| Truck, Pickup | 939 | Equipment and power unit costs. Labor not included. | Hour | $19.82 | 56 | $1,109.92 |
| Portable Welder | 1407 | Portable field welder. Equipment only. Labor not included. | Hour | $18.57 | 16 | $297.12 |
| **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. | Hour | $25.08 | 8 | $200.64 |
| 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. | Hour | $18.93 | 56 | $1,060.08 |
| Equipment Operators, Heavy | 233 | Includes: Cranes, Hydraulic Excavators >=50 HP, Dozers, Paving Machines, Rock Trenchers, Trenchers >=12", Dump Trucks, Ag Equipment >=150 HP, Scrapers, Water Wagons. | Hour | $23.93 | 8 | $191.44 |
| Supervisor or Manager | 234 | Labor involving supervision or management activities. Includes crew supervisors, foremen and farm/ranch managers time required for adopting new technology, etc. | Hour | $34.29 | 56 | $1,920.24 |
| **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 | $1,968.95 | 1 | $1,968.95 |
| 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 | Horsepower | $125.33 | 20 | $2,506.60 |
| Pipe, Steel, 12", Std Wt, USED | 1356 | Materials: - USED - 12" - Steel Std Wt | Foot | $22.66 | 20 | $453.20 |
| Pipe, Steel, 20", Std Wt, USED | 1359 | Materials: - USED - 20" - Steel Std Wt | Foot | $42.47 | 40 | $1,698.80 |

| | | | | | | |
|---|---|---|---|---|---|---|
| Pipe, Steel, 24", Std Wt, USED | 1360 | Materials: - USED - 24" - Steel Std Wt | Foot | $51.07 | 14 | $714.98 |
| Swing Check Valve, metal, 12" | 2082 | 12" swing check valve for back flow prevention, ductile iron metal body with flange mount and lever shaft. Materials only. | Each | $4,130.78 | 1 | $4,130.78 |
| **Mobilization** | | | | | | |
| Mobilization, medium equipment | 1139 | Equipment with 70-150 HP or typical weights between 14,000 and 30,000 pounds. | Each | $232.71 | 1 | $232.71 |

**Practice:** 533 - Pumping Plant

**Scenario** #4 - Electric-Powered Pump >30 hp <=75, with L-pipe

**Scenario Description:**

This is a close-coupled, 3-phase, 50 Hp electric-powered mixed-flow pump mounted in a steel L-pipe for large microirrigation (2,000 gpm and 30 psi) system or a very large-sized surface irrigation system (3,000 gpm) or a large-sized (2,000 gpm and 25 psi) waste transfer system. The pump lifts water out of a stream, bayou, or tailwater pit through a discharge pipe into an irrigation reservoir directly or irrigation pipeline with either a dog-leg or closed stand pipe connection. This is a close-coupled, 3-phase, 50 Hp electric-powered centrifugal pump mounted on a platform for pressurizing a large-sized 1,000 gpm and 50 psi) sprinkler or very large microirrigation (2,000 gpm and 30 psi) system or a very large-sized surface irrigation system (3,000 gpm) or a large-sized (2,000 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 or is currently using ground water wells as irrigation supply.

**After Situation:**

A properly designed and efficient pumping plant is installed, reducing energy use and improving irrigation efficiency

**Feature Measure:** Pump Power Requirement

**Scenario Unit::** Horsepower

**Scenario Typical Size:** 50

**Total Scenario Cost:** $29,510.52

**Scenario Cost/Unit:** $590.21

**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 Yard | $210.23 | 2 | $420.46 |
| Hydraulic Excavator, 1 CY | 931 | Track mounted hydraulic excavator with bucket capacity range of 0.8 to 1.5 CY. Equipment and power unit costs. Labor not included. | Hour | $103.47 | 16 | $1,655.52 |
| Truck, Pickup | 939 | Equipment and power unit costs. Labor not included. | Hour | $19.82 | 56 | $1,109.92 |
| Portable Welder | 1407 | Portable field welder. Equipment only. Labor not included. | Hour | $18.57 | 16 | $297.12 |
| Crane, truck mounted, hydraulic, 12 ton | 1734 | 12 ton capacity truck mounted hydraulic crane. Equipment cost only. | Hour | $83.25 | 16 | $1,332.00 |
| **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. | Hour | $25.08 | 56 | $1,404.48 |
| 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. | Hour | $18.93 | 16 | $302.88 |
| Equipment Operators, Heavy | 233 | Includes: Cranes, Hydraulic Excavators >=50 HP, Dozers, Paving Machines, Rock Trenchers, Trenchers >=12", Dump Trucks, Ag Equipment >=150 HP, Scrapers, Water Wagons. | Hour | $23.93 | 24 | $574.32 |
| Supervisor or Manager | 234 | Labor involving supervision or management activities. Includes crew supervisors, foremen and farm/ranch managers time required for adopting new technology, etc. | Hour | $34.29 | 56 | $1,920.24 |
| **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 | $4,657.54 | 1 | $4,657.54 |
| 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 | $95.62 | 50 | $4,781.00 |

| | | | | | | |
|---|---|---|---|---|---|---|
| Pipe, Steel, 16", Std Wt, USED | 1357 | Materials:  - USED - 16" - Steel Std Wt | Foot | $29.88 | 20 | $597.60 |
| Pipe, Steel, 24", Std Wt, USED | 1360 | Materials: - USED - 24" - Steel Std Wt | Foot | $51.07 | 40 | $2,042.80 |
| Pipe, Steel, 30", Std Wt, USED | 1361 | Materials: - USED - 30" - Steel Std Wt | Foot | $80.28 | 14 | $1,123.92 |
| Swing Check Valve, metal, 16" | 2084 | 16" swing check valve for back flow prevention,  ductile iron metal body with flange mount and lever shaft.  Materials only. | Each | $7,058.01 | 1 | $7,058.01 |
| **Mobilization** | | | | | | |
| Mobilization, medium equipment | 1139 | Equipment with 70-150 HP or typical weights between 14,000 and 30,000 pounds. | Each | $232.71 | 1 | $232.71 |

**Practice:** 533 - Pumping Plant

**Scenario** #5 - Electric-Powered Pump >75 HP, with L-Pipe

**Scenario Description:**

This is a close-coupled, 3-phase, 100 Hp electric-powered mixed-flow pump mounted in a steel L-pipe for a very large-sized surface irrigation system (5,000 gpm) . The pump lifts water out of a stream, bayou, or tailwater pit through a discharge pipe into an irrigation reservoir directly or irrigation pipeline with either a dog-leg or closed stand pipe connection. 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 or is currently using ground water wells as irrigation supply.

**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:** 100

**Total Scenario Cost:** $52,691.37

**Scenario Cost/Unit:** $526.91

**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 Yard | $210.23 | 4 | $840.92 |
| Hydraulic Excavator, 1 CY | 931 | Track mounted hydraulic excavator with bucket capacity range of 0.8 to 1.5 CY. Equipment and power unit costs. Labor not included. | Hour | $103.47 | 8 | $827.76 |
| Truck, Pickup | 939 | Equipment and power unit costs. Labor not included. | Hour | $19.82 | 56 | $1,109.92 |
| Portable Welder | 1407 | Portable field welder. Equipment only. Labor not included. | Hour | $18.57 | 16 | $297.12 |
| Crane, truck mounted, hydraulic, 12 ton | 1734 | 12 ton capacity truck mounted hydraulic crane. Equipment cost only. | Hour | $83.25 | 16 | $1,332.00 |
| **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. | Hour | $25.08 | 12 | $300.96 |
| General Labor | 231 | Labor performed using basic tools such as power tool, shovels, and other tools that do not require extensive training. Ex. pipe layer, herder, concrete placement, materials spreader, flagger, etc. | Hour | $18.93 | 56 | $1,060.08 |
| Equipment Operators, Heavy | 233 | Includes: Cranes, Hydraulic Excavators >=50 HP, Dozers, Paving Machines, Rock Trenchers, Trenchers >=12", Dump Trucks, Ag Equipment >=150 HP, Scrapers, Water Wagons. | Hour | $23.93 | 12 | $287.16 |
| 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. | Hour | $34.29 | 56 | $1,920.24 |
| **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 | $4,657.54 | 1 | $4,657.54 |
| 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 | $95.62 | 100 | $9,562.00 |
| Pipe, Steel, 20", Std Wt, USED | 1359 | Materials: - USED - 20" - Steel Std Wt | Foot | $42.47 | 20 | $849.40 |

| | | | | | | |
|---|---|---|---|---|---|---|
| Pipe, Steel, 36", Std Wt, USED | 1362 | Materials: - USED - 36" - Steel Std Wt | Foot | $102.50 | 50 | $5,125.00 |
| Pipe, Steel, 42", Std Wt, USED | 1363 | Materials: - USED - 42" - Steel Std Wt | Foot | $117.94 | 14 | $1,651.16 |
| Swing Check Valve, metal, 20" | 2086 | 20" swing check valve for back flow prevention, ductile iron metal body with flange mount and lever shaft. Materials only. | Each | $22,637.40 | 1 | $22,637.40 |
| **Mobilization** | | | | | | |
| Mobilization, medium equipment | 1139 | Equipment with 70-150 HP or typical weights between 14,000 and 30,000 pounds. | Each | $232.71 | 1 | $232.71 |

**Practice:** 533 - Pumping Plant

**Scenario** #6 - Electric-Powered Pump >5 HP<=30 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 medium-sized (1,000 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:** 20

**Total Scenario Cost:** $10,018.96

**Scenario Cost/Unit:** $500.95

**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 Yard | $210.23 | 2 | $420.46 |
| Backhoe, 80 HP | 926 | Wheel mounted backhoe excavator with horsepower range of 60 to 90. Equipment and power unit costs. Labor not included. | Hour | $50.99 | 8 | $407.92 |
| Truck, Pickup | 939 | Equipment and power unit costs. Labor not included. | Hour | $19.82 | 56 | $1,109.92 |
| **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. | Hour | $25.08 | 8 | $200.64 |
| 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. | Hour | $18.93 | 56 | $1,060.08 |
| Equipment Operators, Heavy | 233 | Includes: Cranes, Hydraulic Excavators >=50 HP, Dozers, Paving Machines, Rock Trenchers, Trenchers >=12", Dump Trucks, Ag Equipment >=150 HP, Scrapers, Water Wagons. | Hour | $23.93 | 8 | $191.44 |
| Supervisor or Manager | 234 | Labor involving supervision or management activities. Includes crew supervisors, foremen and farm/ranch managers time required for adopting new technology, etc. | Hour | $34.29 | 56 | $1,920.24 |
| **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 | $1,968.95 | 1 | $1,968.95 |
| 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 | Horsepower | $125.33 | 20 | $2,506.60 |
| **Mobilization** | | | | | | |
| Mobilization, medium equipment | 1139 | Equipment with 70-150 HP or typical weights between 14,000 and 30,000 pounds. | Each | $232.71 | 1 | $232.71 |

**Practice:** 533 - Pumping Plant

**Scenario** #7 - Electric-Powered Pump >30 hp <=75

**Scenario Description:**

This is a close-coupled, 3-phase, 50 Hp electric-powered centrifugal pump mounted on a platform for pressurizing a large-sized 1,000 gpm and 50 psi) sprinkler or very large microirrigation (2,000 gpm and 30 psi) system or a very large-sized surface irrigation system (3,000 gpm) or a large-sized (2,000 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:**

A properly designed and efficient pumping plant is installed, reducing energy use and improving irrigation efficiency

**Feature Measure:** <Unknown>

**Scenario Unit::** Horsepower

**Scenario Typical Size:** 50

**Total Scenario Cost:** $16,219.39

**Scenario Cost/Unit:** $324.39

**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 Yard | $210.23 | 2 | $420.46 |
| Backhoe, 80 HP | 926 | Wheel mounted backhoe excavator with horsepower range of 60 to 90. Equipment and power unit costs. Labor not included. | Hour | $50.99 | 16 | $815.84 |
| Truck, Pickup | 939 | Equipment and power unit costs. Labor not included. | Hour | $19.82 | 56 | $1,109.92 |
| **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. | Hour | $25.08 | 56 | $1,404.48 |
| 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. | Hour | $18.93 | 16 | $302.88 |
| Equipment Operators, Heavy | 233 | Includes: Cranes, Hydraulic Excavators >=50 HP, Dozers, Paving Machines, Rock Trenchers, Trenchers >=12", Dump Trucks, Ag Equipment >=150 HP, Scrapers, Water Wagons. | Hour | $23.93 | 24 | $574.32 |
| Supervisor or Manager | 234 | Labor involving supervision or management activities. Includes crew supervisors, foremen and farm/ranch managers time required for adopting new technology, etc. | Hour | $34.29 | 56 | $1,920.24 |
| **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 | $4,657.54 | 1 | $4,657.54 |
| 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 | $95.62 | 50 | $4,781.00 |
| **Mobilization** | | | | | | |
| Mobilization, medium equipment | 1139 | Equipment with 70-150 HP or typical weights between 14,000 and 30,000 pounds. | Each | $232.71 | 1 | $232.71 |

**Practice:** 533 - Pumping Plant

**Scenario** #8 - Electric-Powered Pump >75hp

**Scenario Description:**

This is a close-coupled, 3-phase, 100 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 medium-sized (1,000 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:** 100

**Total Scenario Cost:** $20,379.45

**Scenario Cost/Unit:** $203.79

**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 Yard | $210.23 | 4 | $840.92 |
| Backhoe, 80 HP | 926 | Wheel mounted backhoe excavator with horsepower range of 60 to 90. Equipment and power unit costs. Labor not included. | Hour | $50.99 | 8 | $407.92 |
| Truck, Pickup | 939 | Equipment and power unit costs. Labor not included. | Hour | $19.82 | 56 | $1,109.92 |
| **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. | Hour | $25.08 | 12 | $300.96 |
| General Labor | 231 | Labor performed using basic tools such as power tool, shovels, and other tools that do not require extensive training. Ex. pipe layer, herder, concrete placement, materials spreader, flagger, etc. | Hour | $18.93 | 56 | $1,060.08 |
| Equipment Operators, Heavy | 233 | Includes: Cranes, Hydraulic Excavators >=50 HP, Dozers, Paving Machines, Rock Trenchers, Trenchers >=12", Dump Trucks, Ag Equipment >=150 HP, Scrapers, Water Wagons. | Hour | $23.93 | 12 | $287.16 |
| 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. | Hour | $34.29 | 56 | $1,920.24 |
| **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 | $4,657.54 | 1 | $4,657.54 |
| 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 | $95.62 | 100 | $9,562.00 |
| **Mobilization** | | | | | | |
| Mobilization, medium equipment | 1139 | Equipment with 70-150 HP or typical weights between 14,000 and 30,000 pounds. | Each | $232.71 | 1 | $232.71 |

**Practice:** 533 - Pumping Plant

**Scenario** #9 - Variable Frequency Drive

**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 at the pump site to allow for varying the speed of a 40 Hp electric motor to match the pressure and flow requirements for a center pivot irrigation system.

**Feature Measure:** Pump Power Requirement

**Scenario Unit::** Brake Horse Power

**Scenario Typical Size:** 50

**Total Scenario Cost:** $11,663.50

**Scenario Cost/Unit:** $233.27

**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 | $233.27 | 50 | $11,663.50 |

**Practice:** 533 - Pumping Plant

**Scenario** #10 - Internal Combustion-Powered Pump less than or equal to 50 HP with L-pipe

**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 30 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. orWaste 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:** 30

**Total Scenario Cost:** $28,893.88

**Scenario Cost/Unit:** $963.13

**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 Yard | $210.23 | 0.25 | $52.56 |
| Dozer, 140 HP | 927 | Track mounted Dozer with horsepower range of 125 to 160. Equipment and power unit costs. Labor not included. | Hour | $112.82 | 8 | $902.56 |
| Hydraulic Excavator, 1 CY | 931 | Track mounted hydraulic excavator with bucket capacity range of 0.8 to 1.5 CY. Equipment and power unit costs. Labor not included. | Hour | $103.47 | 8 | $827.76 |
| Truck, Pickup | 939 | Equipment and power unit costs. Labor not included. | Hour | $19.82 | 2 | $39.64 |
| Portable Welder | 1407 | Portable field welder. Equipment only. Labor not included. | Hour | $18.57 | 8 | $148.56 |
| **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. | Hour | $25.08 | 4 | $100.32 |
| General Labor | 231 | Labor performed using basic tools such as power tool, shovels, and other tools that do not require extensive training. Ex. pipe layer, herder, concrete placement, materials spreader, flagger, etc. | Hour | $18.93 | 4 | $75.72 |
| Equipment Operators, Heavy | 233 | Includes: Cranes, Hydraulic Excavators >=50 HP, Dozers, Paving Machines, Rock Trenchers, Trenchers >=12", Dump Trucks, Ag Equipment >=150 HP, Scrapers, Water Wagons. | Hour | $23.93 | 16 | $382.88 |
| 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. | Hour | $34.29 | 4 | $137.16 |
| **Materials** | | | | | | |
| Pump, < 50 HP, Pump & ICE power unit | 1027 | Materials, labor, controls: < 50 HP Pump & ICE power unit | Horsepower | $615.46 | 30 | $18,463.80 |
| Pipe, Steel, 24", Std Wt, USED | 1360 | Materials: - USED - 24" - Steel Std Wt | Foot | $51.07 | 40 | $2,042.80 |
| Pipe, Steel, 30", Std Wt, USED | 1361 | Materials: - USED - 30" - Steel Std Wt | Foot | $80.28 | 14 | $1,123.92 |

| | | | | | | |
|---|---|---|---|---|---|---|
| Swing Check Valve, metal, 12" | 2082 | 12" swing check valve for back flow prevention, ductile iron metal body with flange mount and lever shaft. Materials only. | Each | $4,130.78 | 1 | $4,130.78 |
| **Mobilization** | | | | | | |
| Mobilization, medium equipment | 1139 | Equipment with 70-150 HP or typical weights between 14,000 and 30,000 pounds. | Each | $232.71 | 2 | $465.42 |

**Practice:** 533 - Pumping Plant

**Scenario** #11 - Internal Combustion-Powered Pump greater than 50 to 70 HP, with L-pipe

**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 60 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:** 60

**Total Scenario Cost:** $42,327.12

**Scenario Cost/Unit:** $705.45

**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 Yard | $210.23 | 1 | $210.23 |
| Backhoe, 80 HP | 926 | Wheel mounted backhoe excavator with horsepower range of 60 to 90. Equipment and power unit costs. Labor not included. | Hour | $50.99 | 8 | $407.92 |
| Dozer, 140 HP | 927 | Track mounted Dozer with horsepower range of 125 to 160. Equipment and power unit costs. Labor not included. | Hour | $112.82 | 4 | $451.28 |
| Hydraulic Excavator, 1 CY | 931 | Track mounted hydraulic excavator with bucket capacity range of 0.8 to 1.5 CY. Equipment and power unit costs. Labor not included. | Hour | $103.47 | 8 | $827.76 |
| Portable Welder | 1407 | Portable field welder. Equipment only. Labor not included. | Hour | $18.57 | 8 | $148.56 |
| **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. | Hour | $25.08 | 16 | $401.28 |
| 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. | Hour | $18.93 | 32 | $605.76 |
| Equipment Operators, Heavy | 233 | Includes: Cranes, Hydraulic Excavators >=50 HP, Dozers, Paving Machines, Rock Trenchers, Trenchers >=12", Dump Trucks, Ag Equipment >=150 HP, Scrapers, Water Wagons. | Hour | $23.93 | 16 | $382.88 |
| 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. | Hour | $34.29 | 16 | $548.64 |
| **Materials** | | | | | | |
| Pump, > 50 to 70 HP, Pump & ICE power unit | 1028 | Materials, labor, controls: > 50 to 70 HP Pump & ICE power unit | Horsepower | $485.25 | 60 | $29,115.00 |
| Pipe, Steel, 24", Std Wt, USED | 1360 | Materials: - USED - 24" - Steel Std Wt | Foot | $51.07 | 40 | $2,042.80 |
| Pipe, Steel, 30", Std Wt, USED | 1361 | Materials: - USED - 30" - Steel Std Wt | Foot | $80.28 | 14 | $1,123.92 |

| | | | | | | |
|---|---|---|---|---|---|---|
| Swing Check Valve, metal, 14" | 2083 | 14" swing check valve for back flow prevention, ductile iron metal body with flange mount and lever shaft. Materials only. | Each | $5,595.67 | 1 | $5,595.67 |
| **Mobilization** | | | | | | |
| Mobilization, medium equipment | 1139 | Equipment with 70-150 HP or typical weights between 14,000 and 30,000 pounds. | Each | $232.71 | 2 | $465.42 |

**Practice:** 533 - Pumping Plant

**Scenario** #12 - Internal Combustion-Powered Pump greater than 70 HP, with L-pipe

**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 80 BHP 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,

orWaste 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:** 80

**Total Scenario Cost:** $46,998.69

**Scenario Cost/Unit:** $587.48

**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 Yard | $210.23 | 2 | $420.46 |
| Dozer, 80 HP | 929 | Track mounted Dozer with horsepower range of 60 to 90. Equipment and power unit costs. Labor not included. | Hour | $60.16 | 8 | $481.28 |
| Hydraulic Excavator, 1 CY | 931 | Track mounted hydraulic excavator with bucket capacity range of 0.8 to 1.5 CY. Equipment and power unit costs. Labor not included. | Hour | $103.47 | 8 | $827.76 |
| Truck, Pickup | 939 | Equipment and power unit costs. Labor not included. | Hour | $19.82 | 6 | $118.92 |
| Portable Welder | 1407 | Portable field welder. Equipment only. Labor not included. | Hour | $18.57 | 8 | $148.56 |
| **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. | Hour | $25.08 | 8 | $200.64 |
| 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. | Hour | $18.93 | 48 | $908.64 |
| Equipment Operators, Heavy | 233 | Includes: Cranes, Hydraulic Excavators >=50 HP, Dozers, Paving Machines, Rock Trenchers, Trenchers >=12", Dump Trucks, Ag Equipment >=150 HP, Scrapers, Water Wagons. | Hour | $23.93 | 8 | $191.44 |
| Supervisor or Manager | 234 | Labor involving supervision or management activities. Includes crew supervisors, foremen and farm/ranch managers time required for adopting new technology, etc. | Hour | $34.29 | 24 | $822.96 |
| **Materials** | | | | | | |
| Pump, > 70 HP, Pump & ICE power unit | 1029 | Materials, labor, controls: > 70 HP Pump & ICE power unit | Horsepower | $374.50 | 80 | $29,960.00 |
| Pipe, Steel, 18", Std Wt, USED | 1358 | Materials: - USED - 18" - Steel Std Wt | Foot | $37.42 | 20 | $748.40 |
| Pipe, Steel, 30", Std Wt, USED | 1361 | Materials: - USED - 30" - Steel Std Wt | Foot | $80.28 | 40 | $3,211.20 |

| | | | | | | |
|---|---|---|---|---|---|---|
| Pipe, Steel, 36", Std Wt, USED | 1362 | Materials: - USED - 36" - Steel Std Wt | Foot | $102.50 | 14 | $1,435.00 |
| Swing Check Valve, metal, 16" | 2084 | 16" swing check valve for back flow prevention, ductile iron metal body with flange mount and lever shaft. Materials only. | Each | $7,058.01 | 1 | $7,058.01 |
| **Mobilization** | | | | | | |
| Mobilization, medium equipment | 1139 | Equipment with 70-150 HP or typical weights between 14,000 and 30,000 pounds. | Each | $232.71 | 2 | $465.42 |

**Practice:** 533 - Pumping Plant

**Scenario** #13 - Internal Combustion-Powered Well Pump 50 HP and less, no L-pipe

**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 30 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. orWaste 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:** 30

**Total Scenario Cost:** $21,173.13

**Scenario Cost/Unit:** $705.77

**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 Yard | $210.23 | 1 | $210.23 |
| Backhoe, 80 HP | 926 | Wheel mounted backhoe excavator with horsepower range of 60 to 90. Equipment and power unit costs. Labor not included. | Hour | $50.99 | 8 | $407.92 |
| Truck, Pickup | 939 | Equipment and power unit costs. Labor not included. | Hour | $19.82 | 4 | $79.28 |
| **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. | Hour | $25.08 | 8 | $200.64 |
| 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. | Hour | $18.93 | 32 | $605.76 |
| Equipment Operators, Heavy | 233 | Includes: Cranes, Hydraulic Excavators >=50 HP, Dozers, Paving Machines, Rock Trenchers, Trenchers >=12", Dump Trucks, Ag Equipment >=150 HP, Scrapers, Water Wagons. | Hour | $23.93 | 8 | $191.44 |
| Supervisor or Manager | 234 | Labor involving supervision or management activities. Includes crew supervisors, foremen and farm/ranch managers time required for adopting new technology, etc. | Hour | $34.29 | 16 | $548.64 |
| **Materials** | | | | | | |
| Pump, < 50 HP, Pump & ICE power unit | 1027 | Materials, labor, controls: < 50 HP Pump & ICE power unit | Horsepower | $615.46 | 30 | $18,463.80 |
| **Mobilization** | | | | | | |
| Mobilization, medium equipment | 1139 | Equipment with 70-150 HP or typical weights between 14,000 and 30,000 pounds. | Each | $232.71 | 2 | $465.42 |

**Practice:** 533 - Pumping Plant

**Scenario** #14 - Internal Combustion-Powered Well Pump Greater than 50 to 70 HP, no L-pipe

**Scenario Description:**

The typical scenario supports installation of a well pump in an existing irrigation system or installation of a new well pump on cropland with a 60 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. The well will be drilled using 642 Water Well.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:** 60

**Total Scenario Cost:** $31,824.33

**Scenario Cost/Unit:** $530.41

**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 Yard | $210.23 | 1 | $210.23 |
| Backhoe, 80 HP | 926 | Wheel mounted backhoe excavator with horsepower range of 60 to 90. Equipment and power unit costs. Labor not included. | Hour | $50.99 | 8 | $407.92 |
| Truck, Pickup | 939 | Equipment and power unit costs. Labor not included. | Hour | $19.82 | 4 | $79.28 |
| **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. | Hour | $25.08 | 8 | $200.64 |
| 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. | Hour | $18.93 | 32 | $605.76 |
| Equipment Operators, Heavy | 233 | Includes: Cranes, Hydraulic Excavators >=50 HP, Dozers, Paving Machines, Rock Trenchers, Trenchers >=12", Dump Trucks, Ag Equipment >=150 HP, Scrapers, Water Wagons. | Hour | $23.93 | 8 | $191.44 |
| Supervisor or Manager | 234 | Labor involving supervision or management activities. Includes crew supervisors, foremen and farm/ranch managers time required for adopting new technology, etc. | Hour | $34.29 | 16 | $548.64 |
| **Materials** | | | | | | |
| Pump, > 50 to 70 HP, Pump & ICE power unit | 1028 | Materials, labor, controls: > 50 to 70 HP Pump & ICE power unit | Horsepower | $485.25 | 60 | $29,115.00 |
| **Mobilization** | | | | | | |
| Mobilization, medium equipment | 1139 | Equipment with 70-150 HP or typical weights between 14,000 and 30,000 pounds. | Each | $232.71 | 2 | $465.42 |

**Practice:** 533 - Pumping Plant

**Scenario** #15 - Internal Combustion-Powered Well Pump Greater than 70 HP, no L-pipe

**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 80 BHP 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,

orWaste 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

**Total Scenario Cost:** $40,986.40

**Scenario Cost/Unit:** $409.86

**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 Yard | $210.23 | 2 | $420.46 |
| Backhoe, 80 HP | 926 | Wheel mounted backhoe excavator with horsepower range of 60 to 90. Equipment and power unit costs. Labor not included. | Hour | $50.99 | 8 | $407.92 |
| Truck, Pickup | 939 | Equipment and power unit costs. Labor not included. | Hour | $19.82 | 6 | $118.92 |
| **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. | Hour | $25.08 | 8 | $200.64 |
| 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. | Hour | $18.93 | 48 | $908.64 |
| Equipment Operators, Heavy | 233 | Includes: Cranes, Hydraulic Excavators >=50 HP, Dozers, Paving Machines, Rock Trenchers, Trenchers >=12", Dump Trucks, Ag Equipment >=150 HP, Scrapers, Water Wagons. | Hour | $23.93 | 8 | $191.44 |
| Supervisor or Manager | 234 | Labor involving supervision or management activities. Includes crew supervisors, foremen and farm/ranch managers time required for adopting new technology, etc. | Hour | $34.29 | 24 | $822.96 |
| **Materials** | | | | | | |
| Pump, > 70 HP, Pump & ICE power unit | 1029 | Materials, labor, controls: > 70 HP Pump & ICE power unit | Horsepower | $374.50 | 100 | $37,450.00 |
| **Mobilization** | | | | | | |
| Mobilization, medium equipment | 1139 | Equipment with 70-150 HP or typical weights between 14,000 and 30,000 pounds. | Each | $232.71 | 2 | $465.42 |

**Practice:** 533 - Pumping Plant

**Scenario** #16 - 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

**Total Scenario Cost:** $11,189.47

**Scenario Cost/Unit:** $186.49

**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 Yard | $210.23 | 2 | $420.46 |
| Truck, Pickup | 939 | Equipment and power unit costs. Labor not included. | Hour | $19.82 | 16 | $317.12 |
| **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. | Hour | $18.93 | 16 | $302.88 |
| 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. | Hour | $34.29 | 16 | $548.64 |
| **Materials** | | | | | | |
| Pump, Ag Water PTO, 1,000 GPM | 1923 | Materials, labor, controls: Ag Water PTO Pump 1,000 GPM - 8" | Each | $9,600.37 | 1 | $9,600.37 |

**Practice:** 533 - Pumping Plant

**Scenario** #17 - Windmill-Powered Pump

**Scenario Description:**

A windmill is installed in order to supply a reliable water source for livestock and/or wildlife. The windmill includes the tower, concrete footings, wheel blade unit, sucker rod, down pipe, gear box, pump, plumbing, and well head protection concrete pad. The typical scenario will be a windmill system with a 10 ft diameter mill and 27-foot tower which is pumping from a 150-foot well. As a result of installing this windmill, resource concerns of inadequate stock water, plant establishment, growth, productivity, health, and vigor, and water quantity can be addressed.Resource Concerns: Insufficient stockwater.

**Before Situation:**

In a rangeland or pasture setting, a reliable source of water for livestock is not available, or the spacing between water sources is such that grazing distribution and plant health are adversely impacted.

**After Situation:**

A windmill, with a wheel ranging from 6' to 16' in diameter, will be installed over a well that is located to provide a reliable source of livestock water at the rate of at least 2 gpm, to facilitate proper grazing distribution and improved plant health. To increase reliability, water is pumped into a storage tank to provide a given number of days of supply. Installation includes the footings, wellhead protection concrete pad, tower, gear box, sail, sucker rod, down hole accessories, and a short outlet pipe to a storage tank.

**Feature Measure:** Diameter of Mill Wheel

**Scenario Unit::** Foot

**Scenario Typical Size:** 10

**Total Scenario Cost:** $10,020.50

**Scenario Cost/Unit:** $1,002.05

**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 Yard | $210.23 | 2 | $420.46 |
| Truck, Pickup | 939 | Equipment and power unit costs. Labor not included. | Hour | $19.82 | 4 | $79.28 |
| Aerial lift, telescoping bucket | 1893 | Aerial lift, bucket truck or cherry picker, typical 40' boom. Equipment only. | Hour | $38.38 | 8 | $307.04 |
| **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. | Hour | $18.93 | 32 | $605.76 |
| Supervisor or Manager | 234 | Labor involving supervision or management activities. Includes crew supervisors, foremen and farm/ranch managers time required for adopting new technology, etc. | Hour | $34.29 | 16 | $548.64 |
| **Materials** | | | | | | |
| Windmill, 10', fan diameter | 1036 | Includes materials costs for windmill head and 27' tower | Each | $7,593.90 | 1 | $7,593.90 |
| **Mobilization** | | | | | | |
| Mobilization, medium equipment | 1139 | Equipment with 70-150 HP or typical weights between 14,000 and 30,000 pounds. | Each | $232.71 | 2 | $465.42 |

**Practice:** 533 - Pumping Plant

**Scenario** #18 - Photovoltaic-Powered Pump

**Scenario Description:**

The typical scenario assumes installation of a submersible solar-powered pump in a well or a live stream. The installation includes the pump, wiring, drop pipe, solar panels, mounts, inverter, and all appurtenances. 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 746-watt photovoltaic (PV) panel, capable of operating a 1 Hp solar-powered submersible pump in a well or other water source (Notes: 1) A PV panel is rated under standard and ideal conditions which will most likely not be replicated in the field; 2) 1 Hp is defined as 746 watts; 3) It is reasonable to expect a 1/4 Hp solar-powered submersible pump to deliver about 1.5 gpm and develop a pressure at the pump outlet of about 60 psi.). 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:** Pump Power Requirement

**Scenario Unit::** Brake Horse Power

**Scenario Typical Size:** 1

**Total Scenario Cost:** $9,199.77

**Scenario Cost/Unit:** $9,199.77

**Cost Details:**

| Component Name | ID | Description | Unit | Cost | QTY | Total |
|---|---|---|---|---|---|---|
| **Equipment Installation** | | | | | | |
| Truck, Pickup | 939 | Equipment and power unit costs. Labor not included. | Hour | $19.82 | 16 | $317.12 |
| **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. | Hour | $18.93 | 16 | $302.88 |
| 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. | Hour | $34.29 | 16 | $548.64 |
| **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 | Each | $549.88 | 1 | $549.88 |
| 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 | $413.86 | 1 | $413.86 |
| 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 | $460.51 | 1 | $460.51 |
| 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 | $8,258.60 | 0.8 | $6,606.88 |

**Practice:** 533 - Pumping Plant

**Scenario** #19 - Pump Conversion to Low Pressure

**Scenario Description:**

This scenario involves converting an existing pump which is set up to operate any high pressure system to a pump set up to operate a low pressure system, when the existing high pressure system is being converted to low pressure system. Resource Concerns: Excess/Insufficent Water - Inefficient Use of Irrigation Water & Water Quality Degragation; Energy ConservationAssociated Practices: 449 - Irrigation Water Management, 442 - Irrigation System, Sprinkler

**Before Situation:**

An existing irrigation pump is operating a high pressure center pivot system and needs to be converted to a low pressure pump to efficiently operate a center pivot system converted to low pressure.

**After Situation:**

The existing high pressure pump is pulled and stages are removed in order to reduce the pressure which the pump will produce, this will cause a more energy efficient system and a system which is more efficiently distributing water.

**Feature Measure:** conversion of pump

**Scenario Unit::** Each

**Scenario Typical Size:** 1

**Total Scenario Cost:** $6,002.08

**Scenario Cost/Unit:** $6,002.08

**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. | Hour | $83.25 | 6 | $499.50 |
| **Labor** | | | | | | |
| General Labor | 231 | Labor performed using basic tools such as power tool, shovels, and other tools that do not require extensive training. Ex. pipe layer, herder, concrete placement, materials spreader, flagger, etc. | Hour | $18.93 | 6 | $113.58 |
| Supervisor or Manager | 234 | Labor involving supervision or management activities. Includes crew supervisors, foremen and farm/ranch managers time required for adopting new technology, etc. | Hour | $34.29 | 2 | $68.58 |
| **Materials** | | | | | | |
| Pump, Bowl replacement, 30 to 100 HP | 1984 | Includes all material and shop labor to replace/service the entire set of bowls for a vertical turbine pump, install new bowls as necessary, and all appurtenances and materials to connect to the existing well column. Typical of 100 to 300 feet of column depth, 400 to 800 gpm discharge at 30 to 50 psi. Does not include labor and equipment to remove and install the assembled pump from the well. | Horsepower | $97.10 | 50 | $4,855.00 |
| **Mobilization** | | | | | | |
| Mobilization, medium equipment | 1139 | Equipment with 70-150 HP or typical weights between 14,000 and 30,000 pounds. | Each | $232.71 | 2 | $465.42 |

**Practice:** 533 - Pumping Plant

**Scenario** #20 - Basic Pump Automation

**Scenario Description:**

Typical: a diesel or electrical pump is set up with basic capabilities to shut off the pump based upon time, water levels, or other sensor or deviceto prevent excess run-time and unecessary pumping. Resource Concerns: Excess/Insufficent Water - Inefficient Use of Irrigation Water & Water Quality DegragationAssociated Practices: 449 - Irrigation Water Management

**Before Situation:**

Pumps are manually stopped. Oil, fuel, and water level in reservoir/tailwater pit are manually read. Requires a person to physically be on site to maniputate the pump and to take readings. Excess irrigation water is allowed to run off the crops and farmland when situations occur where farm labor is unable to operate the pump when irrigation is needed or needs have been met.

**After Situation:**

Pump has an automatic pump stop based upon a timer, water level sensor or other device. This prevents the landowner from being physically at the site when sufficient water is available or not for irrigation. Crops are supplied the required water needs and excess is not allowed to leave the farm, thus preventing damage to the pumping system, increased labor of the overall farm operation and increasing effiency, preventing sediment loss, reducing turbidity, over saturation of the plants, water quality turbity or excess water use in critical ground water areas.

**Feature Measure:** automation of a pump cut-off

**Scenario Unit::** Each

**Scenario Typical Size:** 1

**Total Scenario Cost:** $351.43

**Scenario Cost/Unit:** $351.43

**Cost Details:**

| Component Name | ID | Description | Unit | Cost | QTY | Total |
|---|---|---|---|---|---|---|
| **Equipment Installation** | | | | | | |
| Truck, Pickup | 939 | Equipment and power unit costs. Labor not included. | Hour | $19.82 | 2 | $39.64 |
| **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. | Hour | $18.93 | 8 | $151.44 |
| **Materials** | | | | | | |
| Switches and Controls, programmable controller | 1193 | Programmable logic controller (with or without wireless telecommunications) commonly used to control pumps and irrigation systems | Each | $160.35 | 1 | $160.35 |

**Practice:** 533 - Pumping Plant

**Scenario** #21 - Intermediate Pump Automation

**Scenario Description:**

Typical: a diesel or electrical pump is set up with a intermediate automation component that controls the pump via remote access in order to prevent excess run-time and unecessary pumping. Resource Concerns: Excess/Insufficent Water - Inefficient Use of Irrigation Water & Water Quality DegragationAssociated Practices: 449 - Irrigation Water Management

**Before Situation:**

Pumps are manually stopped. Oil, fuel, and water level in reservoir/tailwater pit are manually read. Requires a person to physically be on site to maniputate the pump and to take readings. Excess irrigation water is allowed to run off the crops and farmland when situations occur where farm labor is unable to operate the pump when irrigation is needed or needs have been met.

**After Situation:**

By use of a smartphone or tablet, the pump can be remoted started or stopped. Alerts can be sent to operator of interruptions in the system or can be preset to shut off at specified time. This prevents the landowner from being physically at the site when sufficient water is available or not for irrigation. Crops are supplied the required water needs and excess is not allowed to leave the farm, thus preventing damage to the pumping system, increased labor of the overall farm operation and increasing effiency, preventing sediment loss, reducing turbidity, over saturation of the plants, water quality turbity or excess water use in critical ground water areas.

**Feature Measure:** automation of a pump start and st

**Scenario Unit::** Each

**Scenario Typical Size:** 1

**Total Scenario Cost:** $2,946.37

**Scenario Cost/Unit:** $2,946.37

**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. | Hour | $18.93 | 4 | $75.72 |
| 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. | Hour | $91.60 | 4 | $366.40 |
| **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 | $627.96 | 1 | $627.96 |
| Switches and Controls, programmable controller | 1193 | Programmable logic controller (with or without wireless telecommunications) commonly used to control pumps and irrigation systems | Each | $160.35 | 1 | $160.35 |
| 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 | $430.47 | 1 | $430.47 |
| Switches and Controls, radio system | 1195 | Output radio, field transmitter, and receiver commonly used to control pumps and irrigation systems | Each | $767.55 | 1 | $767.55 |
| Safety Camera on Automated Pump | 2474 | Waterproof outdoor wireless IP Network security camera with housing. Includes materials only. | Each | $468.51 | 1 | $468.51 |
| 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 | $49.41 | 1 | $49.41 |

**Practice:** 533 - Pumping Plant

**Scenario** #22 - Advanced Pump Automation

**Scenario Description:**

Typical Scenario: a diesel pump is set up with automation including telemetry capabilities to operate the pump while recording important data such as the fuel levels, the temperature, oil levels, water levels in the reservoir or tailwater pit or both, and rainfall at the site. This data is collected and obtainable by the producers from any location. An electic power unit may use a different set of sensors (e.g. grid versus fuel tank, VFD) in the specific application, but the basic purpose, intent, and goals remain the same.Resource Concerns: Excess/Insufficent Water - Inefficient Use of Irrigation Water & Water Quality DegragationAssociated Practices: 449 - Irrigation Water Management

**Before Situation:**

Pumps are manually started. Oil, fuel, and water level in reservoir/tailwater pit are manually read. Requires a person to physically be on site to maniputate the pump and to take readings. Excess irrigation water is allowed to run off the crops and farmland when situations occur where farm labor is unable to operate the pump when irrigation is needed or needs have been met.

**After Situation:**

Pump has an automatic pump start/stop remotely controlled from any location based on the information relayed from water availability or unavailibility. This prevents the landowner from being physically at the site when sufficient water is available or not for irrigation. Crops are supplied the required water needs and excess is not allowed to leave the farm, thus preventing damage to the pumping system, increased labor of the overall farm operation and increasing effiency, preventing sediment loss, reducing turbidity, over saturation of the plants, water quality turbity or excess water use in critical ground water areas.

**Feature Measure:** automation of a pump

**Scenario Unit::** Each

**Scenario Typical Size:** 1

**Total Scenario Cost:** $9,395.22

**Scenario Cost/Unit:** $9,395.22

**Cost Details:**

| Component Name | ID | Description | Unit | Cost | QTY | Total |
|---|---|---|---|---|---|---|
| **Equipment Installation** | | | | | | |
| Truck, Pickup | 939 | Equipment and power unit costs. Labor not included. | Hour | $19.82 | 4 | $79.28 |
| **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. | Hour | $25.08 | 4 | $100.32 |
| General Labor | 231 | Labor performed using basic tools such as power tool, shovels, and other tools that do not require extensive training. Ex. pipe layer, herder, concrete placement, materials spreader, flagger, etc. | Hour | $18.93 | 4 | $75.72 |
| 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. | Hour | $91.60 | 4 | $366.40 |
| **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 | $460.51 | 1 | $460.51 |
| 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 | $8,258.60 | 0.5 | $4,129.30 |
| 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 | $627.96 | 1 | $627.96 |
| Switches and Controls, programmable controller | 1193 | Programmable logic controller (with or without wireless telecommunications) commonly used to control pumps and irrigation systems | Each | $160.35 | 1 | $160.35 |
| 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 | $430.47 | 1 | $430.47 |

| | | | | | | |
|---|---|---|---|---|---|---|
| Switches and Controls, radio system | 1195 | Output radio, field transmitter, and receiver commonly used to control pumps and irrigation systems | Each | $767.55 | 1 | $767.55 |
| 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 | $1,679.44 | 1 | $1,679.44 |
| Safety Camera on Automated Pump | 2474 | Waterproof outdoor wireless IP Network security camera with housing. Includes materials only. | Each | $468.51 | 1 | $468.51 |
| 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 | $49.41 | 1 | $49.41 |

**Practice:** 533 - Pumping Plant

**Scenario** #23 - Pump without power unit, with L-pipe

**Scenario Description:**

The typical scenario supports installation of a pump and support typically used with pumping from a tailwater recovery channel or reservoir on cropland with a 35 BHP pump without a power unit (3000gpm x 30 ft)/(3960*.65) = 35 BHP. Size (BHP) of pump is determined by required GPM and pressure derived from a design for specific irrigation system on cropland. Typical scenario is 3000 gpm with 30 ft of head (lift, line friction, pressure, etc). Also may apply to a pump for wastewater. Cooperator has existing motor, will rent motor, or buy used motor.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: Implementation of a tailwater recovery system or on-farm storage system requires a transfer pump w/o a power plant. 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 and allowing proper utilization of captured water.

orWaste 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:** 35

**Total Scenario Cost:** $15,106.16

**Scenario Cost/Unit:** $431.60

**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 Yard | $210.23 | 0.25 | $52.56 |
| Hydraulic Excavator, 2 CY | 932 | Track mounted hydraulic excavator with bucket capacity range of 1.5 to 2.5 CY. Equipment and power unit costs. Labor not included. | Hour | $149.59 | 8 | $1,196.72 |
| Truck, Pickup | 939 | Equipment and power unit costs. Labor not included. | Hour | $19.82 | 2 | $39.64 |
| Portable Welder | 1407 | Portable field welder. Equipment only. Labor not included. | Hour | $18.57 | 8 | $148.56 |
| **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. | Hour | $18.93 | 4 | $75.72 |
| Equipment Operators, Heavy | 233 | Includes: Cranes, Hydraulic Excavators >=50 HP, Dozers, Paving Machines, Rock Trenchers, Trenchers >=12", Dump Trucks, Ag Equipment >=150 HP, Scrapers, Water Wagons. | Hour | $23.93 | 16 | $382.88 |
| 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. | Hour | $34.29 | 4 | $137.16 |
| **Materials** | | | | | | |
| Pipe, Steel, 24", Std Wt, USED | 1360 | Materials: - USED - 24" - Steel Std Wt | Foot | $51.07 | 40 | $2,042.80 |
| Pipe, Steel, 30", Std Wt, USED | 1361 | Materials: - USED - 30" - Steel Std Wt | Foot | $80.28 | 14 | $1,123.92 |
| Swing Check Valve, metal, 12" | 2082 | 12" swing check valve for back flow prevention, ductile iron metal body with flange mount and lever shaft. Materials only. | Each | $4,130.78 | 1 | $4,130.78 |
| Pump, 40-80 hp axial flow/mixed flow | 2215 | Propeller pump to handle 10,000 - 20,000gpm axial flow/ mixed flow; 12" - 24" discharge, head (<20' to 25'), propeller type pump. Materials and shipping only. | Gallon per Minute | $1.77 | 3000 | $5,310.00 |

**Mobilization**

| | | | | | |
|---|---|---|---|---|---|
| Mobilization, medium equipment | 1139 | Equipment with 70-150 HP or typical weights between 14,000 and 30,000 pounds. | Each | $232.71 | 2 | $465.42 |

**Practice:** 554 - Drainage Water Management

**Scenario** #1 - 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

**Total Scenario Cost:** $391.31

**Scenario Cost/Unit:** $78.26

**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 | $45.80 | 0.33 | $15.11 |
| **Labor** | | | | | | |
| Skilled Labor | 230 | Labor requiring a high level skill set: Includes carpenters, welders, electricians, conservation professionals involved with data collection, monitoring, and or record keeping, etc. | Hour | $25.08 | 15 | $376.20 |

**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::** Acre

**Scenario Typical Size:** 25

**Total Scenario Cost:** $50.16

**Scenario Cost/Unit:** $2.01

**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. | Hour | $25.08 | 2 | $50.16 |

**Practice:** 558 - Roof Runoff Structure

**Scenario** #1 - Concrete Curb

**Scenario Description:**

A roof runoff structure, consisting of a concrete curb or parabolic channel installed on existing impervious surface or the ground with appropriate outlet facilities. Environmental/design considerations, for example snow loads, or a building without proper structural support needed for gutters dictate the use of an on-ground concrete curb. Used to keep roof clean water runoff uncontaminated and provide a stable outlet to ground surface. Facilitates waste management and protects the environment by minimizing clean water additions to waste systems and addresses water quality concerns. Associated practices include Waste Storage Facility (313), 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 curb or parabolic channel and outlet system servicing the portion of the building roof that would otherwise drain into a waste management system or create erosion. Concrete curb (6" high - 2' wide) extending the length of a 200' roof with additional length (5') for stable outlet.

**Feature Measure:** Linear Length of Roof to be Curbed

**Scenario Unit::** Foot

**Scenario Typical Size:** 200

**Total Scenario Cost:** $2,100.56

**Scenario Cost/Unit:** $10.50

**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 Yard | $103.61 | 10 | $1,036.10 |
| Geotextile, woven | 42 | Woven Geotextile Fabric. Includes materials, equipment and labor | Square Yard | $2.05 | 16 | $32.80 |
| 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 Yard | $1.99 | 30 | $59.70 |
| Demolition, concrete | 1498 | Demolition and disposal of reinforced concrete structures including slabs and walls. Includes labor and equipment. | Cubic Yard | $10.00 | 6 | $60.00 |
| 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 | $0.30 | 60 | $18.00 |
| **Materials** | | | | | | |
| Aggregate, Sand, Graded, Washed | 45 | Sand, typical ASTM C33 gradation, includes materials, equipment and labor to transport and place | Cubic Yard | $30.40 | 7 | $212.80 |
| Aggregate, Gravel, Graded | 46 | Gravel, includes materials, equipment and labor to transport and place. Includes washed and unwashed gravel. | Cubic Yard | $30.82 | 7 | $215.74 |
| **Mobilization** | | | | | | |
| Mobilization, medium equipment | 1139 | Equipment with 70-150 HP or typical weights between 14,000 and 30,000 pounds. | Each | $232.71 | 2 | $465.42 |

**Practice:** 558 - Roof Runoff Structure

**Scenario** #2 - Trench Drain

**Scenario Description:**

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

**Before Situation:**

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

**After Situation:**

A 2' deep by 3' wide by 200 long deep rock filled, tile drained trench and outlet system servicing the portion of the building roof that would otherwise drain into a waste management system or create erosion.

**Feature Measure:** Linear Length of Roof to be Draine

**Scenario Unit::** Foot

**Scenario Typical Size:** 200

**Total Scenario Cost:** $2,312.98

**Scenario Cost/Unit:** $11.56

**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 | $2.05 | 222 | $455.10 |
| 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 Yard | $1.99 | 44 | $87.56 |
| **Materials** | | | | | | |
| Aggregate, Gravel, Graded | 46 | Gravel, includes materials, equipment and labor to transport and place. Includes washed and unwashed gravel. | Cubic Yard | $30.82 | 44 | $1,356.08 |
| Pipe, HDPE, 4", PCPT, Single Wall | 1270 | Pipe, Corrugated Plastic Tubing, Single Wall, Perforated, 4" diameter - ASTM F405. Material cost only. | Foot | $0.46 | 220 | $101.20 |
| **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 | $156.52 | 2 | $313.04 |

**Practice:** 558 - Roof Runoff Structure

**Scenario** #3 - Roof Gutter and Downspouts_Steel

**Scenario Description:**

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

**Before Situation:**

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

**After Situation:**

A gutter, downspout, and outlet system servicing the portion of the building roof that would otherwise drain into a waste management system or create erosion. Roof line of 200 ft serviced with gutter, downspouts, and appurtances.

**Feature Measure:** Linear Length of Roof to be Gutter

**Scenario Unit::** Foot

**Scenario Typical Size:** 200

**Total Scenario Cost:** $4,490.36

**Scenario Cost/Unit:** $22.45

**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. | Hour | $18.93 | 24 | $454.32 |
| **Materials** | | | | | | |
| Pipe, PVC, 6", SCH 40 | 980 | Materials: - 6" - PVC - SCH 40 - ASTM D1785 | Foot | $6.63 | 100 | $663.00 |
| Pipe, PVC, 8", SDR 41 | 985 | Materials: - 8" - PVC - SDR 41 100 psi - ASTM D2241 | Foot | $6.76 | 50 | $338.00 |
| Gutter, Galvanized Steel, Medium | 1693 | Galvanized Steel gutter (7" to 9") in width with hangers. Materials only. | Foot | $13.61 | 200 | $2,722.00 |
| **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 | $156.52 | 2 | $313.04 |

**Practice:** 558 - Roof Runoff Structure

**Scenario** #4 - Roof Gutter and Downspouts_Alum

**Scenario Description:**

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

**Before Situation:**

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

**After Situation:**

A gutter, downspout, and outlet system servicing the portion of the building roof that would otherwise drain into a waste management system or create erosion. Roof line of 200 ft serviced with gutter, downspouts, and appurtances.

**Feature Measure:** Linear Length of Roof to be Gutter

**Scenario Unit::** Foot

**Scenario Typical Size:** 300

**Total Scenario Cost:** $5,123.52

**Scenario Cost/Unit:** $17.08

**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. | Hour | $18.93 | 36 | $681.48 |
| **Materials** | | | | | | |
| Pipe, PVC, 8", SCH 40 | 981 | Materials: - 8" - PVC - SCH 40 - ASTM D1785 | Foot | $9.74 | 100 | $974.00 |
| Pipe, PVC, 8", SDR 41 | 985 | Materials: - 8" - PVC - SDR 41 100 psi - ASTM D2241 | Foot | $6.76 | 50 | $338.00 |
| Gutter, Aluminum, Medium | 1690 | Aluminum gutter (7" to 9") in width with hangers. Materials only. | Foot | $9.39 | 300 | $2,817.00 |
| **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 | $156.52 | 2 | $313.04 |

**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. 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, 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). When seeding or revegetation is required, use Critical Area Planting (342). Dust control must be addressed under Dust Control on Unpaved Roads and Surfaces (373).

**Feature Measure:** Length of Roadway

**Scenario Unit::** Foot

**Scenario Typical Size:** 1000

**Total Scenario Cost:** $9,580.71

**Scenario Cost/Unit:** $9.58

**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 Yard | $3.76 | 1330 | $5,000.80 |
| Earthfill, Dumped and Spread | 51 | Earthfill, dumped and spread without compaction effort, includes equipment and labor | Cubic Yard | $3.08 | 1330 | $4,096.40 |
| **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. | Hour | $25.08 | 10 | $250.80 |
| **Mobilization** | | | | | | |
| Mobilization, medium equipment | 1139 | Equipment with 70-150 HP or typical weights between 14,000 and 30,000 pounds. | Each | $232.71 | 1 | $232.71 |

**Practice:** 560 - Access Road

**Scenario** #2 - New 6 Inch gravel road in wet, level terrain

**Scenario Description:**

Newly Constructed gravel road with min. 6 inch thick compacted gravel surface in relatively level ground in wet areas. 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, 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 6 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). When seeding or revegetation is required, use Critical Area Planting (342). Dust control must be addressed under Dust Control on Unpaved Roads and Surfaces (373).

**Feature Measure:** Length of Roadway

**Scenario Unit::** Foot

**Scenario Typical Size:** 1000

**Total Scenario Cost:** $19,521.71

**Scenario Cost/Unit:** $19.52

**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 | $2.05 | 2000 | $4,100.00 |
| Earthfill, Roller Compacted | 49 | Earthfill, roller or machine compacted, includes equipment and labor | Cubic Yard | $3.76 | 1330 | $5,000.80 |
| Earthfill, Dumped and Spread | 51 | Earthfill, dumped and spread without compaction effort, includes equipment and labor | Cubic Yard | $3.08 | 1330 | $4,096.40 |
| **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. | Hour | $25.08 | 10 | $250.80 |
| **Materials** | | | | | | |
| Aggregate, Gravel, Ungraded, Quarry Run | 1099 | Includes materials, equipment and labor | Cubic Yard | $21.24 | 275 | $5,841.00 |
| **Mobilization** | | | | | | |
| Mobilization, medium equipment | 1139 | Equipment with 70-150 HP or typical weights between 14,000 and 30,000 pounds. | Each | $232.71 | 1 | $232.71 |

**Practice:** 560 - Access Road

**Scenario** #3 - 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. The extent of construction work over an existing alignment is assumed to average 20% 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, 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). When seeding or revegetation is required, use Critical Area Planting (342). Dust control must be addressed under Dust Control on Unpaved Roads and Surfaces (373).

**Feature Measure:** Length of Roadway

**Scenario Unit::** Foot

**Scenario Typical Size:** 1000

**Total Scenario Cost:** $2,330.31

**Scenario Cost/Unit:** $2.33

**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 Yard | $3.76 | 270 | $1,015.20 |
| Earthfill, Dumped and Spread | 51 | Earthfill, dumped and spread without compaction effort, includes equipment and labor | Cubic Yard | $3.08 | 270 | $831.60 |
| **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. | Hour | $25.08 | 10 | $250.80 |
| **Mobilization** | | | | | | |
| Mobilization, medium equipment | 1139 | Equipment with 70-150 HP or typical weights between 14,000 and 30,000 pounds. | Each | $232.71 | 1 | $232.71 |

**Practice:** 560 - Access Road

**Scenario** #5 - New earth road in dry, sloped terrain

**Scenario Description:**

Newly constructed compacted earth road in steep sloped terrain but relatively dry areas. 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, 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, 80% is considered common earth and 20% 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). When seeding or revegetation is required, use Critical Area Planting (342). Dust control must be addressed under Dust Control on Unpaved Roads and Surfaces (373).

**Feature Measure:** Length of Roadway

**Scenario Unit::** Foot

**Scenario Typical Size:** 1000

**Total Scenario Cost:** $6,634.11

**Scenario Cost/Unit:** $6.63

**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 Yard | $4.21 | 130 | $547.30 |
| Excavation, Common Earth, side cast, small equipment | 48 | Bulk excavation and side casting of common earth with hydraulic excavator with less than 1 CY capacity. Includes equipment and labor. | Cubic Yard | $1.99 | 530 | $1,054.70 |
| Earthfill, Roller Compacted | 49 | Earthfill, roller or machine compacted, includes equipment and labor | Cubic Yard | $3.76 | 665 | $2,500.40 |
| Earthfill, Dumped and Spread | 51 | Earthfill, dumped and spread without compaction effort, includes equipment and labor | Cubic Yard | $3.08 | 665 | $2,048.20 |
| **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. | Hour | $25.08 | 10 | $250.80 |
| **Mobilization** | | | | | | |
| Mobilization, medium equipment | 1139 | Equipment with 70-150 HP or typical weights between 14,000 and 30,000 pounds. | Each | $232.71 | 1 | $232.71 |

**Practice:** 560 - Access Road

**Scenario** #6 - New 6 Inch gravel road in wet, sloped terrain

**Scenario Description:**

Newly Constructed gravel road with min. 6 inch thick compacted gravel surface in steep sloped ground in wet areas. 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, 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 6 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. 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). When seeding or revegetation is required, use Critical Area Planting (342). Dust control must be addressed under Dust Control on Unpaved Roads and Surfaces (373).

**Feature Measure:** Length of Roadway

**Scenario Unit::** Foot

**Scenario Typical Size:** 1000

**Total Scenario Cost:** $16,575.11

**Scenario Cost/Unit:** $16.58

**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 | $2.05 | 2000 | $4,100.00 |
| Excavation, Rock, Ripping | 47 | Excavation, rock, mechanical ripping, includes equipment and labor | Cubic Yard | $4.21 | 130 | $547.30 |
| Excavation, Common Earth, side cast, small equipment | 48 | Bulk excavation and side casting of common earth with hydraulic excavator with less than 1 CY capacity. Includes equipment and labor. | Cubic Yard | $1.99 | 530 | $1,054.70 |
| Earthfill, Roller Compacted | 49 | Earthfill, roller or machine compacted, includes equipment and labor | Cubic Yard | $3.76 | 665 | $2,500.40 |
| Earthfill, Dumped and Spread | 51 | Earthfill, dumped and spread without compaction effort, includes equipment and labor | Cubic Yard | $3.08 | 665 | $2,048.20 |
| **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. | Hour | $25.08 | 10 | $250.80 |
| **Materials** | | | | | | |
| Aggregate, Gravel, Ungraded, Quarry Run | 1099 | Includes materials, equipment and labor | Cubic Yard | $21.24 | 275 | $5,841.00 |
| **Mobilization** | | | | | | |
| Mobilization, medium equipment | 1139 | Equipment with 70-150 HP or typical weights between 14,000 and 30,000 pounds. | Each | $232.71 | 1 | $232.71 |

**Practice:** 560 - Access Road

**Scenario** #7 - 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. The extent of construction work over an existing alignment is assumed to average 20% 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, 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, 80% is considered common earth excavation and 20% 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). When seeding or revegetation is required, use Critical Area Planting (342). Dust control must be addressed under Dust Control on Unpaved Roads and Surfaces (373).

**Feature Measure:** Length of Roadway

**Scenario Unit::** Foot

**Scenario Typical Size:** 1000

**Total Scenario Cost:** $1,713.63

**Scenario Cost/Unit:** $1.71

**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 Yard | $4.21 | 26 | $109.46 |
| Excavation, Common Earth, side cast, small equipment | 48 | Bulk excavation and side casting of common earth with hydraulic excavator with less than 1 CY capacity. Includes equipment and labor. | Cubic Yard | $1.99 | 106 | $210.94 |
| Earthfill, Roller Compacted | 49 | Earthfill, roller or machine compacted, includes equipment and labor | Cubic Yard | $3.76 | 133 | $500.08 |
| Earthfill, Dumped and Spread | 51 | Earthfill, dumped and spread without compaction effort, includes equipment and labor | Cubic Yard | $3.08 | 133 | $409.64 |
| **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. | Hour | $25.08 | 10 | $250.80 |
| **Mobilization** | | | | | | |
| Mobilization, medium equipment | 1139 | Equipment with 70-150 HP or typical weights between 14,000 and 30,000 pounds. | Each | $232.71 | 1 | $232.71 |

**Practice:** 560 - Access Road

**Scenario** #8 - Rehabilitation of existing gravel road in wet, sloped terrain

**Scenario Description:**

Repair and rehabilitation of gravel road with min. 6 inch thick compacted gravel surface on existing alignment in wet, steep sloped terrain. The extent of construction work over an existing alignment is assumed to average 20% 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, 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 6" 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. 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). When seeding or revegetation is required, use Critical Area Planting (342). Dust control must be addressed under Dust Control on Unpaved Roads and Surfaces (373).

**Feature Measure:** Length of Raodway

**Scenario Unit::** Foot

**Scenario Typical Size:** 1000

**Total Scenario Cost:** $3,701.83

**Scenario Cost/Unit:** $3.70

**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 | $2.05 | 400 | $820.00 |
| Excavation, Rock, Ripping | 47 | Excavation, rock, mechanical ripping, includes equipment and labor | Cubic Yard | $4.21 | 26 | $109.46 |
| Excavation, Common Earth, side cast, small equipment | 48 | Bulk excavation and side casting of common earth with hydraulic excavator with less than 1 CY capacity. Includes equipment and labor. | Cubic Yard | $1.99 | 106 | $210.94 |
| Earthfill, Roller Compacted | 49 | Earthfill, roller or machine compacted, includes equipment and labor | Cubic Yard | $3.76 | 133 | $500.08 |
| Earthfill, Dumped and Spread | 51 | Earthfill, dumped and spread without compaction effort, includes equipment and labor | Cubic Yard | $3.08 | 133 | $409.64 |
| **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. | Hour | $25.08 | 10 | $250.80 |
| **Materials** | | | | | | |
| Aggregate, Gravel, Ungraded, Quarry Run | 1099 | Includes materials, equipment and labor | Cubic Yard | $21.24 | 55 | $1,168.20 |
| **Mobilization** | | | | | | |
| Mobilization, medium equipment | 1139 | Equipment with 70-150 HP or typical weights between 14,000 and 30,000 pounds. | Each | $232.71 | 1 | $232.71 |

**Practice:** 561 - Heavy Use Area Protection

**Scenario** #1 - Reinforced Concrete with sand or gravel foundation

**Scenario Description:**

The stabilization of areas around facilities that are frequently and intensively used by people, animals or vehicles by surfacing with reinforced concrete on a sand or gravel foundation to provide a stable, non-eroding surface. Installation includes all materials, equipment, and labor to install this practice, The stabilized area will address the resource concerns soil erosion and water quality degradation.

**Before Situation:**

This practice applies to agricultural, urban, recreational and other frequently and/or intensively used areas requiring treatment to address soil erosion and water quality degradation.

**After Situation:**

The stabilized area is surfaced with approximately 630 square feet of approximately 8 cubic yards of welded wire mesh reinforced concrete with 8 cubic yards of sand or gravel foundation material for surfacing areas around facilities that are frequently and intensively used by people, animals or vehicles and will address soil erosion and water quality degradation. All needed roads must use Access Road (560). Any needed treatment of stream crossings must use Stream Crossing (578). Any needed vegetation of disturbed areas must use Critical Area Planting (342). Provisions to collect, store, utilize, and or treat contaminated runoff must use Sediment Basin (350), Waste Storage Facility (313), or Waste Treatment (629) as appropriate. To reduce the potential for air quality problems from particulate matter associated with heavy use areas, consider the use of Windbreak/Shelterbelt Establishment (380) or Herbaceous Wind Barriers
(603).

**Feature Measure:** Area

**Scenario Unit::** Square Foot

**Scenario Typical Size:** 630

**Total Scenario Cost:** $2,165.71

**Scenario Cost/Unit:** $3.44

**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 Yard | $210.23 | 8 | $1,681.84 |
| 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 Yard | $1.99 | 4 | $7.96 |
| **Materials** | | | | | | |
| Aggregate, Sand, Graded, Washed | 45 | Sand, typical ASTM C33 gradation, includes materials, equipment and labor to transport and place | Cubic Yard | $30.40 | 8 | $243.20 |
| **Mobilization** | | | | | | |
| Mobilization, medium equipment | 1139 | Equipment with 70-150 HP or typical weights between 14,000 and 30,000 pounds. | Each | $232.71 | 1 | $232.71 |

**Practice:** 561 - Heavy Use Area Protection

**Scenario** #2 - Rock/Gravel on Geotextile, 6" thick, Area 450 Square Feet or less

**Scenario Description:**

The stabilization of areas around facilities that are frequently and intensively used by people, animals or vehicles by surfacing with rock and or gravel on a geotextile fabric foundation to provide a stable, non-eroding surface. Total Contracted area is less than 450 Square feet, or 8 Cubic yards, and is therefore not able to purchase aggregate directly from a quarry. The material is instead purchased from other sources, such as, a Redi-mix plant where the landowner is not able to take advantage of the economy of scalle a larger enduser could. the Cost estimate is based upon the installation of two heavy use protection areas of 15 ft x 15 ft x 6 inches deep around two watering facilities, Associated practices in addition to Watering Facility (614) may include Waste Storage Facility (313), Stream Crossing (578) and others. The stabilized area will address the resource concerns of soil erosion and water quality degradation.

**Before Situation:**

A producer of an agricultural has areas of gully and/or rill erosion caused by heavy and frequent use by livestock or machine traffic. The area is denuded of vegitation and not capble of sustaining growth.

**After Situation:**

The stabilized area is surfaced with approximately 450 square feet of rock, (6" deep) and or gravel on approximately 25 square yards of geotextile fabric foundation material for surfacing areas around facilities that are frequently and intensively used by people, animals or vehicles and will address soil erosion and water quality degradation. All needed roads must use Access Road (560). Any needed treatment of stream crossings must use Stream Crossing (578). Any needed vegetation of disturbed areas must use Critical Area Planting (342). Provisions to collect, store, utilize, and or treat contaminated runoff must use Sediment Basin (350), Waste Storage Facility (313), or Waste Treatment (629) as appropriate. To reduce the potential for air quality problems from particulate matter associated with heavy use areas, consider the use of Windbreak/Shelterbelt Establishment (380) or Herbaceous Wind Barriers (603).

**Feature Measure:** Area of Rock and or Gravel

**Scenario Unit::** Square Foot

**Scenario Typical Size:** 450

**Total Scenario Cost:** $799.17

**Scenario Cost/Unit:** $1.78

**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 | $2.05 | 50 | $102.50 |
| Backhoe, 80 HP | 926 | Wheel mounted backhoe excavator with horsepower range of 60 to 90. Equipment and power unit costs. Labor not included. | Hour | $50.99 | 4 | $203.96 |
| **Materials** | | | | | | |
| Aggregate, Gravel, Graded, < 5Tons | 2358 | Washed and unwashed gravel less than 5 Tons. Includes materials and local delivery within 20 miles of quarry. | Ton | $32.50 | 8 | $260.00 |
| **Mobilization** | | | | | | |
| Mobilization, medium equipment | 1139 | Equipment with 70-150 HP or typical weights between 14,000 and 30,000 pounds. | Each | $232.71 | 1 | $232.71 |

**Practice:** 561 - Heavy Use Area Protection

**Scenario** #3 - Rock/Gravel on Geotextile, 6" thick

**Scenario Description:**

The stabilization of areas around facilities that are frequently and intensively used by people, animals or vehicles by surfacing with rock and or gravel on a geotextile fabric foundation to provide a stable, non-eroding surface. Installation includes all materials, equipment, and labor to install this practice, The stabilized area will address the resource concerns of soil erosion and water quality degradation.

**Before Situation:**

This practice applies to agricultural, urban, recreational and other frequently and/or intensively used areas requiring treatment to address soil erosion and water quality degradation.

**After Situation:**

The stabilized area is surfaced with approximately 630 square feet of rock, (6" deep) and or gravel on approximately 70 square yards of geotextile fabric foundation material for surfacing areas around facilities that are frequently and intensively used by people, animals or vehicles and will address soil erosion and water quality degradation. All needed roads must use Access Road (560). Any needed treatment of stream crossings must use Stream Crossing (578). Any needed vegetation of disturbed areas must use Critical Area Planting (342). Provisions to collect, store, utilize, and or treat contaminated runoff must use Sediment Basin (350), Waste Storage Facility (313), or Waste Treatment (629) as appropriate. To reduce the potential for air quality problems from particulate matter associated with heavy use areas, consider the use of Windbreak/Shelterbelt Establishment (380) or Herbaceous Wind Barriers (603).

**Feature Measure:** Area of Rock and or Gravel

**Scenario Unit::** Square Foot

**Scenario Typical Size:** 630

**Total Scenario Cost:** $769.93

**Scenario Cost/Unit:** $1.22

**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 | $2.05 | 70 | $143.50 |
| Excavation, Common Earth, side cast, small equipment | 48 | Bulk excavation and side casting of common earth with hydraulic excavator with less than 1 CY capacity. Includes equipment and labor. | Cubic Yard | $1.99 | 12 | $23.88 |
| **Materials** | | | | | | |
| Aggregate, Gravel, Graded | 46 | Gravel, includes materials, equipment and labor to transport and place. Includes washed and unwashed gravel. | Cubic Yard | $30.82 | 12 | $369.84 |
| **Mobilization** | | | | | | |
| Mobilization, medium equipment | 1139 | Equipment with 70-150 HP or typical weights between 14,000 and 30,000 pounds. | Each | $232.71 | 1 | $232.71 |

**Practice:** 561 - Heavy Use Area Protection

**Scenario** #4 - Rock/Gravel , NO Geotextile

**Scenario Description:**

The stabilization of areas around facilities that are frequently and intensively used by people, animals or vehicles by surfacing with rock and or gravel on a geotextile fabric foundation to provide a stable, non-eroding surface. Installation includes all materials, equipment, and labor to install this practice, The stabilized area will address the resource concerns of soil erosion and water quality degradation.

**Before Situation:**

This practice applies to agricultural, urban, recreational and other frequently and/or intensively used areas requiring treatment to address soil erosion and water quality degradation.

**After Situation:**

The stabilized area is surfaced with approximately 784 square feet of rock and or gravel, 8 inches thick for surfacing areas around facilities that are frequently and intensively used by people, animals or vehicles and will address soil erosion and water quality degradation. All needed roads must use Access Road (560). Any needed treatment of stream crossings must use Stream Crossing (578). Any needed vegetation of disturbed areas must use Critical Area Planting (342). Provisions to collect, store, utilize, and or treat contaminated runoff must use Sediment Basin (350), Waste Storage Facility (313), or Waste Treatment (629) as appropriate. To reduce the potential for air quality problems from particulate matter associated with heavy use areas, consider the use of Windbreak/Shelterbelt Establishment (380) or Herbaceous Wind Barriers (603).

**Feature Measure:** Area of Rock and or Gravel

**Scenario Unit::** Square Foot

**Scenario Typical Size:** 784

**Total Scenario Cost:** $1,120.95

**Scenario Cost/Unit:** $1.43

**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 Yard | $3.08 | 14.52 | $44.72 |
| Skidsteer, 80 HP | 933 | Skidsteer loader with horsepower range of 60 to 90. Equipment and power unit costs. Labor not included. | Hour | $40.57 | 4 | $162.28 |
| **Labor** | | | | | | |
| Equipment Operators, Light | 232 | Includes: Skid Steer Loaders, Hydraulic Excavators <50 HP, Trenchers <12", Ag Equipment <150 HP, Pickup Trucks, Forklifts, Mulchers | Hour | $21.14 | 4 | $84.56 |
| **Materials** | | | | | | |
| Aggregate, Gravel, Graded | 46 | Gravel, includes materials, equipment and labor to transport and place. Includes washed and unwashed gravel. | Cubic Yard | $30.82 | 19.36 | $596.68 |
| **Mobilization** | | | | | | |
| Mobilization, medium equipment | 1139 | Equipment with 70-150 HP or typical weights between 14,000 and 30,000 pounds. | Each | $232.71 | 1 | $232.71 |

**Practice:** 561 - Heavy Use Area Protection

**Scenario** #5 - Rock-Select Onsite Stone onGeotextile

**Scenario Description:**

The stabilization of areas around facilities that are frequently and intensively used by people, animals or vehicles by surfacing with well graded Select Onsite gravel having a maximum size of 4 inches, 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 agricultural, urban, recreational and other frequently and/or intensively used areas requiring treatment to address soil erosion and water quality degradation.

**After Situation:**

The stabilized area is surfaced with approximately 630 square feet of rock and or gravel on approximately 70 square yards of geotextile fabric foundation material for surfacing areas around facilities that are frequently and intensively used by people, animals or vehicles and will address soil erosion and water quality degradation. All needed roads must use Access Road (560). Any needed treatment of stream crossings must use Stream Crossing (578). Any needed vegetation of disturbed areas must use Critical Area Planting (342). Provisions to collect, store, utilize, and or treat contaminated runoff must use Sediment Basin (350), Waste Storage Facility (313), or Waste Treatment (629) as appropriate. To reduce the potential for air quality problems from particulate matter associated with heavy use areas, consider the use of Windbreak/Shelterbelt Establishment (380) or Herbaceous Wind Barriers (603).

**Feature Measure:** Area of Rock and or Gravel

**Scenario Unit::** Square Foot

**Scenario Typical Size:** 630

**Total Scenario Cost:** $468.16

**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 | $2.05 | 70 | $143.50 |
| Excavation, Common Earth, side cast, small equipment | 48 | Bulk excavation and side casting of common earth with hydraulic excavator with less than 1 CY capacity. Includes equipment and labor. | Cubic Yard | $1.99 | 12 | $23.88 |
| Backhoe, 80 HP | 926 | Wheel mounted backhoe excavator with horsepower range of 60 to 90. Equipment and power unit costs. Labor not included. | Hour | $50.99 | 2 | $101.98 |
| **Labor** | | | | | | |
| Equipment Operators, Light | 232 | Includes: Skid Steer Loaders, Hydraulic Excavators <50 HP, Trenchers <12", Ag Equipment <150 HP, Pickup Trucks, Forklifts, Mulchers | Hour | $21.14 | 2 | $42.28 |
| **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 | $156.52 | 1 | $156.52 |

**Practice:** 561 - Heavy Use Area Protection

**Scenario** #6 - Rock/Gravel-GeoCell-Geotextile

**Scenario Description:**

The stabilization of areas around facilities that are frequently and intensively used by people, animals or vehicles by surfacing with rock and or gravel in a cellular containment grid 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 agricultural, urban, recreational and other frequently and/or intensively used areas requiring treatment to address soil erosion and water quality degradation.

**After Situation:**

The stabilized area is surfaced with approximately 630 square feet of rock and or gravel in approximately 70 square yards of cellular containment grid on approximately 70 square yards of geotextile fabric foundation material for surfacing areas around facilities that are frequently and intensively used by people, animals or vehicles and will address soil erosion and water quality degradation. All needed roads must use Access Road (560). Any needed treatment of stream crossings must use Stream Crossing (578). Any needed vegetation of disturbed areas must use Critical Area Planting (342). Provisions to collect, store, utilize, and or treat contaminated runoff must use Sediment Basin (350), Waste Storage Facility (313), or Waste Treatment (629) as appropriate. To reduce the potential for air quality problems from particulate matter associated with heavy use areas, consider the use of Windbreak/Shelterbelt Establishment (380) or Herbaceous Wind Barriers (603).

**Feature Measure:** Area of Rock and or Gravel

**Scenario Unit::** Square Foot

**Scenario Typical Size:** 630

**Total Scenario Cost:** $2,219.73

**Scenario Cost/Unit:** $3.52

**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 | $2.05 | 70 | $143.50 |
| Excavation, Common Earth, side cast, small equipment | 48 | Bulk excavation and side casting of common earth with hydraulic excavator with less than 1 CY capacity. Includes equipment and labor. | Cubic Yard | $1.99 | 4 | $7.96 |
| **Materials** | | | | | | |
| Aggregate, Gravel, Graded | 46 | Gravel, includes materials, equipment and labor to transport and place. Includes washed and unwashed gravel. | Cubic Yard | $30.82 | 8 | $246.56 |
| GeoCell, 4" | 1054 | 4-inch thick cellular confinement system, three-dimensional, expandable panels made from high-density polyethylene (HDPE), polyester or another polymer material. Includes materials, labor and equipment for the geocell only, does not include backfill. | Square Yard | $22.70 | 70 | $1,589.00 |
| **Mobilization** | | | | | | |
| Mobilization, medium equipment | 1139 | Equipment with 70-150 HP or typical weights between 14,000 and 30,000 pounds. | Each | $232.71 | 1 | $232.71 |

**Practice:** 561 - Heavy Use Area Protection

**Scenario** #7 - Bituminous Concrete Pavement

**Scenario Description:**

The stabilization of areas around facilities that are frequently and intensively used by people, animals or vehicles by surfacing with bituminous concrete pavement on aggregate 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 of soil erosion and water quality degradation.

**Before Situation:**

This practice applies to agricultural, urban, recreational and other frequently and/or intensively used areas requiring treatment to address soil erosion and water quality degradation.

**After Situation:**

The stabilized area is surfaced with approximately 630 square feet of bituminous concrete pavement on 8 cubic yards of aggregate gravel material for surfacing areas around facilities that are frequently and intensively used by people, animals or vehicles and will address soil erosion and water quality degradation. All needed roads must use Access Road (560). Any needed treatment of stream crossings must use Stream Crossing (578). Any needed vegetation of disturbed areas must use Critical Area Planting (342). Provisions to collect, store, utilize, and or treat contaminated runoff must use Sediment Basin (350), Waste Storage Facility (313), or Waste Treatment (629) as appropriate. To reduce the potential for air quality problems from particulate matter associated with heavy use areas, consider the use of Windbreak/Shelterbelt Establishment (380) or Herbaceous Wind Barriers (603).

**Feature Measure:** Area of Bituminous Pavement

**Scenario Unit::** Square Foot

**Scenario Typical Size:** 630

**Total Scenario Cost:** $1,677.93

**Scenario Cost/Unit:** $2.66

**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 Yard | $1.99 | 4 | $7.96 |
| **Materials** | | | | | | |
| Aggregate, Gravel, Graded | 46 | Gravel, includes materials, equipment and labor to transport and place. Includes washed and unwashed gravel. | Cubic Yard | $30.82 | 8 | $246.56 |
| Asphalt, pavement | 1867 | Bituminous Concrete,includes materials, equipment and labor for 4" layer, base not included. | Square Foot | $1.89 | 630 | $1,190.70 |
| **Mobilization** | | | | | | |
| Mobilization, medium equipment | 1139 | Equipment with 70-150 HP or typical weights between 14,000 and 30,000 pounds. | Each | $232.71 | 1 | $232.71 |

**Practice:** 561 - Heavy Use Area Protection

**Scenario** #8 - Fly Ash on Geotextile

**Scenario Description:**

The stabilization of areas around facilities that are frequently and intensively used by people, animals or vehicles by surfacing with Fly Ash 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 agricultural, urban, recreational and other frequently and/or intensively used areas requiring treatment to address soil erosion and water quality degradation.

**After Situation:**

The stabilized area is surfaced with approximately 630 square feet of Fly Ash on approximately 70 square yards of geotextile fabric foundation material for surfacing areas around facilities that are frequently and intensively used by people, animals or vehicles and will address soil erosion and water quality degradation. All needed roads must use Access Road (560). Any needed treatment of stream crossings must use Stream Crossing (578). Any needed vegetation of disturbed areas must use Critical Area Planting (342). Provisions to collect, store, utilize, and or treat contaminated runoff must use Sediment Basin (350), Waste Storage Facility (313), or Waste Treatment (629) as appropriate. To reduce the potential for air quality problems from particulate matter associated with heavy use areas, consider the use of Windbreak/Shelterbelt Establishment (380) or Herbaceous Wind Barriers (603).

**Feature Measure:** Area of Fly Ash

**Scenario Unit::** Square Foot

**Scenario Typical Size:** 630

**Total Scenario Cost:** $1,424.88

**Scenario Cost/Unit:** $2.26

**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 Yard | $1.99 | 19 | $37.81 |
| Dozer, 140 HP | 927 | Track mounted Dozer with horsepower range of 125 to 160. Equipment and power unit costs. Labor not included. | Hour | $112.82 | 4 | $451.28 |
| **Labor** | | | | | | |
| Equipment Operators, Heavy | 233 | Includes: Cranes, Hydraulic Excavators >=50 HP, Dozers, Paving Machines, Rock Trenchers, Trenchers >=12", Dump Trucks, Ag Equipment >=150 HP, Scrapers, Water Wagons. | Hour | $23.93 | 4 | $95.72 |
| **Materials** | | | | | | |
| Fly Ash, BAB | 52 | Fly Ash, Bottom Ash Blend, includes material and delivery | Cubic Yard | $19.44 | 19 | $369.36 |
| **Mobilization** | | | | | | |
| Mobilization, Material, distance > 50 miles | 1043 | Mobilization cost of materials for special cases where the distance from the supplier delivery point to the job site exceeds 50 miles. The costs for shipping by UPS or bulk freight shipping to a location within 50 miles of the job site have already been included in the component price. | Dollar | $1.00 | 238 | $238.00 |
| Mobilization, medium equipment | 1139 | Equipment with 70-150 HP or typical weights between 14,000 and 30,000 pounds. | Each | $232.71 | 1 | $232.71 |

**Practice:** 561 - Heavy Use Area Protection

**Scenario** #9 - Rock/Gravel on Geotextile, 8"Thick

**Scenario Description:**

The stabilization of areas around facilities that are frequently and intensively used by people, animals or vehicles by surfacing with rock and or gravel on a geotextile fabric foundation to provide a stable, non-eroding surface. Installation includes all materials, equipment, and labor to install this practice, The stabilized area will address the resource concerns of soil erosion and water quality degradation.

**Before Situation:**

This practice applies to agricultural, urban, recreational and other frequently and/or intensively used areas requiring treatment to address soil erosion and water quality degradation.

**After Situation:**

The stabilized area is surfaced with approximately 630 square feet of rock (8" deep) and or gravel on approximately 70 square yards of geotextile fabric foundation material for surfacing areas around facilities that are frequently and intensively used by people, animals or vehicles and will address soil erosion and water quality degradation. All needed roads must use Access Road (560). Any needed treatment of stream crossings must use Stream Crossing (578). Any needed vegetation of disturbed areas must use Critical Area Planting (342). Provisions to collect, store, utilize, and or treat contaminated runoff must use Sediment Basin (350), Waste Storage Facility (313), or Waste Treatment (629) as appropriate. To reduce the potential for air quality problems from particulate matter associated with heavy use areas, consider the use of Windbreak/Shelterbelt Establishment (380) or Herbaceous Wind Barriers (603).

**Feature Measure:** Area of Rock and or Gravel

**Scenario Unit::** Square Foot

**Scenario Typical Size:** 630

**Total Scenario Cost:** $901.17

**Scenario Cost/Unit:** $1.43

**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 | $2.05 | 70 | $143.50 |
| Excavation, Common Earth, side cast, small equipment | 48 | Bulk excavation and side casting of common earth with hydraulic excavator with less than 1 CY capacity. Includes equipment and labor. | Cubic Yard | $1.99 | 16 | $31.84 |
| **Materials** | | | | | | |
| Aggregate, Gravel, Graded | 46 | Gravel, includes materials, equipment and labor to transport and place. Includes washed and unwashed gravel. | Cubic Yard | $30.82 | 16 | $493.12 |
| **Mobilization** | | | | | | |
| Mobilization, medium equipment | 1139 | Equipment with 70-150 HP or typical weights between 14,000 and 30,000 pounds. | Each | $232.71 | 1 | $232.71 |

**Practice:** 561 - Heavy Use Area Protection

**Scenario** #10 - Winter Feeding Station

**Scenario Description:**

The stabilization of areas around facilities that are frequently and intensively used by people, animals or vehicles by surfacing with reinforced concrete to provide a stable, non-eroding surface. Typical site is 50' X 100' for cattle lots, barn yards, and/or veg and fruit packing/loading areas driven on by heavy equipment. Typical material is 5 inches of reinforced concrete over 4 to 6 inches of sand and/or gravel. Address Soil Erosion and Water Quality Degradation resource concerns.

**Before Situation:**

This practice applies to intensively used livestock feeding areas requiring treatment to address soil erosion and water quality degradation. Area identified has a firm foundation with an erosion/water quality resource concerns due to heavy animal use.

**After Situation:**

The installed concrete surfacing stabilizes and protects the site from further erosion and facilitates the ability to provide winter feeding. The degradation of soil and water quality have been stopped. Typical site is 50' X 100' for cattle lots and barn yards. Typical material is 5 inches of reinforced concrete over 4 to 6 inches of sand and/or gravel. All needed roads must use Access Road (560). Any needed treatment of stream crossings must use Stream Crossing (578). Any needed vegetation of disturbed areas must use Critical Area Planting (342). Provisions to collect, store, utilize, and or treat contaminated runoff must use Sediment Basin (350), Waste Storage Facility (313), or Waste Treatment (629) as appropriate. To reduce the potential for air quality problems from particulate matter associated with heavy use areas, consider the use of Windbreak/Shelterbelt Establishment (380) or Herbaceous Wind Barriers (603). Other associated practices: Agrichemical Handling Facility (309), Composting Facility (317), Watering Facility (614), Waste Transfer (633), Aquacultural Ponds (397), Prescribed Grazing (528), Livestock Pipeline (516).

**Feature Measure:** Area of Concrete

**Scenario Unit::** Square Foot

**Scenario Typical Size:** 5000

**Total Scenario Cost:** $20,435.28

**Scenario Cost/Unit:** $4.09

**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 Yard | $210.23 | 77.2 | $16,229.76 |
| Earthfill, Roller Compacted | 49 | Earthfill, roller or machine compacted, includes equipment and labor | Cubic Yard | $3.76 | 92.6 | $348.18 |
| Dozer, 80 HP | 929 | Track mounted Dozer with horsepower range of 60 to 90. Equipment and power unit costs. Labor not included. | Hour | $60.16 | 5 | $300.80 |
| **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. | Hour | $18.93 | 7 | $132.51 |
| Equipment Operators, Heavy | 233 | Includes: Cranes, Hydraulic Excavators >=50 HP, Dozers, Paving Machines, Rock Trenchers, Trenchers >=12", Dump Trucks, Ag Equipment >=150 HP, Scrapers, Water Wagons. | Hour | $23.93 | 6 | $143.58 |
| **Materials** | | | | | | |
| Aggregate, Sand, Graded, Washed | 45 | Sand, typical ASTM C33 gradation, includes materials, equipment and labor to transport and place | Cubic Yard | $30.40 | 92.6 | $2,815.04 |
| **Mobilization** | | | | | | |
| Mobilization, medium equipment | 1139 | Equipment with 70-150 HP or typical weights between 14,000 and 30,000 pounds. | Each | $232.71 | 2 | $465.42 |

**Practice:** 574 - Spring Development

**Scenario** #1 - Spring Development - Concrete Cutoff

**Scenario Description:**

Develop a water source from a natural spring or seep (i.e., spring development) to provide water for livestock and/or wildlife needs. This typical scenario includes excavating and exposing the water source at the spring/seep (typically on a hillside), constructing a water collection structure by installing a 50 ft long, 1.5 inch SCH40 PVC hand perforated pipe enclosed in a sand/gravel envelope overlaid by 2 ft wide filter fabric (50 ft long) and behind a concrete cutoff wall (6 inch x 4 ft height x 25 ft long) to retain water. Water is directed (via 20 ft long, 1.5 inch PVC) to a spring box (48 inch diameter x 6 ft long CMP) that is located at the cutoff wall or below the wall, equipped with a watertight lid and two outlets. One outlet serves as overflow pipe to account for occasions where inflow exceeds outflow. The collection system is commonly composed of a single or a network of perforated 4 inch diameter drainage pipe placed in an excavated collection trench that runs across the slope. The outflow pipe from the spring box can be directed to buried large storage (not included), and to a watering facility (not included) for useResource 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

**Total Scenario Cost:** $3,531.86

**Scenario Cost/Unit:** $3,531.86

**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 Yard | $326.97 | 2 | $653.94 |
| Geotextile, woven | 42 | Woven Geotextile Fabric. Includes materials, equipment and labor | Square Yard | $2.05 | 11 | $22.55 |
| Backhoe, 80 HP | 926 | Wheel mounted backhoe excavator with horsepower range of 60 to 90. Equipment and power unit costs. Labor not included. | Hour | $50.99 | 16 | $815.84 |
| **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. | Hour | $18.93 | 32 | $605.76 |
| Equipment Operators, Light | 232 | Includes: Skid Steer Loaders, Hydraulic Excavators <50 HP, Trenchers <12", Ag Equipment <150 HP, Pickup Trucks, Forklifts, Mulchers | Hour | $21.14 | 16 | $338.24 |
| **Materials** | | | | | | |
| Aggregate, Sand, Graded, Washed | 45 | Sand, typical ASTM C33 gradation, includes materials, equipment and labor to transport and place | Cubic Yard | $30.40 | 2 | $60.80 |
| Aggregate, Gravel, Graded | 46 | Gravel, includes materials, equipment and labor to transport and place. Includes washed and unwashed gravel. | Cubic Yard | $30.82 | 2 | $61.64 |
| Pipe, PVC, 1 ½", SCH 40 | 975 | Materials: - 1 1/2" - PVC - SCH 40 - ASTM D1785 | Foot | $1.05 | 70 | $73.50 |
| Pipe, CMP, 48", 14 Gauge | 1280 | 48" Corrugated Metal Pipe, Galvanized, Uncoated, 14 gage. Material cost only. | Foot | $42.26 | 6 | $253.56 |
| Spring Collection Box Cover, steel, 4' diameter | 1281 | 4" diameter x 1/4" thick Steel lid with handle for spring collection box. Materials and fabrication. | Each | $180.61 | 1 | $180.61 |
| **Mobilization** | | | | | | |
| Mobilization, medium equipment | 1139 | Equipment with 70-150 HP or typical weights between 14,000 and 30,000 pounds. | Each | $232.71 | 2 | $465.42 |

**Practice:** 574 - Spring Development

**Scenario** #2 - Spring Development - Clay Cutoff

**Scenario Description:**

Develop a water source from a natural spring or seep (i.e., spring development) to provide water for livestock and/or wildlife needs. This typical scenario includes excavating and exposing the water source at the spring/seep (typically on a hillside), constructing a water collection structure by installing a Spring Box (fabricated from a 48 inch diamenter x 4ft long CMP) that is located upstream from a 25 ft long arced compacted clay cut-off berm located to retain water. The excavation is 25 ft x 8 ft with average depth of 3 ft. Gravel or sand drainfill is used to backfill in the excavation and around the spring box. The drainfill is protected along the sides and top from soil intrusion with filter fabric. A 6 inch layer of topsoil is placed on top of the filter fabric. The spring box is perferated along the the sides and upstream side, equipped with a watertight lid and and is plumbed such that sand or other debris will collect in the bottom. The outflow pipe from the spring box can be directed to buried large storage (not included), and to a watering facility (not included) for use. An overflow pipe may be installed for occasions where inflow exceeds outflow.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

**Total Scenario Cost:** $2,268.68

**Scenario Cost/Unit:** $2,268.68

**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 | $2.05 | 20 | $41.00 |
| Backhoe, 80 HP | 926 | Wheel mounted backhoe excavator with horsepower range of 60 to 90. Equipment and power unit costs. Labor not included. | Hour | $50.99 | 11 | $560.89 |
| **Labor** | | | | | | |
| General Labor | 231 | Labor performed using basic tools such as power tool, shovels, and other tools that do not require extensive training. Ex. pipe layer, herder, concrete placement, materials spreader, flagger, etc. | Hour | $18.93 | 20 | $378.60 |
| Equipment Operators, Light | 232 | Includes: Skid Steer Loaders, Hydraulic Excavators <50 HP, Trenchers <12", Ag Equipment <150 HP, Pickup Trucks, Forklifts, Mulchers | Hour | $21.14 | 10 | $211.40 |
| **Materials** | | | | | | |
| Aggregate, Gravel, Graded | 46 | Gravel, includes materials, equipment and labor to transport and place. Includes washed and unwashed gravel. | Cubic Yard | $30.82 | 5 | $154.10 |
| Pipe, PVC, 1 ½", SCH 40 | 975 | Materials: - 1 1/2" - PVC - SCH 40 - ASTM D1785 | Foot | $1.05 | 22 | $23.10 |
| Pipe, CMP, 48", 14 Gauge | 1280 | 48" Corrugated Metal Pipe, Galvanized, Uncoated, 14 gage. Material cost only. | Foot | $42.26 | 6 | $253.56 |
| Spring Collection Box Cover, steel, 4' diameter | 1281 | 4" diameter x 1/4" thick Steel lid with handle for spring collection box. Materials and fabrication. | Each | $180.61 | 1 | $180.61 |
| **Mobilization** | | | | | | |
| Mobilization, medium equipment | 1139 | Equipment with 70-150 HP or typical weights between 14,000 and 30,000 pounds. | Each | $232.71 | 2 | $465.42 |

**Practice:** 575 - Trails and Walkways

**Scenario** #1 - Natural Trail or Walkway

**Scenario Description:**

Layout and construct a trail or walkway of natural surfacing to facilitate animal movement, 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 and address soil erosion and water quality resource concerns. Costs include excavation, shaping, grading, and all equipment, labor and incidental materials necessary to install the practices.

**Before Situation:**

On farmstead area and pastureland and rangeland areas where control of animal movement is needed and needing to address soil erosion and water quality resource concerns.

**After Situation:**

The typical trail or walkway will be a 12 foot wide 300 foot long, 3600 square foot lane. All excavation, grading and shaping necessary to provide a smooth permanent natural travel surface for livestock. No surface materials are included with this practice..Consider the adequacy of natural surfacing. If the lane is vegetated and requires planting, the vegetation shall be planted according to Critical Area Planting, Code 342. Where vegetation is not practical, Heavy Use Area Protection, Code 561,shall be used to provide adequate surface protection. Stream Crossing, Code 578, will be used when the trail or lane crosses streams or shallow water areas. Consider the use of water bars or culverts to control and direct water flow, use Access Road, Code 560. Diversion, Code 362, may also be beneficial. Fencing, Code 382, will be used when needed to control animal movement.

**Feature Measure:** Area of lane or trail

**Scenario Unit::** Square Foot

**Scenario Typical Size:** 3600

**Total Scenario Cost:** $708.30

**Scenario Cost/Unit:** $0.20

**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. | Hour | $60.16 | 6 | $360.96 |
| Truck, Pickup | 939 | Equipment and power unit costs. Labor not included. | Hour | $19.82 | 3 | $59.46 |
| **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. | Hour | $18.93 | 4 | $75.72 |
| Equipment Operators, Heavy | 233 | Includes: Cranes, Hydraulic Excavators >=50 HP, Dozers, Paving Machines, Rock Trenchers, Trenchers >=12", Dump Trucks, Ag Equipment >=150 HP, Scrapers, Water Wagons. | Hour | $23.93 | 6 | $143.58 |
| Supervisor or Manager | 234 | Labor involving supervision or management activities. Includes crew supervisors, foremen and farm/ranch managers time required for adopting new technology, etc. | Hour | $34.29 | 2 | $68.58 |

**Practice:** 576 - Livestock Shelter Structure

**Scenario** #1 - 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 25 ft x 40 ft 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 Foot

**Scenario Typical Size:** 1000

**Total Scenario Cost:** $3,946.67

**Scenario Cost/Unit:** $3.95

**Cost Details:**

| Component Name | ID | Description | Unit | Cost | QTY | Total |
|---|---|---|---|---|---|---|
| **Equipment Installation** | | | | | | |
| Truck, Pickup | 939 | Equipment and power unit costs. Labor not included. | Hour | $19.82 | 8 | $158.56 |
| Portable Welder | 1407 | Portable field welder. Equipment only. Labor not included. | Hour | $18.57 | 16 | $297.12 |
| **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. | Hour | $25.08 | 16 | $401.28 |
| 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. | Hour | $18.93 | 8 | $151.44 |
| **Materials** | | | | | | |
| Pipe, PVC, 2", SCH 40 | 976 | Materials: - 2" - PVC - SCH 40 - ASTM D1785 | Foot | $1.38 | 25 | $34.50 |
| Steel, Plate, 3/16" | 1048 | Flat Steel Plate, 3/16" thick, materials only. | Square Foot | $5.69 | 2 | $11.38 |
| Pipe, Steel, 1 ¼", SCH 40 | 1103 | Materials: - 1 1/4" - Steel SCH 40 | Foot | $4.32 | 94 | $406.08 |
| Pipe, Steel, 2", SCH 40 | 1105 | Materials: - 2" - Steel SCH 40 | Foot | $6.93 | 185 | $1,282.05 |
| Synthetic Liner, 60 mil | 2109 | Synthetic 60 mil HDPE, LLDPE, EPDM, etc membrane liner material. Includes materials and shipping only. | Square Foot | $1.14 | 1000 | $1,140.00 |
| **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 | $64.26 | 1 | $64.26 |

**Practice:** 578 - Stream Crossing

**Scenario** #1 - Bridge

**Scenario Description:**

Install a bridge to allow stream flows to cross under access road or animal trail. Bridge opening determined by sizing for storm event dictated in standard. Scenario includes dewatering, abutments, girders, decking. Work consists of site preparation, dewatering, acquiring and installing abuttments, girders, decking with necessary hardware, backfilling abuttments, and armoring with geotextile and riprap. Riprap and geotextile are used to stabilize and protect abutments as needed. Scenario cost estimate is 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. Width is 14 feet including curbs. Abutments are <= 6 feet. 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 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 Foot

**Scenario Typical Size:** 252

**Total Scenario Cost:** $11,425.98

**Scenario Cost/Unit:** $45.34

**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. | Hour | $87.98 | 8 | $703.84 |
| Excavation, common earth, side cast, large equipment | 1227 | Bulk excavation and side casting of common earth with hydraulic excavator with less greater than 1 CY capacity. Includes equipment and labor. | Cubic Yard | $1.53 | 75 | $114.75 |
| **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. | Hour | $25.08 | 80 | $2,006.40 |
| Equipment Operators, Heavy | 233 | Includes: Cranes, Hydraulic Excavators >=50 HP, Dozers, Paving Machines, Rock Trenchers, Trenchers >=12", Dump Trucks, Ag Equipment >=150 HP, Scrapers, Water Wagons. | Hour | $23.93 | 8 | $191.44 |
| **Materials** | | | | | | |
| Rock Riprap, Placed with geotextile | 44 | Rock Riprap, placed with geotextile, includes materials, equipment and labor to transport and place | Cubic Yard | $55.44 | 20 | $1,108.80 |
| Aggregate, Gravel, Graded | 46 | Gravel, includes materials, equipment and labor to transport and place. Includes washed and unwashed gravel. | Cubic Yard | $30.82 | 20 | $616.40 |
| Dimension Lumber, untreated | 1045 | Untreated dimension lumber with nominal thickness equal or less than 2". Includes lumber and fasteners. | Board Foot | $0.79 | 2000 | $1,580.00 |
| Block, pre-cast concrete, modular | 1496 | Pre-cast concrete blocks, typically 2ft x 2ft x 6ft , includes installation and delivery. | Cubic Yard | $98.98 | 18 | $1,781.64 |
| Steel, structural steel members | 1779 | Structural steel, includes materials and fabrication. | Pound | $1.03 | 3000 | $3,090.00 |
| **Mobilization** | | | | | | |
| Mobilization, medium equipment | 1139 | Equipment with 70-150 HP or typical weights between 14,000 and 30,000 pounds. | Each | $232.71 | 1 | $232.71 |

**Practice:** 578 - Stream Crossing

**Scenario** #2 - Hard armored low water crossing

**Scenario Description:**

Stabilize the bottom and slope of a stream channel using rock riprap or cast in place concrete. The typical scenario includes site preparation, dewatering, acquiring and installing gravel or geotextile with rock riprap or cast in place concrete on channel bottom and approaches. Final travel surface shall be the rocks or concrete. If a different travel surface is needed, refer to another appropriate standard for the surfacing. The cost estimate is based on a typical stream that 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:** Crossing dimensions

**Scenario Unit::** Square Foot

**Scenario Typical Size:** 420

**Total Scenario Cost:** $1,481.99

**Scenario Cost/Unit:** $3.53

**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. | Hour | $87.98 | 2 | $175.96 |
| Excavation, common earth, side cast, large equipment | 1227 | Bulk excavation and side casting of common earth with hydraulic excavator with less greater than 1 CY capacity. Includes equipment and labor. | Cubic Yard | $1.53 | 18 | $27.54 |
| **Labor** | | | | | | |
| Equipment Operators, Heavy | 233 | Includes: Cranes, Hydraulic Excavators >=50 HP, Dozers, Paving Machines, Rock Trenchers, Trenchers >=12", Dump Trucks, Ag Equipment >=150 HP, Scrapers, Water Wagons. | Hour | $23.93 | 2 | $47.86 |
| **Materials** | | | | | | |
| Rock Riprap, Placed with geotextile | 44 | Rock Riprap, placed with geotextile, includes materials, equipment and labor to transport and place | Cubic Yard | $55.44 | 18 | $997.92 |
| **Mobilization** | | | | | | |
| Mobilization, medium equipment | 1139 | Equipment with 70-150 HP or typical weights between 14,000 and 30,000 pounds. | Each | $232.71 | 1 | $232.71 |

**Practice:** 578 - Stream Crossing

**Scenario** #3 - Culvert installation

**Scenario Description:**

Install a new culvert. Work may include 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. Cost estimate is based on a 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.

**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::** Diameter Inch Foot

**Scenario Typical Size:** 720

**Total Scenario Cost:** $4,271.44

**Scenario Cost/Unit:** $5.93

**Cost Details:**

| Component Name | ID | Description | Unit | Cost | QTY | Total |
|---|---|---|---|---|---|---|
| **Equipment Installation** | | | | | | |
| Earthfill, Manually Compacted | 50 | Earthfill, manually compacted, includes equipment and labor | Cubic Yard | $4.95 | 3 | $14.85 |
| Hydraulic Excavator, 1 CY | 931 | Track mounted hydraulic excavator with bucket capacity range of 0.8 to 1.5 CY. Equipment and power unit costs. Labor not included. | Hour | $103.47 | 10 | $1,034.70 |
| **Labor** | | | | | | |
| Equipment Operators, Heavy | 233 | Includes: Cranes, Hydraulic Excavators >=50 HP, Dozers, Paving Machines, Rock Trenchers, Trenchers >=12", Dump Trucks, Ag Equipment >=150 HP, Scrapers, Water Wagons. | Hour | $23.93 | 10 | $239.30 |
| **Materials** | | | | | | |
| Rock Riprap, Placed with geotextile | 44 | Rock Riprap, placed with geotextile, includes materials, equipment and labor to transport and place | Cubic Yard | $55.44 | 2 | $110.88 |
| Aggregate, Gravel, Graded | 46 | Gravel, includes materials, equipment and labor to transport and place. Includes washed and unwashed gravel. | Cubic Yard | $30.82 | 50 | $1,541.00 |
| Pipe, HDPE, CPT, Double Wall, Soil Tight, 30" | 1247 | Pipe, Corrugated HDPE Double Wall, 30" diameter with soil tight joints - AASHTO M294. Material cost only. | Foot | $27.45 | 40 | $1,098.00 |
| **Mobilization** | | | | | | |
| Mobilization, medium equipment | 1139 | Equipment with 70-150 HP or typical weights between 14,000 and 30,000 pounds. | Each | $232.71 | 1 | $232.71 |

**Practice:** 578 - Stream Crossing

**Scenario** #4 - Low water crossing using prefabricated products

**Scenario Description:**

To install a stable crossing medium on channel bottom and approatches. 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. This cost estimate is based on a typical stream that has a 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 Foot

**Scenario Typical Size:** 420

**Total Scenario Cost:** $2,880.72

**Scenario Cost/Unit:** $6.86

**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. | Hour | $87.98 | 2 | $175.96 |
| Excavation, common earth, side cast, large equipment | 1227 | Bulk excavation and side casting of common earth with hydraulic excavator with less greater than 1 CY capacity. Includes equipment and labor. | Cubic Yard | $1.53 | 18 | $27.54 |
| **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. | Hour | $18.93 | 40 | $757.20 |
| Equipment Operators, Heavy | 233 | Includes: Cranes, Hydraulic Excavators >=50 HP, Dozers, Paving Machines, Rock Trenchers, Trenchers >=12", Dump Trucks, Ag Equipment >=150 HP, Scrapers, Water Wagons. | Hour | $23.93 | 2 | $47.86 |
| **Materials** | | | | | | |
| Aggregate, Sand, Graded, Washed | 45 | Sand, typical ASTM C33 gradation, includes materials, equipment and labor to transport and place | Cubic Yard | $30.40 | 6 | $182.40 |
| Aggregate, Gravel, Graded | 46 | Gravel, includes materials, equipment and labor to transport and place. Includes washed and unwashed gravel. | Cubic Yard | $30.82 | 18 | $554.76 |
| GeoCell, 4" | 1054 | 4-inch thick cellular confinement system, three-dimensional, expandable panels made from high-density polyethylene (HDPE), polyester or another polymer material. Includes materials, labor and equipment for the geocell only, does not include backfill. | Square Yard | $22.70 | 50 | $1,135.00 |

**Practice:** 578 - Stream Crossing

**Scenario** #5 - Steam Crossing, Concrete Bottom

**Scenario Description:**

Stabilize the bottom and slope of a stream channel using cast in place concrete with gravel approaches. This scenario includes site preparation, dewatering, acquiring and installing gravel or geotextile with gravel and cast in place concrete on channel bottom and approaches. Final travel surface shall be the rocks above normal highwater mark and concrete below the normal highwater mark. If a different travel surface is needed, refer to another appropriate standard for the surfacing. Typical stream used for cost estimate has 30 linear feet of concrete (bottom width and approaches) with 10 foot gravel approaches on either side above the normal highwater mark. 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:**

An unimproved stream crossing has rill and gully erosion causing excessive sediments and excess nutrient potential. Erosion is made worse by vehicle traffic through the stream or rutting has progressed to the point that access to the field on the other side is no longer possible. Stream flow/velocity during storm events is such that culverts or a less ridgid ford type crossing is not anticipated to last its design life. Access is difficult to the field across the stream and water quality is negatively impacted.

**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:** Crossing dimensions

**Scenario Unit::** Square Foot

**Scenario Typical Size:** 420

**Total Scenario Cost:** $5,024.85

**Scenario Cost/Unit:** $11.96

**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 Yard | $210.23 | 18 | $3,784.14 |
| Truck, dump, 12 CY | 1215 | Dump truck for moving bulk material. Typically capacity is 16 ton or 12 cubic yards. Includes equipment only. | Hour | $87.98 | 2 | $175.96 |
| Excavation, common earth, wet, side cast, large equipment | 1228 | Bulk excavation and side casting of wet common earth with hydraulic excavator or dragline with greater than 1 CY capacity. Includes equipment and labor. | Cubic Yard | $3.93 | 50 | $196.50 |
| **Labor** | | | | | | |
| General Labor | 231 | Labor performed using basic tools such as power tool, shovels, and other tools that do not require extensive training. Ex. pipe layer, herder, concrete placement, materials spreader, flagger, etc. | Hour | $18.93 | 16 | $302.88 |
| Equipment Operators, Heavy | 233 | Includes: Cranes, Hydraulic Excavators >=50 HP, Dozers, Paving Machines, Rock Trenchers, Trenchers >=12", Dump Trucks, Ag Equipment >=150 HP, Scrapers, Water Wagons. | Hour | $23.93 | 2 | $47.86 |
| **Materials** | | | | | | |
| Aggregate, Sand, Graded, Washed | 45 | Sand, typical ASTM C33 gradation, includes materials, equipment and labor to transport and place | Cubic Yard | $30.40 | 5 | $152.00 |
| Geotextile, non-woven, heavy weight | 1210 | Non-woven greater than 8 ounce/square yard geotextile with staple anchoring. Materials and shipping only. | Square Yard | $4.15 | 32 | $132.80 |
| **Mobilization** | | | | | | |
| Mobilization, medium equipment | 1139 | Equipment with 70-150 HP or typical weights between 14,000 and 30,000 pounds. | Each | $232.71 | 1 | $232.71 |

**Practice:** 580 - Streambank and Shoreline Protection

**Scenario** #1 - Vegetative

**Scenario Description:**

Protection of streambanks consisting of conventional plantings of vegetation to stabilize and protect against scour and erosion. The purpose of this practice is to maintain, improve, or restore physical, chemical, and biological functions of a stream to provide diverse aquatic communities to improve habitat for desired aquatic species. Payment cost include shaping bank, critical area vegetation and erosion control fabric; a 6-foot high bank at 3(H):1(V) slope for 1000 linear feet (0.46 acres) is used for estimation purposes.Resource Concerns: Soil Erosion - Excessive Bank Erosion from Streams, Shoreline and Water Conveyance Channels; Water Quality Degradation - Excessive Sediment in Surface Waters; Water Quality Degradation - Elevated Water Temperature; Excess/Insufficient Water - Excessive Sediment in Surface Waters; Inadequate Habitat for Fish and Wildlife- Habitat Degradation.Associated Practices include: 560 - Access Road; 342 - Critical Area Planting; 382 - Fence; 391 - Riparian Forest Buffer; 390 - Riparian Herbaceous Cover; 395 - Stream Habitat Improvement and Management; 614 - Watering Facility; 484-Mulching; and 570-Stormwater Runoff Control

**Before Situation:**

A stream bisects the agricultural property and has had all of the woody vegetation removed due to overgrazing or human manipulation; the stream has 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/Shoreli

**Scenario Unit::** Foot

**Scenario Typical Size:** 1000

**Total Scenario Cost:** $13,095.85

**Scenario Cost/Unit:** $13.10

**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 Yard | $1.99 | 2500 | $4,975.00 |
| Dozer, 80 HP | 929 | Track mounted Dozer with horsepower range of 60 to 90. Equipment and power unit costs. Labor not included. | Hour | $60.16 | 16 | $962.56 |
| Tillage, Primary | 946 | Includes heavy disking (offset) or chisel plow. Includes equipment, power unit and labor costs. | Acre | $15.10 | 0.46 | $6.95 |
| Fertilizer, ground application, dry bulk | 950 | Dry bulk fertilizer application performed by ground equipment. Includes equipment, power unit and labor costs. | Acre | $6.25 | 0.46 | $2.88 |
| Lime application | 953 | Lime application performed by ground equipment. Includes equipment, power unit and labor costs. | Acre | $9.50 | 0.46 | $4.37 |
| Seeding Operation, Broadcast, Ground | 959 | Broadcast seed via ground operation. May require post tillage operation to incorporate seed. Includes equipment, power unit and labor costs. | Acre | $11.48 | 0.46 | $5.28 |
| **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. | Hour | $18.93 | 224 | $4,240.32 |
| Equipment Operators, Light | 232 | Includes: Skid Steer Loaders, Hydraulic Excavators <50 HP, Trenchers <12", Ag Equipment <150 HP, Pickup Trucks, Forklifts, Mulchers | Hour | $21.14 | 16 | $338.24 |
| Supervisor or Manager | 234 | Labor involving supervision or management activities. Includes crew supervisors, foremen and farm/ranch managers time required for adopting new technology, etc. | Hour | $34.29 | 56 | $1,920.24 |
| **Materials** | | | | | | |
| One Species, Cool Season, Annual Grass or Legume | 2311 | Cool season annual grass or legume. Includes material and shipping only. | Acre | $39.29 | 0.46 | $18.07 |
| **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 | $156.52 | 1 | $156.52 |
| Mobilization, medium equipment | 1139 | Equipment with 70-150 HP or typical weights between 14,000 and 30,000 pounds. | Each | $232.71 | 2 | $465.42 |

**Practice:** 580 - Streambank and Shoreline Protection

**Scenario** #2 - Bioengineered

**Scenario Description:**

Protection of streambanks consisting of a bioengineered technique comprised of non-structural measures such as earth revetments and benches with vegetative measures to stabilize and protect the streambank against scour and erosion. Soil bioengineering is a system of living plant materials used as structural components. Adapted types of woody vegetation (shrubs and trees) are initially installed in specified configurations that offer immediate soil protection and reinforcement. In addition, soil bioengineering systems create resistance to sliding or shear displacement in a streambank as they develop roots or fibrous inclusions. Environmental benefits derived from woody vegetation include diverse and productive riparian habitats, shade, organic additions to the stream, cover for fish, and improvements in aesthetic value and water quality. Under certain conditions, soil bioengineering installations work well in conjunction with structures to provide more permanent protection and healthy function, enhance aesthetics, and create a more environmentally acceptable product. Soil bioengineering systems normally use unrooted plant parts in the form of cut branches and rooted plants. For streambanks, living systems include brushmattresses, live stakes, joint plantings, vegetated geogrids, branchpacking, and live fascines.

The purpose of this practice is to maintain, improve, or restore physical, chemical, and biological functions of a stream to provide diverse aquatic communities to improve habitat for desired aquatic species. Payment cost include shaping bank, critical area vegetation, livestake, rootwads and revetments: a 6-foot high bank at 3(H):1(V) slope for 1000 linear feet (0.46 acres) is used for estimation purposes. 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; and 570-Stormwater Runoff Control

**Before Situation:**

A stream bisects the agricultural property and has had all of the woody vegetation removed due to overgrazing or human manipulation; the stream has moderately degraded streambanks that are unstable and show signs of active erosion. Soil Erosion: The streambank is unstable.Water Quality Degradation: The sediment load has increased in the stream resulting in elevated water temperatures.Excess/Insufficient Water: The excessive sediment load has reduced the water conveyance capacity, storage capacity and flow within the stream.Inadequate Habitat for Fish and Wildlife: The deficiencies in the stream's habitat limit survival, growth, reproduction, and/or diversity of aquatic organisms within the stream.

**After Situation:**

The streambank is stable against further erosion and encourages natural sediment transport and deposition. Loss of riparian areas and sediment load is reduced in the stream.For Soil Erosion: The streambank is stable.For Water Quality Degradation: The sediment load has decreased in the stream resulting in improved aquatic habitat.For Excess/Insufficient Water: The water conveyance capacity, storage capacity and flow within the stream has been stabilized.For Inadequate Habitat for Fish and Wildlife: The reduction in the sediment load promotes survival, growth, reproduction, and/or diversity of aquatic organisms within the stream's habitat.

**Feature Measure:** Linear Feet of Streambank/Shoreli

**Scenario Unit::** Foot

**Scenario Typical Size:** 1000

**Total Scenario Cost:** $39,999.30

**Scenario Cost/Unit:** $40.00

**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 Yard | $1.99 | 2500 | $4,975.00 |
| Earthfill, Roller Compacted | 49 | Earthfill, roller or machine compacted, includes equipment and labor | Cubic Yard | $3.76 | 2500 | $9,400.00 |
| Dozer, 80 HP | 929 | Track mounted Dozer with horsepower range of 60 to 90. Equipment and power unit costs. Labor not included. | Hour | $60.16 | 16 | $962.56 |
| Hydraulic Excavator, 2 CY | 932 | Track mounted hydraulic excavator with bucket capacity range of 1.5 to 2.5 CY. Equipment and power unit costs. Labor not included. | Hour | $149.59 | 75 | $11,219.25 |
| Tillage, Primary | 946 | Includes heavy disking (offset) or chisel plow. Includes equipment, power unit and labor costs. | Acre | $15.10 | 0.46 | $6.95 |
| Fertilizer, ground application, dry bulk | 950 | Dry bulk fertilizer application performed by ground equipment. Includes equipment, power unit and labor costs. | Acre | $6.25 | 0.46 | $2.88 |
| Lime application | 953 | Lime application performed by ground equipment. Includes equipment, power unit and labor costs. | Acre | $9.50 | 0.46 | $4.37 |
| Seeding Operation, Broadcast, Ground | 959 | Broadcast seed via ground operation. May require post tillage operation to incorporate seed. Includes equipment, power unit and labor costs. | Acre | $11.48 | 0.46 | $5.28 |
| **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. | Hour | $18.93 | 370 | $7,004.10 |

| | | | | | | |
|---|---|---|---|---|---|---|
| Equipment Operators, Light | 232 | Includes: Skid Steer Loaders, Hydraulic Excavators <50 HP, Trenchers <12", Ag Equipment <150 HP, Pickup Trucks, Forklifts, Mulchers | Hour | $21.14 | 16 | $338.24 |
| Equipment Operators, Heavy | 233 | Includes: Cranes, Hydraulic Excavators >=50 HP, Dozers, Paving Machines, Rock Trenchers, Trenchers >=12", Dump Trucks, Ag Equipment >=150 HP, Scrapers, Water Wagons. | Hour | $23.93 | 75 | $1,794.75 |
| Supervisor or Manager | 234 | Labor involving supervision or management activities. Includes crew supervisors, foremen and farm/ranch managers time required for adopting new technology, etc. | Hour | $34.29 | 80 | $2,743.20 |
| **Materials** | | | | | | |
| Tree, willow | 1426 | Willow tree for planting, 18" to 36" seedling. Includes materials and shipping only. | Each | $0.67 | 1000 | $670.00 |
| One Species, Cool Season, Annual Grass or Legume | 2311 | Cool season annual grass or legume. Includes material and shipping only. | Acre | $39.29 | 0.46 | $18.07 |
| **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 | $156.52 | 1 | $156.52 |
| Mobilization, medium equipment | 1139 | Equipment with 70-150 HP or typical weights between 14,000 and 30,000 pounds. | Each | $232.71 | 3 | $698.13 |

**Practice:** 580 - Streambank and Shoreline Protection

**Scenario** #3 - Structural, Standard

**Scenario Description:**

Protection of streambanks using structural measures such as riprap, concrete block, piling revetments, with wire or geotextile fencing; with slotted fencing; jacks or jack fields, etc. to stabilize and protect banks of streams or excavated channels against scour and erosion. The purpose of this practice is to maintain, improve, or restore physical, chemical, and biological functions of a stream to provide diverse aquatic communities to improve habitat for desired aquatic species. Payment cost include shaping bank, critical area vegetation, geotextile, and rock rip rap; a 8-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 and have a bed key 3 ft deep and extending 6 ft out. 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; and 570-Stormwater Runoff Control

**Before Situation:**

A stream bisects the agricultural property and has had all of the woody vegetation removed due to overgrazing or human manipulation; the stream has severely degraded streambanks that are unstable and show signs of active erosion. Soil Erosion: The streambank is unstable.Water Quality Degradation: The sediment load has increased in the stream resulting in elevated water temperatures.Excess/Insufficient Water: The excessive sediment load has reduced the water conveyance capacity, storage capacity and flow within the stream.Inadequate Habitat for Fish and Wildlife: The deficiencies in the stream's habitat limit survival, growth, reproduction, and/or diversity of aquatic organisms within the stream.

**After Situation:**

The streambank is stable against further erosion and encourages natural sediment transport and deposition. Loss of riparian areas and sediment load is reduced in the stream.For Soil Erosion: The streambank is stable.For Water Quality Degradation: The sediment load has decreased in the stream resulting in improved aquatic habitat.For Excess/Insufficient Water: The water conveyance capacity, storage capacity and flow within the stream has been stabilized.For Inadequate Habitat for Fish and Wildlife: The reduction in the sediment load promotes survival, growth, reproduction, and/or diversity of aquatic organisms within the stream's habitat.

**Feature Measure:** Linear Feet of Streambank/Shoreli

**Scenario Unit::** Foot

**Scenario Typical Size:** 1000

**Total Scenario Cost:** $164,664.53

**Scenario Cost/Unit:** $164.66

**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 Yard | $3.76 | 3167 | $11,907.92 |
| Dozer, 80 HP | 929 | Track mounted Dozer with horsepower range of 60 to 90. Equipment and power unit costs. Labor not included. | Hour | $60.16 | 16 | $962.56 |
| Tillage, Primary | 946 | Includes heavy disking (offset) or chisel plow. Includes equipment, power unit and labor costs. | Acre | $15.10 | 0.46 | $6.95 |
| Fertilizer, ground application, dry bulk | 950 | Dry bulk fertilizer application performed by ground equipment. Includes equipment, power unit and labor costs. | Acre | $6.25 | 0.46 | $2.88 |
| Lime application | 953 | Lime application performed by ground equipment. Includes equipment, power unit and labor costs. | Acre | $9.50 | 0.46 | $4.37 |
| Seeding Operation, Broadcast, Ground | 959 | Broadcast seed via ground operation. May require post tillage operation to incorporate seed. Includes equipment, power unit and labor costs. | Acre | $11.48 | 0.12 | $1.38 |
| Excavation, common earth, wet, side cast, large equipment | 1228 | Bulk excavation and side casting of wet common earth with hydraulic excavator or dragline with greater than 1 CY capacity. Includes equipment and labor. | Cubic Yard | $3.93 | 3167 | $12,446.31 |
| **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. | Hour | $18.93 | 320 | $6,057.60 |
| Equipment Operators, Light | 232 | Includes: Skid Steer Loaders, Hydraulic Excavators <50 HP, Trenchers <12", Ag Equipment <150 HP, Pickup Trucks, Forklifts, Mulchers | Hour | $21.14 | 16 | $338.24 |
| Supervisor or Manager | 234 | Labor involving supervision or management activities. Includes crew supervisors, foremen and farm/ranch managers time required for adopting new technology, etc. | Hour | $34.29 | 80 | $2,743.20 |

**Materials**

| | | | | | | |
|---|---|---|---|---|---|---|
| Rock Riprap, Placed with geotextile | 44 | Rock Riprap, placed with geotextile, includes materials, equipment and labor to transport and place | Cubic Yard | $55.44 | 2333 | $129,341.52 |
| One Species, Cool Season, Annual Grass or Legume | 2311 | Cool season annual grass or legume. Includes material and shipping only. | Acre | $39.29 | 0.46 | $18.07 |
| **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 | $156.52 | 1 | $156.52 |
| Mobilization, medium equipment | 1139 | Equipment with 70-150 HP or typical weights between 14,000 and 30,000 pounds. | Each | $232.71 | 1 | $232.71 |
| Mobilization, large equipment | 1140 | Equipment >150HP or typical weights greater than 30,000 pounds or loads requiring over width or over length permits. | Each | $444.31 | 1 | $444.31 |

**Practice:** 580 - Streambank and Shoreline Protection

**Scenario** #4 - Structural, Site Specific

**Scenario Description:**

Protection of actively eroding 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. Depending on site conditions, protection is extended from the streambank toe to 80% of the top bank height, or all the way to the top bank if overland flow or field runoff creates a need for such protection. 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 15-foot high bank at 2(H):1(V) slope for 125 linear feet is used for estimation purposes. The rock will be keyed in 2' below the streambed at the toe. The rock will extend 80% of the slope distance up the bank, or 12 feet high. The bank above the riprap will be graded to a stable slope and revegetated.Resource Concerns: Soil Erosion - Excessive Bank Erosion from Streams, Shoreline and Water Conveyance Channels; Water Quality Degradation - Excessive Sediment in Surface Waters; Water Quality Degradation - Elevated Water Temperature; Excess/Insufficient Water - Excessive Sediment in Surface Waters; Inadequate Habitat for Fish and Wildlife- Habitat Degradation.Associated Practices include: 560 - Access Road; 342 - Critical Area Planting; 382 - Fence; 391 - Riparian Forest Buffer; 390 - Riparian Herbaceous Cover; 395 - Stream Habitat Improvement and Management; 614 - Watering Facility; 484-Mulching; and 570-Stormwater Runoff Control

**Before Situation:**

A stream bisects the agricultural property and has had all of the woody vegetation removed due to overgrazing or human manipulation; the stream has severely degraded streambanks that are unstable and show signs of active erosion. Soil Erosion: The streambank is unstable.Water Quality Degradation: The sediment load has increased in the stream resulting in elevated water temperatures.Excess/Insufficient Water: The excessive sediment load has reduced the water conveyance capacity, storage capacity and flow within the stream.Inadequate Habitat for Fish and Wildlife: The deficiencies in the stream's habitat limit survival, growth, reproduction, and/or diversity of aquatic organisms within the stream.

**After Situation:**

The streambank is stable against further erosion and encourages natural sediment transport and deposition. Loss of riparian areas and sediment load is reduced in the stream.For Soil Erosion: The streambank is stable.For Water Quality Degradation: The sediment load has decreased in the stream resulting in improved aquatic habitat.For Excess/Insufficient Water: The water conveyance capacity, storage capacity and flow within the stream has been stabilized.For Inadequate Habitat for Fish and Wildlife: The reduction in the sediment load promotes survival, growth, reproduction, and/or diversity of aquatic organisms within the stream's habitat.

**Feature Measure:** Cubic Yards of riprap

**Scenario Unit::** Cubic Yard

**Scenario Typical Size:** 306

**Total Scenario Cost:** $36,432.58

**Scenario Cost/Unit:** $119.06

**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 Yard | $3.76 | 890 | $3,346.40 |
| Dozer, 80 HP | 929 | Track mounted Dozer with horsepower range of 60 to 90. Equipment and power unit costs. Labor not included. | Hour | $60.16 | 16 | $962.56 |
| Hydraulic Excavator, 1 CY | 931 | Track mounted hydraulic excavator with bucket capacity range of 0.8 to 1.5 CY. Equipment and power unit costs. Labor not included. | Hour | $103.47 | 16 | $1,655.52 |
| Tillage, Primary | 946 | Includes heavy disking (offset) or chisel plow. Includes equipment, power unit and labor costs. | Acre | $15.10 | 0.46 | $6.95 |
| Fertilizer, ground application, dry bulk | 950 | Dry bulk fertilizer application performed by ground equipment. Includes equipment, power unit and labor costs. | Acre | $6.25 | 0.46 | $2.88 |
| Lime application | 953 | Lime application performed by ground equipment. Includes equipment, power unit and labor costs. | Acre | $9.50 | 0.46 | $4.37 |
| Seeding Operation, Broadcast, Ground | 959 | Broadcast seed via ground operation. May require post tillage operation to incorporate seed. Includes equipment, power unit and labor costs. | Acre | $11.48 | 0.08 | $0.92 |
| Excavation, common earth, wet, side cast, large equipment | 1228 | Bulk excavation and side casting of wet common earth with hydraulic excavator or dragline with greater than 1 CY capacity. Includes equipment and labor. | Cubic Yard | $3.93 | 890 | $3,497.70 |
| **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. | Hour | $18.93 | 320 | $6,057.60 |
| Equipment Operators, Light | 232 | Includes: Skid Steer Loaders, Hydraulic Excavators <50 HP, Trenchers <12", Ag Equipment <150 HP, Pickup Trucks, Forklifts, Mulchers | Hour | $21.14 | 16 | $338.24 |

| | | | | | | |
|---|---|---|---|---|---|---|
| Supervisor or Manager | 234 | Labor involving supervision or management activities. Includes crew supervisors, foremen and farm/ranch managers time required for adopting new technology, etc. | Hour | $34.29 | 80 | $2,743.20 |
| **Materials** | | | | | | |
| Rock Riprap, Placed with geotextile | 44 | Rock Riprap, placed with geotextile, includes materials, equipment and labor to transport and place | Cubic Yard | $55.44 | 306 | $16,964.64 |
| One Species, Cool Season, Annual Grass or Legume | 2311 | Cool season annual grass or legume. Includes material and shipping only. | Acre | $39.29 | 0.46 | $18.07 |
| **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 | $156.52 | 1 | $156.52 |
| Mobilization, medium equipment | 1139 | Equipment with 70-150 HP or typical weights between 14,000 and 30,000 pounds. | Each | $232.71 | 1 | $232.71 |
| Mobilization, large equipment | 1140 | Equipment >150HP or typical weights greater than 30,000 pounds or loads requiring over width or over length permits. | Each | $444.31 | 1 | $444.31 |

**Practice:** 580 - Streambank and Shoreline Protection

**Scenario** #5 - Vegetative with Willow Staking

**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, staking of willow cuttings, 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) where the lower 3 feet are staked with willows is used for estimation purposes.Resource Concerns: Soil Erosion - Excessive Bank Erosion from Streams, Shoreline and Water Conveyance Channels; Water Quality Degradation - Excessive Sediment in Surface Waters; Water Quality Degradation - Elevated Water Temperature; Excess/Insufficient Water - Excessive Sediment in Surface Waters; Inadequate Habitat for Fish and Wildlife- Habitat Degradation.Associated Practices include: 560 - Access Road; 342 - Critical Area Planting; 382 - Fence; 391 - Riparian Forest Buffer; 390 - Riparian Herbaceous Cover; 395 - Stream Habitat Improvement and Management; 614 - Watering Facility; 484-Mulching; and 570-Stormwater Runoff Control

**Before Situation:**

A stream bisects the agricultural property and has had all of the woody vegetation removed due to overgrazing or human manipulation; the stream has marginally degraded streambanks that are unstable with little hydraulic roughness near the toe 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 stablized against further erosion by the roots of planted willows and encourages natural sediment transport and deposition. The stream bank's toe is further stabilized by the addition of hydraulic roughness, via growing brushy vegatation, at the toe of the slope. 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/Shoreli

**Scenario Unit::** Foot

**Scenario Typical Size:** 1000

**Total Scenario Cost:** $18,625.15

**Scenario Cost/Unit:** $18.63

**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. | Hour | $60.16 | 16 | $962.56 |
| Tillage, Primary | 946 | Includes heavy disking (offset) or chisel plow. Includes equipment, power unit and labor costs. | Acre | $15.10 | 0.46 | $6.95 |
| Fertilizer, ground application, dry bulk | 950 | Dry bulk fertilizer application performed by ground equipment. Includes equipment, power unit and labor costs. | Acre | $6.25 | 0.46 | $2.88 |
| Lime application | 953 | Lime application performed by ground equipment. Includes equipment, power unit and labor costs. | Acre | $9.50 | 0.46 | $4.37 |
| Seeding Operation, Broadcast, Ground | 959 | Broadcast seed via ground operation. May require post tillage operation to incorporate seed. Includes equipment, power unit and labor costs. | Acre | $11.48 | 0.46 | $5.28 |
| Excavation, common earth, wet, side cast, large equipment | 1228 | Bulk excavation and side casting of wet common earth with hydraulic excavator or dragline with greater than 1 CY capacity. Includes equipment and labor. | Cubic Yard | $3.93 | 2500 | $9,825.00 |
| **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. | Hour | $18.93 | 234 | $4,429.62 |
| Equipment Operators, Light | 232 | Includes: Skid Steer Loaders, Hydraulic Excavators <50 HP, Trenchers <12", Ag Equipment <150 HP, Pickup Trucks, Forklifts, Mulchers | Hour | $21.14 | 16 | $338.24 |
| Supervisor or Manager | 234 | Labor involving supervision or management activities. Includes crew supervisors, foremen and farm/ranch managers time required for adopting new technology, etc. | Hour | $34.29 | 56 | $1,920.24 |
| **Materials** | | | | | | |
| Cuttings, woody, medium size | 1308 | Woody cuttings, live stakes or whips typically 1/4" to 1" diameter and 24" to 48" long. Includes materials and shipping only. | Each | $0.49 | 1000 | $490.00 |

| | | | | | | |
|---|---|---|---|---|---|---|
| One Species, Cool Season, Annual Grass or Legume | 2311 | Cool season annual grass or legume. Includes material and shipping only. | Acre | $39.29 | 0.46 | $18.07 |
| **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 | $156.52 | 1 | $156.52 |
| Mobilization, medium equipment | 1139 | Equipment with 70-150 HP or typical weights between 14,000 and 30,000 pounds. | Each | $232.71 | 2 | $465.42 |

**Practice:** 580 - Streambank and Shoreline Protection

**Scenario** #6 - Stream Barbs

**Scenario Description:**

Protection of streambanks using structural measures such as stream barbs, J-hook vanes, bendway weirs, jetties, etc. to stabilize and protect banks of streams or excavated channels against scour and erosion through the use of redirective measures. Use "Structural" where additional structural measures such as 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 are used. 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. The Cost estimate is based on protecting 300 linear feet of streambank having 12 foot high, near verticle banks. Sloping and shaping banks to a 3(H):1(V) slope, installing 3 - 30 ft long stream barbs with geotextile underneath. The stream barbs are 30 ft in length with 20 fto bank keys and top witdth of 4 feet. The barbs have 2(H):1(V) sideslopes, and vary in height from 8' to 1'. The bed key depths vary from 4' to 2' with 1(H):2(V) side slopes. Each barb contains 148 cubic yards of rock. 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:** Cubic yards of Rock Rip Rap

**Scenario Unit::** Cubic Yard

**Scenario Typical Size:** 444

**Total Scenario Cost:** $37,761.02

**Scenario Cost/Unit:** $85.05

**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. | Hour | $149.59 | 40 | $5,983.60 |
| 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 Yard | $3.43 | 2595 | $8,900.85 |
| 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 | $0.30 | 22200 | $6,660.00 |
| **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. | Hour | $18.93 | 16 | $302.88 |
| Equipment Operators, Heavy | 233 | Includes: Cranes, Hydraulic Excavators >=50 HP, Dozers, Paving Machines, Rock Trenchers, Trenchers >=12", Dump Trucks, Ag Equipment >=150 HP, Scrapers, Water Wagons. | Hour | $23.93 | 40 | $957.20 |
| 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. | Hour | $34.29 | 30 | $1,028.70 |
| **Materials** | | | | | | |
| Rock Riprap, graded, angular, material and shipping | 1200 | Graded Rock Riprap for all gradation ranges. Includes materials and delivery only. | Ton | $22.52 | 577 | $12,994.04 |
| Geotextile, non-woven, heavy weight | 1210 | Non-woven greater than 8 ounce/square yard geotextile with staple anchoring. Materials and shipping only. | Square Yard | $4.15 | 225 | $933.75 |

**Practice:** 580 - Streambank and Shoreline Protection

**Scenario** #7 - Longitudinal Peak Stone Toe, 4 foot high or less

**Scenario Description:**

Protection of streambanks using Longitudinal Peak Stone Toe protection (LPST) having a height of 4' or less. Use "Structural" where additional structural measures such as 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 are used. 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. The typical scenario involves the stabilization of 1,000 linear feet of a stream bank having 12 foot high near verticle banks. Estimated cost is based on the insallation of LPST, as described in NEH 654, TS14K-13, having a height of 3 ft, 1.5:1 front slope and 1.5:1 back slope. The area between the sloped bank and LPST is a 19 foot wide bench planted with shrub type vegetation (willow stakes). Material used to make the bench are taken from excavated material taken to acheive the 3(H):1(V) slope. The bank above the riprap will be graded to a stable slope and revegetated in accordance with Critical Area Planting (382).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; and 570-Stormwater Runoff Control

**Before Situation:**

A stream bisects the agricultural property and has had all of the woody vegetation removed due to overgrazing or human manipulation; the stream has severely degraded streambanks that are unstable and show signs of active erosion. Soil Erosion: The streambank is unstable.Water Quality Degradation: The sediment load has increased in the stream resulting in elevated water temperatures.Excess/Insufficient Water: The excessive sediment load has reduced the water conveyance capacity, storage capacity and flow within the stream.Inadequate Habitat for Fish and Wildlife: The deficiencies in the stream's habitat limit survival, growth, reproduction, and/or diversity of aquatic organisms within the stream.

**After Situation:**

The streambank is stable against further erosion and encourages natural sediment transport and deposition. Loss of riparian areas and sediment load is reduced in the stream.For Soil Erosion: The streambank is stable.For Water Quality Degradation: The sediment load has decreased in the stream resulting in improved aquatic habitat.For Excess/Insufficient Water: The water conveyance capacity, storage capacity and flow within the stream has been stabilized.For Inadequate Habitat for Fish and Wildlife: The reduction in the sediment load promotes survival, growth, reproduction, and/or diversity of aquatic organisms within the stream's habitat.

**Feature Measure:** Linear Feet of Streambank/Shoreli

**Scenario Unit::** Foot

**Scenario Typical Size:** 1000

**Total Scenario Cost:** $66,972.50

**Scenario Cost/Unit:** $66.97

**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 Yard | $3.76 | 2100 | $7,896.00 |
| Hydraulic Excavator, 1 CY | 931 | Track mounted hydraulic excavator with bucket capacity range of 0.8 to 1.5 CY. Equipment and power unit costs. Labor not included. | Hour | $103.47 | 186 | $19,245.42 |
| Tillage, Primary | 946 | Includes heavy disking (offset) or chisel plow. Includes equipment, power unit and labor costs. | Acre | $15.10 | 0.06 | $0.91 |
| Fertilizer, ground application, dry bulk | 950 | Dry bulk fertilizer application performed by ground equipment. Includes equipment, power unit and labor costs. | Acre | $6.25 | 0.06 | $0.38 |
| Lime application | 953 | Lime application performed by ground equipment. Includes equipment, power unit and labor costs. | Acre | $9.50 | 0.06 | $0.57 |
| Seeding Operation, Broadcast, Ground | 959 | Broadcast seed via ground operation. May require post tillage operation to incorporate seed. Includes equipment, power unit and labor costs. | Acre | $11.48 | 0.06 | $0.69 |
| 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 | $0.30 | 40500 | $12,150.00 |
| **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. | Hour | $18.93 | 320 | $6,057.60 |
| 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. | Hour | $34.29 | 44 | $1,508.76 |

| | | | | | | |
|---|---|---|---|---|---|---|
| **Materials** | | | | | | |
| Rock Riprap, graded, angular, material and shipping | 1200 | Graded Rock Riprap for all gradation ranges. Includes materials and delivery only. | Ton | $22.52 | 810 | $18,241.20 |
| Cuttings, woody, medium size | 1308 | Woody cuttings, live stakes or whips typically 1/4" to 1" diameter and 24" to 48" long. Includes materials and shipping only. | Each | $0.49 | 2000 | $980.00 |
| One Species, Cool Season, Annual Grass or Legume | 2311 | Cool season annual grass or legume. Includes material and shipping only. | Acre | $39.29 | 0.06 | $2.36 |
| **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 | $444.31 | 2 | $888.62 |

**Practice:** 580 - Streambank and Shoreline Protection

**Scenario** #8 - Longitudinal Peak Stone Toe, higher than 4 feet

**Scenario Description:**

Protection of streambanks using Longitudinal Peak Stone Toe protection (LPST) having a height of 4.5' or more. Use "Structural" where additional structural measures such as 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 are used. 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. The typical scenario involves the stabilization of 1,000 linear feet of a stream bank having 12 foot high near verticle banks. Estimated cost is based on the insallation of LPST, as described in NEH 654, TS14K-13, having a height of 6 ft, 1.5:1 front slope and 1.5:1 back slope. The area between the sloped bank and LPST is a 19 foot wide bench planted with shrub type vegetation (willow stakes). Material used to make the bench are taken from excavated material taken to acheive the 3(H):1(V) slope. The bank above the riprap will be graded to a stable slope and revegetated in accordance with Critical Area Planting (382).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; and 570-Stormwater Runoff Control

**Before Situation:**

A stream bisects the agricultural property and has had all of the woody vegetation removed due to overgrazing or human manipulation; the stream has severely degraded streambanks that are unstable and show signs of active erosion. Soil Erosion: The streambank is unstable.Water Quality Degradation: The sediment load has increased in the stream resulting in elevated water temperatures.Excess/Insufficient Water: The excessive sediment load has reduced the water conveyance capacity, storage capacity and flow within the stream.Inadequate Habitat for Fish and Wildlife: The deficiencies in the stream's habitat limit survival, growth, reproduction, and/or diversity of aquatic organisms within the stream.

**After Situation:**

The streambank is stable against further erosion and encourages natural sediment transport and deposition. Loss of riparian areas and sediment load is reduced in the stream.For Soil Erosion: The streambank is stable.For Water Quality Degradation: The sediment load has decreased in the stream resulting in improved aquatic habitat.For Excess/Insufficient Water: The water conveyance capacity, storage capacity and flow within the stream has been stabilized.For Inadequate Habitat for Fish and Wildlife: The reduction in the sediment load promotes survival, growth, reproduction, and/or diversity of aquatic organisms within the stream's habitat.

**Feature Measure:** Linear Feet of Streambank/Shoreli

**Scenario Unit::** Foot

**Scenario Typical Size:** 1000

**Total Scenario Cost:** $183,155.39

**Scenario Cost/Unit:** $183.16

**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 Yard | $3.76 | 2100 | $7,896.00 |
| Hydraulic Excavator, 1 CY | 931 | Track mounted hydraulic excavator with bucket capacity range of 0.8 to 1.5 CY. Equipment and power unit costs. Labor not included. | Hour | $103.47 | 310 | $32,075.70 |
| Tillage, Primary | 946 | Includes heavy disking (offset) or chisel plow. Includes equipment, power unit and labor costs. | Acre | $15.10 | 0.06 | $0.91 |
| Fertilizer, ground application, dry bulk | 950 | Dry bulk fertilizer application performed by ground equipment. Includes equipment, power unit and labor costs. | Acre | $6.25 | 0.06 | $0.38 |
| Lime application | 953 | Lime application performed by ground equipment. Includes equipment, power unit and labor costs. | Acre | $9.50 | 0.06 | $0.57 |
| Seeding Operation, Broadcast, Ground | 959 | Broadcast seed via ground operation. May require post tillage operation to incorporate seed. Includes equipment, power unit and labor costs. | Acre | $11.48 | 0.06 | $0.69 |
| 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 | $0.30 | 186900 | $56,070.00 |
| **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. | Hour | $18.93 | 480 | $9,086.40 |
| 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. | Hour | $34.29 | 93 | $3,188.97 |

| | | | | | | |
|---|---|---|---|---|---|---|
| **Materials** | | | | | | |
| Rock Riprap, graded, angular, material and shipping | 1200 | Graded Rock Riprap for all gradation ranges. Includes materials and delivery only. | Ton | $22.52 | 3240 | $72,964.80 |
| Cuttings, woody, medium size | 1308 | Woody cuttings, live stakes or whips typically 1/4" to 1" diameter and 24" to 48" long. Includes materials and shipping only. | Each | $0.49 | 2000 | $980.00 |
| One Species, Cool Season, Annual Grass or Legume | 2311 | Cool season annual grass or legume. Includes material and shipping only. | Acre | $39.29 | 0.06 | $2.36 |
| **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 | $444.31 | 2 | $888.62 |

**Practice:** 580 - Streambank and Shoreline Protection

**Scenario** #9 - Gabion Baskets

**Scenario Description:**

Protection of streambanks using gabion baskets to stabilize and protect banks of streams or excavated channels against scour and erosion. The purpose of this practice is to maintain, improve, or restore physical, chemical, and biological functions of a stream to provide diverse aquatic communities to improve habitat for desired aquatic species. Payment cost include shaping bank, critical area vegetation, geotextile, gabion basket installation, rock drainfill behin gabions, and rock rip rap to protect drainfill. An 8-foot high bank with near verticle sideslops is stablilized using a 3'x3'x4.5' gabion mattress for a foundation and a 3'x3'x3' basket to stablilze the toe. Granualar backfill is used behind the baskets with riprap on top of the drainfill to protect against erosion. the riprap and slope above the gabions are 3(H):1(V) for 1000 linear feet (0.3 acres) is used for estimation purposes. Baskets are used for tiebacks and at the beginning and end. 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; and 570-Stormwater Runoff Control

**Before Situation:**

A stream bisects the agricultural property and has had all of the woody vegetation removed due to overgrazing or human manipulation; the stream has severely degraded streambanks that are unstable and show signs of active erosion. Soil Erosion: The streambank is unstable.Water Quality Degradation: The sediment load has increased in the stream resulting in elevated water temperatures.Excess/Insufficient Water: The excessive sediment load has reduced the water conveyance capacity, storage capacity and flow within the stream.Inadequate Habitat for Fish and Wildlife: The deficiencies in the stream's habitat limit survival, growth, reproduction, and/or diversity of aquatic organisms within the stream.

**After Situation:**

The streambank is stable against further erosion and encourages natural sediment transport and deposition. Loss of riparian areas and sediment load is reduced in the stream.For Soil Erosion: The streambank is stable.For Water Quality Degradation: The sediment load has decreased in the stream resulting in improved aquatic habitat.For Excess/Insufficient Water: The water conveyance capacity, storage capacity and flow within the stream has been stabilized.For Inadequate Habitat for Fish and Wildlife: The reduction in the sediment load promotes survival, growth, reproduction, and/or diversity of aquatic organisms within the stream's habitat.

**Feature Measure:** Linear Feet of Streambank/Shoreli

**Scenario Unit::** Foot

**Scenario Typical Size:** 1000

**Total Scenario Cost:** $178,528.59

**Scenario Cost/Unit:** $178.53

**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 Yard | $3.76 | 2500 | $9,400.00 |
| Earthfill, Dumped and Spread | 51 | Earthfill, dumped and spread without compaction effort, includes equipment and labor | Cubic Yard | $3.08 | 1700 | $5,236.00 |
| Dozer, 80 HP | 929 | Track mounted Dozer with horsepower range of 60 to 90. Equipment and power unit costs. Labor not included. | Hour | $60.16 | 40 | $2,406.40 |
| Hydraulic Excavator, 2 CY | 932 | Track mounted hydraulic excavator with bucket capacity range of 1.5 to 2.5 CY. Equipment and power unit costs. Labor not included. | Hour | $149.59 | 40 | $5,983.60 |
| Tillage, Primary | 946 | Includes heavy disking (offset) or chisel plow. Includes equipment, power unit and labor costs. | Acre | $15.10 | 0.3 | $4.53 |
| Fertilizer, ground application, dry bulk | 950 | Dry bulk fertilizer application performed by ground equipment. Includes equipment, power unit and labor costs. | Acre | $6.25 | 0.3 | $1.88 |
| Lime application | 953 | Lime application performed by ground equipment. Includes equipment, power unit and labor costs. | Acre | $9.50 | 0.3 | $2.85 |
| Seeding Operation, Broadcast, Ground | 959 | Broadcast seed via ground operation. May require post tillage operation to incorporate seed. Includes equipment, power unit and labor costs. | Acre | $11.48 | 0.3 | $3.44 |
| 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 Yard | $3.93 | 1700 | $6,681.00 |
| **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. | Hour | $18.93 | 320 | $6,057.60 |

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|---|---|---|---|---|---|---|
| Equipment Operators, Light | 232 | Includes: Skid Steer Loaders, Hydraulic Excavators <50 HP, Trenchers <12", Ag Equipment <150 HP, Pickup Trucks, Forklifts, Mulchers | Hour | $21.14 | 40 | $845.60 |
| Equipment Operators, Heavy | 233 | Includes: Cranes, Hydraulic Excavators >=50 HP, Dozers, Paving Machines, Rock Trenchers, Trenchers >=12", Dump Trucks, Ag Equipment >=150 HP, Scrapers, Water Wagons. | Hour | $23.93 | 40 | $957.20 |
| 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. | Hour | $34.29 | 80 | $2,743.20 |
| **Materials** | | | | | | |
| Aggregate, Gravel, Graded | 46 | Gravel, includes materials, equipment and labor to transport and place. Includes washed and unwashed gravel. | Cubic Yard | $30.82 | 300 | $9,246.00 |
| Rock Riprap, graded, angular, material and shipping | 1200 | Graded Rock Riprap for all gradation ranges. Includes materials and delivery only. | Ton | $22.52 | 448 | $10,088.96 |
| Geotextile, non-woven, heavy weight | 1210 | Non-woven greater than 8 ounce/square yard geotextile with staple anchoring. Materials and shipping only. | Square Yard | $4.15 | 2000 | $8,300.00 |
| 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 Yard | $125.40 | 875 | $109,725.00 |
| One Species, Cool Season, Annual Grass or Legume | 2311 | Cool season annual grass or legume. Includes material and shipping only. | Acre | $39.29 | 0.3 | $11.79 |
| **Mobilization** | | | | | | |
| Mobilization, small equipment | 1138 | Equipment <70 HP but can"t be transported by a pick-up truck or with typical weights between 3,500 to 14,000 pounds. | Each | $156.52 | 1 | $156.52 |
| Mobilization, medium equipment | 1139 | Equipment with 70-150 HP or typical weights between 14,000 and 30,000 pounds. | Each | $232.71 | 1 | $232.71 |
| Mobilization, large equipment | 1140 | Equipment >150HP or typical weights greater than 30,000 pounds or loads requiring over width or over length permits. | Each | $444.31 | 1 | $444.31 |

**Practice:** 585 - Stripcropping

**Scenario** #1 - Stripcropping - water erosion

**Scenario Description:**

This scenario describes the implementation of a stripcropping system that is designed specifically for the control of water erosion or minimizing the transport of sediments or other water borne contaminants originating from runoff on cropland. The planned stripcropping 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. Payment for implementation is to defray 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 water flows to travel unimpeded down the slope due to lack of residue or other conservation measures 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 stripcropping 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 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::** Acre

**Scenario Typical Size:** 80

**Total Scenario Cost:** $299.45

**Scenario Cost/Unit:** $3.74

**Cost Details:**

| Component Name | ID | Description | Unit | Cost | QTY | Total |
|---|---|---|---|---|---|---|
| **Equipment Installation** | | | | | | |
| Truck, Pickup | 939 | Equipment and power unit costs. Labor not included. | Hour | $19.82 | 3 | $59.46 |
| **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. | Hour | $18.93 | 3 | $56.79 |
| Specialist Labor | 235 | Labor requiring a specialized skill set: Includes Agronomists, Foresters, Biologists, etc. to provide additional technical information during the planning and implementation of the practice. Does not include NRCS or TSP services. | Hour | $91.60 | 2 | $183.20 |

**Practice:** 585 - Stripcropping

**Scenario** #2 - Stripcropping - wind erosion

**Scenario Description:**

This scenario describes the implementation of a stripcropping system that is designed specifically for the control of wind erosion or minimizing the transport of airborne particulate matter originating from cropland. The planned stripcropping system will meet the current 585 standard. Implementation will result in alternating strips of erosion susceptible crops crop vegetation with erosion resistant crops or crop vegetation that are oriented as close to perpendicular to the critical wind erosion direction as possible. The designed system will reduce erosion/particulate matter emissions to desired objectives. Payment for implementation is to defray the costs of designing the system, installing the strips on the landscape appropriately, and integrating a crop rotation that includes wind erosion resistant species and vegetation.

**Before Situation:**

In this geographic area, excessive wind erosion is caused by raising crops in a manner that allows wind velocities to travel unimpeded down the length of a field due to lack of growing green vegetation, crop residue, or other conservation measures causing wind erosion, airborne particulate matter emissions, degradation of soil health through loss of topsoil and organic matter, and offsite negative impacts to air quality.

**After Situation:**

A stripcropping system that includes at least two or more strips within the fields(s) will be designed to include parallel strips of approximately equal widths of wind erosion resistant crop species with non-wind erosion resistant crop species. Widths of strips will be determined using current wind erosion prediction technology to meet planned objectives. The design and implementation of a stripcropping system will minimize wind erosion, protect soil quality, reduce offsite deposition, and benefit air quality by reducing airborne particulate matter emissions. Erosion prediction before and after practice application will be recorded showing the design and benefits of the practice. Erosion -resistant strips or vegetation in rotation must be managed to maintain the planned vegetative cover and surface roughness.

**Feature Measure:** area of strips

**Scenario Unit::** Acre

**Scenario Typical Size:** 80

**Total Scenario Cost:** $130.35

**Scenario Cost/Unit:** $1.63

**Cost Details:**

| Component Name | ID | Description | Unit | Cost | QTY | Total |
|---|---|---|---|---|---|---|
| **Equipment Installation** | | | | | | |
| Truck, Pickup | 939 | Equipment and power unit costs. Labor not included. | Hour | $19.82 | 1 | $19.82 |
| **Labor** | | | | | | |
| General Labor | 231 | Labor performed using basic tools such as power tool, shovels, and other tools that do not require extensive training. Ex. pipe layer, herder, concrete placement, materials spreader, flagger, etc. | Hour | $18.93 | 1 | $18.93 |
| Specialist Labor | 235 | Labor requiring a specialized skill set: Includes Agronomists, Foresters, Biologists, etc. to provide additional technical information during the planning and implementation of the practice. Does not include NRCS or TSP services. | Hour | $91.60 | 1 | $91.60 |

**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::** Diameter Inch Foot

**Scenario Typical Size:** 1800

**Total Scenario Cost:** $6,271.13

**Scenario Cost/Unit:** $3.48

**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 Yard | $3.76 | 190 | $714.40 |
| Earthfill, Manually Compacted | 50 | Earthfill, manually compacted, includes equipment and labor | Cubic Yard | $4.95 | 10 | $49.50 |
| Hydraulic Excavator, .5 CY | 930 | Track mounted hydraulic excavator with bucket capacity range of 0.3 to 0.8 CY. Equipment and power unit costs. Labor not included. | Hour | $57.07 | 2 | $114.14 |
| **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. | Hour | $25.08 | 5 | $125.40 |
| 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. | Hour | $18.93 | 6 | $113.58 |
| Equipment Operators, Heavy | 233 | Includes: Cranes, Hydraulic Excavators >=50 HP, Dozers, Paving Machines, Rock Trenchers, Trenchers >=12", Dump Trucks, Ag Equipment >=150 HP, Scrapers, Water Wagons. | Hour | $23.93 | 2 | $47.86 |
| **Materials** | | | | | | |
| Pipe, Steel, 30", Std Wt, USED | 1361 | Materials: - USED - 30" - Steel Std Wt | Foot | $80.28 | 50 | $4,014.00 |
| Pipe, Steel, 36", Std Wt, USED | 1362 | Materials: - USED - 36" - Steel Std Wt | Foot | $102.50 | 6 | $615.00 |
| Steel, Angle, 2 1/2" x 2 1/2" x 1/4" | 1372 | Materials: Angle, 2 1/2" x 2 1/2" x 1/4", Meets ASTM A36 | Foot | $3.47 | 24 | $83.28 |
| Steel, Plate, 3/8" | 1375 | Flat steel plate, 3/8" thickness. Materials only. | Square Foot | $11.61 | 4 | $46.44 |
| Lumber, planks, posts and timbers, treated | 1609 | Treated dimension lumber with nominal thickness greater than 2". Includes lumber and fasteners. Does not include labor. | Board Foot | $1.58 | 32 | $50.56 |
| **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 | $64.26 | 1 | $64.26 |

| | | | | | |
|---|---|---|---|---|---|
| Mobilization, medium equipment | 1139 Equipment with 70-150 HP or typical weights between 14,000 and 30,000 pounds. | Each | $232.71 | 1 | $232.71 |

**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::** Diameter Inch Foot

**Scenario Typical Size:** 1800

**Total Scenario Cost:** $6,609.18

**Scenario Cost/Unit:** $3.67

**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 Yard | $3.76 | 190 | $714.40 |
| Earthfill, Manually Compacted | 50 | Earthfill, manually compacted, includes equipment and labor | Cubic Yard | $4.95 | 15 | $74.25 |
| Hydraulic Excavator, .5 CY | 930 | Track mounted hydraulic excavator with bucket capacity range of 0.3 to 0.8 CY. Equipment and power unit costs. Labor not included. | Hour | $57.07 | 4 | $228.28 |
| **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. | Hour | $25.08 | 7 | $175.56 |
| 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. | Hour | $18.93 | 10 | $189.30 |
| Equipment Operators, Heavy | 233 | Includes: Cranes, Hydraulic Excavators >=50 HP, Dozers, Paving Machines, Rock Trenchers, Trenchers >=12", Dump Trucks, Ag Equipment >=150 HP, Scrapers, Water Wagons. | Hour | $23.93 | 4 | $95.72 |
| **Materials** | | | | | | |
| Pipe, Steel, 30", Std Wt, USED | 1361 | Materials: - USED - 30" - Steel Std Wt | Foot | $80.28 | 50 | $4,014.00 |
| Pipe, Steel, 36", Std Wt, USED | 1362 | Materials: - USED - 36" - Steel Std Wt | Foot | $102.50 | 6 | $615.00 |
| Steel, Angle, 2 1/2" x 2 1/2" x 1/4" | 1372 | Materials: Angle, 2 1/2" x 2 1/2" x 1/4", Meets ASTM A36 | Foot | $3.47 | 24 | $83.28 |
| Steel, Plate, 3/8" | 1375 | Flat steel plate, 3/8" thickness. Materials only. | Square Foot | $11.61 | 10 | $116.10 |
| Lumber, planks, posts and timbers, treated | 1609 | Treated dimension lumber with nominal thickness greater than 2". Includes lumber and fasteners. Does not include labor. | Board Foot | $1.58 | 4 | $6.32 |
| **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 | $64.26 | 1 | $64.26 |

| | | | | | |
|---|---|---|---|---|---|
| Mobilization, medium equipment | 1139 Equipment with 70-150 HP or typical weights between 14,000 and 30,000 pounds. | Each | $232.71 | 1 | $232.71 |

**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::** Diameter Inch Foot

**Scenario Typical Size:** 1000

**Total Scenario Cost:** $4,368.06

**Scenario Cost/Unit:** $4.37

**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 Yard | $3.76 | 190 | $714.40 |
| Earthfill, Manually Compacted | 50 | Earthfill, manually compacted, includes equipment and labor | Cubic Yard | $4.95 | 15 | $74.25 |
| Hydraulic Excavator, .5 CY | 930 | Track mounted hydraulic excavator with bucket capacity range of 0.3 to 0.8 CY. Equipment and power unit costs. Labor not included. | Hour | $57.07 | 2 | $114.14 |
| **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. | Hour | $25.08 | 3 | $75.24 |
| General Labor | 231 | Labor performed using basic tools such as power tool, shovels, and other tools that do not require extensive training. Ex. pipe layer, herder, concrete placement, materials spreader, flagger, etc. | Hour | $18.93 | 8 | $151.44 |
| Equipment Operators, Heavy | 233 | Includes: Cranes, Hydraulic Excavators >=50 HP, Dozers, Paving Machines, Rock Trenchers, Trenchers >=12", Dump Trucks, Ag Equipment >=150 HP, Scrapers, Water Wagons. | Hour | $23.93 | 2 | $47.86 |
| **Materials** | | | | | | |
| Pipe, Steel, 16", Std Wt, USED | 1357 | Materials: - USED - 16" - Steel Std Wt | Foot | $29.88 | 50 | $1,494.00 |
| 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 | $312.56 | 1 | $312.56 |
| Water Control Structure, Stoplog, Inline, variable cost portion | 2146 | Variable cost portion of a Water Level Control Structure, Inline stoplog type. Typically made of PVC or fiberglass materials. Calculate total variable costs by multiplying by the structure height x pipe diameter. Materials only. | Height x Diameter | $12.08 | 90 | $1,087.20 |
| **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 | $64.26 | 1 | $64.26 |
| Mobilization, medium equipment | 1139 | Equipment with 70-150 HP or typical weights between 14,000 and 30,000 pounds. | Each | $232.71 | 1 | $232.71 |

**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::** Diameter Inch Foot

**Scenario Typical Size:** 960

**Total Scenario Cost:** $1,671.69

**Scenario Cost/Unit:** $1.74

**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 Yard | $1.99 | 5 | $9.95 |
| Earthfill, Manually Compacted | 50 | Earthfill, manually compacted, includes equipment and labor | Cubic Yard | $4.95 | 45 | $222.75 |
| **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. | Hour | $18.93 | 10 | $189.30 |
| **Materials** | | | | | | |
| Rock Riprap, Placed with geotextile | 44 | Rock Riprap, placed with geotextile, includes materials, equipment and labor to transport and place | Cubic Yard | $55.44 | 2 | $110.88 |
| Aggregate, Gravel, Graded | 46 | Gravel, includes materials, equipment and labor to transport and place. Includes washed and unwashed gravel. | Cubic Yard | $30.82 | 5 | $154.10 |
| Pipe, HDPE, CPT, Double Wall, Soil Tight, 24" | 1246 | Pipe, Corrugated HDPE Double Wall, 24" diameter with soil tight joints - AASHTO M294. Material cost only. | Foot | $18.80 | 40 | $752.00 |
| **Mobilization** | | | | | | |
| Mobilization, medium equipment | 1139 | Equipment with 70-150 HP or typical weights between 14,000 and 30,000 pounds. | Each | $232.71 | 1 | $232.71 |

**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::** Diameter Inch Foot

**Scenario Typical Size:** 960

**Total Scenario Cost:** $2,082.09

**Scenario Cost/Unit:** $2.17

**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 Yard | $1.99 | 5 | $9.95 |
| Earthfill, Manually Compacted | 50 | Earthfill, manually compacted, includes equipment and labor | Cubic Yard | $4.95 | 45 | $222.75 |
| **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. | Hour | $18.93 | 10 | $189.30 |
| **Materials** | | | | | | |
| Rock Riprap, Placed with geotextile | 44 | Rock Riprap, placed with geotextile, includes materials, equipment and labor to transport and place | Cubic Yard | $55.44 | 2 | $110.88 |
| Aggregate, Gravel, Graded | 46 | Gravel, includes materials, equipment and labor to transport and place. Includes washed and unwashed gravel. | Cubic Yard | $30.82 | 5 | $154.10 |
| Pipe, CMP, 24", 12 Gauge | 1417 | 24" Corrugated Metal Pipe, Galvanized, Uncoated, 12 gage. Material cost only. | Foot | $29.06 | 40 | $1,162.40 |
| **Mobilization** | | | | | | |
| Mobilization, medium equipment | 1139 | Equipment with 70-150 HP or typical weights between 14,000 and 30,000 pounds. | Each | $232.71 | 1 | $232.71 |

**Practice:** 587 - Structure for Water Control

**Scenario** #6 - Culvert Less Than 30 inches SSP

**Scenario Description:**

Install a used Standard Weight Smooth Steel Pipe (SSP) 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::** Diameter Inch Foot

**Scenario Typical Size:** 960

**Total Scenario Cost:** $3,195.20

**Scenario Cost/Unit:** $3.33

**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 Yard | $1.99 | 5 | $9.95 |
| Earthfill, Manually Compacted | 50 | Earthfill, manually compacted, includes equipment and labor | Cubic Yard | $4.95 | 45 | $222.75 |
| **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. | Hour | $18.93 | 10 | $189.30 |
| **Materials** | | | | | | |
| Rock Riprap, Placed with geotextile | 44 | Rock Riprap, placed with geotextile, includes materials, equipment and labor to transport and place | Cubic Yard | $55.44 | 2 | $110.88 |
| Aggregate, Gravel, Graded | 46 | Gravel, includes materials, equipment and labor to transport and place. Includes washed and unwashed gravel. | Cubic Yard | $30.82 | 5 | $154.10 |
| Pipe, Steel, 24", Std Wt, USED | 1360 | Materials: - USED - 24" - Steel Std Wt | Foot | $51.07 | 40 | $2,042.80 |
| **Mobilization** | | | | | | |
| Mobilization, medium equipment | 1139 | Equipment with 70-150 HP or typical weights between 14,000 and 30,000 pounds. | Each | $232.71 | 2 | $465.42 |

**Practice:** 587 - Structure for Water Control

**Scenario** #7 - Slide Gate

**Scenario Description:**

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

**Before Situation:**

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

**After Situation:**

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

**Feature Measure:** diameter

**Scenario Unit::** Foot

**Scenario Typical Size:** 4

**Total Scenario Cost:** $7,866.75

**Scenario Cost/Unit:** $1,966.69

**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. | Hour | $50.99 | 6 | $305.94 |
| **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. | Hour | $25.08 | 12 | $300.96 |
| General Labor | 231 | Labor performed using basic tools such as power tool, shovels, and other tools that do not require extensive training. Ex. pipe layer, herder, concrete placement, materials spreader, flagger, etc. | Hour | $18.93 | 12 | $227.16 |
| Equipment Operators, Heavy | 233 | Includes: Cranes, Hydraulic Excavators >=50 HP, Dozers, Paving Machines, Rock Trenchers, Trenchers >=12", Dump Trucks, Ag Equipment >=150 HP, Scrapers, Water Wagons. | Hour | $23.93 | 6 | $143.58 |
| **Materials** | | | | | | |
| Screw gate, cast iron, 4' diameter, 10/0 head | 1746 | 4' diameter cast iron screw (canal) gate rated at 10 seating head 0 feet unseating head. Includes materials only. | Each | $6,656.40 | 1 | $6,656.40 |
| **Mobilization** | | | | | | |
| Mobilization, medium equipment | 1139 | Equipment with 70-150 HP or typical weights between 14,000 and 30,000 pounds. | Each | $232.71 | 1 | $232.71 |

**Practice:** 587 - Structure for Water Control

**Scenario** #8 - 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::** Foot

**Scenario Typical Size:** 4

**Total Scenario Cost:** $6,776.85

**Scenario Cost/Unit:** $1,694.21

**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. | Hour | $50.99 | 6 | $305.94 |
| **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. | Hour | $25.08 | 12 | $300.96 |
| General Labor | 231 | Labor performed using basic tools such as power tool, shovels, and other tools that do not require extensive training. Ex. pipe layer, herder, concrete placement, materials spreader, flagger, etc. | Hour | $18.93 | 12 | $227.16 |
| Equipment Operators, Heavy | 233 | Includes: Cranes, Hydraulic Excavators >=50 HP, Dozers, Paving Machines, Rock Trenchers, Trenchers >=12", Dump Trucks, Ag Equipment >=150 HP, Scrapers, Water Wagons. | Hour | $23.93 | 6 | $143.58 |
| **Materials** | | | | | | |
| Flap Gate, cast iron, 4' diameter | 1745 | 4' diameter cast iron flap gate. Materials only. | Each | $5,566.50 | 1 | $5,566.50 |
| **Mobilization** | | | | | | |
| Mobilization, medium equipment | 1139 | Equipment with 70-150 HP or typical weights between 14,000 and 30,000 pounds. | Each | $232.71 | 1 | $232.71 |

**Practice:** 587 - Structure for Water Control

**Scenario** #9 - 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 Yard

**Scenario Typical Size:** 10

**Total Scenario Cost:** $10,145.66

**Scenario Cost/Unit:** $1,014.57

**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 Yard | $326.97 | 10 | $3,269.70 |
| Excavation, Common Earth, side cast, small equipment | 48 | Bulk excavation and side casting of common earth with hydraulic excavator with less than 1 CY capacity. Includes equipment and labor. | Cubic Yard | $1.99 | 200 | $398.00 |
| Earthfill, Roller Compacted | 49 | Earthfill, roller or machine compacted, includes equipment and labor | Cubic Yard | $3.76 | 200 | $752.00 |
| **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. | Hour | $18.93 | 2 | $37.86 |
| **Materials** | | | | | | |
| Aggregate, Sand, Graded, Washed | 45 | Sand, typical ASTM C33 gradation, includes materials, equipment and labor to transport and place | Cubic Yard | $30.40 | 4 | $121.60 |
| Flap Gate, cast iron, 4' diameter | 1745 | 4' diameter cast iron flap gate. Materials only. | Each | $5,566.50 | 1 | $5,566.50 |

**Practice:** 587 - Structure for Water Control

**Scenario** #10 - Rock Checks for Water Surface Profile

**Scenario Description:**

Typical setting is in a stream that has become incised and is therefore disconnected from the floodplain. Typical installation consists of installing a "Vee" shaped rock structures with points facing upstream for the purpose of raising the water surface profile. Cost estimate is for three check dams with a top width of 3', max height of 6', min height of 3', and 28' length; containing an average of 58 cubic yards or 29 tons of rock for a total of 87 tons. The check dams are underlain with geotextile fabric. Disturbed areas are protected with permanent vegetative cover. Addresses resource concerns such as water quality degradation and soil erosion-concentrated flow erosion.

**Before Situation:**

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

**After Situation:**

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

**Scenario Unit::** Ton

**Scenario Typical Size:** 87

**Total Scenario Cost:** $3,877.63

**Scenario Cost/Unit:** $44.57

**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 Yard | $1.45 | 84 | $121.80 |
| **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. | Hour | $18.93 | 8 | $151.44 |
| **Materials** | | | | | | |
| Rock Riprap, Placed with geotextile | 44 | Rock Riprap, placed with geotextile, includes materials, equipment and labor to transport and place | Cubic Yard | $55.44 | 57 | $3,160.08 |
| **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 | $444.31 | 1 | $444.31 |

**Practice:** 587 - Structure for Water Control

**Scenario** #11 - 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::** Foot

**Scenario Typical Size:** 36

**Total Scenario Cost:** $7,312.29

**Scenario Cost/Unit:** $203.12

**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 Yard | $326.97 | 19 | $6,212.43 |
| Excavation, Common Earth, side cast, small equipment | 48 | Bulk excavation and side casting of common earth with hydraulic excavator with less than 1 CY capacity. Includes equipment and labor. | Cubic Yard | $1.99 | 18 | $35.82 |
| Water management, Flooding & dewatering | 969 | Includes equipment and power unit. Labor not included. | Acre Foot | $126.14 | 1 | $126.14 |
| **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. | Hour | $18.93 | 10 | $189.30 |
| Supervisor or Manager | 234 | Labor involving supervision or management activities. Includes crew supervisors, foremen and farm/ranch managers time required for adopting new technology, etc. | Hour | $34.29 | 7 | $240.03 |
| **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 | $64.26 | 1 | $64.26 |
| Mobilization, large equipment | 1140 | Equipment >150HP or typical weights greater than 30,000 pounds or loads requiring over width or over length permits. | Each | $444.31 | 1 | $444.31 |

**Practice:** 587 - Structure for Water Control

**Scenario** #12 - CMP Turnout

**Scenario Description:**

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

**Before Situation:**

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

**After Situation:**

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

**Feature Measure:** Each

**Scenario Unit::** Each

**Scenario Typical Size:** 1

**Total Scenario Cost:** $723.07

**Scenario Cost/Unit:** $723.07

**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. | Hour | $50.99 | 2 | $101.98 |
| **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. | Hour | $18.93 | 5 | $94.65 |
| Equipment Operators, Light | 232 | Includes: Skid Steer Loaders, Hydraulic Excavators <50 HP, Trenchers <12", Ag Equipment <150 HP, Pickup Trucks, Forklifts, Mulchers | Hour | $21.14 | 3 | $63.42 |
| **Materials** | | | | | | |
| Pipe, CMP, 12", 16 Gauge | 1269 | 12" Corrugated Metal Pipe, Galvanized, Uncoated, 16 gage. Material cost only. | Foot | $11.10 | 10 | $111.00 |
| Slide gate, steel, 1" diameter, low head | 1830 | 1" diameter steel slide gate for low head installations | Each | $119.31 | 1 | $119.31 |
| **Mobilization** | | | | | | |
| Mobilization, medium equipment | 1139 | Equipment with 70-150 HP or typical weights between 14,000 and 30,000 pounds. | Each | $232.71 | 1 | $232.71 |

**Practice:** 587 - Structure for Water Control

**Scenario** #13 - Concrete Turnout Structure - Small

**Scenario Description:**

A reinforced concrete turnout structure equipped with slide boards or panels diverts irrigation water from a ditch or canal into a field or field ditch. This scenario is for a four ft tall, two foot wide, and five foot long turnout structure.

**Before Situation:**

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

**After Situation:**

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

**Feature Measure:** Each

**Scenario Unit::** Each

**Scenario Typical Size:** 1

**Total Scenario Cost:** $979.92

**Scenario Cost/Unit:** $979.92

**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 Yard | $326.97 | 2 | $653.94 |
| Backhoe, 80 HP | 926 | Wheel mounted backhoe excavator with horsepower range of 60 to 90. Equipment and power unit costs. Labor not included. | Hour | $50.99 | 1 | $50.99 |
| **Labor** | | | | | | |
| Equipment Operators, Light | 232 | Includes: Skid Steer Loaders, Hydraulic Excavators <50 HP, Trenchers <12", Ag Equipment <150 HP, Pickup Trucks, Forklifts, Mulchers | Hour | $21.14 | 2 | $42.28 |
| **Mobilization** | | | | | | |
| Mobilization, medium equipment | 1139 | Equipment with 70-150 HP or typical weights between 14,000 and 30,000 pounds. | Each | $232.71 | 1 | $232.71 |

**Practice:** 587 - Structure for Water Control

**Scenario** #14 - Concrete Turnout Structure

**Scenario Description:**

A reinforced concrete turnout structure equipped with a 48 inch screw gate diverts irrigation water from a canal into a field or field ditch. This scenario is for a six ft tall, eight foot wide, and ten foot long turnout structure. A sloping trash rack fabricated from rebar is installed on the inlet. If needed fish screens may be installed at the inlet..

**Before Situation:**

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

**After Situation:**

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

**Feature Measure:** Each

**Scenario Unit::** Each

**Scenario Typical Size:** 1

**Total Scenario Cost:** $9,675.24

**Scenario Cost/Unit:** $9,675.24

**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 Yard | $326.97 | 5 | $1,634.85 |
| Backhoe, 80 HP | 926 | Wheel mounted backhoe excavator with horsepower range of 60 to 90. Equipment and power unit costs. Labor not included. | Hour | $50.99 | 4 | $203.96 |
| **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. | Hour | $18.93 | 10 | $189.30 |
| Equipment Operators, Light | 232 | Includes: Skid Steer Loaders, Hydraulic Excavators <50 HP, Trenchers <12", Ag Equipment <150 HP, Pickup Trucks, Forklifts, Mulchers | Hour | $21.14 | 5 | $105.70 |
| **Materials** | | | | | | |
| Screw gate, cast iron, 4' diameter, 10/0 head | 1746 | 4' diameter cast iron screw (canal) gate rated at 10 seating head 0 feet unseating head. Includes materials only. | Each | $6,656.40 | 1 | $6,656.40 |
| Welded Bar Grate, metal | 1980 | Heavy duty vertical bar welded grating, typically 1-1/4"x 3/16" bars on 1" spacing with cross rod on 4" spacing. Materials only. | Square Foot | $13.59 | 48 | $652.32 |
| **Mobilization** | | | | | | |
| Mobilization, medium equipment | 1139 | Equipment with 70-150 HP or typical weights between 14,000 and 30,000 pounds. | Each | $232.71 | 1 | $232.71 |

## USDA - Natural Resources Conservation Service

**Arkansas**

**Practice:** 587 - Structure for Water Control

**Scenario** #15 - Fabricated Metal Water Control Structure

**Scenario Description:**

A Water Control Structure 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. This scenario is applicable to large fabricated structures used locally or not covered by other scenarios for the control of water surface elevation. The Cost estimate is based on a structure fabricated from a used Tank Car, having a diameter of 9 ft and lenght of 60 ft (9ft x 60ft = 540 Square Feet). The top half of the tank car is cut away 7 ft from one end, and a steel endplate is welded onto the cut end to form a three sided weir (7ft deep x 9ft wide). A 24 inch steel pipe having a screw valve, accessible topside, is welded through the plate allowing drawdown or further water surface elevation control. The structure passes through an embankment and regulates flow between the two sides. Payment rate is based upon the steel structure's plan view deminsions (Length x Width) in Square Feet (SF).

**Before Situation:**

Fields are irrigate but excess irrigation water runs off into ditches and streams due to inefficiencies in irrigation. The excess water is carrying sediment and nutrients with it which are flowing into to the basins and causing water quality issues throughout the watershed.

**After Situation:**

Excess irrigation water is captured and able to be stored at a consistant level to allow for adequate pumping in order to relift the excess water back into the system either directly to the field or to a surface storage reservoir. The water control structure allows the excess water to be stored so that it is not running down the basin and so excess nutrients or sediments have a chance to settle out of the water. 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:** Structure Length (ft) x Stucture Wi

**Scenario Unit::** Square Foot

**Scenario Typical Size:** 540

**Total Scenario Cost:** $17,647.83

**Scenario Cost/Unit:** $32.68

**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 Yard | $326.97 | 4 | $1,307.88 |
| Earthfill, Roller Compacted | 49 | Earthfill, roller or machine compacted, includes equipment and labor | Cubic Yard | $3.76 | 304 | $1,143.04 |
| Earthfill, Manually Compacted | 50 | Earthfill, manually compacted, includes equipment and labor | Cubic Yard | $4.95 | 15 | $74.25 |
| Hydraulic Excavator, 1 CY | 931 | Track mounted hydraulic excavator with bucket capacity range of 0.8 to 1.5 CY. Equipment and power unit costs. Labor not included. | Hour | $103.47 | 16 | $1,655.52 |
| **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. | Hour | $25.08 | 20 | $501.60 |
| 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. | Hour | $18.93 | 40 | $757.20 |
| Equipment Operators, Heavy | 233 | Includes: Cranes, Hydraulic Excavators >=50 HP, Dozers, Paving Machines, Rock Trenchers, Trenchers >=12", Dump Trucks, Ag Equipment >=150 HP, Scrapers, Water Wagons. | Hour | $23.93 | 16 | $382.88 |
| **Materials** | | | | | | |
| Pipe, Steel, 24", Std Wt, USED | 1360 | Materials: - USED - 24" - Steel Std Wt | Foot | $51.07 | 20 | $1,021.40 |
| Steel, Angle, 2 1/2" x 2 1/2" x 1/4" | 1372 | Materials: Angle, 2 1/2" x 2 1/2" x 1/4", Meets ASTM A36 | Foot | $3.47 | 8 | $27.76 |
| Steel, Plate, 3/8" | 1375 | Flat steel plate, 3/8" thickness. Materials only. | Square Foot | $11.61 | 40.5 | $470.21 |
| Steel Tank Car | 1826 | Materials: - USED Rail Road Tank Car | Each | $9,051.43 | 1 | $9,051.43 |

| | | | | | | |
|---|---|---|---|---|---|---|
| Slide gate, steel, 2" diameter, low head | 1829 | 2" diameter steel slide gate for low head installations | Each | $410.40 | 1 | $410.40 |
| Welded Bar Grate, metal | 1980 | Heavy duty vertical bar welded grating, typically 1-1/4"x 3/16" bars on 1" spacing with cross rod on 4" spacing. Materials only. | Square Foot | $13.59 | 45 | $611.55 |
| **Mobilization** | | | | | | |
| Mobilization, medium equipment | 1139 | Equipment with 70-150 HP or typical weights between 14,000 and 30,000 pounds. | Each | $232.71 | 1 | $232.71 |

**Practice:** 587 - Structure for Water Control

**Scenario** #16 - Flow Meter with Mechanical Index

**Scenario Description:**

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 plantproductivity and health, and Inefficient Energy Use - Equipment and facilitiesAssociated 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

**Total Scenario Cost:** $1,982.40

**Scenario Cost/Unit:** $198.24

**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 | $1,853.88 | 1 | $1,853.88 |
| **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 | $64.26 | 2 | $128.52 |

**Practice:** 587 - Structure for Water Control

**Scenario** #17 - Flow Meter with Electronic Index

**Scenario Description:**

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 plantproductivity and health, and Inefficient Energy Use - Equipment and facilitiesAssociated 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

**Total Scenario Cost:** $3,780.62

**Scenario Cost/Unit:** $378.06

**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 | $3,652.10 | 1 | $3,652.10 |
| **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 | $64.26 | 2 | $128.52 |

**Practice:** 587 - Structure for Water Control

**Scenario** #18 - Flow Meter with Electronic Index & Telemetry

**Scenario Description:**

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 plantproductivity and health, and Inefficient Energy Use - Equipment and facilitiesAssociated 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

**Total Scenario Cost:** $4,866.94

**Scenario Cost/Unit:** $486.69

**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 | $4,738.42 | 1 | $4,738.42 |
| **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 | $64.26 | 2 | $128.52 |

**Practice:** 587 - Structure for Water Control

**Scenario** #19 - Low overfall Structure Less Than 36 inches

**Scenario Description:**

Install a pipe(all material types) under 36 inches in diameter, with a low overfall header, to convey water under roads or other barriers. A typicalscenario would be an 18 inch diameter pipe, 40 feet in length. The work includes site preparation, acquiring a pipe, and altering the pipe to create a low overfall header. This alteration includes applying a cap or partial cap to the inlet end of the pipe and removing a portion of the top of the pipe from the inlet end such that a weir inlet is formed along the newly cut cap and extending horizontally down the sides of the pipe the length necessary to provide adequate weir capacity. Primary use locations are field outlets and sugarcane field cross drain outlets, where erosion can,has occur(ed), in a situation where overfall is low.

**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::** Diameter Inch Foot

**Scenario Typical Size:** 720

**Total Scenario Cost:** $1,994.16

**Scenario Cost/Unit:** $2.77

**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 Yard | $1.99 | 5 | $9.95 |
| Earthfill, Manually Compacted | 50 | Earthfill, manually compacted, includes equipment and labor | Cubic Yard | $4.95 | 20 | $99.00 |
| Portable Welder | 1407 | Portable field welder. Equipment only. Labor not included. | Hour | $18.57 | 2 | $37.14 |
| **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. | Hour | $25.08 | 2 | $50.16 |
| 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. | Hour | $18.93 | 3 | $56.79 |
| **Materials** | | | | | | |
| Pipe, Steel, 18", Std Wt, USED | 1358 | Materials: - USED - 18" - Steel Std Wt | Foot | $37.42 | 40 | $1,496.80 |
| Steel, Plate, 3/8" | 1375 | Flat steel plate, 3/8" thickness. Materials only. | Square Foot | $11.61 | 1 | $11.61 |
| **Mobilization** | | | | | | |
| Mobilization, medium equipment | 1139 | Equipment with 70-150 HP or typical weights between 14,000 and 30,000 pounds. | Each | $232.71 | 1 | $232.71 |

**Practice:** 587 - Structure for Water Control

**Scenario** #20 - Multiple Low Overfall Structures Less Than 36 inches

**Scenario Description:**

Install a pipe(all material types) under 36 inches in diameter, with a low overfall header, to convey water under roads or other barriers. A typicalscenario would be an 18 inch diameter pipe, 40 feet in length. The work includes site preparation, acquiring a pipe, and altering the pipe to create a low overfall header. This alteration includes applying a cap or partial cap to the inlet end of the pipe and removing a portion of the top of the pipe from the inlet end such that a weir inlet is formed along the newly cut cap and extending horizontally down the sides of the pipe the length necessary to provide adequate weir capacity. Primary use locations are field outlets and sugarcane field cross drain outlets, where erosion can,has occur(ed), in a situation where overfall is low. When contract contains more than 5 of this type structure, use this scenario for number 6 and after.

**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:** Each

**Scenario Unit::** Each

**Scenario Typical Size:** 1

**Total Scenario Cost:** $1,761.45

**Scenario Cost/Unit:** $1,761.45

**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 Yard | $1.99 | 5 | $9.95 |
| Earthfill, Manually Compacted | 50 | Earthfill, manually compacted, includes equipment and labor | Cubic Yard | $4.95 | 20 | $99.00 |
| Portable Welder | 1407 | Portable field welder. Equipment only. Labor not included. | Hour | $18.57 | 2 | $37.14 |
| **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. | Hour | $25.08 | 2 | $50.16 |
| 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. | Hour | $18.93 | 3 | $56.79 |
| **Materials** | | | | | | |
| Pipe, Steel, 18", Std Wt, USED | 1358 | Materials: - USED - 18" - Steel Std Wt | Foot | $37.42 | 40 | $1,496.80 |
| Steel, Plate, 3/8" | 1375 | Flat steel plate, 3/8" thickness. Materials only. | Square Foot | $11.61 | 1 | $11.61 |

**Practice:** 590 - Nutrient Management

**Scenario** #1 - Basic NM System

**Scenario Description:**

This scenario describes the implementation of a basic nutrient management system on > = 40 acres of cropland or hayland where there is no manure application. The planned NM system will meet the current 590 standard. Implementation will result in the proper rate, source, method of placement, and timing of nutrients. Payment for implementation is to defray the costs of soil testing, analysis, consultant services that provide nutrient recommendations based on LGU recommendations or crop removal rates and an associated nutrient budget, and recordkeeping. Records demonstrating implementation of the 4 R's of the NM criteria will be required.

**Before Situation:**

In this geographic area, a fertility program is either non existent or does not meet the 590 nutrient management standard. Soil testing is not completed on a regular basis and applications of fertilizers are not based on land grant university recommendations or a nutrient budget. An environmental evaluation or risk assessment is not completed. Nutrients are transported to surface waters through runoff or soil erosion or to ground water from leaching in quantities that degrade water quality and limit use of intended purposes. Soil quality may be degraded by excess or inadequate nutrients.

**After Situation:**

A nutrient management system will be developed to meet the NRCS 590 standard. The development and implementation of a nutrient management plan (NMP) will benefit plant productivity and reduce off-site degradation. A nutrient management budget will be developed for each field(s) based on soil test analysis and land grant university recommendations or crop removal rates. On planning units typically 40 acres or larger, soil testing is completed according to LGU recommendations. The use of pre-plant soil tests will assist with the proper development of the annual nutrient budget. The use post-harvest of soil and/or tissue tests (results interpreted by crop consultant) will help establish the adequacy of the plan in meeting crop needs while minimizing P application rate and residual N, thus reducing the potential for off-site impacts. Records will be provided annually of the current soil test, analysis, amount of application, forms and rates of nutrients for each field, including post harvest analysis. Applications will be completed in a manner that minimizes nutrient runoff and leaching or build up of excess nutrient concentrations.

**Feature Measure:** <Unknown>

**Scenario Unit::** Acre

**Scenario Typical Size:** 40

**Total Scenario Cost:** $251.01

**Scenario Cost/Unit:** $6.28

**Cost Details:**

| Component Name | ID | Description | Unit | Cost | QTY | Total |
|---|---|---|---|---|---|---|
| **Equipment Installation** | | | | | | |
| Truck, Pickup | 939 | Equipment and power unit costs. Labor not included. | Hour | $19.82 | 1 | $19.82 |
| **Labor** | | | | | | |
| General Labor | 231 | Labor performed using basic tools such as power tool, shovels, and other tools that do not require extensive training. Ex. pipe layer, herder, concrete placement, materials spreader, flagger, etc. | Hour | $18.93 | 2 | $37.86 |
| Specialist Labor | 235 | Labor requiring a specialized skill set: Includes Agronomists, Foresters, Biologists, etc. to provide additional technical information during the planning and implementation of the practice. Does not include NRCS or TSP services. | Hour | $91.60 | 2 | $183.20 |
| **Materials** | | | | | | |
| Test, Soil Test, Standard | 299 | Includes materials, shiping, labor, and equipment costs. | Each | $10.13 | 1 | $10.13 |

**Practice:** 590 - Nutrient Management

**Scenario** #2 - Basic Organic NM System

**Scenario Description:**

The planned NM system for organic production will meet the current 590 standard. Implementation will result in the proper rate, source, method of placement, and timing of nutrients. Payment for implementation is to defray the costs of soil testing, manure and/or compost analysis, and consultant services that provide nutrient recommendations. Records demonstrating implementation of the 4 R's of NM standard will be required. This Scenario is designed to encourage organic producers to effectively utilize organic fertilizers, manure, and/or compost appropriately improving soil quality and minimizing runoff of nutrients from fields to surface waters. The basis for nutrient applications will be recommendations based on soil and manure analyses.

**Before Situation:**

In this geographic area, an organic fertility program does not meet the 590 nutrient management standard. Soil testing is not completed on a regular basis and applications of organic fertilizers and amendments are not based on a nutrient budget. Nutrients are transported to surface waters through runoff or erosion and to ground waters through leaching in quantities that degrade water quality and limit use of intended purposes. Soil quality may be degraded by excess or inadequate nutrients. Fields have little or no erosion protection during critical periods often times resulting in sheet, rill, and ephemeral erosion.

**After Situation:**

A nutrient management system will be developed to meet the NRCS 590 standard and NOP regulations. A nutrient management budget will be developed annually for each field(s) based on soil test analysis and crop needs. Soil testing is completed according to LGU instructions. Application of nutrients will be completed at the proper rate, timing, and methods, and sources. Applications will be completed in a manner that minimizes nutrient runoff and leaching or build up of excess nutrient concentrations. Application of nutrients via manures, cover crops or approved commercial forms are applied in a manner that minimizes nutrient runoff and leaching. Specialized training is required by attending annual workshops and/or conferences. Records will be provided annually of the current soil test, analysis, amount of application, forms and rates of nutrients for each field.

**Feature Measure:** <Unknown>

**Scenario Unit::** Acre

**Scenario Typical Size:** 40

**Total Scenario Cost:** $326.32

**Scenario Cost/Unit:** $8.16

**Cost Details:**

| Component Name | ID | Description | Unit | Cost | QTY | Total |
|---|---|---|---|---|---|---|
| **Equipment Installation** | | | | | | |
| Truck, Pickup | 939 | Equipment and power unit costs. Labor not included. | Hour | $19.82 | 1 | $19.82 |
| **Labor** | | | | | | |
| General Labor | 231 | Labor performed using basic tools such as power tool, shovels, and other tools that do not require extensive training. Ex. pipe layer, herder, concrete placement, materials spreader, flagger, etc. | Hour | $18.93 | 1 | $18.93 |
| Specialist Labor | 235 | Labor requiring a specialized skill set: Includes Agronomists, Foresters, Biologists, etc. to provide additional technical information during the planning and implementation of the practice. Does not include NRCS or TSP services. | Hour | $91.60 | 2 | $183.20 |
| **Materials** | | | | | | |
| Test, Soil Test, Standard | 299 | Includes materials, shiping, labor, and equipment costs. | Each | $10.13 | 1 | $10.13 |
| Test, Manure Analysis | 306 | Moisture, Total N, P, K. Includes materials and shipping only. | Each | $47.16 | 1 | $47.16 |
| Test, Compost Analysis | 307 | Moisture, Total N, P, K. Includes materials and shipping only. | Each | $47.08 | 1 | $47.08 |

**Practice:** 590 - Nutrient Management

**Scenario** #3 - Small Farm/Diversified

**Scenario Description:**

Small farm/diversified systems include CSA's (community supported agriculture), truck farms, market gardens, etc., where numerous variable crops are grown on small acreages. This scenario attempts to capture the higher cost/acre of nutrient management planning and implementation on smaller production areas (usually between .25-10 acres) with a large number of crops, often times with multiple harvests per year, that require intense and diversified nutrient management. The planned NM system for this organic or conventional production system will meet current 590 Nutrient Management criteria. Payment for implementation of this scenario is to defray the costs of soil testing, manure and/or compost analysis, training attendance, and consultant services that provide nutrient management recommendations, associated nutrient budgets, and recordkeeping. Records demonstrating implementation of the 4 R's of NM will be required.

**Before Situation:**

In this geographic area, a fertility program does not meet the 590 nutrient management standard. Soil testing is not completed on a regular basis and applications of fertilizers, amendments, manure, and/or compost are not based on land grant university recommendations or a nutrient budget. Nutrients are transported to surface waters through runoff or erosion or to groundwater by 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.

**After Situation:**

A nutrient management system will be developed to meet the 590 nutrient management standard and NOP regulations where applicable. A nutrient management budget will be developed annually for each "crop block" or each crop rotation pertaining to a block of ground 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. Applications will be completed in a manner that minimizes nutrient runoff and leaching or build up of excess nutrient concentrations. Application rates of all nutrients are based upon soil test analyses either LGU recommendations, crop removal rates, or industry standard. Records will be provided annually of the current soil test, analyses, amount of application, forms and rates of nutrients for each crop block.

**Feature Measure:** <Unknown>

**Scenario Unit::** Each

**Scenario Typical Size:** 1

**Total Scenario Cost:** $518.76

**Scenario Cost/Unit:** $518.76

**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. | Hour | $18.93 | 2 | $37.86 |
| Specialist Labor | 235 | Labor requiring a specialized skill set: Includes Agronomists, Foresters, Biologists, etc. to provide additional technical information during the planning and implementation of the practice. Does not include NRCS or TSP services. | Hour | $91.60 | 4 | $366.40 |
| **Materials** | | | | | | |
| Test, Soil Test, Standard | 299 | Includes materials, shiping, labor, and equipment costs. | Each | $10.13 | 2 | $20.26 |
| Test, Manure Analysis | 306 | Moisture, Total N, P, K. Includes materials and shipping only. | Each | $47.16 | 1 | $47.16 |
| Test, Compost Analysis | 307 | Moisture, Total N, P, K. Includes materials and shipping only. | Each | $47.08 | 1 | $47.08 |

**Practice:** 590 - Nutrient Management

**Scenario** #4 - Basic NM system with manure

**Scenario Description:**

This scenario describes the implementation of a basic nutrient management system on planning units 40 ac or larger of cropland or hayland where there is manure or compost application in addition to commercial fertilizer applications. The planned NM system will meet the current 590 standard. Implementation will result in the proper rate, source, method of placement, and timing of nutrients while minimizing off-site degradation or the excessive built up of N and P. Payment for implementation is to defray the costs of soil testing, manure testing, analysis, proper implementation, consultant services that provide nutrient recommendations based on LGU recommendations or crop removal rates and an associated nutrient budget, and recordkeeping. Risk assessments including PI (phosphorus index) and NI (nitrogen index) will be completed with applications of manure completed based on risk results. Records demonstrating implementation of the 4 R's of the NM plan will be required along with copies of risk assessments.

**Before Situation:**

In this geographic area, a fertility program is either non existent or does not meet the 590 nutrient management standard. Soil testing and manure testing is not completed on a regular basis and applications of nutrients are not based on land grant university recommendations or a nutrient budget. Nutrients and manure solids are transported to surface waters through runoff or erosion or to groundwater through leaching in quantities that degrade water quality and limit use of intended purposes. Soil quality may be degraded by excess or inadequate nutrients. Fields have little or no erosion protection often times resulting in wind, sheet, rill, and ephemeral erosion.

**After Situation:**

A nutrient management system that includes manure as a source will be developed to meet the NRCS 590 standard. The development and implementation of a nutrient management plan (NMP) will benefit plant productivity and reduce off-site degradation. A nutrient management budget will be developed for each field(s) based on soil tests and manure test analysis along with land grant university recommendations or crop removal rates. On a planning unit soil testing is completed according to LGU recommendations. The use of pre-plant soil tests will assist with the proper development of the annual nutrient budget. Applications of manure are based on risk assessments (PI - phosphorus index). The use of post-harvest soil and/or tissue tests (results interpreted by crop consultant) will help establish the adequacy of the plan in meeting crop needs while minimizing P application rate and residual N, The use of Pre side-dress soil nitrogen test (PSNT) or a Pre Top Dress Tissue test (PTDTT) prior to the rapid biomass growth of the plant will assist the producer in evaluating the mineralization of Nitrogen from manures / cover crops in providing adequate nitrogen to meet the crop requirements, thus reducing the potential for off-site impacts. Records will be provided annually documenting current soil tests, manure tests, analyses, amount of application, forms and rates of nutrients for each field, including post harvest analysis. Applications will be completed in a manner that minimizes nutrient runoff and leaching or build up of excess nutrient concentrations.

**Feature Measure:** <Unknown>

**Scenario Unit::** Acre

**Scenario Typical Size:** 40

**Total Scenario Cost:** $298.17

**Scenario Cost/Unit:** $7.45

**Cost Details:**

| Component Name | ID | Description | Unit | Cost | QTY | Total |
|---|---|---|---|---|---|---|
| **Equipment Installation** | | | | | | |
| Truck, Pickup | 939 | Equipment and power unit costs. Labor not included. | Hour | $19.82 | 1 | $19.82 |
| **Labor** | | | | | | |
| General Labor | 231 | Labor performed using basic tools such as power tool, shovels, and other tools that do not require extensive training. Ex. pipe layer, herder, concrete placement, materials spreader, flagger, etc. | Hour | $18.93 | 2 | $37.86 |
| Specialist Labor | 235 | Labor requiring a specialized skill set: Includes Agronomists, Foresters, Biologists, etc. to provide additional technical information during the planning and implementation of the practice. Does not include NRCS or TSP services. | Hour | $91.60 | 2 | $183.20 |
| **Materials** | | | | | | |
| Test, Soil Test, Standard | 299 | Includes materials, shiping, labor, and equipment costs. | Each | $10.13 | 1 | $10.13 |
| Test, Manure Analysis | 306 | Moisture, Total N, P, K. Includes materials and shipping only. | Each | $47.16 | 1 | $47.16 |

**Practice:** 590 - Nutrient Management

**Scenario** #5 - Enhanced Nutrient Mgt

**Scenario Description:**

This scenario takes a conventional cropping system where either no nutrient management or only a basic nutrient management is being practiced. An enhanced nutrient management system includes split applications and multiple nutrient concentration tests (other than only soil tests) and methods that more concisely enable scheduling of appropriate fertilizer applications. Nutrients are transported to surface waters through runoff or wind erosion in quantities that degrade water quality and limit use of intended purposes.

**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:**

The development and implementation of a Nutrient Management Plan (NMP) will benefit plant productivity and reduce off-site movement of nutrients. The use of pre-plant soil tests will assist with the development of the annual nutrient budget in accordance with Land Grant University fertilizer guides. The NMP will stress the use of the four R's (Right Source of Nutrients, Right Time of Application, Right Rate, and Right Method of Application). These include practices such as use of split applications, slow release nutrients, nitrogen inhibitors, proper timing of application, more appropriate formulations, banding, etc. Additional nutrient tests including PSNT (pre-sidedress nitrogen test), CSNT (corn stalk nitrate test), and PPSN (pre-plant soil nitrate test), chlorophyll meters, spectral analysis, etc., may be used to further refine nutrient applications. Record keeping will document application of nutrients based on the 4 R's. Use of a post-harvest soil test or tissue tests (interpreted by a crop consultant) will help establish the adequacy of the plan in meeting crop needs while minimizing P application rate and residual N, thus reducing the potential for off-site impacts. Further minimization of risk is accomplished by identifying the variability across the field(s) by using soil survey maps or other simple techniques to establish zones, along with zonal soil testing. Nutrients are applied at rates based on soil test zone analyses. Typical treatment area is 40 acres. Soil testing is completed according to LGU recommendations. Analysis are completed at least once every three years for N-P-K, and for N annually. A nutrient budget is developed for each field or section of field annually. Application of nutrients via fertilizers, and/or manures applied in a manner that minimizes nutrient runoff and leaching. Application rates of all sources of nutrients are based upon soil tests and either LGU recommendations, crop removal rates, or industry standard.

**Feature Measure:** <Unknown>

**Scenario Unit::** Acre

**Scenario Typical Size:** 40

**Total Scenario Cost:** $1,382.00

**Scenario Cost/Unit:** $34.55

**Cost Details:**

| Component Name | ID | Description | Unit | Cost | QTY | Total |
|---|---|---|---|---|---|---|
| **Equipment Installation** | | | | | | |
| Truck, Pickup | 939 | Equipment and power unit costs. Labor not included. | Hour | $19.82 | 2 | $39.64 |
| All terrain vehicles, ATV | 965 | Includes equipment, power unit and labor costs. | Hour | $29.73 | 2 | $59.46 |
| Chlorophyll Reader | 1125 | Applicator and chlorophyll sensor includes labor. No materials | Acre | $10.82 | 40 | $432.80 |
| **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. | Hour | $18.93 | 2 | $37.86 |
| Specialist Labor | 235 | Labor requiring a specialized skill set: Includes Agronomists, Foresters, Biologists, etc. to provide additional technical information during the planning and implementation of the practice. Does not include NRCS or TSP services. | Hour | $91.60 | 4 | $366.40 |
| **Materials** | | | | | | |
| Nitrogen-Urease inhibitor | 260 | Nitrogen-Urease inhibitor | Acre | $10.59 | 40 | $423.60 |
| Test, Soil Test, Standard | 299 | Includes materials, shiping, labor, and equipment costs. | Each | $10.13 | 1 | $10.13 |
| Test, Soil Nitrogen Testing | 311 | Pre-Side Dress/Deep Soil Testing. Includes materials and shipping only. | Each | $12.11 | 1 | $12.11 |

**Practice:** 590 - Nutrient Management

**Scenario** #6 - Precision NM System

**Scenario Description:**

This scenario describes the implementation of a basic precision nutrient management system on cropland. The planned NM system will meet the current 590 standard. Payment for implementation is to defray the costs of soil testing, analysis, consultant services that provide nutrient recommendations based on LGU recommendations or crop removal rates and an associated nutrient budget, recordkeeping, and monitoring on a precision level. Records demonstrating implementation of the 4 R's of at the NM plan will be required. This scenario goes beyond the basic NM system by using technologies that improve efficiency and effectiveness of nutrient management by utilizing precision techniques and tools. Precision nutrient mgmt techniques ensure that the right rate, proper timing, and proper placement of nutrients minimize non-point source pollution and provide proper amounts of nutrients to the crop where it is needed and not applying where it is not needed.

**Before Situation:**

In this geographic area, a fertility program is already in place, however, applied nutrients are applied across large acreages based on a lack of representative soil samples or analyses. The current NM system may or may not meet 590 standards, however, could be improved by more strategic nutrient applications. Because whole fields are fertilized with the same rate, excess nutrients may be applied in some areas while inadequate amounts of nutrients are applied in other areas. Due to the mono-application rate, excess nutrients are transported to surface waters through runoff or erosion or to ground water from leaching in quantities that degrade water quality and limit use of intended purposes. Soil quality may be degraded by excess or inadequate nutrients. Fertilizer applications are made in their entirety more than 30 days prior to planting. Applications do not consider the detrimental affects of improper timing or improper rates. Whole fields with like crops and rotation are fertilized the same.

**After Situation:**

Soil testing is completed in a fashion that provides a representative assessment of nutrient concentrations in each management zone. Soil sampling consists of methods that allow for various zones to be established. Zone maps are created and a nutrient budget developed for each zone. An application rate (prescription) is developed for each zone based on representative soil analysis and zone nutrient budget. Nutrient applications are based on LGU recommendations. Soil testing is completed annually for N and at least once every three years for P-K. A nutrient budget is developed for each field annually. Application of nutrients is completed so that non-point source pollution is minimized. Nutrients are applied based on realistic yield expectations. Records are maintained for all nutrient applications and soil testing. Record keeping will include all soil tests, analysis, zone maps, nutrient prescriptions and budgets, and as-applied applications.

**Feature Measure:** <Unknown>

**Scenario Unit::** Acre

**Scenario Typical Size:** 40

**Total Scenario Cost:** $1,443.74

**Scenario Cost/Unit:** $36.09

**Cost Details:**

| Component Name | ID | Description | Unit | Cost | QTY | Total |
|---|---|---|---|---|---|---|
| **Equipment Installation** | | | | | | |
| Truck, Pickup | 939 | Equipment and power unit costs. Labor not included. | Hour | $19.82 | 1 | $19.82 |
| Fertilizer, precision application | 952 | Fertilizer application performed by light bar/GPS navigation system. Includes equipment, power unit and labor costs. | Acre | $10.44 | 40 | $417.60 |
| All terrain vehicles, ATV | 965 | Includes equipment, power unit and labor costs. | Hour | $29.73 | 2 | $59.46 |
| **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. | Hour | $18.93 | 2 | $37.86 |
| Specialist Labor | 235 | Labor requiring a specialized skill set: Includes Agronomists, Foresters, Biologists, etc. to provide additional technical information during the planning and implementation of the practice. Does not include NRCS or TSP services. | Hour | $91.60 | 3 | $274.80 |
| **Materials** | | | | | | |
| Nitrogen-Urease inhibitor | 260 | Nitrogen-Urease inhibitor | Acre | $10.59 | 40 | $423.60 |
| Test, Soil Test, Precision, Grid or Zone | 300 | Includes materials, shipping, labor, and equipment costs. | Each | $14.04 | 15 | $210.60 |

**Practice:** 590 - Nutrient Management

**Scenario** #7 - Advanced NM Precision System

**Scenario Description:**

This scenario describes the implementation of an advanced precision nutrient management system on cropland. The planned NM system will meet the current 590 standard. Payment for implementation is to defray the costs of soil testing, analysis, consultant services, skilled labor and specialized nutrient application that provide proper nutrient recommendations based on LGU recommendations or crop removal rates and an associated nutrient budget, recordkeeping, and monitoring on a precision level that includes split applications, NDVI sensing, and aerial imaging. Records demonstrating implementation of the 4 R's of the NM plan will be required. This scenario goes beyond the basic precision system by using technologies that improve efficiency and effectiveness of nutrient management by utilizing specialized precision techniques and tools (variable rate applicators, NDVI, aerial photography, yield monitoring). Precision nutrient mgmt techniques ensure that the right rate, proper timing, and proper placement of nutrients minimize non-point source pollution and provide proper amounts of nutrients to the crop where it is needed and not applying where it is not needed.

**Before Situation:**

In this geographic area, a fertility program is already in place, however, application of nutrients across large acreages is based on a lack of representative soil samples or analyses. The current NM system may or may not meet 590 standards, however, could be improved by reducing nutrient inputs and utilizing precise mapping and diagnostic equipment. Because whole fields are often fertilized with the same rate, excess nutrients may be applied in some areas while inadequate amounts of nutrients are applied in other areas. Nutrients are transported to surface waters through runoff or erosion or to ground water from leaching in quantities that degrade water quality and limit use of intended purposes. Soil quality may be degraded by excess or inadequate nutrients. Fertilizer applications are made in their entirety more than 30 days prior to planting. Applications do not consider the detrimental affects of improper timing or improper rates. Whole fields with like crops and rotation are fertilized the same.

**After Situation:**

Soil testing is completed in a fashion that provides a representative assessment of nutrient concentrations in each management zone, real time NDVI (normalized differenced vegetative index) sensing, EC Index type sampling, or via high definition aerial photography that allows for the identification of numerous variations (zones) in a planning unit. Zone maps are created and a nutrient budget developed for each zone. An application rate (prescription) is developed for each zone based on representative soil analysis and a zone nutrient budget. Soil testing is completed annually for N and at least once every three years for P-K. A nutrient budget is developed for each field annually. Application of nutrients is completed so that non-point source pollution is minimized. Nutrients are applied based on realistic yield expectations. The average field size is >=40acres. Applications of nutrients are completed using a GPS guided variable rate fertilizer applicator. Applications of nutrients will be completed in split applications where a majority of the N needs are applied based on the needs of the crop based on growing season requirements. Advanced training may be needed to effectively implement the practice. Producer will attend training courses and use specialized labor where needed in the annual maintenance of the NM plan. Record keeping will include all soil tests, analysis, zone maps, nutrient prescriptions and budgets, and as-applied applications. Yield monitoring maps will be collected and utilized (where technology allows) to develop the following year nutrient applications.

**Feature Measure:** <Unknown>

**Scenario Unit::** Acre

**Scenario Typical Size:** 40

**Total Scenario Cost:** $1,722.44

**Scenario Cost/Unit:** $43.06

**Cost Details:**

| Component Name | ID | Description | Unit | Cost | QTY | Total |
|---|---|---|---|---|---|---|
| **Equipment Installation** | | | | | | |
| Truck, Pickup | 939 | Equipment and power unit costs. Labor not included. | Hour | $19.82 | 3 | $59.46 |
| Fertilizer, precision application | 952 | Fertilizer application performed by light bar/GPS navigation system. Includes equipment, power unit and labor costs. | Acre | $10.44 | 40 | $417.60 |
| All terrain vehicles, ATV | 965 | Includes equipment, power unit and labor costs. | Hour | $29.73 | 4 | $118.92 |
| Satellite imagery, aerial photography, infrared | 966 | Infrared imagery | Acre | $0.17 | 40 | $6.80 |
| **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. | Hour | $25.08 | 2 | $50.16 |
| 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. | Hour | $18.93 | 3 | $56.79 |
| Specialist Labor | 235 | Labor requiring a specialized skill set: Includes Agronomists, Foresters, Biologists, etc. to provide additional technical information during the planning and implementation of the practice. Does not include NRCS or TSP services. | Hour | $91.60 | 4 | $366.40 |
| **Materials** | | | | | | |

| | | | | | |
|---|---|---|---|---|---|
| Nitrogen-Urease inhibitor | 260 Nitrogen-Urease inhibitor | Acre | $10.59 | 40 | $423.60 |
| Test, Soil Test, Precision, Grid or Zone | 300 Includes materials, shipping, labor, and equipment costs. | Each | $14.04 | 15 | $210.60 |
| Test, Soil Nitrogen Testing | 311 Pre-Side Dress/Deep Soil Testing. Includes materials and shipping only. | Each | $12.11 | 1 | $12.11 |

**Practice:** 590 - Nutrient Management

**Scenario** #8 - Adaptive NM

**Scenario Description:**

The practice scenario is for the implementation of nutrient management on a small plot. 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 (right source, right rate, right timing and right placement) by following the procedures outlined in Agronomy Technical Note 6 - Adaptive Nutrient Management. Implementation involves establishing the replicated plots to evaluate one or more of the 4 R's. The plot will consist of 4 replicated plots designed, laid out, managed and evaluated with the assistance of a consultant knowledgeable in nutrient management. Results are used to make nutrient application decisions to address water quality degradation issues and nutrient use efficiencies. Yields will be measured and statistically summarized following the procedures in Agronomy Technical Note 6 - Adaptive Nutrient Management. The yields for each plot will be adjusted to the appropriate moisture content.

**Feature Measure:** <Unknown>

**Scenario Unit::** Each

**Scenario Typical Size:** 1

**Total Scenario Cost:** $1,788.25

**Scenario Cost/Unit:** $1,788.25

**Cost Details:**

| Component Name | ID | Description | Unit | Cost | QTY | Total |
|---|---|---|---|---|---|---|
| **Equipment Installation** | | | | | | |
| Satellite imagery, aerial photography, infrared | 966 | Infrared imagery | Acre | $0.17 | 1 | $0.17 |
| **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. | Hour | $18.93 | 16 | $302.88 |
| Specialist Labor | 235 | Labor requiring a specialized skill set: Includes Agronomists, Foresters, Biologists, etc. to provide additional technical information during the planning and implementation of the practice. Does not include NRCS or TSP services. | Hour | $91.60 | 10 | $916.00 |
| **Materials** | | | | | | |
| Test, Soil Test, Standard | 299 | Includes materials, shiping, labor, and equipment costs. | Each | $10.13 | 2 | $20.26 |
| Test, Plant Tissue Test | 301 | Tissue analysis for crops. Includes materials and shipping only. | Each | $27.10 | 14 | $379.40 |
| Test, Soil Nitrogen Testing | 311 | Pre-Side Dress/Deep Soil Testing. Includes materials and shipping only. | Each | $12.11 | 14 | $169.54 |

**Practice:** 591 - Amendments for the Treatment of Agricultural Waste

**Scenario** #1 - Litter Amendments for Air Quality With Partially Treated Brood Chamber

**Scenario Description:**

This practice scenario includes the application of a litter treatment amendment that is approved by NRCS to the entire poultry house to reduce ammonia emissions from the house and facilitate manure management. An entire poultry house is treated year round for air quality impacts. In the winter, the producer or integrator treats the brood chamber between flocks with litter amendments solely for bird health and production. The amount being applied by the producer or integrator in winter months does not meet the air quality resource concerns. Additional litter amendments are added in winter for Air Quality benefits not being applied by the integrator. Litter amendments are applied spring through fall for entire flocks. NRCS is not responsible for the litter amendments already being applied by the integrator for the purposes of production and bird health. The purpose of the practice is to address resource concerns related to air quality impacts due to particulate matter and precursors, and objectionable odors. Associated practices: Nutrient Management (590).

**Before Situation:**

No litter amendments are being applied during the spring through fall months. An amendment is being applied at a lower application rate during the winter months, typically half the house and only two flocks. Partial winter application is solely for production purposes and the lower application rate is not enough to address the air quality resource concerns. The operation raises 4 flocks per year and the integrator partially treats 2 flocks in the winter months. Approximately 18.7% of the needed litter amendments are being applied and only during the winter months.

**After Situation:**

An NRCS approved amendment is applied between each flock. All flocks are optimally treated with litter amendments year-round. A typical broiler operation with 4 flocks in a 42' x 500' house (21,000 square feet) is treated to reduce the impacts on air quality. Typically 100 pounds of litter amendments per 1000 square feet are applied 4 times annually. The total amendment applied is adjusted by 81.3% to account for the portion of the brood chamber that is receiving partial application during the winter months. The amendment is proven to control the odor, to reduce ammonia emissions from the litter. The selected amendment is applied in conformance with the manufacturer's recommendations and the rates required. The resulting litter contains higher levels of nutrients and nutrient management plans must account for this. Nutrient level testing of the litter and nutrient planning shall be in conformance with CPS Nutrient Management, Code 590. The amendment successfully addresses the air quality impacts from objectionable odors, ammonia emissions, PM and PM precursors and bird health resource concerns. Formula to calculate the number of 1000 SF units:(Square Feet of house) / 1000 SF X (Number of houses) X (Number of applications/year) = Number of 1000SF/year. 21,000 SF / 1000 SF X 1 house X 4 app/yr = 84 units of 1000SF

**Feature Measure:** Number of 1000SF applications per

**Scenario Unit::** 1,000 Square Foot

**Scenario Typical Size:** 84

**Total Scenario Cost:** $2,333.62

**Scenario Cost/Unit:** $27.78

**Cost Details:**

| Component Name | ID | Description | Unit | Cost | QTY | Total |
|---|---|---|---|---|---|---|
| **Equipment Installation** | | | | | | |
| Application of ag waste amendment for poultry litter | 2020 | Litter amendment application performed in house. Includes equipment, power unit and labor costs. | Ton | $52.97 | 3.4 | $180.10 |
| **Materials** | | | | | | |
| Ag Waste Amendment, sodium bisulfate | 1686 | Sodium bisulfate poultry litter amendment. NRCS approved for air quality concerns to reduce ammonia emissions from the litter. Includes materials only. | Ton | $633.39 | 3.4 | $2,153.53 |

**Practice:** 591 - Amendments for the Treatment of Agricultural Waste

**Scenario** #2 - Litter Amendments for Water Quality With Partially Treated Brood Chamber

**Scenario Description:**

This practice scenario includes the application of a litter treatment amendment that is approved by NRCS to the entire poultry house to reduce ammonia emissions and water-soluble phosphorous in the poultry litter. An entire poultry house is treated year round for air and water quality impacts. In the winter, the producer or integrator treats the brood chamber between flocks with litter amendments solely for bird health and production. The amount being applied by the producer or integrator in winter months does not meet the air and water quality resource concerns. Additional litter amendments are added in winter for Air Quality benefits not being applied by the integrator. Litter amendments are applied spring through fall for entire flocks. NRCS is not responsible for the litter amendments already being applied by the integrator for the purposes of production and bird health. The purpose of the practice is to address resource concerns related to water quality degradation due to excess nutrients and pathogens and air quality impacts due to particulate matter and associated precursors, and objectionable odors.Associated practices: Nutrient Management (590).

**Before Situation:**

No litter amendments are being applied during the spring through fall months. An amendment is being applied at a lower application rate during the winter months, typically half the house and only two flocks. Partial winter application is solely for production purposes and the lower application rate is not enough to address resource concerns from existing nutrient levels which may contribute to water quality degradation from nutrient runoff and leaching from fields fertilized with poultry litter and cause adverse air quality impacts such as objectionable odors and ammonia emissions.. The operation raises 4 flocks per year and the integrator partially treats 2 flocks in the winter months. Approximately 18.7% of the needed litter amendments are being applied and only during the winter months.

**After Situation:**

An NRCS approved amendment is applied between each flock. All flocks are optimally treated with litter amendments year-round. A typical broiler operation with 4 flocks in a 42' x 500' house (21,000 square feet) is treated to reduce the impacts on air and water quality. Typically 100 pounds of litter amendments per 1000 square feet are applied 4 times annually. The total amendment applied is adjusted by 81.3% to account for the portion of the brood chamber that is receiving partial application during the winter months. The amendment is proven to reduce ammonia emissions and soluble phosphorus in the litter. The selected amendment is applied in conformance with the manufacturer's recommendations and the rates required. The resulting litter contains higher levels of nutrients and nutrient management plans must account for this. Nutrient level testing of the litter and nutrient planning shall be in conformance with CPS Nutrient Management, Code 590. The amendment successfully addresses water quality degradation from nutrients in surface and ground water and air quality impacts due to objectionable odors, ammonia emissions, PM and PM precursors and bird health resource concerns. Formula to calculate the number of 1000 SF units:(Square Feet of house) / 1000 SF X (Number of houses) X (Number of applications/year) = Number of 1000SF/year. 21,000 SF / 1000 SF X 1 house X 4 app/yr = 84 units of 1000SF

**Feature Measure:** Number of 1000SF applications per

**Scenario Unit::** 1,000 Square Foot

**Scenario Typical Size:** 84

**Total Scenario Cost:** $2,253.83

**Scenario Cost/Unit:** $26.83

**Cost Details:**

| Component Name | ID | Description | Unit | Cost | QTY | Total |
|---|---|---|---|---|---|---|
| **Equipment Installation** | | | | | | |
| Application of ag waste amendment for poultry litter | 2020 | Litter amendment application performed in house. Includes equipment, power unit and labor costs. | Ton | $52.97 | 3.4 | $180.10 |
| **Materials** | | | | | | |
| Ag Waste Amendment, aluminum sulfate, alum | 1684 | Aluminum sulfate, alum, poultry Litter amendment. NRCS approved for air and water quality concerns to reduce ammonia emissions and soluble phosphorus in the litter. Materials only. | Ton | $609.92 | 3.4 | $2,073.73 |

**Practice:** 591 - Amendments for the Treatment of Agricultural Waste

**Scenario** #3 - Litter Amendments applied for Air Quality resource concerns

**Scenario Description:**

This practice scenario includes the application of a litter treatment amendment that is approved by NRCS to the entire poultry house to reduce ammonia emissions from the house and facilitate manure management. The amendment used is proven to reduce ammonia levels in the house by transforming nitrogen into a form of ammonium. The purpose of the practice is to address resource concerns from existing nutrient levels that may contribute to air quality impacts such as objectionable odors and ammonia emissions and impacts on bird health due to excess nutrients and pathogens.Associated practices: Nutrient Management (590).

**Before Situation:**

Integrator does not currently apply waste treatment amendments to the litter that reduce ammonia emissions.

**After Situation:**

This scenario is based on a typical poultry operation with a 2-house facility and each house size is 40' x 400', 16,000 SF. An NRCS approved amendment is applied between flocks, 5 flocks annually, at rate required to meet air quality resource concern, typically 100 pounds per 1000 SF. Formula to calculate the amount of amendment per year on a 1000 SF basis:(Square Feet of house) / 1000 SF X (Number of houses) X (Number of Applications per Year)= Number of 1000SF. 16,000 SF / 1000 SF X 2 houses X 5 applications/year= 160 units of 1000SFAn NRCS approved amendment is applied between each flock, 5 applications, at rate required for treatment to address air quality resource concerns. For most products, this is 100 pounds per 1000 SF. The amendment is proven to control the odor, and to reduce ammonia emissions. The selected amendment is applied in conformance with the manufacturer's recommendations and the rates required. The resulting litter contains higher levels of nutrients and nutrient management plans must account for this. Nutrient level testing of the litter and nutrient planning shall be in conformance with CPS Nutrient Management, Code 590. The amendment successfully addresses the air quality impacts of objectionable odors, ammonia emissions, PM and PM precursors and bird health resource concerns.

**Feature Measure:** Number of 1000SF applications per

**Scenario Unit::** 1,000 Square Foot

**Scenario Typical Size:** 160

**Total Scenario Cost:** $5,490.88

**Scenario Cost/Unit:** $34.32

**Cost Details:**

| Component Name | ID | Description | Unit | Cost | QTY | Total |
|---|---|---|---|---|---|---|
| **Equipment Installation** | | | | | | |
| Application of ag waste amendment for poultry litter | 2020 | Litter amendment application performed in house. Includes equipment, power unit and labor costs. | Ton | $52.97 | 8 | $423.76 |
| **Materials** | | | | | | |
| Ag Waste Amendment, sodium bisulfate | 1686 | Sodium bisulfate poultry litter amendment. NRCS approved for air quality concerns to reduce ammonia emissions from the litter. Includes materials only. | Ton | $633.39 | 8 | $5,067.12 |

**Practice:** 591 - Amendments for the Treatment of Agricultural Waste

**Scenario** #4 - Liquid Animal Waste Amendment

**Scenario Description:**

This practice scenario includes the treatment of liquid animal waste for odor control. The purpose of the practice is to address resource concerns related to air quality impacts from objectionable odors caused by manure storage in a facility close to a small town. Associated practices: Nutrient Management (590), Waste Storage Facility (313).

**Before Situation:**

Before application of the waste amendment, the liquid manure in the storage facility is creating significant odor problems. The producer is receiving complaints from neighbors.

**After Situation:**

This practice scenario is applicable for all types of liquid animal waste. A swine operation has been chosen for this scenario example. Typical implementation scenario is a pit under a swine production building for 1180 head of lactating sows, 400 lb each. The pit is 100' x 140' x 8' deep; 1' freeboard and 1' unpumpable sludge reduces working depth to 6'. This scenario is based on the working volume of manure stored and treated per year. The working volume in the manure storage facility is 84,000 cubic feet, and the facility is emptied every 6 months. The resulting total annual working volume of manure to be treated with the amendment is 168,000 cubic feet. An NRCS approved amendment is applied periodically according to manufacturer's instructions, typically on a monthly basis. The manufacturer's recommended dosage is based on the volume of manure added to the waste storage facility between amendment doses. The resulting waste contains higher levels of nutrients, which is accounted for in the nutrient management plan. Nutrient level testing of the liquid manure and nutrient planning is done in conformance with CPS Nutrient Management, Code 590. The amendment is proven to reduce odor by up to 83%, and successfully reduces the objectionable odors on the site. Complaints from neighbors are no longer received.

**Feature Measure:** Cubic Feet of required manure stor

**Scenario Unit::** Cubic Foot

**Scenario Typical Size:** 168000

**Total Scenario Cost:** $3,173.58

**Scenario Cost/Unit:** $0.02

**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. | Hour | $18.93 | 6 | $113.58 |
| **Materials** | | | | | | |
| Ag Waste Amendment, digestive enzymes, 10 liter container | 1688 | 10 liter container of an organic manure amendment. Liquefied lignite coal. Materials only. | Each | $90.00 | 34 | $3,060.00 |

**Practice:** 591 - Amendments for the Treatment of Agricultural Waste

**Scenario** #5 - Litter Amendments applied on a percent Soluble P Reduced for Water Quality Impacts

**Scenario Description:**

This practice scenario includes the application of a litter treatment amendment that is approved by NRCS to the entire poultry house to reduce water-soluble phosphorous in the poultry litter by a specified percentage. The amendment used is proven to transform nitrogen into a form of ammonium and reduce the concentration of water-soluble phosphorous in the litter and reduces ammonia levels in the house. Resource concerns from existing nutrient levels may contribute to water quality degradation from nutrient runoff and leaching from fields fertilized with poultry litter and air quality impacts such as objectionable odors and ammonia emissions.Associated practices: Nutrient Management (590).

**Before Situation:**

Integrator does not currently apply waste treatment amendments to the litter that reduce ammonia emissions and soluble phosphorus.

**After Situation:**

This scenario is based on a typical poultry operation with a desired application rate is to reduce % soluble of a phosphorus binding amendment (P) by weight of the P to litter (25%, 37.5%, 50% P reduced /ton of litter). 25% Soluble P reduced use 67 lbs. Alum per ton of litter, 37.5% Soluble P Reduced use 100 lbs. alum per ton of litter and 50% soluble P reduced use 133 lbs. alum per ton of litter. Typical operation consists of 2 houses, 40' x 500' house (20,000 SF), 21,000 birds (4 pound finished bird weight). The operation raises 5 flocks per year. 37.5 % soluble P reduced for this operation. Estimated cost is based on the following formula to calculate required amendment at the prescribed rate in tons per year of Alum is: (Number of houses ) x (Number of Flocks per year) x (Number of birds) X (Finish weight of birds (lbs)) X (Pounds of litter)/bird) x (1 ton per 2000 lbs.) x (application rate of Alum for the % Soluble P reduced per ton of litter) x (1 ton per 2000 lbs.)= 37.5% soluble P reduced: 2 houses x 21,000 birds per house X 4 lbs. per bird X 0.50 lb litter/bird x 1 ton / 2000 lbs. X 100 lbs. Alum per ton of litter x 1 ton per 2000 lb = 2.1 tons / application. An NRCS approved amendment is applied between each flock at the prescribed rate up to 5 applications (5 flocks per year). The selected amendment is applied in conformance with the manufacturer's recommendations and the rates required. The amendment is proven to reduce soluble phosphorus in the litter, to control the odor, and to reduce ammonia emissions. The resulting litter contains higher levels of nutrients and nutrient management plans must account for this. Nutrient level testing of the litter and nutrient planning shall be in conformance with CPS Nutrient Management, Code 590. The amendment successfully addresses water quality degradation due to nutrients in surface and ground water and air quality impacts from objectionable odors, ammonia emissions, PM and PM precursors and bird health resource concerns.

**Feature Measure:** Tons of admendment per applicati

**Scenario Unit::** Ton

**Scenario Typical Size:** 2.1

**Total Scenario Cost:** $1,392.07

**Scenario Cost/Unit:** $662.89

**Cost Details:**

| Component Name | ID | Description | Unit | Cost | QTY | Total |
|---|---|---|---|---|---|---|
| **Equipment Installation** | | | | | | |
| Application of ag waste amendment for poultry litter | 2020 | Litter amendment application performed in house. Includes equipment, power unit and labor costs. | Ton | $52.97 | 2.1 | $111.24 |
| **Materials** | | | | | | |
| Ag Waste Amendment, aluminum sulfate, alum | 1684 | Aluminum sulfate, alum, poultry Litter amendment. NRCS approved for air and water quality concerns to reduce ammonia emissions and soluble phosphorus in the litter. Materials only. | Ton | $609.92 | 2.1 | $1,280.83 |

**Practice:** 595 - Integrated Pest Management (IPM)

**Scenario** #1 - Basic IPM Field 1RC

**Scenario Description:**

A basic IPM plan with LGU-approved pest monitoring techniques and pest thresholds (where available) is applied in Large Scale Field/Forage Crops to address one identified resource concern (e.g. Water Quality - Impacts to Human Drinking Water) with either risk prevention (e.g. planned pesticides have no risk to the identified resource concern) or risk mitigation (e.g. planned pesticides have appropriate mitigation planned from Agronomy Technical Note 5 for Intermediate, High, or Extra High WIN-PST Final Hazard Ratings.

**Before Situation:**

Before practice conditions vary widely. Conditions range from the client is not using many pest suppression techniques (pesticides, tillage for weed control, burning, etc.) to the client is using many different pest suppression techniques for many different pests, but in all cases at least one planned pest suppression technique has risk to an identified resource concern (e.g. Water Quality - Impacts to Human Drinking Water).

**After Situation:**

After implementing the 595 practice, a basic IPM system has been implemented with Land Grant University approved pest monitoring techniques and pest thresholds (where available) to help meet the minimum criteria for one identified rresource concern (e.g. Water Quality - Impacts to Human Drinking Water) with either risk prevention (e.g. planned pesticides have no risk to the identified resource concern) or risk mitigation (e.g. planned pesticides have appropriate mitigation planned from Agronomy Technical Note 5 for “Intermediate”, “High” or “Extra High” WIN-PST Final Hazard Ratings).

**Feature Measure:** <Unknown>

**Scenario Unit::** Acre

**Scenario Typical Size:** 40

**Total Scenario Cost:** $599.76

**Scenario Cost/Unit:** $14.99

**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. | Hour | $25.08 | 2 | $50.16 |
| Specialist Labor | 235 | Labor requiring a specialized skill set: Includes Agronomists, Foresters, Biologists, etc. to provide additional technical information during the planning and implementation of the practice. Does not include NRCS or TSP services. | Hour | $91.60 | 6 | $549.60 |

**Practice:** 595 - Integrated Pest Management (IPM)

**Scenario** #2 - Basic IPM Field >1RC

**Scenario Description:**

A basic IPM plan with LGU-approved pest monitoring techniques and pest thresholds (where available) is applied in Large Scale Field/Forage Crops to address multiple identified resource concerns (e.g. Water Quality - Impacts to Human Drinking Water and Pollinator Impacts) with either risk prevention (e.g. planned pesticides have no risks to the identified resource concerns) or risk mitigation (e.g. planned pesticides have appropriate mitigation planned from Agronomy Technical Note 5 for Intermediate, High, or Extra High WIN-PST Final Hazard Ratings).

**Before Situation:**

Before practice conditions vary widely. Conditions range from the client is not using many pest suppression techniques (pesticides, tillage for weed control, burning, etc.) to the client is using many different pest suppression techniques for many different pests, but in all cases at least one planned pest suppression technique has risk to two or more identified resource concerns (e.g. Water Quality- Impacts to Human Drinking Water and Impacts on Pollinators).

**After Situation:**

After implementing the 595 practice, a basic IPM system has been implemented with Land Grant University approved pest monitoring techniques and pest thresholds (where available) to help meet the minimum criteria for one identified rresource concern (e.g. Water Quality - Impacts to Human Drinking Water) with either risk prevention (e.g. planned pesticides have no risk to the identified resource concern) or risk mitigation (e.g. planned pesticides have appropriate mitigation planned from Agronomy Technical Note 5 for “Intermediate”, “High” or “Extra High” WIN-PST Final Hazard Ratings).

**Feature Measure:** <Unknown>

**Scenario Unit::** Acre

**Scenario Typical Size:** 40

**Total Scenario Cost:** $808.04

**Scenario Cost/Unit:** $20.20

**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. | Hour | $25.08 | 3 | $75.24 |
| 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. | Hour | $91.60 | 8 | $732.80 |

**Practice:** 595 - Integrated Pest Management (IPM)

**Scenario** #3 - Advanced Field All RCs

**Scenario Description:**

A comprehensive IPM plan with LGU-approved pest prevention, avoidance and monitoring techniques and pest thresholds (where available) is applied in Large Scale Field/Forage Crops to address all identified resource concerns with either risk prevention (e.g. planned pesticides have no risk to the identified resource concerns) or risk mitigation (e.g. planned pesticides have appropriate mitigation planned from Agronomy Technical Note 5 for Intermediate, High, or Extra High WIN-PST Final Hazard Ratings).

**Before Situation:**

Before practice conditions vary widely. Conditions range from the client is not using many pest suppression techniques (pesticides, tillage for weed control, burning, etc.) to the client is using many different pest suppression techniques for many different pests, but in all cases at least one planned pest suppression technique has risk to an identified resource concern (e.g. Water Quality - Impacts to Human Drinking Water).

**After Situation:**

After implementing the 595 practice, a basic IPM system has been implemented with Land Grant University approved pest monitoring techniques and pest thresholds (where available) to help meet the minimum criteria for one identified rresource concern (e.g. Water Quality - Impacts to Human Drinking Water) with either risk prevention (e.g. planned pesticides have no risk to the identified resource concern) or risk mitigation (e.g. planned pesticides have appropriate mitigation planned from Agronomy Technical Note 5 for “Intermediate”, “High” or “Extra High” WIN-PST Final Hazard Ratings).

**Feature Measure:** <Unknown>

**Scenario Unit::** Acre

**Scenario Typical Size:** 40

**Total Scenario Cost:** $1,199.52

**Scenario Cost/Unit:** $29.99

**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. | Hour | $25.08 | 4 | $100.32 |
| Specialist Labor | 235 | Labor requiring a specialized skill set: Includes Agronomists, Foresters, Biologists, etc. to provide additional technical information during the planning and implementation of the practice. Does not include NRCS or TSP services. | Hour | $91.60 | 12 | $1,099.20 |

**Practice:** 595 - Integrated Pest Management (IPM)

**Scenario** #4 - Basic IPM Fruit/Veg 1RC

**Scenario Description:**

A basic IPM plan with LGU-approved pest monitoring techniques and pest thresholds (where available) is applied in Large Scale Small Fruit/Vegetable Crops to address one identified resource concern (e.g. Water Quality - Impacts to Human Drinking Water) with either risk prevention (e.g. planned pesticides no risk to the identified resource concern) or risk mitigation (e.g. planned pesticides have appropriate mitigation planned from Agronomy Technical Note 5 for Intermediate, High, or Extra High WIN-PST Final Hazard Ratings).

**Before Situation:**

Before practice conditions vary widely. Conditions range from the client is not using many pest suppression techniques (pesticides, tillage for weed control, burning, etc.) to the client is using many different pest suppression techniques for many different pests, but in all cases at least one planned pest suppression technique has risk to an identified resource concern (e.g. Water Quality - Impacts to Human Drinking Water).

**After Situation:**

After implementing the 595 practice, a basic IPM system has been implemented with Land Grant University approved pest monitoring techniques and pest thresholds (where available) to help meet the minimum criteria for one identified rresource concern (e.g. Water Quality - Impacts to Human Drinking Water) with either risk prevention (e.g. planned pesticides have no risk to the identified resource concern) or risk mitigation (e.g. planned pesticides have appropriate mitigation planned from Agronomy Technical Note 5 for “Intermediate”, “High” or “Extra High” WIN-PST Final Hazard Ratings).).

**Feature Measure:** <Unknown>

**Scenario Unit::** Acre

**Scenario Typical Size:** 10

**Total Scenario Cost:** $833.12

**Scenario Cost/Unit:** $83.31

**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. | Hour | $25.08 | 4 | $100.32 |
| Specialist Labor | 235 | Labor requiring a specialized skill set: Includes Agronomists, Foresters, Biologists, etc. to provide additional technical information during the planning and implementation of the practice. Does not include NRCS or TSP services. | Hour | $91.60 | 8 | $732.80 |

**Practice:** 595 - Integrated Pest Management (IPM)

**Scenario** #5 - Basic IPM Fruit/Veg >1RC

**Scenario Description:**

A basic IPM plan with LGU-approved pest monitoring techniques and pest thresholds (where available) is applied in Large Scale Small Fruit/Vegetable Crops to address multiple identified resource concerns (e.g. Water Quality - Impacts to Human Drinking Water and Pollinator Impacts) with either risk prevention (e.g. planned pesticides have no risk to identified resource concerns) or risk mitigation (e.g. planned pesticides have appropriate mitigation planned from Agronomy Technical Note 5 for Intermediate, High, or Extra High WIN-PST Final Hazard Ratings).

**Before Situation:**

Before practice conditions vary widely. Conditions range from the client is not using many pest suppression techniques (pesticides, tillage for weed control, burning, etc.) to the client is using many different pest suppression techniques for many different pests, but in all cases at least one planned pest suppression technique has risk to two or more identified resource concerns (e.g. Water Quality - Impacts to Human Drinking Water and Impacts on Pollinators).

**After Situation:**

After implementing the 595 practice, a basic IPM system has been implemented with Land Grant University approved pest monitoring techniques and pest thresholds (where available) to help meet the minimum criteria for two or more identified resource concerns (e.g. Water Quality - Impacts to Human Drinking Water and Impacts on Pollinators) with either risk prevention (e.g. planned pesticides have no risk to the identified resource concerns) or risk mitigation (e.g. planned pesticides have appropriate mitigation planned from Agronomy Technical Note 5 for “Intermediate”, “High” or “Extra High” WIN-PST Final Hazard Ratings).gs).

**Feature Measure:** <Unknown>

**Scenario Unit::** Acre

**Scenario Typical Size:** 10

**Total Scenario Cost:** $1,066.48

**Scenario Cost/Unit:** $106.65

**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. | Hour | $25.08 | 6 | $150.48 |
| 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. | Hour | $91.60 | 10 | $916.00 |

**Practice:** 595 - Integrated Pest Management (IPM)

**Scenario** #6 - Advanced IPM Fruit/Veg All RCs

**Scenario Description:**

A comprehensive IPM plan with LGU-approved pest prevention, avoidance and monitoring techniques and pest thresholds (where available) is applied in Large Scale Small Fruit/Vegetable Crops to address all identified resource concerns with either risk prevention (e.g. planned pesticides have no risk to the identified resource concerns) or risk mitigation (e.g. planned pesticides have appropriate mitigation planned from Technical Note 5 for Intermediate, High, or Extra High WIN-PST Final Hazard Ratings).

**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).

**After Situation:**

After implementing the 595 practice, a comprehensive IPM plan with Land Grant University approved pest prevention, avoidance and monitoring techniques and pest thresholds (where available) is applied to help meet the minimum criteria for all identified resource concerns with either risk prevention (e.g. planned pesticides have no risk to the identified resource concerns) or risk mitigation (e.g. planned pesticides have appropriate mitigation planned from Agronomy Technical Note 5 for “Intermediate”, “High” or “Extra High” WIN-PST Final Hazard Ratings).s).

**Feature Measure:** <Unknown>

**Scenario Unit::** Acre

**Scenario Typical Size:** 10

**Total Scenario Cost:** $1,624.80

**Scenario Cost/Unit:** $162.48

**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. | Hour | $25.08 | 10 | $250.80 |
| 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. | Hour | $91.60 | 15 | $1,374.00 |

**Practice:** 595 - Integrated Pest Management (IPM)

**Scenario** #7 - Basic IPM Orchard 1RC

**Scenario Description:**

A basic IPM plan with LGU-approved pest monitoring techniques and pest thresholds (where available) is applied in Large Scale Orchard/Specialty Crops to address one identified resource concern (e.g. Water Quality - Impacts to Human Drinking Water) with either risk prevention (e.g. planned pesticides have no risk to the identified resource concern) or risk mitigation (e.g. planned pesticides have appropriate mitigation planned from Agronomy Technical Note 5 for Intermediate, High, or Extra High WIN-PST Final Hazard Ratings).).

**Before Situation:**

Before practice conditions vary widely. Conditions range from the client is not using many pest suppression techniques (pesticides, tillage for weed control, burning, etc.) to the client is using many different pest suppression techniques for many different pests, but in all cases at least one planned pest suppression technique has risk to an identified resource concern (e.g. Water Quality - Impacts to Human Drinking Water).

**After Situation:**

After implementing the 595 practice, a basic IPM system has been implemented with Land Grant University approved pest monitoring techniques and pest thresholds (where available) to help meet the minimum criteria for at least one identified resource concern (e.g. Water Quality - Impacts to Human Drinking Water) with either risk prevention (e.g. planned pesticides have no risk to the identified resource concern) or risk mitigation (e.g. planned pesticides have appropriate mitigation planned from Agronomy Technical Note 5 for “Intermediate”, “High” or “Extra High” WIN-PST Final Hazard Ratings).gs).

**Feature Measure:** <Unknown>

**Scenario Unit::** Acre

**Scenario Typical Size:** 10

**Total Scenario Cost:** $1,066.48

**Scenario Cost/Unit:** $106.65

**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. | Hour | $25.08 | 6 | $150.48 |
| 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. | Hour | $91.60 | 10 | $916.00 |

**Practice:** 595 - Integrated Pest Management (IPM)

**Scenario** #8 - Basic IPM Orchard >1RC

**Scenario Description:**

A basic IPM plan with LGU-approved pest monitoring techniques and pest thresholds (where available) is applied in Large Scale Orchard/Specialty Crops to address multiple identified resource concerns (e.g. Water Quality - Impacts to Human Drinking Water and Pollinator Impacts) with either risk prevention (e.g. planned pesticides have no risks to identified resource concerns) or risk mitigation (e.g. planned pesticides have appropriate mitigation planned from Agronomy Technical Note 5 for Intermediate, High, or Extra High WIN-PST Final Hazard Ratings).

**Before Situation:**

Before practice conditions vary widely. Conditions range from the client is not using many pest suppression techniques (pesticides, tillage for weed control, burning, etc.) to the client is using many different pest suppression techniques for many different pests, but in all cases at least one planned pest suppression technique has risk to two or more identified resource concerns (e.g. Water Quality - Impacts to Human Drinking Water and Impacts on Pollinators).

**After Situation:**

After implementing the 595 practice, a basic IPM system has been implemented with Land Grant University approved pest monitoring techniques and pest thresholds (where available) to help meet the minimum criteria for two or more identified resource concerns (e.g. Water Quality - Impacts to Human Drinking Water and Impacts on Pollinators) with either risk prevention (e.g. planned pesticides have no risk to the identified resource concerns) or risk mitigation (e.g. planned pesticides have appropriate mitigation planned from Agronomy Technical Note 5 for “Intermediate”, “High” or “Extra High” WIN-PST Final Hazard Ratings).gs).

**Feature Measure:** <Unknown>

**Scenario Unit::** Acre

**Scenario Typical Size:** 10

**Total Scenario Cost:** $1,624.80

**Scenario Cost/Unit:** $162.48

**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. | Hour | $25.08 | 10 | $250.80 |
| 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. | Hour | $91.60 | 15 | $1,374.00 |

**Practice:** 595 - Integrated Pest Management (IPM)

**Scenario** #9 - Advanced IPM Orchard All RCs

**Scenario Description:**

A comprehensive IPM plan with LGU-approved pest prevention, avoidance and monitoring techniques and pest thresholds (where available) is applied in Large Scale Orchard/Specialty Crops to address all identified resource concerns with either risk prevention (e.g. planned pesticides have no risk to identified resource concerns) or risk mitigation (e.g. planned pesticides have appropriate mitigation planned from Agronomy Technical Note 5 for Intermediate, High, or Extra High WIN-PST Final Hazard Ratings).

**Before Situation:**

Before practice conditions vary widely. Conditions range from the client is not using many pest suppression techniques (pesticides, tillage for weed control, burning, etc.) to the client is using many different pest suppression techniques for many different pests, but in all cases at least one planned pest suppression technique has risk to an identified resource concern (e.g. Water Quality - Impacts to Human Drinking Water).

**After Situation:**

After implementing the 595 practice, a comprehensive IPM plan with Land Grant University approved pest prevention, avoidance and monitoring techniques and pest thresholds (where available) is applied to help meet the minimum criteria for all identified resource concerns with either risk prevention (e.g. planned pesticides have no risk to the identified resource concerns) or risk mitigation (e.g. planned pesticides have appropriate mitigation planned from Agronomy Technical Note 5 for “Intermediate”, “High” or “Extra High” WIN-PST Final Hazard Ratings).s).

**Feature Measure:** <Unknown>

**Scenario Unit::** Acre

**Scenario Typical Size:** 10

**Total Scenario Cost:** $2,459.00

**Scenario Cost/Unit:** $245.90

**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. | Hour | $25.08 | 25 | $627.00 |
| 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. | Hour | $91.60 | 20 | $1,832.00 |

**Practice:** 595 - Integrated Pest Management (IPM)

**Scenario** #10 - IPM S-Farm 1RC

**Scenario Description:**

A basic IPM plan with LGU-approved pest monitoring techniques and pest thresholds (where available) is applied in Small Farm/Diversified Systems (e.g. CSA, organic, etc.) to address one identified resource concern (e.g. Water Quality - Impacts to Human Drinking Water) with either risk prevention (e.g. planned pesticides have no risk to the identified resource concern) or risk mitigation (e.g. planned pesticides have appropriate mitigation planned from Agronomy Technical Note 5 for Intermediate, High, or Extra High WIN-PST Final Hazard Ratings). This scenario attempts to capture the higher cost/acre of planning and implementing IPM techniques on smaller acreages with very diverse cropping systems.

**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).

**After Situation:**

After implementing the 595 practice, a basic IPM system has been implemented with Land Grant University approved pest monitoring techniques and pest thresholds (where available) to help meet the minimum criteria for at least one identified resource concern resource concern (e.g. Water Quality - Impacts to Human Drinking Water) with either risk prevention (e.g. planned pesticides have no risk to the identified resource concern) or risk mitigation (e.g. planned pesticides have appropriate mitigation planned from Agronomy Technical Note 5 for “Intermediate”, “High” or “Extra High” WIN-PST Final Hazard Ratings).gs).

**Feature Measure:** <Unknown>

**Scenario Unit::** Each

**Scenario Typical Size:** 1

**Total Scenario Cost:** $508.16

**Scenario Cost/Unit:** $508.16

**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. | Hour | $25.08 | 2 | $50.16 |
| Specialist Labor | 235 | Labor requiring a specialized skill set: Includes Agronomists, Foresters, Biologists, etc. to provide additional technical information during the planning and implementation of the practice. Does not include NRCS or TSP services. | Hour | $91.60 | 5 | $458.00 |

**Practice:** 595 - Integrated Pest Management (IPM)

**Scenario** #11 - IPM S-Farm >1RC

**Scenario Description:**

A basic IPM plan with LGU-approved pest monitoring techniques and pest thresholds (where available) is applied in Small Farm/ Diversified Systems (e.g. CSA, organic, etc.) to address multiple identified resource concerns (e.g. Water Quality - Impacts to Human Drinking Water and Pollinator Impacts) with either risk prevention (e.g. planned pesticides have no risk to the identified resource concerns) or risk mitigation (e.g. planned pesticides have appropriate mitigation planned from Agronomy Technical Note 5 for Intermediate, High, or Extra High WIN-PST Final Hazard Ratings). This scenario attempts to capture the higher cost/acre of planning and implementing IPM techniques on smaller acreages with very diverse cropping systems.

**Before Situation:**

Before practice conditions vary widely. Conditions range from the client is not using many pest suppression techniques (pesticides, tillage for weed control, burning, etc.) to the client is using many different pest suppression techniques for many different pests, but in all cases at least one planned pest suppression technique has risk to two or more identified resource concerns (e.g. Water Quality - Impacts to Human Drinking Water and Impacts on Pollinators).

**After Situation:**

After implementing the 595 practice, a basic IPM system has been implemented with Land Grant University approved pest monitoring techniques and pest thresholds (where available) to help meet the minimum criteria for two or more identified resource concerns (e.g. Water Quality - Impacts to Human Drinking Water and Impacts on Pollinators) with either risk prevention (e.g. planned pesticides have no risk to the identified resource concerns) or risk mitigation (e.g. planned pesticides have appropriate mitigation planned from Agronomy Technical Note 5 for “Intermediate”, “High” or “Extra High” WIN-PST Final Hazard Ratings).ngs).

**Feature Measure:** <Unknown>

**Scenario Unit::** Each

**Scenario Typical Size:** 1

**Total Scenario Cost:** $649.92

**Scenario Cost/Unit:** $649.92

**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. | Hour | $25.08 | 4 | $100.32 |
| Specialist Labor | 235 | Labor requiring a specialized skill set: Includes Agronomists, Foresters, Biologists, etc. to provide additional technical information during the planning and implementation of the practice. Does not include NRCS or TSP services. | Hour | $91.60 | 6 | $549.60 |

**Practice:** 595 - Integrated Pest Management (IPM)

**Scenario** #12 - Advanced IPM S-Farm All RCs

**Scenario Description:**

A comprehensive IPM plan with LGU-approved pest prevention, avoidance and monitoring techniques and pest thresholds (where available) is applied in Small Farm/Diversified Systems (e.g. CSA, Organic, etc.) to address all identified resource concerns with either risk prevention (e.g. planned pesticides have no risk to the identified resource concerns) or risk mitigation (e.g. planned pesticides have appropriate mitigation planned from Agronomy Technical Note 5 for Intermediate, High, or Extra High WIN-PST Final Hazard Ratings). This scenario attempts to capture the higher cost/acre of planning and implementing IPM techniques on smaller acreages with very diverse cropping systems.

**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).

**After Situation:**

After implementing the 595 practice, a comprehensive IPM plan with Land Grant University approved pest prevention, avoidance and monitoring techniques and pest thresholds (where available) is applied to help meet the minimum criteria for all identified resource concerns with either risk prevention (e.g. planned pesticides have no risk to the identified resource concerns) or risk mitigation (e.g. planned pesticides have appropriate mitigation planned from Agronomy Technical Note 5 for Intermediate, High, or Extra High WIN-PST Final Hazard Ratings).

**Feature Measure:** <Unknown>

**Scenario Unit::** Each

**Scenario Typical Size:** 1

**Total Scenario Cost:** $974.88

**Scenario Cost/Unit:** $974.88

**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. | Hour | $25.08 | 6 | $150.48 |
| 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. | Hour | $91.60 | 9 | $824.40 |

**Practice:** 595 - Integrated Pest Management (IPM)

**Scenario** #13 - Risk Prevention IPM All RCs

**Scenario Description:**

A comprehensive IPM plan based primarily on LGU-approved pest prevention and avoidance techniques is applied to prevent negative impacts on all identified resource concerns. LGU-approved pest monitoring techniques and pest thresholds may also be included, but suppression techniques cannot pose any hazards to identified resource concerns. This type of system is very difficult to achieve, but may be most commonly achieved in Organic Systems that already rely heavily on prevention and avoidance techniques.

**Before Situation:**

Before practice conditions vary widely. Conditions range from the client is not using many pest suppression techniques (pesticides, tillage for weed control, burning, etc.) to the client is using many different pest suppression techniques for many different pests, but in all cases at least one planned pest suppression technique has risk to an identified resource concern (e.g. Water Quality - Impacts to Human Drinking Water).

**After Situation:**

After implementing the 595 practice, a comprehensive IPM plan based primarily on Land Grant University approved pest prevention and avoidance techniques is applied to prevent negative impacts on all identified resource concerns. Land Grant University approved pest monitoring techniques and pest thresholds may also be included, but suppression techniques cannot pose any hazards to identified resource concerns.

**Feature Measure:** <Unknown>

**Scenario Unit::** Acre

**Scenario Typical Size:** 10

**Total Scenario Cost:** $1,292.20

**Scenario Cost/Unit:** $129.22

**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. | Hour | $25.08 | 15 | $376.20 |
| 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. | Hour | $91.60 | 10 | $916.00 |

**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 2,500 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 2,500 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::** Foot

**Scenario Typical Size:** 2500

**Total Scenario Cost:** $5,087.95

**Scenario Cost/Unit:** $2.04

**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. | Hour | $112.82 | 34 | $3,835.88 |
| **Labor** | | | | | | |
| Equipment Operators, Heavy | 233 | Includes: Cranes, Hydraulic Excavators >=50 HP, Dozers, Paving Machines, Rock Trenchers, Trenchers >=12", Dump Trucks, Ag Equipment >=150 HP, Scrapers, Water Wagons. | Hour | $23.93 | 34 | $813.62 |
| Supervisor or Manager | 234 | Labor involving supervision or management activities. Includes crew supervisors, foremen and farm/ranch managers time required for adopting new technology, etc. | Hour | $34.29 | 6 | $205.74 |
| **Mobilization** | | | | | | |
| Mobilization, medium equipment | 1139 | Equipment with 70-150 HP or typical weights between 14,000 and 30,000 pounds. | Each | $232.71 | 1 | $232.71 |

**Practice:** 600 - Terrace

**Scenario** #2 - Flat Channel

**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 flat channel (level) terrace storing runoff with a length of 2,500 feet and side slopes of 8:1 or greater in a field with slopes from 2% to 8% constructed in loam soils or similar in regards to workability. 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 flat channel (level) terraces with approximately 8:1 front and back slopes, 2.5 feet height, and 2,500 feet in length 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::** Foot

**Scenario Typical Size:** 2500

**Total Scenario Cost:** $8,301.78

**Scenario Cost/Unit:** $3.32

**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. | Hour | $112.82 | 57 | $6,430.74 |
| **Labor** | | | | | | |
| Equipment Operators, Heavy | 233 | Includes: Cranes, Hydraulic Excavators >=50 HP, Dozers, Paving Machines, Rock Trenchers, Trenchers >=12", Dump Trucks, Ag Equipment >=150 HP, Scrapers, Water Wagons. | Hour | $23.93 | 57 | $1,364.01 |
| Supervisor or Manager | 234 | Labor involving supervision or management activities. Includes crew supervisors, foremen and farm/ranch managers time required for adopting new technology, etc. | Hour | $34.29 | 8 | $274.32 |
| **Mobilization** | | | | | | |
| Mobilization, medium equipment | 1139 | Equipment with 70-150 HP or typical weights between 14,000 and 30,000 pounds. | Each | $232.71 | 1 | $232.71 |

**Practice:** 600 - Terrace

**Scenario** #3 - 5 to 1 and 2 to 1

**Scenario Description:**

An earthen embankment with channel constructed across the field slope as part of a system to shorten slope lengths and reduce sheet, rill, and gully erosion in a cropped field. The typical installation is a system of terraces (2,500 feet in length) that have one relatively flat (5:1) slope and one steep (2:1) slope constructed in a field with slopes from 2% to 8% installed in loam soils or similar soils in regards to workability. The steep slope is established to permanent vegetation with the flatter slope farmed. A stable outlet is provided in the form of a Grassed Waterway or Underground Outlet. Costs include all equipment and forces necessary to excavate, shape, and compact terrace. Seeding is not included. This practice addresses Concentrated Flow Erosion and Excessive Sediment in surface waters.

**Before 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 terraces with one steep (2:1) and one flat (5:1) slope measuring 2,500 feet in length and 2.5' height is installed with spacing designed to intercept flow of water and shorten slope length to reduce erosion to acceptable levels. Work is done with dozer, scraper, or road grader. Associated practices are Critical Area Planting (342), Grassed Waterway (412), and Underground Outlet (620).

**Feature Measure:** Length of Terrace

**Scenario Unit::** Foot

**Scenario Typical Size:** 2500

**Total Scenario Cost:** $2,933.83

**Scenario Cost/Unit:** $1.17

**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. | Hour | $112.82 | 19 | $2,143.58 |
| **Labor** | | | | | | |
| Equipment Operators, Heavy | 233 | Includes: Cranes, Hydraulic Excavators >=50 HP, Dozers, Paving Machines, Rock Trenchers, Trenchers >=12", Dump Trucks, Ag Equipment >=150 HP, Scrapers, Water Wagons. | Hour | $23.93 | 19 | $454.67 |
| Supervisor or Manager | 234 | Labor involving supervision or management activities. Includes crew supervisors, foremen and farm/ranch managers time required for adopting new technology, etc. | Hour | $34.29 | 3 | $102.87 |
| **Mobilization** | | | | | | |
| Mobilization, medium equipment | 1139 | Equipment with 70-150 HP or typical weights between 14,000 and 30,000 pounds. | Each | $232.71 | 1 | $232.71 |

**Practice:** 600 - Terrace

**Scenario** #4 - Narrow Base Less Than 8%

**Scenario Description:**

An earthen embankment with channel constructed across the field slope as part of a system to shorten slope lengths and reduce sheet, rill, and gully erosion in a cropped field. The typical installation is a system of narrow base terraces with 2:1 slopes, 2,500' length, and 2.5' height in a field with slopes from 3% to 8% constructed in loam soils or similar in regards to workability. 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. Permanent vegetation is established. Seeding is not included. 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 narrow base terraces with approximately 2:1 front and back slopes measuring 2,500 feet in length and 2.5 feet height is constructed with spacing designed to intercept flow of water and shorten slope length to reduce erosion to acceptable levels. Work is done with dozer, scraper, or road grader. Associated practices are Critical Area Planting (342), Grassed Waterway (412), and Underground Outlet (620).

**Feature Measure:** Length of Terrace

**Scenario Unit::** Foot

**Scenario Typical Size:** 2500

**Total Scenario Cost:** $3,617.58

**Scenario Cost/Unit:** $1.45

**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. | Hour | $112.82 | 24 | $2,707.68 |
| **Labor** | | | | | | |
| Equipment Operators, Heavy | 233 | Includes: Cranes, Hydraulic Excavators >=50 HP, Dozers, Paving Machines, Rock Trenchers, Trenchers >=12", Dump Trucks, Ag Equipment >=150 HP, Scrapers, Water Wagons. | Hour | $23.93 | 24 | $574.32 |
| Supervisor or Manager | 234 | Labor involving supervision or management activities. Includes crew supervisors, foremen and farm/ranch managers time required for adopting new technology, etc. | Hour | $34.29 | 3 | $102.87 |
| **Mobilization** | | | | | | |
| Mobilization, medium equipment | 1139 | Equipment with 70-150 HP or typical weights between 14,000 and 30,000 pounds. | Each | $232.71 | 1 | $232.71 |

**Practice:** 600 - Terrace

**Scenario** #5 - Narrow Base Greater Than 8%

**Scenario Description:**

An earthen embankment with channel constructed across the field slope as part of a system to shorten slope lengths and reduce sheet, rill, and gully erosion in a cropped field. The typical installation is a system of narrow base terraces with 2:1 slopes, 2,500' length, and 2.5' height in a field with slopes exceeding 8% constructed in loam soils or similar in regards to workability. A stable outlet is provided in the form of a Grassed Waterway or Underground Outlet. Costs include all equipment and forces necessary to excavate, shape, and compact terrace. Permanent vegetation is established. Seeding is not included. This practice addresses Concentrated Flow Erosion and Excessive Sediment in surface waters.

**Before 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 narrow base terraces with approximately 2:1 front and back slopes measuring 2,500 feet in length and 2.5' height is constructed with spacing designed to intercept flow of water and shorten slope length to reduce erosion to acceptable levels. Work is done with dozer, scraper, or road grader. Associated practices are Critical Area Planting (342), Grassed Waterway (412), and Underground Outlet (620).

**Feature Measure:** Length of Terrace

**Scenario Unit::** Foot

**Scenario Typical Size:** 2500

**Total Scenario Cost:** $3,925.37

**Scenario Cost/Unit:** $1.57

**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. | Hour | $112.82 | 26 | $2,933.32 |
| **Labor** | | | | | | |
| Equipment Operators, Heavy | 233 | Includes: Cranes, Hydraulic Excavators >=50 HP, Dozers, Paving Machines, Rock Trenchers, Trenchers >=12", Dump Trucks, Ag Equipment >=150 HP, Scrapers, Water Wagons. | Hour | $23.93 | 26 | $622.18 |
| Supervisor or Manager | 234 | Labor involving supervision or management activities. Includes crew supervisors, foremen and farm/ranch managers time required for adopting new technology, etc. | Hour | $34.29 | 4 | $137.16 |
| **Mobilization** | | | | | | |
| Mobilization, medium equipment | 1139 | Equipment with 70-150 HP or typical weights between 14,000 and 30,000 pounds. | Each | $232.71 | 1 | $232.71 |

**Practice:** 601 - Vegetative Barrier

**Scenario** #1 - Vegetative Barrier: 3-5 ft wide

**Scenario Description:**

Permanent strips of stiff, dense vegetation established along the general contour of slopes or across concentrated flow areas.

**Before Situation:**

Significant erosion is occurring resulting in substantial transport of sediment across the slope or concentrated flow areas. A large amount of sediment is subsequently delivered to the edge of the field and/or waterways.

**After Situation:**

A strip or strips of stiff, dense vegetation three to five feet wide is/are established along the general contour of the slope or across concentrated flow areas that effectively settles a significant amount or sediment above the leading edge of the vegetative barrier.Barrier may also help to connect green areas to provide shelter for wildlife.

**Feature Measure:** Linear feet of practice installed

**Scenario Unit::** Foot

**Scenario Typical Size:** 1000

**Total Scenario Cost:** $9.75

**Scenario Cost/Unit:** $0.01

**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. | Acre | $10.14 | 0.09 | $0.91 |
| Seeding Operation, No Till/Grass Drill | 960 | No Till drill or grass drill for seeding. Includes equipment, power unit and labor costs. | Acre | $19.43 | 0.09 | $1.75 |
| **Materials** | | | | | | |
| One Species, Warm Season, Native Perennial Grass | 2322 | Native, warm season perennial grass. Includes material and shipping only. | Acre | $70.93 | 0.1 | $7.09 |

**Practice:** 601 - Vegetative Barrier

**Scenario** #2 - Vegetative Barrier: >5 ft wide

**Scenario Description:**

Permanent strips of stiff, dense vegetation established along the general contour of slopes or across concentrated flow areas.

**Before Situation:**

Significant erosion is occurring resulting in substantial transport of sediment across the slope or concentrated flow areas. A large amount of sediment is subsequently delivered to the edge of the field and/or waterways.

**After Situation:**

A strip or strips of stiff, dense vegetation greater than five feet wide is/are established along the general contour of the slope or across concentrated flow areas that effectively settles a significant amount or sediment above the leading edge of the vegetative barrier.Barrier may also help to connect green areas to provide shelter for wildlife. A strip of land 5-10 feet wide is taken out of crop production.

**Feature Measure:** Linear feet of practice installed

**Scenario Unit::** Foot

**Scenario Typical Size:** 1000

**Total Scenario Cost:** $69.01

**Scenario Cost/Unit:** $0.07

**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. | Acre | $10.14 | 0.18 | $1.83 |
| Seeding Operation, No Till/Grass Drill | 960 | No Till drill or grass drill for seeding. Includes equipment, power unit and labor costs. | Acre | $19.43 | 0.18 | $3.50 |
| **Foregone Income** | | | | | | |
| FI, Soybeans Dryland | 1961 | Dryland Soybeans is Primary Crop | Acre | $211.75 | 0.05 | $10.59 |
| FI, Cotton Dryland | 1967 | Dryland Cotton is Primary Crop | Acre | $156.16 | 0.05 | $7.81 |
| FI, Sorghum Dryland | 1971 | Dryland Sorghum is Primary Crop | Acre | $109.67 | 0.05 | $5.48 |
| FI, Rice | 1974 | Rice is Primary Crop | Acre | $569.29 | 0.05 | $28.46 |
| **Materials** | | | | | | |
| One Species, Warm Season, Native Perennial Grass | 2322 | Native, warm season perennial grass. Includes material and shipping only. | Acre | $70.93 | 0.16 | $11.35 |

**Practice:** 601 - Vegetative Barrier

**Scenario** #3 - Vegetative Barrier: Cuttings on slopes

**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 or concentrated flow areas. A large amount of sediment is subsequently delivered to the edge of the field and/or waterways.

**After Situation:**

A strip or strips of stiff, dense vegetation such as Vetivier Grass is/are established along the general contour of the slope that effectively settles a significant amount or sediment above the leading edge of the vegetative barrier. Barrier may also help to connect green areas to provide shelter for wildlife.

**Feature Measure:** Linear feet of practice installed

**Scenario Unit::** Foot

**Scenario Typical Size:** 100

**Total Scenario Cost:** $783.71

**Scenario Cost/Unit:** $7.84

**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. | Acre | $5.58 | 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. | Acre | $6.25 | 0.01 | $0.06 |
| Ground sprigging | 1101 | Includes costs for equipment, power unit and labor. | Acre | $66.81 | 0.01 | $0.67 |
| **Foregone Income** | | | | | | |
| FI, Soybeans Dryland | 1961 | Dryland Soybeans is Primary Crop | Acre | $211.75 | 0 | $0.00 |
| FI, Cotton Dryland | 1967 | Dryland Cotton is Primary Crop | Acre | $156.16 | 0 | $0.00 |
| FI, Sorghum Dryland | 1971 | Dryland Sorghum is Primary Crop | Acre | $109.67 | 0 | $0.00 |
| FI, Rice | 1974 | Rice is Primary Crop | Acre | $569.29 | 0 | $0.00 |
| **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 | $1.07 | 0.46 | $0.49 |
| 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 | $0.54 | 0.7 | $0.38 |
| Potassium, K2O | 74 | K2O supplied by Muriate Of Potash. Price is not per pound of total product applied, no conversion is needed. | Pound | $0.46 | 0.7 | $0.32 |
| 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. | Acre | $15.93 | 0.01 | $0.16 |
| One Species, Warm Season, Introduced Perennial Rhizome | 2324 | Cool season introduced perennial rhizome. Includes material and shipping only. | 100 Foot | $781.57 | 1 | $781.57 |

**Practice:** 601 - Vegetative Barrier

**Scenario** #4 - Vegetative Barrier: Cuttings across concentrated flow areas

**Scenario Description:**

Permanent strips of stiff, dense vegetation established across concentrated flow areas.

**Before Situation:**

Significant erosion is occurring resulting in substantial transport of sediment through concentrated flow areas. A large amount of sediment is subsequently delivered to the edge of the field and/or waterways.

**After Situation:**

A strip or strips of stiff, dense vegetation such as Vetivier Grass is/are established across concentrated flow areas that effectively settles a significant amount or sediment above the leading edge of the vegetative barrier. Barrier may also help to connect green areas to provide shelter for wildlife.

**Feature Measure:** Linear feet of practice installed

**Scenario Unit::** Foot

**Scenario Typical Size:** 100

**Total Scenario Cost:** $783.71

**Scenario Cost/Unit:** $7.84

**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. | Acre | $5.58 | 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. | Acre | $6.25 | 0.01 | $0.06 |
| Ground sprigging | 1101 | Includes costs for equipment, power unit and labor. | Acre | $66.81 | 0.01 | $0.67 |
| **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 | $1.07 | 0.46 | $0.49 |
| 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 | $0.54 | 0.7 | $0.38 |
| Potassium, K2O | 74 | K2O supplied by Muriate Of Potash. Price is not per pound of total product applied, no conversion is needed. | Pound | $0.46 | 0.7 | $0.32 |
| 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. | Acre | $15.93 | 0.01 | $0.16 |
| One Species, Warm Season, Introduced Perennial Rhizome | 2324 | Cool season introduced perennial rhizome. Includes material and shipping only. | 100 Foot | $781.57 | 1 | $781.57 |

**Practice:** 607 - Surface Drain, Field Ditch

**Scenario** #1 - Field Drainage Ditch

**Scenario Description:**

A new field ditch is constructed to collect the excess irrigation water of a single field and direct it to a collection system so that the water can be recovered and reused. Typical ditch size is trapezoidal ditch with 4ft bottom x 3ft depth x 1760 ft length with 2:1 side slopes. The total yardage of earthwork is 1956 cy.Resource concerns that will be addressed: Excess/Insufficent Water - inefficient use of irrigation water; Water Quality Degradation - excessive sediments in surface waters; Water Quality Degradation - Excess nutrients in surface and ground water; Degradation Plant Condition - undesireable plant prductivity and health.Assoicated practices: 533 - Pumping Plants; 410 - Grade Stabilization Structure; 587 - Structure for water control; 449 - Irrigation Water Management

**Before Situation:**

Excess irrigation water collects at lower ends of field and backs up into crops and causes plant stress or causes erosion and travels off farm in a drainage ditch causing water quality issues in lower watersheds.

**After Situation:**

Excess irrigation water is collected and directed into a recovery system where the water can be recycled and reused for irrigation. Sedimentation has a chance to settle out of the water allowing for less sediment to travel down stream.

**Feature Measure:** Volume of Earth Excavated

**Scenario Unit::** Cubic Yard

**Scenario Typical Size:** 1956

**Total Scenario Cost:** $4,048.96

**Scenario Cost/Unit:** $2.07

**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 Yard | $1.99 | 1956 | $3,892.44 |
| **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 | $156.52 | 1 | $156.52 |

**Practice:** 608 - Surface Drain, Main or Lateral

**Scenario** #1 - Main or Lateral Drainage Ditch

**Scenario Description:**

A new lateral ditch is constructed to collect the excess irrigation water of a series of fields creating a collection system so that the water can be recovered and reused. Typical ditch size is trapezoidal ditch with 8 ft bottom x 5 ft depth x 1950 ft length with 2:1 side slopes. The total yardage of earthwork is 6,500 cy.Resource concerns that will be addressed: Excess/Insufficent Water - inefficient use of irrigation water; Water Quality Degradation - excessive sediments in surface waters; Water Quality Degradation - Excess nutrients in surface and ground water; Degradation Plant Condition - undesireable plant prductivity and health.Assoicated practices: 533 - Pumping Plants; 410 - Grade Stabilization Structure; 587 - Structure for water control; 449 - Irrigation Water Management

**Before Situation:**

Excess irrigation water collects at lower ends of field and backs up into crops and causes plant stress or causes erosion and travels off farm in a drainage ditch causing water quality issues in lower watersheds.

**After Situation:**

Excess irrigation water is collected and directed into a recovery system where the water can be recycled and reused for irrigation. Sedimentation has a chance to settle out of the water allowing for less sediment to travel down stream.

**Feature Measure:** Volume of Earth Excavated

**Scenario Unit::** Cubic Yard

**Scenario Typical Size:** 6500

**Total Scenario Cost:** $13,091.52

**Scenario Cost/Unit:** $2.01

**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 Yard | $1.99 | 6500 | $12,935.00 |
| **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 | $156.52 | 1 | $156.52 |

**Practice:** 608 - Surface Drain, Main or Lateral

**Scenario** #2 - Two Stage Ditch

**Scenario Description:**

A nesting discharge channel within a larger channel is built to create a flood plain within a ditch to all improve water quality and to slow the high flow. Typical ditch size is trapezoidal ditch with 8ft bottom x 4ft depth x 1760 ft length with 2:1 side slopes with a small trapezoidal ditch with dimensions of 4ft bottom x 2ft depth x 1760 length with 2:1 side slopes. The total yardage of earthwork is 5,215 cy.Resource concerns that will be addressed: Excess/Insufficient Water - inefficient use of irrigation water; Water Quality Degradation - excessive sediments in surface waters; Water Quality Degradation - Excess nutrients in surface and ground water; Degradation Plant Condition - undesirable plant productivity and health.Associated practices: 533 - Pumping Plants; 410 - Grade Stabilization Structure; 587 - Structure for water control; 449 - Irrigation Water Management; 436 - Irrigation Reservoir

**Before Situation:**

Existing ditch is too small and frequent flooding occurs. Erosion due to flood velocities is high and water quality is degraded because of erosion along the stream banks. Deposition of eroded material creates sediment bars which cause the bottom of the ditch to meander which in turn creates more erosion.

**After Situation:**

Ditch is created which more closely mimics a natural channel. Excess flow has a flood plain to help dissipate energy and allow sediment to fall out, resulting in improved water quality down stream.

**Feature Measure:** Excavated Material

**Scenario Unit::** Cubic Yard

**Scenario Typical Size:** 5215

**Total Scenario Cost:** $11,699.97

**Scenario Cost/Unit:** $2.24

**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 Yard | $1.99 | 5215 | $10,377.85 |
| Dozer, 80 HP | 929 | Track mounted Dozer with horsepower range of 60 to 90. Equipment and power unit costs. Labor not included. | Hour | $60.16 | 12 | $721.92 |
| **Labor** | | | | | | |
| Equipment Operators, Heavy | 233 | Includes: Cranes, Hydraulic Excavators >=50 HP, Dozers, Paving Machines, Rock Trenchers, Trenchers >=12", Dump Trucks, Ag Equipment >=150 HP, Scrapers, Water Wagons. | Hour | $23.93 | 12 | $287.16 |
| **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 | $156.52 | 2 | $313.04 |

**Practice:** 612 - Tree/Shrub Establishment

**Scenario** #1 - Pine, Bare root

**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:** Number planted

**Scenario Unit::** Each

**Scenario Typical Size:** 10000

**Total Scenario Cost:** $1,827.84

**Scenario Cost/Unit:** $0.18

**Cost Details:**

| Component Name | ID | Description | Unit | Cost | QTY | Total |
|---|---|---|---|---|---|---|
| **Equipment Installation** | | | | | | |
| Hand tools, tree planting | 1590 | Various hand tools for digging holes and planting trees such as augers, dibble bars, planting shovel, hoe-dad. Equipment only. Labor not included. | Hour | $12.04 | 8 | $96.32 |
| **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. | Hour | $18.93 | 40 | $757.20 |
| 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. | Hour | $34.29 | 8 | $274.32 |
| **Materials** | | | | | | |
| Tree, conifer, seedling, bare root, 1-0 | 1512 | Bare root conifer trees, 1-0 (1 year old). Includes materials and shipping only. | Each | $0.06 | 10000 | $600.00 |
| **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. | Dollar | $1.00 | 100 | $100.00 |

**Practice:** 612 - Tree/Shrub Establishment

**Scenario** #2 - Hardwood, bare root

**Scenario Description:**

Establishing a hardwood forest setting by hand planting hardwood tree seedlings. 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 20 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:** Number planted

**Scenario Unit::** Each

**Scenario Typical Size:** 6000

**Total Scenario Cost:** $2,746.40

**Scenario Cost/Unit:** $0.46

**Cost Details:**

| Component Name | ID | Description | Unit | Cost | QTY | Total |
|---|---|---|---|---|---|---|
| **Equipment Installation** | | | | | | |
| Hand tools, tree planting | 1590 | Various hand tools for digging holes and planting trees such as augers, dibble bars, planting shovel, hoe-dad. Equipment only. Labor not included. | Hour | $12.04 | 8 | $96.32 |
| **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. | Hour | $18.93 | 32 | $605.76 |
| Supervisor or Manager | 234 | Labor involving supervision or management activities. Includes crew supervisors, foremen and farm/ranch managers time required for adopting new technology, etc. | Hour | $34.29 | 8 | $274.32 |
| **Materials** | | | | | | |
| Tree, hardwood, seedling or transplant, bare root, 6-18" | 1509 | Bare root hardwood trees 6-18" tall. Includes materials and shipping only. | Each | $0.27 | 6000 | $1,620.00 |
| **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. | Dollar | $1.00 | 150 | $150.00 |

**Practice:** 612 - Tree/Shrub Establishment

**Scenario** #3 - Shrub, bare root

**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 shrubs. 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:** Number planted

**Scenario Unit::** Each

**Scenario Typical Size:** 2000

**Total Scenario Cost:** $2,327.60

**Scenario Cost/Unit:** $1.16

**Cost Details:**

| Component Name | ID | Description | Unit | Cost | QTY | Total |
|---|---|---|---|---|---|---|
| **Equipment Installation** | | | | | | |
| Hand tools, tree planting | 1590 | Various hand tools for digging holes and planting trees such as augers, dibble bars, planting shovel, hoe-dad. Equipment only. Labor not included. | Hour | $12.04 | 24 | $288.96 |
| **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. | Hour | $18.93 | 24 | $454.32 |
| Supervisor or Manager | 234 | Labor involving supervision or management activities. Includes crew supervisors, foremen and farm/ranch managers time required for adopting new technology, etc. | Hour | $34.29 | 8 | $274.32 |
| **Materials** | | | | | | |
| Shrub, seedling or transplant, bare root, 18"-36" | 1507 | Bare root hardwood trees 18-36" tall. Includes materials and shipping only. | Each | $0.58 | 2000 | $1,160.00 |
| **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. | Dollar | $1.00 | 150 | $150.00 |

**Practice:** 612 - Tree/Shrub Establishment

**Scenario** #4 - Pine, containerized

**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. Typically, containerized seedlings are used for special species such as longleaf or to help insure survival in droughty areas. 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:** Number planted

**Scenario Unit::** Each

**Scenario Typical Size:** 10000

**Total Scenario Cost:** $3,731.52

**Scenario Cost/Unit:** $0.37

**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. | Hour | $18.93 | 40 | $757.20 |
| 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. | Hour | $34.29 | 8 | $274.32 |
| **Materials** | | | | | | |
| Tree, conifer, seedling, containerized, 4 cu. in. | 1516 | Containerized conifer stock, 4 cubic inches (e.g., "4a" plug), 1.1" x 5.2". Includes materials and shipping only. | Each | $0.26 | 10000 | $2,600.00 |
| **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. | Dollar | $1.00 | 100 | $100.00 |

**Practice:** 612 - Tree/Shrub Establishment

**Scenario** #5 - Cuttings

**Scenario Description:**

Establishing a hardwood forest setting by hand planting hardwood tree cuttings. Resource concerns are degraded plant condition - undesirable productivity and health; inadequate structure and composition; inadequate habitat for fish and wildlife - habitat degradation.

**Before Situation:**

In an abandoned field or existing 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. Vegetation control may be conducted before or after planting.

**After Situation:**

The area of treatment is 20 acres. Hardwood cuttings are planted by hand in the best locations for tree survival. Post planting vegetation control is planned to ensure tree survival.

**Feature Measure:** Number planted

**Scenario Unit::** Each

**Scenario Typical Size:** 6000

**Total Scenario Cost:** $4,305.36

**Scenario Cost/Unit:** $0.72

**Cost Details:**

| Component Name | ID | Description | Unit | Cost | QTY | Total |
|---|---|---|---|---|---|---|
| **Equipment Installation** | | | | | | |
| Hand tools, tree planting | 1590 | Various hand tools for digging holes and planting trees such as augers, dibble bars, planting shovel, hoe-dad. Equipment only. Labor not included. | Hour | $12.04 | 32 | $385.28 |
| **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. | Hour | $18.93 | 32 | $605.76 |
| Supervisor or Manager | 234 | Labor involving supervision or management activities. Includes crew supervisors, foremen and farm/ranch managers time required for adopting new technology, etc. | Hour | $34.29 | 8 | $274.32 |
| **Materials** | | | | | | |
| Cuttings, woody, medium size | 1308 | Woody cuttings, live stakes or whips typically 1/4" to 1" diameter and 24" to 48" long. Includes materials and shipping only. | Each | $0.49 | 6000 | $2,940.00 |
| **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. | Dollar | $1.00 | 100 | $100.00 |

**Practice:** 612 - Tree/Shrub Establishment

**Scenario** #6 - Hardwood, 3 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 10 acres. Potted/containerized hardwood seedlings are planted by hand. Post vegetation control should be evaluated and conducted it necessary.

**Feature Measure:** Number planted

**Scenario Unit::** Each

**Scenario Typical Size:** 100

**Total Scenario Cost:** $1,679.72

**Scenario Cost/Unit:** $16.80

**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. | Hour | $6.65 | 8 | $53.20 |
| Tractor, agricultural, 60 HP | 963 | Agricultural tractor with horsepower range of 50 to 90. Equipment and power unit costs. Labor not included. | Hour | $22.54 | 8 | $180.32 |
| **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. | Hour | $18.93 | 16 | $302.88 |
| 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. | Hour | $34.29 | 8 | $274.32 |
| **Materials** | | | | | | |
| Tree, hardwood, seedling or transplant, potted or B&B, 2-3 gal. | 1532 | Potted or balled and burlapped hardwood tree, 2-3 gal. Includes materials and shipping only. | Each | $7.69 | 100 | $769.00 |
| **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. | Dollar | $1.00 | 100 | $100.00 |

**Practice:** 614 - Watering Facility

**Scenario** #1 - Permanent Drinking/Storage <500 Gallons

**Scenario Description:**

A permanent watering facility for livestock and or wildlife constructed of approved materials with less than 500 gallons of capacity that stores adequate quantity and quality of water for storage and or direct drinking access. All watering facilities will be constructed from approved durable materials that have a life expectancy that meets or exceeds the planned useful life of the installation. This watering facility will address the resource concerns of inadequate supply of water for livestock 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 new or improved watering facilities for livestock and or wildlife, where water is not available in sufficient quantities at specific locations, and habitat, water quality, plant productivity and health needs to be improved.

**After Situation:**

A permanent watering facility with a capacity of less than 500 gallons is installed with all tank materials, tank plumbing and float valve, to provide adequate water storage capacity to ensure an adequate supply and quality of water for livestock or wildlife for storage and or direct drinking access and provides improved plant productivity and health, water quality, and habitat. All watering facilities are constructed from approved durable materials that have a life expectancy that meets or exceeds the planned useful life of the installation and placed on a properly prepared foundation with required plumbing. All needed pipelines are installed using Livestock Pipeline (516). Any needed vegetation of disturbed areas will use Critical Area Planting (342). All collectors or catchments for collecting precipitation will be addressed by using Water Harvesting Catchment (636). Any needed water source installation will use Water Well (642), Pumping Plant (533), Spring Development (574), or Livestock Pipeline (516) as appropriate. Areas around watering facilities where animal concentrations or overflow from the watering facility will cause resource concerns will be protected by using Heavy Use Area Protection (561) as appropriate.

**Feature Measure:** Capacity in Gallons

**Scenario Unit::** Gallon

**Scenario Typical Size:** 250

**Total Scenario Cost:** $820.25

**Scenario Cost/Unit:** $3.28

**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 Yard | $1.99 | 0.5 | $1.00 |
| Backhoe, 80 HP | 926 | Wheel mounted backhoe excavator with horsepower range of 60 to 90. Equipment and power unit costs. Labor not included. | Hour | $50.99 | 2 | $101.98 |
| Truck, Pickup | 939 | Equipment and power unit costs. Labor not included. | Hour | $19.82 | 2 | $39.64 |
| **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. | Hour | $18.93 | 2.5 | $47.33 |
| Equipment Operators, Light | 232 | Includes: Skid Steer Loaders, Hydraulic Excavators <50 HP, Trenchers <12", Ag Equipment <150 HP, Pickup Trucks, Forklifts, Mulchers | Hour | $21.14 | 2 | $42.28 |
| **Materials** | | | | | | |
| Wildlife Escape Ramp | 242 | Pool size 15' x 30', for small mammals less than one pound | Each | $24.70 | 1 | $24.70 |
| Tank, Galvanized Steel Livestock, >75 - 300 gallon | 1067 | Includes tank materials and float valve | Gallon | $1.28 | 250 | $320.00 |
| Aggregate, Gravel, Ungraded, Quarry Run | 1099 | Includes materials, equipment and labor | Cubic Yard | $21.24 | 0.5 | $10.62 |
| **Mobilization** | | | | | | |
| Mobilization, medium equipment | 1139 | Equipment with 70-150 HP or typical weights between 14,000 and 30,000 pounds. | Each | $232.71 | 1 | $232.71 |

**Practice:** 614 - Watering Facility

**Scenario** #2 - Permanent Drinking/Storage 500-1000 Gallons

**Scenario Description:**

A permanent watering facility for livestock and or wildlife constructed of approved materials with 500 to 1,000 gallons of capacity that stores adequate quantity and quality of water for storage and or direct drinking access. All watering facilities will be constructed from approved durable materials that have a life expectancy that meets or exceeds the planned useful life of the installation. This watering facility will address the resource concerns of inadequate supply of water for livestock 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 new or improved watering facilities for livestock and or wildlife, where water is not available in sufficient quantities at specific locations, and habitat, water quality, plant productivity and health needs to be improved.

**After Situation:**

A permanent watering facility with a capacity of 500 to 1,000 gallons is installed with all tank materials, tank plumbing and float valve, to provide adequate water storage capacity to ensure an adequate supply and quality of water for livestock or wildlife for storage and or direct drinking access and provides improved plant productivity and health, water quality, and habit. All watering facilities are constructed from approved durable materials that have a life expectancy that meets or exceeds the planned useful life of the installation and placed on a properly prepared foundation with required plumbing. All needed pipelines are installed using Livestock Pipeline (516). Any needed vegetation of disturbed areas will use Critical Area Planting (342). All collectors or catchments for collecting precipitation will be addressed by using Water Harvesting Catchment (636). Any needed water source installation will use Water Well (642), Pumping Plant (533), Spring Development (574), or Livestock Pipeline (516) as appropriate. Areas around watering facilities where animal concentrations or overflow from the watering facility will cause resource concerns will be protected by using Heavy Use Area Protection (561) as appropriate.

**Feature Measure:** Capacity in Gallons

**Scenario Unit::** Gallon

**Scenario Typical Size:** 750

**Total Scenario Cost:** $1,703.83

**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 Yard | $1.99 | 2 | $3.98 |
| Backhoe, 80 HP | 926 | Wheel mounted backhoe excavator with horsepower range of 60 to 90. Equipment and power unit costs. Labor not included. | Hour | $50.99 | 6 | $305.94 |
| Truck, Pickup | 939 | Equipment and power unit costs. Labor not included. | Hour | $19.82 | 6 | $118.92 |
| **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. | Hour | $25.08 | 6 | $150.48 |
| 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. | Hour | $18.93 | 6.75 | $127.78 |
| Equipment Operators, Light | 232 | Includes: Skid Steer Loaders, Hydraulic Excavators <50 HP, Trenchers <12", Ag Equipment <150 HP, Pickup Trucks, Forklifts, Mulchers | Hour | $21.14 | 6 | $126.84 |
| **Materials** | | | | | | |
| Wildlife Escape Ramp | 242 | Pool size 15' x 30', for small mammals less than one pound | Each | $24.70 | 1 | $24.70 |
| Tank, Galvanized Steel Livestock, > 300 - 1,000 gallon | 1068 | Includes tank materials and float valve | Gallon | $0.76 | 750 | $570.00 |
| Aggregate, Gravel, Ungraded, Quarry Run | 1099 | Includes materials, equipment and labor | Cubic Yard | $21.24 | 2 | $42.48 |
| **Mobilization** | | | | | | |
| Mobilization, medium equipment | 1139 | Equipment with 70-150 HP or typical weights between 14,000 and 30,000 pounds. | Each | $232.71 | 1 | $232.71 |

**Practice:** 614 - Watering Facility

**Scenario** #3 - Permanent Drinking/Storage 1001-5000 Gallons

**Scenario Description:**

A permanent watering facility for livestock and 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 and or direct drinking access. All watering facilities will be constructed from approved durable materials that have a life expectancy that meets or exceeds the planned useful life of the installation. This watering facility will address the resource concerns of inadequate supply of water for livestock, habitat degradation, water quality, and undesirable plant productivity and health.

**Before Situation:**

This practice applies to all land uses where there is a need for new or improved watering facilities for livestock and or wildlife, where water is not available in sufficient quantities at specific locations, and habitat, water quality, plant productivity and health needs to be improved.

**After Situation:**

A permanent watering facility with a capacity of greater than 1,000 to 5,000 gallons is installed with all tank materials, tank plumbing and float valve, to provide adequate water storage capacity to ensure an adequate supply and quality of water for livestock or wildlife for storage and or direct drinking access and provides improved plant productivity and health, water quality, and habitat. All watering facilities are constructed from approved durable materials that have a life expectancy that meets or exceeds the planned useful life of the installation and placed on a properly prepared foundation with required plumbing. All needed pipelines are installed using Livestock Pipeline (516). Any needed vegetation of disturbed areas will use Critical Area Planting (342). All collectors or catchments for collecting precipitation will be addressed by using Water Harvesting Catchment (636). Any needed water source installation will use Water Well (642), Pumping Plant (533), Spring Development (574), or Livestock Pipeline (516) as appropriate. Areas around watering facilities where animal concentrations or overflow from the watering facility will cause resource concerns will be protected by using Heavy Use Area Protection (561) as appropriate.

**Feature Measure:** Capacity in Gallons

**Scenario Unit::** Gallon

**Scenario Typical Size:** 2000

**Total Scenario Cost:** $2,991.67

**Scenario Cost/Unit:** $1.50

**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 Yard | $210.23 | 4 | $840.92 |
| Excavation, Common Earth, side cast, small equipment | 48 | Bulk excavation and side casting of common earth with hydraulic excavator with less than 1 CY capacity. Includes equipment and labor. | Cubic Yard | $1.99 | 7 | $13.93 |
| Backhoe, 80 HP | 926 | Wheel mounted backhoe excavator with horsepower range of 60 to 90. Equipment and power unit costs. Labor not included. | Hour | $50.99 | 8 | $407.92 |
| Truck, Pickup | 939 | Equipment and power unit costs. Labor not included. | Hour | $19.82 | 8 | $158.56 |
| **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. | Hour | $25.08 | 8 | $200.64 |
| 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. | Hour | $18.93 | 9 | $170.37 |
| Equipment Operators, Light | 232 | Includes: Skid Steer Loaders, Hydraulic Excavators <50 HP, Trenchers <12", Ag Equipment <150 HP, Pickup Trucks, Forklifts, Mulchers | Hour | $21.14 | 8 | $169.12 |
| **Materials** | | | | | | |
| Aggregate, Sand, Graded, Washed | 45 | Sand, typical ASTM C33 gradation, includes materials, equipment and labor to transport and place | Cubic Yard | $30.40 | 7 | $212.80 |
| Wildlife Escape Ramp | 242 | Pool size 15' x 30', for small mammals less than one pound | Each | $24.70 | 1 | $24.70 |
| Tank, Galvanized Steel Bottomless Livestock, <= 6,000 gallon | 1069 | Includes tank materials, shipping, and float valve, no liner | Gallon | $0.28 | 2000 | $560.00 |
| **Mobilization** | | | | | | |

| | | | | | |
|---|---|---|---|---|---|
| Mobilization, medium equipment | 1139 Equipment with 70-150 HP or typical weights between 14,000 and 30,000 pounds. | Each | $232.71 | 1 | $232.71 |

**Practice:** 614 - Watering Facility

**Scenario** #4 - Permanent Drinking/Storage Greater Than 5000 Gallons

**Scenario Description:**

A permanent watering facility for livestock and or wildlife constructed of approved materials with more than 5,000 gallons of capacity that stores adequate quantity and quality of water for storage and or direct drinking access All watering facilities will be constructed from approved durable materials that have a life expectancy that meets or exceeds the planned useful life of the installation. This watering facility will address the resource concerns of inadequate supply of water for livestock, habitat degradation, water quality, and undesirable plant productivity and
health.

**Before Situation:**

This practice applies to all land uses where there is a need for new or improved watering facilities for livestock and or wildlife, where water is not available in sufficient quantities at specific locations, and habitat, water quality, plant productivity and health needs to be
improved.

**After Situation:**

A permanent watering facility with a capacity of more than 5,000 gallons is installed with all tank materials, tank plumbing and float valve, to provide adequate water storage capacity to ensure an adequate supply and quality of water for livestock or wildlife for storage and or direct drinking access and provides improved plant productivity and health, water quality, and habitat. All watering facilities are constructed from approved durable materials that have a life expectancy that meets or exceeds the planned useful life of the installation and placed on a properly prepared foundation with required plumbing. All needed pipelines are installed using Livestock Pipeline (516). Any needed vegetation of disturbed areas will use Critical Area Planting (342). All collectors or catchments for collecting precipitation will be addressed by using Water Harvesting Catchment (636). Any needed water source installation will use Water Well (642), Pumping Plant (533), Spring Development (574), or Livestock Pipeline (516) as appropriate. Areas around watering facilities where animal concentrations or overflow from the watering facility will cause resource concerns must be protected by using Heavy Use Area Protection (561) as appropriate.

**Feature Measure:** Capacity in Gallons

**Scenario Unit::** Gallon

**Scenario Typical Size:** 10000

**Total Scenario Cost:** $6,130.95

**Scenario Cost/Unit:** $0.61

**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 Yard | $210.23 | 7 | $1,471.61 |
| Excavation, Common Earth, side cast, small equipment | 48 | Bulk excavation and side casting of common earth with hydraulic excavator with less than 1 CY capacity. Includes equipment and labor. | Cubic Yard | $1.99 | 13 | $25.87 |
| Backhoe, 80 HP | 926 | Wheel mounted backhoe excavator with horsepower range of 60 to 90. Equipment and power unit costs. Labor not included. | Hour | $50.99 | 12 | $611.88 |
| Truck, Pickup | 939 | Equipment and power unit costs. Labor not included. | Hour | $19.82 | 12 | $237.84 |
| **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. | Hour | $25.08 | 12 | $300.96 |
| General Labor | 231 | Labor performed using basic tools such as power tool, shovels, and other tools that do not require extensive training. Ex. pipe layer, herder, concrete placement, materials spreader, flagger, etc. | Hour | $18.93 | 14 | $265.02 |
| Equipment Operators, Light | 232 | Includes: Skid Steer Loaders, Hydraulic Excavators <50 HP, Trenchers <12", Ag Equipment <150 HP, Pickup Trucks, Forklifts, Mulchers | Hour | $21.14 | 12 | $253.68 |
| 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. | Hour | $34.29 | 12 | $411.48 |
| **Materials** | | | | | | |
| Aggregate, Sand, Graded, Washed | 45 | Sand, typical ASTM C33 gradation, includes materials, equipment and labor to transport and place | Cubic Yard | $30.40 | 13 | $395.20 |
| Wildlife Escape Ramp | 242 | Pool size 15' x 30', for small mammals less than one pound | Each | $24.70 | 1 | $24.70 |

| | | | | | | |
|---|---|---|---|---|---|---|
| Tank, Galvanized Steel Bottomless Livestock, > 6,000 gallon | 1070 | Includes tank materials, shipping, and float valve, no liner | Gallon | $0.19 | 10000 | $1,900.00 |
| **Mobilization** | | | | | | |
| Mobilization, medium equipment | 1139 | Equipment with 70-150 HP or typical weights between 14,000 and 30,000 pounds. | Each | $232.71 | 1 | $232.71 |

**Practice:** 614 - Watering Facility

**Scenario** #5 - Freeze Proof Conc. Tank

**Scenario Description:**

Freeze Proof Tank: The scenario is for the installation of a freeze proof concrete livestock watering tank with a capacity greater than 200 gallons. The tank is a manufactured or formed in place concrete tank with sloping sides designed to prevent freezing. It is installed in the ground or partially covered with soil to prevent freezing. The cost includes all field preparation, excavation, concrete or gravel base, and plumbing as needed to install the tank. It does not include the pipeline to deliver the water to the tank.. 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 new or improved watering facilities for livestock and or wildlife, where water is not available in sufficient quantities at specific locations, and habitat, water quality, plant productivity and health needs to be improved.

**After Situation:**

The typical installation is one single tank of 250 gallons. The tank may be installed in the back slope of a pond's embankment or backfilled by material obtained from the pasture. Typically a small backhoe or skidsteer is needed to prepare the foundation, place the gravel and place the tank. A laborer is required to assist the operator and make on-the-ground connections and adjustments. After the installaiton, livestock may easily obtain water from relatively short distances. Surface water is no longer used for watering livestock and livestock grazing is uniformly distributed, thereby preventing sediments from reaching the surface water. All needed pipelines are installed using Livestock Pipeline (516). Any needed vegetation of disturbed areas will use Critical Area Planting (342). All collectors or catchments for collecting precipitation will be addressed by using Water Harvesting Catchment (636). Any needed water source installation will use Water Well (642), Pumping Plant (533), Spring Development (574), or Livestock Pipeline (516) as appropriate. Areas around watering facilities where animal concentrations or overflow from the watering facility will cause resource concerns will be protected by using Heavy Use Area Protection (561) as appropriate.

**Feature Measure:** Capacity in Gallons

**Scenario Unit::** Gallon

**Scenario Typical Size:** 250

**Total Scenario Cost:** $1,144.49

**Scenario Cost/Unit:** $4.58

**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. | Hour | $50.99 | 2 | $101.98 |
| **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. | Hour | $18.93 | 2 | $37.86 |
| Equipment Operators, Light | 232 | Includes: Skid Steer Loaders, Hydraulic Excavators <50 HP, Trenchers <12", Ag Equipment <150 HP, Pickup Trucks, Forklifts, Mulchers | Hour | $21.14 | 2 | $42.28 |
| **Materials** | | | | | | |
| Wildlife Escape Ramp | 242 | Pool size 15' x 30', for small mammals less than one pound | Each | $24.70 | 1 | $24.70 |
| Tank, Freeze Proof, concrete, => 200 gallons | 285 | Concrete tank with sloping sides, cover for partial burial providing freeze protection. Includes materials and shipping. | Each | $770.53 | 1 | $770.53 |
| Aggregate, Gravel, Ungraded, Quarry Run | 1099 | Includes materials, equipment and labor | Cubic Yard | $21.24 | 0.5 | $10.62 |
| **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 | $156.52 | 1 | $156.52 |

**Practice:** 614 - Watering Facility

**Scenario** #6 - Fountain

**Scenario Description:**

This scenario is for the installation of a livestock watering fountain in a pasture; typically near headquarters. The fountain is a manufactured valve type fountain with a capacity of less than 200 gallons. The cost includes all field preparation, excavation, concrete or gravel pad, and plumbing as needed to install the fountain. It does not include the pipeline to deliver the drinking water to the fountain or the heavy use are around the fountain. The unit cost will be based on each (ea) structure installed. 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:**

The typical location of this practice is near headquarters or other winter grazing area which has limited or no access to water. This practice applies to all land uses where there is a need for new or improved watering facilities for livestock and or wildlife, where water is not available in sufficient quantities at specific locations, and habitat, water quality, plant productivity and health needs to be improved.

**After Situation:**

A permanent watering facility, typically a single livestock watering fountain with two ball tupe access ports, with a capacity of less than 200 gallons is installed with all tank materials, tank plumbing and float valve, to provide adequate water storage capacity to ensure an adequate supply and quality of water for livestock or wildlife for storage and or direct drinking access and provides improved plant productivity and health, water quality, and habitat. All watering facilities are constructed from approved durable materials that have a life expectancy that meets or exceeds the planned useful life of the installation and placed on a properly prepared foundation with required plumbing. All needed pipelines are installed using Livestock Pipeline (516). Any needed vegetation of disturbed areas will use Critical Area Planting (342). All collectors or catchments for collecting precipitation will be addressed by using Water Harvesting Catchment (636). Any needed water source installation will use Water Well (642), Pumping Plant (533), Spring Development (574), or Livestock Pipeline (516) as appropriate. Areas around watering facilities where animal concentrations or overflow from the watering facility will cause resource concerns will be protected by using Heavy Use Area Protection (561) as appropriate.

**Feature Measure:** Each Fountain

**Scenario Unit::** Each

**Scenario Typical Size:** 1

**Total Scenario Cost:** $1,167.88

**Scenario Cost/Unit:** $1,167.88

**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 Yard | $210.23 | 0.5 | $105.12 |
| Backhoe, 80 HP | 926 | Wheel mounted backhoe excavator with horsepower range of 60 to 90. Equipment and power unit costs. Labor not included. | Hour | $50.99 | 2 | $101.98 |
| **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. | Hour | $18.93 | 2 | $37.86 |
| Equipment Operators, Light | 232 | Includes: Skid Steer Loaders, Hydraulic Excavators <50 HP, Trenchers <12", Ag Equipment <150 HP, Pickup Trucks, Forklifts, Mulchers | Hour | $21.14 | 2 | $42.28 |
| **Materials** | | | | | | |
| Wildlife Escape Ramp | 242 | Pool size 15' x 30', for small mammals less than one pound | Each | $24.70 | 1 | $24.70 |
| Tank, Freeze Proof, 2 hole | 280 | Tank, Freeze Proof with 2 drinking holes. Includes materials and shipping. | Each | $699.42 | 1 | $699.42 |
| **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 | $156.52 | 1 | $156.52 |

**Practice:** 614 - Watering Facility

**Scenario** #7 - Tire Tank

**Scenario Description:**

This scenario is for the installation of a livestock watering tank frabricated from a heavy equipment or tractor tire in a condition acceptable for use as a livestock waterer. The cost includes all field preparation, excavation, sand, gravel and plumbing as needed to install the tank. The payment is based on the volume in gallons (gal) that the tank can store. It does not include the pipeline to deliver the water to a tank or trough. Cost estimates are based on a 8 foot diameter tire tank having a storage capacity of 630 gallons ((Diameter2)/4 x 3.14 x Water Depth x 7.48 gal/ft3)

**Before Situation:**

The typical location of this practice is a pasture which has limited or no access to water. Livestock concentrate in areas creating erosion and do not graze uniformly. This scenario is to address the Resouce Concerns - Domestic Animals, Inadequate Stock Water and Water Quality, Excessive Nutrients and Excessive Sediments in Surface Water.

**After Situation:**

The typical installation is one single tank of 630 gallons. A small backhoe or skid steer is needed to prepare the gravel foundation. Laborer is required to assist with on-the-ground connections. The tank will be located so that livestock may easily obtain water from relatively short distances. Surface water is no longer used for watering livestock and livestock grazing is uniformly distributed, thereby preventing sediments from reaching the surface water.

**Feature Measure:** Capacity in Gallons

**Scenario Unit::** Gallon

**Scenario Typical Size:** 630

**Total Scenario Cost:** $1,056.28

**Scenario Cost/Unit:** $1.68

**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. | Hour | $50.99 | 1 | $50.99 |
| **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. | Hour | $18.93 | 2 | $37.86 |
| Equipment Operators, Light | 232 | Includes: Skid Steer Loaders, Hydraulic Excavators <50 HP, Trenchers <12", Ag Equipment <150 HP, Pickup Trucks, Forklifts, Mulchers | Hour | $21.14 | 1 | $21.14 |
| **Materials** | | | | | | |
| Wildlife Escape Ramp | 242 | Pool size 15' x 30', for small mammals less than one pound | Each | $24.70 | 1 | $24.70 |
| Tank, Tire, 8' diameter | 286 | Tire, includes material cost for tank and shipping. Labor and other appurtenance costs not included. | Each | $730.29 | 1 | $730.29 |
| Tank, Float Valve Assembly | 1077 | Float Valve, Stem, Swivel, Float Ball | Each | $24.16 | 1 | $24.16 |
| Aggregate, Gravel, Ungraded, Quarry Run | 1099 | Includes materials, equipment and labor | Cubic Yard | $21.24 | 0.5 | $10.62 |
| **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 | $156.52 | 1 | $156.52 |

**Practice:** 620 - Underground Outlet

**Scenario** #1 - UO Less Than 6 inches

**Scenario Description:**

Cost estimate is based upon 500 feet of 6" approved plastic pipe to convey stormwater or roof runoff from one location to a suitable and stable outlet. Trench is excavated 30" deep and 18" wide by small hydraulic track excavator or backhoe. Costs include 6" SCH-40, PVC pipe, trench excavation, trench backfill, rodent guard and laid up stone headwall at outlet. This practice is often installed in conjunction with Roof Run off Structure, 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 Roof Runoff Structure (558), 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::** Foot

**Scenario Typical Size:** 500

**Total Scenario Cost:** $4,167.33

**Scenario Cost/Unit:** $8.33

**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 Yard | $2.28 | 69 | $157.32 |
| 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 Yard | $1.53 | 69 | $105.57 |
| **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. | Hour | $34.29 | 2 | $68.58 |
| **Materials** | | | | | | |
| Rock Riprap, Placed with geotextile | 44 | Rock Riprap, placed with geotextile, includes materials, equipment and labor to transport and place | Cubic Yard | $55.44 | 1 | $55.44 |
| Pipe, PVC, 6", SCH 40 | 980 | Materials: - 6" - PVC - SCH 40 - ASTM D1785 | Foot | $6.63 | 500 | $3,315.00 |
| **Mobilization** | | | | | | |
| Mobilization, medium equipment | 1139 | Equipment with 70-150 HP or typical weights between 14,000 and 30,000 pounds. | Each | $232.71 | 2 | $465.42 |

**Practice:** 620 - Underground Outlet

**Scenario** #2 - UO Less than 6inches, w Riser

**Scenario Description:**

Install 500 feet of 6" approved plastic pipe to convey stormwater from one location to a suitable and stable outlet. Trench is excavated approximately 54" deep and 15" wide by trencher. Costs include 6" HDPE corrugated single wall plastic tubing, 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::** Foot

**Scenario Typical Size:** 500

**Total Scenario Cost:** $2,925.50

**Scenario Cost/Unit:** $5.85

**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 Yard | $2.28 | 105 | $239.40 |
| Trencher, wheel type | 1259 | Wheel type Trencher, typically 350 HP with 6' max depth. Equipment only. | Hour | $240.66 | 5 | $1,203.30 |
| 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 Yard | $1.96 | 2 | $3.92 |
| **Labor** | | | | | | |
| Equipment Operators, Light | 232 | Includes: Skid Steer Loaders, Hydraulic Excavators <50 HP, Trenchers <12", Ag Equipment <150 HP, Pickup Trucks, Forklifts, Mulchers | Hour | $21.14 | 5 | $105.70 |
| 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. | Hour | $34.29 | 2 | $68.58 |
| **Materials** | | | | | | |
| Rock Riprap, Placed with geotextile | 44 | Rock Riprap, placed with geotextile, includes materials, equipment and labor to transport and place | Cubic Yard | $55.44 | 1 | $55.44 |
| Pipe, HDPE, 6", CPT, Single Wall | 1242 | Pipe, Corrugated Plastic Tubing, Single Wall, 6" diameter - ASTM F405. Material cost only. | Foot | $1.13 | 500 | $565.00 |
| Inlet, riser, 8" | 1262 | Riser, polymer, complete vertical perforated UGO inlet with Tee, orifice plate if needed, 8" diameter. Materials only. | Each | $109.37 | 2 | $218.74 |
| **Mobilization** | | | | | | |
| Mobilization, medium equipment | 1139 | Equipment with 70-150 HP or typical weights between 14,000 and 30,000 pounds. | Each | $232.71 | 2 | $465.42 |

**Practice:** 620 - Underground Outlet

**Scenario** #3 - Greater Than 6 and Less Than or Equal To 12 inches

**Scenario Description:**

Cost estimate is based upon 500 feet of 8" approved plastic pipe to convey stormwater or roof runoff from one location to a suitable and stable outlet. Trench is excavated 30" deep and 18" wide by small hydraulic track excavator or backhoe. Costs include 6" SCH-40, PVC pipe, trench excavation, trench backfill, rodent guard and laid up stone headwall at outlet. This practice is often installed in conjunction with Roof Run off Structure, 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 Roof Runoff Structure (558), 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::** Foot

**Scenario Typical Size:** 500

**Total Scenario Cost:** $5,722.33

**Scenario Cost/Unit:** $11.44

**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 Yard | $2.28 | 69 | $157.32 |
| 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 Yard | $1.53 | 69 | $105.57 |
| **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. | Hour | $34.29 | 2 | $68.58 |
| **Materials** | | | | | | |
| Rock Riprap, Placed with geotextile | 44 | Rock Riprap, placed with geotextile, includes materials, equipment and labor to transport and place | Cubic Yard | $55.44 | 1 | $55.44 |
| Pipe, PVC, 8", SCH 40 | 981 | Materials: - 8" - PVC - SCH 40 - ASTM D1785 | Foot | $9.74 | 500 | $4,870.00 |
| **Mobilization** | | | | | | |
| Mobilization, medium equipment | 1139 | Equipment with 70-150 HP or typical weights between 14,000 and 30,000 pounds. | Each | $232.71 | 2 | $465.42 |

**Practice:** 620 - Underground Outlet

**Scenario** #4 - Greater Than 6 and Less Than or Equal To 12 inches, with Riser

**Scenario Description:**

Install 500 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::** Foot

**Scenario Typical Size:** 500

**Total Scenario Cost:** $5,271.36

**Scenario Cost/Unit:** $10.54

**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 Yard | $2.28 | 210 | $478.80 |
| Trencher, wheel type | 1259 | Wheel type Trencher, typically 350 HP with 6' max depth. Equipment only. | Hour | $240.66 | 5 | $1,203.30 |
| 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 Yard | $1.96 | 2 | $3.92 |
| **Labor** | | | | | | |
| Equipment Operators, Light | 232 | Includes: Skid Steer Loaders, Hydraulic Excavators <50 HP, Trenchers <12", Ag Equipment <150 HP, Pickup Trucks, Forklifts, Mulchers | Hour | $21.14 | 5 | $105.70 |
| 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. | Hour | $34.29 | 4 | $137.16 |
| **Materials** | | | | | | |
| Rock Riprap, Placed with geotextile | 44 | Rock Riprap, placed with geotextile, includes materials, equipment and labor to transport and place | Cubic Yard | $55.44 | 1 | $55.44 |
| Pipe, HDPE, CPT, Double Wall, Soil Tight, 10" | 1243 | Pipe, Corrugated HDPE Double Wall, 10" diameter with soil tight joints - AASHTO M252. Material cost only. | Foot | $5.05 | 500 | $2,525.00 |
| Inlet, riser, 10" | 1263 | Riser, polymer, complete vertical perforated UGO inlet with Tee, orifice plate if needed, 10" diameter. Materials only. | Each | $148.31 | 2 | $296.62 |
| **Mobilization** | | | | | | |
| Mobilization, medium equipment | 1139 | Equipment with 70-150 HP or typical weights between 14,000 and 30,000 pounds. | Each | $232.71 | 2 | $465.42 |

**Practice:** 620 - Underground Outlet

**Scenario** #5 - Greater Than 12 and Less Than or Equal To 18 inches

**Scenario Description:**

Install 500 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 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::** Foot

**Scenario Typical Size:** 500

**Total Scenario Cost:** $9,908.07

**Scenario Cost/Unit:** $19.82

**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 Yard | $2.28 | 330 | $752.40 |
| Excavation, common earth, side cast, large equipment | 1227 | Bulk excavation and side casting of common earth with hydraulic excavator with less greater than 1 CY capacity. Includes equipment and labor. | Cubic Yard | $1.53 | 330 | $504.90 |
| 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 Yard | $1.96 | 2 | $3.92 |
| **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. | Hour | $34.29 | 4 | $137.16 |
| **Materials** | | | | | | |
| Rock Riprap, Placed with geotextile | 44 | Rock Riprap, placed with geotextile, includes materials, equipment and labor to transport and place | Cubic Yard | $55.44 | 1 | $55.44 |
| Aggregate, Gravel, Graded | 46 | Gravel, includes materials, equipment and labor to transport and place. Includes washed and unwashed gravel. | Cubic Yard | $30.82 | 60 | $1,849.20 |
| Pipe, HDPE, CPT, Double Wall, Soil Tight, 18" | 1245 | Pipe, Corrugated HDPE Double Wall, 18" diameter with soil tight joints - AASHTO M294. Material cost only. | Foot | $11.18 | 500 | $5,590.00 |
| Catch Basin, concrete, 2'x2'x6' | 1257 | Catch Basin, Precast Concrete, 2' square or round, cast grate, 6' deep. Includes materials, equipment and labor. | Each | $549.63 | 1 | $549.63 |
| **Mobilization** | | | | | | |
| Mobilization, medium equipment | 1139 | Equipment with 70-150 HP or typical weights between 14,000 and 30,000 pounds. | Each | $232.71 | 2 | $465.42 |

**Practice:** 620 - Underground Outlet

**Scenario** #6 - Greater Than 18 and Less Than or Equal To 24 inches

**Scenario Description:**

Install 500 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::** Foot

**Scenario Typical Size:** 500

**Total Scenario Cost:** $14,926.72

**Scenario Cost/Unit:** $29.85

**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 Yard | $2.28 | 445 | $1,014.60 |
| Excavation, common earth, side cast, large equipment | 1227 | Bulk excavation and side casting of common earth with hydraulic excavator with less greater than 1 CY capacity. Includes equipment and labor. | Cubic Yard | $1.53 | 445 | $680.85 |
| 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 Yard | $1.96 | 2 | $3.92 |
| **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. | Hour | $34.29 | 4 | $137.16 |
| **Materials** | | | | | | |
| Rock Riprap, Placed with geotextile | 44 | Rock Riprap, placed with geotextile, includes materials, equipment and labor to transport and place | Cubic Yard | $55.44 | 1 | $55.44 |
| Aggregate, Gravel, Graded | 46 | Gravel, includes materials, equipment and labor to transport and place. Includes washed and unwashed gravel. | Cubic Yard | $30.82 | 85 | $2,619.70 |
| Pipe, HDPE, CPT, Double Wall, Soil Tight, 24" | 1246 | Pipe, Corrugated HDPE Double Wall, 24" diameter with soil tight joints - AASHTO M294. Material cost only. | Foot | $18.80 | 500 | $9,400.00 |
| Catch Basin, concrete, 2'x2'x6' | 1257 | Catch Basin, Precast Concrete, 2' square or round, cast grate, 6' deep. Includes materials, equipment and labor. | Each | $549.63 | 1 | $549.63 |
| **Mobilization** | | | | | | |
| Mobilization, medium equipment | 1139 | Equipment with 70-150 HP or typical weights between 14,000 and 30,000 pounds. | Each | $232.71 | 2 | $465.42 |

**Practice:** 620 - Underground Outlet

**Scenario** #7 - Greater Than 24 and Less Than or Equal To 30 inches

**Scenario Description:**

Install 500 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::** Foot

**Scenario Typical Size:** 500

**Total Scenario Cost:** $20,498.32

**Scenario Cost/Unit:** $41.00

**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 Yard | $2.28 | 565 | $1,288.20 |
| Excavation, common earth, side cast, large equipment | 1227 | Bulk excavation and side casting of common earth with hydraulic excavator with less greater than 1 CY capacity. Includes equipment and labor. | Cubic Yard | $1.53 | 565 | $864.45 |
| 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 Yard | $1.96 | 2 | $3.92 |
| **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. | Hour | $34.29 | 4 | $137.16 |
| **Materials** | | | | | | |
| Rock Riprap, Placed with geotextile | 44 | Rock Riprap, placed with geotextile, includes materials, equipment and labor to transport and place | Cubic Yard | $55.44 | 1 | $55.44 |
| Aggregate, Gravel, Graded | 46 | Gravel, includes materials, equipment and labor to transport and place. Includes washed and unwashed gravel. | Cubic Yard | $30.82 | 105 | $3,236.10 |
| Pipe, HDPE, CPT, Double Wall, Soil Tight, 30" | 1247 | Pipe, Corrugated HDPE Double Wall, 30" diameter with soil tight joints - AASHTO M294. Material cost only. | Foot | $27.45 | 500 | $13,725.00 |
| Catch Basin, concrete, 3'x3'x6' | 1258 | Catch Basin, Precast Concrete, 3' square or round, cast grate, 6' deep. Includes materials, equipment and labor. | Each | $722.63 | 1 | $722.63 |
| **Mobilization** | | | | | | |
| Mobilization, medium equipment | 1139 | Equipment with 70-150 HP or typical weights between 14,000 and 30,000 pounds. | Each | $232.71 | 2 | $465.42 |

**Practice:** 620 - Underground Outlet

**Scenario** #8 - UO Greater Than 30 inches

**Scenario Description:**

Install 500 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::** Foot

**Scenario Typical Size:** 500

**Total Scenario Cost:** $26,009.17

**Scenario Cost/Unit:** $52.02

**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 Yard | $2.28 | 690 | $1,573.20 |
| Excavation, common earth, side cast, large equipment | 1227 | Bulk excavation and side casting of common earth with hydraulic excavator with less greater than 1 CY capacity. Includes equipment and labor. | Cubic Yard | $1.53 | 690 | $1,055.70 |
| 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 Yard | $1.96 | 2 | $3.92 |
| **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. | Hour | $34.29 | 4 | $137.16 |
| **Materials** | | | | | | |
| Rock Riprap, Placed with geotextile | 44 | Rock Riprap, placed with geotextile, includes materials, equipment and labor to transport and place | Cubic Yard | $55.44 | 1 | $55.44 |
| Aggregate, Gravel, Graded | 46 | Gravel, includes materials, equipment and labor to transport and place. Includes washed and unwashed gravel. | Cubic Yard | $30.82 | 135 | $4,160.70 |
| Pipe, HDPE, CPT, Double Wall, Soil Tight, 36" | 1248 | Pipe, Corrugated HDPE Double Wall, 36" diameter with soil tight joints - AASHTO M294. Material cost only. | Foot | $35.67 | 500 | $17,835.00 |
| Catch Basin, concrete, 3'x3'x6' | 1258 | Catch Basin, Precast Concrete, 3' square or round, cast grate, 6' deep. Includes materials, equipment and labor. | Each | $722.63 | 1 | $722.63 |
| **Mobilization** | | | | | | |
| Mobilization, medium equipment | 1139 | Equipment with 70-150 HP or typical weights between 14,000 and 30,000 pounds. | Each | $232.71 | 2 | $465.42 |

**Practice:** 620 - Underground Outlet

**Scenario** #9 - UO Pipe Protection, Sleeved

**Scenario Description:**

An underground outlet pipe is protected from crushing or other harm by encasing it in concrete, or sleeving it with a stronger pipe material such as, steel, concrete or Schedule 80 pipe. Cost estimate is based upon 100 feet of 5" approved plastic pipe with 50 feet of that pipe inside a steel pipe to convey stormwater or roof runoff from one location to a suitable and stable outlet. Trench is excavated 30" deep and 18" wide by small hydraulic track excavator or backhoe. Costs include 5" HDPE, single wall pipe, steel pipe, trench excavation, trench backfill, rodent guard and laid up stone headwall at outlet. This practice is often installed in conjunction with Roof Run off Structure, 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 in the vacinity of a heavily used area where it is not practical to bury an underground outlet to a sufficient depth to protect it form vehicle or animal traffic, or other threat.

**After Situation:**

Field system meets "T" or "clean" storm water runoff is diverted away from the erodable area and underground outlet is protected allowing outlet to function throughout practice lifespan. Associated practices are Roof Runoff Structure (558), 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::** Foot

**Scenario Typical Size:** 100

**Total Scenario Cost:** $1,246.83

**Scenario Cost/Unit:** $12.47

**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 Yard | $2.28 | 19 | $43.32 |
| 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 Yard | $1.53 | 19 | $29.07 |
| **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. | Hour | $34.29 | 2 | $68.58 |
| **Materials** | | | | | | |
| Rock Riprap, Placed with geotextile | 44 | Rock Riprap, placed with geotextile, includes materials, equipment and labor to transport and place | Cubic Yard | $55.44 | 1 | $55.44 |
| Pipe, HDPE, 5", PCPT, Single Wall | 1271 | Pipe, Corrugated Plastic Tubing, Single Wall, Perforated, 5" diameter - ASTM F405. Material cost only. | Foot | $0.69 | 100 | $69.00 |
| 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 | $0.86 | 600 | $516.00 |
| **Mobilization** | | | | | | |
| Mobilization, medium equipment | 1139 | Equipment with 70-150 HP or typical weights between 14,000 and 30,000 pounds. | Each | $232.71 | 2 | $465.42 |

**Practice:** 632 - Waste Separation Facility

**Scenario** #1 - 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 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

**Total Scenario Cost:** $34,213.17

**Scenario Cost/Unit:** $34,213.17

**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 Yard | $210.23 | 10 | $2,102.30 |
| **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. | Hour | $25.08 | 16 | $401.28 |
| 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. | Hour | $18.93 | 32 | $605.76 |
| **Materials** | | | | | | |
| Vibratory or Rotating Screen | 1948 | Vibratory or Rotating Screen, includes materials, shipping and equipment. | Each | $30,325.37 | 1 | $30,325.37 |
| **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 | $156.52 | 2 | $313.04 |
| Mobilization, medium equipment | 1139 | Equipment with 70-150 HP or typical weights between 14,000 and 30,000 pounds. | Each | $232.71 | 2 | $465.42 |

**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:**

One earthen settling basin structure (60 ft wide by 200 ft long by 3 ft deep, 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.

**Feature Measure:** Cubic Foot of Design Storage

**Scenario Unit::** Cubic Foot

**Scenario Typical Size:** 30000

**Total Scenario Cost:** $12,722.92

**Scenario Cost/Unit:** $0.42

**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 Yard | $326.97 | 12 | $3,923.64 |
| Excavation, Common Earth, side cast, small equipment | 48 | Bulk excavation and side casting of common earth with hydraulic excavator with less than 1 CY capacity. Includes equipment and labor. | Cubic Yard | $1.99 | 1000 | $1,990.00 |
| Earthfill, Roller Compacted | 49 | Earthfill, roller or machine compacted, includes equipment and labor | Cubic Yard | $3.76 | 1000 | $3,760.00 |
| **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. | Hour | $18.93 | 8 | $151.44 |
| **Materials** | | | | | | |
| Aggregate, Gravel, Graded | 46 | Gravel, includes materials, equipment and labor to transport and place. Includes washed and unwashed gravel. | Cubic Yard | $30.82 | 14 | $431.48 |
| Weeping Wall | 1765 | Weeping wall or picket screen structure for solid settling basin. Materials only. | Foot | $53.48 | 24 | $1,283.52 |
| **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 | $64.26 | 3 | $192.78 |
| 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 | $156.52 | 2 | $313.04 |
| Mobilization, medium equipment | 1139 | Equipment with 70-150 HP or typical weights between 14,000 and 30,000 pounds. | Each | $232.71 | 1 | $232.71 |
| Mobilization, large equipment | 1140 | Equipment >150HP or typical weights greater than 30,000 pounds or loads requiring over width or over length permits. | Each | $444.31 | 1 | $444.31 |

**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 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 basin structure (20 ft wide by 30 ft long with 3 ft high walls and weeping wall/picket structure or outlet control) 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.

**Feature Measure:** Cubic Foot of Design Storage

**Scenario Unit::** Cubic Foot

**Scenario Typical Size:** 1800

**Total Scenario Cost:** $9,477.80

**Scenario Cost/Unit:** $5.27

**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 Yard | $210.23 | 12 | $2,522.76 |
| 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 Yard | $326.97 | 12 | $3,923.64 |
| Geotextile, woven | 42 | Woven Geotextile Fabric. Includes materials, equipment and labor | Square Yard | $2.05 | 50 | $102.50 |
| Excavation, Common Earth, side cast, small equipment | 48 | Bulk excavation and side casting of common earth with hydraulic excavator with less than 1 CY capacity. Includes equipment and labor. | Cubic Yard | $1.99 | 50 | $99.50 |
| Earthfill, Roller Compacted | 49 | Earthfill, roller or machine compacted, includes equipment and labor | Cubic Yard | $3.76 | 50 | $188.00 |
| **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. | Hour | $18.93 | 8 | $151.44 |
| **Materials** | | | | | | |
| Aggregate, Gravel, Graded | 46 | Gravel, includes materials, equipment and labor to transport and place. Includes washed and unwashed gravel. | Cubic Yard | $30.82 | 32 | $986.24 |
| Weeping Wall | 1765 | Weeping wall or picket screen structure for solid settling basin. Materials only. | Foot | $53.48 | 6 | $320.88 |
| **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 | $64.26 | 3 | $192.78 |
| 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 | $156.52 | 2 | $313.04 |
| Mobilization, medium equipment | 1139 | Equipment with 70-150 HP or typical weights between 14,000 and 30,000 pounds. | Each | $232.71 | 1 | $232.71 |
| Mobilization, large equipment | 1140 | Equipment >150HP or typical weights greater than 30,000 pounds or loads requiring over width or over length permits. | Each | $444.31 | 1 | $444.31 |

**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 Foot

**Scenario Typical Size:** 5000

**Total Scenario Cost:** $30,113.34

**Scenario Cost/Unit:** $6.02

**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 Yard | $210.23 | 90 | $18,920.70 |
| Concrete, CIP, formed reinforced | 38 | Steel reinforced concrete formed and cast-in-placed in formed structures such as walls or suspended slabs by chute placement. Typical strength is 3000 to 4000 psi. Includes materials, labor and equipment to transport, place and finish. | Cubic Yard | $326.97 | 20 | $6,539.40 |
| 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 Yard | $1.99 | 180 | $358.20 |
| Earthfill, Roller Compacted | 49 | Earthfill, roller or machine compacted, includes equipment and labor | Cubic Yard | $3.76 | 90 | $338.40 |
| **Materials** | | | | | | |
| Aggregate, Gravel, Graded | 46 | Gravel, includes materials, equipment and labor to transport and place. Includes washed and unwashed gravel. | Cubic Yard | $30.82 | 90 | $2,773.80 |
| **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 | $64.26 | 3 | $192.78 |
| 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 | $156.52 | 2 | $313.04 |
| Mobilization, medium equipment | 1139 | Equipment with 70-150 HP or typical weights between 14,000 and 30,000 pounds. | Each | $232.71 | 1 | $232.71 |
| Mobilization, large equipment | 1140 | Equipment >150HP or typical weights greater than 30,000 pounds or loads requiring over width or over length permits. | Each | $444.31 | 1 | $444.31 |

**Practice:** 634 - Waste Transfer

**Scenario** #1 - Wastewater catch basin, less than or equal to 1000 gal.

**Scenario Description:**

Installation for a wastewater collection system that includes materials and structures to collect liquids of a design volume less than 1000 gallons such as silage leachate, lot runoff and other contaminated liquid effluent. This may include curbs, screens, precast manholes, sumps or catch basins. The wastewater will typically be transferred from the collection basin to a waste storage facility through a gravity or low pressure flow conduit.Associated practices may include: PS 313 Waste Storage Facility; PS 533, Pumping Plant; PS 430, Irrigation Pipeline; PS 632, Waste Separation Facility; PS 468, Lined Waterway or Outlet; PS 590 Nutrient Management; PS 633, Waste Recycling. This scenario addresses the potential for surface water and groundwater quality degradation from liquid wastewater running unchecked out of silage bunkers and off of animal feeding lots.

**Before Situation:**

Inadequate storage is available to collect wastewater from an operation that may contaminate surface or groundwater resources. The liquids contain few solids or limited solids that can be easily screened out without blocking the collection intake.

**After Situation:**

This practice scenario is suitable where the estimated design volume for wastewater transfer is less than 1000 gallons of contaminated liquid that may flow from silage bunkers or animal lot areas after a precipitation event. The practice scenario typically includes materials and installation of flat and formed concrete for curbs and/or gutters to collect liquids. With the installation of a precast manhole with lid or catch basin with grate. The cost includes excavation, placement of bedding as needed, placement of structure and backfill with construction of concrete inlet collection area. Transfer pump if needed must be contracted under pumping plant, PS 533.

**Feature Measure:** Collection volume installed

**Scenario Unit::** Gallon

**Scenario Typical Size:** 1000

**Total Scenario Cost:** $6,576.14

**Scenario Cost/Unit:** $6.58

**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 Yard | $210.23 | 4 | $840.92 |
| Concrete, CIP, formed reinforced | 38 | Steel reinforced concrete formed and cast-in-placed in formed structures such as walls or suspended slabs by chute placement. Typical strength is 3000 to 4000 psi. Includes materials, labor and equipment to transport, place and finish. | Cubic Yard | $326.97 | 2 | $653.94 |
| Backhoe, 80 HP | 926 | Wheel mounted backhoe excavator with horsepower range of 60 to 90. Equipment and power unit costs. Labor not included. | Hour | $50.99 | 8 | $407.92 |
| Dozer, 80 HP | 929 | Track mounted Dozer with horsepower range of 60 to 90. Equipment and power unit costs. Labor not included. | Hour | $60.16 | 4 | $240.64 |
| Tractor, agricultural, 120 HP | 962 | Agricultural tractor with horsepower range of 90 to 140. Equipment and power unit costs. Labor not included. | Hour | $52.49 | 4 | $209.96 |
| Demolition, concrete | 1498 | Demolition and disposal of reinforced concrete structures including slabs and walls. Includes labor and equipment. | Cubic Yard | $10.00 | 2 | $20.00 |
| **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. | Hour | $18.93 | 24 | $454.32 |
| Equipment Operators, Light | 232 | Includes: Skid Steer Loaders, Hydraulic Excavators <50 HP, Trenchers <12", Ag Equipment <150 HP, Pickup Trucks, Forklifts, Mulchers | Hour | $21.14 | 8 | $169.12 |
| Equipment Operators, Heavy | 233 | Includes: Cranes, Hydraulic Excavators >=50 HP, Dozers, Paving Machines, Rock Trenchers, Trenchers >=12", Dump Trucks, Ag Equipment >=150 HP, Scrapers, Water Wagons. | Hour | $23.93 | 8 | $191.44 |
| Supervisor or Manager | 234 | Labor involving supervision or management activities. Includes crew supervisors, foremen and farm/ranch managers time required for adopting new technology, etc. | Hour | $34.29 | 16 | $548.64 |
| **Materials** | | | | | | |
| Aggregate, Gravel, Ungraded, Quarry Run | 1099 | Includes materials, equipment and labor | Cubic Yard | $21.24 | 5 | $106.20 |

| | | | | | | |
|---|---|---|---|---|---|---|
| Catch Basin, concrete, 60" dia. | 1754 | Precast 60-in diameter catch basin, 6' deep, with collar and grate cover. Materials only. | Each | $1,954.58 | 1 | $1,954.58 |
| **Mobilization** | | | | | | |
| Mobilization, small equipment | 1138 | Equipment <70 HP but can"t be transported by a pick-up truck or with typical weights between 3,500 to 14,000 pounds. | Each | $156.52 | 2 | $313.04 |
| Mobilization, medium equipment | 1139 | Equipment with 70-150 HP or typical weights between 14,000 and 30,000 pounds. | Each | $232.71 | 2 | $465.42 |

**Practice:** 634 - Waste Transfer

**Scenario** #2 - Wastewater reception pit, 1000 to 5000 gal.

**Scenario Description:**

Installation for a wastewater collection system that includes materials and structures to collect liquids of a design volume between 1000 and 5000 gallons such as silage leachate, lot runoff and other contaminated liquid effluent. This scenario includes a reinforced concrete manure reception pit for temporary storage and transfer of manure and wastewater for an animal operation. Reception Pit includes safety fence w/gate or solid/grated cover. The wastewater will typically be transferred from the collection basin to a waste storage facility through a gravity or low pressure flow conduit. Associated practices may include: PS 313 Waste Storage Facility; PS 533, Pumping Plant; PS 430, Irrigation Pipeline; PS 632, Waste Separation Facility; PS 468, Lined Waterway or Outlet; PS 590 Nutrient Management; PS 633, Waste Recycling.

This scenario addresses the potential for surface water and groundwater quality degradation from liquid wastewater running unchecked out of silage bunkers and off of animal feeding lots.

**Before Situation:**

Inadequate storage is available to collect wastewater from an operation that may contaminate surface or groundwater resources.

**After Situation:**

This practice scenario is suitable where the estimated design volume for waste collection and transfer is between 1000 and 5000 gallons of liquid waste. The practice scenario typically includes materials and installation of flat and formed concrete for curbs and gutters to collect liquid slurry waste and the installation of an 8'x12'x6' reinforced concrete reception pit formed in place that includes safety fence w/gate or solid/grated cover. The cost includes excavation, placement of subgrade as needed, forming, pouring and finishing of concrete structure and backfilling. Transfer pump if needed must be contracted under pumping plant, PS 533.

**Feature Measure:** Collection volume installed

**Scenario Unit::** Gallon

**Scenario Typical Size:** 4300

**Total Scenario Cost:** $12,088.70

**Scenario Cost/Unit:** $2.81

**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 Yard | $210.23 | 6 | $1,261.38 |
| Concrete, CIP, formed reinforced | 38 | Steel reinforced concrete formed and cast-in-placed in formed structures such as walls or suspended slabs by chute placement. Typical strength is 3000 to 4000 psi. Includes materials, labor and equipment to transport, place and finish. | Cubic Yard | $326.97 | 14 | $4,577.58 |
| Backhoe, 80 HP | 926 | Wheel mounted backhoe excavator with horsepower range of 60 to 90. Equipment and power unit costs. Labor not included. | Hour | $50.99 | 24 | $1,223.76 |
| Dozer, 80 HP | 929 | Track mounted Dozer with horsepower range of 60 to 90. Equipment and power unit costs. Labor not included. | Hour | $60.16 | 8 | $481.28 |
| Tractor, agricultural, 120 HP | 962 | Agricultural tractor with horsepower range of 90 to 140. Equipment and power unit costs. Labor not included. | Hour | $52.49 | 8 | $419.92 |
| Demolition, concrete | 1498 | Demolition and disposal of reinforced concrete structures including slabs and walls. Includes labor and equipment. | Cubic Yard | $10.00 | 3 | $30.00 |
| **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. | Hour | $18.93 | 64 | $1,211.52 |
| Equipment Operators, Light | 232 | Includes: Skid Steer Loaders, Hydraulic Excavators <50 HP, Trenchers <12", Ag Equipment <150 HP, Pickup Trucks, Forklifts, Mulchers | Hour | $21.14 | 16 | $338.24 |
| Equipment Operators, Heavy | 233 | Includes: Cranes, Hydraulic Excavators >=50 HP, Dozers, Paving Machines, Rock Trenchers, Trenchers >=12", Dump Trucks, Ag Equipment >=150 HP, Scrapers, Water Wagons. | Hour | $23.93 | 24 | $574.32 |
| Supervisor or Manager | 234 | Labor involving supervision or management activities. Includes crew supervisors, foremen and farm/ranch managers time required for adopting new technology, etc. | Hour | $34.29 | 24 | $822.96 |
| **Materials** | | | | | | |
| Aggregate, Gravel, Ungraded, Quarry Run | 1099 | Includes materials, equipment and labor | Cubic Yard | $21.24 | 12 | $254.88 |

| | | | | | | |
|---|---|---|---|---|---|---|
| Safety chain tractor barrier | 1725 | 3/8 in. Transport chain barrier installed to prevent tractor equipment from entering wastewater collection basin or pit. Material cost only. | Foot | $2.86 | 40 | $114.40 |
| **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 | $156.52 | 2 | $313.04 |
| Mobilization, medium equipment | 1139 | Equipment with 70-150 HP or typical weights between 14,000 and 30,000 pounds. | Each | $232.71 | 2 | $465.42 |

**Practice:** 634 - Waste Transfer

**Scenario** #3 - Wastewater basin, 5000 gal. and larger

**Scenario Description:**

Installation for a wastewater collection system that includes materials and structures to collect liquids of a design volume greater than 5000 gallons such as lot runoff, manure slurry and other contaminated liquid effluent. The wastewater collected in this pit is intended to be transferred to final storage within a 48 hour period. This scenario includes a reinforced concrete manure reception pit for temporary storage and transfer of manure and wastewater for an animal operation. Reception Pit includes safety fence w/gate or solid/grated cover. The wastewater will typically be transferred from the collection basin to a waste storage facility through a gravity or low pressure flow conduit. Associated practices may include: PS 313 Waste Storage Facility; PS 533, Pumping Plant; PS 430, Irrigation Pipeline; PS 632, Waste Separation Facility; PS 468, Lined Waterway or Outlet; PS 590 Nutrient Management; PS 633, Waste Recycling. This scenario addresses the potential for surface water and groundwater quality degradation from liquid wastewater running unchecked out of silage bunkers and off of animal feeding lots.

**Before Situation:**

Inadequate storage is available to collect wastewater from an operation that may contaminate surface or groundwater resources.

**After Situation:**

This practice scenario is suitable where the estimated maximum design volume for wastewater collected is greater than 5000 gallons of liquid waste within 48 hours or before it is stored or treated. The practice scenario typically includes materials and installation of flat and formed concrete for curbs and gutters inlet area to collect liquid slurry waste and the installation of an 12 ft wide x 16 ft long x 6 ft deep reinforced concrete reception pit formed in place that includes safety fence w/gate or solid/grated cover. The cost includes excavation, placement of subgrade as needed, forming, pouring and finishing of concrete structure and backfilling. Transfer pump if needed must be contracted under pumping plant, PS 533.

**Feature Measure:** Collection volume installed

**Scenario Unit::** Gallon

**Scenario Typical Size:** 8600

**Total Scenario Cost:** $18,251.65

**Scenario Cost/Unit:** $2.12

**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 Yard | $210.23 | 11 | $2,312.53 |
| Concrete, CIP, formed reinforced | 38 | Steel reinforced concrete formed and cast-in-placed in formed structures such as walls or suspended slabs by chute placement. Typical strength is 3000 to 4000 psi. Includes materials, labor and equipment to transport, place and finish. | Cubic Yard | $326.97 | 22 | $7,193.34 |
| Backhoe, 80 HP | 926 | Wheel mounted backhoe excavator with horsepower range of 60 to 90. Equipment and power unit costs. Labor not included. | Hour | $50.99 | 32 | $1,631.68 |
| Dozer, 80 HP | 929 | Track mounted Dozer with horsepower range of 60 to 90. Equipment and power unit costs. Labor not included. | Hour | $60.16 | 12 | $721.92 |
| Tractor, agricultural, 120 HP | 962 | Agricultural tractor with horsepower range of 90 to 140. Equipment and power unit costs. Labor not included. | Hour | $52.49 | 16 | $839.84 |
| Demolition, concrete | 1498 | Demolition and disposal of reinforced concrete structures including slabs and walls. Includes labor and equipment. | Cubic Yard | $10.00 | 4 | $40.00 |
| **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. | Hour | $18.93 | 80 | $1,514.40 |
| Equipment Operators, Light | 232 | Includes: Skid Steer Loaders, Hydraulic Excavators <50 HP, Trenchers <12", Ag Equipment <150 HP, Pickup Trucks, Forklifts, Mulchers | Hour | $21.14 | 28 | $591.92 |
| Equipment Operators, Heavy | 233 | Includes: Cranes, Hydraulic Excavators >=50 HP, Dozers, Paving Machines, Rock Trenchers, Trenchers >=12", Dump Trucks, Ag Equipment >=150 HP, Scrapers, Water Wagons. | Hour | $23.93 | 32 | $765.76 |
| Supervisor or Manager | 234 | Labor involving supervision or management activities. Includes crew supervisors, foremen and farm/ranch managers time required for adopting new technology, etc. | Hour | $34.29 | 40 | $1,371.60 |
| **Materials** | | | | | | |
| Aggregate, Gravel, Ungraded, Quarry Run | 1099 | Includes materials, equipment and labor | Cubic Yard | $21.24 | 15 | $318.60 |

| | | | | | | |
|---|---|---|---|---|---|---|
| Safety chain tractor barrier | 1725 | 3/8 in. Transport chain barrier installed to prevent tractor equipment from entering wastewater collection basin or pit. Material cost only. | Foot | $2.86 | 60 | $171.60 |
| **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 | $156.52 | 2 | $313.04 |
| Mobilization, medium equipment | 1139 | Equipment with 70-150 HP or typical weights between 14,000 and 30,000 pounds. | Each | $232.71 | 2 | $465.42 |

**Practice:** 634 - Waste Transfer

**Scenario** #4 - Medium sized wastewater reception pit with 6 inch conduit transfer pipe to waste storage pond

**Scenario Description:**

Installation for a wastewater collection system that includes materials and structures to collect a design volume between 1000 and 5000 gallons of liquids such as silage leachate, lot runoff and other contaminated liquid effluent which is then transferred through a 6" low pressure conduit to the waste storage structure. This scenario includes a reinforced concrete manure reception pit and a 6" PVC SDR 41 conduit to transfer the manure and wastewater to a waste storage pond. Reception Pit includes safety fence w/gate or solid/grated cover. The transfer conduit consists of the pipe plus the inlet structure connection and all other fittings, trench excavation and backfill, labor and equipment for installation. If pumping is required for the pipe flow velocity that needs to be contracted under PS 533, Pumping PlantAssociated practices may include: PS 313 Waste Storage Facility; PS 533, Pumping Plant; PS 430, Irrigation Pipeline; PS 632, Waste Separation Facility; PS 468, Lined Waterway or Outlet; PS 590 Nutrient Management; PS 633, Waste Recycling. This scenario addresses the potential for surface water and groundwater quality degradation from liquid wastewater running unchecked out of silage bunkers and off of animal feeding lots.

**Before Situation:**

Inadequate storage is available to collect wastewater from an operation that may contaminate surface or groundwater resources. The transfer of waste water to a waste storage facility is required for the CNMP.

**After Situation:**

This practice scenario is for the estimated design volume for waste collection and transfer of 4300 gallons of liquid waste and can be transferred under gravity or low pressure flow in a 6" PVC pipeline to a waste storage pond. The practice scenario typically includes materials and installation of flat and formed concrete for curbs and gutters at the basin to collect liquid slurry waste and the installation of an 8'x12'x6' reinforced concrete reception pit formed in place that includes safety fence w/gate or solid/grated cover. The transfer pipeline is assumed to be 300 feet long, 6" PVC gasketted SDR 41 pipe with an adapter for the concrete basin, couplers, air-vac vents, all other fittings placed as specified by the design, trench excavation, pipe bedding and backfill. Pipe length for contract is increased by 10% to account for required fittings. The cost includes excavation, placement of subgrade as needed, forming, pouring and finishing of concrete structure and backfilling as well as pipeline installation. Transfer pump if needed must be contracted under pumping plant, PS 533.

**Feature Measure:** Collection volume installed

**Scenario Unit::** Gallon

**Scenario Typical Size:** 4300

**Total Scenario Cost:** $15,647.52

**Scenario Cost/Unit:** $3.64

**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 Yard | $210.23 | 6 | $1,261.38 |
| Concrete, CIP, formed reinforced | 38 | Steel reinforced concrete formed and cast-in-placed in formed structures such as walls or suspended slabs by chute placement. Typical strength is 3000 to 4000 psi. Includes materials, labor and equipment to transport, place and finish. | Cubic Yard | $326.97 | 14 | $4,577.58 |
| Backhoe, 80 HP | 926 | Wheel mounted backhoe excavator with horsepower range of 60 to 90. Equipment and power unit costs. Labor not included. | Hour | $50.99 | 32 | $1,631.68 |
| Dozer, 80 HP | 929 | Track mounted Dozer with horsepower range of 60 to 90. Equipment and power unit costs. Labor not included. | Hour | $60.16 | 8 | $481.28 |
| Tractor, agricultural, 120 HP | 962 | Agricultural tractor with horsepower range of 90 to 140. Equipment and power unit costs. Labor not included. | Hour | $52.49 | 16 | $839.84 |
| Demolition, concrete | 1498 | Demolition and disposal of reinforced concrete structures including slabs and walls. Includes labor and equipment. | Cubic Yard | $10.00 | 3 | $30.00 |
| **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. | Hour | $18.93 | 96 | $1,817.28 |
| Equipment Operators, Light | 232 | Includes: Skid Steer Loaders, Hydraulic Excavators <50 HP, Trenchers <12", Ag Equipment <150 HP, Pickup Trucks, Forklifts, Mulchers | Hour | $21.14 | 24 | $507.36 |
| Equipment Operators, Heavy | 233 | Includes: Cranes, Hydraulic Excavators >=50 HP, Dozers, Paving Machines, Rock Trenchers, Trenchers >=12", Dump Trucks, Ag Equipment >=150 HP, Scrapers, Water Wagons. | Hour | $23.93 | 32 | $765.76 |
| Supervisor or Manager | 234 | Labor involving supervision or management activities. Includes crew supervisors, foremen and farm/ranch managers time required for adopting new technology, etc. | Hour | $34.29 | 32 | $1,097.28 |

| | | | | | | |
|---|---|---|---|---|---|---|
| **Materials** | | | | | | |
| Pipe, PVC, 6", SDR 41 | 984 | Materials: - 6" - PVC - SDR 41 100 psi - ASTM D2241 | Foot | $4.13 | 330 | $1,362.90 |
| Aggregate, Gravel, Ungraded, Quarry Run | 1099 | Includes materials, equipment and labor | Cubic Yard | $21.24 | 18 | $382.32 |
| Safety chain tractor barrier | 1725 | 3/8 in. Transport chain barrier installed to prevent tractor equipment from entering wastewater collection basin or pit. Material cost only. | Foot | $2.86 | 40 | $114.40 |
| **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 | $156.52 | 2 | $313.04 |
| Mobilization, medium equipment | 1139 | Equipment with 70-150 HP or typical weights between 14,000 and 30,000 pounds. | Each | $232.71 | 2 | $465.42 |

**Practice:** 634 - Waste Transfer

**Scenario** #5 - Large reception pit, 8 inch pipe to treatment, plus 6 inch pipe to storage.

**Scenario Description:**

Installation for a wastewater collection system that includes materials and structures to collect liquids such as lot runoff, manure slurry and other contaminated liquid effluent. The wastewater collected in this 8600 gallon pit is intended to be transferred to final storage within a 48 hour period. The waste is transferred through an 8" conduit to a waste treatment location. After treatment the remaining liquids are transferred to the waste storage pond in a 6" pipeline. This scenario includes a reinforced concrete manure reception pit an 8" conduit to transfer the manure and wastewater to a treatment location and a secondary 6" transfer pipeline. Reception Pit includes safety fence w/gate or solid/grated cover. The 8" transfer conduit and 6" transfer pipeline consists of the pipe plus the inlet structures connections and all other fittings, trench excavation and backfill, labor and equipment for installation. If pumping is required for the pipe flow velocity that needs to be contracted under PS 533, Pumping PlantAssociated practices may include: PS 313 Waste Storage Facility; PS 533, Pumping Plant; PS 430, Irrigation Pipeline; PS 632, Waste Separation Facility; PS 468, Lined Waterway or Outlet; PS 590 Nutrient Management; PS 633, Waste Recycling. This scenario addresses the potential for surface water and groundwater quality degradation from liquid wastewater running unchecked out of silage bunkers and off of animal feeding lots.

**Before Situation:**

Inadequate storage is available to collect wastewater from an operation that may contaminate surface or groundwater resources. The transfer of waste water to a waste storage facility is required for the CNMP. Additional waste treatment is required for the waste stream prior to reaching in the waste storage pond.

**After Situation:**

This practice scenario is suitable where the estimated design volume for waste collection and transfer is greater than 5000 gallons of liquid waste and can be transferred under gravity or low pressure flow in an 8" conduit to a waste treatment site. Then the remaining liquids will be transferred in a 6" pipeline to a waste storage pond. The practice scenario typically includes materials and installation of flat and formed concrete for curbs and gutters to collect liquid slurry waste and the installation of an 8'x12'x6' reinforced concrete reception pit formed in place that includes safety fence w/gate or solid/grated cover. The first stage transfer pipeline is assumed to be 200 feet long, 8" PVC gasketted SDR 41 pipe with an adapter for the concrete basin, couplers, air-vac vents, all other fittings placed as specified by the design. The second stage transfer pipe is assumed to be 500 feet long 6" PVC gasketted SDR 41 pipe with an adapter for the wastewater treatment system, couplers, air-vac vents, all other fittings placed as specified by the design.. Pipe length for contract is increased by 10% to account for required fittings. The cost includes excavation, placement of subgrade as needed, forming, pouring and finishing of concrete structure and backfilling as well as pipeline installation costs for trench excavation, pipe bedding and backfill. Transfer pump if needed must be contracted under pumping plant, PS 533.

**Feature Measure:** Collection volume installed

**Scenario Unit::** Gallon

**Scenario Typical Size:** 8600

**Total Scenario Cost:** $25,372.37

**Scenario Cost/Unit:** $2.95

**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 Yard | $210.23 | 11 | $2,312.53 |
| Concrete, CIP, formed reinforced | 38 | Steel reinforced concrete formed and cast-in-placed in formed structures such as walls or suspended slabs by chute placement. Typical strength is 3000 to 4000 psi. Includes materials, labor and equipment to transport, place and finish. | Cubic Yard | $326.97 | 22 | $7,193.34 |
| Backhoe, 80 HP | 926 | Wheel mounted backhoe excavator with horsepower range of 60 to 90. Equipment and power unit costs. Labor not included. | Hour | $50.99 | 40 | $2,039.60 |
| Dozer, 80 HP | 929 | Track mounted Dozer with horsepower range of 60 to 90. Equipment and power unit costs. Labor not included. | Hour | $60.16 | 12 | $721.92 |
| Tractor, agricultural, 120 HP | 962 | Agricultural tractor with horsepower range of 90 to 140. Equipment and power unit costs. Labor not included. | Hour | $52.49 | 24 | $1,259.76 |
| Demolition, concrete | 1498 | Demolition and disposal of reinforced concrete structures including slabs and walls. Includes labor and equipment. | Cubic Yard | $10.00 | 4 | $40.00 |
| **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. | Hour | $18.93 | 140 | $2,650.20 |
| Equipment Operators, Light | 232 | Includes: Skid Steer Loaders, Hydraulic Excavators <50 HP, Trenchers <12", Ag Equipment <150 HP, Pickup Trucks, Forklifts, Mulchers | Hour | $21.14 | 36 | $761.04 |
| Equipment Operators, Heavy | 233 | Includes: Cranes, Hydraulic Excavators >=50 HP, Dozers, Paving Machines, Rock Trenchers, Trenchers >=12", Dump Trucks, Ag Equipment >=150 HP, Scrapers, Water Wagons. | Hour | $23.93 | 40 | $957.20 |

| | | | | | | |
|---|---|---|---|---|---|---|
| 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. | Hour | $34.29 | 40 | $1,371.60 |
| **Materials** | | | | | | |
| Pipe, PVC, 6", SDR 41 | 984 | Materials: - 6" - PVC - SDR 41 100 psi - ASTM D2241 | Foot | $4.13 | 220 | $908.60 |
| Pipe, PVC, 8", SDR 41 | 985 | Materials: - 8" - PVC - SDR 41 100 psi - ASTM D2241 | Foot | $6.76 | 550 | $3,718.00 |
| Aggregate, Gravel, Ungraded, Quarry Run | 1099 | Includes materials, equipment and labor | Cubic Yard | $21.24 | 23 | $488.52 |
| Safety chain tractor barrier | 1725 | 3/8 in. Transport chain barrier installed to prevent tractor equipment from entering wastewater collection basin or pit. Material cost only. | Foot | $2.86 | 60 | $171.60 |
| **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 | $156.52 | 2 | $313.04 |
| Mobilization, medium equipment | 1139 | Equipment with 70-150 HP or typical weights between 14,000 and 30,000 pounds. | Each | $232.71 | 2 | $465.42 |

**Practice:** 634 - Waste Transfer

**Scenario** #6 - Concrete Channel

**Scenario Description:**

Installation of a concrete channel that consists of a slab with curb and footing on each side of the slab for the entire length of the channel to enable the facility manager to direct liquid waste to an existing collection basin and/or waste storage facility. Water quality concerns will be addressed by preventing liquid waste from entering surface waters, and to facilitate timely land application of manure and wastewater at agronomic rates according to the CNMP. This scenario addresses the potential for surface water and groundwater quality degradation. Associated practices may include: PS 313 Waste Storage Facility; PS 533, Pumping Plant; PS 430, Irrigation Pipeline; PS 632, Waste Separation Facility; PS 468, Lined Waterway or Outlet; PS 590 Nutrient Management; 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:**

Typical installation of a 12 foot wide 100' long concrete channel that consists of a 5" thick concrete slab with curbing on each side of the slab that is 2' high, 6" thick with footing for the entire length. The purpose is to transfer liquids or manure slurry from one area to an existing collection basin or waste storage facility. Includes safety chain for equipment.Alternative configurations can consist of the installation of a more narrow or wider channel that may or may not have curbs or a deeper shaped channel and may include a half pipe on the bottom.

**Feature Measure:** Bottom surface area of concrete ch

**Scenario Unit::** Square Foot

**Scenario Typical Size:** 1200

**Total Scenario Cost:** $13,125.01

**Scenario Cost/Unit:** $10.94

**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 Yard | $210.23 | 22 | $4,625.06 |
| Concrete, CIP, formed reinforced | 38 | Steel reinforced concrete formed and cast-in-placed in formed structures such as walls or suspended slabs by chute placement. Typical strength is 3000 to 4000 psi. Includes materials, labor and equipment to transport, place and finish. | Cubic Yard | $326.97 | 11 | $3,596.67 |
| Dozer, 80 HP | 929 | Track mounted Dozer with horsepower range of 60 to 90. Equipment and power unit costs. Labor not included. | Hour | $60.16 | 8 | $481.28 |
| Demolition, concrete | 1498 | Demolition and disposal of reinforced concrete structures including slabs and walls. Includes labor and equipment. | Cubic Yard | $10.00 | 4 | $40.00 |
| **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. | Hour | $18.93 | 64 | $1,211.52 |
| Equipment Operators, Heavy | 233 | Includes: Cranes, Hydraulic Excavators >=50 HP, Dozers, Paving Machines, Rock Trenchers, Trenchers >=12", Dump Trucks, Ag Equipment >=150 HP, Scrapers, Water Wagons. | Hour | $23.93 | 8 | $191.44 |
| Supervisor or Manager | 234 | Labor involving supervision or management activities. Includes crew supervisors, foremen and farm/ranch managers time required for adopting new technology, etc. | Hour | $34.29 | 50 | $1,714.50 |
| **Materials** | | | | | | |
| Aggregate, Gravel, Ungraded, Quarry Run | 1099 | Includes materials, equipment and labor | Cubic Yard | $21.24 | 26 | $552.24 |
| Safety gate, span manure transfer channel or chute | 1952 | Safety gate to span manure transfer channel at push off wall or chute outlet. Minimum of 4' tall with openings that will not pass a 6" or larger sphere. Includes materials only. | Foot | $15.43 | 16 | $246.88 |
| **Mobilization** | | | | | | |
| Mobilization, medium equipment | 1139 | Equipment with 70-150 HP or typical weights between 14,000 and 30,000 pounds. | Each | $232.71 | 2 | $465.42 |

**Practice:** 634 - Waste Transfer

**Scenario** #7 - Concrete Channel, push-off wall at pond and safety gate

**Scenario Description:**

Installation of a concrete channel that consists of a slab with curb and footing on each side of the slab for the entire length of the channel to enable the facility manager to direct liquid waste to a collection basin and/or waste storage facility at the end of a push-off ramp. A safety gate is installed at the end of the push-off ramp. Water quality concerns will be addressed by preventing liquid waste from entering surface waters, and to facilitate timely land application of manure and wastewater at agronomic rates according to the CNMP. This scenario addresses the potential for surface water and groundwater quality degradation. Associated practices may include: PS 313 Waste Storage Facility; PS 533, Pumping Plant; PS 430, Irrigation Pipeline; PS 632, Waste Separation Facility; PS 468, Lined Waterway or Outlet; PS 590 Nutrient Management; 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:**

Typical installation of a 12 foot wide 100' long concrete channel that consists of a 5" thick concrete slab with curbing on each side of the slab that is 2' high, 6" thick with footing for the entire length. The push-off ramp is a concrete cantilever structure that allows the waste to be moved into the storage facility. The purpose is to transfer liquids or manure slurry from one area to a collection basin or waste storage facility. Includes safety gate for human and animal exclusion.Alternative configurations can consist of the installation of a more narrow or wider channel that may or may not have curbs or a deeper shaped channel and may include a half pipe on the bottom.

**Feature Measure:** Bottom surface area of concrete ch

**Scenario Unit::** Square Foot

**Scenario Typical Size:** 1200

**Total Scenario Cost:** $15,740.45

**Scenario Cost/Unit:** $13.12

**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 Yard | $210.23 | 22 | $4,625.06 |
| Concrete, CIP, formed reinforced | 38 | Steel reinforced concrete formed and cast-in-placed in formed structures such as walls or suspended slabs by chute placement. Typical strength is 3000 to 4000 psi. Includes materials, labor and equipment to transport, place and finish. | Cubic Yard | $326.97 | 17 | $5,558.49 |
| Dozer, 80 HP | 929 | Track mounted Dozer with horsepower range of 60 to 90. Equipment and power unit costs. Labor not included. | Hour | $60.16 | 8 | $481.28 |
| Demolition, concrete | 1498 | Demolition and disposal of reinforced concrete structures including slabs and walls. Includes labor and equipment. | Cubic Yard | $10.00 | 5 | $50.00 |
| **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. | Hour | $18.93 | 98 | $1,855.14 |
| Equipment Operators, Heavy | 233 | Includes: Cranes, Hydraulic Excavators >=50 HP, Dozers, Paving Machines, Rock Trenchers, Trenchers >=12", Dump Trucks, Ag Equipment >=150 HP, Scrapers, Water Wagons. | Hour | $23.93 | 8 | $191.44 |
| Supervisor or Manager | 234 | Labor involving supervision or management activities. Includes crew supervisors, foremen and farm/ranch managers time required for adopting new technology, etc. | Hour | $34.29 | 50 | $1,714.50 |
| **Materials** | | | | | | |
| Aggregate, Gravel, Ungraded, Quarry Run | 1099 | Includes materials, equipment and labor | Cubic Yard | $21.24 | 26 | $552.24 |
| Safety gate, span manure transfer channel or chute | 1952 | Safety gate to span manure transfer channel at push off wall or chute outlet. Minimum of 4' tall with openings that will not pass a 6" or larger sphere. Includes materials only. | Foot | $15.43 | 16 | $246.88 |
| **Mobilization** | | | | | | |
| Mobilization, medium equipment | 1139 | Equipment with 70-150 HP or typical weights between 14,000 and 30,000 pounds. | Each | $232.71 | 2 | $465.42 |

**Practice:** 634 - Waste Transfer

**Scenario** #8 - Concrete channel, to medium sized wastewater reception pit

**Scenario Description:**

Installation of a concrete channel that consists of a slab with curb and footing on each side of the slab for the entire length of the channel to enable the facility manager to direct liquid waste to a 4300 gallon wastewater collection basin and/or waste storage facility. Water quality concerns will be addressed by preventing liquid waste from entering surface waters, and to facilitate timely land application of manure and wastewater at agronomic rates according to the CNMP. This scenario addresses the potential for surface water and groundwater quality degradation. Associated practices may include: PS 313 Waste Storage Facility; PS 533, Pumping Plant; PS 430, Irrigation Pipeline; PS 632, Waste Separation Facility; PS 468, Lined Waterway or Outlet; PS 590 Nutrient Management; 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:**

Typical installation of a 12 foot wide 100' long concrete channel that consists of a 5" thick concrete slab with curbing on each side of the slab that is 2' high, 6" thick with footing for the entire length. The purpose is to transfer liquids or manure slurry from one area to a 8'x12'x6' collection basin or waste storage facility. Includes safety chain around the basin for equipment.Alternative configurations can consist of the installation of a more narrow or wider channel that may or may not have curbs or a deeper shaped channel and may include a half pipe on the bottom.

**Feature Measure:** Bottom surface area of concrete ch

**Scenario Unit::** Square Foot

**Scenario Typical Size:** 1200

**Total Scenario Cost:** $20,899.03

**Scenario Cost/Unit:** $17.42

**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 Yard | $210.23 | 22 | $4,625.06 |
| Concrete, CIP, formed reinforced | 38 | Steel reinforced concrete formed and cast-in-placed in formed structures such as walls or suspended slabs by chute placement. Typical strength is 3000 to 4000 psi. Includes materials, labor and equipment to transport, place and finish. | Cubic Yard | $326.97 | 23 | $7,520.31 |
| Backhoe, 80 HP | 926 | Wheel mounted backhoe excavator with horsepower range of 60 to 90. Equipment and power unit costs. Labor not included. | Hour | $50.99 | 24 | $1,223.76 |
| Dozer, 80 HP | 929 | Track mounted Dozer with horsepower range of 60 to 90. Equipment and power unit costs. Labor not included. | Hour | $60.16 | 8 | $481.28 |
| Demolition, concrete | 1498 | Demolition and disposal of reinforced concrete structures including slabs and walls. Includes labor and equipment. | Cubic Yard | $10.00 | 4 | $40.00 |
| **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. | Hour | $18.93 | 120 | $2,271.60 |
| Equipment Operators, Light | 232 | Includes: Skid Steer Loaders, Hydraulic Excavators <50 HP, Trenchers <12", Ag Equipment <150 HP, Pickup Trucks, Forklifts, Mulchers | Hour | $21.14 | 8 | $169.12 |
| Equipment Operators, Heavy | 233 | Includes: Cranes, Hydraulic Excavators >=50 HP, Dozers, Paving Machines, Rock Trenchers, Trenchers >=12", Dump Trucks, Ag Equipment >=150 HP, Scrapers, Water Wagons. | Hour | $23.93 | 24 | $574.32 |
| Supervisor or Manager | 234 | Labor involving supervision or management activities. Includes crew supervisors, foremen and farm/ranch managers time required for adopting new technology, etc. | Hour | $34.29 | 60 | $2,057.40 |
| **Materials** | | | | | | |
| Pipe, Steel, 3", SCH 40 | 1003 | Materials: - 3" - Steel SCH 40 | Foot | $14.00 | 30 | $420.00 |
| Aggregate, Gravel, Ungraded, Quarry Run | 1099 | Includes materials, equipment and labor | Cubic Yard | $21.24 | 28 | $594.72 |
| Safety chain tractor barrier | 1725 | 3/8 in. Transport chain barrier installed to prevent tractor equipment from entering wastewater collection basin or pit. Material cost only. | Foot | $2.86 | 50 | $143.00 |

**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 | $156.52 | 2 | $313.04 |
| Mobilization, medium equipment | 1139 | Equipment with 70-150 HP or typical weights between 14,000 and 30,000 pounds. | Each | $232.71 | 2 | $465.42 |

**Practice:** 634 - Waste Transfer

**Scenario** #9 - Concrete channel, to medium reception pit, 6 inch pipe to storage.

**Scenario Description:**

Installation of a concrete channel that consists of a slab with curb and footing on each side of the slab for the entire length of the channel to enable the facility manager to direct liquid waste to a 4300 gallon collection basin and/or waste storage facility. The wastewater is then transferred from the basin to the waste storage pond through a 6" diameter low pressure pipeline. Water quality concerns will be addressed by preventing liquid waste from entering surface waters, and to facilitate timely land application of manure and wastewater at agronomic rates according to the CNMP. This scenario addresses the potential for surface water and groundwater quality degradation. Associated practices may include: PS 313 Waste Storage Facility; PS 533, Pumping Plant; PS 430, Irrigation Pipeline; PS 632, Waste Separation Facility; PS 468, Lined Waterway or Outlet; PS 590 Nutrient Management; 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. Waste transfer structures are needed to transfer wastes to a waste storage pond

**After Situation:**

Typical installation of a 12 foot wide 100' long concrete channel that consists of a 5" thick concrete slab with curbing on each side of the slab that is 2' high, 6" thick with footing for the entire length. The waste transfer scenario is to scrape liquids or manure slurry from the waste production area down the channel to a 8'x12'x6' collection basin. From the basin it is then transferred through a 6" pipe 500 feet to the waste storage pond. The scenario also includes a safety chain around the basin. The transfer pipe is a 6" diameter gasketted PVC SDR 41 low pressure pipeline. Pipe length for contract is increased by 10% to account for required fittings. The cost includes excavation, placement of subgrade as needed, forming, pouring and finishing of concrete structure and backfilling as well as pipeline installation costs for trench excavation, pipe bedding and backfill. Transfer pump if needed must be contracted under pumping plant, PS 533.Alternative configurations can consist of the installation of a more narrow or wider channel that may or may not have curbs or a deeper shaped channel and may include a half pipe on the bottom.

**Feature Measure:** Bottom surface area of concrete ch

**Scenario Unit::** Square Foot

**Scenario Typical Size:** 1200

**Total Scenario Cost:** $25,296.18

**Scenario Cost/Unit:** $21.08

**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 Yard | $210.23 | 22 | $4,625.06 |
| Concrete, CIP, formed reinforced | 38 | Steel reinforced concrete formed and cast-in-placed in formed structures such as walls or suspended slabs by chute placement. Typical strength is 3000 to 4000 psi. Includes materials, labor and equipment to transport, place and finish. | Cubic Yard | $326.97 | 23 | $7,520.31 |
| Earthfill, Manually Compacted | 50 | Earthfill, manually compacted, includes equipment and labor | Cubic Yard | $4.95 | 45 | $222.75 |
| Trenching, Earth, loam, 24" x 48" | 54 | Trenching, earth, loam, 24" wide x 48" depth, includes equipment and labor for trenching and backfilling | Foot | $2.67 | 500 | $1,335.00 |
| Backhoe, 80 HP | 926 | Wheel mounted backhoe excavator with horsepower range of 60 to 90. Equipment and power unit costs. Labor not included. | Hour | $50.99 | 24 | $1,223.76 |
| Dozer, 80 HP | 929 | Track mounted Dozer with horsepower range of 60 to 90. Equipment and power unit costs. Labor not included. | Hour | $60.16 | 8 | $481.28 |
| Demolition, concrete | 1498 | Demolition and disposal of reinforced concrete structures including slabs and walls. Includes labor and equipment. | Cubic Yard | $10.00 | 4 | $40.00 |
| **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. | Hour | $18.93 | 150 | $2,839.50 |
| Equipment Operators, Light | 232 | Includes: Skid Steer Loaders, Hydraulic Excavators <50 HP, Trenchers <12", Ag Equipment <150 HP, Pickup Trucks, Forklifts, Mulchers | Hour | $21.14 | 8 | $169.12 |
| Equipment Operators, Heavy | 233 | Includes: Cranes, Hydraulic Excavators >=50 HP, Dozers, Paving Machines, Rock Trenchers, Trenchers >=12", Dump Trucks, Ag Equipment >=150 HP, Scrapers, Water Wagons. | Hour | $23.93 | 24 | $574.32 |
| Supervisor or Manager | 234 | Labor involving supervision or management activities. Includes crew supervisors, foremen and farm/ranch managers time required for adopting new technology, etc. | Hour | $34.29 | 60 | $2,057.40 |

| | | | | | | |
|---|---|---|---|---|---|---|
| **Materials** | | | | | | |
| Pipe, PVC, 6", SDR 41 | 984 | Materials: - 6" - PVC - SDR 41 100 psi - ASTM D2241 | Foot | $4.13 | 550 | $2,271.50 |
| Pipe, Steel, 3", SCH 40 | 1003 | Materials: - 3" - Steel SCH 40 | Foot | $14.00 | 30 | $420.00 |
| Aggregate, Gravel, Ungraded, Quarry Run | 1099 | Includes materials, equipment and labor | Cubic Yard | $21.24 | 28 | $594.72 |
| Safety chain tractor barrier | 1725 | 3/8 in. Transport chain barrier installed to prevent tractor equipment from entering wastewater collection basin or pit. Material cost only. | Foot | $2.86 | 50 | $143.00 |
| **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 | $156.52 | 2 | $313.04 |
| Mobilization, medium equipment | 1139 | Equipment with 70-150 HP or typical weights between 14,000 and 30,000 pounds. | Each | $232.71 | 2 | $465.42 |

**Practice:** 634 - Waste Transfer

**Scenario** #10 - Small Flush System, less than 1000 gallon per flush to reception pit, 8 inch pipe to storage.

**Scenario Description:**

Installation of a manure and wastewater collection system that includes materials and structures to flush waste from a concrete surface into a collection basin and transferred to a waste storage pond. This small flush system must have an adequate source for the flush water and will use an 8" diameter pipe. The system may include flush water tank, piping and valves, concrete flush lane, concrete curbs or gutter, precast manholes, sumps or catch basins. The animal waste will be transferred by a flush cyle released from the flush tank to rinse the concrete surface and carry the waste to a collection basin, into a pipe and to a waste storage pond.Associated practices may include: PS 313 Waste Storage Facility; PS 533, Pumping Plant; PS 430, Irrigation Pipeline; PS 632, Waste Separation Facility; PS 468, Lined Waterway or Outlet; PS 590 Nutrient Management; PS 633, Waste Recycling. This scenario addresses the potential for surface water and groundwater quality degradation from animal waste.

**Before Situation:**

A small animal production facility does not have an efficient method for collecting and transferring the animal waste produced. A source of sufficient water or wastewater resources are available to design a flush system to clean the production floor and collect the waste materials deposited.

**After Situation:**

This practice scenario is suitable only where the water or wastewater supplies are available for operating a flush system to collect the animal waste deposited on the concrete surfaces. The design flush volume for a small wastewater flush system is less than 1000 gallons and requires no more than 50 feet of an 8 inch diameter pressure pipe for the flush pipe. The scenario includes materials and installation of a flush tank, piping and valves to manage the flush flow, concrete flush lane, concrete curbs or gutters to transfer the flow to a collection basin. The liquids then flow from the basin to the waste storage pond, an estimated length of 200 feet and requires an 8 inch diameter low pressure pipeline with an open outlet to the waste storage pond. The cost includes excavation, placement of bedding aggregate as needed, forming and placement of structures, conveyance pipeline with valves and structural backfill. Pump must be contracted under pumping plant, PS 533.

**Feature Measure:** 1000 Gallons of flush water

**Scenario Unit::** Gallon

**Scenario Typical Size:** 1000

**Total Scenario Cost:** $13,190.23

**Scenario Cost/Unit:** $13.19

**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 Yard | $210.23 | 7 | $1,471.61 |
| Concrete, CIP, formed reinforced | 38 | Steel reinforced concrete formed and cast-in-placed in formed structures such as walls or suspended slabs by chute placement. Typical strength is 3000 to 4000 psi. Includes materials, labor and equipment to transport, place and finish. | Cubic Yard | $326.97 | 3 | $980.91 |
| Backhoe, 80 HP | 926 | Wheel mounted backhoe excavator with horsepower range of 60 to 90. Equipment and power unit costs. Labor not included. | Hour | $50.99 | 20 | $1,019.80 |
| Dozer, 80 HP | 929 | Track mounted Dozer with horsepower range of 60 to 90. Equipment and power unit costs. Labor not included. | Hour | $60.16 | 4 | $240.64 |
| Tractor, agricultural, 120 HP | 962 | Agricultural tractor with horsepower range of 90 to 140. Equipment and power unit costs. Labor not included. | Hour | $52.49 | 4 | $209.96 |
| Demolition, concrete | 1498 | Demolition and disposal of reinforced concrete structures including slabs and walls. Includes labor and equipment. | Cubic Yard | $10.00 | 4 | $40.00 |
| **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. | Hour | $18.93 | 60 | $1,135.80 |
| Equipment Operators, Light | 232 | Includes: Skid Steer Loaders, Hydraulic Excavators <50 HP, Trenchers <12", Ag Equipment <150 HP, Pickup Trucks, Forklifts, Mulchers | Hour | $21.14 | 8 | $169.12 |
| Equipment Operators, Heavy | 233 | Includes: Cranes, Hydraulic Excavators >=50 HP, Dozers, Paving Machines, Rock Trenchers, Trenchers >=12", Dump Trucks, Ag Equipment >=150 HP, Scrapers, Water Wagons. | Hour | $23.93 | 20 | $478.60 |
| 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. | Hour | $34.29 | 30 | $1,028.70 |
| **Materials** | | | | | | |
| Pipe, PVC, 8", SDR 21 | 988 | Materials: - 8" - PVC - SDR 21 200 psi - ASTM D2241 | Foot | $12.95 | 55 | $712.25 |

| | | | | | | |
|---|---|---|---|---|---|---|
| Pipe, PVC, 8", SDR 35 | 994 | Materials: - 8" - PVC - SDR 35 - ASTM D3034 | Foot | $7.96 | 220 | $1,751.20 |
| Tank, Poly enclosed Storage, 300-1000 gal | 1074 | Water storage tanks. Includes materials and shipping only. | Gallon | $0.90 | 1000 | $900.00 |
| Aggregate, Gravel, Ungraded, Quarry Run | 1099 | Includes materials, equipment and labor | Cubic Yard | $21.24 | 15 | $318.60 |
| Catch Basin, concrete, 60" dia. | 1754 | Precast 60-in diameter catch basin, 6' deep, with collar and grate cover. Materials only. | Each | $1,954.58 | 1 | $1,954.58 |
| **Mobilization** | | | | | | |
| Mobilization, small equipment | 1138 | Equipment <70 HP but can"t be transported by a pick-up truck or with typical weights between 3,500 to 14,000 pounds. | Each | $156.52 | 2 | $313.04 |
| Mobilization, medium equipment | 1139 | Equipment with 70-150 HP or typical weights between 14,000 and 30,000 pounds. | Each | $232.71 | 2 | $465.42 |

**Practice:** 634 - Waste Transfer

**Scenario** #11 - Wastewater Flush Transfer System, Pipes only, 12 inch diameter

**Scenario Description:**

Installation of the pipe for a manure and wastewater flush system that provides the structures to utilize recycled wastewater to flush waste from a concrete surface into a waste storage pond. This may include pipe and valves, concrete flush lane, concrete curbs or gutter. The animal waste will be transferred by recycled flush water through the pipe system to rinse the concrete surface and carry the waste to a waste storage pond.Associated practices may include: PS 313 Waste Storage Facility; PS 533, Pumping Plant; PS 430, Irrigation Pipeline; PS 632, Waste Separation Facility; PS 468, Lined Waterway or Outlet; PS 590 Nutrient Management; PS 633, Waste Recycling.

This scenario addresses the potential for surface water and groundwater quality degradation from animal waste.

**Before Situation:**

An animal production facility does not have an efficient method for collecting and transferring the animal waste produced. Wastewater however is available in a sufficient quantity to provide a flush cycle to clean the production floor and collect the waste materials deposited.

**After Situation:**

This practice scenario is suitable where wastewater can be recycled for a flush system. Supplemental piping is needed to install the recycled flush water as a means to collect the animal waste deposited on the concrete surfaces. The pipe design for the flush volume requires100 feet of 12 inch diameter pipe for pressure flow. The flushed wastes are then piped from an existing collection basin to the waste storage pond an estimated length of 200 feet through a 12 inch diameter low pressure pipe with an open outlet at the pond. The cost includes excavation, placement of bedding as needed, flush and conveyance pipelines with valves and pipe backfill. Pumps must be contracted under pumping plant, PS 533.

**Feature Measure:** Flush - pipes

**Scenario Unit::** Foot

**Scenario Typical Size:** 300

**Total Scenario Cost:** $15,489.83

**Scenario Cost/Unit:** $51.63

**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 Yard | $210.23 | 8 | $1,681.84 |
| Earthfill, Manually Compacted | 50 | Earthfill, manually compacted, includes equipment and labor | Cubic Yard | $4.95 | 66 | $326.70 |
| Backhoe, 80 HP | 926 | Wheel mounted backhoe excavator with horsepower range of 60 to 90. Equipment and power unit costs. Labor not included. | Hour | $50.99 | 30 | $1,529.70 |
| Tractor, agricultural, 120 HP | 962 | Agricultural tractor with horsepower range of 90 to 140. Equipment and power unit costs. Labor not included. | Hour | $52.49 | 8 | $419.92 |
| Demolition, concrete | 1498 | Demolition and disposal of reinforced concrete structures including slabs and walls. Includes labor and equipment. | Cubic Yard | $10.00 | 4 | $40.00 |
| **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. | Hour | $18.93 | 70 | $1,325.10 |
| Equipment Operators, Light | 232 | Includes: Skid Steer Loaders, Hydraulic Excavators <50 HP, Trenchers <12", Ag Equipment <150 HP, Pickup Trucks, Forklifts, Mulchers | Hour | $21.14 | 8 | $169.12 |
| Equipment Operators, Heavy | 233 | Includes: Cranes, Hydraulic Excavators >=50 HP, Dozers, Paving Machines, Rock Trenchers, Trenchers >=12", Dump Trucks, Ag Equipment >=150 HP, Scrapers, Water Wagons. | Hour | $23.93 | 30 | $717.90 |
| Supervisor or Manager | 234 | Labor involving supervision or management activities. Includes crew supervisors, foremen and farm/ranch managers time required for adopting new technology, etc. | Hour | $34.29 | 35 | $1,200.15 |
| **Materials** | | | | | | |
| Aggregate, Sand, Graded, Washed | 45 | Sand, typical ASTM C33 gradation, includes materials, equipment and labor to transport and place | Cubic Yard | $30.40 | 10 | $304.00 |
| Aggregate, Gravel, Ungraded, Quarry Run | 1099 | Includes materials, equipment and labor | Cubic Yard | $21.24 | 6 | $127.44 |
| Pipe, PVC, 12", SDR 35 | 1252 | Pipe, PVC, SDR 35, 12" Diameter - ASTM D3034. Material cost only. | Foot | $17.82 | 220 | $3,920.40 |

| | | | | | | |
|---|---|---|---|---|---|---|
| Pipe, PVC, 12", SDR 21 | 1717 | Materials: - 12" - PVC - SDR 21 - ASTM D2241 | Foot | $26.81 | 110 | $2,949.10 |
| **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 | $156.52 | 2 | $313.04 |
| Mobilization, medium equipment | 1139 | Equipment with 70-150 HP or typical weights between 14,000 and 30,000 pounds. | Each | $232.71 | 2 | $465.42 |

**Practice:** 634 - Waste Transfer

**Scenario** #12 - Hopper gravity inlet, 24 inch diameter HDPE pipeline, to waste storage facility

**Scenario Description:**

Gravity flow conduit is typically a large diameter water tight HDPE sanitary sewer pipe used to transfer manure by gravity from one location to another. The gravity transfer system typically consists of an inlet structure or hopper with an adaptor to a smooth interior large diameter HDPE pipe. The pipe conveys the slurry waste liquid between the waste collection point and a manure storage or waste treatment structure. Adequate head on the pipe flow or change in elevation must be available for the gravity system to function and should be evaluated by the design engineer. This practice includes the inlet structure, transfer pipe plus an and all other fittings, trench excavation and backfill, labor and equipment for installation.This conduit is part of a manure transfer system for a planned waste management or comprehensive nutrient management plan. This scenario addresses the transport of liquid waste to a waste storage or treatment facility to prevent a water quality resource concern of excessive nutrients/organics and harmful levels of pathogens in surface water and/or excessive nutrients/organics in ground water. Associated practices may include: PS 313 Waste Storage Facility; PS 533, Pumping Plant; PS 430, Irrigation Pipeline; PS 632, Waste Separation Facility; PS 468, Lined Waterway or Outlet; PS 590 Nutrient Management; 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 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 an 80 foot long gravity transfer system of a precast collection hopper with an adaptor to a water tight smooth interior 24"diameter HDPE sanitary sewer grade pipe that will flow to an outlet at the site of manure treatment or storage. This scenario includes the collection hopper, pipe, inlet, outlet, couplers and all other fittings, trench excavation, pipe bedding and backfill. The site should be evaluated by the designing engineer to make sure there is adequate elevation drop before contracting. The transfer conduit will provide collection and containment of the manure slurry, thereby protecting water quality resources.

**Feature Measure:** Length of pipe installed

**Scenario Unit::** Foot

**Scenario Typical Size:** 80

**Total Scenario Cost:** $8,804.55

**Scenario Cost/Unit:** $110.06

**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 Yard | $210.23 | 7 | $1,471.61 |
| Excavation, Common Earth, side cast, small equipment | 48 | Bulk excavation and side casting of common earth with hydraulic excavator with less than 1 CY capacity. Includes equipment and labor. | Cubic Yard | $1.99 | 61 | $121.39 |
| Earthfill, Manually Compacted | 50 | Earthfill, manually compacted, includes equipment and labor | Cubic Yard | $4.95 | 33 | $163.35 |
| Earthfill, Dumped and Spread | 51 | Earthfill, dumped and spread without compaction effort, includes equipment and labor | Cubic Yard | $3.08 | 15 | $46.20 |
| 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. | Hour | $57.07 | 16 | $913.12 |
| Demolition, concrete | 1498 | Demolition and disposal of reinforced concrete structures including slabs and walls. Includes labor and equipment. | Cubic Yard | $10.00 | 4 | $40.00 |
| **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. | Hour | $18.93 | 36 | $681.48 |
| Equipment Operators, Heavy | 233 | Includes: Cranes, Hydraulic Excavators >=50 HP, Dozers, Paving Machines, Rock Trenchers, Trenchers >=12", Dump Trucks, Ag Equipment >=150 HP, Scrapers, Water Wagons. | Hour | $23.93 | 16 | $382.88 |
| 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. | Hour | $34.29 | 16 | $548.64 |
| **Materials** | | | | | | |
| Aggregate, Sand, Graded, Washed | 45 | Sand, typical ASTM C33 gradation, includes materials, equipment and labor to transport and place | Cubic Yard | $30.40 | 7 | $212.80 |
| Aggregate, Gravel, Ungraded, Quarry Run | 1099 | Includes materials, equipment and labor | Cubic Yard | $21.24 | 7 | $148.68 |

| | | | | | |
|---|---|---|---|---|---|
| Pipe, HDPE, CPT, Double Wall, Soil Tight, 24" | 1246 | Pipe, Corrugated HDPE Double Wall, 24" diameter with soil tight joints - AASHTO M294. Material cost only. | Foot | $18.80 | 88 | $1,654.40 |
| Catch Basin, concrete, 60" dia. | 1754 | Precast 60-in diameter catch basin, 6' deep, with collar and grate cover. Materials only. | Each | $1,954.58 | 1 | $1,954.58 |
| **Mobilization** | | | | | | |
| Mobilization, medium equipment | 1139 | Equipment with 70-150 HP or typical weights between 14,000 and 30,000 pounds. | Each | $232.71 | 2 | $465.42 |

**Practice:** 634 - Waste Transfer

**Scenario** #13 - 30 inch HDPE conduit, gravity flow, from an existing inlet structure to site of treatment or storage.

**Scenario Description:**

Gravity flow conduit is typically a large diameter water tight HDPE sanitary sewer pipe used to transfer manure by gravity from one location to another. The gravity transfer system typically consists of an existing inlet structure or hopper with attachment to a smooth interior large diameter pipe. The pipe conveys the slurry waste liquid between the waste collection point and a manure storage or waste treatment structure. Adequate head on the pipe flow or change in elevation must be available for the gravity system to function and should be evaluated by the design engineer. This practice includes the pipe attachment to an existing inlet structure and all other fittings, trench excavation and backfill, labor and a equipment for installation.This conduit is part of a manure transfer system for a planned waste management or comprehensive nutrient management plan. This scenario addresses the transport of liquid waste to a waste storage or treatment facility to prevent a water quality resource concern of excessive nutrients/organics and harmful levels of pathogens in surface water and/or excessive nutrients/organics in ground water. Associated practices may include: PS 313 Waste Storage Facility; PS 533, Pumping Plant; PS 430, Irrigation Pipeline; PS 632, Waste Separation Facility; PS 468, Lined Waterway or Outlet; PS 590 Nutrient Management; 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 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 150 foot long 30" diameter water tight HDPE pipe to transfer manure by gravity from one location to another. A gravity transfer system typically consists of a sealed inlet at an existing waste collection structure to a smooth interior 30" sewer grade pipe that will gravity flow to an outlet at a site of manure treatment or storage. This scenario includes the pipe, inlet, outlet, couplers and all other fittings, trench excavation, pipe bedding and backfill. The site should be evaluated by the designing engineer to make sure there is adequate elevation drop before contracting. If required an inlet structure may be contracted under another scenario.The transfer conduit will provide collection and containment of the manure slurry, thereby protecting water quality resources.

**Feature Measure:** Length of pipe installed

**Scenario Unit::** Foot

**Scenario Typical Size:** 150

**Total Scenario Cost:** $12,914.63

**Scenario Cost/Unit:** $86.10

**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 Yard | $210.23 | 14 | $2,943.22 |
| Excavation, Common Earth, side cast, small equipment | 48 | Bulk excavation and side casting of common earth with hydraulic excavator with less than 1 CY capacity. Includes equipment and labor. | Cubic Yard | $1.99 | 125 | $248.75 |
| Earthfill, Manually Compacted | 50 | Earthfill, manually compacted, includes equipment and labor | Cubic Yard | $4.95 | 57 | $282.15 |
| Earthfill, Dumped and Spread | 51 | Earthfill, dumped and spread without compaction effort, includes equipment and labor | Cubic Yard | $3.08 | 45 | $138.60 |
| Backhoe, 80 HP | 926 | Wheel mounted backhoe excavator with horsepower range of 60 to 90. Equipment and power unit costs. Labor not included. | Hour | $50.99 | 30 | $1,529.70 |
| Demolition, concrete | 1498 | Demolition and disposal of reinforced concrete structures including slabs and walls. Includes labor and equipment. | Cubic Yard | $10.00 | 7 | $70.00 |
| **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. | Hour | $18.93 | 48 | $908.64 |
| Equipment Operators, Heavy | 233 | Includes: Cranes, Hydraulic Excavators >=50 HP, Dozers, Paving Machines, Rock Trenchers, Trenchers >=12", Dump Trucks, Ag Equipment >=150 HP, Scrapers, Water Wagons. | Hour | $23.93 | 30 | $717.90 |
| Supervisor or Manager | 234 | Labor involving supervision or management activities. Includes crew supervisors, foremen and farm/ranch managers time required for adopting new technology, etc. | Hour | $34.29 | 20 | $685.80 |
| **Materials** | | | | | | |
| Aggregate, Sand, Graded, Washed | 45 | Sand, typical ASTM C33 gradation, includes materials, equipment and labor to transport and place | Cubic Yard | $30.40 | 13 | $395.20 |

| | | | | | |
|---|---|---|---|---|---|
| Pipe, HDPE, CPT, Double Wall, Soil Tight, 30" | 1247 | Pipe, Corrugated HDPE Double Wall, 30" diameter with soil tight joints - AASHTO M294. Material cost only. | Foot | $27.45 | 165 | $4,529.25 |
| **Mobilization** | | | | | | |
| Mobilization, medium equipment | 1139 | Equipment with 70-150 HP or typical weights between 14,000 and 30,000 pounds. | Each | $232.71 | 2 | $465.42 |

**Practice:** 634 - Waste Transfer

**Scenario** #14 - 12 inch diameter, Low pressure flow, PVC conduit

**Scenario Description:**

Low pressure flow conduit is typically a PVC pipeline used to transfer wastewater or manure slurry by pumping from one production location to a storage or treatment location. Low pressure flow PVC transfer pipelines can be between 3" and 30" diameter and are designed for a pumping pressure of no more than 100 psi. The low pressure transfer system typically consists of an inlet structure or hopper connected to a smooth interior PVC pipe sized to deliver the design flow. This practice includes the pipe plus the inlet structure connection and all other fittings, trench excavation and backfill, labor and a equipment for installation.This conduit is part of a manure transfer system for a planned waste management or comprehensive nutrient management plan. This scenario addresses the transport of liquid waste to a waste storage or treatment 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; PS 533, Pumping Plant; PS 430, Irrigation Pipeline; PS 632, Waste Separation Facility; PS 468, Lined Waterway or Outlet; PS 590 Nutrient Management; 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. The site of waste collection or structure has the capacity to install a pumping plant but needs a pipeline to transfer the liquid manure slurry under low pressure from the collection site to the treatment or storage structure.

**After Situation:**

Install a 300 foot long 12 inch diameter low pressure wastewater pipeline to transfer wastewater or manure slurry from one location to another. The low pressure flow situation refers to pipeflow that has an unrestricted outlet and low pumping head pressure. A pumping plant will send the liquid through a pipe inlet at an existing waste collection basin into a 12 inch diameter pipeline to transfer the design volume to an outlet at the wastewater treatment or storage site. This scenario includes the pipe, inlet connection, outlet, couplers and all other fittings, trench excavation, pipe bedding and backfill. The site should be evaluated by the designing engineer before contracting. If required a pumping plant may be contracted under PS 533, Pumping Plant to support this system.The low pressure transfer conduit will provide collection, transfer and containment of the manure slurry, thereby protecting water quality resources.

**Feature Measure:** Length of pipe installed

**Scenario Unit::** Foot

**Scenario Typical Size:** 300

**Total Scenario Cost:** $14,229.67

**Scenario Cost/Unit:** $47.43

**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 Yard | $210.23 | 14 | $2,943.22 |
| Excavation, Common Earth, side cast, small equipment | 48 | Bulk excavation and side casting of common earth with hydraulic excavator with less than 1 CY capacity. Includes equipment and labor. | Cubic Yard | $1.99 | 97 | $193.03 |
| Earthfill, Manually Compacted | 50 | Earthfill, manually compacted, includes equipment and labor | Cubic Yard | $4.95 | 56 | $277.20 |
| Earthfill, Dumped and Spread | 51 | Earthfill, dumped and spread without compaction effort, includes equipment and labor | Cubic Yard | $3.08 | 33 | $101.64 |
| Backhoe, 80 HP | 926 | Wheel mounted backhoe excavator with horsepower range of 60 to 90. Equipment and power unit costs. Labor not included. | Hour | $50.99 | 32 | $1,631.68 |
| Demolition, concrete | 1498 | Demolition and disposal of reinforced concrete structures including slabs and walls. Includes labor and equipment. | Cubic Yard | $10.00 | 7 | $70.00 |
| **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. | Hour | $18.93 | 64 | $1,211.52 |
| Equipment Operators, Heavy | 233 | Includes: Cranes, Hydraulic Excavators >=50 HP, Dozers, Paving Machines, Rock Trenchers, Trenchers >=12", Dump Trucks, Ag Equipment >=150 HP, Scrapers, Water Wagons. | Hour | $23.93 | 32 | $765.76 |
| **Materials** | | | | | | |
| Aggregate, Sand, Graded, Washed | 45 | Sand, typical ASTM C33 gradation, includes materials, equipment and labor to transport and place | Cubic Yard | $30.40 | 14 | $425.60 |
| Pipe, PVC, 12", SCH 40 | 1716 | Materials: 12" dia. PVC SCH 40, ASTM D1785 | Foot | $18.62 | 330 | $6,144.60 |
| **Mobilization** | | | | | | |

| | | | | | |
|---|---|---|---|---|---|
| Mobilization, medium equipment | 1139 | Equipment with 70-150 HP or typical weights between 14,000 and 30,000 pounds. | Each | $232.71 | 2 | $465.42 |

**Practice:** 634 - Waste Transfer

**Scenario** #15 - 10 inch diameter, Low pressure flow PVC pipeline, from waste storage pond to land application site.

**Scenario Description:**

Low pressure flow pipeline used to transfer manure wastewater by a low pressure pump from the waste storage pond to the field where it is applied according to the CNMP. The pipeline moves the water from the pond through a buried mainline with low pressure outlets that spread the water on a vegetated treatment area or to a site where the water is applied through an existing field application system. Low pressure flow PVC transfer pipelines can be between 3" and 30" diameter and are designed for a pumping pressure of 100 psi or less. This practice includes the pipe plus an inlet riser structure, clean-out risers and outlet risers plus all other valves and fittings, trench excavation and backfill, labor and a equipment for installation. Appurtenances include: couplings, fittings, air vents, pressure relief valves, thrust blocks, risers, and inline valves, and are included in the cost of pipe material (additional 10% of pipe material quantity). Cost of appurtenances does not include flow meters or backflow preventers. Typical installation applies to soils with no special bedding requirements.This pipeline is part of a manure transfer system for a planned waste management or comprehensive nutrient management plan. This scenario addresses the transport of liquid waste to a waste storage or treatment facility to prevent a water quality resource concern of excessive nutrients/organics and harmful levels of pathogens in surface water and/or excessive nutrients/organics in ground water. Associated practices may include: PS 313 Waste Storage Facility; PS 533, Pumping Plant; PS 430, Irrigation Pipeline; PS 632, Waste Separation Facility; PS 468, Lined Waterway or Outlet; PS 590 Nutrient Management; PS 633, Waste Recycling; PS 635, Vegetated Treatment Area.

**Before Situation:**

The waste storage structure is separated from the application fields where wastewater nutrients are needed. Soil nutrients in the near fields have high phosphorus levels from over application near the waste storage facility. The current application operation is high in the use of time and energy and may cause water quality concerns as it is not efficient in transporting the waste to the field.

**After Situation:**

Install a 1000 foot long 10 inch diameter PVC gasketted IPS pipe that has an SDR of 41 and is water tight under low pressure flow to transfer the manure wastewater. An inlet riser and is located near the pump site of the waste storage pond and designed for the desired pumping pressure and flow volume for the application system. This scenario includes the pipe, inlet riser, couplers, air-vac vents, all other fittings, and risers placed as specified by the design, trench excavation, pipe bedding and backfill. The site should be evaluated by the designing engineer to make sure the design will function. The transfer pipeline will deliver the manure slurry to the fields for agronomic nutrient utilization according to the CNMP, thereby protecting water quality resources.

**Feature Measure:** Length of pipe installed

**Scenario Unit::** Foot

**Scenario Typical Size:** 1000

**Total Scenario Cost:** $26,063.58

**Scenario Cost/Unit:** $26.06

**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 Yard | $103.61 | 1 | $103.61 |
| Earthfill, Manually Compacted | 50 | Earthfill, manually compacted, includes equipment and labor | Cubic Yard | $4.95 | 127 | $628.65 |
| Trenching, Earth, loam, 24" x 48" | 54 | Trenching, earth, loam, 24" wide x 48" depth, includes equipment and labor for trenching and backfilling | Foot | $2.67 | 1000 | $2,670.00 |
| **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. | Hour | $18.93 | 70 | $1,325.10 |
| Supervisor or Manager | 234 | Labor involving supervision or management activities. Includes crew supervisors, foremen and farm/ranch managers time required for adopting new technology, etc. | Hour | $34.29 | 20 | $685.80 |
| **Materials** | | | | | | |
| Pipe, PVC, 10", SDR 21 | 1714 | Materials: - 10" - PVC - SDR 21 - ASTM D2241 | Foot | $18.35 | 1100 | $20,185.00 |
| **Mobilization** | | | | | | |
| Mobilization, medium equipment | 1139 | Equipment with 70-150 HP or typical weights between 14,000 and 30,000 pounds. | Each | $232.71 | 2 | $465.42 |

**Practice:** 634 - Waste Transfer

**Scenario** #16 - 6 inch diameter, Pressure flow PVC pipeline, from waste storage pond to land application site.

**Scenario Description:**

Pressure flow pipeline used to transfer manure wastewater by pumping from the waste storage pond to the field where it is to be applied according to the CNMP. Pressure flow transfer pipelines can be between 3" and 12" diameter but 6" diameter is a commonly used pipe size. Pressure pipe will handle an internal pumping pressure between 130 and 200 psi depending on the designed pumping system and must have gasketted joints to seal for the wastewater transfer. The pressure pipe moves the water by pumping from the intake riser location, through a buried mainline with outlet risers spaced at 300 ft intervals for a traveler applicator. This practice includes the pipe plus an inlet riser structure, clean-out risers and outlet risers plus all other valves and fittings, trench excavation and backfill, labor and a equipment for installation. Appurtenances include: couplings, fittings, air vents, pressure relief valves, thrust blocks, risers, and inline valves, and are included in the cost of pipe material (additional 10% of pipe material quantity). Cost of appurtenances does not include flow meters or backflow preventers. Typical installation applies to soils with no special bedding requirements.This pipeline is part of a manure transfer system for a planned waste management or comprehensive nutrient management plan. This scenario addresses the transport of liquid waste to a waste storage or treatment facility to prevent a water quality resource concern of excessive nutrients/organics and harmful levels of pathogens in surface water and/or excessive nutrients/organics in ground water. Associated practices may include: PS 313 Waste Storage Facility; PS 533, Pumping Plant; PS 430, Irrigation Pipeline; PS 632, Waste Separation Facility; PS 468, Lined Waterway or Outlet; PS 590 Nutrient Management; PS 633, Waste Recycling; PS 635, Vegetated Treatment Area.

**Before Situation:**

The waste storage structure is separated from the application fields where wastewater nutrients are needed. Soil nutrients in the near fields have high phosphorus levels from over application near the waste storage facility. The current application operation is high in the use of time and energy and may cause water quality concerns as it is not efficient in transporting the waste to the field.

**After Situation:**

Install a 1000 foot long 6 inch diameter PVC gasketted IPS pipe that has an SDR of 21 and is water tight under pressure flow to transfer the manure wastewater. An inlet riser and is located near the pump site of the waste storage pond and designed for the desired pressure and flow for the application system. This scenario includes the pipe, inlet riser, couplers, air-vac vents, all other fittings, and risers placed as specified by the design, trench excavation, pipe bedding and backfill. The site should be evaluated by the designing engineer to make sure the design will function. The transfer pipeline will deliver the manure slurry to the fields for agronomic nutrient utilization according to the CNMP, thereby protecting water quality resources.

**Feature Measure:** Length of pipe installed

**Scenario Unit::** Foot

**Scenario Typical Size:** 1000

**Total Scenario Cost:** $14,154.43

**Scenario Cost/Unit:** $14.15

**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 Yard | $103.61 | 1 | $103.61 |
| Earthfill, Manually Compacted | 50 | Earthfill, manually compacted, includes equipment and labor | Cubic Yard | $4.95 | 90 | $445.50 |
| Trenching, Earth, loam, 24" x 48" | 54 | Trenching, earth, loam, 24" wide x 48" depth, includes equipment and labor for trenching and backfilling | Foot | $2.67 | 1000 | $2,670.00 |
| **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. | Hour | $18.93 | 70 | $1,325.10 |
| Supervisor or Manager | 234 | Labor involving supervision or management activities. Includes crew supervisors, foremen and farm/ranch managers time required for adopting new technology, etc. | Hour | $34.29 | 20 | $685.80 |
| **Materials** | | | | | | |
| Pipe, PVC, 6", SDR 21 | 987 | Materials: - 6" - PVC - SDR 21 200 psi - ASTM D2241 | Foot | $7.69 | 1100 | $8,459.00 |
| **Mobilization** | | | | | | |
| Mobilization, medium equipment | 1139 | Equipment with 70-150 HP or typical weights between 14,000 and 30,000 pounds. | Each | $232.71 | 2 | $465.42 |

**Practice:** 634 - Waste Transfer

**Scenario** #17 - Agitator, small, mixing contents of a reception pit that is no more than 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; PS 533, Pumping Plant; PS 430, Irrigation Pipeline; PS 632, Waste Separation Facility; PS 468, Lined Waterway or Outlet; PS 590 Nutrient Management; 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

**Total Scenario Cost:** $11,718.69

**Scenario Cost/Unit:** $11,718.69

**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. | Hour | $25.08 | 11 | $275.88 |
| **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 | $11,314.29 | 1 | $11,314.29 |
| **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 | $64.26 | 2 | $128.52 |

**Practice:** 634 - Waste Transfer

**Scenario** #18 - Agitator, medium, mixing contents of a reception pit that is 10 ft to 15 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 storage facility to a site for proper utilization. This agitator is typically 30 HP and is used where the waste storage facility tank or pond is between 10 and 15 feet deep. This scenario does not include a pump.Associated practices may include: PS 313 Waste Storage Facility; PS 533, Pumping Plant; PS 430, Irrigation Pipeline; PS 632, Waste Separation Facility; PS 468, Lined Waterway or Outlet; PS 590 Nutrient Management; 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 waste production from a confined animal feeding operation without an effective waste handling and transfer system to manage the waste stream departing from the facility.

**After Situation:**

A typical installation would be for a medium 30 HP manure agitator to put settled manure solids into suspension for removal from an animal waste storage structure and transfer to the next step of waste treatment, utilization or storage. Part of an animal waste management system to address water quality concerns. 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

**Total Scenario Cost:** $18,099.71

**Scenario Cost/Unit:** $18,099.71

**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. | Hour | $25.08 | 12 | $300.96 |
| **Materials** | | | | | | |
| Manure agitator, mixing depth 10 to 15 feet deep | 1766 | Agitator to move put settled manure solids into suspension for removal from an animal waste storage structure. Materials only. | Each | $17,485.71 | 1 | $17,485.71 |
| **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 | $156.52 | 2 | $313.04 |

**Practice:** 634 - Waste Transfer

**Scenario** #19 - Agitator, large, mixing contents of a reception pit that is over 15 ft. deep.

**Scenario Description:**

This scenario is for a large manure and wastewater agitator associated with an agricultural production operation to transfer agricultural waste product from the storage facility to a site for proper utilization. This agitator is typically 100 HP and is used where the waste storage facility tank or pond is greater than15 feet deep. This scenario does not include a pump.Associated practices may include: PS 313 Waste Storage Facility; PS 533, Pumping Plant; PS 430, Irrigation Pipeline; PS 632, Waste Separation Facility; PS 468, Lined Waterway or Outlet; PS 590 Nutrient Management; 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 waste production from a confined animal feeding operation without an effective waste handling and transfer system to manage the waste stream departing from the facility.

**After Situation:**

A typical installation would be for a large 100 HP manure agitator to put settled manure solids into suspension for removal from an animal waste storage structure and facilitate the transfer of this material to the next step of waste treatment or utilization. This agitator is for a tank deeper than 15 feet and is part of an animal waste management system to address water quality concerns. This covers the cost of the agitator equipment materials and labor for the electrical hook-up.

**Feature Measure:** Agitator for wastewater, installed

**Scenario Unit::** Each

**Scenario Typical Size:** 1

**Total Scenario Cost:** $26,480.67

**Scenario Cost/Unit:** $26,480.67

**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. | Hour | $25.08 | 12 | $300.96 |
| **Materials** | | | | | | |
| Manure agitator, mixing depth greater than 15 feet deep. | 1767 | Agitator to move put settled manure solids into suspension for removal from an animal waste storage structure. Materials only. | Each | $25,714.29 | 1 | $25,714.29 |
| **Mobilization** | | | | | | |
| Mobilization, medium equipment | 1139 | Equipment with 70-150 HP or typical weights between 14,000 and 30,000 pounds. | Each | $232.71 | 2 | $465.42 |

**Practice:** 638 - Water and Sediment Control Basin

**Scenario** #1 - WASCOB base

**Scenario Description:**

Typical scenario s for the construction of 700 CY earthen embankment. Outlet is typically an underground outlet. An earthen embankment or combination ridge and channel generally constructed across the slope and minor watercourses to form a sediment trap and water detention basin. Work is done with dozer, scraper, or road grader. Costs include all equipment necessary to excavate, shape, grade and compact the Water and Sediment Control Basin and mobilization of equipment. This practice is utilized to reduce watercourse and gully erosion, trap sediment, reduce and manage onsite and downstream runoff. Sheet and rill erosion will be controlled by other conservation practices.

**Before 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 Basis is constructed with 700 CY of excavation/earthfill with dozer, scraper and/or road grader. Rill and/or gully erosion is reduced. If riser and underground outlet are needed, then include Underground Outlet (620). Include Critical Area Planting (342) where necessary to prevent erosion following construction activities.

**Feature Measure:** CY of WASCOB Embankment

**Scenario Unit::** Cubic Yard

**Scenario Typical Size:** 700

**Total Scenario Cost:** $1,863.00

**Scenario Cost/Unit:** $2.66

**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 Yard | $2.28 | 700 | $1,596.00 |
| **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. | Hour | $34.29 | 1 | $34.29 |
| **Mobilization** | | | | | | |
| Mobilization, medium equipment | 1139 | Equipment with 70-150 HP or typical weights between 14,000 and 30,000 pounds. | Each | $232.71 | 1 | $232.71 |

**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 2 to 4 foot in diameter and 15 feet in depth. The well is excavated using a backhoe. Excavate to a depth where the water recharge is greater than the equipment can remove. Washed gravel is placed in the base of the dug opening. Concrete casings about 2 inches thick 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 cover.

**Before Situation:**

Livestock have insufficient water or are fenced from their water source.

**After Situation:**

Sufficient water is available for livestock. Utilize Pumping Plant (533) and Pipeline (516) as associated practices. Use Critical Area Seeding (342) where necessary to prevent erosion following construciton activities.

**Feature Measure:** Linear Foot of well depth

**Scenario Unit::** Foot

**Scenario Typical Size:** 15

**Total Scenario Cost:** $2,286.93

**Scenario Cost/Unit:** $152.46

**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 Yard | $326.97 | 1 | $326.97 |
| Backhoe, 80 HP | 926 | Wheel mounted backhoe excavator with horsepower range of 60 to 90. Equipment and power unit costs. Labor not included. | Hour | $50.99 | 10 | $509.90 |
| **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. | Hour | $18.93 | 10 | $189.30 |
| Equipment Operators, Heavy | 233 | Includes: Cranes, Hydraulic Excavators >=50 HP, Dozers, Paving Machines, Rock Trenchers, Trenchers >=12", Dump Trucks, Ag Equipment >=150 HP, Scrapers, Water Wagons. | Hour | $23.93 | 10 | $239.30 |
| **Materials** | | | | | | |
| Aggregate, Gravel, Graded | 46 | Gravel, includes materials, equipment and labor to transport and place. Includes washed and unwashed gravel. | Cubic Yard | $30.82 | 3 | $92.46 |
| Test, Standard Water Test, Well Water | 309 | Well Water Suitability test. Includes materials and shipping only. | Each | $42.13 | 1 | $42.13 |
| Aggregate, gravel, washed, pea gravel | 1331 | Washed and graded pea gravel river stone. Includes materials and local delivery within 20 miles of quarry. | Cubic Yard | $33.97 | 1 | $33.97 |
| 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 Yard | $609.23 | 1 | $609.23 |
| Chlorine | 1335 | Liquid chlorine bleach. Includes materials only. | Gallon | $2.74 | 4 | $10.96 |
| **Mobilization** | | | | | | |
| Mobilization, medium equipment | 1139 | Equipment with 70-150 HP or typical weights between 14,000 and 30,000 pounds. | Each | $232.71 | 1 | $232.71 |

**Practice:** 642 - Water Well

**Scenario** #2 - 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 typically 6 inches or greater in diameter. Steel casing is installed to a depth of 65 feet. Note that doubling the diameter of water well casings only increases specific capacity by 10%. Increasing the length of the screened interval in a well is much more cost-effective at increasing yield.

**Before Situation:**

There is insufficient water for use in livestock or irrigation.

**After Situation:**

Sufficient water is available for livestock or micro-irrigation. Utilize Pumping Plant (533) and Pipeline (516) as associated practices. Use Critical Area Seeding (342) where necessary to prevent erosion following construciton activities.

**Feature Measure:** Linear Foot of well depth

**Scenario Unit::** Foot

**Scenario Typical Size:** 75

**Total Scenario Cost:** $5,166.95

**Scenario Cost/Unit:** $68.89

**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. | Hour | $308.78 | 3 | $926.34 |
| **Materials** | | | | | | |
| Test, Standard Water Test, Well Water | 309 | Well Water Suitability test. Includes materials and shipping only. | Each | $42.13 | 1 | $42.13 |
| 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 Yard | $609.23 | 1 | $609.23 |
| Chlorine | 1335 | Liquid chlorine bleach. Includes materials only. | Gallon | $2.74 | 1 | $2.74 |
| Well Cap, 10" | 1788 | Well cap, 10". Materials only. | Each | $65.65 | 1 | $65.65 |
| Well Casing, Metal, 10" | 1812 | Steel well casing, 10". Materials only. | Foot | $32.45 | 65 | $2,109.25 |
| Well Screen, stainless steel, 10" | 1996 | 10" Stainless steel well screen. Materials only. | Foot | $117.89 | 10 | $1,178.90 |
| **Mobilization** | | | | | | |
| Mobilization, medium equipment | 1139 | Equipment with 70-150 HP or typical weights between 14,000 and 30,000 pounds. | Each | $232.71 | 1 | $232.71 |

**Practice:** 642 - Water Well

**Scenario** #3 - 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, 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 typically 6 inches or greater in diameter. Steel casing is installed to a depth of 375 feet. Note that doubling the diameter of water well casings only increases specific capacity by 10%. Increasing the length of the screened interval in a well is much more cost-effective at increasing yield.

**Before Situation:**

There is insufficient water for use in livestock or irrigation.

**After Situation:**

Sufficient water is available for livestock or micro-irrigation. Utilize Pumping Plant (533) and Pipeline (516) as associated practices. Use Critical Area Seeding (342) where necessary to prevent erosion following construciton activities.

**Feature Measure:** Linear Foot of well depth

**Scenario Unit::** Foot

**Scenario Typical Size:** 400

**Total Scenario Cost:** $21,008.94

**Scenario Cost/Unit:** $52.52

**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. | Hour | $308.78 | 16 | $4,940.48 |
| **Materials** | | | | | | |
| Test, Standard Water Test, Well Water | 309 | Well Water Suitability test. Includes materials and shipping only. | Each | $42.13 | 1 | $42.13 |
| 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 Yard | $609.23 | 1 | $609.23 |
| Chlorine | 1335 | Liquid chlorine bleach. Includes materials only. | Gallon | $2.74 | 1 | $2.74 |
| Well Cap, 10" | 1788 | Well cap, 10". Materials only. | Each | $65.65 | 1 | $65.65 |
| Well Casing, Metal, 10" | 1812 | Steel well casing, 10". Materials only. | Foot | $32.45 | 375 | $12,168.75 |
| Well Screen, stainless steel, 10" | 1996 | 10" Stainless steel well screen. Materials only. | Foot | $117.89 | 25 | $2,947.25 |
| **Mobilization** | | | | | | |
| Mobilization, medium equipment | 1139 | Equipment with 70-150 HP or typical weights between 14,000 and 30,000 pounds. | Each | $232.71 | 1 | $232.71 |

**Practice:** 642 - Water Well

**Scenario** #4 - Small Plastic Farm Well, Less Than 6 in

**Scenario Description:**

Installation of a well with PVC casing diameter of 4 inches or less; typical farm well has 4 inch diameter PVC casing. Note that doubling the diameter of water well casings only increases specific capacity by 10%. Increasing the length of the screened interval in a well is much more cost-effective at increasing yield. A well is drilled, dug, driven, bored, jetted or otherwise constructed to an aquifer for water supply. A PVC cap and grouting are installed to prevent a direct conduit to ground water, and the well is disinfected in accordance with state and local regulations. The purpose of the practice is to provide water for livestock or small irrigation systems, such as, micro-irrigation. Cost estimate is based on a well depth of 100 feet, with well casing 4 inches in diameter, PVC casing installed to a depth of 50 feet, and typical yield of less than or equal to 250 gpm.

**Before Situation:**

Livestock have insufficient water or are fenced from their water source or there is insufficient water for use in micro-irrigation/small irrigation systems.

**After Situation:**

Sufficient water is available for livestock or irrigation. Utilize Pumping Plant (533) and Pipeline (516) or Irrigation water conveyance (430) as associated practices. Use Critical Area Seeding (342) where necessary to prevent erosion following construciton activities.

**Feature Measure:** Linear Foot of well depth

**Scenario Unit::** Foot

**Scenario Typical Size:** 100

**Total Scenario Cost:** $2,664.10

**Scenario Cost/Unit:** $26.64

**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. | Hour | $308.78 | 4 | $1,235.12 |
| **Materials** | | | | | | |
| Test, Standard Water Test, Well Water | 309 | Well Water Suitability test. Includes materials and shipping only. | Each | $42.13 | 1 | $42.13 |
| 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 Yard | $609.23 | 1 | $609.23 |
| Chlorine | 1335 | Liquid chlorine bleach. Includes materials only. | Gallon | $2.74 | 1 | $2.74 |
| Well Cap, 4" | 1785 | Well cap, 4". Materials only. | Each | $25.67 | 1 | $25.67 |
| Well Casing, Plastic, 4" | 1803 | PVC or ABS non-threaded well casing, 4". Materials only. | Foot | $3.64 | 50 | $182.00 |
| Well Screen, plastic, 4" | 1998 | 4" PVC well screen. Materials only. | Foot | $6.69 | 50 | $334.50 |
| **Mobilization** | | | | | | |
| Mobilization, medium equipment | 1139 | Equipment with 70-150 HP or typical weights between 14,000 and 30,000 pounds. | Each | $232.71 | 1 | $232.71 |

**Practice:** 642 - Water Well

**Scenario** #5 - Small Plastic Farm Well, 6 in and Greater

**Scenario Description:**

Installation of a well with PVC casing having a diameter of 6 inches or greater. Note that doubling the diameter of water well casings only increases specific capacity by 10%. Increasing the length of the screened interval in a well is much more cost-effective at increasing yield. A well is drilled, dug, driven, bored, jetted or otherwise constructed to an aquifer for water supply. A PVC cap and grouting are installed to prevent a direct conduit to ground water, and the well is disinfected in accordance with state and local regulations. The purpose of the practice is to provide water for livestock or small irrigation systems. Cost estimate is based on a well depth of 100 feet, with well casing 6 inches in diameter, PVC casing installed to a depth of 50 feet, and typical yield of less than or equal to 250 gpm.

**Before Situation:**

Livestock have insufficient water or are fenced from their water source or there is insufficient water for use in micro-irrigation/small irrigation systems.

**After Situation:**

Sufficient water is available for livestock or irrigation. Utilize Pumping Plant (533) and Pipeline (516) or Irrigation water conveyance (430) as associated practices. Use Critical Area Seeding (342) where necessary to prevent erosion following construciton activities.

**Feature Measure:** Linear Foot of well depth

**Scenario Unit::** Foot

**Scenario Typical Size:** 100

**Total Scenario Cost:** $3,668.51

**Scenario Cost/Unit:** $36.69

**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. | Hour | $308.78 | 4 | $1,235.12 |
| **Materials** | | | | | | |
| Test, Standard Water Test, Well Water | 309 | Well Water Suitability test. Includes materials and shipping only. | Each | $42.13 | 1 | $42.13 |
| 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 Yard | $609.23 | 2 | $1,218.46 |
| Chlorine | 1335 | Liquid chlorine bleach. Includes materials only. | Gallon | $2.74 | 1 | $2.74 |
| Well Cap, 6" | 1786 | Well cap, 6". Materials only. | Each | $33.60 | 1 | $33.60 |
| Well Casing, Plastic, 6" | 1804 | PVC or ABS non-threaded well casing, 6". Materials only. | Foot | $6.52 | 75 | $489.00 |
| Well Screen, plastic, 6" | 1999 | 6" PVC well screen. Materials only. | Foot | $16.59 | 25 | $414.75 |
| **Mobilization** | | | | | | |
| Mobilization, medium equipment | 1139 | Equipment with 70-150 HP or typical weights between 14,000 and 30,000 pounds. | Each | $232.71 | 1 | $232.71 |

**Practice:** 642 - Water Well

**Scenario** #6 - Uncased Bedrock Well with PVC Surface Casing

**Scenario Description:**

Typical construction is for the installation of a deep open borehole well in solid bedrock with 6 inch diameter PVC surface casing. A well is drilled, dug, driven, bored, jetted or otherwise constructed to an aquifer for water supply. A PVC cap and grouting are installed to prevent a direct conduit to ground water, and the well is disinfected in accordance with state and local regulations. The purpose of the practice is to provide water for livestock or small irrigation systems, such as, micro-irrigation. Cost estimate is based on a well depth of 350 feet, with an open borehole 4 inches in diameter, and 30 ft of 6 inch PVC casing installed from surface into top of bedrock. Note that doubling the diameter of water well casings only increases specific capacity by 10%. Increasing the length of the screened interval in a well is much more cost-effective at increasing yield.

**Before Situation:**

Livestock have insufficient water or are fenced from their water source or there is insufficient water for use in micro-irrigation/small irrigation systems.

**After Situation:**

Sufficient water is available for livestock or irrigation. Utilize Pumping Plant (533) and Pipeline (516) or Irrigation water conveyance (430) as associated practices. Use Critical Area Seeding (342) where necessary to prevent erosion following construciton activities.

**Feature Measure:** Linear Foot of well depth

**Scenario Unit::** Foot

**Scenario Typical Size:** 350

**Total Scenario Cost:** $9,761.85

**Scenario Cost/Unit:** $27.89

**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. | Hour | $308.78 | 28 | $8,645.84 |
| **Materials** | | | | | | |
| Test, Standard Water Test, Well Water | 309 | Well Water Suitability test. Includes materials and shipping only. | Each | $42.13 | 1 | $42.13 |
| 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 Yard | $609.23 | 1 | $609.23 |
| Chlorine | 1335 | Liquid chlorine bleach. Includes materials only. | Gallon | $2.74 | 1 | $2.74 |
| Well Cap, 6" | 1786 | Well cap, 6". Materials only. | Each | $33.60 | 1 | $33.60 |
| Well Casing, Plastic, 6" | 1804 | PVC or ABS non-threaded well casing, 6". Materials only. | Foot | $6.52 | 30 | $195.60 |
| **Mobilization** | | | | | | |
| Mobilization, medium equipment | 1139 | Equipment with 70-150 HP or typical weights between 14,000 and 30,000 pounds. | Each | $232.71 | 1 | $232.71 |

**Practice:** 642 - Water Well

**Scenario** #7 - Uncased Bedrock Well with Steel Surface Casing

**Scenario Description:**

Typical construction is for the installation of an deep open borehole well in solid bedrock with 6 inch diameter steel surface casing. Steel surface casing is often required for installation purposes when gravel or cobbles are present at or near the surface. A well is drilled, dug, driven, bored, jetted or otherwise constructed to an aquifer for water supply. A PVC cap and grouting are installed to prevent a direct conduit to ground water, and the well is disinfected in accordance with state and local regulations. The purpose of the practice is to provide water for livestock or small irrigation systems, such as, micro-irrigation. Cost estimate is based on a well depth of 350 feet, with an open borehole 4 inches in diameter, and 30 ft of 6 inch steel casing installed from surface into top of bedrock. Note that doubling the diameter of water well casings only increases specific capacity by 10%. Increasing the length of the screened interval in a well is much more cost-effective at increasing yield.

**Before Situation:**

Livestock have insufficient water or are fenced from their water source or there is insufficient water for use in micro-irrigation/small irrigation systems.

**After Situation:**

Sufficient water is available for livestock or irrigation. Utilize Pumping Plant (533) and Pipeline (516) or Irrigation water conveyance (430) as associated practices. Use Critical Area Seeding (342) where necessary to prevent erosion following construciton activities.

**Feature Measure:** Linear Foot of well depth

**Scenario Unit::** Foot

**Scenario Typical Size:** 350

**Total Scenario Cost:** $9,990.45

**Scenario Cost/Unit:** $28.54

**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. | Hour | $308.78 | 28 | $8,645.84 |
| **Materials** | | | | | | |
| Test, Standard Water Test, Well Water | 309 | Well Water Suitability test. Includes materials and shipping only. | Each | $42.13 | 1 | $42.13 |
| 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 Yard | $609.23 | 1 | $609.23 |
| Chlorine | 1335 | Liquid chlorine bleach. Includes materials only. | Gallon | $2.74 | 1 | $2.74 |
| Well Cap, 6" | 1786 | Well cap, 6". Materials only. | Each | $33.60 | 1 | $33.60 |
| Well Casing, Metal, 6" | 1810 | Steel well casing, 6". Materials only. | Foot | $14.14 | 30 | $424.20 |
| **Mobilization** | | | | | | |
| Mobilization, medium equipment | 1139 | Equipment with 70-150 HP or typical weights between 14,000 and 30,000 pounds. | Each | $232.71 | 1 | $232.71 |

**Practice:** 642 - Water Well

**Scenario** #8 - 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, 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. Well casings are 4-6" in diameter. Cost estimate based on a well 800 feet deep, with casing installed to a depth of 775 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) and Pipeline (516) as associated practices. Use Critical Area Seeding (342) where necessary to prevent erosion following construciton activities.

**Feature Measure:** Linear foot of well depth

**Scenario Unit::** Foot

**Scenario Typical Size:** 800

**Total Scenario Cost:** $23,288.62

**Scenario Cost/Unit:** $29.11

**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. | Hour | $308.78 | 32 | $9,880.96 |
| **Materials** | | | | | | |
| Test, Standard Water Test, Well Water | 309 | Well Water Suitability test. Includes materials and shipping only. | Each | $42.13 | 1 | $42.13 |
| 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 Yard | $609.23 | 1 | $609.23 |
| Chlorine | 1335 | Liquid chlorine bleach. Includes materials only. | Gallon | $2.74 | 1 | $2.74 |
| Well Cap, 6" | 1786 | Well cap, 6". Materials only. | Each | $33.60 | 1 | $33.60 |
| Well Casing, Metal, 6" | 1810 | Steel well casing, 6". Materials only. | Foot | $14.14 | 775 | $10,958.50 |
| Well Screen, stainless steel, 6" | 1995 | 6" Stainless steel well screen. Materials only. | Foot | $61.15 | 25 | $1,528.75 |
| **Mobilization** | | | | | | |
| Mobilization, medium equipment | 1139 | Equipment with 70-150 HP or typical weights between 14,000 and 30,000 pounds. | Each | $232.71 | 1 | $232.71 |

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

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

**Scenario Description:**

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

**Before Situation:**

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

**After Situation:**

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

**Feature Measure:** Monitoring efforts and adaptive m

**Scenario Unit::** Acre

**Scenario Typical Size:** 640

**Total Scenario Cost:** $579.60

**Scenario Cost/Unit:** $0.91

**Cost Details:**

| Component Name | ID | Description | Unit | Cost | QTY | Total |
|---|---|---|---|---|---|---|
| **Equipment Installation** | | | | | | |
| Chainsaw | 937 | Equipment and power unit costs. Labor not included. | Hour | $3.97 | 2 | $7.94 |
| Truck, Pickup | 939 | Equipment and power unit costs. Labor not included. | Hour | $19.82 | 3 | $59.46 |
| Rangeland/grassland field monitoring kit | 967 | Miscellaneous tools needed to complete rangeland/grassland monitoring. Materials may include camera, clippers, plot frame, scale, tape measure, etc. Includes materials and shipping only. | Each | $48.10 | 1 | $48.10 |
| **Labor** | | | | | | |
| General Labor | 231 | Labor performed using basic tools such as power tool, shovels, and other tools that do not require extensive training. Ex. pipe layer, herder, concrete placement, materials spreader, flagger, etc. | Hour | $18.93 | 10 | $189.30 |
| Specialist Labor | 235 | Labor requiring a specialized skill set: Includes Agronomists, Foresters, Biologists, etc. to provide additional technical information during the planning and implementation of the practice. Does not include NRCS or TSP services. | Hour | $91.60 | 3 | $274.80 |

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

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

**Scenario Description:**

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

**Before Situation:**

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

**After Situation:**

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

**Feature Measure:** Monitoring efforts and adaptive m

**Scenario Unit::** Acre

**Scenario Typical Size:** 160

**Total Scenario Cost:** $489.11

**Scenario Cost/Unit:** $3.06

**Cost Details:**

| Component Name | ID | Description | Unit | Cost | QTY | Total |
|---|---|---|---|---|---|---|
| **Equipment Installation** | | | | | | |
| Chainsaw | 937 | Equipment and power unit costs. Labor not included. | Hour | $3.97 | 1 | $3.97 |
| Truck, Pickup | 939 | Equipment and power unit costs. Labor not included. | Hour | $19.82 | 1.5 | $29.73 |
| Rangeland/grassland field monitoring kit | 967 | Miscellaneous tools needed to complete rangeland/grassland monitoring. Materials may include camera, clippers, plot frame, scale, tape measure, etc. Includes materials and shipping only. | Each | $48.10 | 1 | $48.10 |
| **Labor** | | | | | | |
| General Labor | 231 | Labor performed using basic tools such as power tool, shovels, and other tools that do not require extensive training. Ex. pipe layer, herder, concrete placement, materials spreader, flagger, etc. | Hour | $18.93 | 7 | $132.51 |
| Specialist Labor | 235 | Labor requiring a specialized skill set: Includes Agronomists, Foresters, Biologists, etc. to provide additional technical information during the planning and implementation of the practice. Does not include NRCS or TSP services. | Hour | $91.60 | 3 | $274.80 |

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

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

**Scenario Description:**

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

**Before Situation:**

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

**After Situation:**

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

**Feature Measure:** Monitoring efforts and adaptive m

**Scenario Unit::** Acre

**Scenario Typical Size:** 160

**Total Scenario Cost:** $1,819.30

**Scenario Cost/Unit:** $11.37

**Cost Details:**

| Component Name | ID | Description | Unit | Cost | QTY | Total |
|---|---|---|---|---|---|---|
| **Equipment Installation** | | | | | | |
| Chainsaw | 937 | Equipment and power unit costs. Labor not included. | Hour | $3.97 | 4 | $15.88 |
| Truck, Pickup | 939 | Equipment and power unit costs. Labor not included. | Hour | $19.82 | 6 | $118.92 |
| Mower, Bush Hog | 940 | Equipment and power unit costs. Labor not included. | Hour | $47.22 | 5 | $236.10 |
| Rangeland/grassland field monitoring kit | 967 | Miscellaneous tools needed to complete rangeland/grassland monitoring. Materials may include camera, clippers, plot frame, scale, tape measure, etc. Includes materials and shipping only. | Each | $48.10 | 1 | $48.10 |
| **Labor** | | | | | | |
| General Labor | 231 | Labor performed using basic tools such as power tool, shovels, and other tools that do not require extensive training. Ex. pipe layer, herder, concrete placement, materials spreader, flagger, etc. | Hour | $18.93 | 20 | $378.60 |
| Equipment Operators, Light | 232 | Includes: Skid Steer Loaders, Hydraulic Excavators <50 HP, Trenchers <12", Ag Equipment <150 HP, Pickup Trucks, Forklifts, Mulchers | Hour | $21.14 | 5 | $105.70 |
| Specialist Labor | 235 | Labor requiring a specialized skill set: Includes Agronomists, Foresters, Biologists, etc. to provide additional technical information during the planning and implementation of the practice. Does not include NRCS or TSP services. | Hour | $91.60 | 10 | $916.00 |

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

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

**Scenario Description:**

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

**Before Situation:**

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

**After Situation:**

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

**Feature Measure:** Monitoring efforts and adaptive m

**Scenario Unit::** Acre

**Scenario Typical Size:** 80

**Total Scenario Cost:** $1,698.46

**Scenario Cost/Unit:** $21.23

**Cost Details:**

| Component Name | ID | Description | Unit | Cost | QTY | Total |
|---|---|---|---|---|---|---|
| **Equipment Installation** | | | | | | |
| Chainsaw | 937 | Equipment and power unit costs. Labor not included. | Hour | $3.97 | 8 | $31.76 |
| Truck, Pickup | 939 | Equipment and power unit costs. Labor not included. | Hour | $19.82 | 6 | $118.92 |
| Mower, Bush Hog | 940 | Equipment and power unit costs. Labor not included. | Hour | $47.22 | 3 | $141.66 |
| Rangeland/grassland field monitoring kit | 967 | Miscellaneous tools needed to complete rangeland/grassland monitoring. Materials may include camera, clippers, plot frame, scale, tape measure, etc. Includes materials and shipping only. | Each | $48.10 | 1 | $48.10 |
| **Labor** | | | | | | |
| General Labor | 231 | Labor performed using basic tools such as power tool, shovels, and other tools that do not require extensive training. Ex. pipe layer, herder, concrete placement, materials spreader, flagger, etc. | Hour | $18.93 | 20 | $378.60 |
| Equipment Operators, Light | 232 | Includes: Skid Steer Loaders, Hydraulic Excavators <50 HP, Trenchers <12", Ag Equipment <150 HP, Pickup Trucks, Forklifts, Mulchers | Hour | $21.14 | 3 | $63.42 |
| Specialist Labor | 235 | Labor requiring a specialized skill set: Includes Agronomists, Foresters, Biologists, etc. to provide additional technical information during the planning and implementation of the practice. Does not include NRCS or TSP services. | Hour | $91.60 | 10 | $916.00 |

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

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

**Scenario Description:**

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

**Scenario Typical Size:** 20

**Total Scenario Cost:** $743.78

**Scenario Cost/Unit:** $37.19

**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. | Acre | $15.10 | 20 | $302.00 |
| Tractor, agricultural, 120 HP | 962 | Agricultural tractor with horsepower range of 90 to 140. Equipment and power unit costs. Labor not included. | Hour | $52.49 | 6 | $314.94 |
| **Labor** | | | | | | |
| Equipment Operators, Light | 232 | Includes: Skid Steer Loaders, Hydraulic Excavators <50 HP, Trenchers <12", Ag Equipment <150 HP, Pickup Trucks, Forklifts, Mulchers | Hour | $21.14 | 6 | $126.84 |

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

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

**Scenario Description:**

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

**Before Situation:**

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

**After Situation:**

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

**Feature Measure:** Hours

**Scenario Unit::** Acre

**Scenario Typical Size:** 20

**Total Scenario Cost:** $1,997.41

**Scenario Cost/Unit:** $99.87

**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. | Hour | $176.61 | 6 | $1,059.66 |
| Tillage, Primary | 946 | Includes heavy disking (offset) or chisel plow. Includes equipment, power unit and labor costs. | Acre | $15.10 | 20 | $302.00 |
| **Labor** | | | | | | |
| Equipment Operators, Heavy | 233 | Includes: Cranes, Hydraulic Excavators >=50 HP, Dozers, Paving Machines, Rock Trenchers, Trenchers >=12", Dump Trucks, Ag Equipment >=150 HP, Scrapers, Water Wagons. | Hour | $23.93 | 8 | $191.44 |
| **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 | $444.31 | 1 | $444.31 |

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

**Scenario** #7 - Topographic Feature Creation, Medium Complexity and Intensity

**Scenario Description:**

Setting is any land use with the potential to provide habitat for species of plants and animals identified as Rare and Declining and the habitat potential is not currently being captured. This scenario is typically occurs on lands used for the production of forest products, grazing and/or fish and wildlife where the slope gradient is less than two percent and predominant soils are not excessively drained. The State-approved habitat evaluation or appraisal found that a limiting factor for species of plants and animals identified as rare and declining is the absence of sufficient variability in microtopograpic relief in the area. The construction of medium intensity and medium complexity topographic features will provide for diverse soil hydrologic conditions needed to treat the degraded plant condition and/or inadequate habitat for rare and declining species. The construction of micro and macro topographic features can be implemented with the use of equipment in the 70-150 HP range due to current site conditions and implementation techniques. This scenario is for earthwork, not associated with habitat structures or any other national standard (e.g. Wetland Restoration (657), Wetland Enhancement (659), Wetland Creation (658), and Dike (356)).

**Before Situation:**

The site lacks sufficient micro- and macrotopographic features needed for optimal habitat for target rare and declining species. Typically the site has been previously manipulated and utilized for agricultural, livestock or forest production. With the loss of hummocks, depressions and other topographic features scattered throughout the site, both plant and animal species that are dependent on the microenvironments created by these features are no longer present or are in decline within the planning unit.

**After Situation:**

Appropriate equipment (i.e. Skidsteer, Farm Tractor, Small Dozer, etc) was used to construct planned topographic features essential for identified species. As a result of the installation, adequate habitat needs have been provided.

**Feature Measure:** number and size of constructed fea

**Scenario Unit::** Acre

**Scenario Typical Size:** 50

**Total Scenario Cost:** $36,203.24

**Scenario Cost/Unit:** $724.06

**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 Yard | $1.99 | 15 | $29.85 |
| Earthfill, Roller Compacted | 49 | Earthfill, roller or machine compacted, includes equipment and labor | Cubic Yard | $3.76 | 15 | $56.40 |
| Earthfill, Manually Compacted | 50 | Earthfill, manually compacted, includes equipment and labor | Cubic Yard | $4.95 | 15 | $74.25 |
| Backhoe, 80 HP | 926 | Wheel mounted backhoe excavator with horsepower range of 60 to 90. Equipment and power unit costs. Labor not included. | Hour | $50.99 | 32 | $1,631.68 |
| Dozer, 140 HP | 927 | Track mounted Dozer with horsepower range of 125 to 160. Equipment and power unit costs. Labor not included. | Hour | $112.82 | 64 | $7,220.48 |
| Dozer, 80 HP | 929 | Track mounted Dozer with horsepower range of 60 to 90. Equipment and power unit costs. Labor not included. | Hour | $60.16 | 64 | $3,850.24 |
| Hydraulic Excavator, 1 CY | 931 | Track mounted hydraulic excavator with bucket capacity range of 0.8 to 1.5 CY. Equipment and power unit costs. Labor not included. | Hour | $103.47 | 32 | $3,311.04 |
| Skidsteer, 80 HP | 933 | Skidsteer loader with horsepower range of 60 to 90. Equipment and power unit costs. Labor not included. | Hour | $40.57 | 64 | $2,596.48 |
| Track Loader, 95HP | 935 | Equipment and power unit costs. Labor not included. | Hour | $80.20 | 64 | $5,132.80 |
| Tractor, agricultural, 120 HP | 962 | Agricultural tractor with horsepower range of 90 to 140. Equipment and power unit costs. Labor not included. | Hour | $52.49 | 64 | $3,359.36 |
| Satellite imagery, aerial photography, infrared | 966 | Infrared imagery | Acre | $0.17 | 50 | $8.50 |
| **Labor** | | | | | | |
| General Labor | 231 | Labor performed using basic tools such as power tool, shovels, and other tools that do not require extensive training. Ex. pipe layer, herder, concrete placement, materials spreader, flagger, etc. | Hour | $18.93 | 128 | $2,423.04 |
| Equipment Operators, Light | 232 | Includes: Skid Steer Loaders, Hydraulic Excavators <50 HP, Trenchers <12", Ag Equipment <150 HP, Pickup Trucks, Forklifts, Mulchers | Hour | $21.14 | 256 | $5,411.84 |

| | | | | | | |
|---|---|---|---|---|---|---|
| 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. | Hour | $34.29 | 32 | $1,097.28 |

**Practice:** 644 - Wetland Wildlife Habitat Management

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

**Scenario Description:**

This scenario is applied to wetlands within all landuse types including those with wildlife as a modifier, where any resource concern is identified for wildlife, and where very-low intensity and complexity of monitoring or management will treat the identified resource concern. Only 1-2 monitoring efforts are needed and each requiring less than 2 people and 4 hours per effort. The adaptive management actions such as cutting of limbs that are impeding access of birds into nest boxs, replacing damaged fence markers, cleaning of nest structures and debris around other structures requires only hand labor and less than 16 hours of labor per year.

**Before Situation:**

Wetland wildlife habitat is deficient due to the absence of annual monitoring and adaptive management actions of very-low intensity and complexity.

**After Situation:**

Wetland wildlife habitat is improved by implementation of annual adaptive management actions of very- low intensity and complexity.

**Feature Measure:** Monitoring efforts and adaptive m

**Scenario Unit::** Acre

**Scenario Typical Size:** 640

**Total Scenario Cost:** $579.60

**Scenario Cost/Unit:** $0.91

**Cost Details:**

| Component Name | ID | Description | Unit | Cost | QTY | Total |
|---|---|---|---|---|---|---|
| **Equipment Installation** | | | | | | |
| Chainsaw | 937 | Equipment and power unit costs. Labor not included. | Hour | $3.97 | 2 | $7.94 |
| Truck, Pickup | 939 | Equipment and power unit costs. Labor not included. | Hour | $19.82 | 3 | $59.46 |
| Rangeland/grassland field monitoring kit | 967 | Miscellaneous tools needed to complete rangeland/grassland monitoring. Materials may include camera, clippers, plot frame, scale, tape measure, etc. Includes materials and shipping only. | Each | $48.10 | 1 | $48.10 |
| **Labor** | | | | | | |
| General Labor | 231 | Labor performed using basic tools such as power tool, shovels, and other tools that do not require extensive training. Ex. pipe layer, herder, concrete placement, materials spreader, flagger, etc. | Hour | $18.93 | 10 | $189.30 |
| Specialist Labor | 235 | Labor requiring a specialized skill set: Includes Agronomists, Foresters, Biologists, etc. to provide additional technical information during the planning and implementation of the practice. Does not include NRCS or TSP services. | Hour | $91.60 | 3 | $274.80 |

**Practice:** 644 - Wetland Wildlife Habitat Management

**Scenario** #2 - Wetland Widlife Habitat Monitoring and Management, Low Intensity and Complexity

**Scenario Description:**

This scenario is applied to wetlands on landuse types including those with wildlife as a modifier, where any resource concern is identified for wildlife, and where low intensity and complexity of monitoring or management will treat the identified resource concern. Only 1-2 monitoring efforts are needed and each requiring less than 2 people and 4 hours per effort. The adaptive management actions such as cutting of limbs that are impeding access of birds into nest boxs, replacing damaged fence markers, cleaning of nest structures and debris around other structures requires only hand labor and less than 8 hours labor per year.

**Before Situation:**

Wetland wildlife habitat is deficient due to the absence of annual monitoring and adaptive management actions of low intensity and complexity.

**After Situation:**

Widlife habitat is improved by implementation of annual adaptive management actions of low intensity and complexity.

**Feature Measure:** Monitoring efforts and adaptive m

**Scenario Unit::** Acre

**Scenario Typical Size:** 160

**Total Scenario Cost:** $489.11

**Scenario Cost/Unit:** $3.06

**Cost Details:**

| Component Name | ID | Description | Unit | Cost | QTY | Total |
|---|---|---|---|---|---|---|
| **Equipment Installation** | | | | | | |
| Chainsaw | 937 | Equipment and power unit costs. Labor not included. | Hour | $3.97 | 1 | $3.97 |
| Truck, Pickup | 939 | Equipment and power unit costs. Labor not included. | Hour | $19.82 | 1.5 | $29.73 |
| Rangeland/grassland field monitoring kit | 967 | Miscellaneous tools needed to complete rangeland/grassland monitoring. Materials may include camera, clippers, plot frame, scale, tape measure, etc. Includes materials and shipping only. | Each | $48.10 | 1 | $48.10 |
| **Labor** | | | | | | |
| General Labor | 231 | Labor performed using basic tools such as power tool, shovels, and other tools that do not require extensive training. Ex. pipe layer, herder, concrete placement, materials spreader, flagger, etc. | Hour | $18.93 | 7 | $132.51 |
| Specialist Labor | 235 | Labor requiring a specialized skill set: Includes Agronomists, Foresters, Biologists, etc. to provide additional technical information during the planning and implementation of the practice. Does not include NRCS or TSP services. | Hour | $91.60 | 3 | $274.80 |

**Practice:** 644 - Wetland Wildlife Habitat Management

**Scenario** #3 - Habitat Monitoring and Management, Medium Intensity and Complexity

**Scenario Description:**

This scenario is applied to wetland areas located on all landuse types including those with wildlife as a modifier, where any resource concern is identified for wildlife, and where medium intensity and complexity of monitoring or management will treat the identified resource concern. Two or three monitoring efforts are needed and each requiring less than 2 people and less than 8 hours per effort. Two or three adaptive management efforts are required (such as cutting of limbs that are impeding access of birds into nest boxes, replacing damaged fence markers, cleaning of nest structures and debris around other structures). The adaptive mgmt requires hand labor and the occasional use of light equipment. A crew of 2 is needed for the hand labor efforts and the crew will require less than 16 total hours of labor per mgmt effort. Mowing of roads and trail is required to provide access for monitoring and management.

**Before Situation:**

Wetland wildlife habitat is deficient due to the absence of annual monitoring and adaptive management actions of medium intensity and complexity.

**After Situation:**

wetland wildlife habitat is improved by implementation of annual adaptive management actions of medium intensity and complexity.

**Feature Measure:** Monitoring efforts and adaptive m

**Scenario Unit::** Acre

**Scenario Typical Size:** 160

**Total Scenario Cost:** $1,819.30

**Scenario Cost/Unit:** $11.37

**Cost Details:**

| Component Name | ID | Description | Unit | Cost | QTY | Total |
|---|---|---|---|---|---|---|
| **Equipment Installation** | | | | | | |
| Chainsaw | 937 | Equipment and power unit costs. Labor not included. | Hour | $3.97 | 4 | $15.88 |
| Truck, Pickup | 939 | Equipment and power unit costs. Labor not included. | Hour | $19.82 | 6 | $118.92 |
| Mower, Bush Hog | 940 | Equipment and power unit costs. Labor not included. | Hour | $47.22 | 5 | $236.10 |
| Rangeland/grassland field monitoring kit | 967 | Miscellaneous tools needed to complete rangeland/grassland monitoring. Materials may include camera, clippers, plot frame, scale, tape measure, etc. Includes materials and shipping only. | Each | $48.10 | 1 | $48.10 |
| **Labor** | | | | | | |
| General Labor | 231 | Labor performed using basic tools such as power tool, shovels, and other tools that do not require extensive training. Ex. pipe layer, herder, concrete placement, materials spreader, flagger, etc. | Hour | $18.93 | 20 | $378.60 |
| Equipment Operators, Light | 232 | Includes: Skid Steer Loaders, Hydraulic Excavators <50 HP, Trenchers <12", Ag Equipment <150 HP, Pickup Trucks, Forklifts, Mulchers | Hour | $21.14 | 5 | $105.70 |
| Specialist Labor | 235 | Labor requiring a specialized skill set: Includes Agronomists, Foresters, Biologists, etc. to provide additional technical information during the planning and implementation of the practice. Does not include NRCS or TSP services. | Hour | $91.60 | 10 | $916.00 |

**Practice:** 644 - Wetland Wildlife Habitat Management

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

**Scenario Description:**

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

**Before Situation:**

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

**After Situation:**

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

**Feature Measure:** Monitoring efforts and adaptive m

**Scenario Unit::** Acre

**Scenario Typical Size:** 80

**Total Scenario Cost:** $2,208.06

**Scenario Cost/Unit:** $27.60

**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. | Hour | $103.47 | 4 | $413.88 |
| Chainsaw | 937 | Equipment and power unit costs. Labor not included. | Hour | $3.97 | 8 | $31.76 |
| Truck, Pickup | 939 | Equipment and power unit costs. Labor not included. | Hour | $19.82 | 6 | $118.92 |
| Mower, Bush Hog | 940 | Equipment and power unit costs. Labor not included. | Hour | $47.22 | 3 | $141.66 |
| Rangeland/grassland field monitoring kit | 967 | Miscellaneous tools needed to complete rangeland/grassland monitoring. Materials may include camera, clippers, plot frame, scale, tape measure, etc. Includes materials and shipping only. | Each | $48.10 | 1 | $48.10 |
| **Labor** | | | | | | |
| General Labor | 231 | Labor performed using basic tools such as power tool, shovels, and other tools that do not require extensive training. Ex. pipe layer, herder, concrete placement, materials spreader, flagger, etc. | Hour | $18.93 | 20 | $378.60 |
| Equipment Operators, Light | 232 | Includes: Skid Steer Loaders, Hydraulic Excavators <50 HP, Trenchers <12", Ag Equipment <150 HP, Pickup Trucks, Forklifts, Mulchers | Hour | $21.14 | 3 | $63.42 |
| Equipment Operators, Heavy | 233 | Includes: Cranes, Hydraulic Excavators >=50 HP, Dozers, Paving Machines, Rock Trenchers, Trenchers >=12", Dump Trucks, Ag Equipment >=150 HP, Scrapers, Water Wagons. | Hour | $23.93 | 4 | $95.72 |
| 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. | Hour | $91.60 | 10 | $916.00 |

**Practice:** 644 - Wetland Wildlife Habitat Management

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

**Scenario Description:**

This typical scenario is installed on non-forested wetlands, including openlands prior to tree planting. 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::** Acre

**Scenario Typical Size:** 20

**Total Scenario Cost:** $743.78

**Scenario Cost/Unit:** $37.19

**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. | Acre | $15.10 | 20 | $302.00 |
| Tractor, agricultural, 120 HP | 962 | Agricultural tractor with horsepower range of 90 to 140. Equipment and power unit costs. Labor not included. | Hour | $52.49 | 6 | $314.94 |
| **Labor** | | | | | | |
| Equipment Operators, Light | 232 | Includes: Skid Steer Loaders, Hydraulic Excavators <50 HP, Trenchers <12", Ag Equipment <150 HP, Pickup Trucks, Forklifts, Mulchers | Hour | $21.14 | 6 | $126.84 |

**Practice:** 644 - Wetland Wildlife Habitat Management

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

**Scenario Description:**

This typical scenario is installed on non-forested wetlands (or open land prior to tree planting), 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::** Acre

**Scenario Typical Size:** 20

**Total Scenario Cost:** $1,997.41

**Scenario Cost/Unit:** $99.87

**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. | Hour | $176.61 | 6 | $1,059.66 |
| Tillage, Primary | 946 | Includes heavy disking (offset) or chisel plow. Includes equipment, power unit and labor costs. | Acre | $15.10 | 20 | $302.00 |
| **Labor** | | | | | | |
| Equipment Operators, Heavy | 233 | Includes: Cranes, Hydraulic Excavators >=50 HP, Dozers, Paving Machines, Rock Trenchers, Trenchers >=12", Dump Trucks, Ag Equipment >=150 HP, Scrapers, Water Wagons. | Hour | $23.93 | 8 | $191.44 |
| **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 | $444.31 | 1 | $444.31 |

**Practice:** 644 - Wetland Wildlife Habitat Management

**Scenario** #7 - Monitoring, Management

**Scenario Description:**

Setting is any lands with the potential to provide wetland wildlife habitat and that potential is not currently being captured. The identified wetland wildlife habitat limiting factors can be restored, enhanced or created, with the application of this practice alone, or in combination with other supporting and facilitating practices. Monitoring will be used to determine if the conservation system meets or exceeds the minimum quality criteria for the targeted wildlife. Management will be implemented based on the findings of the habitat assessment and monitoring.Wetland wildlife habitat management and monitoring needed to treat the resource concerns may require training, no qualitative data assessment, no water quality monitoring and is medium in complexity and intensity. Examples of prescribed monitoring, include but are not limited to: photo points taken, documentation of annual management, remote cameras, documenting wildlife sightings, documenting location and presence of invasive species and condition of vegetative and structural treatments and occurance of damage to habitat. The planner will specify locations and identify the methods to the customer who will implement the monitoring and management plan. Facilitating practices may include but not limited to: 314, 315, 327, 342, 380, 384, 390, 391, 422, 472, 490, 511, 528, 550, 612, 647, 650, 654, 660, 666.

**Before Situation:**

Existing degraded plant conditions and resulting inadequate habitat for fish and wildlife have resulting in low use of the area by target and associated wetland wildlife species.

**After Situation:**

Based on the results of a State-approved upland wildlife habitat assessment process, the application of wetland wildlife habitat management efforts and prescribed monitoring have been implemented. With the application of this practice alone, or in combination with other supporting and facilitating practices, the inadequate wetland wildlife habitat conditions have addressed. Monitoring has maximized the benefits of the needed upland wildlife habitat treatment efforts.

**Feature Measure:** Acres Managed and Monitored.

**Scenario Unit::** Acre

**Scenario Typical Size:** 100

**Total Scenario Cost:** $463.19

**Scenario Cost/Unit:** $4.63

**Cost Details:**

| Component Name | ID | Description | Unit | Cost | QTY | Total |
|---|---|---|---|---|---|---|
| **Equipment Installation** | | | | | | |
| All terrain vehicles, ATV | 965 | Includes equipment, power unit and labor costs. | Hour | $29.73 | 0.5 | $14.87 |
| Satellite imagery, aerial photography, infrared | 966 | Infrared imagery | Acre | $0.17 | 100 | $17.00 |
| **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. | Hour | $91.60 | 3 | $274.80 |
| **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 | $156.52 | 1 | $156.52 |

**Practice:** 644 - Wetland Wildlife Habitat Management

**Scenario** #8 - Topoggraphic Feature Creation, High

**Scenario Description:**

Corrective measures will require the use of equipment 150 HP in size or larger due to current site conditions and implementation techniques. The setting is all landuses, but typically is on lands used for the production of agricultural products, where the slope gradient is less than two percent and soils that are not excessivly drained, that are being converted back to wetland habitats for fish and wildlife. The State-approved habitat evaluation or appraisal found that a limiting factor for wetland wildlife is the absence of sufficient variability in microtopograpic releif in the area. The construction of low intensity and low complexity topographic features will provide for diverse soil hydrologic conditions needed to treat the degraded plant condition and/or inadequate habitat for wetland wildlife. The contruction of micro and macro topographic featuires will require the use of equipment 150 HP in size or larger due to current site conditions and implementation techniques. Appropriate equipment (i.e. Dozer, Excavator, etc) will be used to construct planned topographic features essential for identified species.

**Before Situation:**

The site lacks sufficient micro- and macrotopographic features needed for optimal wetland wildlife habitat for target species. Typically the site has been previously manipulated and utilized for agricultural production. With the loss of ridges and swales and other topographic features scattered throughout the site, both plant and animal species that are dependent on the microenvironments created by these features are no longer present or are in decline within the planning unit.

**After Situation:**

Appropriate equipment (i.e. Dozer, Excavator, etc) was used to construct planned topographic features essential for identified species. As a result of the installation, adequate habitat structure such as micro and macro topographic features will provide for diverse soil hydrologic conditions needed to treat the degraded plant condition and/or inadequate habitat for wetland wildlife.

**Feature Measure:** number and size of constructed fea

**Scenario Unit::** Acre

**Scenario Typical Size:** 100

**Total Scenario Cost:** $384,403.96

**Scenario Cost/Unit:** $3,844.04

**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 | $45.80 | 1 | $45.80 |
| **Equipment Installation** | | | | | | |
| Dozer, 200 HP | 928 | Track mounted Dozer with horsepower range of 160 to 250. Equipment and power unit costs. Labor not included. | Hour | $176.61 | 1000 | $176,610.00 |
| 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. | Hour | $149.59 | 1000 | $149,590.00 |
| Satellite imagery, aerial photography, infrared | 966 | Infrared imagery | Acre | $0.17 | 100 | $17.00 |
| **Labor** | | | | | | |
| Equipment Operators, Heavy | 233 | Includes: Cranes, Hydraulic Excavators >=50 HP, Dozers, Paving Machines, Rock Trenchers, Trenchers >=12", Dump Trucks, Ag Equipment >=150 HP, Scrapers, Water Wagons. | Hour | $23.93 | 2000 | $47,860.00 |
| 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. | Hour | $34.29 | 248 | $8,503.92 |
| **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 | $444.31 | 4 | $1,777.24 |

**Practice:** 644 - Wetland Wildlife Habitat Management

**Scenario** #9 - Mottled Duck Habitat, wetland component-activity #5

**Scenario Description:**

Used on adjacent grassland and wetland components to manipulate water levels to provide nesting and brooding habitat for mottled ducks and wintering habitat for other water birds through specific management objectives

**Before Situation:**

Currently these agricultural fields do not provide habitat for waterfowl/shorebirds. Grassland and wetland components are typically not managed adequately to provide suitable nesting and brooding habitat for mottled ducks

**After Situation:**

Wetland components are managed so that shallow water habitat is available from February 1 through July 31, with no more than 50% of the area covered by tall, emergent vegetation.

**Feature Measure:** <Unknown>

**Scenario Unit::** Acre

**Scenario Typical Size:** 250

**Total Scenario Cost:** $2,574.48

**Scenario Cost/Unit:** $10.30

**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. | Hour | $18.93 | 136 | $2,574.48 |

**Practice:** 644 - Wetland Wildlife Habitat Management

**Scenario** #10 - Close Risers by Nov.1-Feb.15

**Scenario Description:**

This scenario addresses inadequate habitat for fish and wildlife on cropland and/or moist soil areas. 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 placing boards in risers of water control structures by November 1 to catch precipitation. Removal of boards after February 15 allows area to drain. Associated practices are P.C. 587, Structure for Water Control and P.C. 356, Dikes.

**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. Water control structures are closed by November 1 and held through February 15 to catch rainfall. Depths are based on actual rainfall for that year; based on climatic data, assume enough rainfall to average 6-8 inches. The producer manages the timing and duration of water required for different species of waterfowl/shorebirds. This management will benefit wildlife while minimizing nutrient export and aquifer depletion. 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). Depending on local conditions, other Conservation Practices may also be required.

**Feature Measure:** <Unknown>

**Scenario Unit::** Acre

**Scenario Typical Size:** 15

**Total Scenario Cost:** $151.44

**Scenario Cost/Unit:** $10.10

**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. | Hour | $18.93 | 8 | $151.44 |

**Practice:** 645 - Upland Wildlife Habitat Management

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

**Scenario Description:**

This scenario is applied to all landuse types including those with wildlife as a modifier, where any resource concern is identified for wildlife, and where very-low intensity and complexity of monitoring or management will treat the identified resource concern. Only 1-2 monitoring efforts are needed and each requiring less than 2 people and 4 hours per effort. The adaptive management actions such as cutting of limbs that are impeding access of birds into nest boxs, replacing damaged fence markers, cleaning of nest structures and debris around other structures requires only hand labor and less than 16 hours of labor per year.

**Before Situation:**

Wildlife habitat is deficient due to the absence of annual monitoring and adaptive management actions of very-low intensity and complexity.

**After Situation:**

Widlife habitat is improved by implementation of annual adaptive management actions of very- low intensity and complexity.

**Feature Measure:** Monitoring efforts and adaptive m

**Scenario Unit::** Acre

**Scenario Typical Size:** 640

**Total Scenario Cost:** $579.60

**Scenario Cost/Unit:** $0.91

**Cost Details:**

| Component Name | ID | Description | Unit | Cost | QTY | Total |
|---|---|---|---|---|---|---|
| **Equipment Installation** | | | | | | |
| Chainsaw | 937 | Equipment and power unit costs. Labor not included. | Hour | $3.97 | 2 | $7.94 |
| Truck, Pickup | 939 | Equipment and power unit costs. Labor not included. | Hour | $19.82 | 3 | $59.46 |
| Rangeland/grassland field monitoring kit | 967 | Miscellaneous tools needed to complete rangeland/grassland monitoring. Materials may include camera, clippers, plot frame, scale, tape measure, etc. Includes materials and shipping only. | Each | $48.10 | 1 | $48.10 |
| **Labor** | | | | | | |
| General Labor | 231 | Labor performed using basic tools such as power tool, shovels, and other tools that do not require extensive training. Ex. pipe layer, herder, concrete placement, materials spreader, flagger, etc. | Hour | $18.93 | 10 | $189.30 |
| Specialist Labor | 235 | Labor requiring a specialized skill set: Includes Agronomists, Foresters, Biologists, etc. to provide additional technical information during the planning and implementation of the practice. Does not include NRCS or TSP services. | Hour | $91.60 | 3 | $274.80 |

**Practice:** 645 - Upland Wildlife Habitat Management

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

**Scenario Description:**

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

**Before Situation:**

Wildlife habitat is deficient due to the absence of annual monitoring and adaptive management actions of low intensity and complexity.

**After Situation:**

Widlife habitat is improved by implementation of annual adaptive management actions of low intensity and complexity.

**Feature Measure:** Monitoring efforts and adaptive m

**Scenario Unit::** Acre

**Scenario Typical Size:** 160

**Total Scenario Cost:** $489.11

**Scenario Cost/Unit:** $3.06

**Cost Details:**

| Component Name | ID | Description | Unit | Cost | QTY | Total |
|---|---|---|---|---|---|---|
| **Equipment Installation** | | | | | | |
| Chainsaw | 937 | Equipment and power unit costs. Labor not included. | Hour | $3.97 | 1 | $3.97 |
| Truck, Pickup | 939 | Equipment and power unit costs. Labor not included. | Hour | $19.82 | 1.5 | $29.73 |
| Rangeland/grassland field monitoring kit | 967 | Miscellaneous tools needed to complete rangeland/grassland monitoring. Materials may include camera, clippers, plot frame, scale, tape measure, etc. Includes materials and shipping only. | Each | $48.10 | 1 | $48.10 |
| **Labor** | | | | | | |
| General Labor | 231 | Labor performed using basic tools such as power tool, shovels, and other tools that do not require extensive training. Ex. pipe layer, herder, concrete placement, materials spreader, flagger, etc. | Hour | $18.93 | 7 | $132.51 |
| Specialist Labor | 235 | Labor requiring a specialized skill set: Includes Agronomists, Foresters, Biologists, etc. to provide additional technical information during the planning and implementation of the practice. Does not include NRCS or TSP services. | Hour | $91.60 | 3 | $274.80 |

**Practice:** 645 - Upland Wildlife Habitat Management

**Scenario** #3 - Habitat Monitoring and Management, Medium Intensity and Complexity

**Scenario Description:**

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

**Before Situation:**

Wildlife habitat is deficient due to the absence of annual monitoring and adaptive management actions of medium intensity and complexity.

**After Situation:**

Wildlife habitat is improved by implementation of annual adaptive management actions of medium intensity and complexity.

**Feature Measure:** Monitoring efforts and adaptive m

**Scenario Unit::** Acre

**Scenario Typical Size:** 160

**Total Scenario Cost:** $1,819.30

**Scenario Cost/Unit:** $11.37

**Cost Details:**

| Component Name | ID | Description | Unit | Cost | QTY | Total |
|---|---|---|---|---|---|---|
| **Equipment Installation** | | | | | | |
| Chainsaw | 937 | Equipment and power unit costs. Labor not included. | Hour | $3.97 | 4 | $15.88 |
| Truck, Pickup | 939 | Equipment and power unit costs. Labor not included. | Hour | $19.82 | 6 | $118.92 |
| Mower, Bush Hog | 940 | Equipment and power unit costs. Labor not included. | Hour | $47.22 | 5 | $236.10 |
| Rangeland/grassland field monitoring kit | 967 | Miscellaneous tools needed to complete rangeland/grassland monitoring. Materials may include camera, clippers, plot frame, scale, tape measure, etc. Includes materials and shipping only. | Each | $48.10 | 1 | $48.10 |
| **Labor** | | | | | | |
| General Labor | 231 | Labor performed using basic tools such as power tool, shovels, and other tools that do not require extensive training. Ex. pipe layer, herder, concrete placement, materials spreader, flagger, etc. | Hour | $18.93 | 20 | $378.60 |
| Equipment Operators, Light | 232 | Includes: Skid Steer Loaders, Hydraulic Excavators <50 HP, Trenchers <12", Ag Equipment <150 HP, Pickup Trucks, Forklifts, Mulchers | Hour | $21.14 | 5 | $105.70 |
| Specialist Labor | 235 | Labor requiring a specialized skill set: Includes Agronomists, Foresters, Biologists, etc. to provide additional technical information during the planning and implementation of the practice. Does not include NRCS or TSP services. | Hour | $91.60 | 10 | $916.00 |

**Practice:** 645 - Upland Wildlife Habitat Management

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

**Scenario Description:**

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

**Before Situation:**

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

**After Situation:**

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

**Feature Measure:** Monitoring efforts and adaptive m

**Scenario Unit::** Acre

**Scenario Typical Size:** 80

**Total Scenario Cost:** $2,208.06

**Scenario Cost/Unit:** $27.60

**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. | Hour | $103.47 | 4 | $413.88 |
| Chainsaw | 937 | Equipment and power unit costs. Labor not included. | Hour | $3.97 | 8 | $31.76 |
| Truck, Pickup | 939 | Equipment and power unit costs. Labor not included. | Hour | $19.82 | 6 | $118.92 |
| Mower, Bush Hog | 940 | Equipment and power unit costs. Labor not included. | Hour | $47.22 | 3 | $141.66 |
| Rangeland/grassland field monitoring kit | 967 | Miscellaneous tools needed to complete rangeland/grassland monitoring. Materials may include camera, clippers, plot frame, scale, tape measure, etc. Includes materials and shipping only. | Each | $48.10 | 1 | $48.10 |
| **Labor** | | | | | | |
| General Labor | 231 | Labor performed using basic tools such as power tool, shovels, and other tools that do not require extensive training. Ex. pipe layer, herder, concrete placement, materials spreader, flagger, etc. | Hour | $18.93 | 20 | $378.60 |
| Equipment Operators, Light | 232 | Includes: Skid Steer Loaders, Hydraulic Excavators <50 HP, Trenchers <12", Ag Equipment <150 HP, Pickup Trucks, Forklifts, Mulchers | Hour | $21.14 | 3 | $63.42 |
| Equipment Operators, Heavy | 233 | Includes: Cranes, Hydraulic Excavators >=50 HP, Dozers, Paving Machines, Rock Trenchers, Trenchers >=12", Dump Trucks, Ag Equipment >=150 HP, Scrapers, Water Wagons. | Hour | $23.93 | 4 | $95.72 |
| 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. | Hour | $91.60 | 10 | $916.00 |

**Practice:** 645 - Upland Wildlife Habitat Management

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

**Scenario Description:**

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

**Scenario Typical Size:** 20

**Total Scenario Cost:** $743.78

**Scenario Cost/Unit:** $37.19

**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. | Acre | $15.10 | 20 | $302.00 |
| Tractor, agricultural, 120 HP | 962 | Agricultural tractor with horsepower range of 90 to 140. Equipment and power unit costs. Labor not included. | Hour | $52.49 | 6 | $314.94 |
| **Labor** | | | | | | |
| Equipment Operators, Light | 232 | Includes: Skid Steer Loaders, Hydraulic Excavators <50 HP, Trenchers <12", Ag Equipment <150 HP, Pickup Trucks, Forklifts, Mulchers | Hour | $21.14 | 6 | $126.84 |

**Practice:** 645 - Upland Wildlife Habitat Management

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

**Scenario Description:**

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

**Before Situation:**

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

**After Situation:**

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

**Feature Measure:** Hours

**Scenario Unit::** Acre

**Scenario Typical Size:** 20

**Total Scenario Cost:** $1,997.41

**Scenario Cost/Unit:** $99.87

**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. | Hour | $176.61 | 6 | $1,059.66 |
| Tillage, Primary | 946 | Includes heavy disking (offset) or chisel plow. Includes equipment, power unit and labor costs. | Acre | $15.10 | 20 | $302.00 |
| **Labor** | | | | | | |
| Equipment Operators, Heavy | 233 | Includes: Cranes, Hydraulic Excavators >=50 HP, Dozers, Paving Machines, Rock Trenchers, Trenchers >=12", Dump Trucks, Ag Equipment >=150 HP, Scrapers, Water Wagons. | Hour | $23.93 | 8 | $191.44 |
| **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 | $444.31 | 1 | $444.31 |

**Practice:** 645 - Upland Wildlife Habitat Management

**Scenario** #7 - Snag Creation

**Scenario Description:**

Creation of snags can provide habitat components in monotypic woodlands where there is little standing decaying trees, downed woody debris, and/or little understory. The selected trees within the proposed area would be chemically deadened. Consideration should be given regarding increased nest parasitism by species such as brown-headed cowbirds. This scenario covers all uplands habitats, that are not covered under 643, that need snags created when habitat assessment indicates Inadequate Habitat for Fish or Wildlife-habitat degradation. Intensity is the number of structures to be installed per acre. For this scenario the intensity is 6 snags per acre. Complexity is defined by the combination of skill level, equipment needed and ease of accesability for createing and installing these structures. For this scenario the complexity would include: specialized labor without supervision; common hand tools and equipment; installation is within a quarter mile of a driveable road; and terrain is gentle to moderate. This practice may be installed alone or in combination with facilitating practices. Facilitating practices may include but not limited to: 391, 647 and 666.

**Before Situation:**

The setting is a 160-acre woodland area lacking sufficient snags needed to provide nesting and cover cavities, foraging habitat, and perching locations for the vast array of species dependent on dead and decaying standing and laying trees. In addition, the canopy lacks forest opening critical to the target wildlife species. No more than 6 snags per acre is needed to bring the deficient habitat limiting factor up to planning criteria. The project can be implemented within a quarter mile of a driveable road and terrain is gentle to moderate.

**After Situation:**

The 160 acres of treated woodland has become more diverse in regard to the number snags, as well as small forest openings and the resulting increase in richness and diversity of the understory. Adquate habitat exists for the vast array of invetegrates, birds and mammals that require dead trees for food, cover and shelter.

**Feature Measure:** <Unknown>

**Scenario Unit::** Acre

**Scenario Typical Size:** 160

**Total Scenario Cost:** $4,599.56

**Scenario Cost/Unit:** $28.75

**Cost Details:**

| Component Name | ID | Description | Unit | Cost | QTY | Total |
|---|---|---|---|---|---|---|
| **Equipment Installation** | | | | | | |
| Rangeland/grassland field monitoring kit | 967 | Miscellaneous tools needed to complete rangeland/grassland monitoring. Materials may include camera, clippers, plot frame, scale, tape measure, etc. Includes materials and shipping only. | Each | $48.10 | 2 | $96.20 |
| **Labor** | | | | | | |
| Specialist Labor | 235 | Labor requiring a specialized skill set: Includes Agronomists, Foresters, Biologists, etc. to provide additional technical information during the planning and implementation of the practice. Does not include NRCS or TSP services. | Hour | $91.60 | 48 | $4,396.80 |
| **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. | Acre | $6.66 | 16 | $106.56 |

**Practice:** 646 - Shallow Water Development and Management

**Scenario** #1 - Shallow Water Management - Low Level

**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::** Acre

**Scenario Typical Size:** 1

**Total Scenario Cost:** $18.93

**Scenario Cost/Unit:** $18.93

**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. | Hour | $18.93 | 1 | $18.93 |

**Practice:** 646 - Shallow Water Development and Management

**Scenario** #2 - Shallow Water Management-High Level

**Scenario Description:**

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

**Before Situation:**

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

**After Situation:**

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

**Feature Measure:** Acre of shallow water

**Scenario Unit::** Acre

**Scenario Typical Size:** 1

**Total Scenario Cost:** $82.00

**Scenario Cost/Unit:** $82.00

**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 Foot | $126.14 | 0.5 | $63.07 |
| **Labor** | | | | | | |
| General Labor | 231 | Labor performed using basic tools such as power tool, shovels, and other tools that do not require extensive training. Ex. pipe layer, herder, concrete placement, materials spreader, flagger, etc. | Hour | $18.93 | 1 | $18.93 |

**Practice:** 647 - Early Successional Habitat Development/Management

**Scenario** #1 - Disking

**Scenario Description:**

This practice addresses inadequate wildlife habitat for species requiring early successional habitat at varying stages. This scenario provides early successional habitat by setting back succession and manipulating species composition by disking vegetation and creating bare ground, forbs for feeding habitat, and NWSGS for nesting habitat all within the homerange for grassland birds, such as quail. No more than 1/3 to 1/2 of the area should be disked within 1 year. The typical setting for this scenario is at the edge of crop fields, in pastures, odd areas such as pivot corners, and thinned forest understory. This scenario is applicable nationwide. Where the management of woody plants is required to create or maintain early successional habitat, conservation practice 314 brush management or 666 forest stand improvement should be used. 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 550 range seeding or 327 Conservation Cover.

**Before Situation:**

The site is static or trending to higher successional plant species. The disturbance regime to maintain a lower successional stage is lacking. Pastures are often monotypic, lacking in diversity. Bare ground for seedling establishment is absent. Stands are often dense and inhibit the movements of younger wildlife species suchh as game bird chicks.

**After Situation:**

The application of this scenario improves wildlife habitat for species requiring early successional plant communities by reducing competition and creating bare ground for the establishment of early successional plants. Additionally, brood rearing habitat is improved both by the resultant food resources and the increased openess of the plant community that allows chicks to negotiate the terrain and exploit those food resources.

**Feature Measure:** width and length of treated area

**Scenario Unit::** Acre

**Scenario Typical Size:** 40

**Total Scenario Cost:** $1,091.40

**Scenario Cost/Unit:** $27.29

**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. | Acre | $10.14 | 40 | $405.60 |
| **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. | Hour | $34.29 | 20 | $685.80 |

**Practice:** 647 - Early Successional Habitat Development/Management

**Scenario** #2 - CRP Mowing/Bailing

**Scenario Description:**

This practice scenario is used as a mid-contract management activity for the CRP program. It involves mowing and bailing established plant communities to both stimulate new growth and to set back woody, less desirable species. The typical size of the practice is 20 acres. Increased annual/herbaceous plant diversity will improve wildlife habitat, pollinator habitat, and overall soil health. The typical setting for this scenario is on CRP lands established in early successional vegetation. This scenario is applicable nationwide. Where the management of woody plants is require to create or maintain early successional habitat conservation practice 314 brush management or 666 forest stand improvement should be used. 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 550 range seeding or 327 Conservation Cover.

**Before Situation:**

The site has an established native plant cover and is being managed under a conservation plan and CRP contract. Typically, plant diversity and vigor begins to diminish over time and less desirable woody species begin to emerge as a part of natural succession. Wildlife populations are healthy, some pollinator habitat is being provided, and soil health is improving. Wildlife populations are healthy, some pollinator habitat is being provided, and soil health is improving.

**After Situation:**

With the introduction of a mowing/bailing activity, wildlife populations improve considerably, pollinator habitat is improved and exists for a longer period of time, woody species are set back, and soil health improves at a faster pace.

**Feature Measure:** width and length of treated area

**Scenario Unit::** Acre

**Scenario Typical Size:** 20

**Total Scenario Cost:** $410.16

**Scenario Cost/Unit:** $20.51

**Cost Details:**

| Component Name | ID | Description | Unit | Cost | QTY | Total |
|---|---|---|---|---|---|---|
| **Equipment Installation** | | | | | | |
| Mower, Bush Hog | 940 | Equipment and power unit costs. Labor not included. | Hour | $47.22 | 6 | $283.32 |
| **Labor** | | | | | | |
| Equipment Operators, Light | 232 | Includes: Skid Steer Loaders, Hydraulic Excavators <50 HP, Trenchers <12", Ag Equipment <150 HP, Pickup Trucks, Forklifts, Mulchers | Hour | $21.14 | 6 | $126.84 |

**Practice:** 647 - Early Successional Habitat Development/Management

**Scenario** #3 - Wetland Disking

**Scenario Description:**

This practice addresses inadequate wetland wildlife habitat for species preferring early successional foods and habitat. This scenario provides early successional habitat by setting back succession and manipulating species composition. The typical setting for this scenario is managed moist-soil wetlands, restored wetlands, and shallow natural wetlands that periodically dry under normal conditions. Where the management of woody plants is require to maintain early successional habitat conservation practice 314 brush management or 666 forest stand improvement should be used. 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.

**Before Situation:**

The site is static or trending to late successional perennial plant species. The disturbance regime to maintain a early successional stage is lacking. Bare ground for annual seedling establishment is absent. Stands are often dense and do not produce preferred foods for wetland dependant wildlife species, such as waterfowl and shorebirds.

**After Situation:**

The application of this scenario improves wetland wildlife foods and habitat for species requiring early successional plant communities by reducing competition and creating bare ground for the establishment of early successional plants. Additionally, plant diversity and wetland functions and values can be improved.

**Feature Measure:** width and length of treated area

**Scenario Unit::** Acre

**Scenario Typical Size:** 15

**Total Scenario Cost:** $539.54

**Scenario Cost/Unit:** $35.97

**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. | Acre | $15.10 | 15 | $226.50 |
| **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 | $156.52 | 2 | $313.04 |

**Practice:** 647 - Early Successional Habitat Development/Management

**Scenario** #4 - Wetland Mowing

**Scenario Description:**

This scenario address inadequate habitat for wetland wildlife where setting back succession by mowing herbaceous and/or woody species will improve habitat for the target species. Mowing can be used to increase structural diversity by creating areas of shorter vegetation prefered by some species or certain life stages of species. Mowing also allows wildlife access when habitat is flooded, makes seed more available, and provides vegetation and soil contact necessary for invertebrate response in wetlands. The typical setting for this scenario is in managed moist-soil wetlands, restored wetlands, andshallow natural wetlands that periodically dry under normal conditions. Where the management of woody plants is require to create or maintain early successional habitat conservation practice 314 brush management or 666 forest stand improvement should be used. 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.

**Before Situation:**

The site is static or trending to late successional perennial plant species. The disturbance regime to maintain a early successional stage is lacking. Bare ground for annual seedling establishment is absent. Stands are often dense and do not produce preferred foods for wetland dependant wildlife species, such as waterfowl and shorebirds.

**After Situation:**

The application of this scenario improves wetland wildlife foods and habitat for species requiring early successional plant communities by reducing competition and creating bare ground for the establishment of early successional plants. Additionally, plant diversity and wetland functions and values can be improved.

**Feature Measure:** width and length of treated area

**Scenario Unit::** Acre

**Scenario Typical Size:** 15

**Total Scenario Cost:** $518.12

**Scenario Cost/Unit:** $34.54

**Cost Details:**

| Component Name | ID | Description | Unit | Cost | QTY | Total |
|---|---|---|---|---|---|---|
| **Equipment Installation** | | | | | | |
| Mower, Bush Hog | 940 | Equipment and power unit costs. Labor not included. | Hour | $47.22 | 3 | $141.66 |
| **Labor** | | | | | | |
| Equipment Operators, Light | 232 | Includes: Skid Steer Loaders, Hydraulic Excavators <50 HP, Trenchers <12", Ag Equipment <150 HP, Pickup Trucks, Forklifts, Mulchers | Hour | $21.14 | 3 | $63.42 |
| **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 | $156.52 | 2 | $313.04 |

**Practice:** 647 - Early Successional Habitat Development/Management

**Scenario** #5 - Late Season Shallow Water with Manipulation

**Scenario Description:**

Used on rice fields, crawfish fields, other cropland, moist soil units, shallow water areas to provide habitat for wildife. This scenario addresses inadequate habitat for fish and wildlife on cropland and/or moist soil areas. 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". Associated practices are P.C. 587, Structure for Water Control and P.C. 356, Dikes.

**Before Situation:**

Currently these agricultural fields do not provide habitat for waterfowl/shorebirds. Water and moist soil is typically not managed during this timeframe.

**After Situation:**

Water control structures are closed, holding 8 to 18 inches of water as of May 1, to catch rainfall. Depths will be dependent on actual rainfall for that year. Based on climatic data, we assume enough rainfall to average 6-8 inches, lasting through July. The producer will manipulate emergent vegetation by rolling or lightly disking, so that 50% or more of the vegetation is at or below the soil surface. This management will benefit wildlife while minimizing nutrient export and aquifer depletion.

**Feature Measure:** <Unknown>

**Scenario Unit::** Acre

**Scenario Typical Size:** 40

**Total Scenario Cost:** $1,605.32

**Scenario Cost/Unit:** $40.13

**Cost Details:**

| Component Name | ID | Description | Unit | Cost | QTY | Total |
|---|---|---|---|---|---|---|
| **Equipment Installation** | | | | | | |
| Mower, Bush Hog | 940 | Equipment and power unit costs. Labor not included. | Hour | $47.22 | 22 | $1,038.84 |
| Tillage, Light | 945 | Includes light disking (tandem) or field cultivator. Includes equipment, power unit and labor costs. | Acre | $10.14 | 10 | $101.40 |
| **Labor** | | | | | | |
| Equipment Operators, Light | 232 | Includes: Skid Steer Loaders, Hydraulic Excavators <50 HP, Trenchers <12", Ag Equipment <150 HP, Pickup Trucks, Forklifts, Mulchers | Hour | $21.14 | 22 | $465.08 |

**Practice:** 647 - Early Successional Habitat Development/Management

**Scenario** #6 - Extended Late Season Shallow Water w/ Manipulation

**Scenario Description:**

Used on rice fields, crawfish fields, other cropland, moist soil units, shallow water areas to provide habitat for wildife. This scenario addresses inadequate habitat for fish and wildlife on cropland and/or moist soil areas. 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". Associated practices are P.C. 587, Structure for Water Control and P.C. 356, Dikes.

**Before Situation:**

Currently these agricultural fields do not provide habitat for waterfowl/shorebirds. Water and moist soil is typically not managed during this timeframe.

**After Situation:**

Water control structures are closed, holding 8 to 18 inches of water as of May 1, to catch rainfall. Depths will be dependent on actual rainfall for that year. Based on climatic data, we assume enough rainfall to average 6-8 inches, lasting through August. The producer will manipulate emergent vegetation by rolling or lightly disking, so that 50% or more of the vegetation is at or below the soil surface. This management will benefit wildlife while minimizing nutrient export and aquifer depletion.

**Feature Measure:** <Unknown>

**Scenario Unit::** Acre

**Scenario Typical Size:** 40

**Total Scenario Cost:** $3,041.20

**Scenario Cost/Unit:** $76.03

**Cost Details:**

| Component Name | ID | Description | Unit | Cost | QTY | Total |
|---|---|---|---|---|---|---|
| **Equipment Installation** | | | | | | |
| Mower, Bush Hog | 940 | Equipment and power unit costs. Labor not included. | Hour | $47.22 | 20 | $944.40 |
| Tillage, Light | 945 | Includes light disking (tandem) or field cultivator. Includes equipment, power unit and labor costs. | Acre | $10.14 | 40 | $405.60 |
| **Labor** | | | | | | |
| Equipment Operators, Light | 232 | Includes: Skid Steer Loaders, Hydraulic Excavators <50 HP, Trenchers <12", Ag Equipment <150 HP, Pickup Trucks, Forklifts, Mulchers | Hour | $21.14 | 80 | $1,691.20 |

**Practice:** 647 - Early Successional Habitat Development/Management

**Scenario** #7 - Mottled Duck Habitat,low intensity grassland component-activity #5

**Scenario Description:**

Used on grasslands near other core grasslands with high intensity improvementswith an adjacent wetland component to provide nesting and brooding habitat for mottled ducks and wintering habitat for other water birds through specific management objectives.

**Before Situation:**

Currently these agricultural fields do not provide habitat for waterfowl/shorebirds. Grassland and wetland components are typically not managed adequately to provide suitable nesting and brooding habitat for mottled ducks.

**After Situation:**

Grasslands are managed to promote large expanses of a diverse plant community of grasses, legumes, and forbs. Trees and shrubs are not desirable.

**Feature Measure:** <Unknown>

**Scenario Unit::** Acre

**Scenario Typical Size:** 250

**Total Scenario Cost:** $2,255.88

**Scenario Cost/Unit:** $9.02

**Cost Details:**

| Component Name | ID | Description | Unit | Cost | QTY | Total |
|---|---|---|---|---|---|---|
| **Equipment Installation** | | | | | | |
| Mower, Bush Hog | 940 | Equipment and power unit costs. Labor not included. | Hour | $47.22 | 33 | $1,558.26 |
| **Labor** | | | | | | |
| Equipment Operators, Light | 232 | Includes: Skid Steer Loaders, Hydraulic Excavators <50 HP, Trenchers <12", Ag Equipment <150 HP, Pickup Trucks, Forklifts, Mulchers | Hour | $21.14 | 33 | $697.62 |

**Practice:** 647 - Early Successional Habitat Development/Management

**Scenario** #8 - Mottled Duck Habitat, high intensity grassland component-activity #5

**Scenario Description:**

Used on grasslands with an adjacent wetland component to provide nesting and brooding habitat for mottled ducks and wintering habitat for other water birds through specific management objectives. High intensity measures are applicable when significant changes in management techniques and expenitures are planned to bring the grassland component from minimal mottled duck nesting habitat to high quality. Low intensity measures should be applied where slight changes are planned for on-going grassland management techniques which will increase benefits to mottled duck nesting habitats. This scenario addresses inadequate habitat for fish and wildlife on cropland and/or moist soil areas. Sites are flooded up to a depth of 18" with an average depth of 9". Associated practices are P.C. 587, Structure for Water Control and P.C. 356, Dikes.

**Before Situation:**

Currently these agricultural fields do not provide habitat for waterfowl/shorebirds. Grassland and wetland components are typically not managed adequately to provide suitable nesting and brooding habitat for mottled ducks.

**After Situation:**

Grasslands are managed to promote large expanses of a diverse plant community of grasses, legumes, and forbs. Trees and shrubs are not desirable.

**Feature Measure:** <Unknown>

**Scenario Unit::** Acre

**Scenario Typical Size:** 250

**Total Scenario Cost:** $14,088.24

**Scenario Cost/Unit:** $56.35

**Cost Details:**

| Component Name | ID | Description | Unit | Cost | QTY | Total |
|---|---|---|---|---|---|---|
| **Equipment Installation** | | | | | | |
| Mower, Bush Hog | 940 | Equipment and power unit costs. Labor not included. | Hour | $47.22 | 120 | $5,666.40 |
| Tillage, Primary | 946 | Includes heavy disking (offset) or chisel plow. Includes equipment, power unit and labor costs. | Acre | $15.10 | 60 | $906.00 |
| **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. | Hour | $18.93 | 120 | $2,271.60 |
| 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. | Hour | $34.29 | 16 | $548.64 |
| **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 | $156.52 | 30 | $4,695.60 |

**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 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 birds, bats and pollinators. These structures/features enhance habitat, cover, and improve species survivability.

**Feature Measure:** Number of structures

**Scenario Unit::** Each

**Scenario Typical Size:** 1

**Total Scenario Cost:** $40.24

**Scenario Cost/Unit:** $40.24

**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. | Hour | $18.93 | 0.5 | $9.47 |
| **Materials** | | | | | | |
| Habitat Box, Bird | 251 | Bluebird nesting box to increase nesting success. Each is 1-1/2" x 6" x 12-1/2" w/ 1-1/2" diameter opening. Includes materials and shipping. | Each | $30.77 | 1 | $30.77 |

**Practice:** 649 - Structures for Wildlife

**Scenario** #2 - Nesting Box, Small, with wood pole

**Scenario Description:**

Constructing a nest box and mounting on a pole. A structure is provided to support the nesting and rearing of targeted species, such as pollinators and 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 speces, such as blue birds and waterfowl. 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

**Total Scenario Cost:** $60.07

**Scenario Cost/Unit:** $60.07

**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. | Hour | $18.93 | 0.75 | $14.20 |
| **Materials** | | | | | | |
| Post, Wood, CCA treated, 6" x 8' | 12 | Wood Post, End 6" X 8', CCA Treated. Includes materials and shipping only. | Each | $15.10 | 1 | $15.10 |
| Habitat Box, Bird | 251 | Bluebird nesting box to increase nesting success. Each is 1-1/2" x 6" x 12-1/2" w/ 1-1/2" diameter opening. Includes materials and shipping. | Each | $30.77 | 1 | $30.77 |

**Practice:** 649 - Structures for Wildlife

**Scenario** #3 - Nesting Box, Large

**Scenario Description:**

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

**Before Situation:**

The area lacks sufficient overall habitat conditions to support viable populations of targeted species. A suitable location to mount the box is available. 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

**Total Scenario Cost:** $81.69

**Scenario Cost/Unit:** $81.69

**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. | Hour | $18.93 | 0.5 | $9.47 |
| **Materials** | | | | | | |
| Habitat Box, waterfowl | 1449 | Wood Duck Box, typically 24" x 11" x 12" with 4" wide oval entrance, single. Includes material and shipping only. | Each | $72.22 | 1 | $72.22 |

**Practice:** 649 - Structures for Wildlife

**Scenario** #4 - Nesting Box or Rapture 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 woodducks, 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

**Total Scenario Cost:** $182.96

**Scenario Cost/Unit:** $182.96

**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 Yard | $103.61 | 0.1 | $10.36 |
| All terrain vehicles, ATV | 965 | Includes equipment, power unit and labor costs. | Hour | $29.73 | 0.5 | $14.87 |
| **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. | Hour | $18.93 | 1.5 | $28.40 |
| **Materials** | | | | | | |
| Post, Wood, CCA treated, 6" x 12-14' | 13 | Wood Post, Line/End 6" X 12-14', CCA Treated. Includes materials and shipping only. | Each | $26.98 | 1 | $26.98 |
| Habitat Box, waterfowl | 1449 | Wood Duck Box, typically 24" x 11" x 12" with 4" wide oval entrance, single. Includes material and shipping only. | Each | $72.22 | 1 | $72.22 |
| Predator Guard | 1461 | Predator guards (i.e. stove pipes, cone, hole guard, etc.) for habitat boxes. Materials only. Includes material and shipping only. | Each | $30.14 | 1 | $30.14 |

**Practice:** 649 - Structures for Wildlife

**Scenario** #5 - Escape Ramp

**Scenario Description:**

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

**Before Situation:**

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

**After Situation:**

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

**Feature Measure:** Each Ramp

**Scenario Unit::** Each

**Scenario Typical Size:** 1

**Total Scenario Cost:** $34.17

**Scenario Cost/Unit:** $34.17

**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. | Hour | $18.93 | 0.5 | $9.47 |
| **Materials** | | | | | | |
| Wildlife Escape Ramp | 242 | Pool size 15' x 30', for small mammals less than one pound | Each | $24.70 | 1 | $24.70 |

**Practice:** 649 - Structures for Wildlife

**Scenario** #6 - Fence Markers, Vinyl Undersill

**Scenario Description:**

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

**Before Situation:**

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

**After Situation:**

Fence related mortality of species of special concern is reduced.

**Feature Measure:** feet of fence marked

**Scenario Unit::** Foot

**Scenario Typical Size:** 1320

**Total Scenario Cost:** $188.72

**Scenario Cost/Unit:** $0.14

**Cost Details:**

| Component Name | ID | Description | Unit | Cost | QTY | Total |
|---|---|---|---|---|---|---|
| **Equipment Installation** | | | | | | |
| All terrain vehicles, ATV | 965 | Includes equipment, power unit and labor costs. | Hour | $29.73 | 0.5 | $14.87 |
| **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. | Hour | $18.93 | 5 | $94.65 |
| **Materials** | | | | | | |
| Vinyl Undersill Strips | 241 | Marking material using the "undersill" strips of vinyl siding. Priced per foot of fence per each wire. Materials only. | Foot | $0.06 | 1320 | $79.20 |

**Practice:** 649 - Structures for Wildlife

**Scenario** #7 - Brush Pile - Small

**Scenario Description:**

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

**Before Situation:**

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

**After Situation:**

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

**Feature Measure:** brush piles

**Scenario Unit::** Each

**Scenario Typical Size:** 1

**Total Scenario Cost:** $30.86

**Scenario Cost/Unit:** $30.86

**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. | Hour | $40.57 | 0.5 | $20.29 |
| **Labor** | | | | | | |
| Equipment Operators, Light | 232 | Includes: Skid Steer Loaders, Hydraulic Excavators <50 HP, Trenchers <12", Ag Equipment <150 HP, Pickup Trucks, Forklifts, Mulchers | Hour | $21.14 | 0.5 | $10.57 |

**Practice:** 649 - Structures for Wildlife

**Scenario** #8 - 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

**Total Scenario Cost:** $122.47

**Scenario Cost/Unit:** $122.47

**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. | Hour | $40.57 | 1 | $40.57 |
| Chainsaw | 937 | Equipment and power unit costs. Labor not included. | Hour | $3.97 | 1 | $3.97 |
| **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. | Hour | $18.93 | 3 | $56.79 |
| Equipment Operators, Light | 232 | Includes: Skid Steer Loaders, Hydraulic Excavators <50 HP, Trenchers <12", Ag Equipment <150 HP, Pickup Trucks, Forklifts, Mulchers | Hour | $21.14 | 1 | $21.14 |

**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, water and tissue sampling are required. The purpose of the practice is to address resource concerns related to water quality degradation due to excess nutrient and pathogens. Associated practices: Structure for Water Control (587); Sediment Basin (350); Dike (356); Pond Sealing or Lining, Compacted Clay Treatment (521D); Pond Sealing or Lining, Flexible Membrane (521A); Fence (382); Grade Stabilization Structure (410); Pumping Plant (533); Waste Transfer (634)

**Before 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 Foot

**Scenario Typical Size:** 2000

**Total Scenario Cost:** $1,349.65

**Scenario Cost/Unit:** $0.67

**Cost Details:**

| Component Name | ID | Description | Unit | Cost | QTY | Total |
|---|---|---|---|---|---|---|
| **Equipment Installation** | | | | | | |
| Clearing and Grubbing | 40 | Clearing and Grubbing, includes materials, equipment and labor | Acre | $257.52 | 0.05 | $12.88 |
| Stripping and stockpiling, topsoil | 1199 | Stripping and stockpiling of topsoil adjacent to stripping area. Includes equipment and labor. | Cubic Yard | $0.81 | 37 | $29.97 |
| 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 Yard | $2.28 | 74 | $168.72 |
| **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. | Hour | $18.93 | 4 | $75.72 |
| **Materials** | | | | | | |
| Test, Soil Test, Standard | 299 | Includes materials, shiping, labor, and equipment costs. | Each | $10.13 | 2 | $20.26 |
| Test, Plant Tissue Test | 301 | Tissue analysis for crops. Includes materials and shipping only. | Each | $27.10 | 1 | $27.10 |
| Test, Standard Water Test, Well Water | 309 | Well Water Suitability test. Includes materials and shipping only. | Each | $42.13 | 8 | $337.04 |
| Native Aquatic Plants, Emergent or Submerged | 2336 | Native aquatic emergent or submerged. All required materials for establishing vegetation. Includes material and shipping. | Each | $1.37 | 325 | $445.25 |
| **Mobilization** | | | | | | |
| Mobilization, medium equipment | 1139 | Equipment with 70-150 HP or typical weights between 14,000 and 30,000 pounds. | Each | $232.71 | 1 | $232.71 |

**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, water and tissue sampling are required. The purpose of the practice is to address resource concerns related to water quality degradation due to excess nutrient and pathogens. Associated practices: Structure for Water Control (587); Sediment Basin (350); Dike (356); Pond Sealing or Lining, Compacted Clay Treatment (521D); Pond Sealing or Lining, Flexible Membrane (521A); Fence (382); Grade Stabilization Structure (410); Pumping Plant (533); Waste Transfer (634)

**Before 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::** Acre

**Scenario Typical Size:** 0.25

**Total Scenario Cost:** $3,870.01

**Scenario Cost/Unit:** $15,480.04

**Cost Details:**

| Component Name | ID | Description | Unit | Cost | QTY | Total |
|---|---|---|---|---|---|---|
| **Equipment Installation** | | | | | | |
| Clearing and Grubbing | 40 | Clearing and Grubbing, includes materials, equipment and labor | Acre | $257.52 | 0.25 | $64.38 |
| Stripping and stockpiling, topsoil | 1199 | Stripping and stockpiling of topsoil adjacent to stripping area. Includes equipment and labor. | Cubic Yard | $0.81 | 200 | $162.00 |
| 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 Yard | $2.28 | 400 | $912.00 |
| **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. | Hour | $18.93 | 14 | $265.02 |
| **Materials** | | | | | | |
| Test, Soil Test, Standard | 299 | Includes materials, shiping, labor, and equipment costs. | Each | $10.13 | 2 | $20.26 |
| Test, Plant Tissue Test | 301 | Tissue analysis for crops. Includes materials and shipping only. | Each | $27.10 | 1 | $27.10 |
| Test, Standard Water Test, Well Water | 309 | Well Water Suitability test. Includes materials and shipping only. | Each | $42.13 | 8 | $337.04 |
| Native Aquatic Plants, Emergent or Submerged | 2336 | Native aquatic emergent or submerged. All required materials for establishing vegetation. Includes material and shipping. | Each | $1.37 | 1350 | $1,849.50 |
| **Mobilization** | | | | | | |
| Mobilization, medium equipment | 1139 | Equipment with 70-150 HP or typical weights between 14,000 and 30,000 pounds. | Each | $232.71 | 1 | $232.71 |

**Practice:** 656 - Constructed Wetland

**Scenario** #3 - Large greater 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, water and tissue sampling are required. The purpose of the practice is to address resource concerns related to water quality degradation due to excess nutrient and pathogens. Associated practices: Structure for Water Control (587); Sediment Basin (350); Dike (356); Pond Sealing or Lining, Compacted Clay Treatment (521D); Pond Sealing or Lining, Flexible Membrane (521A); Fence (382); Grade Stabilization Structure (410); Pumping Plant (533); Waste Transfer (634)

**Before 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::** Acre

**Scenario Typical Size:** 1

**Total Scenario Cost:** $10,860.50

**Scenario Cost/Unit:** $10,860.50

**Cost Details:**

| Component Name | ID | Description | Unit | Cost | QTY | Total |
|---|---|---|---|---|---|---|
| **Equipment Installation** | | | | | | |
| Clearing and Grubbing | 40 | Clearing and Grubbing, includes materials, equipment and labor | Acre | $257.52 | 1 | $257.52 |
| Stripping and stockpiling, topsoil | 1199 | Stripping and stockpiling of topsoil adjacent to stripping area. Includes equipment and labor. | Cubic Yard | $0.81 | 809 | $655.29 |
| 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 Yard | $2.28 | 1619 | $3,691.32 |
| **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. | Hour | $18.93 | 37 | $700.41 |
| **Materials** | | | | | | |
| Test, Soil Test, Standard | 299 | Includes materials, shiping, labor, and equipment costs. | Each | $10.13 | 2 | $20.26 |
| Test, Plant Tissue Test | 301 | Tissue analysis for crops. Includes materials and shipping only. | Each | $27.10 | 1 | $27.10 |
| Test, Standard Water Test, Well Water | 309 | Well Water Suitability test. Includes materials and shipping only. | Each | $42.13 | 8 | $337.04 |
| Native Aquatic Plants, Emergent or Submerged | 2336 | Native aquatic emergent or submerged. All required materials for establishing vegetation. Includes material and shipping. | Each | $1.37 | 3605 | $4,938.85 |
| **Mobilization** | | | | | | |
| Mobilization, medium equipment | 1139 | Equipment with 70-150 HP or typical weights between 14,000 and 30,000 pounds. | Each | $232.71 | 1 | $232.71 |

**Practice:** 657 - Wetland Restoration

**Scenario** #1 - Mineral 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::** Acre

**Scenario Typical Size:** 160

**Total Scenario Cost:** $2,109.75

**Scenario Cost/Unit:** $13.19

**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. | Hour | $57.07 | 24 | $1,369.68 |
| **Labor** | | | | | | |
| Equipment Operators, Light | 232 | Includes: Skid Steer Loaders, Hydraulic Excavators <50 HP, Trenchers <12", Ag Equipment <150 HP, Pickup Trucks, Forklifts, Mulchers | Hour | $21.14 | 24 | $507.36 |
| **Mobilization** | | | | | | |
| Mobilization, medium equipment | 1139 | Equipment with 70-150 HP or typical weights between 14,000 and 30,000 pounds. | Each | $232.71 | 1 | $232.71 |

**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::** Acre

**Scenario Typical Size:** 100

**Total Scenario Cost:** $34,207.73

**Scenario Cost/Unit:** $342.08

**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 Yard | $1.99 | 16520 | $32,874.80 |
| **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 | $444.31 | 3 | $1,332.93 |

**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 strucuture 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::** Acre

**Scenario Typical Size:** 15

**Total Scenario Cost:** $17,276.59

**Scenario Cost/Unit:** $1,151.77

**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 Yard | $1.99 | 8067 | $16,053.33 |
| Earthfill, Roller Compacted | 49 | Earthfill, roller or machine compacted, includes equipment and labor | Cubic Yard | $3.76 | 89 | $334.64 |
| **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 | $444.31 | 2 | $888.62 |

**Practice:** 657 - Wetland Restoration

**Scenario** #4 - Estuarine Fringe Levee Removal

**Scenario Description:**

An Estuarine Fringe HGM landscape is to be restored. The wetland is subject to tidally induced water level fluctuations. The tract size is 120 acres, and the wetland area is 100 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 wetland has been converted to agricultural production by construction of a dike to prevent tidal flows. The dike has a culvert with a flapgate to allow surface water to flow out, but prevents tide water from entering. The dike is 7 feet high above the current marsh surface. The dike has side slopes of 3:1, with a 12 foot top. A suitable seedbank exists for natural regeneration of the original plant community. The soils are organic, and loss of hydrology has caused the land surface to subside 3 feet due to aerobic decomposition of organic matter (mineralization).

**After Situation:**

The dike has been breached in 4 locations, corresponding to the number of original inlet channels. The breach locations have 8 foot long steel sheet pile Structures for Water Control installed to prevent tidal surges from causing serious erosion on the subsided land surface. The original flap gate culvert has been removed. The dike is 4 feet higher than the weir crests, so the excavations are 4 feet by 8 feet long, with 3:1 side slopes. The culvert has been removed and salvaged by the landowner. Facilitating practices are Structure for Water Control. 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::** Acre

**Scenario Typical Size:** 120

**Total Scenario Cost:** $1,898.09

**Scenario Cost/Unit:** $15.82

**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 Yard | $1.99 | 284 | $565.16 |
| **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 | $444.31 | 3 | $1,332.93 |

**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::** Acre

**Scenario Typical Size:** 15

**Total Scenario Cost:** $6,908.37

**Scenario Cost/Unit:** $460.56

**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 Yard | $1.99 | 3025 | $6,019.75 |
| **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 | $444.31 | 2 | $888.62 |

**Practice:** 657 - Wetland Restoration

**Scenario** #6 - Aquaculture Pond Levee Breach

**Scenario Description:**

Levee Breach - minimum 50 ft. base with 6:1 side slope (includes mobilization, equipment and labor to cut breach and spread spoil along levee). An Aquaculture Pond tract on a large floodplain is to be restored to a wetland and reconnected to the floodplain. It has been converted to aquacultural production by clearing of woody vegetation, land leveling and building levees. The total levee breach is 500 feet. Resource Concerns are: 19 - DEGRADED PLANT CONDITION, Inadequate strucuture and composition, 22- INADEQUATE HABITAT FOR FISH AND WILDLIFE - Habitat degradation.

**Before Situation:**

Levee construction for aquaculture production has reduced floodplain size and eliminated floodplain function in impacted area. The coversion to aquaculture was achieved by filling and leveling of backswamp, side channel, and/or oxbow features which formerly ponded water, provided floodplain storage, and/or provided floodplain filtering. The site no longer has access to floodwater and does not function as part of the floodplain.

**After Situation:**

A minimum breach of 50 feet at the base (varying top widths) will be used to allow the floodplain hydrologic access into and out of the existing aquaculture pond bottoms in order to restore floodplain wetland functions. Levee breaches will be installed in sizes and amounts where needed to restore floodplain and wetland function. Levee breaches are typically installed with 6:1 side slopes to provide easy maintenance and deter animal burrowing. Bottom widths are wide (min. 50') to allow adequate floodplain function, maintenance, and deter beaver dam activity. Breaches are typically installed with heavy euipment to address the resource problem of impaired hydrological function.

**Feature Measure:** <Unknown>

**Scenario Unit::** Each

**Scenario Typical Size:** 8

**Total Scenario Cost:** $11,093.86

**Scenario Cost/Unit:** $1,386.73

**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 Yard | $3.76 | 945 | $3,553.20 |
| 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 Yard | $5.99 | 945 | $5,660.55 |
| **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. | Hour | $34.29 | 3 | $102.87 |
| **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 | $444.31 | 4 | $1,777.24 |

**Practice:** 657 - Wetland Restoration

**Scenario** #7 - Levee Breach _ DS

**Scenario Description:**

Levee Breach - minimum 50 ft. base with 6:1 side slope (includes mobilization, equipment and labor to cut breach and spread spoil along levee). A levee on a large floodplain is to be breached to restore a wetland. It has been converted to agricultural production by clearing of woody vegetation, land leveling and building levees. The levee size is 1000 feet. Resource Concerns are: 19 - DEGRADED PLANT CONDITION, Inadequate strucuture and composition, 22- INADEQUATE HABITAT FOR FISH AND WILDLIFE - Habitat degradation.

**Before Situation:**

This practice will be applied on existing levees impacting the restoration of the hydrological functions of wetlands.

**After Situation:**

A minimum breach of 50 feet will be used to restore wetland function. This is typically installed with heavy euipment to address the resource problem of impaired hydrological function.

**Feature Measure:** number of breaches

**Scenario Unit::** Each

**Scenario Typical Size:** 1

**Total Scenario Cost:** $2,666.78

**Scenario Cost/Unit:** $2,666.78

**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. | Hour | $112.82 | 12 | $1,353.84 |
| **Labor** | | | | | | |
| Equipment Operators, Heavy | 233 | Includes: Cranes, Hydraulic Excavators >=50 HP, Dozers, Paving Machines, Rock Trenchers, Trenchers >=12", Dump Trucks, Ag Equipment >=150 HP, Scrapers, Water Wagons. | Hour | $23.93 | 12 | $287.16 |
| 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. | Hour | $34.29 | 4 | $137.16 |
| **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 | $444.31 | 2 | $888.62 |

**Practice:** 657 - Wetland Restoration

**Scenario** #8 - Levee Demolition - DS

**Scenario Description:**

Demolition of Levee - 10 ft. top and 2:1 side slope. A levee on a large floodplain is to be demolished to restore a wetland. It has been converted to agricultural production by clearing of woody vegetation, land leveling and building levees. The levee size is 1000 feet. Resource Concerns are: 19 - DEGRADED PLANT CONDITION, Inadequate strucuture and composition, 22- INADEQUATE HABITAT FOR FISH AND WILDLIFE - Habitat degradation.

**Before Situation:**

This practice will be applied by removing existing levees which impede the restoration of the hydrological functions of wetlands.

**After Situation:**

This is typically installed with heavy euipment to address the resource problem of impaired hydrological function.

**Feature Measure:** 1000 ft of levee

**Scenario Unit::** Each

**Scenario Typical Size:** 1

**Total Scenario Cost:** $10,168.15

**Scenario Cost/Unit:** $10,168.15

**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. | Hour | $50.99 | 24 | $1,223.76 |
| Dozer, 105 HP | 1320 | Track mounted Dozer with horsepower range of 90 to 125. Equipment and power unit costs. Labor not included. | Hour | $76.76 | 24 | $1,842.24 |
| Truck, dump, 8 CY | 1401 | Dump truck for moving bulk material. Typically capacity is 12 ton or 8 cubic yards. Includes equipment only. | Hour | $52.36 | 48 | $2,513.28 |
| **Labor** | | | | | | |
| Equipment Operators, Heavy | 233 | Includes: Cranes, Hydraulic Excavators >=50 HP, Dozers, Paving Machines, Rock Trenchers, Trenchers >=12", Dump Trucks, Ag Equipment >=150 HP, Scrapers, Water Wagons. | Hour | $23.93 | 96 | $2,297.28 |
| Supervisor or Manager | 234 | Labor involving supervision or management activities. Includes crew supervisors, foremen and farm/ranch managers time required for adopting new technology, etc. | Hour | $34.29 | 15 | $514.35 |
| **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 | $444.31 | 4 | $1,777.24 |

**Practice:** 657 - Wetland Restoration

**Scenario** #9 - Microhydrology - dump spoil - DS

**Scenario Description:**

Pond/Serpentine excavation and dumping within 100 ft., creating mound from spoil (typically 1.2 acre pond or 750 ft. serpentine). Serpentine typical size is 50' bottom, 3:1 s/s 3' deep, yeilding 4916 c.y. of spoil.

**Before Situation:**

This practice is typically conducted on hydrologically impaired degraded wetlands where slough type habitat has been removed.

**After Situation:**

This is typically installed with heavy euipment to address the resource problem of impaired hydrological function and lacking wetland habatit.

**Feature Measure:** 750' of serpentine

**Scenario Unit::** Acre

**Scenario Typical Size:** 1.2

**Total Scenario Cost:** $8,505.42

**Scenario Cost/Unit:** $7,087.85

**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. | Hour | $50.99 | 38 | $1,937.62 |
| Dozer, 80 HP | 929 | Track mounted Dozer with horsepower range of 60 to 90. Equipment and power unit costs. Labor not included. | Hour | $60.16 | 38 | $2,286.08 |
| **Labor** | | | | | | |
| Equipment Operators, Heavy | 233 | Includes: Cranes, Hydraulic Excavators >=50 HP, Dozers, Paving Machines, Rock Trenchers, Trenchers >=12", Dump Trucks, Ag Equipment >=150 HP, Scrapers, Water Wagons. | Hour | $23.93 | 76 | $1,818.68 |
| 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. | Hour | $34.29 | 20 | $685.80 |
| **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 | $444.31 | 4 | $1,777.24 |

**Practice:** 657 - Wetland Restoration

**Scenario** #10 - Microhydrology haul spoil - DS

**Scenario Description:**

Pond/Serpentine excavation and dumping greater than 200 ft., creating mound from spoil (typically 1.2 acre pond or 750 ft. serpentine). Serpentine typical size is 50' bottom, 3:1 s/s 3' deep, yeilding 4916 c.y. of spoil.

**Before Situation:**

This practice is typically conducted on hydrologically impaired degraded wetlands where slough type habitat has been removed.

**After Situation:**

This is typically installed with heavy euipment to address the resource problem of impaired hydrological function and lacking wetland habatit.

**Feature Measure:** 750' of serpentine

**Scenario Unit::** Acre

**Scenario Typical Size:** 1.2

**Total Scenario Cost:** $10,856.99

**Scenario Cost/Unit:** $9,047.49

**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. | Hour | $50.99 | 38 | $1,937.62 |
| Dozer, 80 HP | 929 | Track mounted Dozer with horsepower range of 60 to 90. Equipment and power unit costs. Labor not included. | Hour | $60.16 | 25 | $1,504.00 |
| Truck, dump, 8 CY | 1401 | Dump truck for moving bulk material. Typically capacity is 12 ton or 8 cubic yards. Includes equipment only. | Hour | $52.36 | 38 | $1,989.68 |
| **Labor** | | | | | | |
| Equipment Operators, Heavy | 233 | Includes: Cranes, Hydraulic Excavators >=50 HP, Dozers, Paving Machines, Rock Trenchers, Trenchers >=12", Dump Trucks, Ag Equipment >=150 HP, Scrapers, Water Wagons. | Hour | $23.93 | 101 | $2,416.93 |
| Supervisor or Manager | 234 | Labor involving supervision or management activities. Includes crew supervisors, foremen and farm/ranch managers time required for adopting new technology, etc. | Hour | $34.29 | 10 | $342.90 |
| **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 | $444.31 | 6 | $2,665.86 |

**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. 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 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::** Acre

**Scenario Typical Size:** 5

**Total Scenario Cost:** $16,941.95

**Scenario Cost/Unit:** $3,388.39

**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 Yard | $1.99 | 8067 | $16,053.33 |
| **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 | $444.31 | 2 | $888.62 |

**Practice:** 659 - Wetland Enhancement

**Scenario** #1 - 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::** Acre

**Scenario Typical Size:** 15

**Total Scenario Cost:** $6,908.37

**Scenario Cost/Unit:** $460.56

**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 Yard | $1.99 | 3025 | $6,019.75 |
| **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 | $444.31 | 2 | $888.62 |

**Practice:** 660 - Tree/Shrub Pruning

**Scenario** #1 - One step to 18ft

**Scenario Description:**

Pruning is done by hand with hand tools, pole saws or with gas pole saw. 100 Crop trees/acre are identified for pruning. To improve the quality of the stem wood and increase grass production in sylvopasture system, branches are pruned from the trees. Trees are pruned to a height to allow the bottom 16" of log to be free of branches and leave room for a stump (approx. 18").

**Before Situation:**

Trees are retaining limbs mostly along the mid to upper section of the tree bole, reducing quality and grass production. Lower branches may have naturally self pruned to differing heights. Pruning height is at least to eighteen (18) feet above the ground, leaving 40% crown. Degrade plant condition- undesirable plant productivity and health is the resource concern.

**After Situation:**

Typical Sylvopasture system of 20 acres is maintained. Trees are pruned to the desirable height of 18 feet, but leaving 40% crown. Pruned branches are treated if they are a hazard, see Woody Residue Treatment standard or Prescribed fire.

**Feature Measure:** area of treatment

**Scenario Unit::** Acre

**Scenario Typical Size:** 20

**Total Scenario Cost:** $9,000.08

**Scenario Cost/Unit:** $450.00

**Cost Details:**

| Component Name | ID | Description | Unit | Cost | QTY | Total |
|---|---|---|---|---|---|---|
| **Equipment Installation** | | | | | | |
| Truck, Pickup | 939 | Equipment and power unit costs. Labor not included. | Hour | $19.82 | 48 | $951.36 |
| Pruning tools, hand tools | 1318 | Pruning tools, hand tools, shears, loppers, pole saw, handsaw. Material costs only. Labor not included. | Hour | $4.94 | 80 | $395.20 |
| Pruning tool, pole saw | 1319 | Gasoline powered pole chainsaw. Labor not included. | Hour | $8.32 | 160 | $1,331.20 |
| **Labor** | | | | | | |
| General Labor | 231 | Labor performed using basic tools such as power tool, shovels, and other tools that do not require extensive training. Ex. pipe layer, herder, concrete placement, materials spreader, flagger, etc. | Hour | $18.93 | 240 | $4,543.20 |
| 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. | Hour | $34.29 | 48 | $1,645.92 |
| **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. | Acre | $6.66 | 20 | $133.20 |

**Practice:** 660 - Tree/Shrub Pruning

**Scenario** #2 - First Stage to 10ft

**Scenario Description:**

Pruning is done by hand with chain saws, tree loppers, hand shears, or hand saws. 100 crop trees/acre are identified for pruning. To improve the quality of the stem wood and increase sunlight for grass development in sylvopasture system, branches are pruned from the trees. Trees are not big enough to allow pruning in one step. Plan to prune in two stages. First stage is to prune approximtely 8 - 10 ft with the idea to prune the remainder of the desired 18 ft at a later date.

**Before Situation:**

Trees are retaining lower limbs along the entire tree bole, reducing wood quality and inhibiting grass growth. Pruning height will be based on overall stand diameter and height, leaving 40% crown. 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:**

Typical Sylvopasture system of 20 acres is maintained. Trees are pruned to the desirable height of 8-10 feet, but leaving 40% crown. Pruned branches are treated if they are a hazard, see Woody Residue Treatment standard or Prescribed fire.

**Feature Measure:** area of treatment

**Scenario Unit::** Acre

**Scenario Typical Size:** 20

**Total Scenario Cost:** $3,043.76

**Scenario Cost/Unit:** $152.19

**Cost Details:**

| Component Name | ID | Description | Unit | Cost | QTY | Total |
|---|---|---|---|---|---|---|
| **Equipment Installation** | | | | | | |
| Truck, Pickup | 939 | Equipment and power unit costs. Labor not included. | Hour | $19.82 | 16 | $317.12 |
| Pruning tools, hand tools | 1318 | Pruning tools, hand tools, shears, loppers, pole saw, handsaw. Material costs only. Labor not included. | Hour | $4.94 | 40 | $197.60 |
| Pruning tool, pole saw | 1319 | Gasoline powered pole chainsaw. Labor not included. | Hour | $8.32 | 40 | $332.80 |
| **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. | Hour | $18.93 | 80 | $1,514.40 |
| 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. | Hour | $34.29 | 16 | $548.64 |
| **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. | Acre | $6.66 | 20 | $133.20 |

**Practice:** 660 - Tree/Shrub Pruning

**Scenario** #3 - Second Stage 10ft to 18ft

**Scenario Description:**

Pruning is done by hand with pole saws or with gas pole saw. 100 Crop trees/acre are identified for pruning. To improve the quality of the stem wood and increase grass production in sylvopasture system, branches are pruned from the trees. Second stage is to prune remainder of the unpruned branches left by the first stage of pruning to the desired 18 ft. (approx. 10' to 18').

**Before Situation:**

Trees are retaining limbs mostly along the mid to upper section of the tree bole, reducing quality and grass production. Lower branches (0-9 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, leaving 40% crown. Degrade plant condition-undesirable plant productivity and health is the resource concern.

**After Situation:**

Typical Sylvopasture system of 20 acres is maintained. Trees are pruned to the desirable height of 18 feet, but leaving 40% crown. Pruned branches are treated if they are a hazard, see Woody Residue Treatment standard or Prescribed fire.

**Feature Measure:** area of treatment

**Scenario Unit::** Acre

**Scenario Typical Size:** 20

**Total Scenario Cost:** $7,614.40

**Scenario Cost/Unit:** $380.72

**Cost Details:**

| Component Name | ID | Description | Unit | Cost | QTY | Total |
|---|---|---|---|---|---|---|
| **Equipment Installation** | | | | | | |
| Truck, Pickup | 939 | Equipment and power unit costs. Labor not included. | Hour | $19.82 | 40 | $792.80 |
| Pruning tool, pole saw | 1319 | Gasoline powered pole chainsaw. Labor not included. | Hour | $8.32 | 200 | $1,664.00 |
| **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. | Hour | $18.93 | 200 | $3,786.00 |
| 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. | Hour | $34.29 | 40 | $1,371.60 |

**Practice:** 666 - Forest Stand Improvement

**Scenario** #1 - Single stem - Hand tools

**Scenario Description:**

Adjust species composition and/or density of a stand of trees to meet objectives. The operation is supervised and carried out using hand tools such as chainsaws, weed eaters with saw blades, or machetes. Species that do NOT sprout are targeted (i.e. cedar and pine). This scenerio is NOT appropriate to target species that sprout. Resource concerns can include: Forage Quality and Palatability, Noxious and Invasive Plants, Plants not adapted or suited, Productivity, Health and Vigor, Wildfire Hazard, Inadequate Cover/Shelter, Inadequate Quantities and Quality of Feed and Forage, Excessive Greenhouse Gas - CO2 (carbon dioxide), or Classic Gully.

**Before Situation:**

The density and/or species composition of a stand of trees is inconsistent with desired objectives. The stand could have poor health and vigor because of overstocking or undesirable species to be compatible with objectives for timber, wildlife, or aesthetics.

**After Situation:**

Density and/or species composition of the stand is consistent with desired objectives. Stand will have good health and vigor with desirable species.

**Feature Measure:** Area treated

**Scenario Unit::** Acre

**Scenario Typical Size:** 40

**Total Scenario Cost:** $8,244.00

**Scenario Cost/Unit:** $206.10

**Cost Details:**

| Component Name | ID | Description | Unit | Cost | QTY | Total |
|---|---|---|---|---|---|---|
| **Equipment Installation** | | | | | | |
| Chainsaw | 937 | Equipment and power unit costs. Labor not included. | Hour | $3.97 | 200 | $794.00 |
| **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. | Hour | $18.93 | 200 | $3,786.00 |
| 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. | Hour | $91.60 | 40 | $3,664.00 |

**Practice:** 666 - Forest Stand Improvement

**Scenario** #2 - Single Stem - Chemical

**Scenario Description:**

Adjust species composition and/or density of a stand of trees to meet objectives. The operation is carried out using hand tools with chemical treatment such as cut stump treatment, hack and squirt, basal spray. or back pack spray. Species that sprout are targeted (i.e. oak, hickory, elm, etc.). This scenerio is NOT appropriate to target species that DO NOT sprout. Resource concerns can include: Forage Quality and Palatability, Noxious and Invasive Plants, Plants not adapted or suited, Productivity, Health and Vigor, Wildfire Hazard, Inadequate Cover/Shelter, Inadequate Quantities and Quality of Feed and Forage, Excessive Greenhouse Gas - CO2 (carbon dioxide), or Classic Gully.

**Before Situation:**

The existing condition of the stand cannot meet the landowners objectives because the composition consists of unwanted species and the stocking exceeds the recommended level.

**After Situation:**

The composition of the stand can meet the landowners objectives and the growth, condition and quality of the remaining trees are improved.

**Feature Measure:** Acres treated

**Scenario Unit::** Acre

**Scenario Typical Size:** 40

**Total Scenario Cost:** $6,674.32

**Scenario Cost/Unit:** $166.86

**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. | Hour | $54.07 | 96 | $5,190.72 |
| **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. | Hour | $91.60 | 8 | $732.80 |
| **Materials** | | | | | | |
| Herbicide, Picloram | 337 | Refer to WIN-PST for product names and active ingredients. Includes materials and shipping only. | Acre | $18.77 | 40 | $750.80 |

**Practice:** 666 - Forest Stand Improvement

**Scenario** #3 - Chemical-Ground-Light Equipment

**Scenario Description:**

Using ground applied herbicides to release young desirable trees from competing and/or overtopping vegetation using ground-based machinery (typical farm equipment). Typical sites include abandoned fields, pastures, or agricultural fields. Resource concerns can include: Forage Quality and Palatability, Noxious and Invasive Plants, Plants not adapted or suited, Productivity, Health and Vigor, Wildfire Hazard, Inadequate Cover/Shelter, Inadequate Quantities and Quality of Feed and Forage, Excessive Greenhouse Gas - CO2 (carbon dioxide), or Classic Gully.

**Before Situation:**

An adequately stocked stand of desirable species is not meeting objective due to undesirable vegetation. If left uncontrolled, undesirable vegetation will inhibit desired species. Noxious and invasive species may also be present on the site. Application of herbicides 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::** Acre

**Scenario Typical Size:** 40

**Total Scenario Cost:** $2,342.85

**Scenario Cost/Unit:** $58.57

**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. | Acre | $5.58 | 40 | $223.20 |
| **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. | Hour | $34.29 | 6 | $205.74 |
| **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. | Acre | $40.73 | 40 | $1,629.20 |
| 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. | Acre | $1.30 | 40 | $52.00 |
| **Mobilization** | | | | | | |
| Mobilization, medium equipment | 1139 | Equipment with 70-150 HP or typical weights between 14,000 and 30,000 pounds. | Each | $232.71 | 1 | $232.71 |

**Practice:** 666 - Forest Stand Improvement

**Scenario** #4 - Chemical-Ground-Heavy Equipment

**Scenario Description:**

Using ground applied herbicides to release young desirable trees from competing and/or overtopping vegetation using ground-based machinery (dozers or skidders and NOT typical farm equipment). Typical sites include forestland with terrain too rough and uneven or vegetation too big or thick to be sprayed with normal farm equipment. Resource concerns can include: Forage Quality and Palatability, Noxious and Invasive Plants, Plants not adapted or suited, Productivity, Health and Vigor, Wildfire Hazard, Inadequate Cover/Shelter, Inadequate Quantities and Quality of Feed and Forage, Excessive Greenhouse Gas - CO2 (carbon dioxide), or Classic Gully.

**Before Situation:**

An adequately stocked stand of desirable species is not meeting objective due to undesirable vegetation. If left uncontrolled, undesirable vegetation will inhibit desired species. Noxious and invasive species may also be present on the site. Application of herbicides 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::** Acre

**Scenario Typical Size:** 40

**Total Scenario Cost:** $6,654.63

**Scenario Cost/Unit:** $166.37

**Cost Details:**

| Component Name | ID | Description | Unit | Cost | QTY | Total |
|---|---|---|---|---|---|---|
| **Equipment Installation** | | | | | | |
| Chemical, ground application, wildland | 1313 | Chemical application performed by ground equipment. Includes forestry application methods that include heavy equipment such as skidders. Includes material, equipment, power unit and labor costs. | Acre | $106.37 | 40 | $4,254.80 |
| **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. | Hour | $34.29 | 8 | $274.32 |
| **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. | Acre | $40.73 | 40 | $1,629.20 |
| 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. | Acre | $1.30 | 40 | $52.00 |
| **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 | $444.31 | 1 | $444.31 |

**Practice:** 666 - Forest Stand Improvement

**Scenario** #5 - Chemical, Aerial

**Scenario Description:**

Using aerially applied chemicals to release desirable trees from competing and/or overtopping vegetation. Resource concerns can include: Forage Quality and Palatability, Noxious and Invasive Plants, Plants not adapted or suited, Productivity, Health and Vigor, Wildfire Hazard, Inadequate Cover/Shelter, Inadequate Quantities and Quality of Feed and Forage, Excessive Greenhouse Gas - CO2 (carbon dioxide), or Classic Gully.

**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 helicopter as an over-the-top spray. The work will be professionally planned and supervised.

**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:** Area treated

**Scenario Unit::** Acre

**Scenario Typical Size:** 40

**Total Scenario Cost:** $3,816.02

**Scenario Cost/Unit:** $95.40

**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. | Acre | $31.94 | 40 | $1,277.60 |
| **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. | Hour | $18.93 | 8 | $151.44 |
| Supervisor or Manager | 234 | Labor involving supervision or management activities. Includes crew supervisors, foremen and farm/ranch managers time required for adopting new technology, etc. | Hour | $34.29 | 2 | $68.58 |
| **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. | Acre | $15.93 | 40 | $637.20 |
| 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. | Acre | $40.73 | 40 | $1,629.20 |
| 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. | Acre | $1.30 | 40 | $52.00 |

**Practice:** 666 - Forest Stand Improvement

**Scenario** #6 - Mechanical, Light Equipment

**Scenario Description:**

Using light equipment (typcially tractors used in normal farming operations) to control undesirable vegetation (disk or bush hog) competing with desirable species. Resource concerns can include: Forage Quality and Palatability, Noxious and Invasive Plants, Plants not adapted or suited, Productivity, Health and Vigor, Wildfire Hazard, Inadequate Cover/Shelter, Inadequate Quantities and Quality of Feed and Forage, Excessive Greenhouse Gas - CO2 (carbon dioxide), or Classic Gully.

**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::** Acre

**Scenario Typical Size:** 40

**Total Scenario Cost:** $2,420.23

**Scenario Cost/Unit:** $60.51

**Cost Details:**

| Component Name | ID | Description | Unit | Cost | QTY | Total |
|---|---|---|---|---|---|---|
| **Equipment Installation** | | | | | | |
| Mower, Bush Hog | 940 | Equipment and power unit costs. Labor not included. | Hour | $47.22 | 32 | $1,511.04 |
| **Labor** | | | | | | |
| Equipment Operators, Light | 232 | Includes: Skid Steer Loaders, Hydraulic Excavators <50 HP, Trenchers <12", Ag Equipment <150 HP, Pickup Trucks, Forklifts, Mulchers | Hour | $21.14 | 32 | $676.48 |
| **Mobilization** | | | | | | |
| Mobilization, medium equipment | 1139 | Equipment with 70-150 HP or typical weights between 14,000 and 30,000 pounds. | Each | $232.71 | 1 | $232.71 |

**Practice:** 666 - Forest Stand Improvement

**Scenario** #7 - Mechanical, Medium Equipment

**Scenario Description:**

Using medium equipment (usually hydroax & not typical farming equipment) to control undesirable competing vegetation that is competing with desirable species or to reduce the stocking level of a stand of desirable trees too big to be mowed with a bush hog. Resource concerns can include: Forage Quality and Palatability, Noxious and Invasive Plants, Plants not adapted or suited, Productivity, Health and Vigor, Wildfire Hazard, Inadequate Cover/Shelter, Inadequate Quantities and Quality of Feed and Forage, Excessive Greenhouse Gas - CO2 (carbon dioxide), or Classic Gully.

**Before Situation:**

A stand of desirable trees is adversely affected by competition either from undesirable species, cull trees, or because the stand is overstocked. The vegetation to be controlled is too large to be mowed.

**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:** Area treated

**Scenario Unit::** Acre

**Scenario Typical Size:** 40

**Total Scenario Cost:** $5,691.71

**Scenario Cost/Unit:** $142.29

**Cost Details:**

| Component Name | ID | Description | Unit | Cost | QTY | Total |
|---|---|---|---|---|---|---|
| **Equipment Installation** | | | | | | |
| Brush Chipper, 6" capacity | 938 | Brush Chipper, 6" capacity, typically 35 HP. Includes chipper and power unit. Labor not included. | Hour | $19.33 | 80 | $1,546.40 |
| Truck, Pickup | 939 | Equipment and power unit costs. Labor not included. | Hour | $19.82 | 20 | $396.40 |
| **Labor** | | | | | | |
| Equipment Operators, Heavy | 233 | Includes: Cranes, Hydraulic Excavators >=50 HP, Dozers, Paving Machines, Rock Trenchers, Trenchers >=12", Dump Trucks, Ag Equipment >=150 HP, Scrapers, Water Wagons. | Hour | $23.93 | 80 | $1,914.40 |
| 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. | Hour | $34.29 | 20 | $685.80 |
| 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. | Hour | $91.60 | 10 | $916.00 |
| **Mobilization** | | | | | | |
| Mobilization, medium equipment | 1139 | Equipment with 70-150 HP or typical weights between 14,000 and 30,000 pounds. | Each | $232.71 | 1 | $232.71 |

**Practice:** 666 - Forest Stand Improvement

**Scenario** #8 - Mechanical, Heavy Equipment

**Scenario Description:**

Using heavy equipment (usually bull dozers, masticator, or mulcher & not typical farming equipment) to control undesirable competing vegetation that is competing with desirable species or to reduce the stocking level of a stand of desirable trees too big to be mowed. Resource concerns can include: Forage Quality and Palatability, Noxious and Invasive Plants, Plants not adapted or suited, Productivity, Health and Vigor, Wildfire Hazard, Inadequate Cover/Shelter, Inadequate Quantities and Quality of Feed and Forage, Excessive Greenhouse Gas - CO2 (carbon dioxide), or Classic Gully.

**Before Situation:**

A stand of desirable trees is adversely affected by competition either from undesirable species, cull trees, or because the stand is overstocked. The vegetation to be controlled is too large to be mowed or shredded. Therefore other mechanical methods such as using masticators or mulchers is necessary.

**After 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:** Area treated

**Scenario Unit::** Acre

**Scenario Typical Size:** 40

**Total Scenario Cost:** $13,305.51

**Scenario Cost/Unit:** $332.64

**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. | Hour | $84.38 | 110 | $9,281.80 |
| **Labor** | | | | | | |
| Equipment Operators, Light | 232 | Includes: Skid Steer Loaders, Hydraulic Excavators <50 HP, Trenchers <12", Ag Equipment <150 HP, Pickup Trucks, Forklifts, Mulchers | Hour | $21.14 | 110 | $2,325.40 |
| 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. | Hour | $91.60 | 16 | $1,465.60 |
| **Mobilization** | | | | | | |
| Mobilization, medium equipment | 1139 | Equipment with 70-150 HP or typical weights between 14,000 and 30,000 pounds. | Each | $232.71 | 1 | $232.71 |

**Practice:** 666 - Forest Stand Improvement

**Scenario** #37 - Competition Control - Mechanical, Heavy Equipment

**Scenario Description:**

Using equipment such as a masticator or mulcher to control vegetation that is competing with desirable trees and species or to reduce the stocking level of a stand of desirable trees. The trees to be retained will be marked by a consultant. Resource concerns include Undesirable plant productivity and health; Wildlife habitat degradation; Wildfire hazard; and Inadequate structure and composition.

**Before Situation:**

A stand of desirable trees is adversely affected by competition either from undesirable species, cull trees, or because the stand is overstocked. The vegetation to be controlled is too large to be mowed or shredded. Therefore other mechanical methods such as using masticators or mulchers is necessary.

**After 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:** Area treated

**Scenario Unit::** Acre

**Scenario Typical Size:** 10

**Total Scenario Cost:** $4,772.31

**Scenario Cost/Unit:** $477.23

**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. | Hour | $84.38 | 30 | $2,531.40 |
| **Labor** | | | | | | |
| Equipment Operators, Light | 232 | Includes: Skid Steer Loaders, Hydraulic Excavators <50 HP, Trenchers <12", Ag Equipment <150 HP, Pickup Trucks, Forklifts, Mulchers | Hour | $21.14 | 30 | $634.20 |
| 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. | Hour | $91.60 | 15 | $1,374.00 |
| **Mobilization** | | | | | | |
| Mobilization, medium equipment | 1139 | Equipment with 70-150 HP or typical weights between 14,000 and 30,000 pounds. | Each | $232.71 | 1 | $232.71 |

**Practice:** 670 - Lighting System Improvement

**Scenario** #1 - Lighting, CFL

**Scenario Description:**

To install dimmable CFLs to replace incandescent lamps on a one-for-one basis. Light fixtures do not have to be replaced. A typical poultry house has 48 fixtures. CFL requirements: minimum 8 Watt, 4100 Kelvin, dimmable, grow-out bulb; industrial grade; suitably protected from dirt accumulation. In high humidity environments or areas subject to wash down, gasketted or weatherproof housings are required to prevent corrosion and premature failure.

**Before 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 Compact Fluorescent Lamps (CFLs) in order to reduce energy use as evidenced by the energy audit. Associated practices/activities: 122-AgEMP - HQ and other activities within 374-Farmstead Energy Improvement. The resource concern is inefficient use of energy in the farm operation which increases dependence on non-renewable energy sources and can be addressed through improved energy efficiency. Any improvements are based on a Type 2 energy audit meeting the requirements of ASABE S612.

**Feature Measure:** Each lamp replaced

**Scenario Unit::** Each

**Scenario Typical Size:** 1

**Total Scenario Cost:** $17.95

**Scenario Cost/Unit:** $17.95

**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. | Hour | $18.93 | 0.17 | $3.22 |
| **Materials** | | | | | | |
| Lighting, bulb, CFL, 8 watt | 1166 | 8 watt compact fluorescent lamp (CFL), typically 4100 Kelvin, dimmable, grow-out bulb, industrial grade, suitably protected from dirt accumulation. Materials only. | Each | $14.73 | 1 | $14.73 |

**Practice:** 670 - Lighting System Improvement

**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

**Total Scenario Cost:** $23.04

**Scenario Cost/Unit:** $23.04

**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. | Hour | $18.93 | 0.17 | $3.22 |
| **Materials** | | | | | | |
| Lighting, bulb, LED, 6 watt | 1167 | 6 watt light emitting diode (LED), typically 3700 Kelvin, dimmable, grow-out bulb; industrial grade; suitably protected from dirt accumulation. Materials only. | Each | $19.82 | 1 | $19.82 |

**Practice:** 670 - Lighting System Improvement

**Scenario** #3 - Lighting, Linear Fluorescent

**Scenario Description:**

The lighting system consists of a four-foot, three-lamp fixture with a single electronic ballast. The high-efficiency lighting system uses high-efficiency T8 or T5 fluorescent lamps. 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 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 fixture replaced

**Scenario Unit::** Each

**Scenario Typical Size:** 1

**Total Scenario Cost:** $337.78

**Scenario Cost/Unit:** $337.78

**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. | Hour | $25.08 | 1 | $25.08 |
| **Materials** | | | | | | |
| Lighting, fixture, Fluorescent, 75 watt | 1168 | 75 watt fluorescent lamp fixture with T5 or T8 lamps and ballast. Materials only. | Each | $312.70 | 1 | $312.70 |

**Practice:** 670 - Lighting System Improvement

**Scenario** #4 - Lighting, Pulse-Start Metal Halide

**Scenario Description:**

The lighting system consists of a Pulse-Start Metal Halide (PSMH) lamp with a matched ballast or light-emitting diode (LED) equivalent fixtures (as detailed in ASABE S612-compliant energy audit). Associated materials for installation of replacement fixtures are included. Appropriate disposal of existing lamps, ballasts and other materials is required

**Before Situation:**

Inefficient high-bay or exterior lighting (such as mercury vapor, T12 fluorescent, or similar) 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 and 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

**Total Scenario Cost:** $26.03

**Scenario Cost/Unit:** $26.03

**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. | Hour | $25.08 | 1 | $25.08 |
| **Materials** | | | | | | |
| Lighting, Pulse Start Metal Halide | 2425 | Replacement of lighting with PSMH Light. | Watt | $0.95 | 1 | $0.95 |

**Practice:** 672 - Building Envelope Improvement

**Scenario** #1 - 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 Foot

**Scenario Typical Size:** 20000

**Total Scenario Cost:** $5,908.89

**Scenario Cost/Unit:** $0.30

**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. | Hour | $18.93 | 48 | $908.64 |
| **Materials** | | | | | | |
| Insulation material, cellulose | 2272 | Cellulose insulation. Unit is a measurement of the in-place volume after being blown. Includes materials only. | Cubic Foot | $0.75 | 6667 | $5,000.25 |

**Practice:** 672 - Building Envelope Improvement

**Scenario** #2 - Building Envelope, 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' poultry house.

**Before Situation:**

A poultry house 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 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 Wall Insulated

**Scenario Unit::** Square Foot

**Scenario Typical Size:** 4500

**Total Scenario Cost:** $7,785.00

**Scenario Cost/Unit:** $1.73

**Cost Details:**

| Component Name | ID | Description | Unit | Cost | QTY | Total |
|---|---|---|---|---|---|---|
| **Materials** | | | | | | |
| Insulation, polyurethane, R-7, with sheathing skirt | 1198 | Closed-cell polyurethane foam insulation (minimum 1" thickness (R-7) with a protective sheeting barrier on lower 2 feet of wall height. Includes materials, equipment and labor to install. | Square Foot | $1.73 | 4500 | $7,785.00 |

**Practice:** 672 - Building Envelope Improvement

**Scenario** #3 - Building Envelope, Sidewall Renovation

**Scenario Description:**

Renovate sidewalls from top of footer to eave to remove flexible curtains and construct an insulated permanent wall 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' poultry house.

**Before Situation:**

A poultry house has plastic or flexible drop-down curtains in one or more walls. The curtains, which provide little thermal resistance, are obsolete due to changes in the ventilation scheme of the house.

**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 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 Wall Renovated

**Scenario Unit::** Square Foot

**Scenario Typical Size:** 4620

**Total Scenario Cost:** $15,697.80

**Scenario Cost/Unit:** $3.40

**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. | Hour | $18.93 | 80 | $1,514.40 |
| **Materials** | | | | | | |
| Corrugated Steel, 28 gage | 223 | Corrugated or ribbed, galvanized, 28 gauge, includes fasteners, materials only. | Square Foot | $1.34 | 4620 | $6,190.80 |
| Insulation, polyurethane, R-7, with sheathing skirt | 1198 | Closed-cell polyurethane foam insulation (minimum 1" thickness (R-7) with a protective sheeting barrier on lower 2 feet of wall height. Includes materials, equipment and labor to install. | Square Foot | $1.73 | 4620 | $7,992.60 |

**Practice:** 672 - Building Envelope Improvement

**Scenario** #4 - Building Envelope, Sealant, Open Truss

**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 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:** Length of House

**Scenario Unit::** Foot

**Scenario Typical Size:** 500

**Total Scenario Cost:** $3,900.00

**Scenario Cost/Unit:** $7.80

**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. | Foot | $1.30 | 3000 | $3,900.00 |

**Practice:** 672 - Building Envelope Improvement

**Scenario** #5 - Building Envelope, Sealant, Drop Ceiling

**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 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:** Length of House

**Scenario Unit::** Foot

**Scenario Typical Size:** 500

**Total Scenario Cost:** $1,950.00

**Scenario Cost/Unit:** $3.90

**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. | Foot | $1.30 | 1500 | $1,950.00 |

**Practice:** 672 - Building Envelope Improvement

**Scenario** #6 - Building Envelope, Greenhouse Screens

**Scenario Description:**

The mechanical energy screen system consists of a drive motor, support cables, controls, and shade material, which may be woven, knitted, or non-woven strips of aluminum fiber, polyethylene, nylon or other synthetic material. 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.

**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 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 Screen

**Scenario Unit::** Square Foot

**Scenario Typical Size:** 25000

**Total Scenario Cost:** $49,651.28

**Scenario Cost/Unit:** $1.99

**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. | Hour | $25.08 | 16 | $401.28 |
| **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 Foot | $1.97 | 25000 | $49,250.00 |

**Practice:** 672 - Building Envelope Improvement

**Scenario** #7 - Greenhouse, Insulate Unglazed Walls

**Scenario Description:**

A typical scenario is the installation insulation in green house to address energy loss. The insulation can be either of the cellouse or bubble type (or equivalent). The increased insulation reduces seasonal heat loss and heat gain which reduces the respective need for heating and cooling equipment to operate.

**Before Situation:**

Green house with standard glazing, plastic or polycarbonate walls and no insulation. Heating and cooling of an existing greenhouse is inefficient due to excessive heat loss.

**After Situation:**

The greenhouse is fitted with insulation installed truss-to-truss or gutter-to-gutter and/or non glazed endwalls and/or sidewalls, reducing heat loss and gain in the greenhouse. Associated practices/activities: may include 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:** Square Feet of insulation

**Scenario Unit::** Square Foot

**Scenario Typical Size:** 25000

**Total Scenario Cost:** $7,401.28

**Scenario Cost/Unit:** $0.30

**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. | Hour | $25.08 | 16 | $401.28 |
| **Materials** | | | | | | |
| Insulation, Greenhouse, Reflective Bubble | 2410 | Double bubble reflective insulation with aluminum foil on both sides. Includes materials and shipping only. | Square Foot | $0.28 | 25000 | $7,000.00 |

**Practice:** 672 - Building Envelope Improvement

**Scenario** #8 - Building Envelope, Insulated Roll-Up Door

**Scenario Description:**

A typical scenario is the replacement of non-insulated rollup doors on poultry houses with insulated rollup doors. The increased insulation reduces seasonal heat loss and heat gain which reduces the respective need for heating and cooling equipment to operate.

**Before Situation:**

Poultry house has non-insulated or inefficiantly insulated rollup doors causing high heat loss or gain.

**After Situation:**

A more effective and efficient energy seal can be created through the addition of, or increased R-value, insulated rollup doors. 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:** Each Door

**Scenario Unit::** Each

**Scenario Typical Size:** 1

**Total Scenario Cost:** $1,501.05

**Scenario Cost/Unit:** $1,501.05

**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. | Hour | $18.93 | 5 | $94.65 |
| **Materials** | | | | | | |
| Door, Insulated, Roll-up | 2392 | Rolling service insulated steel door, 20 gauge. Includes hardware required to install. Used to replace non insulated door in buildings. Materials only. | Square Foot | $8.79 | 160 | $1,406.40 |

**Practice:** 672 - Building Envelope Improvement

**Scenario** #9 - Building Envelope, Brood Curtain

**Scenario Description:**

Replace an existing uninsulated curtain with a seven-layer insulated curtain with an R-value of 3 for a livestock building. The curtain's two outer layers are vinyl and polyethylene and the five inner layers are composed of insulating materials with air trapping fibers and a vapor barrier. Payment includes curtain and labor to install. Payment does not includes mounting accessories because the scenario presumes the curtain is replacing an existing curtain.

**Before Situation:**

The broiler house has an uninsulated mid-house brooding curtain or a brooding curtain which is in poor condition with holes and rips. Either condition allows a significant loss of heat to the off-end during the high-heat period of brooding.

**After Situation:**

A seven-layer insulated curtain is installed as a replacement for an existing less efficient curtain on a livestock building. 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:** Each Brood Curtain

**Scenario Unit::** Each

**Scenario Typical Size:** 1

**Total Scenario Cost:** $910.30

**Scenario Cost/Unit:** $910.30

**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. | Hour | $18.93 | 10 | $189.30 |
| **Materials** | | | | | | |
| Curtain , 7-Layer, R3 Insulated | 2427 | Seven layer insulated curtain with an R-value of 3 for a livestock building. Typical curtain size is 4' x 270'. The curtain's two outer layers are vinyl and polyethylene and the five inner layers are composed of insulating materials with air trapping fibers and a vapor barrier. Does not include mounting accessories, assumes it is replacing a non-insulated curtain. | Square Foot | $2.06 | 350 | $721.00 |