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

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

**Scenario Description:**

A Comprehensive Nutrient Management Plan (CNMP) will be developed to address resource concerns on a small non-dairy Animal Feeding Operation (AFO) 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:**

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 small-sized non-dairy AFO production area and land application areas. Collection, transfer, and storage of manure and wastewater systems, mortality management facilities, as well as any rainfall or runoff diversion systems will be 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:** 1.0

**Scenario Total Cost:** $8,068.46

**Scenario Cost/Unit:** $8,068.46

Cost Details:

| Component Name | ID | Description | Unit | Cost | QTY | Total |
|---|---|---|---|---|---|---|
| **Labor** | | | | | | |
| CAP Labor, professional engineer | 1297 | Conservation Activity Plan labor to apply knowledge of engineering technology and biological science to agricultural problems concerned with power and machinery, electrification, structures, soil and water conservation, and processing of agricultural prod | Hour | $88.79 | 55 | $4,883.45 |
| 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 prod | Hour | $74.07 | 43 | $3,185.01 |

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

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

**Scenario Description:**

A Comprehensive Nutrient Management Plan (CNMP) and CNMP Case File will be developed to address resource concerns on a small Dairy Animal Feeding Operation (AFO) 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:** 1.0

**Scenario Total Cost:** $10,066.47

**Scenario Cost/Unit:** $10,066.47

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 prod | Hour | $88.79 | 75 | $6,659.25 |
| 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 prod | Hour | $74.07 | 46 | $3,407.22 |

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

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

**Scenario Description:**

A Comprehensive Nutrient Management Plan (CNMP) will be developed to address resource concerns on a medium non-dairy Animal Feeding Operation (AFO) 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:** 1.0

**Scenario Total Cost:** $10,392.66

**Scenario Cost/Unit:** $10,392.66

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 prod | Hour | $88.79 | 72 | $6,392.88 |
| 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 prod | Hour | $74.07 | 54 | $3,999.78 |

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

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

**Scenario Description:**

A Comprehensive Nutrient Management Plan (CNMP) will be developed to address resource concerns on a medium Dairy Animal Feeding Operation (AFO) 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:** 1.0

**Scenario Total Cost:** $11,502.77

**Scenario Cost/Unit:** $11,502.77

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 prod | Hour | $88.79 | 82 | $7,280.78 |
| 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 prod | Hour | $74.07 | 57 | $4,221.99 |

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

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

**Scenario Description:**

A Comprehensive Nutrient Management Plan (CNMP) will be developed to address resource concerns on a large non-dairy Animal Feeding Operation ((AFO) 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:** 1.0

**Scenario Total Cost:** $12,554.00

**Scenario Cost/Unit:** $12,554.00

Cost Details:

| Component Name | ID | Description | Unit | Cost | QTY | Total |
|---|---|---|---|---|---|---|
| **Labor** | | | | | | |
| CAP Labor, professional engineer | 1297 | Conservation Activity Plan labor to apply knowledge of engineering technology and biological science to agricultural problems concerned with power and machinery, electrification, structures, soil and water conservation, and processing of agricultural prod | Hour | $88.79 | 88 | $7,813.52 |
| 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 prod | Hour | $74.07 | 64 | $4,740.48 |

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

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

**Scenario Description:**

A Comprehensive Nutrient Management Plan (CNMP) will be developed to address resource concerns on a large Dairy Animal Feeding Operation (AFO) 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:** 1.0

**Scenario Total Cost:** $12,790.93

**Scenario Cost/Unit:** $12,790.93

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 prod | Hour | $88.79 | 89 | $7,902.31 |
| 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 prod | Hour | $74.07 | 66 | $4,888.62 |

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

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

**Scenario Description:**

A Comprehensive Nutrient Management Plan (CNMP) will be developed to address resource concerns on a small Animal Feeding Operation (AFO) 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:** 1.0

**Scenario Total Cost:** $7,267.47

**Scenario Cost/Unit:** $7,267.47

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 prod | Hour | $88.79 | 66 | $5,860.14 |
| 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 prod | Hour | $74.07 | 19 | $1,407.33 |

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

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

**Scenario Description:**

A Comprehensive Nutrient Management Plan (CNMP) will be developed to address resource concerns on a medium-large Animal Feeding Operation (AFO) 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:** 1.0

**Scenario Total Cost:** $9,028.55

**Scenario Cost/Unit:** $9,028.55

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 prod | Hour | $88.79 | 85 | $7,547.15 |
| 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 prod | Hour | $74.07 | 20 | $1,481.40 |

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

**Scenario** #116 - 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:**

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 small-sized non-dairy AFO production area and land application areas. Collection, transfer, and storage of manure and wastewater systems, mortality management facilities, as well as any rainfall or runoff diversion systems will be 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:** 1.0

**Scenario Total Cost:** $8,068.46

**Scenario Cost/Unit:** $8,068.46

Cost Details:

| Component Name | ID | Description | Unit | Cost | QTY | Total |
|---|---|---|---|---|---|---|
| **Labor** | | | | | | |
| CAP Labor, professional engineer | 1297 | Conservation Activity Plan labor to apply knowledge of engineering technology and biological science to agricultural problems concerned with power and machinery, electrification, structures, soil and water conservation, and processing of agricultural prod | Hour | $88.79 | 55 | $4,883.45 |
| 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 prod | Hour | $74.07 | 43 | $3,185.01 |

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

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

**Scenario Description:**

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

**Before Situation:**

The owner/operator of an AFO has not received a written Comprehensive Nutrient Management Plan (CNMP) that addresses all resource concerns present on the facility production area and land waste application areas. Various levels of management and conservation implementation has occurred on the farm. Little documentation of the systems used and practices installed exists. Partial implementation of conservation practices for the AFO has potentially occurred. Resource concerns on the AFO production area and land waste application areas remain to be addressed through the development of a complete CNMP including management and conservation practices for proper manure/wastewater storage and handling, proper disposal of animal mortality, treatment of land application areas to reduce soil erosion to sustainable levels, and application of waste nutrients at an agronomic rate that meets application crop needs and does not exceed site risk analysis assessment condition. Negative air quality impacts 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 systems to address all identified resource concerns on the AFO production area and land application areas. Collection, transfer, and storage of manure and wastewater systems, mortality management facilities, as well as any rainfall or runoff diversion systems will be inventories-evaluated and planned for adequacy according to applicable NRCS conservation practice standard technical criteria. Management and conservation practices in the CNMP document delivered to the client ensure that, if implemented, the AFO will properly, within applicable NRCS standards and specifications, store, handle, and contain manure and wastewater materials generated by the AFO; dispose of AFO mortality; implement conservation practices to address soil erosion, water quality, and air quality within the NRCS planning criteria. Accurate record keeping documents for crop yields, operation and maintenance of existing and new CNMP-related practices, manure application, AFO manure imports and exports, and other information relevant to the management and compliance of the AFO with state and/or local rules and regulations are included in the CNMP.

**Feature Measure:** Each

**Scenario Unit::** Number

**Scenario Typical Size:** 1.0

**Scenario Total Cost:** $4,679.90

**Scenario Cost/Unit:** $4,679.90

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, physi | Hour | $75.84 | 50 | $3,792.00 |
| 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 prod | Hour | $88.79 | 10 | $887.90 |

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

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

**Scenario Description:**

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

**Before Situation:**

The owner/operator of the AFO has not received a written comprehensive nutrient management plan (CNMP) that addresses all resource concerns present on the facility production areas and any applicable land application areas. Various levels of management and conservation implementation 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 record keeping documentation of manure generation and exports. Negative air quality impacts and farmstead safety and security issues may remain on the AFO, and record keeping methods for inspection and monitoring of the existing CNMP-related practices, manure imports/exports may need further improvement.

**After Situation:**

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

**Feature Measure:** Each

**Scenario Unit::** Number

**Scenario Typical Size:** 1.0

**Scenario Total Cost:** $2,739.65

**Scenario Cost/Unit:** $2,739.65

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 prod | Hour | $88.79 | 10 | $887.90 |
| Cap Labor, conservation scientist | 1300 | Conservation Activity Plan labor to manage, improve, and protect natural resources to maximize their use without damaging the environment. Interprets resource information and assess resource conditions to provide conservation practice alternatives to prod | Hour | $74.07 | 25 | $1,851.75 |

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

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

**Scenario Description:**

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

**Before Situation:**

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

**After Situation:**

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

**Feature Measure:** Each

**Scenario Unit::** Number

**Scenario Typical Size:** 1.0

**Scenario Total Cost:** $6,146.40

**Scenario Cost/Unit:** $6,146.40

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 prod | Hour | $88.79 | 15 | $1,331.85 |
| 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 prod | Hour | $74.07 | 65 | $4,814.55 |

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

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

**Scenario Description:**

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

**Before Situation:**

The owner/operator of an AFO has not received a written comprehensive nutrient management plan (CNMP) that addresses the soil erosion, water quality, and air quality resource concerns present on the facility production areas and any applicable land application areas. Various levels of management and conservation implementation 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, soil erosion, water quality, and air quality concerns from feeding and lounging areas, and record keeping documentation of manure generation and exports. Negative air quality impacts issues may remain on the AFO, and record keeping methods for inspection and monitoring of the existing CNMP-related practices, manure imports/exports may need further improvement.

**After Situation:**

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

**Feature Measure:** Each

**Scenario Unit::** Number

**Scenario Typical Size:** 1.0

**Scenario Total Cost:** $3,110.00

**Scenario Cost/Unit:** $3,110.00

Cost Details:

| Component Name | ID | Description | Unit | Cost | QTY | Total |
|---|---|---|---|---|---|---|
| **Labor** | | | | | | |
| CAP Labor, professional engineer | 1297 | Conservation Activity Plan labor to apply knowledge of engineering technology and biological science to agricultural problems concerned with power and machinery, electrification, structures, soil and water conservation, and processing of agricultural prod | Hour | $88.79 | 10 | $887.90 |
| Cap Labor, conservation scientist | 1300 | Conservation Activity Plan labor to manage, improve, and protect natural resources to maximize their use without damaging the environment. Interprets resource information and assess resource conditions to provide conservation practice alternatives to prod | Hour | $74.07 | 30 | $2,222.10 |

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

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

**Scenario Description:**

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

**Before Situation:**

Agricultural producer has no plan or minimal knowledge for 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:** 1.0

**Scenario Total Cost:** $2,275.20

**Scenario Cost/Unit:** $2,275.20

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, physi | Hour | $75.84 | 30 | $2,275.20 |

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

**Scenario** #51 - 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:** 1.0

**Scenario Total Cost:** $3,033.60

**Scenario Cost/Unit:** $3,033.60

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, physi | Hour | $75.84 | 40 | $3,033.60 |

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

**Scenario** #52 - 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:** 1.0

**Scenario Total Cost:** $3,792.00

**Scenario Cost/Unit:** $3,792.00

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, physi | Hour | $75.84 | 50 | $3,792.00 |

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

**Scenario** #53 - 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:** 1.0

**Scenario Total Cost:** $3,792.00

**Scenario Cost/Unit:** $3,792.00

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, physi | Hour | $75.84 | 50 | $3,792.00 |

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

**Scenario** #54 - 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:** 1.0

**Scenario Total Cost:** $5,308.80

**Scenario Cost/Unit:** $5,308.80

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, physi | Hour | $75.84 | 70 | $5,308.80 |

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

**Scenario** #55 - Nutrient Management CAP 104 Greater Than 300 Acres (Element of a CNMP)

**Scenario Description:**

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

**Before Situation:**

Agricultural producer has no plan or minimal knowledge for applicant and management of nutrient s 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 590 criteria for the primary Water Quality resource concern and other applicable resource concerns and provides for opportunities to manage nutrients for plant production and address offsite movement of nutrients. The CAP plan may include recommendations for associated conservation practices which address other related resource concerns. CAP meets the basic criteria for the 104 plan as cited in the NRCS Field Office Technical Guide.

**Feature Measure:** Number

**Scenario Unit::** Number

**Scenario Typical Size:** 1.0

**Scenario Total Cost:** $6,446.40

**Scenario Cost/Unit:** $6,446.40

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, physi | Hour | $75.84 | 85 | $6,446.40 |

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

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

**Scenario Description:**

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

**Before Situation:**

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

**After Situation:**

After EQIP contract approval, participant has obtained services from a certified TSP for development of the "Forest Management 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:** 1.0

**Scenario Total Cost:** $1,365.91

**Scenario Cost/Unit:** $1,365.91

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 t | Hour | $71.89 | 19 | $1,365.91 |

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

**Scenario** #57 - FMP 21 to 100 acres

**Scenario Description:**

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

**Before Situation:**

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

**After Situation:**

After EQIP contract approval, participant has obtained services from a certified TSP for development of the "Forest Management 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:** 1.0

**Scenario Total Cost:** $1,725.36

**Scenario Cost/Unit:** $1,725.36

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 t | Hour | $71.89 | 24 | $1,725.36 |

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

**Scenario** #58 - FMP 101 to 250 acres

**Scenario Description:**

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

**Before Situation:**

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

**After Situation:**

After EQIP contract approval, participant has obtained services from a certified TSP for development of the "Forest Management 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:** 1.0

**Scenario Total Cost:** $3,091.27

**Scenario Cost/Unit:** $3,091.27

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 t | Hour | $71.89 | 43 | $3,091.27 |

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

**Scenario** #59 - FMP Greater Than 1000 acres

**Scenario Description:**

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

**Before Situation:**

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

**After Situation:**

After EQIP contract approval, participant has obtained services from a certified TSP for development of the "Forest Management 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:** 1.0

**Scenario Total Cost:** $6,470.10

**Scenario Cost/Unit:** $6,470.10

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 t | Hour | $71.89 | 90 | $6,470.10 |

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

**Scenario** #60 - FMP 251 to 500 acres

**Scenario Description:**

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

**Before Situation:**

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

**After Situation:**

After EQIP contract approval, participant has obtained services from a certified TSP for development of the "Forest Management 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:** 1.0

**Scenario Total Cost:** $4,457.18

**Scenario Cost/Unit:** $4,457.18

Cost Details:

| Component Name | ID | Description | Unit | Cost | QTY | Total |
|---|---|---|---|---|---|---|
| **Labor** | | | | | | |
| CAP Labor, forester | 1302 | Conservation Activity Plan labor to manage nonindustrial private forest lands for conservation, economic, and recreational purposes. Will inventory the type, amount, and location of standing timber and appraise the timber's condition. Will determine how t | Hour | $71.89 | 62 | $4,457.18 |

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

**Scenario** #61 - FMP 501 to 1000 acres

**Scenario Description:**

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

**Before Situation:**

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

**After Situation:**

After EQIP contract approval, participant has obtained services from a certified TSP for development of the "Forest Management 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:** 1.0

**Scenario Total Cost:** $5,176.08

**Scenario Cost/Unit:** $5,176.08

Cost Details:

| Component Name | ID | Description | Unit | Cost | QTY | Total |
|---|---|---|---|---|---|---|
| **Labor** | | | | | | |
| CAP Labor, forester | 1302 | Conservation Activity Plan labor to manage nonindustrial private forest lands for conservation, economic, and recreational purposes. Will inventory the type, amount, and location of standing timber and appraise the timber's condition. Will determine how t | Hour | $71.89 | 72 | $5,176.08 |

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

**Scenario** #54 - Feed Management Plan

**Scenario Description:**

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

**Before Situation:**

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

**After Situation:**

After EQIP contract approval, participant has obtained services from a certified TSP for development of the “Feed Management” (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:** 1.0

**Scenario Total Cost:** $2,402.72

**Scenario Cost/Unit:** $2,402.72

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, physi | Hour | $75.84 | 16 | $1,213.44 |
| 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 an | Hour | $74.33 | 16 | $1,189.28 |

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

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

**Scenario Description:**

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

**Before Situation:**

Producer has no plan or limited knowledge of management of livestock or other animals on grazed land resources. The producer currently manages animals without 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:** 1.0

**Scenario Total Cost:** $2,229.90

**Scenario Cost/Unit:** $2,229.90

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 an | Hour | $74.33 | 30 | $2,229.90 |

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

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

**Scenario Description:**

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

**Before Situation:**

Producer has no plan or limited knowledge of management of livestock or other animals on grazed land resources. The producer currently manages animals without 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:** 1.0

**Scenario Total Cost:** $2,973.20

**Scenario Cost/Unit:** $2,973.20

Cost Details:

| Component Name | ID | Description | Unit | Cost | QTY | Total |
|---|---|---|---|---|---|---|
| **Labor** | | | | | | |
| CAP Labor, range conservation | 1299 | Conservation Activity Plan labor to study, plan the use and management of rangelands to maximize their use in a sustainable manner. Range managers may inventory soils, plants, and animals; develop resource management plans; identify monitoring methods an | Hour | $74.33 | 40 | $2,973.20 |

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

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

**Scenario Description:**

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

**Before Situation:**

Producer has no plan or limited knowledge of management of livestock or other animals on grazed land resources. The producer currently manages animals without 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:** 1.0

**Scenario Total Cost:** $4,459.80

**Scenario Cost/Unit:** $4,459.80

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 an | Hour | $74.33 | 60 | $4,459.80 |

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

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

**Scenario Description:**

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

**Before Situation:**

Producer has no plan or limited knowledge of management of livestock or other animals on grazed land resources. The producer currently manages animals without 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:** 1.0

**Scenario Total Cost:** $5,203.10

**Scenario Cost/Unit:** $5,203.10

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 an | Hour | $74.33 | 70 | $5,203.10 |

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

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

**Scenario Description:**

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

**Before Situation:**

Producer has no plan or limited knowledge of management of livestock or other animals on grazed land resources. The producer currently manages animals without 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 of plans

**Scenario Unit::** Number

**Scenario Typical Size:** 1.0

**Scenario Total Cost:** $3,716.50

**Scenario Cost/Unit:** $3,716.50

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 an | Hour | $74.33 | 50 | $3,716.50 |

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

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

**Scenario Description:**

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

**Before Situation:**

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

**After Situation:**

After EQIP contract approval, participant has obtained services from a certified Technical Service Provider (TSP) for development of the “Prescribed Burning 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:** 1.0

**Scenario Total Cost:** $359.45

**Scenario Cost/Unit:** $359.45

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 t | Hour | $71.89 | 5 | $359.45 |

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

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

**Scenario Description:**

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

**Before Situation:**

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

**After Situation:**

After EQIP contract approval, participant has obtained services from a certified Technical Service Provider (TSP) for development of the “Prescribed Burning 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:** 1.0

**Scenario Total Cost:** $575.12

**Scenario Cost/Unit:** $575.12

Cost Details:

| Component Name | ID | Description | Unit | Cost | QTY | Total |
|---|---|---|---|---|---|---|
| **Labor** | | | | | | |
| CAP Labor, forester | 1302 | Conservation Activity Plan labor to manage nonindustrial private forest lands for conservation, economic, and recreational purposes. Will inventory the type, amount, and location of standing timber and appraise the timber's condition. Will determine how t | Hour | $71.89 | 8 | $575.12 |

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

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

**Scenario Description:**

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

**Before Situation:**

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

**After Situation:**

After EQIP contract approval, participant has obtained services from a certified Technical Service Provider (TSP) for development of the “Prescribed Burning 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:** 1.0

**Scenario Total Cost:** $862.68

**Scenario Cost/Unit:** $862.68

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 t | Hour | $71.89 | 12 | $862.68 |

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

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

**Scenario Description:**

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

**Before Situation:**

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

**After Situation:**

After EQIP contract approval, participant has obtained services from a certified Technical Service Provider (TSP) for development of the “Prescribed Burning 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:** 1.0

**Scenario Total Cost:** $1,150.24

**Scenario Cost/Unit:** $1,150.24

Cost Details:

| Component Name | ID | Description | Unit | Cost | QTY | Total |
|---|---|---|---|---|---|---|
| **Labor** | | | | | | |
| CAP Labor, forester | 1302 | Conservation Activity Plan labor to manage nonindustrial private forest lands for conservation, economic, and recreational purposes. Will inventory the type, amount, and location of standing timber and appraise the timber's condition. Will determine how t | Hour | $71.89 | 16 | $1,150.24 |

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

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

**Scenario Description:**

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

**Before Situation:**

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

**After Situation:**

After EQIP contract approval, participant has obtained services from a certified Technical Service Provider (TSP) for development of the “Prescribed Burning 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:** 1.0

**Scenario Total Cost:** $1,437.80

**Scenario Cost/Unit:** $1,437.80

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 t | Hour | $71.89 | 20 | $1,437.80 |

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

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

**Scenario Description:**

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

**Before Situation:**

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

**After Situation:**

After EQIP contract approval, participant has obtained services from a certified Technical Service Provider (TSP) for development of the “Prescribed Burning 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:** 1.0

**Scenario Total Cost:** $1,725.36

**Scenario Cost/Unit:** $1,725.36

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 t | Hour | $71.89 | 24 | $1,725.36 |

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

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

**Scenario Description:**

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

**Before Situation:**

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 management 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:** 1.0

**Scenario Total Cost:** $1,896.00

**Scenario Cost/Unit:** $1,896.00

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, physi | Hour | $75.84 | 25 | $1,896.00 |

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

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

**Scenario Description:**

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

**Before Situation:**

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 management 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:** 1.0

**Scenario Total Cost:** $2,426.88

**Scenario Cost/Unit:** $2,426.88

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, physi | Hour | $75.84 | 32 | $2,426.88 |

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

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

**Scenario Description:**

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

**Before Situation:**

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 management 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:** 1.0

**Scenario Total Cost:** $3,792.00

**Scenario Cost/Unit:** $3,792.00

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, physi | Hour | $75.84 | 50 | $3,792.00 |

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

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

**Scenario Description:**

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

**Before Situation:**

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 management 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:** 1.0

**Scenario Total Cost:** $3,107.65

**Scenario Cost/Unit:** $3,107.65

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 prod | Hour | $88.79 | 35 | $3,107.65 |

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

**Scenario** #17 - Irrigation Water Management CAP with pump test

**Scenario Description:**

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

**Before Situation:**

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. The pump for the irrigation system is of unknown performance. Producer is interested in management 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. Because a pump test was performed, a new pump that operates more efficiently and matches the irrigation system has been analyzed and could possibly be installed such that less water and energy are consumed. The CAP criteria requires the plan to meet quality criteria for applicable resource concerns. The CAP plan may include recommendations for associated conservation practices which address other related resource concerns. CAP meets the basic quality criteria for the 118 plan as cited in the NRCS Field Office Technical Guide.

**Feature Measure:** Acre

**Scenario Unit::** Number

**Scenario Typical Size:** 1.0

**Scenario Total Cost:** $4,883.45

**Scenario Cost/Unit:** $4,883.45

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 prod | Hour | $88.79 | 55 | $4,883.45 |

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

**Scenario** #113 - AgEMP Small, One Enterprise

**Scenario Description:**

Typical operation has either < 300 Acres < 300 AU Up to 2 irrigation pumps <20,000 sq ft of heater greenhouse, or A maple syrup enterprise One enterprise as defined in the ASABE S612 Standard on-farm energy audit standard. A small operation is as described above. Agricultural producer currently has minimal knowledge of and no plan for energy conservation. 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:** 1.0

**Scenario Total Cost:** $2,034.95

**Scenario Cost/Unit:** $2,034.95

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 prod | Hour | $88.79 | 9 | $799.11 |
| 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 | $39.94 | 17 | $678.98 |
| 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 | $27.32 | 1.5 | $40.98 |
| CAP Labor, Energy Auditor | 1740 | Conservation Activity Plan labor involving analyzing energy efficient measures and conducting energy audits of industrial areas and facilities. | Hour | $42.99 | 12 | $515.88 |

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

**Scenario** #114 - 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:** 1.0

**Scenario Total Cost:** $2,526.88

**Scenario Cost/Unit:** $2,526.88

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 prod | Hour | $88.79 | 12 | $1,065.48 |
| 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 | $39.94 | 18 | $718.92 |
| 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 | $27.32 | 2 | $54.64 |
| CAP Labor, Energy Auditor | 1740 | Conservation Activity Plan labor involving analyzing energy efficient measures and conducting energy audits of industrial areas and facilities. | Hour | $42.99 | 16 | $687.84 |

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

**Scenario** #115 - 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:** 1.0

**Scenario Total Cost:** $3,327.93

**Scenario Cost/Unit:** $3,327.93

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 prod | Hour | $88.79 | 19 | $1,687.01 |
| 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 | $39.94 | 20 | $798.80 |
| CAP Labor, Administrative Assistant | 1739 | Conservation Activity Plan labor involving routine clerical and administrative functions such as drafting correspondence, scheduling appointments, organizing and maintaining paper and electronic files, or providing information to callers. | Hour | $27.32 | 2.5 | $68.30 |
| CAP Labor, Energy Auditor | 1740 | Conservation Activity Plan labor involving analyzing energy efficient measures and conducting energy audits of industrial areas and facilities. | Hour | $42.99 | 18 | $773.82 |

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

**Scenario** #116 - 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:** 1.0

**Scenario Total Cost:** $3,141.68

**Scenario Cost/Unit:** $3,141.68

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 prod | Hour | $88.79 | 15 | $1,331.85 |
| 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 | $39.94 | 21 | $838.74 |
| 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 | $27.32 | 2.5 | $68.30 |
| CAP Labor, Energy Auditor | 1740 | Conservation Activity Plan labor involving analyzing energy efficient measures and conducting energy audits of industrial areas and facilities. | Hour | $42.99 | 21 | $902.79 |

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

**Scenario** #117 - 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:** 1.0

**Scenario Total Cost:** $4,248.41

**Scenario Cost/Unit:** $4,248.41

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 prod | Hour | $88.79 | 21 | $1,864.59 |
| 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 | $39.94 | 25 | $998.50 |
| 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 | $27.32 | 3.5 | $95.62 |
| CAP Labor, Energy Auditor | 1740 | Conservation Activity Plan labor involving analyzing energy efficient measures and conducting energy audits of industrial areas and facilities. | Hour | $42.99 | 30 | $1,289.70 |

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

**Scenario** #118 - 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:** 1.0

**Scenario Total Cost:** $5,799.09

**Scenario Cost/Unit:** $5,799.09

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 prod | Hour | $88.79 | 32 | $2,841.28 |
| 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 | $39.94 | 29 | $1,158.26 |
| 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 | $27.32 | 4.5 | $122.94 |
| CAP Labor, Energy Auditor | 1740 | Conservation Activity Plan labor involving analyzing energy efficient measures and conducting energy audits of industrial areas and facilities. | Hour | $42.99 | 39 | $1,676.61 |

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

**Scenario** #119 - AgEMP Small, Three Enterprise

**Scenario Description:**

Typical operation has either < 300 Acres < 300 AU Up to 2 irrigation pumps <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

**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:** 1.0

**Scenario Total Cost:** $3,633.61

**Scenario Cost/Unit:** $3,633.61

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 prod | Hour | $88.79 | 18 | $1,598.22 |
| CAP Labor, Manager | 1603 | Conservation Activity Plan labor involving supervision or management activities. Includes crew supervisors, foremen and farm/ranch managers time required for adopting new technology, etc. | Hour | $39.94 | 22 | $878.68 |
| CAP Labor, Administrative Assistant | 1739 | Conservation Activity Plan labor involving routine clerical and administrative functions such as drafting correspondence, scheduling appointments, organizing and maintaining paper and electronic files, or providing information to callers. | Hour | $27.32 | 3 | $81.96 |
| CAP Labor, Energy Auditor | 1740 | Conservation Activity Plan labor involving analyzing energy efficient measures and conducting energy audits of industrial areas and facilities. | Hour | $42.99 | 25 | $1,074.75 |

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

**Scenario** #120 - 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:** 1.0

**Scenario Total Cost:** $4,740.34

**Scenario Cost/Unit:** $4,740.34

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 prod | Hour | $88.79 | 24 | $2,130.96 |
| CAP Labor, Manager | 1603 | Conservation Activity Plan labor involving supervision or management activities. Includes crew supervisors, foremen and farm/ranch managers time required for adopting new technology, etc. | Hour | $39.94 | 26 | $1,038.44 |
| CAP Labor, Administrative Assistant | 1739 | Conservation Activity Plan labor involving routine clerical and administrative functions such as drafting correspondence, scheduling appointments, organizing and maintaining paper and electronic files, or providing information to callers. | Hour | $27.32 | 4 | $109.28 |
| CAP Labor, Energy Auditor | 1740 | Conservation Activity Plan labor involving analyzing energy efficient measures and conducting energy audits of industrial areas and facilities. | Hour | $42.99 | 34 | $1,461.66 |

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

**Scenario** #121 - 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:** 1.0

**Scenario Total Cost:** $6,379.81

**Scenario Cost/Unit:** $6,379.81

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 prod | Hour | $88.79 | 36 | $3,196.44 |
| 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 | $39.94 | 30 | $1,198.20 |
| CAP Labor, Administrative Assistant | 1739 | Conservation Activity Plan labor involving routine clerical and administrative functions such as drafting correspondence, scheduling appointments, organizing and maintaining paper and electronic files, or providing information to callers. | Hour | $27.32 | 5 | $136.60 |
| CAP Labor, Energy Auditor | 1740 | Conservation Activity Plan labor involving analyzing energy efficient measures and conducting energy audits of industrial areas and facilities. | Hour | $42.99 | 43 | $1,848.57 |

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

**Scenario** #122 - AgEMP Small, Four Enterprises

**Scenario Description:**

Typical operation has either < 300 Acres < 300 AU Up to 2 irrigation pumps, or <20,000 sq ft of heater greenhouse Four enterprises as defined in the ASABE S612 Standard on-farm energy audit standard in combination with 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:** 1.0

**Scenario Total Cost:** $4,434.66

**Scenario Cost/Unit:** $4,434.66

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 prod | Hour | $88.79 | 25 | $2,219.75 |
| 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 | $39.94 | 24 | $958.56 |
| CAP Labor, Administrative Assistant | 1739 | Conservation Activity Plan labor involving routine clerical and administrative functions such as drafting correspondence, scheduling appointments, organizing and maintaining paper and electronic files, or providing information to callers. | Hour | $27.32 | 3.5 | $95.62 |
| CAP Labor, Energy Auditor | 1740 | Conservation Activity Plan labor involving analyzing energy efficient measures and conducting energy audits of industrial areas and facilities. | Hour | $42.99 | 27 | $1,160.73 |

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

**Scenario** #123 - 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:** 1.0

**Scenario Total Cost:** $5,541.39

**Scenario Cost/Unit:** $5,541.39

Cost Details:

| Component Name | ID | Description | Unit | Cost | QTY | Total |
|---|---|---|---|---|---|---|
| **Labor** | | | | | | |
| CAP Labor, professional engineer | 1297 | Conservation Activity Plan labor to apply knowledge of engineering technology and biological science to agricultural problems concerned with power and machinery, electrification, structures, soil and water conservation, and processing of agricultural prod | Hour | $88.79 | 31 | $2,752.49 |
| 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 | $39.94 | 28 | $1,118.32 |
| CAP Labor, Administrative Assistant | 1739 | Conservation Activity Plan labor involving routine clerical and administrative functions such as drafting correspondence, scheduling appointments, organizing and maintaining paper and electronic files, or providing information to callers. | Hour | $27.32 | 4.5 | $122.94 |
| CAP Labor, Energy Auditor | 1740 | Conservation Activity Plan labor involving analyzing energy efficient measures and conducting energy audits of industrial areas and facilities. | Hour | $42.99 | 36 | $1,547.64 |

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

**Scenario** #124 - 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:** 1.0

**Scenario Total Cost:** $7,269.65

**Scenario Cost/Unit:** $7,269.65

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 prod | Hour | $88.79 | 44 | $3,906.76 |
| 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 | $39.94 | 32 | $1,278.08 |
| 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 | $27.32 | 5.5 | $150.26 |
| CAP Labor, Energy Auditor | 1740 | Conservation Activity Plan labor involving analyzing energy efficient measures and conducting energy audits of industrial areas and facilities. | Hour | $42.99 | 45 | $1,934.55 |

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

**Scenario** #15 - DWMP - Tile Map Available

**Scenario Description:**

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

**Before Situation:**

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

**After Situation:**

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

**Feature Measure:** Number

**Scenario Unit::** Number

**Scenario Typical Size:** 1.0

**Scenario Total Cost:** $2,639.87

**Scenario Cost/Unit:** $2,639.87

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 | Hour | $104.52 | 8 | $836.16 |
| 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 prod | Hour | $74.07 | 13 | $962.91 |
| 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 | Hour | $52.55 | 16 | $840.80 |

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

**Scenario** #16 - DWMP - No Tile Map Available

**Scenario Description:**

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

**Before Situation:**

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

**After Situation:**

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

**Feature Measure:** Number

**Scenario Unit::** Number

**Scenario Typical Size:** 1.0

**Scenario Total Cost:** $3,149.31

**Scenario Cost/Unit:** $3,149.31

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 | Hour | $104.52 | 8 | $836.16 |
| 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 prod | Hour | $74.07 | 13 | $962.91 |
| 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 | Hour | $52.55 | 16 | $840.80 |
| 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 | $31.84 | 16 | $509.44 |

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

**Scenario** #16 - 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 management 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:** 1.0

**Scenario Total Cost:** $3,036.87

**Scenario Cost/Unit:** $3,036.87

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 prod | Hour | $74.07 | 41 | $3,036.87 |

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

**Scenario** #17 - 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 management 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:** 1.0

**Scenario Total Cost:** $4,740.48

**Scenario Cost/Unit:** $4,740.48

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 prod | Hour | $74.07 | 64 | $4,740.48 |

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

**Scenario** #9 - 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:** 1.0

**Scenario Total Cost:** $3,225.18

**Scenario Cost/Unit:** $3,225.18

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 eff | Hour | $76.79 | 42 | $3,225.18 |

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

**Scenario** #16 - Pollinator Habitat Enhancement Plan CAP

**Scenario Description:**

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

**Before Situation:**

Agricultural producer currently has no plan or knowledge of development or management of pollinator habitat. The producer does not currently manage or enhance habitat to promote opportunities for pollinator habitat. Within existing land uses, 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:** 1.0

**Scenario Total Cost:** $3,225.18

**Scenario Cost/Unit:** $3,225.18

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 eff | Hour | $76.79 | 42 | $3,225.18 |

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

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

**Scenario Description:**

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

**Before Situation:**

Agricultural producer currently has no plan or knowledge of development or management of pollinator habitat. The producer does not currently manage or enhance habitat to promote opportunities for pollinator habitat. Within existing land uses, 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:** 1.0

**Scenario Total Cost:** $4,684.19

**Scenario Cost/Unit:** $4,684.19

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 eff | Hour | $76.79 | 61 | $4,684.19 |

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

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

**Scenario Description:**

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

**Before Situation:**

Agricultural producer currently has no plan or limited knowledge for management of cropland weeds or for adaptive techniques to address herbicide resistant weeds. The producer currently manages cropland weeds based upon herbicide label instructions, personal knowledge, or other local criteria, and has not implemented strategies to 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 management 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. Recommendations 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:** 1.0

**Scenario Total Cost:** $2,275.20

**Scenario Cost/Unit:** $2,275.20

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, physi | Hour | $75.84 | 30 | $2,275.20 |

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

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

**Scenario Description:**

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

**Before Situation:**

Agricultural producer currently has no plan or limited knowledge for management of cropland weeds or for adaptive techniques to address herbicide resistant weeds. The producer currently manages cropland weeds based upon herbicide label instructions, personal knowledge, or other local criteria, and has not implemented strategies to 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 management 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. Recommendations 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:** 1.0

**Scenario Total Cost:** $2,957.76

**Scenario Cost/Unit:** $2,957.76

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, physi | Hour | $75.84 | 39 | $2,957.76 |

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

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

**Scenario Description:**

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

**Before Situation:**

Agricultural producer currently has no plan or limited knowledge for management of cropland weeds or for adaptive techniques to address herbicide resistant weeds. The producer currently manages cropland weeds based upon herbicide label instructions, personal knowledge, or other local criteria, and has not implemented strategies to 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 management 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. Recommendations 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:** 1.0

**Scenario Total Cost:** $4,550.40

**Scenario Cost/Unit:** $4,550.40

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, physi | Hour | $75.84 | 60 | $4,550.40 |

**Practice:** 309 - Agrichemical Handling Facility

**Scenario** #5 - Concrete Pad for mixing and loading

**Scenario Description:**

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

**Before Situation:**

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

**After Situation:**

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

**Feature Measure:** Total Containment Area

**Scenario Unit::** Square Foot

**Scenario Typical Size:** 640.0

**Scenario Total Cost:** $8,733.21

**Scenario Cost/Unit:** $13.65

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 | $327.92 | 10 | $3,279.20 |
| 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 | $510.00 | 7 | $3,570.00 |
| 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 | $2.36 | 35 | $82.60 |
| Dozer, 80 HP | 929 | Track mounted Dozer with horsepower range of 60 to 90. Equipment and power unit costs. Labor not included. | Hour | $66.13 | 4 | $264.52 |
| **Labor** | | | | | | |
| General Labor | 231 | Labor performed using basic tools such as power tool, shovels, and other tools that do not require extensive training. Ex. pipe layer, herder, concrete placement, materials spreader, flagger, etc. | Hour | $25.31 | 4 | $101.24 |
| 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 | $44.37 | 4 | $177.48 |
| **Materials** | | | | | | |
| Aggregate, Sand, Graded, Washed | 45 | Sand, typical ASTM C33 gradation, includes materials, equipment and labor to transport and place | Cubic Yard | $34.29 | 10 | $342.90 |
| Painting, concrete surface, impermeable | 1497 | Painting of concrete surfaces with an impermeable coating. Includes materials and application. | Square Foot | $0.92 | 640 | $588.80 |
| **Mobilization** | | | | | | |
| Mobilization, very small equipment | 1137 | Equipment that is small enough to be transported by a pick-up truck with typical weights less than 3,500 pounds. Can be multiple pieces of equipment if all hauled simultaneously. | Each | $70.64 | 1 | $70.64 |
| Mobilization, medium equipment | 1139 | Equipment with 70-150 HP or typical weights between 14,000 and 30,000 pounds. | Each | $255.83 | 1 | $255.83 |

**Practice:** 309 - Agrichemical Handling Facility

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

**Scenario Description:**

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

**Before Situation:**

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

**After Situation:**

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

**Feature Measure:** Storage Area + Mixing Area

**Scenario Unit::** Square Foot

**Scenario Typical Size:** 89.0

**Scenario Total Cost:** $1,769.48

**Scenario Cost/Unit:** $19.88

Cost Details:

| Component Name | ID | Description | Unit | Cost | QTY | Total |
|---|---|---|---|---|---|---|
| **Labor** | | | | | | |
| General Labor | 231 | Labor performed using basic tools such as power tool, shovels, and other tools that do not require extensive training. Ex. pipe layer, herder, concrete placement, materials spreader, flagger, etc. | Hour | $25.31 | 8 | $202.48 |
| **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 | $19.95 | 64 | $1,276.80 |

**Practice:** 313 - Waste Storage Facility

**Scenario** #1 - Earthen Storage Facility upto 50K ft3 Storage

**Scenario Description:**

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

**Before Situation:**

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

**After Situation:**

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

**Feature Measure:** "Strike Full" Volume

**Scenario Unit::** Cubic Foot

**Scenario Typical Size:** 24,864.0

**Scenario Total Cost:** $9,216.53

**Scenario Cost/Unit:** $0.37

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 | $4.45 | 599 | $2,665.55 |
| Earthfill, Dumped and Spread | 51 | Earthfill, dumped and spread without compaction effort, includes equipment and labor | Cubic Yard | $3.65 | 599 | $2,186.35 |
| 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 | $3.77 | 599 | $2,258.23 |
| **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 | $45.69 | 20 | $913.80 |
| **Materials** | | | | | | |
| Structural steel tubing, 2" diameter | 1120 | Structural steel tubing, 2" diameter, 1/8" wall thickness, materials only | Foot | $3.50 | 8 | $28.00 |
| **Mobilization** | | | | | | |
| Mobilization, very small equipment | 1137 | Equipment that is small enough to be transported by a pick-up truck with typical weights less than 3,500 pounds. Can be multiple pieces of equipment if all hauled simultaneously. | Each | $70.64 | 2 | $141.28 |
| Mobilization, medium equipment | 1139 | Equipment with 70-150 HP or typical weights between 14,000 and 30,000 pounds. | Each | $255.83 | 4 | $1,023.32 |

**Practice:** 313 - Waste Storage Facility

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

**Scenario Description:**

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

**Before Situation:**

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

**After Situation:**

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

**Feature Measure:** "Strike Full" Volume

**Scenario Unit::** Cubic Foot

**Scenario Typical Size:** 199,878.0

**Scenario Total Cost:** $61,090.12

**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 | $4.45 | 4812 | $21,413.40 |
| Earthfill, Dumped and Spread | 51 | Earthfill, dumped and spread without compaction effort, includes equipment and labor | Cubic Yard | $3.65 | 4812 | $17,563.80 |
| 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 | $3.77 | 4812 | $18,141.24 |
| **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 | $45.69 | 40 | $1,827.60 |
| **Materials** | | | | | | |
| Structural steel tubing, 2" diameter | 1120 | Structural steel tubing, 2" diameter, 1/8" wall thickness, materials only | Foot | $3.50 | 14 | $49.00 |
| **Mobilization** | | | | | | |
| Mobilization, very small equipment | 1137 | Equipment that is small enough to be transported by a pick-up truck with typical weights less than 3,500 pounds. Can be multiple pieces of equipment if all hauled simultaneously. | Each | $70.64 | 2 | $141.28 |
| Mobilization, large equipment | 1140 | Equipment >150HP or typical weights greater than 30,000 pounds or loads requiring over width or over length permits. | Each | $488.45 | 4 | $1,953.80 |

**Practice:** 313 - Waste Storage Facility

**Scenario** #3 - Above Ground Steel/Concrete upto 25K ft3 Storage

**Scenario Description:**

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

**Before Situation:**

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

**After Situation:**

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

**Feature Measure:** "Strike Full" Volume

**Scenario Unit::** Cubic Foot

**Scenario Typical Size:** 14,340.0

**Scenario Total Cost:** $101,612.56

**Scenario Cost/Unit:** $7.09

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 | $327.92 | 12 | $3,935.04 |
| Concrete, CIP, formed reinforced | 38 | Steel reinforced concrete formed and cast-in-placed in formed structures such as walls or suspended slabs by chute placement. Typical strength is 3000 to 4000 psi. Includes materials, labor and equipment to transport, place and finish. | Cubic Yard | $510.00 | 18 | $9,180.00 |
| Earthfill, Roller Compacted | 49 | Earthfill, roller or machine compacted, includes equipment and labor | Cubic Yard | $4.45 | 84 | $373.80 |
| Truck, Concrete Pump | 1211 | Concrete pump, normally truck mounted. Use this item in association with other concrete components when job requires placement by other than normal chutes. Include drive and setup time in quantity; therefore, do not include mobilization. Includes equi | Hour | $201.97 | 5 | $1,009.85 |
| 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 | $3.77 | 84 | $316.68 |
| Plate compactor | 1915 | Manually guided vibratroy plate compactor. Equipment only. | Hour | $5.07 | 2 | $10.14 |
| **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 | $25.31 | 2 | $50.62 |
| 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 | $45.69 | 30 | $1,370.70 |
| **Materials** | | | | | | |
| Aggregate, Gravel, Graded | 46 | Gravel, includes materials, equipment and labor to transport and place. Includes washed and unwashed gravel. | Cubic Yard | $34.75 | 14 | $486.50 |
| 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 | 14340 | $83,458.80 |
| **Mobilization** | | | | | | |
| Mobilization, very small equipment | 1137 | Equipment that is small enough to be transported by a pick-up truck with typical weights less than 3,500 pounds. Can be multiple pieces of equipment if all hauled simultaneously. | Each | $70.64 | 2 | $141.28 |
| Mobilization, medium equipment | 1139 | Equipment with 70-150 HP or typical weights between 14,000 and 30,000 pounds. | Each | $255.83 | 5 | $1,279.15 |

**Practice:** 313 - Waste Storage Facility

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

**Scenario Description:**

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

**Before Situation:**

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

**After Situation:**

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

**Feature Measure:** "Strike Full" Volume

**Scenario Unit::** Cubic Foot

**Scenario Typical Size:** 79,522.0

**Scenario Total Cost:** $218,934.76

**Scenario Cost/Unit:** $2.75

Cost Details:

| Component Name | ID | Description | Unit | Cost | QTY | Total |
|---|---|---|---|---|---|---|
| **Equipment Installation** | | | | | | |
| Concrete, CIP, slab on grade, reinforced | 37 | Steel reinforced concrete formed and cast-in-placed as a slab on grade by chute placement. Typical strength is 3000 to 4000 psi. Includes materials, labor and equipment to transport, place and finish. | Cubic Yard | $327.92 | 65 | $21,314.80 |
| Concrete, CIP, formed reinforced | 38 | Steel reinforced concrete formed and cast-in-placed in formed structures such as walls or suspended slabs by chute placement. Typical strength is 3000 to 4000 psi. Includes materials, labor and equipment to transport, place and finish. | Cubic Yard | $510.00 | 43 | $21,930.00 |
| Earthfill, Roller Compacted | 49 | Earthfill, roller or machine compacted, includes equipment and labor | Cubic Yard | $4.45 | 465 | $2,069.25 |
| Truck, Concrete Pump | 1211 | Concrete pump, normally truck mounted. Use this item in association with other concrete components when job requires placement by other than normal chutes. Include drive and setup time in quantity; therefore, do not include mobilization. Includes equi | Hour | $201.97 | 6 | $1,211.82 |
| 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 | $3.77 | 465 | $1,753.05 |
| Plate compactor | 1915 | Manually guided vibratroy plate compactor. Equipment only. | Hour | $5.07 | 4 | $20.28 |
| **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 | $25.31 | 4 | $101.24 |
| 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 | $45.69 | 40 | $1,827.60 |
| **Materials** | | | | | | |
| Aggregate, Gravel, Graded | 46 | Gravel, includes materials, equipment and labor to transport and place. Includes washed and unwashed gravel. | Cubic Yard | $34.75 | 77 | $2,675.75 |
| 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 | 79522 | $164,610.54 |
| **Mobilization** | | | | | | |
| Mobilization, very small equipment | 1137 | Equipment that is small enough to be transported by a pick-up truck with typical weights less than 3,500 pounds. Can be multiple pieces of equipment if all hauled simultaneously. | Each | $70.64 | 2 | $141.28 |
| Mobilization, medium equipment | 1139 | Equipment with 70-150 HP or typical weights between 14,000 and 30,000 pounds. | Each | $255.83 | 5 | $1,279.15 |

**Practice:** 313 - Waste Storage Facility

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

**Scenario Description:**

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

**Before Situation:**

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

**After Situation:**

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

**Feature Measure:** "Strike Full" Volume

**Scenario Unit::** Cubic Foot

**Scenario Typical Size:** 187,189.0

**Scenario Total Cost:** $411,028.50

**Scenario Cost/Unit:** $2.20

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 | $327.92 | 152 | $49,843.84 |
| 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 | $510.00 | 65 | $33,150.00 |
| Earthfill, Roller Compacted | 49 | Earthfill, roller or machine compacted, includes equipment and labor | Cubic Yard | $4.45 | 1094 | $4,868.30 |
| Truck, Concrete Pump | 1211 | Concrete pump, normally truck mounted. Use this item in association with other concrete components when job requires placement by other than normal chutes. Include drive and setup time in quantity; therefore, do not include mobilization. Includes equi | Hour | $201.97 | 7 | $1,413.79 |
| 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 | $3.77 | 1094 | $4,124.38 |
| Plate compactor | 1915 | Manually guided vibratroy plate compactor. Equipment only. | Hour | $5.07 | 5 | $25.35 |
| **Labor** | | | | | | |
| General Labor | 231 | Labor performed using basic tools such as power tool, shovels, and other tools that do not require extensive training. Ex. pipe layer, herder, concrete placement, materials spreader, flagger, etc. | Hour | $25.31 | 5 | $126.55 |
| Supervisor 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 | $45.69 | 60 | $2,741.40 |
| **Materials** | | | | | | |
| Aggregate, Gravel, Graded | 46 | Gravel, includes materials, equipment and labor to transport and place. Includes washed and unwashed gravel. | Cubic Yard | $34.75 | 182 | $6,324.50 |
| 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 | 187189 | $306,989.96 |
| **Mobilization** | | | | | | |
| Mobilization, very small equipment | 1137 | Equipment that is small enough to be transported by a pick-up truck with typical weights less than 3,500 pounds. Can be multiple pieces of equipment if all hauled simultaneously. | Each | $70.64 | 2 | $141.28 |
| Mobilization, medium equipment | 1139 | Equipment with 70-150 HP or typical weights between 14,000 and 30,000 pounds. | Each | $255.83 | 5 | $1,279.15 |

## USDA - Natural Resources Conservation Service

**Massachusetts**

**Practice:** 313 - Waste Storage Facility

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

**Scenario Description:**

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

**Before Situation:**

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

**After Situation:**

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

**Feature Measure:** "Strike Full" Volume

**Scenario Unit::** Cubic Foot

**Scenario Typical Size:** 248,326.0

**Scenario Total Cost:** $563,917.21

**Scenario Cost/Unit:** $2.27

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 | $327.92 | 202 | $66,239.84 |
| 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 | $510.00 | 75 | $38,250.00 |
| Earthfill, Roller Compacted | 49 | Earthfill, roller or machine compacted, includes equipment and labor | Cubic Yard | $4.45 | 1452 | $6,461.40 |
| Truck, Concrete Pump | 1211 | Concrete pump, normally truck mounted. Use this item in association with other concrete components when job requires placement by other than normal chutes. Include drive and setup time in quantity; therefore, do not include mobilization. Includes equi | Hour | $201.97 | 8 | $1,615.76 |
| 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 | $3.77 | 1452 | $5,474.04 |
| Plate compactor | 1915 | Manually guided vibratroy plate compactor. Equipment only. | Hour | $5.07 | 10 | $50.70 |
| **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 | $25.31 | 10 | $253.10 |
| 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 | $45.69 | 80 | $3,655.20 |
| **Materials** | | | | | | |
| Aggregate, Gravel, Graded | 46 | Gravel, includes materials, equipment and labor to transport and place. Includes washed and unwashed gravel. | Cubic Yard | $34.75 | 242 | $8,409.50 |
| 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 | 248326 | $432,087.24 |
| **Mobilization** | | | | | | |
| Mobilization, very small equipment | 1137 | Equipment that is small enough to be transported by a pick-up truck with typical weights less than 3,500 pounds. Can be multiple pieces of equipment if all hauled simultaneously. | Each | $70.64 | 2 | $141.28 |
| Mobilization, medium equipment | 1139 | Equipment with 70-150 HP or typical weights between 14,000 and 30,000 pounds. | Each | $255.83 | 5 | $1,279.15 |

**Practice:** 313 - Waste Storage Facility

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

**Scenario Description:**

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

**Before Situation:**

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

**After Situation:**

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

**Feature Measure:** Total Volume including freeboard,

**Scenario Unit::** Cubic Foot

**Scenario Typical Size:** 3,840.0

**Scenario Total Cost:** $36,045.19

**Scenario Cost/Unit:** $9.39

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 | $327.92 | 8 | $2,623.36 |
| 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 | $510.00 | 48 | $24,480.00 |
| Earthfill, Dumped and Spread | 51 | Earthfill, dumped and spread without compaction effort, includes equipment and labor | Cubic Yard | $3.65 | 390 | $1,423.50 |
| Truck, Concrete Pump | 1211 | Concrete pump, normally truck mounted. Use this item in association with other concrete components when job requires placement by other than normal chutes. Include drive and setup time in quantity; therefore, do not include mobilization. Includes equi | Hour | $201.97 | 8 | $1,615.76 |
| Excavation, common earth, small equipment, 50 ft | 1220 | Bulk excavation of common earth with dozer <100 HP with average push distance of 50 feet. Includes equipment and labor. | Cubic Yard | $2.50 | 390 | $975.00 |
| Plate compactor | 1915 | Manually guided vibratroy plate compactor. Equipment only. | Hour | $5.07 | 3 | $15.21 |
| **Labor** | | | | | | |
| General Labor | 231 | Labor performed using basic tools such as power tool, shovels, and other tools that do not require extensive training. Ex. pipe layer, herder, concrete placement, materials spreader, flagger, etc. | Hour | $25.31 | 11 | $278.41 |
| Supervisor 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 | $45.69 | 20 | $913.80 |
| **Materials** | | | | | | |
| Aggregate, Gravel, Graded | 46 | Gravel, includes materials, equipment and labor to transport and place. Includes washed and unwashed gravel. | Cubic Yard | $34.75 | 11 | $382.25 |
| Cement, Type I or II | 1336 | Type I or II Portland Cement (94 lb. bag), Materials only. | Each | $10.11 | 56 | $566.16 |
| Waterstop, PVC, ribbed, 3/16" x 6" | 1614 | Waterstop, PVC, ribbed, 3/16" thick by 6"wide. Includes materials, equipment and labor. | Foot | $6.30 | 104 | $655.20 |
| Steel, rebar | 1832 | Steel rebar, grade 60. Materials only. | Pound | $0.52 | 575 | $299.00 |
| **Mobilization** | | | | | | |
| Mobilization, very small equipment | 1137 | Equipment that is small enough to be transported by a pick-up truck with typical weights less than 3,500 pounds. Can be multiple pieces of equipment if all hauled simultaneously. | Each | $70.64 | 4 | $282.56 |

| | | | | | | |
|---|---|---|---|---|---|---|
| Mobilization, medium equipment | 1139 | Equipment with 70-150 HP or typical weights between 14,000 and 30,000 pounds. | Each | $255.83 | 6 | $1,534.98 |

**Practice:** 313 - Waste Storage Facility

**Scenario** #8 - Concrete, Rectangular, Without Roof upto 35K ft3 Storage

**Scenario Description:**

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

**Before Situation:**

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

**After Situation:**

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

**Feature Measure:** Total Volume including Freeboard,

**Scenario Unit::** Cubic Foot

**Scenario Typical Size:** 34,944.0

**Scenario Total Cost:** $130,359.47

**Scenario Cost/Unit:** $3.73

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 | $327.92 | 50 | $16,396.00 |
| Concrete, CIP, formed reinforced | 38 | Steel reinforced concrete formed and cast-in-placed in formed structures such as walls or suspended slabs by chute placement. Typical strength is 3000 to 4000 psi. Includes materials, labor and equipment to transport, place and finish. | Cubic Yard | $510.00 | 171 | $87,210.00 |
| Earthfill, Dumped and Spread | 51 | Earthfill, dumped and spread without compaction effort, includes equipment and labor | Cubic Yard | $3.65 | 1660 | $6,059.00 |
| Truck, Concrete Pump | 1211 | Concrete pump, normally truck mounted. Use this item in association with other concrete components when job requires placement by other than normal chutes. Include drive and setup time in quantity; therefore, do not include mobilization. Includes equi | Hour | $201.97 | 8 | $1,615.76 |
| 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 | $3.77 | 1660 | $6,258.20 |
| Plate compactor | 1915 | Manually guided vibratroy plate compactor. Equipment only. | Hour | $5.07 | 4 | $20.28 |
| **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 | $25.31 | 54 | $1,366.74 |
| Supervisor or Manager | 234 | Labor involving supervision or management activities. Includes crew supervisors, foremen and farm/ranch managers time required for adopting new technology, etc. | Hour | $45.69 | 40 | $1,827.60 |
| **Materials** | | | | | | |
| Aggregate, Gravel, Graded | 46 | Gravel, includes materials, equipment and labor to transport and place. Includes washed and unwashed gravel. | Cubic Yard | $34.75 | 104 | $3,614.00 |
| Cement, Type I or II | 1336 | Type I or II Portland Cement (94 lb. bag), Materials only. | Each | $10.11 | 221 | $2,234.31 |
| Steel, rebar | 1832 | Steel rebar, grade 60. Materials only. | Pound | $0.52 | 3595 | $1,869.40 |
| **Mobilization** | | | | | | |
| Mobilization, very small equipment | 1137 | Equipment that is small enough to be transported by a pick-up truck with typical weights less than 3,500 pounds. Can be multiple pieces of equipment if all hauled simultaneously. | Each | $70.64 | 5 | $353.20 |

| | | | | | | |
|---|---|---|---|---|---|---|
| Mobilization, medium equipment | 1139 | Equipment with 70-150 HP or typical weights between 14,000 and 30,000 pounds. | Each | $255.83 | 6 | $1,534.98 |

**Practice:** 313 - Waste Storage Facility

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

**Scenario Description:**

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

**Before Situation:**

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

**After Situation:**

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

**Feature Measure:** Total Volume including freeboard,

**Scenario Unit::** Cubic Foot

**Scenario Typical Size:** 69,192.0

**Scenario Total Cost:** $195,428.41

**Scenario Cost/Unit:** $2.82

Cost Details:

| Component Name | ID | Description | Unit | Cost | QTY | Total |
|---|---|---|---|---|---|---|
| **Equipment Installation** | | | | | | |
| Concrete, CIP, slab on grade, reinforced | 37 | Steel reinforced concrete formed and cast-in-placed as a slab on grade by chute placement. Typical strength is 3000 to 4000 psi. Includes materials, labor and equipment to transport, place and finish. | Cubic Yard | $327.92 | 113 | $37,054.96 |
| 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 | $510.00 | 220 | $112,200.00 |
| Earthfill, Dumped and Spread | 51 | Earthfill, dumped and spread without compaction effort, includes equipment and labor | Cubic Yard | $3.65 | 3053 | $11,143.45 |
| Truck, Concrete Pump | 1211 | Concrete pump, normally truck mounted. Use this item in association with other concrete components when job requires placement by other than normal chutes. Include drive and setup time in quantity; therefore, do not include mobilization. Includes equi | Hour | $201.97 | 12 | $2,423.64 |
| 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 | $3.77 | 3053 | $11,509.81 |
| Plate compactor | 1915 | Manually guided vibratroy plate compactor. Equipment only. | Hour | $5.07 | 7 | $35.49 |
| **Labor** | | | | | | |
| General Labor | 231 | Labor performed using basic tools such as power tool, shovels, and other tools that do not require extensive training. Ex. pipe layer, herder, concrete placement, materials spreader, flagger, etc. | Hour | $25.31 | 120 | $3,037.20 |
| 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 | $45.69 | 60 | $2,741.40 |
| **Materials** | | | | | | |
| Aggregate, Gravel, Graded | 46 | Gravel, includes materials, equipment and labor to transport and place. Includes washed and unwashed gravel. | Cubic Yard | $34.75 | 191 | $6,637.25 |
| Cement, Type I or II | 1336 | Type I or II Portland Cement (94 lb. bag), Materials only. | Each | $10.11 | 333 | $3,366.63 |
| Steel, rebar | 1832 | Steel rebar, grade 60. Materials only. | Pound | $0.52 | 6520 | $3,390.40 |
| **Mobilization** | | | | | | |
| Mobilization, very small equipment | 1137 | Equipment that is small enough to be transported by a pick-up truck with typical weights less than 3,500 pounds. Can be multiple pieces of equipment if all hauled simultaneously. | Each | $70.64 | 5 | $353.20 |

| | | | | | | |
|---|---|---|---|---|---|---|
| Mobilization, medium equipment | 1139 | Equipment with 70-150 HP or typical weights between 14,000 and 30,000 pounds. | Each | $255.83 | 6 | $1,534.98 |

**Practice:** 313 - Waste Storage Facility

**Scenario** #10 - Concrete, Rectangular, with Roof

**Scenario Description:**

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

**Before Situation:**

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

**After Situation:**

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

**Feature Measure:** Total Volume including Freeboard,

**Scenario Unit::** Cubic Foot

**Scenario Typical Size:** 34,944.0

**Scenario Total Cost:** $148,196.28

**Scenario Cost/Unit:** $4.24

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 | $327.92 | 50 | $16,396.00 |
| Concrete, CIP, formed reinforced | 38 | Steel reinforced concrete formed and cast-in-placed in formed structures such as walls or suspended slabs by chute placement. Typical strength is 3000 to 4000 psi. Includes materials, labor and equipment to transport, place and finish. | Cubic Yard | $510.00 | 207 | $105,570.00 |
| Earthfill, Dumped and Spread | 51 | Earthfill, dumped and spread without compaction effort, includes equipment and labor | Cubic Yard | $3.65 | 1660 | $6,059.00 |
| Excavation, common earth, large equipment, 150 ft | 1223 | Bulk excavation of common earth including sand and gravel with dozer >100 HP with average push distance of 150 feet. Includes equipment and labor. | Cubic Yard | $3.77 | 1660 | $6,258.20 |
| Plate compactor | 1915 | Manually guided vibratroy plate compactor. Equipment only. | Hour | $5.07 | 4 | $20.28 |
| **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 | $25.31 | 54 | $1,366.74 |
| Supervisor or Manager | 234 | Labor involving supervision or management activities. Includes crew supervisors, foremen and farm/ranch managers time required for adopting new technology, etc. | Hour | $45.69 | 60 | $2,741.40 |
| **Materials** | | | | | | |
| Aggregate, Gravel, Graded | 46 | Gravel, includes materials, equipment and labor to transport and place. Includes washed and unwashed gravel. | Cubic Yard | $34.75 | 104 | $3,614.00 |
| Cement, Type I or II | 1336 | Type I or II Portland Cement (94 lb. bag), Materials only. | Each | $10.11 | 257 | $2,598.27 |
| Steel, rebar | 1832 | Steel rebar, grade 60. Materials only. | Pound | $0.52 | 3595 | $1,869.40 |
| **Mobilization** | | | | | | |
| Mobilization, very small equipment | 1137 | Equipment that is small enough to be transported by a pick-up truck with typical weights less than 3,500 pounds. Can be multiple pieces of equipment if all hauled simultaneously. | Each | $70.64 | 6 | $423.84 |
| Mobilization, medium equipment | 1139 | Equipment with 70-150 HP or typical weights between 14,000 and 30,000 pounds. | Each | $255.83 | 5 | $1,279.15 |

**Practice:** 313 - Waste Storage Facility

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

**Scenario Description:**

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

**Before Situation:**

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

**After Situation:**

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

**Feature Measure:** "Strike Full" Volume

**Scenario Unit::** Cubic Foot

**Scenario Typical Size:** 6,000.0

**Scenario Total Cost:** $15,986.86

**Scenario Cost/Unit:** $2.66

Cost Details:

| Component Name | ID | Description | Unit | Cost | QTY | Total |
|---|---|---|---|---|---|---|
| **Equipment Installation** | | | | | | |
| Concrete, CIP, slab on grade, reinforced | 37 | Steel reinforced concrete formed and cast-in-placed as a slab on grade by chute placement. Typical strength is 3000 to 4000 psi. Includes materials, labor and equipment to transport, place and finish. | Cubic Yard | $327.92 | 18 | $5,902.56 |
| Earthfill, Dumped and Spread | 51 | Earthfill, dumped and spread without compaction effort, includes equipment and labor | Cubic Yard | $3.65 | 132 | $481.80 |
| 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 | $3.77 | 132 | $497.64 |
| Plate compactor | 1915 | Manually guided vibratroy plate compactor. Equipment only. | Hour | $5.07 | 2 | $10.14 |
| **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 | $25.31 | 2 | $50.62 |
| 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 | $45.69 | 20 | $913.80 |
| **Materials** | | | | | | |
| Aggregate, Gravel, Graded | 46 | Gravel, includes materials, equipment and labor to transport and place. Includes washed and unwashed gravel. | Cubic Yard | $34.75 | 22 | $764.50 |
| Block, pre-cast concrete, modular | 1496 | Pre-cast concrete blocks, typically 2ft x 2ft x 6ft , includes installation and delivery. | Cubic Yard | $99.83 | 42 | $4,192.86 |
| Waterstop, PVC, ribbed, 3/16" x 6" | 1614 | Waterstop, PVC, ribbed, 3/16" thick by 6"wide. Includes materials, equipment and labor. | Foot | $6.30 | 400 | $2,520.00 |
| **Mobilization** | | | | | | |
| Mobilization, very small equipment | 1137 | Equipment that is small enough to be transported by a pick-up truck with typical weights less than 3,500 pounds. Can be multiple pieces of equipment if all hauled simultaneously. | Each | $70.64 | 2 | $141.28 |
| Mobilization, medium equipment | 1139 | Equipment with 70-150 HP or typical weights between 14,000 and 30,000 pounds. | Each | $255.83 | 2 | $511.66 |

**Practice:** 313 - Waste Storage Facility

**Scenario** #12 - Conc Tank, buried upto 15K ft3 Storage

**Scenario Description:**

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

**Before Situation:**

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

**After Situation:**

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

**Feature Measure:** Total Volume including Freeboard,

**Scenario Unit::** Cubic Foot

**Scenario Typical Size:** 9,557.0

**Scenario Total Cost:** $38,023.08

**Scenario Cost/Unit:** $3.98

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 | $327.92 | 18 | $5,902.56 |
| Concrete, CIP, formed reinforced | 38 | Steel reinforced concrete formed and cast-in-placed in formed structures such as walls or suspended slabs by chute placement. Typical strength is 3000 to 4000 psi. Includes materials, labor and equipment to transport, place and finish. | Cubic Yard | $510.00 | 38 | $19,380.00 |
| Earthfill, Dumped and Spread | 51 | Earthfill, dumped and spread without compaction effort, includes equipment and labor | Cubic Yard | $3.65 | 670 | $2,445.50 |
| Truck, Concrete Pump | 1211 | Concrete pump, normally truck mounted. Use this item in association with other concrete components when job requires placement by other than normal chutes. Include drive and setup time in quantity; therefore, do not include mobilization. Includes equi | Hour | $201.97 | 8 | $1,615.76 |
| Excavation, common earth, small equipment, 50 ft | 1220 | Bulk excavation of common earth with dozer <100 HP with average push distance of 50 feet. Includes equipment and labor. | Cubic Yard | $2.50 | 670 | $1,675.00 |
| Plate compactor | 1915 | Manually guided vibratroy plate compactor. Equipment only. | Hour | $5.07 | 2 | $10.14 |
| **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 | $25.31 | 20 | $506.20 |
| 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 | $45.69 | 40 | $1,827.60 |
| **Materials** | | | | | | |
| Aggregate, Gravel, Graded | 46 | Gravel, includes materials, equipment and labor to transport and place. Includes washed and unwashed gravel. | Cubic Yard | $34.75 | 22 | $764.50 |
| Cement, Type I or II | 1336 | Type I or II Portland Cement (94 lb. bag), Materials only. | Each | $10.11 | 56 | $566.16 |
| Waterstop, PVC, ribbed, 3/16" x 6" | 1614 | Waterstop, PVC, ribbed, 3/16" thick by 6"wide. Includes materials, equipment and labor. | Foot | $6.30 | 122 | $768.60 |
| Steel, rebar | 1832 | Steel rebar, grade 60. Materials only. | Pound | $0.52 | 1294 | $672.88 |
| **Mobilization** | | | | | | |
| Mobilization, very small equipment | 1137 | Equipment that is small enough to be transported by a pick-up truck with typical weights less than 3,500 pounds. Can be multiple pieces of equipment if all hauled simultaneously. | Each | $70.64 | 5 | $353.20 |

| | | | | | | |
|---|---|---|---|---|---|---|
| Mobilization, medium equipment | 1139 | Equipment with 70-150 HP or typical weights between 14,000 and 30,000 pounds. | Each | $255.83 | 6 | $1,534.98 |

**Practice:** 313 - Waste Storage Facility

**Scenario** #13 - Conc Tank, Buried 15 to 25K ft3 Storage

**Scenario Description:**

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

**Before Situation:**

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

**After Situation:**

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

**Feature Measure:** Total Volume including freeboard,

**Scenario Unit::** Cubic Foot

**Scenario Typical Size:** 20,057.0

**Scenario Total Cost:** $61,807.91

**Scenario Cost/Unit:** $3.08

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 | $327.92 | 39 | $12,788.88 |
| Concrete, CIP, formed reinforced | 38 | Steel reinforced concrete formed and cast-in-placed in formed structures such as walls or suspended slabs by chute placement. Typical strength is 3000 to 4000 psi. Includes materials, labor and equipment to transport, place and finish. | Cubic Yard | $510.00 | 55 | $28,050.00 |
| Earthfill, Dumped and Spread | 51 | Earthfill, dumped and spread without compaction effort, includes equipment and labor | Cubic Yard | $3.65 | 1155 | $4,215.75 |
| Truck, Concrete Pump | 1211 | Concrete pump, normally truck mounted. Use this item in association with other concrete components when job requires placement by other than normal chutes. Include drive and setup time in quantity; therefore, do not include mobilization. Includes equi | Hour | $201.97 | 10 | $2,019.70 |
| Excavation, common earth, large equipment, 150 ft | 1223 | Bulk excavation of common earth including sand and gravel with dozer >100 HP with average push distance of 150 feet. Includes equipment and labor. | Cubic Yard | $3.77 | 1155 | $4,354.35 |
| Plate compactor | 1915 | Manually guided vibratroy plate compactor. Equipment only. | Hour | $5.07 | 3 | $15.21 |
| **Labor** | | | | | | |
| General Labor | 231 | Labor performed using basic tools such as power tool, shovels, and other tools that do not require extensive training. Ex. pipe layer, herder, concrete placement, materials spreader, flagger, etc. | Hour | $25.31 | 42 | $1,063.02 |
| Supervisor 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 | $45.69 | 50 | $2,284.50 |
| **Materials** | | | | | | |
| Aggregate, Gravel, Graded | 46 | Gravel, includes materials, equipment and labor to transport and place. Includes washed and unwashed gravel. | Cubic Yard | $34.75 | 46 | $1,598.50 |
| Cement, Type I or II | 1336 | Type I or II Portland Cement (94 lb. bag), Materials only. | Each | $10.11 | 94 | $950.34 |
| Waterstop, PVC, ribbed, 3/16" x 6" | 1614 | Waterstop, PVC, ribbed, 3/16" thick by 6"wide. Includes materials, equipment and labor. | Foot | $6.30 | 178 | $1,121.40 |
| Steel, rebar | 1832 | Steel rebar, grade 60. Materials only. | Pound | $0.52 | 2804 | $1,458.08 |
| **Mobilization** | | | | | | |

| | | | | | | |
|---|---|---|---|---|---|---|
| Mobilization, very small equipment | 1137 | Equipment that is small enough to be transported by a pick-up truck with typical weights less than 3,500 pounds. Can be multiple pieces of equipment if all hauled simultaneously. | Each | $70.64 | 5 | $353.20 |
| Mobilization, medium equipment | 1139 | Equipment with 70-150 HP or typical weights between 14,000 and 30,000 pounds. | Each | $255.83 | 6 | $1,534.98 |

**Practice:** 313 - Waste Storage Facility

**Scenario** #14 - Conc Tank, Buried 25 to 50K ft3 Storage

**Scenario Description:**

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

**Before Situation:**

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

**After Situation:**

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

**Feature Measure:** Total Volume including Freeboard,

**Scenario Unit::** Cubic Foot

**Scenario Typical Size:** 28,274.0

**Scenario Total Cost:** $81,560.43

**Scenario Cost/Unit:** $2.88

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 | $327.92 | 44 | $14,428.48 |
| Concrete, CIP, formed reinforced | 38 | Steel reinforced concrete formed and cast-in-placed in formed structures such as walls or suspended slabs by chute placement. Typical strength is 3000 to 4000 psi. Includes materials, labor and equipment to transport, place and finish. | Cubic Yard | $510.00 | 79 | $40,290.00 |
| Earthfill, Dumped and Spread | 51 | Earthfill, dumped and spread without compaction effort, includes equipment and labor | Cubic Yard | $3.65 | 1708 | $6,234.20 |
| Truck, Concrete Pump | 1211 | Concrete pump, normally truck mounted. Use this item in association with other concrete components when job requires placement by other than normal chutes. Include drive and setup time in quantity; therefore, do not include mobilization. Includes equi | Hour | $201.97 | 12 | $2,423.64 |
| 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 | $3.77 | 1708 | $6,439.16 |
| Plate compactor | 1915 | Manually guided vibratroy plate compactor. Equipment only. | Hour | $5.07 | 4 | $20.28 |
| **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 | $25.31 | 48 | $1,214.88 |
| 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 | $45.69 | 60 | $2,741.40 |
| **Materials** | | | | | | |
| Aggregate, Gravel, Graded | 46 | Gravel, includes materials, equipment and labor to transport and place. Includes washed and unwashed gravel. | Cubic Yard | $34.75 | 52 | $1,807.00 |
| Cement, Type I or II | 1336 | Type I or II Portland Cement (94 lb. bag), Materials only. | Each | $10.11 | 123 | $1,243.53 |
| Waterstop, PVC, ribbed, 3/16" x 6" | 1614 | Waterstop, PVC, ribbed, 3/16" thick by 6"wide. Includes materials, equipment and labor. | Foot | $6.30 | 188 | $1,184.40 |
| Steel, rebar | 1832 | Steel rebar, grade 60. Materials only. | Pound | $0.52 | 3164 | $1,645.28 |
| **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 | $70.64 | 5 | $353.20 |
| Mobilization, medium equipment | 1139 | Equipment with 70-150 HP or typical weights between 14,000 and 30,000 pounds. | Each | $255.83 | 6 | $1,534.98 |

**Practice:** 313 - Waste Storage Facility

**Scenario** #15 - Conc Tank, Buried 50 to 75K ft3 Storage

**Scenario Description:**

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

**Before Situation:**

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

**After Situation:**

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

**Feature Measure:** Total Volume including free board,

**Scenario Unit::** Cubic Foot

**Scenario Typical Size:** 61,836.0

**Scenario Total Cost:** $134,196.09

**Scenario Cost/Unit:** $2.17

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 | $327.92 | 80 | $26,233.60 |
| Concrete, CIP, formed reinforced | 38 | Steel reinforced concrete formed and cast-in-placed in formed structures such as walls or suspended slabs by chute placement. Typical strength is 3000 to 4000 psi. Includes materials, labor and equipment to transport, place and finish. | Cubic Yard | $510.00 | 122 | $62,220.00 |
| Earthfill, Dumped and Spread | 51 | Earthfill, dumped and spread without compaction effort, includes equipment and labor | Cubic Yard | $3.65 | 3470 | $12,665.50 |
| Truck, Concrete Pump | 1211 | Concrete pump, normally truck mounted. Use this item in association with other concrete components when job requires placement by other than normal chutes. Include drive and setup time in quantity; therefore, do not include mobilization. Includes equi | Hour | $201.97 | 14 | $2,827.58 |
| 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 | $3.77 | 3470 | $13,081.90 |
| Plate compactor | 1915 | Manually guided vibratroy plate compactor. Equipment only. | Hour | $5.07 | 4 | $20.28 |
| **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 | $25.31 | 84 | $2,126.04 |
| Supervisor or Manager | 234 | Labor involving supervision or management activities. Includes crew supervisors, foremen and farm/ranch managers time required for adopting new technology, etc. | Hour | $45.69 | 70 | $3,198.30 |
| **Materials** | | | | | | |
| Aggregate, Gravel, Graded | 46 | Gravel, includes materials, equipment and labor to transport and place. Includes washed and unwashed gravel. | Cubic Yard | $34.75 | 95 | $3,301.25 |
| Cement, Type I or II | 1336 | Type I or II Portland Cement (94 lb. bag), Materials only. | Each | $10.11 | 202 | $2,042.22 |
| Waterstop, PVC, ribbed, 3/16" x 6" | 1614 | Waterstop, PVC, ribbed, 3/16" thick by 6"wide. Includes materials, equipment and labor. | Foot | $6.30 | 254 | $1,600.20 |
| Steel, rebar | 1832 | Steel rebar, grade 60. Materials only. | Pound | $0.52 | 5752 | $2,991.04 |
| **Mobilization** | | | | | | |

| | | | | | | |
|---|---|---|---|---|---|---|
| Mobilization, very small equipment | 1137 | Equipment that is small enough to be transported by a pick-up truck with typical weights less than 3,500 pounds. Can be multiple pieces of equipment if all hauled simultaneously. | Each | $70.64 | 5 | $353.20 |
| Mobilization, medium equipment | 1139 | Equipment with 70-150 HP or typical weights between 14,000 and 30,000 pounds. | Each | $255.83 | 6 | $1,534.98 |

**Practice:** 313 - Waste Storage Facility

**Scenario** #16 - Conc Tank, Buried 75 to 110K ft3 Storage

**Scenario Description:**

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

**Before Situation:**

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

**After Situation:**

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

**Feature Measure:** Total Volume including Freeboard,

**Scenario Unit::** Cubic Foot

**Scenario Typical Size:** 96,142.0

**Scenario Total Cost:** $181,914.50

**Scenario Cost/Unit:** $1.89

Cost Details:

| Component Name | ID | Description | Unit | Cost | QTY | Total |
|---|---|---|---|---|---|---|
| **Equipment Installation** | | | | | | |
| Concrete, CIP, slab on grade, reinforced | 37 | Steel reinforced concrete formed and cast-in-placed as a slab on grade by chute placement. Typical strength is 3000 to 4000 psi. Includes materials, labor and equipment to transport, place and finish. | Cubic Yard | $327.92 | 123 | $40,334.16 |
| Concrete, CIP, formed reinforced | 38 | Steel reinforced concrete formed and cast-in-placed in formed structures such as walls or suspended slabs by chute placement. Typical strength is 3000 to 4000 psi. Includes materials, labor and equipment to transport, place and finish. | Cubic Yard | $510.00 | 153 | $78,030.00 |
| Earthfill, Dumped and Spread | 51 | Earthfill, dumped and spread without compaction effort, includes equipment and labor | Cubic Yard | $3.65 | 4993 | $18,224.45 |
| Truck, Concrete Pump | 1211 | Concrete pump, normally truck mounted. Use this item in association with other concrete components when job requires placement by other than normal chutes. Include drive and setup time in quantity; therefore, do not include mobilization. Includes equi | Hour | $201.97 | 16 | $3,231.52 |
| Excavation, common earth, large equipment, 150 ft | 1223 | Bulk excavation of common earth including sand and gravel with dozer >100 HP with average push distance of 150 feet. Includes equipment and labor. | Cubic Yard | $3.77 | 4993 | $18,823.61 |
| Plate compactor | 1915 | Manually guided vibratroy plate compactor. Equipment only. | Hour | $5.07 | 6 | $30.42 |
| **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 | $25.31 | 129 | $3,264.99 |
| Supervisor 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 | $45.69 | 80 | $3,655.20 |
| **Materials** | | | | | | |
| Aggregate, Gravel, Graded | 46 | Gravel, includes materials, equipment and labor to transport and place. Includes washed and unwashed gravel. | Cubic Yard | $34.75 | 148 | $5,143.00 |
| Cement, Type I or II | 1336 | Type I or II Portland Cement (94 lb. bag), Materials only. | Each | $10.11 | 276 | $2,790.36 |
| Waterstop, PVC, ribbed, 3/16" x 6" | 1614 | Waterstop, PVC, ribbed, 3/16" thick by 6"wide. Includes materials, equipment and labor. | Foot | $6.30 | 317 | $1,997.10 |
| Steel, rebar | 1832 | Steel rebar, grade 60. Materials only. | Pound | $0.52 | 8844 | $4,598.88 |
| **Mobilization** | | | | | | |
| Mobilization, medium equipment | 1139 | Equipment with 70-150 HP or typical weights between 14,000 and 30,000 pounds. | Each | $255.83 | 7 | $1,790.81 |

**Practice:** 313 - Waste Storage Facility

**Scenario** #17 - Conc Tank, Buried over 110K ft3 Storage

**Scenario Description:**

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

**Before Situation:**

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

**After Situation:**

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

**Feature Measure:** Total Volume including Freeboard,

**Scenario Unit::** Cubic Foot

**Scenario Typical Size:** 158,336.0

**Scenario Total Cost:** $268,961.33

**Scenario Cost/Unit:** $1.70

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 | $327.92 | 165 | $54,106.80 |
| Concrete, CIP, formed reinforced | 38 | Steel reinforced concrete formed and cast-in-placed in formed structures such as walls or suspended slabs by chute placement. Typical strength is 3000 to 4000 psi. Includes materials, labor and equipment to transport, place and finish. | Cubic Yard | $510.00 | 245 | $124,950.00 |
| Earthfill, Dumped and Spread | 51 | Earthfill, dumped and spread without compaction effort, includes equipment and labor | Cubic Yard | $3.65 | 7612 | $27,783.80 |
| Truck, Concrete Pump | 1211 | Concrete pump, normally truck mounted. Use this item in association with other concrete components when job requires placement by other than normal chutes. Include drive and setup time in quantity; therefore, do not include mobilization. Includes equi | Hour | $201.97 | 18 | $3,635.46 |
| 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 | $3.77 | 7612 | $28,697.24 |
| Plate compactor | 1915 | Manually guided vibratroy plate compactor. Equipment only. | Hour | $5.07 | 8 | $40.56 |
| **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 | $25.31 | 173 | $4,378.63 |
| Supervisor 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 | $45.69 | 90 | $4,112.10 |
| **Materials** | | | | | | |
| Aggregate, Gravel, Graded | 46 | Gravel, includes materials, equipment and labor to transport and place. Includes washed and unwashed gravel. | Cubic Yard | $34.75 | 197 | $6,845.75 |
| Cement, Type I or II | 1336 | Type I or II Portland Cement (94 lb. bag), Materials only. | Each | $10.11 | 410 | $4,145.10 |
| Waterstop, PVC, ribbed, 3/16" x 6" | 1614 | Waterstop, PVC, ribbed, 3/16" thick by 6"wide. Includes materials, equipment and labor. | Foot | $6.30 | 366 | $2,305.80 |
| Steel, rebar | 1832 | Steel rebar, grade 60. Materials only. | Pound | $0.52 | 11864 | $6,169.28 |
| **Mobilization** | | | | | | |
| Mobilization, medium equipment | 1139 | Equipment with 70-150 HP or typical weights between 14,000 and 30,000 pounds. | Each | $255.83 | 7 | $1,790.81 |

**Practice:** 313 - Waste Storage Facility

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

**Scenario Description:**

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

**Before Situation:**

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

**After Situation:**

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

**Feature Measure:** Area of Facility from Outside Wall t

**Scenario Unit::** Square Foot

**Scenario Typical Size:** 3,200.0

**Scenario Total Cost:** $85,339.25

**Scenario Cost/Unit:** $26.67

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 | $510.00 | 127 | $64,770.00 |
| Geotextile, woven | 42 | Woven Geotextile Fabric. Includes materials, equipment and labor | Square Yard | $2.53 | 330 | $834.90 |
| Excavation, Common Earth, side cast, small equipment | 48 | Bulk excavation and side casting of common earth with hydraulic excavator with less than 1 CY capacity. Includes equipment and labor. | Cubic Yard | $2.36 | 430 | $1,014.80 |
| Earthfill, Manually Compacted | 50 | Earthfill, manually compacted, includes equipment and labor | Cubic Yard | $5.87 | 77 | $451.99 |
| Stripping and stockpiling, topsoil | 1199 | Stripping and stockpiling of topsoil adjacent to stripping area. Includes equipment and labor. | Cubic Yard | $0.89 | 200 | $178.00 |
| Truck, Concrete Pump | 1211 | Concrete pump, normally truck mounted. Use this item in association with other concrete components when job requires placement by other than normal chutes. Include drive and setup time in quantity; therefore, do not include mobilization. Includes equi | Hour | $201.97 | 12 | $2,423.64 |
| 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 | $2.50 | 200 | $500.00 |
| Excavation, common earth, large equipment, 150 ft | 1223 | Bulk excavation of common earth including sand and gravel with dozer >100 HP with average push distance of 150 feet. Includes equipment and labor. | Cubic Yard | $3.77 | 200 | $754.00 |
| **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 | $25.31 | 40 | $1,012.40 |
| 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 | $45.69 | 30 | $1,370.70 |
| **Materials** | | | | | | |
| Aggregate, Sand, Graded, Washed | 45 | Sand, typical ASTM C33 gradation, includes materials, equipment and labor to transport and place | Cubic Yard | $34.29 | 77 | $2,640.33 |
| Aggregate, Gravel, Graded | 46 | Gravel, includes materials, equipment and labor to transport and place. Includes washed and unwashed gravel. | Cubic Yard | $34.75 | 200 | $6,950.00 |

| | | | | | | |
|---|---|---|---|---|---|---|
| Aggregate, Gravel, Ungraded, Quarry Run | 1099 | Includes materials, equipment and labor | Cubic Yard | $23.96 | 55 | $1,317.80 |
| **Mobilization** | | | | | | |
| Mobilization, very small equipment | 1137 | Equipment that is small enough to be transported by a pick-up truck with typical weights less than 3,500 pounds. Can be multiple pieces of equipment if all hauled simultaneously. | Each | $70.64 | 5 | $353.20 |
| Mobilization, medium equipment | 1139 | Equipment with 70-150 HP or typical weights between 14,000 and 30,000 pounds. | Each | $255.83 | 3 | $767.49 |

**Practice:** 313 - Waste Storage Facility

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

**Scenario Description:**

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

**Before Situation:**

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

**After Situation:**

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

**Feature Measure:** Square Foot Floor Area

**Scenario Unit::** Square Foot

**Scenario Typical Size:** 3,200.0

**Scenario Total Cost:** $94,170.00

**Scenario Cost/Unit:** $29.43

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 | $327.92 | 46 | $15,084.32 |
| Concrete, CIP, formed reinforced | 38 | Steel reinforced concrete formed and cast-in-placed in formed structures such as walls or suspended slabs by chute placement. Typical strength is 3000 to 4000 psi. Includes materials, labor and equipment to transport, place and finish. | Cubic Yard | $510.00 | 127 | $64,770.00 |
| 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 | $2.36 | 430 | $1,014.80 |
| Earthfill, Roller Compacted | 49 | Earthfill, roller or machine compacted, includes equipment and labor | Cubic Yard | $4.45 | 200 | $890.00 |
| Earthfill, Manually Compacted | 50 | Earthfill, manually compacted, includes equipment and labor | Cubic Yard | $5.87 | 77 | $451.99 |
| Stripping and stockpiling, topsoil | 1199 | Stripping and stockpiling of topsoil adjacent to stripping area. Includes equipment and labor. | Cubic Yard | $0.89 | 200 | $178.00 |
| Truck, Concrete Pump | 1211 | Concrete pump, normally truck mounted. Use this item in association with other concrete components when job requires placement by other than normal chutes. Include drive and setup time in quantity; therefore, do not include mobilization. Includes equi | Hour | $201.97 | 15 | $3,029.55 |
| 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 | $2.50 | 200 | $500.00 |
| Excavation, common earth, large equipment, 150 ft | 1223 | Bulk excavation of common earth including sand and gravel with dozer >100 HP with average push distance of 150 feet. Includes equipment and labor. | Cubic Yard | $3.77 | 200 | $754.00 |
| **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 | $25.31 | 40 | $1,012.40 |
| 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 | $45.69 | 30 | $1,370.70 |
| **Materials** | | | | | | |
| Aggregate, Gravel, Graded | 46 | Gravel, includes materials, equipment and labor to transport and place. Includes washed and unwashed gravel. | Cubic Yard | $34.75 | 77 | $2,675.75 |

| | | | | | | |
|---|---|---|---|---|---|---|
| Aggregate, Gravel, Ungraded, Quarry Run | 1099 | Includes materials, equipment and labor | Cubic Yard | $23.96 | 55 | $1,317.80 |
| **Mobilization** | | | | | | |
| Mobilization, very small equipment | 1137 | Equipment that is small enough to be transported by a pick-up truck with typical weights less than 3,500 pounds. Can be multiple pieces of equipment if all hauled simultaneously. | Each | $70.64 | 5 | $353.20 |
| Mobilization, medium equipment | 1139 | Equipment with 70-150 HP or typical weights between 14,000 and 30,000 pounds. | Each | $255.83 | 3 | $767.49 |

**Practice:** 313 - Waste Storage Facility

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

**Scenario Description:**

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

**Before Situation:**

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

**After Situation:**

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

**Feature Measure:** Area of Building (Outside Post to O

**Scenario Unit::** Square Foot

**Scenario Typical Size:** 4,307.0

**Scenario Total Cost:** $34,286.85

**Scenario Cost/Unit:** $7.96

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 | $510.00 | 34 | $17,340.00 |
| Geotextile, woven | 42 | Woven Geotextile Fabric. Includes materials, equipment and labor | Square Yard | $2.53 | 480 | $1,214.40 |
| 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 | $2.36 | 155 | $365.80 |
| Earthfill, Roller Compacted | 49 | Earthfill, roller or machine compacted, includes equipment and labor | Cubic Yard | $4.45 | 160 | $712.00 |
| Earthfill, Manually Compacted | 50 | Earthfill, manually compacted, includes equipment and labor | Cubic Yard | $5.87 | 155 | $909.85 |
| Stripping and stockpiling, topsoil | 1199 | Stripping and stockpiling of topsoil adjacent to stripping area. Includes equipment and labor. | Cubic Yard | $0.89 | 160 | $142.40 |
| 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 | $2.50 | 315 | $787.50 |
| 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 | $3.77 | 160 | $603.20 |
| **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 | $25.31 | 80 | $2,024.80 |
| Supervisor or Manager | 234 | Labor involving supervision or management activities. Includes crew supervisors, foremen and farm/ranch managers time required for adopting new technology, etc. | Hour | $45.69 | 30 | $1,370.70 |
| **Materials** | | | | | | |
| Aggregate, Gravel, Ungraded, Quarry Run | 1099 | Includes materials, equipment and labor | Cubic Yard | $23.96 | 80 | $1,916.80 |
| 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 | $1.62 | 3540 | $5,734.80 |
| **Mobilization** | | | | | | |

| | | | | | | |
|---|---|---|---|---|---|---|
| Mobilization, very small equipment | 1137 | Equipment that is small enough to be transported by a pick-up truck with typical weights less than 3,500 pounds. Can be multiple pieces of equipment if all hauled simultaneously. | Each | $70.64 | 2 | $141.28 |
| Mobilization, medium equipment | 1139 | Equipment with 70-150 HP or typical weights between 14,000 and 30,000 pounds. | Each | $255.83 | 4 | $1,023.32 |

**Practice:** 313 - Waste Storage Facility

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

**Scenario Description:**

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

**Before Situation:**

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

**After Situation:**

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

**Feature Measure:** Square Foot Floor Area

**Scenario Unit::** Square Foot

**Scenario Typical Size:** 4,307.0

**Scenario Total Cost:** $56,943.27

**Scenario Cost/Unit:** $13.22

Cost Details:

| Component Name | ID | Description | Unit | Cost | QTY | Total |
|---|---|---|---|---|---|---|
| **Equipment Installation** | | | | | | |
| Concrete, CIP, slab on grade, reinforced | 37 | Steel reinforced concrete formed and cast-in-placed as a slab on grade by chute placement. Typical strength is 3000 to 4000 psi. Includes materials, labor and equipment to transport, place and finish. | Cubic Yard | $327.92 | 66 | $21,642.72 |
| Concrete, CIP, formed reinforced | 38 | Steel reinforced concrete formed and cast-in-placed in formed structures such as walls or suspended slabs by chute placement. Typical strength is 3000 to 4000 psi. Includes materials, labor and equipment to transport, place and finish. | Cubic Yard | $510.00 | 34 | $17,340.00 |
| 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 | $2.36 | 155 | $365.80 |
| Earthfill, Roller Compacted | 49 | Earthfill, roller or machine compacted, includes equipment and labor | Cubic Yard | $4.45 | 160 | $712.00 |
| Earthfill, Manually Compacted | 50 | Earthfill, manually compacted, includes equipment and labor | Cubic Yard | $5.87 | 235 | $1,379.45 |
| Stripping and stockpiling, topsoil | 1199 | Stripping and stockpiling of topsoil adjacent to stripping area. Includes equipment and labor. | Cubic Yard | $0.89 | 160 | $142.40 |
| Truck, Concrete Pump | 1211 | Concrete pump, normally truck mounted. Use this item in association with other concrete components when job requires placement by other than normal chutes. Include drive and setup time in quantity; therefore, do not include mobilization. Includes equi | Hour | $201.97 | 5 | $1,009.85 |
| 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 | $2.50 | 315 | $787.50 |
| 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 | $3.77 | 160 | $603.20 |
| **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 | $25.31 | 80 | $2,024.80 |
| Supervisor or Manager | 234 | Labor involving supervision or management activities. Includes crew supervisors, foremen and farm/ranch managers time required for adopting new technology, etc. | Hour | $45.69 | 30 | $1,370.70 |
| **Materials** | | | | | | |
| Aggregate, Gravel, Graded | 46 | Gravel, includes materials, equipment and labor to transport and place. Includes washed and unwashed gravel. | Cubic Yard | $34.75 | 80 | $2,780.00 |

| | | | | | | |
|---|---|---|---|---|---|---|
| Lumber, planks, posts and timbers, treated | 1609 | Treated dimension lumber with nominal thickness greater than 2". Includes lumber and fasteners. Does not include labor. | Board Foot | $1.62 | 3540 | $5,734.80 |
| **Mobilization** | | | | | | |
| Mobilization, very small equipment | 1137 | Equipment that is small enough to be transported by a pick-up truck with typical weights less than 3,500 pounds. Can be multiple pieces of equipment if all hauled simultaneously. | Each | $70.64 | 4 | $282.56 |
| Mobilization, medium equipment | 1139 | Equipment with 70-150 HP or typical weights between 14,000 and 30,000 pounds. | Each | $255.83 | 3 | $767.49 |

**Practice:** 313 - Waste Storage Facility

**Scenario** #22 - Concrete Stacking Slab without Curb

**Scenario Description:**

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

**Before Situation:**

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

**After Situation:**

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

**Feature Measure:** Area of Concrete Slab

**Scenario Unit::** Square Foot

**Scenario Typical Size:** 2,000.0

**Scenario Total Cost:** $15,036.77

**Scenario Cost/Unit:** $7.52

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 | $327.92 | 31 | $10,165.52 |
| Earthfill, Dumped and Spread | 51 | Earthfill, dumped and spread without compaction effort, includes equipment and labor | Cubic Yard | $3.65 | 111 | $405.15 |
| 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 | $3.77 | 111 | $418.47 |
| Plate compactor | 1915 | Manually guided vibratroy plate compactor. Equipment only. | Hour | $5.07 | 2 | $10.14 |
| Plate compactor | 1915 | Manually guided vibratroy plate compactor. Equipment only. | Hour | $5.07 | 2 | $10.14 |
| **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 | $45.69 | 10 | $456.90 |
| **Materials** | | | | | | |
| Aggregate, Gravel, Graded | 46 | Gravel, includes materials, equipment and labor to transport and place. Includes washed and unwashed gravel. | Cubic Yard | $34.75 | 37 | $1,285.75 |
| Aggregate, Gravel, Ungraded, Quarry Run | 1099 | Includes materials, equipment and labor | Cubic Yard | $23.96 | 74 | $1,773.04 |
| **Mobilization** | | | | | | |
| Mobilization, medium equipment | 1139 | Equipment with 70-150 HP or typical weights between 14,000 and 30,000 pounds. | Each | $255.83 | 2 | $511.66 |

**Practice:** 313 - Waste Storage Facility

**Scenario** #23 - Concrete Stacking Slab with Curb

**Scenario Description:**

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

**Before Situation:**

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

**After Situation:**

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

**Feature Measure:** Area of Concrete Slab

**Scenario Unit::** Square Foot

**Scenario Typical Size:** 2,000.0

**Scenario Total Cost:** $21,452.25

**Scenario Cost/Unit:** $10.73

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 | $327.92 | 31 | $10,165.52 |
| 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 | $510.00 | 12.5 | $6,375.00 |
| Earthfill, Dumped and Spread | 51 | Earthfill, dumped and spread without compaction effort, includes equipment and labor | Cubic Yard | $3.65 | 111 | $405.15 |
| 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 | $3.77 | 111 | $418.47 |
| Plate compactor | 1915 | Manually guided vibratroy plate compactor. Equipment only. | Hour | $5.07 | 2 | $10.14 |
| **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 | $25.31 | 2 | $50.62 |
| 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 | $45.69 | 10 | $456.90 |
| **Materials** | | | | | | |
| Aggregate, Gravel, Graded | 46 | Gravel, includes materials, equipment and labor to transport and place. Includes washed and unwashed gravel. | Cubic Yard | $34.75 | 37 | $1,285.75 |
| Aggregate, Gravel, Ungraded, Quarry Run | 1099 | Includes materials, equipment and labor | Cubic Yard | $23.96 | 74 | $1,773.04 |
| **Mobilization** | | | | | | |
| Mobilization, medium equipment | 1139 | Equipment with 70-150 HP or typical weights between 14,000 and 30,000 pounds. | Each | $255.83 | 2 | $511.66 |

**Practice:** 313 - Waste Storage Facility

**Scenario** #24 - Plastic Tank

**Scenario Description:**

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

**Before Situation:**

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

**After Situation:**

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

**Feature Measure:** "Strike Full" Volume

**Scenario Unit::** Cubic Foot

**Scenario Typical Size:** 1,340.0

**Scenario Total Cost:** $18,966.99

**Scenario Cost/Unit:** $14.15

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 | $327.92 | 8 | $2,623.36 |
| Geotextile, woven | 42 | Woven Geotextile Fabric. Includes materials, equipment and labor | Square Yard | $2.53 | 30 | $75.90 |
| Earthfill, Manually Compacted | 50 | Earthfill, manually compacted, includes equipment and labor | Cubic Yard | $5.87 | 773 | $4,537.51 |
| 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 | $1.59 | 875 | $1,391.25 |
| Plate compactor | 1915 | Manually guided vibratroy plate compactor. Equipment only. | Hour | $5.07 | 2 | $10.14 |
| **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 | $25.31 | 2 | $50.62 |
| 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 | $45.69 | 4 | $182.76 |
| **Materials** | | | | | | |
| Aggregate, Gravel, Graded | 46 | Gravel, includes materials, equipment and labor to transport and place. Includes washed and unwashed gravel. | Cubic Yard | $34.75 | 52 | $1,807.00 |
| Tank, rinsate or chemical storage, > 1,000 gal | 2397 | Poly tank reservoir for storing rinsate or other liquid agrichemicals. Greater than 1,000 gallon capacity. Materials only. | Gallon | $0.78 | 10000 | $7,800.00 |
| **Mobilization** | | | | | | |
| Mobilization, large equipment | 1140 | Equipment >150HP or typical weights greater than 30,000 pounds or loads requiring over width or over length permits. | Each | $488.45 | 1 | $488.45 |

**Practice:** 313 - Waste Storage Facility

**Scenario** #25 - Timber Sided with Concrete Floor

**Scenario Description:**

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

**Before Situation:**

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

**After Situation:**

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

**Feature Measure:** "Strike Full" Volume

**Scenario Unit::** Cubic Foot

**Scenario Typical Size:** 3,600.0

**Scenario Total Cost:** $13,851.15

**Scenario Cost/Unit:** $3.85

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 | $327.92 | 17 | $5,574.64 |
| 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 | $510.00 | 3 | $1,530.00 |
| Earthfill, Manually Compacted | 50 | Earthfill, manually compacted, includes equipment and labor | Cubic Yard | $5.87 | 36 | $211.32 |
| 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 | $62.74 | 20 | $1,254.80 |
| Plate compactor | 1915 | Manually guided vibratroy plate compactor. Equipment only. | Hour | $5.07 | 4 | $20.28 |
| **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 | $41.76 | 30 | $1,252.80 |
| 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 | $25.31 | 4 | $101.24 |
| Equipment Operators, Light | 232 | Includes: Skid Steer Loaders, Hydraulic Excavators <50 HP, Trenchers <12", Ag Equipment <150 HP, Pickup Trucks, Forklifts, Mulchers | Hour | $25.23 | 20 | $504.60 |
| **Materials** | | | | | | |
| Aggregate, Gravel, Graded | 46 | Gravel, includes materials, equipment and labor to transport and place. Includes washed and unwashed gravel. | Cubic Yard | $34.75 | 20 | $695.00 |
| Dimension Lumber, Treated | 1044 | Treated dimension lumber with nominal thickness equal or less than 2". Includes lumber and fasteners | Board Foot | $0.90 | 656 | $590.40 |
| Lumber, planks, posts and timbers, treated | 1609 | Treated dimension lumber with nominal thickness greater than 2". Includes lumber and fasteners. Does not include labor. | Board Foot | $1.62 | 1200 | $1,944.00 |
| **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 | $172.07 | 1 | $172.07 |

**Practice:** 313 - Waste Storage Facility

**Scenario** #26 - Concrete Liner up to 16K Square Feet

**Scenario Description:**

Install a water tight concrete liner inside an earthen WSF to store wastes such as manure, wastewater, and contaminated runoff as part of an agricultural waste management system. This practice will address soil and water quality by reducing the pollution potential for surface water and groundwater quality degradation. Potential Associated Practices: Fence (382), Critical Area Planting (342), Nutrient Management (590), Waste Transfer (634), Heavy Use Area Protection (561), Solid/Liquid Waste Separation Facility (632), and Pumping Plant (533).

**Before Situation:**

Manure and other agricultural waste by-products are not being utilized, controlled, or managed in an environmentally safe manner. In situ soils do not meet NRCS permeability requirements. The situation poses an environmental threat of excessive nutrients, organics, and pathogens being transported into surface and groundwater resources.

**After Situation:**

A watertight concrete liner is desired to properly store manure and other agricultural waste by-products in an environmentally safe manner. Concrete liner is desired to minimize seepage of agricultural waste into the ground water while allowing the operator to mobilize equipment into the waste storage facility so he/she can remove accumulated solids and sand bedding. This facility will also allow the operator to store waste until it can be utilized in a proper manner in accordance with a nutrient management plan. Typical design : Liner will be installed on the inside slope of an earthen waste storage facility, liner will cover the bottom and side slopes of the facility. The liner will be 5" thick with steel rebar reinforcement. 4" of drainfill material will be placed and compacted on the bottom to absorb excess water produced by rain or small seeps. Drainfill for side slopes is not needed. Watertight construction joints will have to be installed at critical locations in the liner. Typical liner size = 15,232 square feet. (WSF - 12' Deep, 60' x 60' at bottom, 2.5 to 1 side slopes)

**Feature Measure:** Square Feet of Liner

**Scenario Unit::** Square Foot

**Scenario Typical Size:** 15,232.0

**Scenario Total Cost:** $98,353.88

**Scenario Cost/Unit:** $6.46

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 | $327.92 | 235 | $77,061.20 |
| Truck, Concrete Pump | 1211 | Concrete pump, normally truck mounted. Use this item in association with other concrete components when job requires placement by other than normal chutes. Include drive and setup time in quantity; therefore, do not include mobilization. Includes equi | Hour | $201.97 | 12 | $2,423.64 |
| Plate compactor | 1915 | Manually guided vibratroy plate compactor. Equipment only. | Hour | $5.07 | 4 | $20.28 |
| **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 | $25.31 | 255 | $6,454.05 |
| Supervisor 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 | $45.69 | 10 | $456.90 |
| **Materials** | | | | | | |
| Aggregate, Gravel, Graded | 46 | Gravel, includes materials, equipment and labor to transport and place. Includes washed and unwashed gravel. | Cubic Yard | $34.75 | 44 | $1,529.00 |
| Cement, Type I or II | 1336 | Type I or II Portland Cement (94 lb. bag), Materials only. | Each | $10.11 | 235 | $2,375.85 |
| Steel, rebar | 1832 | Steel rebar, grade 60. Materials only. | Pound | $0.52 | 13560 | $7,051.20 |
| Waterstop, Bentonite, half-round, 3/4"x 3/8" | 2362 | Flexible and expandible bentonite strip for concrete construction. Half round profile of 3/4" x 3/8". Includes materials and shipping only. | Foot | $2.36 | 416 | $981.76 |

**Practice:** 313 - Waste Storage Facility

**Scenario** #27 - Concrete Liner over 16K Square Feet

**Scenario Description:**

Install a water tight concrete liner inside an earthen WSF to store wastes such as manure, wastewater, and contaminated runoff as part of an agricultural waste management system. This practice will address soil and water quality by reducing the pollution potential for surface water and groundwater quality degradation. Potential Associated Practices: Fence (382), Critical Area Planting (342), Nutrient Management (590), Waste Transfer (634), Heavy Use Area Protection (561), Solid/Liquid Waste Separation Facility (632), and Pumping Plant (533).

**Before Situation:**

Manure and other agricultural waste by-products are not being utilized, controlled, or managed in an environmentally safe manner. In situ soils do not meet NRCS permeability requirements. The situation poses an environmental threat of excessive nutrients, organics, and pathogens being transported into surface and groundwater resources.

**After Situation:**

A watertight concrete liner is desired to properly store manure and other agricultural waste by-products in an environmentally safe manner. Concrete liner is desired to minimize seepage of agricultural waste into the ground water while allowing the operator to mobilize equipment into the waste storage facility so he/she can remove accumulated solids and sand bedding. This facility will also allow the operator to store waste until it can be utilized in a proper manner in accordance with a nutrient management plan. Typical design : Liner will be installed on the inside slope of an earthen waste storage facility, liner will cover the bottom and side slopes of the facility. The liner will be 5" thick with steel rebar reinforcement. 4" of drainfill material will be placed and compacted on the bottom to absorb excess water produced by rain or small seeps. Drainfill for side slopes is not needed. Watertight construction joints will have to be installed at critical locations in the liner. Typical liner size = 30,194 square feet. (WSF - 12' Deep, 110' x 110' at bottom, 2.5 to 1 side slopes)

**Feature Measure:** Square Feet of Liner

**Scenario Unit::** Square Foot

**Scenario Typical Size:** 30,194.0

**Scenario Total Cost:** $186,598.02

**Scenario Cost/Unit:** $6.18

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 | $327.92 | 466 | $152,810.72 |
| Truck, Concrete Pump | 1211 | Concrete pump, normally truck mounted. Use this item in association with other concrete components when job requires placement by other than normal chutes. Include drive and setup time in quantity; therefore, do not include mobilization. Includes equi | Hour | $201.97 | 20 | $4,039.40 |
| Plate compactor | 1915 | Manually guided vibratroy plate compactor. Equipment only. | Hour | $5.07 | 8 | $40.56 |
| **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 | $45.69 | 20 | $913.80 |
| **Materials** | | | | | | |
| Aggregate, Gravel, Graded | 46 | Gravel, includes materials, equipment and labor to transport and place. Includes washed and unwashed gravel. | Cubic Yard | $34.75 | 148 | $5,143.00 |
| Cement, Type I or II | 1336 | Type I or II Portland Cement (94 lb. bag), Materials only. | Each | $10.11 | 466 | $4,711.26 |
| Steel, rebar | 1832 | Steel rebar, grade 60. Materials only. | Pound | $0.52 | 33505 | $17,422.60 |
| Steel, rebar | 1832 | Steel rebar, grade 60. Materials only. | Pound | $0.52 | 121 | $62.92 |
| Waterstop, Bentonite, half-round, 3/4"x 3/8" | 2362 | Flexible and expandible bentonite strip for concrete construction. Half round profile of 3/4" x 3/8". Includes materials and shipping only. | Foot | $2.36 | 616 | $1,453.76 |

**Practice:** 314 - Brush Management

**Scenario** #1 - Brush Hog

**Scenario Description:**

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

**Before Situation:**

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

**After Situation:**

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

**Feature Measure:** Acres planned

**Scenario Unit::** Acre

**Scenario Typical Size:** 5.0

**Scenario Total Cost:** $712.05

**Scenario Cost/Unit:** $142.41

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 | $51.91 | 7 | $363.37 |
| **Labor** | | | | | | |
| Equipment Operators, Light | 232 | Includes: Skid Steer Loaders, Hydraulic Excavators <50 HP, Trenchers <12", Ag Equipment <150 HP, Pickup Trucks, Forklifts, Mulchers | Hour | $25.23 | 7 | $176.61 |
| **Mobilization** | | | | | | |
| Mobilization, small equipment | 1138 | Equipment <70 HP but can't be transported by a pick-up truck or with typical weights between 3,500 to 14,000 pounds. | Each | $172.07 | 1 | $172.07 |

**Practice:** 314 - Brush Management

**Scenario** #2 - Light Mechanical

**Scenario Description:**

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

**Before Situation:**

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

**After Situation:**

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

**Feature Measure:** Acres planned

**Scenario Unit::** Acre

**Scenario Typical Size:** 3.0

**Scenario Total Cost:** $1,158.56

**Scenario Cost/Unit:** $386.19

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 | 9 | $759.42 |
| **Labor** | | | | | | |
| Equipment Operators, Light | 232 | Includes: Skid Steer Loaders, Hydraulic Excavators <50 HP, Trenchers <12", Ag Equipment <150 HP, Pickup Trucks, Forklifts, Mulchers | Hour | $25.23 | 9 | $227.07 |
| **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 | $172.07 | 1 | $172.07 |

**Practice:** 314 - Brush Management

**Scenario** #3 - Medium Mechanical

**Scenario Description:**

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

**Before Situation:**

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

**After Situation:**

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

**Feature Measure:** Acres planned

**Scenario Unit::** Acre

**Scenario Typical Size:** 3.0

**Scenario Total Cost:** $1,954.61

**Scenario Cost/Unit:** $651.54

Cost Details:

| Component Name | ID | Description | Unit | Cost | QTY | Total |
|---|---|---|---|---|---|---|
| **Equipment Installation** | | | | | | |
| Chainsaw | 937 | Equipment and power unit costs. Labor not included. | Hour | $4.37 | 3 | $13.11 |
| Mechanical cutter, chopper | 943 | Forestry mulcher, flail shredder, hydro axe, brush cutter, etc. Equipment and power unit costs. Labor not included. | Hour | $84.38 | 15 | $1,265.70 |
| **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 | $41.76 | 3 | $125.28 |
| Equipment Operators, Light | 232 | Includes: Skid Steer Loaders, Hydraulic Excavators <50 HP, Trenchers <12", Ag Equipment <150 HP, Pickup Trucks, Forklifts, Mulchers | Hour | $25.23 | 15 | $378.45 |
| **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 | $172.07 | 1 | $172.07 |

**Practice:** 314 - Brush Management

**Scenario** #4 - Heavy Mechanical

**Scenario Description:**

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

**Before Situation:**

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

**After Situation:**

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

**Feature Measure:** Acres planned

**Scenario Unit::** Acre

**Scenario Typical Size:** 2.0

**Scenario Total Cost:** $1,671.91

**Scenario Cost/Unit:** $835.96

Cost Details:

| Component Name | ID | Description | Unit | Cost | QTY | Total |
|---|---|---|---|---|---|---|
| **Equipment Installation** | | | | | | |
| Chainsaw | 937 | Equipment and power unit costs. Labor not included. | Hour | $4.37 | 4 | $17.48 |
| 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** | | | | | | |
| Skilled Labor | 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 | $41.76 | 4 | $167.04 |
| Equipment Operators, Light | 232 | Includes: Skid Steer Loaders, Hydraulic Excavators <50 HP, Trenchers <12", Ag Equipment <150 HP, Pickup Trucks, Forklifts, Mulchers | Hour | $25.23 | 12 | $302.76 |
| **Mobilization** | | | | | | |
| Mobilization, small equipment | 1138 | Equipment <70 HP but can't be transported by a pick-up truck or with typical weights between 3,500 to 14,000 pounds. | Each | $172.07 | 1 | $172.07 |

**Practice:** 314 - Brush Management

**Scenario** #5 - Mechanical Chemical

**Scenario Description:**

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

**Before Situation:**

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

**After Situation:**

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

**Feature Measure:** Acres planned

**Scenario Unit::** Acre

**Scenario Typical Size:** 3.0

**Scenario Total Cost:** $3,157.83

**Scenario Cost/Unit:** $1,052.61

Cost Details:

| Component Name | ID | Description | Unit | Cost | QTY | Total |
|---|---|---|---|---|---|---|
| **Equipment Installation** | | | | | | |
| Chainsaw | 937 | Equipment and power unit costs. Labor not included. | Hour | $4.37 | 5 | $21.85 |
| Mechanical cutter, chopper | 943 | Forestry mulcher, flail shredder, hydro axe, brush cutter, etc. Equipment and power unit costs. Labor not included. | Hour | $84.38 | 15 | $1,265.70 |
| Chemical, ground application | 948 | Chemical application performed by ground equipment. Includes equipment, power unit and labor costs. | Acre | $6.13 | 3 | $18.39 |
| **Labor** | | | | | | |
| Skilled Labor | 230 | Labor requiring a high level skill set: Includes carpenters, welders, electricians, conservation professionals involved with data collection, monitoring, and or record keeping, etc. | Hour | $41.76 | 20 | $835.20 |
| Equipment Operators, Light | 232 | Includes: Skid Steer Loaders, Hydraulic Excavators <50 HP, Trenchers <12", Ag Equipment <150 HP, Pickup Trucks, Forklifts, Mulchers | Hour | $25.23 | 15 | $378.45 |
| Specialist Labor | 235 | Labor requiring a specialized skill set: Includes 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 | $110.71 | 1 | $110.71 |
| **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 | $17.48 | 3 | $52.44 |
| Herbicide, Triclopyor | 338 | Refer to WIN-PST for product names and active ingredients. Materials and shipping | Acre | $42.37 | 3 | $127.11 |
| 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 shi | Acre | $1.28 | 3 | $3.84 |
| **Mobilization** | | | | | | |
| Mobilization, small equipment | 1138 | Equipment <70 HP but can't be transported by a pick-up truck or with typical weights between 3,500 to 14,000 pounds. | Each | $172.07 | 2 | $344.14 |

**Practice:** 314 - Brush Management

**Scenario** #6 - Chemical Moderate

**Scenario Description:**

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

**Before Situation:**

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

**After Situation:**

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

**Feature Measure:** Acres planned

**Scenario Unit::** Acre

**Scenario Typical Size:** 1.0

**Scenario Total Cost:** $507.91

**Scenario Cost/Unit:** $507.91

Cost Details:

| Component Name | ID | Description | Unit | Cost | QTY | Total |
|---|---|---|---|---|---|---|
| **Equipment Installation** | | | | | | |
| Chainsaw | 937 | Equipment and power unit costs. Labor not included. | Hour | $4.37 | 2 | $8.74 |
| Chemical, ground application | 948 | Chemical application performed by ground equipment. Includes equipment, power unit and labor costs. | Acre | $6.13 | 1 | $6.13 |
| **Labor** | | | | | | |
| Skilled Labor | 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 | $41.76 | 6 | $250.56 |
| Specialist Labor | 235 | Labor requiring a specialized skill set: Includes Agronomists, Foresters, Biologists, etc. to provide additional technical information during the planning and implementation of the practice. Does not include NRCS or TSP services. | Hour | $110.71 | 1 | $110.71 |
| **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 | $17.48 | 1 | $17.48 |
| Herbicide, Triclopyor | 338 | Refer to WIN-PST for product names and active ingredients. Materials and shipping | Acre | $42.37 | 1 | $42.37 |
| 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 shi | Acre | $1.28 | 1 | $1.28 |
| **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 | $70.64 | 1 | $70.64 |

**Practice:** 314 - Brush Management

**Scenario** #7 - Chemical Moderate & Follow-up

**Scenario Description:**

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

**Before Situation:**

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

**After Situation:**

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

**Feature Measure:** Acres planned

**Scenario Unit::** Acre

**Scenario Typical Size:** 1.0

**Scenario Total Cost:** $942.79

**Scenario Cost/Unit:** $942.79

Cost Details:

| Component Name | ID | Description | Unit | Cost | QTY | Total |
|---|---|---|---|---|---|---|
| **Equipment Installation** | | | | | | |
| Chainsaw | 937 | Equipment and power unit costs. Labor not included. | Hour | $4.37 | 3 | $13.11 |
| Chemical, ground application | 948 | Chemical application performed by ground equipment. Includes equipment, power unit and labor costs. | Acre | $6.13 | 1.6 | $9.81 |
| **Labor** | | | | | | |
| Skilled Labor | 230 | Labor requiring a high level skill set: Includes carpenters, welders, electricians, conservation professionals involved with data collection, monitoring, and or record keeping, etc. | Hour | $41.76 | 11 | $459.36 |
| Specialist Labor | 235 | Labor requiring a specialized skill set: Includes Agronomists, Foresters, Biologists, etc. to provide additional technical information during the planning and implementation of the practice. Does not include NRCS or TSP services. | Hour | $110.71 | 2 | $221.42 |
| **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 | $17.48 | 1.6 | $27.97 |
| Herbicide, Triclopyor | 338 | Refer to WIN-PST for product names and active ingredients. Materials and shipping | Acre | $42.37 | 1.6 | $67.79 |
| 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 shi | Acre | $1.28 | 1.6 | $2.05 |
| **Mobilization** | | | | | | |
| Mobilization, very small equipment | 1137 | Equipment that is small enough to be transported by a pick-up truck with typical weights less than 3,500 pounds. Can be multiple pieces of equipment if all hauled simultaneously. | Each | $70.64 | 2 | $141.28 |

**Practice:** 314 - Brush Management

**Scenario** #8 - Chemical Difficult Control

**Scenario Description:**

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

**Before Situation:**

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

**After Situation:**

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

**Feature Measure:** Acres treated

**Scenario Unit::** Acre

**Scenario Typical Size:** 1.0

**Scenario Total Cost:** $1,007.31

**Scenario Cost/Unit:** $1,007.31

Cost Details:

| Component Name | ID | Description | Unit | Cost | QTY | Total |
|---|---|---|---|---|---|---|
| **Equipment Installation** | | | | | | |
| Chainsaw | 937 | Equipment and power unit costs. Labor not included. | Hour | $4.37 | 6 | $26.22 |
| Chemical, ground application | 948 | Chemical application performed by ground equipment. Includes equipment, power unit and labor costs. | Acre | $6.13 | 1 | $6.13 |
| **Labor** | | | | | | |
| Skilled Labor | 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 | $41.76 | 14 | $584.64 |
| Specialist Labor | 235 | Labor requiring a specialized skill set: Includes 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 | $110.71 | 2 | $221.42 |
| **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 | $17.48 | 1 | $17.48 |
| 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 | $37.13 | 1 | $37.13 |
| Herbicide, Triclopyor | 338 | Refer to WIN-PST for product names and active ingredients. Materials and shipping | Acre | $42.37 | 1 | $42.37 |
| 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 shi | Acre | $1.28 | 1 | $1.28 |
| **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 | $70.64 | 1 | $70.64 |

**Practice:** 314 - Brush Management

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

**Scenario Description:**

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

**Before Situation:**

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

**After Situation:**

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

**Feature Measure:** Acres planned

**Scenario Unit::** Acre

**Scenario Typical Size:** 1.0

**Scenario Total Cost:** $1,485.34

**Scenario Cost/Unit:** $1,485.34

Cost Details:

| Component Name | ID | Description | Unit | Cost | QTY | Total |
|---|---|---|---|---|---|---|
| **Equipment Installation** | | | | | | |
| Chainsaw | 937 | Equipment and power unit costs. Labor not included. | Hour | $4.37 | 7 | $30.59 |
| Chemical, ground application | 948 | Chemical application performed by ground equipment. Includes equipment, power unit and labor costs. | Acre | $6.13 | 1.8 | $11.03 |
| **Labor** | | | | | | |
| Skilled Labor | 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 | $41.76 | 19 | $793.44 |
| Specialist Labor | 235 | Labor requiring a specialized skill set: Includes Agronomists, Foresters, Biologists, etc. to provide additional technical information during the planning and implementation of the practice. Does not include NRCS or TSP services. | Hour | $110.71 | 3 | $332.13 |
| **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 | $17.48 | 1.8 | $31.46 |
| 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 | $37.13 | 1.8 | $66.83 |
| Herbicide, Triclopyor | 338 | Refer to WIN-PST for product names and active ingredients. Materials and shipping | Acre | $42.37 | 1.8 | $76.27 |
| 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 shi | Acre | $1.28 | 1.8 | $2.30 |
| **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 | $70.64 | 2 | $141.28 |

**Practice:** 314 - Brush Management

**Scenario** #10 - Manual, Hand tools

**Scenario Description:**

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

**Before Situation:**

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

**After Situation:**

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

**Feature Measure:** Acres treated

**Scenario Unit::** Acre

**Scenario Typical Size:** 1.0

**Scenario Total Cost:** $82.29

**Scenario Cost/Unit:** $82.29

Cost Details:

| Component Name | ID | Description | Unit | Cost | QTY | Total |
|---|---|---|---|---|---|---|
| **Equipment Installation** | | | | | | |
| Truck, Pickup | 939 | Equipment and power unit costs. Labor not included. | Hour | $21.79 | 1 | $21.79 |
| Pruning tools, hand tools | 1318 | Pruning tools, hand tools, shears, loppers, pole saw, handsaw. Material costs only. Labor not included. | Hour | $4.94 | 2 | $9.88 |
| **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 | $25.31 | 2 | $50.62 |

**Practice:** 314 - Brush Management

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

**Scenario Description:**

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

**Before Situation:**

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

**After Situation:**

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

**Feature Measure:** Acres planned

**Scenario Unit::** Acre

**Scenario Typical Size:** 1.0

**Scenario Total Cost:** $112.54

**Scenario Cost/Unit:** $112.54

Cost Details:

| Component Name | ID | Description | Unit | Cost | QTY | Total |
|---|---|---|---|---|---|---|
| **Equipment Installation** | | | | | | |
| Truck, Pickup | 939 | Equipment and power unit costs. Labor not included. | Hour | $21.79 | 1 | $21.79 |
| Pruning tools, hand tools | 1318 | Pruning tools, hand tools, shears, loppers, pole saw, handsaw. Material costs only. Labor not included. | Hour | $4.94 | 3 | $14.82 |
| **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 | $25.31 | 3 | $75.93 |

**Practice:** 315 - Herbaceous Weed Control

**Scenario** #1 - Low Density

**Scenario Description:**

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

**Before Situation:**

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

**After Situation:**

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

**Feature Measure:** Acres treated

**Scenario Unit::** Acre

**Scenario Typical Size:** 5.0

**Scenario Total Cost:** $364.92

**Scenario Cost/Unit:** $72.98

Cost Details:

| Component Name | ID | Description | Unit | Cost | QTY | Total |
|---|---|---|---|---|---|---|
| **Equipment Installation** | | | | | | |
| Mower, Bush Hog | 940 | Equipment and power unit costs. Labor not included. | Hour | $51.91 | 2.5 | $129.78 |
| **Labor** | | | | | | |
| Equipment Operators, Light | 232 | Includes: Skid Steer Loaders, Hydraulic Excavators <50 HP, Trenchers <12", Ag Equipment <150 HP, Pickup Trucks, Forklifts, Mulchers | Hour | $25.23 | 2.5 | $63.08 |
| **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 | $172.07 | 1 | $172.07 |

**Practice:** 315 - Herbaceous Weed Control

**Scenario** #2 - Low Density with Follow Up

**Scenario Description:**

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

**Before Situation:**

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

**After Situation:**

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

**Feature Measure:** Acres treated

**Scenario Unit::** Acre

**Scenario Typical Size:** 5.0

**Scenario Total Cost:** $652.70

**Scenario Cost/Unit:** $130.54

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 | $51.91 | 4 | $207.64 |
| **Labor** | | | | | | |
| Equipment Operators, Light | 232 | Includes: Skid Steer Loaders, Hydraulic Excavators <50 HP, Trenchers <12", Ag Equipment <150 HP, Pickup Trucks, Forklifts, Mulchers | Hour | $25.23 | 4 | $100.92 |
| **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 | $172.07 | 2 | $344.14 |

**Practice:** 315 - Herbaceous Weed Control

**Scenario** #3 - Moderate Density

**Scenario Description:**

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

**Before Situation:**

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

**After Situation:**

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

**Feature Measure:** Acres treated

**Scenario Unit::** Acre

**Scenario Typical Size:** 1.0

**Scenario Total Cost:** $308.99

**Scenario Cost/Unit:** $308.99

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 | $64.90 | 3 | $194.70 |
| **Materials** | | | | | | |
| Herbicide, Triclopyor | 338 | Refer to WIN-PST for product names and active ingredients. Materials and shipping | Acre | $42.37 | 1 | $42.37 |
| 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 shi | Acre | $1.28 | 1 | $1.28 |
| **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 | $70.64 | 1 | $70.64 |

**Practice:** 315 - Herbaceous Weed Control

**Scenario** #4 - Moderate Density with Follow Up

**Scenario Description:**

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

**Before Situation:**

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

**After Situation:**

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

**Feature Measure:** Acres treated

**Scenario Unit::** Acre

**Scenario Typical Size:** 1.0

**Scenario Total Cost:** $498.81

**Scenario Cost/Unit:** $498.81

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 | $64.90 | 4.5 | $292.05 |
| **Materials** | | | | | | |
| Herbicide, Triclopyor | 338 | Refer to WIN-PST for product names and active ingredients. Materials and shipping | Acre | $42.37 | 1.5 | $63.56 |
| 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 shi | Acre | $1.28 | 1.5 | $1.92 |
| **Mobilization** | | | | | | |
| Mobilization, very small equipment | 1137 | Equipment that is small enough to be transported by a pick-up truck with typical weights less than 3,500 pounds. Can be multiple pieces of equipment if all hauled simultaneously. | Each | $70.64 | 2 | $141.28 |

**Practice:** 315 - Herbaceous Weed Control

**Scenario** #5 - Intensive

**Scenario Description:**

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

**Before Situation:**

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

**After Situation:**

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

**Feature Measure:** Acres treated

**Scenario Unit::** Acre

**Scenario Typical Size:** 1.0

**Scenario Total Cost:** $663.56

**Scenario Cost/Unit:** $663.56

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 | 3 | $253.14 |
| 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 | $64.90 | 3 | $194.70 |
| **Materials** | | | | | | |
| Herbicide, Triclopyor | 338 | Refer to WIN-PST for product names and active ingredients. Materials and shipping | Acre | $42.37 | 1 | $42.37 |
| 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 shi | Acre | $1.28 | 1 | $1.28 |
| **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 | $172.07 | 1 | $172.07 |

**Practice:** 315 - Herbaceous Weed Control

**Scenario** #6 - High Density with Follow Up

**Scenario Description:**

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

**Before Situation:**

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

**After Situation:**

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

**Feature Measure:** Acres treated

**Scenario Unit::** Acre

**Scenario Typical Size:** 1.0

**Scenario Total Cost:** $853.38

**Scenario Cost/Unit:** $853.38

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 | 3 | $253.14 |
| 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 | $64.90 | 4.5 | $292.05 |
| **Materials** | | | | | | |
| Herbicide, Triclopyor | 338 | Refer to WIN-PST for product names and active ingredients. Materials and shipping | Acre | $42.37 | 1.5 | $63.56 |
| 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 shi | Acre | $1.28 | 1.5 | $1.92 |
| **Mobilization** | | | | | | |
| Mobilization, very small equipment | 1137 | Equipment that is small enough to be transported by a pick-up truck with typical weights less than 3,500 pounds. Can be multiple pieces of equipment if all hauled simultaneously. | Each | $70.64 | 1 | $70.64 |
| 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 | $172.07 | 1 | $172.07 |

**Practice:** 316 - Animal Mortality Facility

**Scenario** #1 - Incineration up to 50CF 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 150 lbs per day average mortality for a small poultry operation. Included is a concrete slab to set the incinerator on and a fuel tank. Ash materials to be stored in suitable containers until land disposal as per the nutrient management plan or landfilled.

**Feature Measure:** Incinerator Chamber Volume

**Scenario Unit::** Cubic Foot

**Scenario Typical Size:** 44.0

**Scenario Total Cost:** $12,821.25

**Scenario Cost/Unit:** $291.39

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 | $327.92 | 4 | $1,311.68 |
| Excavation, Common Earth, side cast, small equipment | 48 | Bulk excavation and side casting of common earth with hydraulic excavator with less than 1 CY capacity. Includes equipment and labor. | Cubic Yard | $2.36 | 8 | $18.88 |
| 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 | $113.75 | 1 | $113.75 |
| **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 | $25.31 | 1 | $25.31 |
| Equipment Operators, Light | 232 | Includes: Skid Steer Loaders, Hydraulic Excavators <50 HP, Trenchers <12", Ag Equipment <150 HP, Pickup Trucks, Forklifts, Mulchers | Hour | $25.23 | 1 | $25.23 |
| **Materials** | | | | | | |
| Aggregate, Gravel, Graded | 46 | Gravel, includes materials, equipment and labor to transport and place. Includes washed and unwashed gravel. | Cubic Yard | $34.75 | 4 | $139.00 |
| 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 | $255.83 | 2 | $511.66 |

**Practice:** 316 - Animal Mortality Facility

**Scenario** #2 - Incineration 50 to 100 CF chamber

**Scenario Description:**

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

**Before 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 and a diesel fuel tank. Ash materials to be stored in suitable containers until land disposal as per the nutrient management plan or landfilled.

**Feature Measure:** Incinerator Chamber Volume

**Scenario Unit::** Cubic Foot

**Scenario Typical Size:** 55.0

**Scenario Total Cost:** $14,612.92

**Scenario Cost/Unit:** $265.69

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 | $327.92 | 4 | $1,311.68 |
| Excavation, Common Earth, side cast, small equipment | 48 | Bulk excavation and side casting of common earth with hydraulic excavator with less than 1 CY capacity. Includes equipment and labor. | Cubic Yard | $2.36 | 8 | $18.88 |
| 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 | $113.75 | 1 | $113.75 |
| **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 | $25.31 | 1 | $25.31 |
| Equipment Operators, Light | 232 | Includes: Skid Steer Loaders, Hydraulic Excavators <50 HP, Trenchers <12", Ag Equipment <150 HP, Pickup Trucks, Forklifts, Mulchers | Hour | $25.23 | 1 | $25.23 |
| **Materials** | | | | | | |
| Aggregate, Gravel, Graded | 46 | Gravel, includes materials, equipment and labor to transport and place. Includes washed and unwashed gravel. | Cubic Yard | $34.75 | 4 | $139.00 |
| 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 | $255.83 | 2 | $511.66 |

**Practice:** 316 - Animal Mortality Facility

**Scenario** #3 - Incineration over 100 CF Chamber

**Scenario Description:**

This scenario consists of installing a manufactured Type IV incinerator designed to handle a single 1,200 to 1,500 mortality. Typically a single dairy cow or multiple heifers or swine. System shall use high temperature (>1,300 degrees F) incineration with a secondary combustion or afterburner chamber prior to flue discharge. Select smallest incinerator that has a bin capacity to handle largest individual mortality. Payment made per unit of actual chamber size obtained from manufacturers' product literature. This option uses a very small footprint, however, it costs 15-20 gallons of diesel fuel per fill. The usage needs to be significant. At 500 cows with replacements, this option would offset a 4,000 SF concrete pad with another 8,000 to 12,000 SF of grassed area. Cost for that option would be for an area of 4,000 ft2 @$4.50 or $18,000 vs. $24,000. This option for small dairy operations would not typically be least-cost. In most states either a roofed or unroofed static pile with concrete floor and walls would be considered least cost. Unless regulations require this or severe site limitations exist, consider reducing payment rate as per State Conservationist discretion. The purpose of the practice is to address resource concerns related to water quality degradation due to excessive nutrients, organics, and pathogens being transported into surface and groundwater resources. Air quality impacts due to odors will also be addressed, however, in non-attainment areas, certain states may require a higher level of processing such as gasification or other approved methods. Potential Associated Practices: Heavy Use Area Protection (561), Fence (382), Critical Area Planting (342), Access Road (560), Waste Storage Facility (313), Nutrient Management (590), Roofs and Covers (367), Critical Area Planting (342).

**Before 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 1350 lb dairy cow on a 1,000 cow operation. Included is a concrete slab to set the incinerator on and a fuel tank. Ash materials to be stored in suitable containers, a waste storage pit until land disposal as per the nutrient management plan or landfilled. Proper incineration will require between 15 and 25 gallons of diesel fuel per usage.

**Feature Measure:** Incineration Chamber Volume

**Scenario Unit::** Cubic Foot

**Scenario Typical Size:** 119.0

**Scenario Total Cost:** $16,475.83

**Scenario Cost/Unit:** $138.45

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 | $327.92 | 4 | $1,311.68 |
| Excavation, Common Earth, side cast, small equipment | 48 | Bulk excavation and side casting of common earth with hydraulic excavator with less than 1 CY capacity. Includes equipment and labor. | Cubic Yard | $2.36 | 8 | $18.88 |
| 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 | $113.75 | 1 | $113.75 |
| **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 | $25.31 | 1 | $25.31 |
| Equipment Operators, Light | 232 | Includes: Skid Steer Loaders, Hydraulic Excavators <50 HP, Trenchers <12", Ag Equipment <150 HP, Pickup Trucks, Forklifts, Mulchers | Hour | $25.23 | 1 | $25.23 |
| **Materials** | | | | | | |
| Aggregate, Gravel, Graded | 46 | Gravel, includes materials, equipment and labor to transport and place. Includes washed and unwashed gravel. | Cubic Yard | $34.75 | 4 | $139.00 |
| 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 | $255.83 | 2 | $511.66 |

**Practice:** 316 - Animal Mortality Facility

**Scenario** #4 - 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: 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:** 2,500.0

**Scenario Total Cost:** $1,242.54

**Scenario Cost/Unit:** $0.50

Cost Details:

| Component Name | ID | Description | Unit | Cost | QTY | Total |
|---|---|---|---|---|---|---|
| **Equipment Installation** | | | | | | |
| Dozer, 80 HP | 929 | Track mounted Dozer with horsepower range of 60 to 90. Equipment and power unit costs. Labor not included. | Hour | $66.13 | 8 | $529.04 |
| **Labor** | | | | | | |
| Equipment Operators, Light | 232 | Includes: Skid Steer Loaders, Hydraulic Excavators <50 HP, Trenchers <12", Ag Equipment <150 HP, Pickup Trucks, Forklifts, Mulchers | Hour | $25.23 | 8 | $201.84 |
| **Mobilization** | | | | | | |
| Mobilization, medium equipment | 1139 | Equipment with 70-150 HP or typical weights between 14,000 and 30,000 pounds. | Each | $255.83 | 2 | $511.66 |

**Practice:** 316 - Animal Mortality Facility

**Scenario** #5 - Static pile, Gravel pad

**Scenario Description:**

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

**Before Situation:**

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

**After Situation:**

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

**Feature Measure:** Pad Area

**Scenario Unit::** Square Foot

**Scenario Typical Size:** 2,500.0

**Scenario Total Cost:** $6,275.24

**Scenario Cost/Unit:** $2.51

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 | $2.53 | 280 | $708.40 |
| Earthfill, Roller Compacted | 49 | Earthfill, roller or machine compacted, includes equipment and labor | Cubic Yard | $4.45 | 93 | $413.85 |
| Dozer, 80 HP | 929 | Track mounted Dozer with horsepower range of 60 to 90. Equipment and power unit costs. Labor not included. | Hour | $66.13 | 8 | $529.04 |
| **Labor** | | | | | | |
| Skilled Labor | 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 | $41.76 | 4 | $167.04 |
| Equipment Operators, Light | 232 | Includes: Skid Steer Loaders, Hydraulic Excavators <50 HP, Trenchers <12", Ag Equipment <150 HP, Pickup Trucks, Forklifts, Mulchers | Hour | $25.23 | 8 | $201.84 |
| **Materials** | | | | | | |
| Aggregate, Gravel, Graded | 46 | Gravel, includes materials, equipment and labor to transport and place. Includes washed and unwashed gravel. | Cubic Yard | $34.75 | 93 | $3,231.75 |
| **Mobilization** | | | | | | |
| Mobilization, medium equipment | 1139 | Equipment with 70-150 HP or typical weights between 14,000 and 30,000 pounds. | Each | $255.83 | 4 | $1,023.32 |

**Practice:** 316 - Animal Mortality Facility

**Scenario** #6 - Static pile, Concrete Pad

**Scenario Description:**

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

**Before Situation:**

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

**After Situation:**

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

**Feature Measure:** Pad Area

**Scenario Unit::** Square Foot

**Scenario Typical Size:** 2,500.0

**Scenario Total Cost:** $16,755.26

**Scenario Cost/Unit:** $6.70

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 | $327.92 | 39 | $12,788.88 |
| Earthfill, Manually Compacted | 50 | Earthfill, manually compacted, includes equipment and labor | Cubic Yard | $5.87 | 46 | $270.02 |
| Dozer, 80 HP | 929 | Track mounted Dozer with horsepower range of 60 to 90. Equipment and power unit costs. Labor not included. | Hour | $66.13 | 8 | $529.04 |
| **Labor** | | | | | | |
| Skilled Labor | 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 | $41.76 | 4 | $167.04 |
| Equipment Operators, Light | 232 | Includes: Skid Steer Loaders, Hydraulic Excavators <50 HP, Trenchers <12", Ag Equipment <150 HP, Pickup Trucks, Forklifts, Mulchers | Hour | $25.23 | 8 | $201.84 |
| **Materials** | | | | | | |
| Aggregate, Gravel, Graded | 46 | Gravel, includes materials, equipment and labor to transport and place. Includes washed and unwashed gravel. | Cubic Yard | $34.75 | 46 | $1,598.50 |
| **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 | $172.07 | 4 | $688.28 |
| Mobilization, medium equipment | 1139 | Equipment with 70-150 HP or typical weights between 14,000 and 30,000 pounds. | Each | $255.83 | 2 | $511.66 |

**Practice:** 316 - Animal Mortality Facility

**Scenario** #7 - Static pile, Wood Bin(s)

**Scenario Description:**

This scenario consists of installing a group of small bins along one side and a long narrow bin on the backside of a concrete pad to compost poultry or small swine mortality in static pile(s) that have sufficient bulking material to allow natural aeration. Piles are turned to go through a second heat cycle prior to final land application. The roofed portion of the facility is addressed with Roofs and Covers (367). Size of facility based on daily mortality and sizing procedures accepted in particular state. Organic sites will require more frequent replacement of lumber. Scenario addresses additional resource concerns not addressed by other scenarios such as air quality. Site limitations such as lack of available space warrant the use of bins plus bins are more conducive for managing smaller mortalities such as poultry and swine and are less likely to produce manure laden runoff than large gravel or concrete pads. Producer possibly had a certain type of structure originally that had to be replaced to address resource concerns. 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:** 720.0

**Scenario Total Cost:** $11,226.25

**Scenario Cost/Unit:** $15.59

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 | $161.60 | 4 | $646.40 |
| 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 | $327.92 | 9 | $2,951.28 |
| Concrete, CIP, formed reinforced | 38 | Steel reinforced concrete formed and cast-in-placed in formed structures such as walls or suspended slabs by chute placement. Typical strength is 3000 to 4000 psi. Includes materials, labor and equipment to transport, place and finish. | Cubic Yard | $510.00 | 3 | $1,530.00 |
| 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 | $2.36 | 47 | $110.92 |
| Skidsteer, 80 HP | 933 | Skidsteer loader with horsepower range of 60 to 90. Equipment and power unit costs. Labor not included. | Hour | $44.60 | 7 | $312.20 |
| Auger, Post driver attachment | 934 | Auger or post driver attachment to a tractor or skidsteer. Does not include power unit. Labor not included. | Hour | $7.31 | 7 | $51.17 |
| **Labor** | | | | | | |
| Skilled Labor | 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 | $41.76 | 40 | $1,670.40 |
| 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 | $25.31 | 40 | $1,012.40 |
| Equipment Operators, Light | 232 | Includes: Skid Steer Loaders, Hydraulic Excavators <50 HP, Trenchers <12", Ag Equipment <150 HP, Pickup Trucks, Forklifts, Mulchers | Hour | $25.23 | 7 | $176.61 |
| **Materials** | | | | | | |
| Aggregate, Gravel, Graded | 46 | Gravel, includes materials, equipment and labor to transport and place. Includes washed and unwashed gravel. | Cubic Yard | $34.75 | 11 | $382.25 |
| Dimension Lumber, Treated | 1044 | Treated dimension lumber with nominal thickness equal or less than 2". Includes lumber and fasteners | Board Foot | $0.90 | 880 | $792.00 |
| Lumber, planks, posts and timbers, treated | 1609 | Treated dimension lumber with nominal thickness greater than 2". Includes lumber and fasteners. Does not include labor. | Board Foot | $1.62 | 448 | $725.76 |

**Mobilization**

| | | | | | | |
|---|---|---|---|---|---|---|
| Mobilization, very small equipment | 1137 | Equipment that is small enough to be transported by a pick-up truck with typical weights less than 3,500 pounds. Can be multiple pieces of equipment if all hauled simultaneously. | Each | $70.64 | 5 | $353.20 |
| Mobilization, medium equipment | 1139 | Equipment with 70-150 HP or typical weights between 14,000 and 30,000 pounds. | Each | $255.83 | 2 | $511.66 |

**Practice:** 316 - Animal Mortality Facility

**Scenario** #8 - Static pile, Concrete Bin(s)

**Scenario Description:**

This scenario consists of installing 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. Scenario addresses additional resource concerns not addressed in other scenarios such as air quality. State laws regarding seepage from composting facilities warrant the installation of concrete bins as opposed to timber. Also, concrete bins provide a much longer "life span" and are less likely to be damaged by equipment routinely used to remove and turn compost. Site limitations such as lack of available space warrant the use of bins plus bins are more conducive for managing smaller mortalities such as poultry and swine and are less likely to produce manure laden runoff than large gravel or concrete pads. Producer possibly had a certain type of structure originally that had to be replaced to address resource concerns. 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 48' long pad with four bins with 4' high walls and one end open. Roofed portion is addressed under Roofs and Covers (367). Site preparation includes topsoil removal, installing 4" of gravel, setting posts , and installing concrete slab, 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:** 960.0

**Scenario Total Cost:** $15,308.30

**Scenario Cost/Unit:** $15.95

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 | $327.92 | 18 | $5,902.56 |
| Concrete, CIP, formed reinforced | 38 | Steel reinforced concrete formed and cast-in-placed in formed structures such as walls or suspended slabs by chute placement. Typical strength is 3000 to 4000 psi. Includes materials, labor and equipment to transport, place and finish. | Cubic Yard | $510.00 | 15 | $7,650.00 |
| 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 | $2.36 | 83 | $195.88 |
| **Materials** | | | | | | |
| Aggregate, Gravel, Graded | 46 | Gravel, includes materials, equipment and labor to transport and place. Includes washed and unwashed gravel. | Cubic Yard | $34.75 | 20 | $695.00 |
| **Mobilization** | | | | | | |
| Mobilization, very small equipment | 1137 | Equipment that is small enough to be transported by a pick-up truck with typical weights less than 3,500 pounds. Can be multiple pieces of equipment if all hauled simultaneously. | Each | $70.64 | 5 | $353.20 |
| Mobilization, medium equipment | 1139 | Equipment with 70-150 HP or typical weights between 14,000 and 30,000 pounds. | Each | $255.83 | 2 | $511.66 |

**Practice:** 316 - Animal Mortality Facility

**Scenario** #18 - Invessel Rotary Drum < 700 CF

**Scenario Description:**

A horizontal rotary drum is installed to compost small poultry and swine facility mortality. The facility can handle between 250 and 600 lbs per day of mortality, plus equal or higher volumes of carbon material (i.e. wood chips). A secondary composting storage area is required to finish materials. The payment quantity is based on the interior volume of the rotary composter in cubic feet of the smallest drum that can process the daily mortality as per manufacturer's recommendations. This practice addresses 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 also addressed. Associated Practices: Access Road (560), Critical Area Planting (342), Diversion (362), Fence (382), Nutrient Management (590), Roofs and Covers (367), Structure for Water Control (587), Subsurface Drain (606), Underground Outlet (620), and Waste Storage Facility (313).

**Before Situation:**

An agricultural operation currently deals with animal mortality in a manner that results in non-point source pollution of excessive nutrients, organics, and pathogens being transported into surface and groundwater resources. The improper management of the operation results in odors and spread pathogens from incomplete composting, incineration, or interaction with predators. No plan is in place for both normal and catastrophic mortality events.

**After Situation:**

A 5' diameter, 22' long rotary drum is installed on two concrete pads that can process 325 lbs of mortality per day. Drum rotation moves and mixes mortality and wood chips. Site preparation includes topsoil removal, gravel sub-base, 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. An animal mortality plan is formulated for normal and catastrophic mortality events to prevent non-point source pollution of excessive nutrients, organics, and pathogens being transported into surface and groundwater resources. Proper management results in little to no odors and protection from predators to minimize pathogen survival and spreading. The selected method for carcass treatment and disposal meets or is permitted by federal, stale, and local laws, rules, and regulations. Note regarding reason for inclusion of In-Vessel scenarios: Rotary Drum is necessary in situations such as, but not limited to, where producer has limited footprint, where state law prohibits the use of static pile, in areas where concern over poultry industry density have dictated a need for 100% pathogen containment during the composing process.

**Feature Measure:** Volume of Drum

**Scenario Unit::** Cubic Foot

**Scenario Typical Size:** 432.0

**Scenario Total Cost:** $44,888.02

**Scenario Cost/Unit:** $103.91

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 | $161.60 | 4 | $646.40 |
| 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 | $327.92 | 12 | $3,935.04 |
| Concrete, CIP, formed reinforced | 38 | Steel reinforced concrete formed and cast-in-placed in formed structures such as walls or suspended slabs by chute placement. Typical strength is 3000 to 4000 psi. Includes materials, labor and equipment to transport, place and finish. | Cubic Yard | $510.00 | 6 | $3,060.00 |
| 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 | $2.36 | 4 | $9.44 |
| **Materials** | | | | | | |
| Aggregate, Gravel, Graded | 46 | Gravel, includes materials, equipment and labor to transport and place. Includes washed and unwashed gravel. | Cubic Yard | $34.75 | 8 | $278.00 |
| 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, 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 | $172.07 | 2 | $344.14 |

**Practice:** 316 - Animal Mortality Facility

**Scenario** #19 - Invessel Rotary Drum => 700 CF

**Scenario Description:**

A horizontal rotary drum is installed to compost large poultry and swine facility mortality. The facility can handle between 600 and 1000 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. The payment quantity is based on the interior volume of the rotary composter in cubic feet of the smallest drum that can process the daily mortality as per manufacturer's recommendations. This practice addresses 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 also addressed. Associated Practices: Access Road (560), Critical Area Planting (342), Diversion (362), Fence (382), Nutrient Management (590), Roofs and Covers (367), Structure for Water Control (587), Subsurface Drain (606), Underground Outlet (620), and Waste Storage Facility (313).

**Before Situation:**

An agricultural operation currently deals with animal mortality in a manner that results in non-point source pollution of excessive nutrients, organics, and pathogens being transported into surface and groundwater resources. The improper management of the operation results in odors and spread pathogens from incomplete composting, incineration, or interaction with predators. No plan is in place for both normal and catastrophic mortality events.

**After Situation:**

A 5' diameter, 54' long rotary drum is installed on two concrete pads that can process 810 lbs of mortality per day. Drum rotation moves and mixes mortality and wood chips. Site preparation includes topsoil removal, gravel sub-base, 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, 30'x 30' concrete bin with 10'x30 concrete pad for secondary composting. Area can be protected by adding Roofs and Covers (367 ) standard. An animal mortality plan is formulated for normal and catastrophic mortality events to prevent non-point source pollution of excessive nutrients, organics, and pathogens being transported into surface and groundwater resources. Proper management results in little to no odors and protection from predators to minimize pathogen survival and spreading. The selected method for carcass treatment and disposal meets or is permitted by federal, stale, and local laws, rules, and regulations. Note regarding reason for inclusion of In-Vessel scenarios: Rotary Drum is necessary in situations such as, but not limited to, where producer has limited footprint, where state law prohibits the use of static pile, in areas where concern over poultry industry density have dictated a need for 100% pathogen containment during the composing process.

**Feature Measure:** Volume of Drum

**Scenario Unit::** Cubic Foot

**Scenario Typical Size:** 1,079.0

**Scenario Total Cost:** $59,819.16

**Scenario Cost/Unit:** $55.44

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 | $161.60 | 6 | $969.60 |
| 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 | $327.92 | 21 | $6,886.32 |
| Concrete, CIP, formed reinforced | 38 | Steel reinforced concrete formed and cast-in-placed in formed structures such as walls or suspended slabs by chute placement. Typical strength is 3000 to 4000 psi. Includes materials, labor and equipment to transport, place and finish. | Cubic Yard | $510.00 | 9 | $4,590.00 |
| 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 | $2.36 | 4 | $9.44 |
| **Materials** | | | | | | |
| Aggregate, Gravel, Graded | 46 | Gravel, includes materials, equipment and labor to transport and place. Includes washed and unwashed gravel. | Cubic Yard | $34.75 | 8 | $278.00 |
| 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, 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 | $172.07 | 2 | $344.14 |
| Mobilization, medium equipment | 1139 | Equipment with 70-150 HP or typical weights between 14,000 and 30,000 pounds. | Each | $255.83 | 2 | $511.66 |

**Practice:** 317 - Composting Facility

**Scenario** #1 - Composter, windrow, concrete

**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. This scenario should be used in place of asphalt when additional durability is needed due to heavy equipment or when a site specific design requires the use of concrete. Concrete curbs measuring 10" by 12" are installed on three sides of the pad. All animal mortality composting shall be done using Practice Standard 316 - Animal Mortality Facility. Potential Associated Practices: Fence (382), Critical Area Planting (342), Nutrient Management (590), Access Road (560), Structure for water control (587), Diversion (362), Pipeline (516), Subsurface Drain (606), Heavy Use Area Protection (561), Roofs and Covers (367), Roof Runoff Structure (558), Waste Storage Facility (313), Waste Recycling (633), Waste Transfer (634), Underground Outlet (620) and Vegetative Treatment Area (635).

**Before Situation:**

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

**After Situation:**

Manure and other agricultural by-products are being controlled, by the collection at the source, and stored properly, at an environmentally suitable location, until such time that they are disposed of or utilized in a proper manner, typically in accordance with a nutrient management plan. This is incorporated as part of the overall waste management system meeting the National Engineering Handbook (NEH), Part 651, Agricultural Waste Management Field Handbook (AWMFH) that has been developed to also account for end use of the product from the composting facility. This scenario consists of installing a concrete pad over compacted gravel 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 disposal, typically land application. Typical pad is 100' x 100' (10,000 square feet) on a compacted earth and gravel surface. Sub base material sufficiently compacted. Include sufficient area for processing equipment access. Single piles or windrows to minimize runoff. Site to be located out of drainage areas, 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 prior to installing concrete pad.

**Feature Measure:** Square Foot Floor Area

**Scenario Unit::** Square Foot

**Scenario Typical Size:** 10,000.0

**Scenario Total Cost:** $69,172.30

**Scenario Cost/Unit:** $6.92

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 | $327.92 | 164 | $53,778.88 |
| Geotextile, woven | 42 | Woven Geotextile Fabric. Includes materials, equipment and labor | Square Yard | $2.53 | 1120 | $2,833.60 |
| Earthfill, Roller Compacted | 49 | Earthfill, roller or machine compacted, includes equipment and labor | Cubic Yard | $4.45 | 201 | $894.45 |
| 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 | $3.77 | 386 | $1,455.22 |
| **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 | $45.69 | 40 | $1,827.60 |
| **Materials** | | | | | | |
| Aggregate, Gravel, Graded | 46 | Gravel, includes materials, equipment and labor to transport and place. Includes washed and unwashed gravel. | Cubic Yard | $34.75 | 185 | $6,428.75 |
| **Mobilization** | | | | | | |
| Mobilization, large equipment | 1140 | Equipment >150HP or typical weights greater than 30,000 pounds or loads requiring over width or over length permits. | Each | $488.45 | 4 | $1,953.80 |

**Practice:** 317 - Composting Facility

**Scenario** #2 - Composter, windrow, asphalt

**Scenario Description:**

The composting facility is installed to address water quality concerns and disease vectors resulting from improper waste disposal by providing a dedicated facility for storage and treatment, and by creating a compost product that can be used in multiple ways including land application for enrichment of crop ground. This scenario is applicable when geological, soil, climate conditions or state and local regulations prohibit the use of an earthen surface and there are no special design or equipment needs that require the use of concrete. All animal mortality composting shall be done using Practice Standard 316 - Animal Mortality Facility. Potential Associated Practices: Fence (382), Critical Area Planting (342), Nutrient Management (590), Access Road (560), Structure for water control (587), Diversion (362), Pipeline (516), Subsurface Drain (606), Heavy Use Area Protection (561), Roofs and Covers (367), Roof Runoff Structure (558), Waste Storage Facility (313), Waste Recycling (633), Waste Transfer (634), Underground Outlet (620) and Vegetative Treatment Area (635).

**Before Situation:**

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

**After Situation:**

Manure and other agricultural by-products are being controlled, by the collection at the source, and stored properly, at an environmentally suitable location, until such time that they are disposed of or utilized in a proper manner, typically in accordance with a nutrient management plan. 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 an asphalt pad over compacted gravel to act as a working area to compost organic material in a static pile, windrow, that has sufficient carbon based bulking material to allow natural aeration. Piles typically turned at least once to go into another heat cycle prior to final deposal, typically land application. Typical pad is 100' x 100' (10,000 square feet) on a compacted earth and gravel surface. Sub base material is sufficiently compacted. Include sufficient area for processing equipment access. Single piles or windrows to minimize runoff. Site to be located out of drainage areas, off-site water diverted and any runoff to spread out into a grassed area or vegetated treatment area as per regulations. Site preparation includes topsoil removal, compaction of subsoil, and installing 6" of compacted gravel prior to installing asphalt pad.

**Feature Measure:** Square Foot Floor Area

**Scenario Unit::** Square Foot

**Scenario Typical Size:** 10,000.0

**Scenario Total Cost:** $44,625.17

**Scenario Cost/Unit:** $4.46

Cost Details:

| Component Name | ID | Description | Unit | Cost | QTY | Total |
|---|---|---|---|---|---|---|
| **Equipment Installation** | | | | | | |
| Geotextile, woven | 42 | Woven Geotextile Fabric. Includes materials, equipment and labor | Square Yard | $2.53 | 1120 | $2,833.60 |
| Earthfill, Roller Compacted | 49 | Earthfill, roller or machine compacted, includes equipment and labor | Cubic Yard | $4.45 | 201 | $894.45 |
| 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 | $3.77 | 386 | $1,455.22 |
| **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 | $45.69 | 40 | $1,827.60 |
| **Materials** | | | | | | |
| Aggregate, Gravel, Graded | 46 | Gravel, includes materials, equipment and labor to transport and place. Includes washed and unwashed gravel. | Cubic Yard | $34.75 | 278 | $9,660.50 |
| Asphalt, pavement | 1867 | Bituminous Concrete,includes materials, equipment and labor for 4" layer, base not included. | Square Foot | $2.60 | 10000 | $26,000.00 |
| **Mobilization** | | | | | | |
| Mobilization, large equipment | 1140 | Equipment >150HP or typical weights greater than 30,000 pounds or loads requiring over width or over length permits. | Each | $488.45 | 4 | $1,953.80 |

**Practice:** 317 - Composting Facility

**Scenario** #3 - Composter, timber bins

**Scenario Description:**

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

**Before Situation:**

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

**After Situation:**

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

**Feature Measure:** Square Foot Floor Area

**Scenario Unit::** Square Foot

**Scenario Typical Size:** 498.0

**Scenario Total Cost:** $10,831.01

**Scenario Cost/Unit:** $21.75

Cost Details:

| Component Name | ID | Description | Unit | Cost | QTY | Total |
|---|---|---|---|---|---|---|
| **Equipment Installation** | | | | | | |
| Concrete, CIP, slab on grade, reinforced | 37 | Steel reinforced concrete formed and cast-in-placed as a slab on grade by chute placement. Typical strength is 3000 to 4000 psi. Includes materials, labor and equipment to transport, place and finish. | Cubic Yard | $327.92 | 8 | $2,623.36 |
| 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 | $510.00 | 3.5 | $1,785.00 |
| Geotextile, woven | 42 | Woven Geotextile Fabric. Includes materials, equipment and labor | Square Yard | $2.53 | 56 | $141.68 |
| Earthfill, Roller Compacted | 49 | Earthfill, roller or machine compacted, includes equipment and labor | Cubic Yard | $4.45 | 9.5 | $42.28 |
| Skidsteer, 80 HP | 933 | Skidsteer loader with horsepower range of 60 to 90. Equipment and power unit costs. Labor not included. | Hour | $44.60 | 4 | $178.40 |
| Auger, Post driver attachment | 934 | Auger or post driver attachment to a tractor or skidsteer. Does not include power unit. Labor not included. | Hour | $7.31 | 4 | $29.24 |
| 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 | $3.77 | 23 | $86.71 |
| **Labor** | | | | | | |
| General Labor | 231 | Labor performed using basic tools such as power tool, shovels, and other tools that do not require extensive training. Ex. pipe layer, herder, concrete placement, materials spreader, flagger, etc. | Hour | $25.31 | 90 | $2,277.90 |
| Equipment Operators, Light | 232 | Includes: Skid Steer Loaders, Hydraulic Excavators <50 HP, Trenchers <12", Ag Equipment <150 HP, Pickup Trucks, Forklifts, Mulchers | Hour | $25.23 | 4 | $100.92 |
| **Materials** | | | | | | |
| Aggregate, Gravel, Graded | 46 | Gravel, includes materials, equipment and labor to transport and place. Includes washed and unwashed gravel. | Cubic Yard | $34.75 | 9.5 | $330.13 |
| Dimension Lumber, Treated | 1044 | Treated dimension lumber with nominal thickness equal or less than 2". Includes lumber and fasteners | Board Foot | $0.90 | 560 | $504.00 |
| Lumber, planks, posts and timbers, treated | 1609 | Treated dimension lumber with nominal thickness greater than 2". Includes lumber and fasteners. Does not include labor. | Board Foot | $1.62 | 480 | $777.60 |
| **Mobilization** | | | | | | |

| | | | | | | |
|---|---|---|---|---|---|---|
| Mobilization, large equipment | 1140 | Equipment >150HP or typical weights greater than 30,000 pounds or loads requiring over width or over length permits. | Each | $488.45 | 4 | $1,953.80 |

**Practice:** 317 - Composting Facility

**Scenario** #4 - Composter, conc block bins

**Scenario Description:**

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

**Before Situation:**

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

**After Situation:**

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

**Feature Measure:** Square Foot Floor Area

**Scenario Unit::** Square Foot

**Scenario Typical Size:** 780.0

**Scenario Total Cost:** $13,842.03

**Scenario Cost/Unit:** $17.75

Cost Details:

| Component Name | ID | Description | Unit | Cost | QTY | Total |
|---|---|---|---|---|---|---|
| **Equipment Installation** | | | | | | |
| Concrete, CIP, slab on grade, reinforced | 37 | Steel reinforced concrete formed and cast-in-placed as a slab on grade by chute placement. Typical strength is 3000 to 4000 psi. Includes materials, labor and equipment to transport, place and finish. | Cubic Yard | $327.92 | 12 | $3,935.04 |
| Concrete, CIP, formed reinforced | 38 | Steel reinforced concrete formed and cast-in-placed in formed structures such as walls or suspended slabs by chute placement. Typical strength is 3000 to 4000 psi. Includes materials, labor and equipment to transport, place and finish. | Cubic Yard | $510.00 | 3.5 | $1,785.00 |
| Geotextile, woven | 42 | Woven Geotextile Fabric. Includes materials, equipment and labor | Square Yard | $2.53 | 87 | $220.11 |
| Earthfill, Roller Compacted | 49 | Earthfill, roller or machine compacted, includes equipment and labor | Cubic Yard | $4.45 | 148 | $658.60 |
| 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 | $3.77 | 34 | $128.18 |
| **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 | $45.69 | 20 | $913.80 |
| **Materials** | | | | | | |
| Aggregate, Gravel, Graded | 46 | Gravel, includes materials, equipment and labor to transport and place. Includes washed and unwashed gravel. | Cubic Yard | $34.75 | 14.5 | $503.88 |
| Block, pre-cast concrete, modular | 1496 | Pre-cast concrete blocks, typically 2ft x 2ft x 6ft , includes installation and delivery. | Cubic Yard | $99.83 | 37.5 | $3,743.63 |
| **Mobilization** | | | | | | |
| Mobilization, large equipment | 1140 | Equipment >150HP or typical weights greater than 30,000 pounds or loads requiring over width or over length permits. | Each | $488.45 | 4 | $1,953.80 |

**Practice:** 317 - Composting Facility

**Scenario** #5 - Composter, concrete bins

**Scenario Description:**

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

**Before Situation:**

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

**After Situation:**

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

**Feature Measure:** Square Foot Floor Area

**Scenario Unit::** Square Foot

**Scenario Typical Size:** 846.0

**Scenario Total Cost:** $23,543.61

**Scenario Cost/Unit:** $27.83

Cost Details:

| Component Name | ID | Description | Unit | Cost | QTY | Total |
|---|---|---|---|---|---|---|
| **Equipment Installation** | | | | | | |
| Concrete, CIP, slab on grade, reinforced | 37 | Steel reinforced concrete formed and cast-in-placed as a slab on grade by chute placement. Typical strength is 3000 to 4000 psi. Includes materials, labor and equipment to transport, place and finish. | Cubic Yard | $327.92 | 31.5 | $10,329.48 |
| Concrete, CIP, formed reinforced | 38 | Steel reinforced concrete formed and cast-in-placed in formed structures such as walls or suspended slabs by chute placement. Typical strength is 3000 to 4000 psi. Includes materials, labor and equipment to transport, place and finish. | Cubic Yard | $510.00 | 15.5 | $7,905.00 |
| Geotextile, woven | 42 | Woven Geotextile Fabric. Includes materials, equipment and labor | Square Yard | $2.53 | 94 | $237.82 |
| Earthfill, Roller Compacted | 49 | Earthfill, roller or machine compacted, includes equipment and labor | Cubic Yard | $4.45 | 134 | $596.30 |
| Excavation, common earth, large equipment, 150 ft | 1223 | Bulk excavation of common earth including sand and gravel with dozer >100 HP with average push distance of 150 feet. Includes equipment and labor. | Cubic Yard | $3.77 | 36.5 | $137.61 |
| **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 | $45.69 | 40 | $1,827.60 |
| **Materials** | | | | | | |
| Aggregate, Gravel, Graded | 46 | Gravel, includes materials, equipment and labor to transport and place. Includes washed and unwashed gravel. | Cubic Yard | $34.75 | 16 | $556.00 |
| **Mobilization** | | | | | | |
| Mobilization, large equipment | 1140 | Equipment >150HP or typical weights greater than 30,000 pounds or loads requiring over width or over length permits. | Each | $488.45 | 4 | $1,953.80 |

**Practice:** 317 - Composting Facility

**Scenario** #6 - Composter, gravel pad

**Scenario Description:**

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

**Before Situation:**

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

**After Situation:**

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

**Feature Measure:** Square Foot Floor Area

**Scenario Unit::** Square Foot

**Scenario Typical Size:** 10,000.0

**Scenario Total Cost:** $24,135.00

**Scenario Cost/Unit:** $2.41

Cost Details:

| Component Name | ID | Description | Unit | Cost | QTY | Total |
|---|---|---|---|---|---|---|
| **Equipment Installation** | | | | | | |
| Geotextile, woven | 42 | Woven Geotextile Fabric. Includes materials, equipment and labor | Square Yard | $2.53 | 1120 | $2,833.60 |
| Earthfill, Roller Compacted | 49 | Earthfill, roller or machine compacted, includes equipment and labor | Cubic Yard | $4.45 | 370 | $1,646.50 |
| 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 | $3.77 | 800 | $3,016.00 |
| **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 | $45.69 | 40 | $1,827.60 |
| **Materials** | | | | | | |
| Aggregate, Gravel, Graded | 46 | Gravel, includes materials, equipment and labor to transport and place. Includes washed and unwashed gravel. | Cubic Yard | $34.75 | 370 | $12,857.50 |
| **Mobilization** | | | | | | |
| Mobilization, large equipment | 1140 | Equipment >150HP or typical weights greater than 30,000 pounds or loads requiring over width or over length permits. | Each | $488.45 | 4 | $1,953.80 |

**Practice:** 317 - Composting Facility

**Scenario** #7 - Composter, Drum

**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 should be used when compost material is more suitable for a drum type composter than a bin type composter or when it is necessary to begin the composting in a drum prior to finishing the compost using a windrow type system. All animal mortality composting shall be done using Practice Standard 316 - Animal Mortality Facility. Potential Associated Practices: Fence (382), Critical Area Planting (342), Nutrient Management (590), Access Road (560), Structure for water control (587), Diversion (362), Pipeline (516), Subsurface Drain (606), Heavy Use Area Protection (561), Roofs and Covers (367), Roof Runoff Structure (558), Waste Storage Facility (313), Waste Recycling (633), Waste Transfer (634), Underground Outlet (620) and Vegetative Treatment Area (635).

**Before Situation:**

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

**After Situation:**

Manure and other agricultural by-products are being controlled, by the collection at the source, and stored properly, at an environmentally suitable location, until such time that they are disposed of or utilized in a proper manner, typically in accordance with a nutrient management plan. This is incorporated as part of the overall waste management system meeting the National Engineering Handbook (NEH), Part 651, Agricultural Waste Management Field Handbook (AWMFH) that has been developed to also account for end use of the product from the composting facility. This scenario consists of installing a composting drum on a concrete pad. Typical drum is 6 cubic yards and concrete pad is 10' x 12' (120 square feet) on a gravel and compacted earth surface. Gravel material sufficiently compacted. Include sufficient area for accessing drum. Site to be located out of drainage areas, off-site water diverted and any runoff to spread out into a grassed area or vegetated treatment area as per regulations. Site preparation includes topsoil removal, compaction of subsoil, and installing a geotextile plus compacted gravel, concrete pad, and composting drum.

**Feature Measure:** Square Feet Floor Area

**Scenario Unit::** Square Foot

**Scenario Typical Size:** 120.0

**Scenario Total Cost:** $23,743.03

**Scenario Cost/Unit:** $197.86

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 | $327.92 | 2.5 | $819.80 |
| Geotextile, woven | 42 | Woven Geotextile Fabric. Includes materials, equipment and labor | Square Yard | $2.53 | 15 | $37.95 |
| Earthfill, Roller Compacted | 49 | Earthfill, roller or machine compacted, includes equipment and labor | Cubic Yard | $4.45 | 4 | $17.80 |
| 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 | $3.77 | 6.5 | $24.51 |
| Composter, drum, 6 CY | 2036 | 6 CY drum composter unit. Includes equipment and operation controls and shipping. Labor not included. | Each | $19,195.00 | 1 | $19,195.00 |
| **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 | $41.76 | 40 | $1,670.40 |
| 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 | $45.69 | 20 | $913.80 |
| **Materials** | | | | | | |
| Aggregate, Gravel, Graded | 46 | Gravel, includes materials, equipment and labor to transport and place. Includes washed and unwashed gravel. | Cubic Yard | $34.75 | 2.5 | $86.88 |
| **Mobilization** | | | | | | |
| Mobilization, large equipment | 1140 | Equipment >150HP or typical weights greater than 30,000 pounds or loads requiring over width or over length permits. | Each | $488.45 | 2 | $976.90 |

**Practice:** 317 - Composting Facility

**Scenario** #8 - Urban/Peri-Urban Composter

**Scenario Description:**

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

**Before Situation:**

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

**After Situation:**

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

**Feature Measure:** Square Foot Floor Area

**Scenario Unit::** Square Foot

**Scenario Typical Size:** 54.0

**Scenario Total Cost:** $2,337.87

**Scenario Cost/Unit:** $43.29

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 | $2.53 | 14 | $35.42 |
| Earthfill, Manually Compacted | 50 | Earthfill, manually compacted, includes equipment and labor | Cubic Yard | $5.87 | 2 | $11.74 |
| Truck, Pickup | 939 | Equipment and power unit costs. Labor not included. | Hour | $21.79 | 5 | $108.95 |
| **Labor** | | | | | | |
| Skilled Labor | 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 | $41.76 | 20 | $835.20 |
| 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 | $25.31 | 16 | $404.96 |
| 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 | $45.69 | 10 | $456.90 |
| **Materials** | | | | | | |
| Aggregate, Gravel, Graded | 46 | Gravel, includes materials, equipment and labor to transport and place. Includes washed and unwashed gravel. | Cubic Yard | $34.75 | 2 | $69.50 |
| Lumber, planks, posts and timbers, untreated, rot resistant | 1612 | Untreated dimension lumber with nominal thickness greater than 2" milled from rot resistant species such as cedar. Includes lumber and fasteners. Does not include labor. | Board Foot | $2.40 | 173 | $415.20 |

**Practice:** 324 - Deep Tillage

**Scenario** #8 - Deep Tillage less than 20 inches

**Scenario Description:**

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

**Before Situation:**

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

**After Situation:**

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

**Feature Measure:** <Unknown>

**Scenario Unit::** Acre

**Scenario Typical Size:** 80.0

**Scenario Total Cost:** $1,889.03

**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 | $21.79 | 1 | $21.79 |
| 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 | $19.94 | 80 | $1,595.20 |
| **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 | $25.31 | 2 | $50.62 |
| Specialist Labor | 235 | Labor requiring a specialized skill set: Includes 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 | $110.71 | 2 | $221.42 |

**Practice:** 324 - Deep Tillage

**Scenario** #9 - Deep Tillage more than 20 inches

**Scenario Description:**

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

**Before Situation:**

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

**After Situation:**

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

**Feature Measure:** <Unknown>

**Scenario Unit::** Acre

**Scenario Typical Size:** 80.0

**Scenario Total Cost:** $5,137.03

**Scenario Cost/Unit:** $64.21

Cost Details:

| Component Name | ID | Description | Unit | Cost | QTY | Total |
|---|---|---|---|---|---|---|
| **Equipment Installation** | | | | | | |
| Truck, Pickup | 939 | Equipment and power unit costs. Labor not included. | Hour | $21.79 | 1 | $21.79 |
| Ripper or subsoiler, > 36 inch depth | 1236 | Deep ripper or subsoiler, (>36 inches depth) includes tillage implement, power unit and labor. | Acre | $60.54 | 80 | $4,843.20 |
| **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 | $25.31 | 2 | $50.62 |
| Specialist Labor | 235 | Labor requiring a specialized skill set: Includes 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 | $110.71 | 2 | $221.42 |

**Practice:** 325 - High Tunnel System

**Scenario** #30 - Contiguous US Snow

**Scenario Description:**

Used for contiguous US states in areas with high snowfall. A gothic style (peaked) manufactured frame of tubular steel (30 x 70 ft.) covered with 4-year 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 high tunnel structure has been installed and he growing season has been extended for 1-4 months on average. Plant health and vigor has been improved.

**Feature Measure:** Area of Tunnel Installed

**Scenario Unit::** Square Foot

**Scenario Typical Size:** 2,160.0

**Scenario Total Cost:** $11,203.21

**Scenario Cost/Unit:** $5.19

Cost Details:

| Component Name | ID | Description | Unit | Cost | QTY | Total |
|---|---|---|---|---|---|---|
| **Labor** | | | | | | |
| General Labor | 231 | Labor performed using basic tools such as power tool, shovels, and other tools that do not require extensive training. Ex. pipe layer, herder, concrete placement, materials spreader, flagger, etc. | Hour | $25.31 | 71 | $1,797.01 |
| **Materials** | | | | | | |
| Hoop House, gothic style, base package | 1278 | Includes heavy-duty, gothic framework complete with all predrilled steel, hardware and instructions. Includes 6 mil 4-year polyethylene film to cover tunnel, roll-up sides, lumber, and polylock for sides and ends for a gothic style (peaked top) hoop house | Square Foot | $4.32 | 2160 | $9,331.20 |
| **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 i | Dollar | $1.00 | 75 | $75.00 |

**Practice:** 326 - Clearing and Snagging

**Scenario** #13 - Clearing and Snagging - Light

**Scenario Description:**

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

**Before Situation:**

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

**After Situation:**

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

**Feature Measure:** Linear Feet

**Scenario Unit::** Foot

**Scenario Typical Size:** 200.0

**Scenario Total Cost:** $3,479.86

**Scenario Cost/Unit:** $17.40

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 | $66.13 | 6 | $396.78 |
| 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 | $113.75 | 6 | $682.50 |
| Chainsaw | 937 | Equipment and power unit costs. Labor not included. | Hour | $4.37 | 12 | $52.44 |
| Truck, dump, 8 CY | 1401 | Dump truck for moving bulk material. Typically capacity is 12 ton or 8 cubic yards. Includes equipment only. | Hour | $57.56 | 8 | $460.48 |
| **Labor** | | | | | | |
| General Labor | 231 | Labor performed using basic tools such as power tool, shovels, and other tools that do not require extensive training. Ex. pipe layer, herder, concrete placement, materials spreader, flagger, etc. | Hour | $25.31 | 16 | $404.96 |
| Equipment Operators, Light | 232 | Includes: Skid Steer Loaders, Hydraulic Excavators <50 HP, Trenchers <12", Ag Equipment <150 HP, Pickup Trucks, Forklifts, Mulchers | Hour | $25.23 | 24 | $605.52 |
| Supervisor or Manager | 234 | Labor involving supervision or management activities. Includes crew supervisors, foremen and farm/ranch managers time required for adopting new technology, etc. | Hour | $45.69 | 8 | $365.52 |
| **Mobilization** | | | | | | |
| Mobilization, medium equipment | 1139 | Equipment with 70-150 HP or typical weights between 14,000 and 30,000 pounds. | Each | $255.83 | 2 | $511.66 |

**Practice:** 326 - Clearing and Snagging

**Scenario** #14 - Clearing and Snagging - Medium

**Scenario Description:**

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

**Before Situation:**

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

**After Situation:**

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

**Feature Measure:** Linear Feet

**Scenario Unit::** Foot

**Scenario Typical Size:** 300.0

**Scenario Total Cost:** $5,221.68

**Scenario Cost/Unit:** $17.41

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 | $124.03 | 10 | $1,240.30 |
| 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 | $113.75 | 10 | $1,137.50 |
| Chainsaw | 937 | Equipment and power unit costs. Labor not included. | Hour | $4.37 | 20 | $87.40 |
| Truck, dump, 8 CY | 1401 | Dump truck for moving bulk material. Typically capacity is 12 ton or 8 cubic yards. Includes equipment only. | Hour | $57.56 | 10 | $575.60 |
| **Labor** | | | | | | |
| General Labor | 231 | Labor performed using basic tools such as power tool, shovels, and other tools that do not require extensive training. Ex. pipe layer, herder, concrete placement, materials spreader, flagger, etc. | Hour | $25.31 | 16 | $404.96 |
| Equipment Operators, Light | 232 | Includes: Skid Steer Loaders, Hydraulic Excavators <50 HP, Trenchers <12", Ag Equipment <150 HP, Pickup Trucks, Forklifts, Mulchers | Hour | $25.23 | 32 | $807.36 |
| Supervisor or Manager | 234 | Labor involving supervision or management activities. Includes crew supervisors, foremen and farm/ranch managers time required for adopting new technology, etc. | Hour | $45.69 | 10 | $456.90 |
| **Mobilization** | | | | | | |
| Mobilization, medium equipment | 1139 | Equipment with 70-150 HP or typical weights between 14,000 and 30,000 pounds. | Each | $255.83 | 2 | $511.66 |

**Practice:** 326 - Clearing and Snagging

**Scenario** #15 - Clearing and Snagging - Heavy

**Scenario Description:**

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

**Before Situation:**

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

**After Situation:**

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

**Feature Measure:** Linear Feet

**Scenario Unit::** Foot

**Scenario Typical Size:** 400.0

**Scenario Total Cost:** $7,867.74

**Scenario Cost/Unit:** $19.67

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 | $124.03 | 16 | $1,984.48 |
| 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 | $113.75 | 16 | $1,820.00 |
| Chainsaw | 937 | Equipment and power unit costs. Labor not included. | Hour | $4.37 | 30 | $131.10 |
| Truck, dump, 8 CY | 1401 | Dump truck for moving bulk material. Typically capacity is 12 ton or 8 cubic yards. Includes equipment only. | Hour | $57.56 | 16 | $920.96 |
| **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 | $25.31 | 30 | $759.30 |
| Equipment Operators, Light | 232 | Includes: Skid Steer Loaders, Hydraulic Excavators <50 HP, Trenchers <12", Ag Equipment <150 HP, Pickup Trucks, Forklifts, Mulchers | Hour | $25.23 | 40 | $1,009.20 |
| 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 | $45.69 | 16 | $731.04 |
| **Mobilization** | | | | | | |
| Mobilization, medium equipment | 1139 | Equipment with 70-150 HP or typical weights between 14,000 and 30,000 pounds. | Each | $255.83 | 2 | $511.66 |

**Practice:** 327 - Conservation Cover

**Scenario** #1 - Introduced Species

**Scenario Description:**

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

**Before Situation:**

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

**After Situation:**

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

**Feature Measure:** Area planted

**Scenario Unit::** Acre

**Scenario Typical Size:** 50.0

**Scenario Total Cost:** $8,490.00

**Scenario Cost/Unit:** $169.80

Cost Details:

| Component Name | ID | Description | Unit | Cost | QTY | Total |
|---|---|---|---|---|---|---|
| **Equipment Installation** | | | | | | |
| Tillage, Light | 945 | Includes light disking (tandem) or field cultivator. Includes equipment, power unit and labor costs. | Acre | $11.14 | 150 | $1,671.00 |
| Fertilizer, ground application, dry bulk | 950 | Dry bulk fertilizer application performed by ground equipment. Includes equipment, power unit and labor costs. | Acre | $6.62 | 50 | $331.00 |
| Mechanical weed control, Vegetation termination | 957 | Mechanical operations, Includes: Roller/crimper, mower, shredder, etc. Includes equipment, power unit and labor costs. | Acre | $20.54 | 50 | $1,027.00 |
| Seeding Operation, No Till/Grass Drill | 960 | No Till drill or grass drill for seeding. Includes equipment, power unit and labor costs. | Acre | $21.36 | 50 | $1,068.00 |
| **Materials** | | | | | | |
| Nitrogen (N), Ammonium Nitrate | 69 | Price per pound of N supplied by Ammonium Nitrate. Price is not per pound of total product applied, no conversion is needed. | Pound | $0.60 | 2500 | $1,500.00 |
| 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 | $0.65 | 2000 | $1,300.00 |
| One Species, Cool Season, Introduced Perennial Grass | 2313 | Introduced, cool season perennial grass. Includes material and shipping only. | Acre | $31.86 | 50 | $1,593.00 |

**Practice:** 327 - Conservation Cover

**Scenario** #2 - Native Species

**Scenario Description:**

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

**Before Situation:**

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

**After Situation:**

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

**Feature Measure:** Area planted

**Scenario Unit::** Acre

**Scenario Typical Size:** 50.0

**Scenario Total Cost:** $9,397.00

**Scenario Cost/Unit:** $187.94

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 | $11.14 | 150 | $1,671.00 |
| Mechanical weed control, Vegetation termination | 957 | Mechanical operations, Includes: Roller/crimper, mower, shredder, etc. Includes equipment, power unit and labor costs. | Acre | $20.54 | 100 | $2,054.00 |
| Seeding Operation, No Till/Grass Drill | 960 | No Till drill or grass drill for seeding. Includes equipment, power unit and labor costs. | Acre | $21.36 | 50 | $1,068.00 |
| **Materials** | | | | | | |
| Two Species Mix, Warm Season, Native Perennial Grass | 2325 | Native, warm season perennial grass. Includes material and shipping only. | Acre | $92.08 | 50 | $4,604.00 |

**Practice:** 327 - Conservation Cover

**Scenario** #3 - Orchard or Vineyard Alleyways

**Scenario Description:**

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

**Before Situation:**

Orchard or vineyard with bare soil between vine/tree rows. Bare soil is exposed to wind erosion and/or intense rainfall during the fall, winter, and early spring. Over the winter sediment/nutrient runoff from orchards/vineyards increases. Soil erosion exceeds tolerable levels. Runoff from the fields flows into streams, water courses or other water bodies causing degradation to the receiving waters. Soil health (soil organic matter) declines over time as a result of long periods of bare soil. Little to no wildlife/pollinator habitat is present.

**After Situation:**

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

**Feature Measure:** Area planted

**Scenario Unit::** Acre

**Scenario Typical Size:** 20.0

**Scenario Total Cost:** $2,323.20

**Scenario Cost/Unit:** $116.16

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 | $11.14 | 24 | $267.36 |
| Fertilizer, ground application, dry bulk | 950 | Dry bulk fertilizer application performed by ground equipment. Includes equipment, power unit and labor costs. | Acre | $6.62 | 12 | $79.44 |
| Mechanical weed control, Vegetation termination | 957 | Mechanical operations, Includes: Roller/crimper, mower, shredder, etc. Includes equipment, power unit and labor costs. | Acre | $20.54 | 24 | $492.96 |
| Seeding Operation, No Till/Grass Drill | 960 | No Till drill or grass drill for seeding. Includes equipment, power unit and labor costs. | Acre | $21.36 | 12 | $256.32 |
| **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 | $0.60 | 600 | $360.00 |
| 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 | $0.65 | 480 | $312.00 |
| Potassium, K2O | 74 | K2O supplied by Muriate Of Potash. Price is not per pound of total product applied, no conversion is needed. | Pound | $0.36 | 480 | $172.80 |
| One Species, Cool Season, Introduced Perennial Grass | 2313 | Introduced, cool season perennial grass. Includes material and shipping only. | Acre | $31.86 | 12 | $382.32 |

**Practice:** 327 - Conservation Cover

**Scenario** #4 - Pollinator Species

**Scenario Description:**

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

**Before Situation:**

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

**After Situation:**

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

**Feature Measure:** Area planted

**Scenario Unit::** Acre

**Scenario Typical Size:** 1.0

**Scenario Total Cost:** $604.68

**Scenario Cost/Unit:** $604.68

Cost Details:

| Component Name | ID | Description | Unit | Cost | QTY | Total |
|---|---|---|---|---|---|---|
| **Equipment Installation** | | | | | | |
| Tillage, Light | 945 | Includes light disking (tandem) or field cultivator. Includes equipment, power unit and labor costs. | Acre | $11.14 | 3 | $33.42 |
| Mechanical weed control, Vegetation termination | 957 | Mechanical operations, Includes: Roller/crimper, mower, shredder, etc. Includes equipment, power unit and labor costs. | Acre | $20.54 | 2 | $41.08 |
| Seeding Operation, No Till/Grass Drill | 960 | No Till drill or grass drill for seeding. Includes equipment, power unit and labor costs. | Acre | $21.36 | 1 | $21.36 |
| **Materials** | | | | | | |
| 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 | $254.41 | 2 | $508.82 |

**Practice:** 327 - Conservation Cover

**Scenario** #22 - Monarch Species Mix

**Scenario Description:**

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

**Before Situation:**

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

**After Situation:**

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

**Feature Measure:** area planted

**Scenario Unit::** Acre

**Scenario Typical Size:** 1.0

**Scenario Total Cost:** $895.90

**Scenario Cost/Unit:** $895.90

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 | $11.14 | 3 | $33.42 |
| Mechanical weed control, Vegetation termination | 957 | Mechanical operations, Includes: Roller/crimper, mower, shredder, etc. Includes equipment, power unit and labor costs. | Acre | $20.54 | 2 | $41.08 |
| Seeding Operation, No Till/Grass Drill | 960 | No Till drill or grass drill for seeding. Includes equipment, power unit and labor costs. | Acre | $21.36 | 1 | $21.36 |
| **Materials** | | | | | | |
| Three Species Mix, Native Forb | 2333 | Native forb mix. Includes material and shipping only. | Acre | $571.46 | 1.4 | $800.04 |

**Practice:** 327 - Conservation Cover

**Scenario** #35 - Introduced with Forgone Income

**Scenario Description:**

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

**Before Situation:**

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

**After Situation:**

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

**Feature Measure:** Area planted

**Scenario Unit::** Acre

**Scenario Typical Size:** 50.0

**Scenario Total Cost:** $25,397.50

**Scenario Cost/Unit:** $507.95

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 | $11.14 | 150 | $1,671.00 |
| Fertilizer, ground application, dry bulk | 950 | Dry bulk fertilizer application performed by ground equipment. Includes equipment, power unit and labor costs. | Acre | $6.62 | 50 | $331.00 |
| Mechanical weed control, Vegetation termination | 957 | Mechanical operations, Includes: Roller/crimper, mower, shredder, etc. Includes equipment, power unit and labor costs. | Acre | $20.54 | 50 | $1,027.00 |
| Seeding Operation, No Till/Grass Drill | 960 | No Till drill or grass drill for seeding. Includes equipment, power unit and labor costs. | Acre | $21.36 | 50 | $1,068.00 |
| **Foregone Income** | | | | | | |
| FI, Corn Dryland | 1959 | Dryland Corn is Primary Crop | Acre | $376.15 | 50 | $18,807.50 |
| **Materials** | | | | | | |
| Nitrogen, Organic | 266 | ORGANIC Nitrogen | Pound | $0.20 | 2500 | $500.00 |
| Phosphorus, Organic | 267 | ORGANIC Phosphorus | Pound | $0.20 | 2000 | $400.00 |
| One Species, Cool Season, Introduced Perennial Grass | 2313 | Introduced, cool season perennial grass. Includes material and shipping only. | Acre | $31.86 | 50 | $1,593.00 |

**Practice:** 327 - Conservation Cover

**Scenario** #36 - Native Species with Forgone Income

**Scenario Description:**

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

**Before Situation:**

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

**After Situation:**

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

**Feature Measure:** Area planted

**Scenario Unit::** Acre

**Scenario Typical Size:** 50.0

**Scenario Total Cost:** $28,204.50

**Scenario Cost/Unit:** $564.09

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 | $11.14 | 150 | $1,671.00 |
| Mechanical weed control, Vegetation termination | 957 | Mechanical operations, Includes: Roller/crimper, mower, shredder, etc. Includes equipment, power unit and labor costs. | Acre | $20.54 | 100 | $2,054.00 |
| Seeding Operation, No Till/Grass Drill | 960 | No Till drill or grass drill for seeding. Includes equipment, power unit and labor costs. | Acre | $21.36 | 50 | $1,068.00 |
| **Foregone Income** | | | | | | |
| FI, Corn Dryland | 1959 | Dryland Corn is Primary Crop | Acre | $376.15 | 50 | $18,807.50 |
| **Materials** | | | | | | |
| Two Species Mix, Warm Season, Native Perennial Grass | 2325 | Native, warm season perennial grass. Includes material and shipping only. | Acre | $92.08 | 50 | $4,604.00 |

**Practice:** 327 - Conservation Cover

**Scenario** #37 - Pollinator Species with Forgone Income

**Scenario Description:**

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

**Before Situation:**

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

**After Situation:**

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

**Feature Measure:** Area planted

**Scenario Unit::** Acre

**Scenario Typical Size:** 1.0

**Scenario Total Cost:** $853.63

**Scenario Cost/Unit:** $853.63

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 | $11.14 | 3 | $33.42 |
| Mechanical weed control, Vegetation termination | 957 | Mechanical operations, Includes: Roller/crimper, mower, shredder, etc. Includes equipment, power unit and labor costs. | Acre | $20.54 | 2 | $41.08 |
| Seeding Operation, No Till/Grass Drill | 960 | No Till drill or grass drill for seeding. Includes equipment, power unit and labor costs. | Acre | $21.36 | 1 | $21.36 |
| **Foregone Income** | | | | | | |
| FI, Corn Dryland | 1959 | Dryland Corn is Primary Crop | Acre | $376.15 | 1 | $376.15 |
| **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 | $254.41 | 1.5 | $381.62 |

**Practice:** 328 - Conservation Crop Rotation

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

**Scenario Description:**

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

**Before Situation:**

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

**After Situation:**

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

**Feature Measure:** Area planted

**Scenario Unit::** Acre

**Scenario Typical Size:** 200.0

**Scenario Total Cost:** $1,370.70

**Scenario Cost/Unit:** $6.85

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 | $45.69 | 30 | $1,370.70 |

**Practice:** 328 - Conservation Crop Rotation

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

**Scenario Description:**

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

**Before Situation:**

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

**After Situation:**

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

**Feature Measure:** Area planted

**Scenario Unit::** Acre

**Scenario Typical Size:** 50.0

**Scenario Total Cost:** $1,827.60

**Scenario Cost/Unit:** $36.55

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 | $45.69 | 40 | $1,827.60 |

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

**Scenario** #1 - No-Till/Strip-Till

**Scenario Description:**

This practice typically involves conversion from a clean-tilled (conventional tilled) system to no-till or strip-till system on 100 acres of cropland. This involves managing the amount, orientation and distribution of crop and other plant residue on the soil surface year round while limiting soil-disturbing activities used to establish and harvest crops. The practice is used to reduce sheet and rill erosion, reduce wind erosion, improve soil quality, reduce CO2 losses from the soil, reduce energy use, increase plant available moisture and provide food and escape cover for wildlife. The no-till/strip-till system includes non-tillage types of weed control and may also include a period of no till fallow. System is applicable in both irrigated and non-irrigated fields of organic and non-organic operations.

**Before Situation:**

Row crops or small grains are grown and harvested. Full width tillage is performed prior to planting and weed control during crop production is typically cultivation and chemical application. Fields are disked immediately following harvest, with additional operations in some fields to facilitate drainage, seedbed preparation or additional weed control. Residue amounts after tillage operations average 10% or less, resulting in bare soil being exposed to wind erosion and/or intense rainfall. Any crop residue that is present degrades and sediment/nutrient runoff from fields increases during rainfall events. Sheet and rill erosion occurs with visible rills by spring. Soil health (soil organic matter) declines over time as a result of tillage practices, low residue, and long periods of bare soil. This system will typically have a negative Soil Conditioning Index (SCI) and a high Soil Tillage Intensity Rating (STIR).

**After Situation:**

The Implementation Requirements for 329 Residue Management, No Till is prepared and installed. Managing crop residue on the surface of a field (typical 100 acre) year around according to the 329 practice plan while limiting soil disturbing activities to those which place nutrients, and plant crops that meet the minimum criteria in the 329 practice standard. All crops are seeded/planted with a no-till drill or no-till/strip-till planter, which minimizes soil disturbance while establishing good seed-soil contact. All residues are to be maintained on the soil surface in a uniform distribution over the entire field and not burned or removed. Crop residues provide soil surface cover throughout the year. Runoff and erosion are reduced and no rills are visible on the soil surface. Wind erosion is reduced by standing residues and surface cover. Over time, soil health is improved due to the additional biomass (crop residues), ground cover, and soil infiltration. Crop residues and/or cover crop residues left on the soil surface may maximize weed control by increasing allelopathic and mulching effect, and provides cover for wildlife. The practice would require reducing soil disturbance and erosion and increasing biomass returned to the soil in sufficient amounts to achieve increased SCI and decreased STIR.

**Feature Measure:** Area planted

**Scenario Unit::** Acre

**Scenario Typical Size:** 100.0

**Scenario Total Cost:** $2,011.00

**Scenario Cost/Unit:** $20.11

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 | $21.36 | 50 | $1,068.00 |
| 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 | $18.86 | 50 | $943.00 |

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

**Scenario** #3 - No Till Adaptive Management

**Scenario Description:**

The practice scenario is for the implementation of no till in small replicated plots to allow the producer to learn how to manage no till on their operation. Scenario includes implementing replicated strip trials on a field plot to evaluate, identify and implement a particular no till management strategy (e.g., no till vs conventional till, drill vs planter, strip till vs no till, residue row cleaners, vs no row cleaners, etc.) This will be done by following the Agronomy Technical Note 10 - Adaptive Management.

**Before Situation:**

Row crops or small grains are grown and harvested. Full width tillage is performed prior to planting and weed control during crop production is typically cultivation and chemical application. Fields are disked immediately following harvest, with additional operations in some fields to facilitate drainage or additional weed control. Residue amounts after tillage operations average 10% or less, resulting in bare soil being exposed to wind erosion and/or intense rainfall. Any crop residue that is present degrades and sediment/nutrient runoff from fields increases during rainfall events. Sheet and rill erosion exceeds soil loss tolerances. Soil health (soil organic matter) declines over time as a result of tillage practices, low residue, and long periods of bare soil. This system will typically have a negative Soil Conditioning Index (SCI) and a high Soil Tillage Intensity Rating (STIR). The producer is considering using no till technology, but is unsure how to manage on their operation or needs to improve the management of no till to be successful.

**After Situation:**

Implementation Requirements are prepared and an Adaptive Management Plan for the plots is developed and implemented. Installation of this scenario will result in establishment of no till replicated plots to compare to different management strategies for no till and other residue management strategies following the guidance in the Agronomy Technical Note 10 - Adaptive Management Process. Implementation involves establishing the replicated plots to evaluate one or more no till management strategies. The plot will consist of at least 4 replicated plots designed, laid out, managed and evaluated with the assistance of a consultant knowledgeable in no till management. Results are used to make no till management decisions to address erosion, soil health, and water quality issues. Yields will be measured and statistically summarized following the procedures in Agronomy Technical Note 10 - Adaptive Management. The yields for each plot will be adjusted to the appropriate moisture content. This would be repeated for 3 years.

**Feature Measure:** Based on 15 acre plots

**Scenario Unit::** Each

**Scenario Typical Size:** 1.0

**Scenario Total Cost:** $3,528.25

**Scenario Cost/Unit:** $3,528.25

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 | $21.36 | 7.5 | $160.20 |
| Seeding Operation, No Till/Strip Till Planter | 1230 | No Till/Strip Till row planters for seeding. Includes all costs for equipment, power unit, and labor. | Acre | $18.86 | 7.5 | $141.45 |
| **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 | $25.31 | 40 | $1,012.40 |
| 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 | $110.71 | 20 | $2,214.20 |

**Practice:** 330 - Contour Farming

**Scenario** #1 - Contour Farming

**Scenario Description:**

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

**Before Situation:**

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

**After Situation:**

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

**Feature Measure:** acre

**Scenario Unit::** Acre

**Scenario Typical Size:** 30.0

**Scenario Total Cost:** $285.01

**Scenario Cost/Unit:** $9.50

Cost Details:

| Component Name | ID | Description | Unit | Cost | QTY | Total |
|---|---|---|---|---|---|---|
| **Equipment Installation** | | | | | | |
| Truck, Pickup | 939 | Equipment and power unit costs. Labor not included. | Hour | $21.79 | 1 | $21.79 |
| **Labor** | | | | | | |
| Equipment Operators, Light | 232 | Includes: Skid Steer Loaders, Hydraulic Excavators <50 HP, Trenchers <12", Ag Equipment <150 HP, Pickup Trucks, Forklifts, Mulchers | Hour | $25.23 | 5 | $126.15 |
| Supervisor or Manager | 234 | Labor involving supervision or management activities. Includes crew supervisors, foremen and farm/ranch managers time required for adopting new technology, etc. | Hour | $45.69 | 3 | $137.07 |

**Practice:** 332 - Contour Buffer Strips

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

**Scenario Description:**

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

**Before Situation:**

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

**After Situation:**

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

**Feature Measure:** number of acres

**Scenario Unit::** Acre

**Scenario Typical Size:** 1.0

**Scenario Total Cost:** $490.18

**Scenario Cost/Unit:** $490.18

Cost Details:

| Component Name | ID | Description | Unit | Cost | QTY | Total |
|---|---|---|---|---|---|---|
| **Equipment Installation** | | | | | | |
| Chemical, ground application | 948 | Chemical application performed by ground equipment. Includes equipment, power unit and labor costs. | Acre | $6.13 | 1 | $6.13 |
| Seeding Operation, No Till/Grass Drill | 960 | No Till drill or grass drill for seeding. Includes equipment, power unit and labor costs. | Acre | $21.36 | 1 | $21.36 |
| **Foregone Income** | | | | | | |
| FI, Corn Dryland | 1959 | Dryland Corn is Primary Crop | Acre | $376.15 | 1 | $376.15 |
| **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 | $17.48 | 1 | $17.48 |
| One Species, Warm Season, Native Perennial Grass | 2322 | Native, warm season perennial grass. Includes material and shipping only. | Acre | $69.06 | 1 | $69.06 |

**Practice:** 332 - Contour Buffer Strips

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

**Scenario Description:**

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

**Before Situation:**

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

**After Situation:**

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

**Feature Measure:** Number of acres

**Scenario Unit::** Acre

**Scenario Typical Size:** 1.0

**Scenario Total Cost:** $494.48

**Scenario Cost/Unit:** $494.48

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 | $6.13 | 1 | $6.13 |
| Seeding Operation, No Till/Grass Drill | 960 | No Till drill or grass drill for seeding. Includes equipment, power unit and labor costs. | Acre | $21.36 | 1 | $21.36 |
| **Foregone Income** | | | | | | |
| FI, Corn Dryland | 1959 | Dryland Corn is Primary Crop | Acre | $376.15 | 1 | $376.15 |
| **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 | $0.49 | 30 | $14.70 |
| 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 | $0.65 | 20 | $13.00 |
| Sulfate of Potash | 263 | Approved for Organic Systems - Muriate of Potash | Pound | $0.69 | 20 | $13.80 |
| Herbicide, Glyphosate | 334 | A broad-spectrum, non-selective systemic herbicide. Refer to WIN-PST for product names and active ingredients. Includes materials and shipping only. | Acre | $17.48 | 1 | $17.48 |
| One Species, Cool Season, Introduced Perennial Grass | 2313 | Introduced, cool season perennial grass. Includes material and shipping only. | Acre | $31.86 | 1 | $31.86 |

**Practice:** 332 - Contour Buffer Strips

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

**Scenario Description:**

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

**Before Situation:**

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

**After Situation:**

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

**Feature Measure:** Number of acres

**Scenario Unit::** Acre

**Scenario Typical Size:** 1.0

**Scenario Total Cost:** $636.28

**Scenario Cost/Unit:** $636.28

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 | $6.13 | 1 | $6.13 |
| Seeding Operation, No Till/Grass Drill | 960 | No Till drill or grass drill for seeding. Includes equipment, power unit and labor costs. | Acre | $21.36 | 1 | $21.36 |
| **Foregone Income** | | | | | | |
| FI, Corn Dryland | 1959 | Dryland Corn is Primary Crop | Acre | $376.15 | 1 | $376.15 |
| **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 | $17.48 | 1 | $17.48 |
| Three plus Species Mix, Warm Season, Native Perennial | 2327 | Native, warm season perennial grass. Includes material and shipping only. | Acre | $215.16 | 1 | $215.16 |

**Practice:** 332 - Contour Buffer Strips

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

**Scenario Description:**

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

**Before Situation:**

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

**After Situation:**

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

**Feature Measure:** number of acres

**Scenario Unit::** Acre

**Scenario Typical Size:** 1.0

**Scenario Total Cost:** $1,206.62

**Scenario Cost/Unit:** $1,206.62

Cost Details:

| Component Name | ID | Description | Unit | Cost | QTY | Total |
|---|---|---|---|---|---|---|
| **Equipment Installation** | | | | | | |
| Chemical, ground application | 948 | Chemical application performed by ground equipment. Includes equipment, power unit and labor costs. | Acre | $6.13 | 1 | $6.13 |
| Seeding Operation, No Till/Grass Drill | 960 | No Till drill or grass drill for seeding. Includes equipment, power unit and labor costs. | Acre | $21.36 | 1 | $21.36 |
| **Foregone Income** | | | | | | |
| FI, Vegetables | 2033 | Vegetables is Primary Crop | Acre | $1,092.59 | 1 | $1,092.59 |
| **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 | $17.48 | 1 | $17.48 |
| One Species, Warm Season, Native Perennial Grass | 2322 | Native, warm season perennial grass. Includes material and shipping only. | Acre | $69.06 | 1 | $69.06 |

**Practice:** 332 - Contour Buffer Strips

**Scenario** #25 - Introduced-High Value Cropland

**Scenario Description:**

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

**Before Situation:**

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

**After Situation:**

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

**Feature Measure:** Number of acres

**Scenario Unit::** Acre

**Scenario Typical Size:** 1.0

**Scenario Total Cost:** $1,210.92

**Scenario Cost/Unit:** $1,210.92

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 | $6.13 | 1 | $6.13 |
| Seeding Operation, No Till/Grass Drill | 960 | No Till drill or grass drill for seeding. Includes equipment, power unit and labor costs. | Acre | $21.36 | 1 | $21.36 |
| **Foregone Income** | | | | | | |
| FI, Vegetables | 2033 | Vegetables is Primary Crop | Acre | $1,092.59 | 1 | $1,092.59 |
| **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 | $0.49 | 30 | $14.70 |
| 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 | $0.65 | 20 | $13.00 |
| Sulfate of Potash | 263 | Approved for Organic Systems - Muriate of Potash | Pound | $0.69 | 20 | $13.80 |
| Herbicide, Glyphosate | 334 | A broad-spectrum, non-selective systemic herbicide. Refer to WIN-PST for product names and active ingredients. Includes materials and shipping only. | Acre | $17.48 | 1 | $17.48 |
| One Species, Cool Season, Introduced Perennial Grass | 2313 | Introduced, cool season perennial grass. Includes material and shipping only. | Acre | $31.86 | 1 | $31.86 |

**Practice:** 332 - Contour Buffer Strips

**Scenario** #26 - Wildlife/Pollinator-High Value Cropland

**Scenario Description:**

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

**Before Situation:**

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

**After Situation:**

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

**Feature Measure:** Number of acres

**Scenario Unit::** Acre

**Scenario Typical Size:** 1.0

**Scenario Total Cost:** $1,352.72

**Scenario Cost/Unit:** $1,352.72

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 | $6.13 | 1 | $6.13 |
| Seeding Operation, No Till/Grass Drill | 960 | No Till drill or grass drill for seeding. Includes equipment, power unit and labor costs. | Acre | $21.36 | 1 | $21.36 |
| **Foregone Income** | | | | | | |
| FI, Vegetables | 2033 | Vegetables is Primary Crop | Acre | $1,092.59 | 1 | $1,092.59 |
| **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 | $17.48 | 1 | $17.48 |
| Three plus Species Mix, Warm Season, Native Perennial | 2327 | Native, warm season perennial grass. Includes material and shipping only. | Acre | $215.16 | 1 | $215.16 |

**Practice:** 338 - Prescribed Burning

**Scenario** #1 - Understory Burn

**Scenario Description:**

Applying a prescribed burn according to designed burn plan and NRCS Prescribed Burning (338) standard and specifications in order to control undesirable species, improve wildlife habitat, improve plant productivity and/or quality, facilitate grazing distribution, to encourage natural seeding or to permit reforestation by planting or direct seeding and maintain ecological processes. An Understory burn can consume debris or leaf litter under controlled conditions that otherwise could burn uncontrollably and devastatingly. Prior to burning unit may need to be treated to reduce slash height and quantities. Burn should be cool enough to not cause mortality to residual stand but also must reduce litter and debris. Burned firebreaks used to achieve total firebreak width are part of these burns. (Constructed firebreak cost is not included in cost of burn. Refer to Firebreak (394) standard and cost scenarios)

**Before Situation:**

Moderate slash accumulation in a open forest stand. Leaf litter and debris throughout stand. Small seedlings of various quantities may be present. Desirable plant composition is lacking due to reduced plant vigor, invasive species or improper livestock distribution.

**After Situation:**

Litter, debris and slash are consumed, small seedlings may be killed during active burning. Residual larger trees have little to no scorching. Post treatment fire danger is significantly reduced. Desirable plant composition is restored, plant vigor improved and invasive species reduced. Forage production and quality for livestock and /or wildlife is improved.

**Feature Measure:** Acres planned

**Scenario Unit::** Acre

**Scenario Typical Size:** 10.0

**Scenario Total Cost:** $7,911.09

**Scenario Cost/Unit:** $791.11

Cost Details:

| Component Name | ID | Description | Unit | Cost | QTY | Total |
|---|---|---|---|---|---|---|
| **Equipment Installation** | | | | | | |
| Truck, Pickup | 939 | Equipment and power unit costs. Labor not included. | Hour | $21.79 | 10 | $217.90 |
| Trailer, water tank | 1598 | Mobile 5,000 gal water tank mounted on a trailer. Equipment only. Does not include towing equipment. | Hour | $19.74 | 10 | $197.40 |
| **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 | $25.31 | 20 | $506.20 |
| 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 | $45.69 | 20 | $913.80 |
| 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 | $110.71 | 50 | $5,535.50 |
| **Materials** | | | | | | |
| Fuel, ignition fuel mixture | 1596 | Mixture of gasoline and diesel for ignition of prescribed burns. Materials only. | Gallon | $4.32 | 12 | $51.84 |
| **Mobilization** | | | | | | |
| Mobilization, large equipment | 1140 | Equipment >150HP or typical weights greater than 30,000 pounds or loads requiring over width or over length permits. | Each | $488.45 | 1 | $488.45 |

**Practice:** 338 - Prescribed Burning

**Scenario** #3 - Steep Terrain, Volatile fuels >4 ft tall, <10% Canopy Cover

**Scenario Description:**

Applying a prescribed burn according to designed burn plan and NRCS Prescribed Burning (338) standard and specifications in order to control undesirable species, improve wildlife habitat, improve plant productivity and/or quality, and maintain ecological processes. This scenario is based on a burn area of 15 acres and applies under the following conditions: where the terrain of the majority of the area to be burned >15% slopes with herbaceous and low volatile woody fuel with high volatile woody fuels greater than 4ft tall, but fire is still a ground fire carried by fine fuel. Burned firebreaks used to achieve total firebreak width are part of these burns. (Constructed firebreak cost is not included in cost of burn. Refer to Firebreak (394) standard and cost scenarios)

**Before Situation:**

Desirable plant composition is lacking due to reduced plant vigor, invasive species or improper livestock distribution.

**After Situation:**

Desirable plant composition is restored, plant vigor improved and invasive species reduced. Forage production and quality for livestock and /or wildlife is improved.

**Feature Measure:** Acres Planned

**Scenario Unit::** Acre

**Scenario Typical Size:** 15.0

**Scenario Total Cost:** $8,545.07

**Scenario Cost/Unit:** $569.67

Cost Details:

| Component Name | ID | Description | Unit | Cost | QTY | Total |
|---|---|---|---|---|---|---|
| **Equipment Installation** | | | | | | |
| Truck, Pickup | 939 | Equipment and power unit costs. Labor not included. | Hour | $21.79 | 8 | $174.32 |
| All terrain vehicles, ATV | 965 | Includes equipment, power unit and labor costs. | Hour | $28.28 | 16 | $452.48 |
| Trailer, water tank | 1598 | Mobile 5,000 gal water tank mounted on a trailer. Equipment only. Does not include towing equipment. | Hour | $19.74 | 8 | $157.92 |
| 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 | $2.42 | 8 | $19.36 |
| **Labor** | | | | | | |
| Skilled Labor | 230 | Labor requiring a high level skill set: Includes carpenters, welders, electricians, conservation professionals involved with data collection, monitoring, and or record keeping, etc. | Hour | $41.76 | 16 | $668.16 |
| 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 | $25.31 | 56 | $1,417.36 |
| Supervisor or Manager | 234 | Labor involving supervision or management activities. Includes crew supervisors, foremen and farm/ranch managers time required for adopting new technology, etc. | Hour | $45.69 | 8 | $365.52 |
| Specialist Labor | 235 | Labor requiring a specialized skill set: Includes Agronomists, Foresters, Biologists, etc. to provide additional technical information during the planning and implementation of the practice. Does not include NRCS or TSP services. | Hour | $110.71 | 44 | $4,871.24 |
| **Materials** | | | | | | |
| Fuel, ignition fuel mixture | 1596 | Mixture of gasoline and diesel for ignition of prescribed burns. Materials only. | Gallon | $4.32 | 5 | $21.60 |
| **Mobilization** | | | | | | |
| Mobilization, very small equipment | 1137 | Equipment that is small enough to be transported by a pick-up truck with typical weights less than 3,500 pounds. Can be multiple pieces of equipment if all hauled simultaneously. | Each | $70.64 | 2 | $141.28 |
| Mobilization, medium equipment | 1139 | Equipment with 70-150 HP or typical weights between 14,000 and 30,000 pounds. | Each | $255.83 | 1 | $255.83 |

**Practice:** 338 - Prescribed Burning

**Scenario** #4 - Volatile Fuel Burn

**Scenario Description:**

Applying a prescribed burn according to designed burn plan and NRCS Prescribed Burning (338) standard and specifications in order to control undesirable species, improve wildlife habitat, improve plant productivity and/or quality, facilitate grazing distribution, to encourage natural seeding or to permit reforestation by planting or direct seeding and maintain ecological processes. An Understory burn can consume debris or leaf litter under controlled conditions that otherwise could burn uncontrollably and devastatingly. Prior to burning unit may need to be treated to reduce slash height and quantities. Burn should be cool enough to not cause mortality to residual stand but also must reduce litter and debris. Burned firebreaks used to achieve total firebreak width are part of these burns. (Constructed firebreak cost is not included in cost of burn. Refer to Firebreak (394) standard and cost scenarios)

**Before Situation:**

Heavy shrub accumulation with a high volatility. Leaf litter and debris throughout stand. Small seedlings of various quantities may be present. Desirable plant composition is lacking due to reduced plant vigor or invasive species.

**After Situation:**

Shrubs, litter, and debris are consumed, small seedlings may be killed during active burning. Residual larger trees have little to no scorching. Post treatment fire danger is significantly reduced. Desirable plant composition is restored, plant vigor improved and invasive species reduced.

**Feature Measure:** Acres Planned

**Scenario Unit::** Acre

**Scenario Typical Size:** 10.0

**Scenario Total Cost:** $11,622.41

**Scenario Cost/Unit:** $1,162.24

Cost Details:

| Component Name | ID | Description | Unit | Cost | QTY | Total |
|---|---|---|---|---|---|---|
| **Equipment Installation** | | | | | | |
| Truck, Pickup | 939 | Equipment and power unit costs. Labor not included. | Hour | $21.79 | 15 | $326.85 |
| Trailer, water tank | 1598 | Mobile 5,000 gal water tank mounted on a trailer. Equipment only. Does not include towing equipment. | Hour | $19.74 | 15 | $296.10 |
| **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 | $25.31 | 30 | $759.30 |
| 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 | $45.69 | 30 | $1,370.70 |
| 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 | $110.71 | 75 | $8,303.25 |
| **Materials** | | | | | | |
| Fuel, ignition fuel mixture | 1596 | Mixture of gasoline and diesel for ignition of prescribed burns. Materials only. | Gallon | $4.32 | 18 | $77.76 |
| **Mobilization** | | | | | | |
| Mobilization, large equipment | 1140 | Equipment >150HP or typical weights greater than 30,000 pounds or loads requiring over width or over length permits. | Each | $488.45 | 1 | $488.45 |

**Practice:** 340 - Cover Crop

**Scenario** #1 - Cover Crop - Basic and organic/non-organic

**Scenario Description:**

Typically a small grain or legume (may also use forage sorghum, radishes, turnips, buckwheat, etc.) will be planted as a cover crop immediately after harvest of a row crop, and will be followed by a row crop that will utilize the residue as a mulch. This scenario assumes that seed will be planted with a drill. The cover crop should be allowed to generate as much biomass as possible, without delaying planting of the following crop. The cover crop will be terminated using an approved herbicide prior to planting the subsequent crop.

**Before Situation:**

Row crops such as corn, soybeans, or cotton are grown and harvested in mid-late fall. Fields are disked immediately following harvest, with rows in some fields being hipped for drainage. Residue amounts after harvest average 30% or less, resulting in bare soil being exposed to wind erosion and/or intense rainfall during the fall, winter, and early spring. Over the winter residue degrades and sediment/nutrient runoff from fields increases. Erosion exceeds soil loss tolerances. Runoff from the fields flows into streams, water courses or other water bodies causing degradation to the receiving waters. Soil health (soil organic matter) declines over time as a result of tillage practices, low residue crops, and long periods of bare soil.

**After Situation:**

Implementation Requirements according to Cover Crop (340) are prepared and implemented. Within 30 days after harvest of the row crop, fields are planted with a small grain or legume cover crop (may also use forage sorghum, radishes, turnips, buckwheat, etc.), typically rye or clover. The average field size is 40 acres. The cover crop is seeded with a drill. No additional fertilizer is applied with the cover crop. The cover crop provides soil cover by late fall, throughout the winter, and into the early spring. Runoff and erosion are reduced. Wind erosion is reduced by standing residues. The cover crop is terminated with an approved herbicide prior to spring planting as late as feasible to maximize plant biomass production. Over time, soil health is improved due to the additional biomass, ground cover, soil infiltration, and plant diversity introduced to the cropping system. Cover crop residues left on the surface may maximize weed control by increasing allelopathic and mulching effect.

**Feature Measure:** Area planted

**Scenario Unit::** Acre

**Scenario Typical Size:** 40.0

**Scenario Total Cost:** $3,329.20

**Scenario Cost/Unit:** $83.23

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 | $6.13 | 40 | $245.20 |
| Seeding Operation, No Till/Grass Drill | 960 | No Till drill or grass drill for seeding. Includes equipment, power unit and labor costs. | Acre | $21.36 | 40 | $854.40 |
| **Materials** | | | | | | |
| Herbicide, Glyphosate | 334 | A broad-spectrum, non-selective systemic herbicide. Refer to WIN-PST for product names and active ingredients. Includes materials and shipping only. | Acre | $17.48 | 40 | $699.20 |
| One Species, Cool Season, Annual Grass or Legume | 2311 | Cool season annual grass or legume. Includes material and shipping only. | Acre | $38.26 | 40 | $1,530.40 |

**Practice:** 340 - Cover Crop

**Scenario** #6 - Cover Crop Adaptive Management

**Scenario Description:**

The practice scenario is for the implementation of cover crops in small replicated plots to allow the producer to learn how to manage cover crops on their operation. Scenario includes implementing replicated strip trials on a field plot to evaluate, identify and implement a particular cover crop management strategy (e.g., cover crop vs no cover crop, multiple species vs, single species, evaluate different termination methods or timings, using a legume vs no legume for nitrogen credits). This will be done following the guidance in the NRCS Technical Note 10 - Adaptive Management.

**Before Situation:**

Row crops such as corn, soybeans, or cotton are grown and harvested in mid-late fall. Fields are disked immediately following harvest, with rows in some fields being hipped for drainage. Residue amounts after harvest average 30% or less, resulting in bare soil being exposed to wind erosion and/or intense rainfall. Over the winter residue degrades and sediment/nutrient runoff from fields increases. Sheet and rill erosion occurs with visible rills by spring. Runoff from the fields flows into streams, water courses or other water bodies causing degradation to the receiving waters. Soil health (soil organic matter) declines over time as a result of tillage practices, low residue crops, and long periods of bare soil. The producer is considering the use of cover crops but is unsure how to manage on their unique operation or is seeking a way to better manage cover crops in the operation.

**After Situation:**

Implementation Requirements for Cover Crop (340) will be prepared along with the Adaptive Management plan for the replicated cover crop plots and implemented. Installation of this scenario will result in establishment of a cover crop replicated plots to compare to different management strategies for cover crop management following the guidance in the Agronomy Technical Note 10 - Adaptive Management. Implementation involves establishing the replicated plots to evaluate one or more cover crop management strategies. The plot will consist of at least 4 replicated plots designed, laid out, managed and evaluated with the assistance of a consultant knowledgeable in cover crop management. Results are used to make cover crop management decisions to address erosion and water quality issues. Yields will be measured and statistically summarized following the procedures in Agronomy Technical Note 10 - Adaptive Management. The yields for each plot will be adjusted to the appropriate moisture content. This would be repeated for 3 years.

**Feature Measure:** Area planted

**Scenario Unit::** Each

**Scenario Typical Size:** 1.0

**Scenario Total Cost:** $2,824.10

**Scenario Cost/Unit:** $2,824.10

Cost Details:

| Component Name | ID | Description | Unit | Cost | QTY | Total |
|---|---|---|---|---|---|---|
| **Equipment Installation** | | | | | | |
| Chemical, ground application | 948 | Chemical application performed by ground equipment. Includes equipment, power unit and labor costs. | Acre | $6.13 | 10 | $61.30 |
| Seeding Operation, No Till/Grass Drill | 960 | No Till drill or grass drill for seeding. Includes equipment, power unit and labor costs. | Acre | $21.36 | 10 | $213.60 |
| **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 | $41.76 | 20 | $835.20 |
| 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 | $25.31 | 40 | $1,012.40 |
| **Materials** | | | | | | |
| Herbicide, Glyphosate | 334 | A broad-spectrum, non-selective systemic herbicide. Refer to WIN-PST for product names and active ingredients. Includes materials and shipping only. | Acre | $17.48 | 10 | $174.80 |
| 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 | $52.68 | 10 | $526.80 |

**Practice:** 340 - Cover Crop

**Scenario** #11 - Cover Crop Multiple Species Organic and Non-Organic

**Scenario Description:**

Typically the multi-species cover crop (two or more species) mix includes a small grain, a legume, and may include other species such as forage sorghum, radishes, turnips, buckwheat, etc.). This mix will address all the purposes of the Cover Crop (340) standard. Typically the cover crop is seeded immediately after harvest of a row crop, but may be inter-seeded into a row crop using a broadcast seeder, drill, or similar device. The cover crop will be followed by another row crop and will utilize the residue as a mulch. The cover crop should be allowed to generate as much biomass as possible without delaying planting of the following crop. The cover crop will be terminated using an approved herbicide or tillage prior to planting the subsequent crop and terminated per the NRCS Cover Crop Termination Guidelines.

**Before Situation:**

Row crops such as corn, soybeans, or cotton are grown and harvested in mid-late fall. Fields are disked immediately following harvest with rows in some fields being hipped for drainage. Residue amounts after harvest average 30% or less resulting in bare soil being exposed to wind erosion and/or intense rainfall during the fall, winter, and early spring. Over the winter residue degrades and sediment/nutrient runoff from fields increases. Erosion exceeds soil loss tolerances. Runoff from the fields flows into streams, water courses or other water bodies causing degradation to the receiving waters. Soil health (soil organic matter) declines over time as a result of tillage practices, low residue crops, and long periods of bare soil.

**After Situation:**

Implementation Requirements according to Cover Crop (340) are prepared and implemented. Within 30 days after the harvest of row crop, fields are planted with a multi-species (2 or more species) cover crop mix that generally includes a small grain, a legume, and may include other species such as forage sorghum, radishes, turnips, buckwheat, etc. The average field size is 40 acres. The cover crop is seeded with a drill, broadcast seeder, aerial broadcast, or other method. No additional fertilizer is applied with the cover crop. The cover crop provides soil cover by late fall, throughout the winter, and into the early spring. Runoff and erosion are reduced. Wind erosion is reduced by standing residues. The cover crop is terminated with an approved herbicide prior to spring planting as late as feasible to maximize plant biomass production. Over time, soil health is improved due to the additional biomass, ground cover, soil infiltration, and plant diversity introduced to the cropping system. Cover crop residues left on the surface may maximize weed control by increasing allelopathic and mulching effect.

**Feature Measure:** Area planted

**Scenario Unit::** Acre

**Scenario Typical Size:** 40.0

**Scenario Total Cost:** $3,906.00

**Scenario Cost/Unit:** $97.65

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 | $6.13 | 40 | $245.20 |
| Seeding Operation, No Till/Grass Drill | 960 | No Till drill or grass drill for seeding. Includes equipment, power unit and labor costs. | Acre | $21.36 | 40 | $854.40 |
| **Materials** | | | | | | |
| Herbicide, Glyphosate | 334 | A broad-spectrum, non-selective systemic herbicide. Refer to WIN-PST for product names and active ingredients. Includes materials and shipping only. | Acre | $17.48 | 40 | $699.20 |
| 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 | $52.68 | 40 | $2,107.20 |

**Practice:** 342 - Critical Area Planting

**Scenario** #1 - Vegetation-normal tillage (Organic and Non-Organic)

**Scenario Description:**

Establishment of permanent vegetation (Native and Introduced) on a site (both organic and non-organic) that is void or nearly void of vegetation due to a natural occurrence or a newly constructed conservation practice. Costs include seedbed preparation with typical tillage implements, grass/legume seed, companion crop, and fertilizer and lime with application.

**Before Situation:**

Areas that are void or nearly void of vegetation, resulting in bare soil being exposed to erosive processes. The exposed areas may be caused from recent natural occurrences (fire, flood, wind, etc.) or due to newly constructed conservation practices such as waterways, terraces, water and sediment basins or dams. The exposed areas will be subject to wind and water erosion that exceed soil loss tolerances. Runoff from the area flows into streams, water courses or other water bodies causing degradation to the receiving waters. The soil typically has a pH imbalance and low fertility.

**After Situation:**

Implementation Requirements are prepared and implemented according to the Critical Area Planting (342) standard. This typical 1.0 acre critical area is stabilized by applying fertilizer, lime and seed. Soil amendments will be incorporated at a depth of four to six inches to improve fertility and ensure establishment of permanent vegetative cover. The site will be stabilized, erosion reduced, and offsite damages reduced/eliminated.

**Feature Measure:** area seeded

**Scenario Unit::** Acre

**Scenario Typical Size:** 1.0

**Scenario Total Cost:** $351.58

**Scenario Cost/Unit:** $351.58

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 | $11.14 | 2 | $22.28 |
| Fertilizer, ground application, dry bulk | 950 | Dry bulk fertilizer application performed by ground equipment. Includes equipment, power unit and labor costs. | Acre | $6.62 | 1 | $6.62 |
| Seeding Operation, No Till/Grass Drill | 960 | No Till drill or grass drill for seeding. Includes equipment, power unit and labor costs. | Acre | $21.36 | 1 | $21.36 |
| Cultipacking | 1100 | Includes equipment, power unit and labor costs. | Acre | $7.70 | 1 | $7.70 |
| **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 | $0.49 | 30 | $14.70 |
| 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 | $0.65 | 60 | $39.00 |
| Potassium, K2O | 74 | K2O supplied by Muriate Of Potash. Price is not per pound of total product applied, no conversion is needed. | Pound | $0.36 | 60 | $21.60 |
| Lime, ENM | 75 | Fertilizer: Limestone Spread on field. | Ton | $93.23 | 2 | $186.46 |
| One Species, Cool Season, Introduced Perennial Grass | 2313 | Introduced, cool season perennial grass. Includes material and shipping only. | Acre | $31.86 | 1 | $31.86 |

**Practice:** 342 - Critical Area Planting

**Scenario** #4 - Native and Introduced Vegetation - Moderate Grading

**Scenario Description:**

Establishment of permanent vegetation (native and introduced) on a site that is void or nearly void of vegetation due to a natural or human disturbance. Costs include a dozer for grading and shaping of small gullies, seedbed preparation with typical tillage implements, grass/legume seed, companion crop, and fertilizer and lime with application.

**Before Situation:**

Areas that are void or nearly void of vegetation, resulting in bare soil being exposed to erosive processes. The exposed areas may be caused from natural occurrences (fire, flood, etc.) or human disturbance. The exposed areas have visible rills and small gullies averaging 1 foot in depth and 1 foot in width that requires some moderate grading to prepare a seedbed. Runoff from the area flows into streams, water courses or other water bodies causing degradation to the receiving waters. The soil typically has a pH imbalance and low fertility.

**After Situation:**

Implementation Requirements are prepared and implemented according to the Critical Area Planting (342) standard.. This typical 1.0 acre critical area is stabilized by grading and shaping the small gullies with a dozer and then applying fertilizer, lime and seed. The site will be stabilized, erosion reduced, and offsite damages reduced/eliminated.

**Feature Measure:** area seeded

**Scenario Unit::** Acre

**Scenario Typical Size:** 1.0

**Scenario Total Cost:** $799.98

**Scenario Cost/Unit:** $799.98

Cost Details:

| Component Name | ID | Description | Unit | Cost | QTY | Total |
|---|---|---|---|---|---|---|
| **Equipment Installation** | | | | | | |
| Dozer, 80 HP | 929 | Track mounted Dozer with horsepower range of 60 to 90. Equipment and power unit costs. Labor not included. | Hour | $66.13 | 4 | $264.52 |
| Tillage, Light | 945 | Includes light disking (tandem) or field cultivator. Includes equipment, power unit and labor costs. | Acre | $11.14 | 2 | $22.28 |
| Fertilizer, ground application, dry bulk | 950 | Dry bulk fertilizer application performed by ground equipment. Includes equipment, power unit and labor costs. | Acre | $6.62 | 1 | $6.62 |
| Seeding Operation, No Till/Grass Drill | 960 | No Till drill or grass drill for seeding. Includes equipment, power unit and labor costs. | Acre | $21.36 | 1 | $21.36 |
| Cultipacking | 1100 | Includes equipment, power unit and labor costs. | Acre | $7.70 | 1 | $7.70 |
| **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 | $44.37 | 4 | $177.48 |
| **Materials** | | | | | | |
| Nitrogen (N), Urea | 71 | Price per pound of N supplied by Urea. Price is not per pound of total product applied, no conversion is needed. | Pound | $0.49 | 30 | $14.70 |
| 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 | $0.65 | 60 | $39.00 |
| Potassium, K2O | 74 | K2O supplied by Muriate Of Potash. Price is not per pound of total product applied, no conversion is needed. | Pound | $0.36 | 60 | $21.60 |
| Lime, ENM | 75 | Fertilizer: Limestone Spread on field. | Ton | $93.23 | 2 | $186.46 |
| One Species, Cool Season, Annual Grass or Legume | 2311 | Cool season annual grass or legume. Includes material and shipping only. | Acre | $38.26 | 1 | $38.26 |

**Practice:** 342 - Critical Area Planting

**Scenario** #6 - Native or Introduced Grass/legume mix-heavy grading (Organic and Non-organic)

**Scenario Description:**

Establishment of permanent vegetation on a site that is void or nearly void of vegetation due to a natural or human disturbance. Costs include a dozer for grading and shaping of moderate to severe gullies, seedbed preparation with typical tillage implements, grass/legume seed, companion crop, and fertilizer and lime with application.

**Before Situation:**

Areas that are void or nearly void of vegetation, resulting in bare soil being exposed to erosive processes. The exposed areas may be caused from natural occurrences (fire, flood, etc.) or human disturbance. The exposed areas have visible rills and moderate to severe gullies averaging 3 feet in depth and 3 feet in width. Runoff from the area flows into streams, water courses or other water bodies causing degradation to the receiving waters. The soil typically has a pH imbalance and low fertility.

**After Situation:**

Implementation Requirements are prepared and implemented according to the Critical Area Planting (342) standard. This typical 1.0 acre critical area is stabilized by grading and shaping the moderate to severe gullies with a dozer and then applying fertilizer, lime and seed. The site will be stabilized, erosion reduced, and offsite damages reduced/eliminated.

**Feature Measure:** area seeded

**Scenario Unit::** Acre

**Scenario Typical Size:** 1.0

**Scenario Total Cost:** $1,256.40

**Scenario Cost/Unit:** $1,256.40

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 | $66.13 | 8 | $529.04 |
| Tillage, Light | 945 | Includes light disking (tandem) or field cultivator. Includes equipment, power unit and labor costs. | Acre | $11.14 | 2 | $22.28 |
| Fertilizer, ground application, dry bulk | 950 | Dry bulk fertilizer application performed by ground equipment. Includes equipment, power unit and labor costs. | Acre | $6.62 | 1 | $6.62 |
| Seeding Operation, No Till/Grass Drill | 960 | No Till drill or grass drill for seeding. Includes equipment, power unit and labor costs. | Acre | $21.36 | 1 | $21.36 |
| Cultipacking | 1100 | Includes equipment, power unit and labor costs. | Acre | $7.70 | 1 | $7.70 |
| **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 | $44.37 | 8 | $354.96 |
| **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 | $0.49 | 30 | $14.70 |
| 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 | $0.65 | 60 | $39.00 |
| Potassium, K2O | 74 | K2O supplied by Muriate Of Potash. Price is not per pound of total product applied, no conversion is needed. | Pound | $0.36 | 60 | $21.60 |
| Lime, ENM | 75 | Fertilizer: Limestone Spread on field. | Ton | $93.23 | 2 | $186.46 |
| 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 | $52.68 | 1 | $52.68 |

**Practice:** 342 - Critical Area Planting

**Scenario** #29 - Hydroseed

**Scenario Description:**

Establishment of permanent vegetation (Native and Introduced) on a site (both organic and non-organic) that is void or nearly void of vegetation due to a natural occurrence or a newly constructed conservation practice. Costs include a specialized hydroseed truck, grass/legume seed, companion crop, and fertilizer and lime with application.

**Before Situation:**

Areas that are void or nearly void of vegetation, resulting in bare soil being exposed to erosive processes. The exposed areas may be caused from recent natural occurrences (fire, flood, wind, etc.) or due to newly constructed conservation practices such as waterways, terraces, water and sediment basins or dams. The exposed areas will be subject to wind and water erosion that exceed soil loss tolerances. Runoff from the area flows into streams, water courses or other water bodies causing degradation to the receiving waters. The soil typically has a pH imbalance and low fertility. The site has poor access, is excessively steep, wet or is a newly shaped earthen engineering application which will not tolerate seeding by hand or machine.

**After Situation:**

Implementation Requirements are prepared and implemented according to the Critical Area Planting (342) standard. This typical 1.0 acre critical area is stabilized by applying fertilizer, lime and seed. Soil amendments are not incorporated, but are in liquid form and readily adsorbed into the soil to improve fertility and ensure establishment of permanent vegetative cover. The site will be stabilized, erosion reduced, and offsite damages reduced/eliminated.

**Feature Measure:** Area Planted

**Scenario Unit::** Acre

**Scenario Typical Size:** 1.0

**Scenario Total Cost:** $2,646.47

**Scenario Cost/Unit:** $2,646.47

Cost Details:

| Component Name | ID | Description | Unit | Cost | QTY | Total |
|---|---|---|---|---|---|---|
| **Equipment Installation** | | | | | | |
| Lime application | 953 | Lime application performed by ground equipment. Includes equipment, power unit and labor costs. | Acre | $10.63 | 1 | $10.63 |
| Seeding Operation, hydroseeder | 1291 | Hydroseeding with typical 1500 to 3600 gallon seeder. Includes all costs for equipment, power unit, and labor. | Acre | $2,113.10 | 1 | $2,113.10 |
| **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 | $25.31 | 8 | $202.48 |
| **Materials** | | | | | | |
| Nitrogen (N), Urea | 71 | Price per pound of N supplied by Urea. Price is not per pound of total product applied, no conversion is needed. | Pound | $0.49 | 30 | $14.70 |
| 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 | $0.65 | 60 | $39.00 |
| Potassium, K2O | 74 | K2O supplied by Muriate Of Potash. Price is not per pound of total product applied, no conversion is needed. | Pound | $0.36 | 60 | $21.60 |
| Lime, ENM | 75 | Fertilizer: Limestone Spread on field. | Ton | $93.23 | 2 | $186.46 |
| Five Species Mix, Cool Season, Annual Grasses and Legumes | 2320 | Cool season, introduced grass and legume mix. Includes material and shipping only. | Acre | $58.50 | 1 | $58.50 |

**Practice:** 342 - Critical Area Planting

**Scenario** #31 - Hydroseed, extra site preparation

**Scenario Description:**

Establishment of permanent vegetation (Native and Introduced) on a site (both organic and non-organic) that is relatively steep with concentrated flow resulting in rills and channel erosion which is void or nearly void of vegetation due to a natural occurrence or a newly constructed conservation practice. Costs include a dozer, specialized hydroseed truck, grass/legume seed, companion crop, and fertilizer and lime with application.

**Before Situation:**

Steep side slopes such as those on road banks and travel ways that are void or nearly void of vegetation, resulting in bare soil being exposed to erosive processes. The exposed areas may be caused from recent natural occurrences (fire, flood, wind, etc.) or due to newly constructed conservation practices such as waterways, terraces, water and sediment basins or dams. The exposed areas will be subject to wind and water erosion that exceed soil loss tolerances. Runoff from the area flows into streams, water courses or other water bodies causing degradation to the receiving waters. The soil typically has a pH imbalance and low fertility. The site has poor access, is excessively steep, wet or is a newly shaped earthen engineering application which will not tolerate seeding by hand or machine.

**After Situation:**

Implementation Requirements are prepared and implemented according to the Critical Area Planting (342) standard. This typical 1.0 acre critical area is shaped and graded then stabilized by applying fertilizer, lime and seed. Soil amendments are not incorporated, but are in liquid form and readily adsorbed into the soil to improve fertility and ensure establishment of permanent vegetative cover. The site will be stabilized, erosion reduced, and offsite damages reduced/eliminated.

**Feature Measure:** area planted

**Scenario Unit::** Acre

**Scenario Typical Size:** 1.0

**Scenario Total Cost:** $3,344.30

**Scenario Cost/Unit:** $3,344.30

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 | $66.13 | 4 | $264.52 |
| Lime application | 953 | Lime application performed by ground equipment. Includes equipment, power unit and labor costs. | Acre | $10.63 | 1 | $10.63 |
| Seeding Operation, hydroseeder | 1291 | Hydroseeding with typical 1500 to 3600 gallon seeder. Includes all costs for equipment, power unit, and labor. | Acre | $2,113.10 | 1 | $2,113.10 |
| **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 | $25.31 | 8 | $202.48 |
| 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 | $44.37 | 4 | $177.48 |
| **Materials** | | | | | | |
| Nitrogen (N), Urea | 71 | Price per pound of N supplied by Urea. Price is not per pound of total product applied, no conversion is needed. | Pound | $0.49 | 30 | $14.70 |
| 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 | $0.65 | 60 | $39.00 |
| Potassium, K2O | 74 | K2O supplied by Muriate Of Potash. Price is not per pound of total product applied, no conversion is needed. | Pound | $0.36 | 60 | $21.60 |
| Lime, ENM | 75 | Fertilizer: Limestone Spread on field. | Ton | $93.23 | 2 | $186.46 |
| Five Species Mix, Cool Season, Annual Grasses and Legumes | 2320 | Cool season, introduced grass and legume mix. Includes material and shipping only. | Acre | $58.50 | 1 | $58.50 |
| **Mobilization** | | | | | | |
| Mobilization, medium equipment | 1139 | Equipment with 70-150 HP or typical weights between 14,000 and 30,000 pounds. | Each | $255.83 | 1 | $255.83 |

**Practice:** 345 - Residue and Tillage Management, Reduced Till

**Scenario** #2 - Residue and Tillage Management, Reduced Till

**Scenario Description:**

Mulch-till is managing the amount, orientation and distribution of crop and other plant residue on the soil surface year round while limiting the soil-disturbing activities used to grow crops in systems where the entire field surface is tilled by the planter/drill or tillage tools prior to planting. This practice includes tillage methods commonly referred to as mulch tillage, vertical tillage, chiseling and disking, or the use of high disturbance drills without additional tillage. It applies to stubble mulching on summer-fallowed land, to tillage for annually planted crops, to tillage for planted crops and to tillage for planting perennial crops. All residue shall be uniformly spread or managed over the surface throughout the critical erosion period(s). All residue shall be uniformly distributed over the entire field and not burned or removed. These periods of intensive tillage have led to excessive soil loss, often above the soil loss tolerance (T), due to the loss of crop residue on the soil surface. The NRCS erosion prediction model(s) will be used to review the farming operations and determine the amount of surface residue to manage throughout the rotation to keep soil loss below T. The producer will adopt a reduced till system to meet one or more of the practice purposes.

**Before Situation:**

Crops such as corn, soybeans, small grains, or cotton are grown and harvested. Fields are tilled immediately following harvest, with rows in some fields being hipped for drainage. Residue amounts after harvest average 30% or less, resulting in bare soil being exposed to wind erosion and/or intense rainfall during the fall, winter, and early spring. Over the winter residue degrades and sediment/nutrient runoff from fields increase. Sheet, rill and wind erosion occurs. Spring tillage and seedbed preparation activities occur as early as possible in the late winter and early spring. Runoff from the fields flows into streams, water courses or other water bodies causing water quality degradation. Soil health (soil organic matter) declines over time as a result of tillage practices, low residue monocultures, and long periods of bare soil.

**After Situation:**

The Implementation Requirements are prepared following the criteria in the 345 Residue and Tillage Management, Reduced Till conservation practice standard. Reduced till applies to all cropland and other lands where crops are planted. This scenario includes the use of a reduce till systems and high disturbance drills, such as a hoe drill, air seeder, or no-till drill that disturbs a large percentage of soil surface during the planting operation. The residue that remains on the soil surface provides soil cover during late fall, throughout the winter, and into the early spring. Runoff and water/wind erosion are reduced and water quality improves. Over time, soil health is improved due to less tillage, the additional biomass, ground cover, soil infiltration, and plant diversity in the cropping system.

**Feature Measure:** Area planted

**Scenario Unit::** Acre

**Scenario Typical Size:** 100.0

**Scenario Total Cost:** $2,136.00

**Scenario Cost/Unit:** $21.36

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 | $21.36 | 100 | $2,136.00 |

**Practice:** 345 - Residue and Tillage Management, Reduced Till

**Scenario** #3 - Mulch till-Adaptive Management

**Scenario Description:**

The practice scenario is for the implementation of mulch till in small replicated plots to allow the producer to learn how to manage mulch till on their operation. Scenario includes implementing replicated strip trials on a field plot to evaluate, identify and implement a particular mulch till management strategy (e.g., mulch till vs. conventional till, two different mulch till systems, etc.). This will be done following the guidelines outlined in Agronomy Technical Note 10 - Adaptive Management.

**Before Situation:**

Row crops such as corn, soybeans, or cotton are grown and harvested in mid-late fall. Fields are disked immediately following harvest, with rows in some fields being hipped for drainage. Residue amounts after harvest average 30% or less, resulting in bare soil being exposed to wind erosion and/or intense rainfall. Over the winter residue degrades and sediment/nutrient runoff from fields increases. Erosion exceeds soil loss tolerances. Spring tillage and seedbed preparation activities occur as early as possible in the late winter and early spring prior to planting. Weed control is accomplished primarily through tillage, requiring multiple operations. Runoff from the fields flows into streams, water courses or other water bodies causing degradation to the receiving waters. Soil health (soil organic matter) declines over time as a result of tillage practices, low residue monocultures, and long periods of bare soil. The producer is considering using mulch till technology, but is unsure how to manage on their operation or needs to improve the management of mulch till to be successful.

**After Situation:**

Implementation Requirements and the Adaptive Management Plan is prepared for the plots and implemented. Installation of this scenario will result in establishment of mulch till replicated plots to compare to different management strategies for mulch till and other residue management strategies following the guidelines outlined in Agronomy Technical Note 10 - Adaptive Management and the Adaptive Management Guidance 345 for Mulch Till. Implementation involves establishing the replicated plots to evaluate one or more reduced till management strategies. The plot will consist of at least four replicated plots designed, laid out, managed and evaluated with the assistance of a consultant knowledgeable in reduced till management. Results are used to make reduced till management decisions to address erosion, soil health, and water quality issues. Yields will be measured and statistically summarized following the procedures in Agronomy Technical Note 10 - Adaptive Management. The yields for each plot will be adjusted to the appropriate moisture content and residue levels measured as needed. This practice will be repeated for three years.

**Feature Measure:** Area planted

**Scenario Unit::** Each

**Scenario Typical Size:** 1.0

**Scenario Total Cost:** $4,183.60

**Scenario Cost/Unit:** $4,183.60

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 | $11.14 | 20 | $222.80 |
| Tillage, Primary | 946 | Includes heavy disking (offset) or chisel plow. Includes equipment, power unit and labor costs. | Acre | $16.60 | 20 | $332.00 |
| Seeding Operation, No Till/Grass Drill | 960 | No Till drill or grass drill for seeding. Includes equipment, power unit and labor costs. | Acre | $21.36 | 10 | $213.60 |
| 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 | $18.86 | 10 | $188.60 |
| **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 | $25.31 | 40 | $1,012.40 |
| 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 | $110.71 | 20 | $2,214.20 |

**Practice:** 350 - Sediment Basin

**Scenario** #1 - Excavated basin

**Scenario Description:**

An excavated sediment basin in an existing drainage way on a farm for purpose of trapping sediment and preserving the capacity of reservoirs, ditches, canals, diversions, waterways and streams and to prevent undesirable deposition on bottom lands and other developed lands. The sediment basin is created solely by excavation and impounds less than 3 feet against the embankment or spoil. Excavated material is spoiled, not placed in a designed embankment. Earthen spillway is constructed as needed. Resource concerns addressed include excessive suspended sediment and turbidity in surface water, damage from sediment deposition, and reduced capacity of conveyances by sediment deposition. Surface water causes the sediment (and potentially pesticides and nutrients) to be transported into the riparian areas and water bodies downstream.

**Before Situation:**

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

**After Situation:**

'The typical sediment basin is constructed by excavating 800 cubic yards and spreading the spoil outside the pool area using a dozer or similar excavation equipment. The sediment storage capacity should be a minimum of 900 cubic feet per acre of disturbed area. The detention storage should be a minimum of 3600 cubic feet per acre of drainage area. Associated practice(s): Other practices that may need to be implemented along with sediment basin to address all of the site specific resource concerns include: Critical Area Planting (342), Stormwater Runoff Control (570) and Mulching (484) where necessary to prevent erosion following construction activities, Structure for Water Control (587) if using a dewatering device, and Pond Sealing or Lining (521A,521B,521C,521D).

**Feature Measure:** Excavated volume

**Scenario Unit::** Cubic Yard

**Scenario Typical Size:** 800.0

**Scenario Total Cost:** $2,276.63

**Scenario Cost/Unit:** $2.85

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 | $124.03 | 12 | $1,488.36 |
| **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 | $44.37 | 12 | $532.44 |
| **Mobilization** | | | | | | |
| Mobilization, medium equipment | 1139 | Equipment with 70-150 HP or typical weights between 14,000 and 30,000 pounds. | Each | $255.83 | 1 | $255.83 |

**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), Stormwater Runoff Control (570) and Mulching (484) where necessary to prevent erosion following construction activities, Structure for Water Control (587) if using a dewatering device, and Pond Sealing or Lining (521A,521B,521C,521D).

**Feature Measure:** Embankment volume

**Scenario Unit::** Cubic Yard

**Scenario Typical Size:** 1,500.0

**Scenario Total Cost:** $4,129.03

**Scenario Cost/Unit:** $2.75

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 | $124.03 | 23 | $2,852.69 |
| **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 | $44.37 | 23 | $1,020.51 |
| **Mobilization** | | | | | | |
| Mobilization, medium equipment | 1139 | Equipment with 70-150 HP or typical weights between 14,000 and 30,000 pounds. | Each | $255.83 | 1 | $255.83 |

**Practice:** 350 - Sediment Basin

**Scenario** #3 - Embankment earthen basin with pipe

**Scenario Description:**

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

**Before Situation:**

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

**After Situation:**

The typical sediment basin is constructed by excavating the pool area, constructing the auxiliary spillway, preparing the foundation as designed, and using 1500 cubic yards to create an embankment. The embankment will be designed and constructed according the Pond standard (378). The product of the storage times the effective height of the dam is less than 3,000. The effective height of the dam is 35 feet or less. The sediment storage capacity should be a minimum of 900 cubic feet per acre of disturbed area. The detention storage should be a minimum of 3600 cubic feet per acre of drainage area. The principal spillway is created using an approved conduit material and filter diaphragm. The earthen auxiliary spillway will be constructed as designed based on Pond standard (378). Associated practice(s): Other practices that may need to be implemented along with sediment basin to address all of the site specific resource concerns include: Critical Area Planting (342), Stormwater Runoff Control (570) and Mulching (484) where necessary to prevent erosion following construction activities, Structure for Water Control (587) if using a dewatering device, and Pond Sealing or Lining (521A,521B,521C,521D).

**Feature Measure:** Embankment volume

**Scenario Unit::** Cubic Yard

**Scenario Typical Size:** 1,500.0

**Scenario Total Cost:** $8,871.43

**Scenario Cost/Unit:** $5.91

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 | $510.00 | 3 | $1,530.00 |
| Dozer, 140 HP | 927 | Track mounted Dozer with horsepower range of 125 to 160. Equipment and power unit costs. Labor not included. | Hour | $124.03 | 23 | $2,852.69 |
| **Labor** | | | | | | |
| Skilled Labor | 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 | $41.76 | 8 | $334.08 |
| 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 | $44.37 | 23 | $1,020.51 |
| **Materials** | | | | | | |
| Aggregate, Sand, Graded, Washed | 45 | Sand, typical ASTM C33 gradation, includes materials, equipment and labor to transport and place | Cubic Yard | $34.29 | 19.6 | $672.08 |
| Aggregate, Gravel, Graded | 46 | Gravel, includes materials, equipment and labor to transport and place. Includes washed and unwashed gravel. | Cubic Yard | $34.75 | 1.6 | $55.60 |
| Pipe, CMP, 18-16 gauge, weight priced | 1322 | 18 & 16 gauge galvanized helical corrugated metal pipe priced by the weight of the pipe materials. Materials only. | Pound | $1.13 | 1662 | $1,878.06 |
| 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 | $2.31 | 118 | $272.58 |
| **Mobilization** | | | | | | |
| Mobilization, medium equipment | 1139 | Equipment with 70-150 HP or typical weights between 14,000 and 30,000 pounds. | Each | $255.83 | 1 | $255.83 |

**Practice:** 351 - Well Decommissioning

**Scenario** #1 - Dug Well

**Scenario Description:**

A licensed well driller will seal and permanently close an inactive, abandoned, or unusable water well to prevent excess nutrients in surface and groundwater and to eliminate pesticides transported to surface and ground water. Well will be cleared of all equipment and materials. Residual water column must be treated with chlorine concentration of >50 ppm or according to local, State, Tribal, or Federal regulations.

**Before Situation:**

Shallow well or hand dug well 36 inches in diameter and 20 feet deep that is not being used.

**After Situation:**

Procedures and sealing materials shall conform to ASTM D5299 and be compatible with all local, State, Tribal, and Federal requirements. Place compacted earthfill in the well up to five feet from the surface. The top five feet of the well is filled with cement grout or bentonite. Associated practices: 342 Critical Area Seeding

**Feature Measure:** Each Well to be Decommissioned

**Scenario Unit::** Each

**Scenario Typical Size:** 1.0

**Scenario Total Cost:** $2,845.61

**Scenario Cost/Unit:** $2,845.61

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 | $5.87 | 5.3 | $31.11 |
| Grout pump | 1334 | Grout pump with tremie pipe. Equipment and power unit costs. Labor not included. | Hour | $15.31 | 3 | $45.93 |
| **Labor** | | | | | | |
| General Labor | 231 | Labor performed using basic tools such as power tool, shovels, and other tools that do not require extensive training. Ex. pipe layer, herder, concrete placement, materials spreader, flagger, etc. | Hour | $25.31 | 3 | $75.93 |
| **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 | $950.26 | 1.8 | $1,710.47 |
| Chlorine | 1335 | Liquid chlorine bleach. Includes materials only. | Gallon | $2.76 | 1 | $2.76 |
| **Mobilization** | | | | | | |
| Mobilization, very small equipment | 1137 | Equipment that is small enough to be transported by a pick-up truck with typical weights less than 3,500 pounds. Can be multiple pieces of equipment if all hauled simultaneously. | Each | $70.64 | 3 | $211.92 |
| Mobilization, medium equipment | 1139 | Equipment with 70-150 HP or typical weights between 14,000 and 30,000 pounds. | Each | $255.83 | 3 | $767.49 |

**Practice:** 351 - Well Decommissioning

**Scenario** #2 - Dug Well Sealed with Grout

**Scenario Description:**

A licensed well driller will seal and permanently close an inactive, abandoned, or unusable water well to prevent excess nutrients in surface and groundwater and to eliminate pesticides transported to surface and ground water. Well will be cleared of all equipment and materials. Residual water column must be treated with chlorine concentration of >50 ppm or according to local, State, Tribal, or Federal regulations.

**Before Situation:**

A drilled or driven well with a 6" diameter casing and a depth of 150 feet that is not being used

**After Situation:**

Procedures and sealing materials shall conform to ASTM D5299 and be compatible with all local, State, Tribal, and Federal requirements. Grout shall be pumped into the well starting at the bottom and working toward the top. Associated practices: 342 Critical Area Seeding

**Feature Measure:** Each Well to be Decommissioned

**Scenario Unit::** Each

**Scenario Typical Size:** 1.0

**Scenario Total Cost:** $1,594.50

**Scenario Cost/Unit:** $1,594.50

Cost Details:

| Component Name | ID | Description | Unit | Cost | QTY | Total |
|---|---|---|---|---|---|---|
| **Equipment Installation** | | | | | | |
| Grout pump | 1334 | Grout pump with tremie pipe. Equipment and power unit costs. Labor not included. | Hour | $15.31 | 6 | $91.86 |
| **Labor** | | | | | | |
| General Labor | 231 | Labor performed using basic tools such as power tool, shovels, and other tools that do not require extensive training. Ex. pipe layer, herder, concrete placement, materials spreader, flagger, etc. | Hour | $25.31 | 6 | $151.86 |
| 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 | $45.69 | 3 | $137.07 |
| **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 | $950.26 | 1.2 | $1,140.31 |
| Chlorine | 1335 | Liquid chlorine bleach. Includes materials only. | Gallon | $2.76 | 1 | $2.76 |
| **Mobilization** | | | | | | |
| Mobilization, very small equipment | 1137 | Equipment that is small enough to be transported by a pick-up truck with typical weights less than 3,500 pounds. Can be multiple pieces of equipment if all hauled simultaneously. | Each | $70.64 | 1 | $70.64 |

**Practice:** 351 - Well Decommissioning

**Scenario** #3 - Dug Well Sealed with Grout

**Scenario Description:**

A licensed well driller will seal and permanently close an inactive, abandoned, or unusable water well to prevent excess nutrients in surface and groundwater and to eliminate pesticides transported to surface and ground water. Well will be cleared of all equipment and materials. Residual water column must be treated with chlorine concentration of >50 ppm or according to local, State, Tribal, or Federal regulations.

**Before Situation:**

A drilled or driven well with a 6" diameter casing and a depth of 150 feet that is not being used

**After Situation:**

Procedures and sealing materials shall conform to ASTM D5299 and be compatible with all local, State, Tribal, and Federal requirements. Bentonite chips shall be screened and dropped into the well in a manner that prevents bridging of the bentonite. Associated practices: 342 Critical Area Seeding

**Feature Measure:** Each Well to be Decommissioned

**Scenario Unit::** Each

**Scenario Typical Size:** 1.0

**Scenario Total Cost:** $1,222.82

**Scenario Cost/Unit:** $1,222.82

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 | $25.31 | 5 | $126.55 |
| Supervisor 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 | $45.69 | 3 | $137.07 |
| **Materials** | | | | | | |
| Bentonite | 41 | Bentonite, includes materials (50# bag) | Each | $20.60 | 43 | $885.80 |
| Chlorine | 1335 | Liquid chlorine bleach. Includes materials only. | Gallon | $2.76 | 1 | $2.76 |
| **Mobilization** | | | | | | |
| Mobilization, very small equipment | 1137 | Equipment that is small enough to be transported by a pick-up truck with typical weights less than 3,500 pounds. Can be multiple pieces of equipment if all hauled simultaneously. | Each | $70.64 | 1 | $70.64 |

**Practice:** 355 - Groundwater Testing

**Scenario** #1 - Basic Water Test

**Scenario Description:**

Typical scenario includes the professional testing for nitrates, nitrites, and coliform to confirm well water meets basic water quality standards for consumption by livestock or use in irrigation. Water samples are sent to an EPA or state certified laboratory for testing. This scenario is recommended when water quality is suspected to be acceptable.

**Before Situation:**

There are no known contaminants of the well, however, neighboring wells have known issues with nitrates, or coliform, and confirmation of acceptable water quality is desired. Manure is spread near to the well, following a nutrient management plan; well contamination is unlikely but possible.

**After Situation:**

Water quality results are known.

**Feature Measure:** No.

**Scenario Unit::** Each

**Scenario Typical Size:** 1.0

**Scenario Total Cost:** $56.02

**Scenario Cost/Unit:** $56.02

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 | $25.31 | 0.5 | $12.66 |
| **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 | $43.36 | 1 | $43.36 |

**Practice:** 355 - Groundwater Testing

**Scenario** #2 - Specialty Water Test

**Scenario Description:**

Typical scenario includes the professional testing for pesticides, heavy metals, VOC's or other less common substances, in addition to the basic water test items. Tests are intended to confirm well water meets water quality standards for consumption by livestock or use in irrigation. Water samples are sent to an EPA or state certified laboratory for testing. This scenario is recommended when water quality is suspected to be degraded due to a specialized substance.

**Before Situation:**

There are no known contaminants of the well, however, neighboring wells have known issues with water quality, and confirmation of acceptable water quality is desired. Manure, pesticides, or other potential contaminants have been spread near to the well, in an unmanaged manner; well contamination is possible.

**After Situation:**

Water quality results are known.

**Feature Measure:** No.

**Scenario Unit::** Each

**Scenario Typical Size:** 1.0

**Scenario Total Cost:** $225.60

**Scenario Cost/Unit:** $225.60

Cost Details:

| Component Name | ID | Description | Unit | Cost | QTY | Total |
|---|---|---|---|---|---|---|
| **Labor** | | | | | | |
| General Labor | 231 | Labor performed using basic tools such as power tool, shovels, and other tools that do not require extensive training. Ex. pipe layer, herder, concrete placement, materials spreader, flagger, etc. | Hour | $25.31 | 0.5 | $12.66 |
| **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 | $43.36 | 1 | $43.36 |
| 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 | $169.58 | 1 | $169.58 |

**Practice:** 355 - Groundwater Testing

**Scenario** #3 - Full Spectrum Test

**Scenario Description:**

Typical scenario includes the professional comprehensive testing for all less common substances, to include: pesticides, heavy metals, VOC's or other less common substances, in addition to the basic water test items. Tests are intended to confirm well water meets water quality standards for consumption by livestock or use in irrigation. Water samples are sent to an EPA or state certified laboratory for testing. This scenario is recommended when water quality is known to be degraded due to a specialized substance but thorough analysis is warranted.

**Before Situation:**

There are no known contaminants of the well, however, neighboring wells have known issues with water quality, and confirmation of acceptable water quality is desired. Manure, pesticides, sewage sludge, or other potential contaminants have been spread near to the well, in an unmanaged manner; well contamination is likely.

**After Situation:**

Water quality results are known.

**Feature Measure:** No.

**Scenario Unit::** Each

**Scenario Typical Size:** 1.0

**Scenario Total Cost:** $275.05

**Scenario Cost/Unit:** $275.05

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 | $25.31 | 0.5 | $12.66 |
| **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 | $43.36 | 1 | $43.36 |
| 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 | $219.03 | 1 | $219.03 |

**Practice:** 356 - Dike

**Scenario** #1 - Material haul 1 mile or less

**Scenario Description:**

Construction of a barrier, constructed of an earthen embankment, to control water level. Embankment structure to provide adequate freeboard, allowance for settlement, and foundation and embankment stability. Material haul < 1 mile. Associated practices include, but are not limited to: PS327 Conservation Cover, PS656 Constructed Wetland, PS342 Critical Area Planting, PS378 Ponds, PS382 Fence, PS464 Irrigation Land Levelling, PS500 Obstruction Removal, PS528 Prescribed Grazing, PS587 Structure for Water Control, PS620 Underground Outlet, PS645 Upland Wildlife Management, PS658 Wetland Creation, PS659 Wetland Enhancement, PS657 Wetland Restoration, PS644 Wetland Wildlife Habitat Management.

**Before Situation:**

Site is subject to flooding or inundation 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 management; 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:** 4,500.0

**Scenario Total Cost:** $33,030.44

**Scenario Cost/Unit:** $7.34

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 | $2.36 | 4500 | $10,620.00 |
| Earthfill, Roller Compacted | 49 | Earthfill, roller or machine compacted, includes equipment and labor | Cubic Yard | $4.45 | 4500 | $20,025.00 |
| **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 | $110.71 | 6 | $664.26 |
| **Mobilization** | | | | | | |
| Mobilization, medium equipment | 1139 | Equipment with 70-150 HP or typical weights between 14,000 and 30,000 pounds. | Each | $255.83 | 1 | $255.83 |
| Mobilization, large equipment | 1140 | Equipment >150HP or typical weights greater than 30,000 pounds or loads requiring over width or over length permits. | Each | $488.45 | 3 | $1,465.35 |

**Practice:** 356 - Dike

**Scenario** #2 - Material haul over 1 mile

**Scenario Description:**

Construction of a barrier, constructed of an earthen embankment, to control water level. Embankment structure to provide adequate freeboard, allowance for settlement, and foundation and embankment stability. Material haul > 1 mile. Associated practices include, but are not limited to: PS327 Conservation Cover, PS656 Constructed Wetland, PS342 Critical Area Planting, PS378 Ponds, PS382 Fence, PS464 Irrigation Land Levelling, PS500 Obstruction Removal, PS528 Prescribed Grazing, PS587 Structure for Water Control, PS620 Underground Outlet, PS645 Upland Wildlife Management, PS658 Wetland Creation, PS659 Wetland Enhancement, PS657 Wetland Restoration, PS644 Wetland Wildlife Habitat Management.

**Before Situation:**

Site is subject to flooding or inundation 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 management; 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:** 4,500.0

**Scenario Total Cost:** $36,000.44

**Scenario Cost/Unit:** $8.00

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 | $2.36 | 4500 | $10,620.00 |
| Earthfill, Roller Compacted | 49 | Earthfill, roller or machine compacted, includes equipment and labor | Cubic Yard | $4.45 | 4500 | $20,025.00 |
| 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 | $0.33 | 9000 | $2,970.00 |
| **Labor** | | | | | | |
| Specialist Labor | 235 | Labor requiring a specialized skill set: Includes Agronomists, Foresters, Biologists, etc. to provide additional technical information during the planning and implementation of the practice. Does not include NRCS or TSP services. | Hour | $110.71 | 6 | $664.26 |
| **Mobilization** | | | | | | |
| Mobilization, medium equipment | 1139 | Equipment with 70-150 HP or typical weights between 14,000 and 30,000 pounds. | Each | $255.83 | 1 | $255.83 |
| Mobilization, large equipment | 1140 | Equipment >150HP or typical weights greater than 30,000 pounds or loads requiring over width or over length permits. | Each | $488.45 | 3 | $1,465.35 |

**Practice:** 356 - Dike

**Scenario** #3 - Cranberry Mineral Soils

**Scenario Description:**

Construction of a barrier, constructed of an earthen embankment, to control water level. Embankment structure to provide adequate freeboard, allowance for settlement, and foundation and embankment stability. Typical earthen dike assumed 500 lineal feet, Class IV (5 ft. in height, 6 ft. top width, 1.5H:1V side slopes) for 2.5CY/LF of dike. Material haul > 1 mile. Associated practices include, but are not limited to: PS342 Critical Area Planting, PS466 Land Smoothing, PS587 Structure for Water Control.

**Before Situation:**

Site requires control of water level for purposes connected with crop production; fish and wildlife management; or wetland maintenance, improvement, restoration, or construction. An adequate quantity of soil suitable for constructing an earthen dike is available at an economical haul distance. Material haul < 1 mile.

**After Situation:**

Water level controlled by a stable earthen structure. Water can be impounded temporarily for harvesting, trash removal, pest control, and winter flooding.

**Feature Measure:** Volume of Earthfill (including volu

**Scenario Unit::** Cubic Yard

**Scenario Typical Size:** 1,250.0

**Scenario Total Cost:** $8,768.33

**Scenario Cost/Unit:** $7.01

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 | $2.36 | 1250 | $2,950.00 |
| Earthfill, Roller Compacted | 49 | Earthfill, roller or machine compacted, includes equipment and labor | Cubic Yard | $4.45 | 1250 | $5,562.50 |
| **Mobilization** | | | | | | |
| Mobilization, medium equipment | 1139 | Equipment with 70-150 HP or typical weights between 14,000 and 30,000 pounds. | Each | $255.83 | 1 | $255.83 |

**Practice:** 356 - Dike

**Scenario** #4 - Cranberry Organic Soils

**Scenario Description:**

Construction of a barrier, constructed of an earthen embankment, to control water level. Embankment structure to provide adequate freeboard, allowance for settlement, and foundation and embankment stability. Successive application of fill required for stability on organic soils. Typical earthen dike assumed 500 lineal feet, Class IV (5 ft. in height, 6 ft. top width, 1.5H:1V side slopes) including 2ft overexcavation and fill of organic material for about 4.3CY/LF. Material haul > 1 mile. Associated practices include, but are not limited to: PS342 Critical Area Planting, PS466 Land Smoothing, PS587 Structure for Water Control.

**Before Situation:**

Site requires control of water level for purposes connected with crop production; fish and wildlife management; or wetland maintenance, improvement, restoration, or construction. An adequate quantity of soil suitable for constructing an earthen dike is available at an economical haul distance. Material haul > 1 mile.

**After Situation:**

Water level controlled by a stable earthen structure. Water can be impounded temporarily for harvesting, trash removal, pest control, and winter flooding.

**Feature Measure:** Volume of Earthfill (including volu

**Scenario Unit::** Cubic Yard

**Scenario Typical Size:** 2,150.0

**Scenario Total Cost:** $17,537.49

**Scenario Cost/Unit:** $8.16

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 | $2.36 | 2150 | $5,074.00 |
| Earthfill, Roller Compacted | 49 | Earthfill, roller or machine compacted, includes equipment and labor | Cubic Yard | $4.45 | 2150 | $9,567.50 |
| 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 | $0.33 | 6450 | $2,128.50 |
| **Mobilization** | | | | | | |
| Mobilization, medium equipment | 1139 | Equipment with 70-150 HP or typical weights between 14,000 and 30,000 pounds. | Each | $255.83 | 3 | $767.49 |

**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:** 16,000.0

**Scenario Total Cost:** $12,837.99

**Scenario Cost/Unit:** $0.80

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 | $3.65 | 380 | $1,387.00 |
| 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 | $113.75 | 31 | $3,526.25 |
| Manure, compost, application | 955 | Loading, hauling and spreading manure/compost by ground equipment. Includes equipment, power unit and labor costs. | Hour | $112.69 | 19 | $2,141.11 |
| Tractor, agricultural, 120 HP | 962 | Agricultural tractor with horsepower range of 90 to 140. Equipment and power unit costs. Labor not included. | Hour | $57.70 | 1 | $57.70 |
| Aggregate, Wood Chips | 1098 | Includes materials, equipment and labor | Cubic Yard | $22.66 | 82 | $1,858.12 |
| 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 | $93.68 | 6 | $562.08 |
| **Labor** | | | | | | |
| Equipment Operators, Light | 232 | Includes: Skid Steer Loaders, Hydraulic Excavators <50 HP, Trenchers <12", Ag Equipment <150 HP, Pickup Trucks, Forklifts, Mulchers | Hour | $25.23 | 1 | $25.23 |
| 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 | $44.37 | 31 | $1,375.47 |
| **Materials** | | | | | | |
| Test, Soil Test, Standard | 299 | Includes materials, shiping, labor, and equipment costs. | Each | $10.04 | 16 | $160.64 |
| **Mobilization** | | | | | | |
| Mobilization, medium equipment | 1139 | Equipment with 70-150 HP or typical weights between 14,000 and 30,000 pounds. | Each | $255.83 | 3 | $767.49 |
| Mobilization, large equipment | 1140 | Equipment >150HP or typical weights greater than 30,000 pounds or loads requiring over width or over length permits. | Each | $488.45 | 2 | $976.90 |

**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 nutrients 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 Obstruction Removal, Code 500.

**Feature Measure:** Cubic feet of soil remediated

**Scenario Unit::** Cubic Foot

**Scenario Typical Size:** 130,680.0

**Scenario Total Cost:** $37,310.71

**Scenario Cost/Unit:** $0.29

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 | $113.75 | 40 | $4,550.00 |
| Manure, compost, application | 955 | Loading, hauling and spreading manure/compost by ground equipment. Includes equipment, power unit and labor costs. | Hour | $112.69 | 269 | $30,313.61 |
| **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 | $44.37 | 40 | $1,774.80 |
| **Materials** | | | | | | |
| Test, Soil Test, Standard | 299 | Includes materials, shiping, labor, and equipment costs. | Each | $10.04 | 16 | $160.64 |
| **Mobilization** | | | | | | |
| Mobilization, medium equipment | 1139 | Equipment with 70-150 HP or typical weights between 14,000 and 30,000 pounds. | Each | $255.83 | 2 | $511.66 |

**Practice:** 360 - Waste Facility Closure

**Scenario** #3 - Demolition of Concrete Waste Storage Structure

**Scenario Description:**

This practice scenario includes the demolition of an existing concrete waste storage structure. The purpose of the practice is to address resource concerns related to water quality degradation due to excess nutrient and pathogens in ground and/or surface waters and air quality impacts from greenhouse gases, particulate matter and associated precursors, and objectionable odors. Associated practices: Nutrient Management (590), Critical Area Planting (342)

**Before Situation:**

An existing concrete waste storage structure is no longer functioning correctly or is not being used for its intended purpose. It poses a safety hazard for humans and livestock and is a threat to environmentally sustainability by the potential for impacts to water and air quality.

**After Situation:**

This scenario assumes a concrete waste storage structure, with dimensions of 60 ft x 60 ft with 10 ft vertical walls. The walls are 8 inches thick, the concrete floor is 5 inches thick and the footing for the wall is 24 inches wide by 12 inches deep. The "strike full" capacity of the structure equals 36,000 cubic feet. The total volume of concrete to be demolished is: Walls = 60' x 4 sides x 10' x 8"/12 / 27 = 59 CY Footer = 60' x 4 sides x 2' x 1' / 27 = 18 CY Slab = 60'x60'x5"/12 / 27 = 56 CY Total = 133 CY The volume of waste to be removed approximately equals 50% of the structural volume (50% x 36,000 x 7.48 Gal/CF = 134,640 Gal). The volume of earthwork (earthfill and/or excavation, final grading) required is approximately 50% of the structural volume(50% x 36,000 / 27 = 670 CY. The concrete will be demolished and hauled off-site for recycling or disposal. Structural removal, as necessary, may include the sealing or removal and disposal of waste transfer components and other appurtenances associated with closure of the facility. Demolition of a concrete waste storage structure includes agitating, removing, and spreading the waste remaining in the structure. All waste material shall be land applied in accordance with Nutrient Management (590). Excavated areas will be filled in. The disturbed areas shall be vegetated in accordance with Critical Area Planting (342). Demolition of the concrete waste structure will address water quality degradation, air quality impacts and safety hazards by removing and properly utilizing the waste from the impoundment. The site will also become available for another use.

**Feature Measure:** "Strike Full" Capacity of Structure

**Scenario Unit::** Cubic Foot

**Scenario Typical Size:** 36,000.0

**Scenario Total Cost:** $9,688.92

**Scenario Cost/Unit:** $0.27

Cost Details:

| Component Name | ID | Description | Unit | Cost | QTY | Total |
|---|---|---|---|---|---|---|
| **Equipment Installation** | | | | | | |
| Earthfill, Roller Compacted | 49 | Earthfill, roller or machine compacted, includes equipment and labor | Cubic Yard | $4.45 | 670 | $2,981.50 |
| Hydraulic Excavator, 1 CY | 931 | Track mounted hydraulic excavator with bucket capacity range of 0.8 to 1.5 CY. Equipment and power unit costs. Labor not included. | Hour | $113.75 | 10 | $1,137.50 |
| 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 | $11.85 | 133 | $1,576.05 |
| 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 | $0.33 | 1330 | $438.90 |
| **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 | $25.31 | 10 | $253.10 |
| 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 | $44.37 | 10 | $443.70 |
| **Mobilization** | | | | | | |
| Mobilization, medium equipment | 1139 | Equipment with 70-150 HP or typical weights between 14,000 and 30,000 pounds. | Each | $255.83 | 4 | $1,023.32 |
| Mobilization, large equipment | 1140 | Equipment >150HP or typical weights greater than 30,000 pounds or loads requiring over width or over length permits. | Each | $488.45 | 1 | $488.45 |

**Practice:** 360 - Waste Facility Closure

**Scenario** #4 - Liquid Waste Impoundment Closure with 75% Liquids and 25% Solids

**Scenario Description:**

This practice scenario includes the decommissioning of an earthen liquid waste impoundment (embankment or excavated type) where the estimated volume of waste to be removed is approximately 75% liquid/slurry waste and 25% sludge/solid waste of the structural storage capacity of the structure. The purpose of the practice is to address resource concerns related to water quality degradation due to excess nutrient and pathogens in ground and/or surface waters and air quality impacts from greenhouse gases, particulate matter and associated precursors, and objectionable odors. Associated practices: Nutrient Management (590), Critical Area Planting (342)

**Before Situation:**

An existing lagoon or waste storage pond is no longer functioning correctly or is not being used for its intended purpose. It poses a safety hazard for humans and livestock and is a threat to environmental sustainability by the potential for impacts to water and air quality.

**After Situation:**

This scenario assumes a waste storage pond, with top dimensions of 110 ft x 110 ft, 8 ft total depth with 2:1 side slopes. The total structural storage volume equals 63,851 cubic feet. The volume of liquid waste to be pumped approximately equals 75% if the structural volume (75% X 63,851 CF = 47,888 CF). The volume of solid waste to be removed approximately equals 25% of the structural volume (25% X 63,851 = 15,963 CF). The volume of earthwork (earthfill and excavation) required to breach the embankment and/or fill in the impoundment and perform final grading of the site is approximately 50% of the structural volume. The volume of earthwork will include 60% as excavation and 40% as compacted earthfill. Structural removal, as necessary, may include the removal and disposal of the synthetic liner, sealing or removal and disposal of waste transfer components and other appurtenances associated with closure of the facility. Decommissioning of a liquid waste storage impoundment includes agitating, removing, and spreading liquid/slurry waste material, removing solid/sludge waste remaining in the bottom. All waste material shall be land applied in accordance with Nutrient Management (590). If present, the synthetic liner will be removed and properly disposed of. All inflow devices and associated appurtenances will be removed and properly disposed of. The embankment will be breached and the excavation filled in with the embankment material or hauled in earthfill. The disturbed areas shall be vegetated in accordance with Critical Area Planting (342). Closure of the waste impoundment will address water quality degradation, air quality impacts and safety hazards by removing and properly utilizing the waste from the impoundment. The site will also become available for another use.

**Feature Measure:** Cubic feet of structural storage

**Scenario Unit::** Cubic Foot

**Scenario Typical Size:** 63,851.0

**Scenario Total Cost:** $14,496.96

**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 | $2.36 | 709 | $1,673.24 |
| Earthfill, Roller Compacted | 49 | Earthfill, roller or machine compacted, includes equipment and labor | Cubic Yard | $4.45 | 473 | $2,104.85 |
| 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 | $25.31 | 12 | $303.72 |
| 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 | $44.37 | 12 | $532.44 |
| **Mobilization** | | | | | | |
| Mobilization, medium equipment | 1139 | Equipment with 70-150 HP or typical weights between 14,000 and 30,000 pounds. | Each | $255.83 | 4 | $1,023.32 |
| Mobilization, large equipment | 1140 | Equipment >150HP or typical weights greater than 30,000 pounds or loads requiring over width or over length permits. | Each | $488.45 | 1 | $488.45 |

**Practice:** 360 - Waste Facility Closure

**Scenario** #5 - Liquid Waste Impoundment Closure with 50% Liquids and 50% 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:** 63,851.0

**Scenario Total Cost:** $18,091.55

**Scenario Cost/Unit:** $0.28

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 | $2.36 | 709 | $1,673.24 |
| Earthfill, Roller Compacted | 49 | Earthfill, roller or machine compacted, includes equipment and labor | Cubic Yard | $4.45 | 473 | $2,104.85 |
| 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 | $25.31 | 12 | $303.72 |
| 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 | $44.37 | 12 | $532.44 |
| **Mobilization** | | | | | | |
| Mobilization, medium equipment | 1139 | Equipment with 70-150 HP or typical weights between 14,000 and 30,000 pounds. | Each | $255.83 | 4 | $1,023.32 |
| Mobilization, large equipment | 1140 | Equipment >150HP or typical weights greater than 30,000 pounds or loads requiring over width or over length permits. | Each | $488.45 | 1 | $488.45 |

**Practice:** 360 - Waste Facility Closure

**Scenario** #6 - Liquid Waste Impoundment Closure with 25% Liquids and 75% 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 100 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 (Strike Full)

**Scenario Unit::** Cubic Foot

**Scenario Typical Size:** 63,851.0

**Scenario Total Cost:** $21,686.43

**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 | $2.36 | 709 | $1,673.24 |
| Earthfill, Roller Compacted | 49 | Earthfill, roller or machine compacted, includes equipment and labor | Cubic Yard | $4.45 | 473 | $2,104.85 |
| 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 | $25.31 | 12 | $303.72 |
| 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 | $44.37 | 12 | $532.44 |
| **Mobilization** | | | | | | |
| Mobilization, medium equipment | 1139 | Equipment with 70-150 HP or typical weights between 14,000 and 30,000 pounds. | Each | $255.83 | 4 | $1,023.32 |
| Mobilization, large equipment | 1140 | Equipment >150HP or typical weights greater than 30,000 pounds or loads requiring over width or over length permits. | Each | $488.45 | 1 | $488.45 |

**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 400 feet long, 15' wide with 10-15' wide berm, installed on a field slope of 1 percent and requires ~1 CY excavation & compaction per LF. Topsoil is stripped, stockpiled and respread. Channel my be level or gradient and ridge 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 agricultural wastes that significantly contributes to the amount of runoff that has to be stored or treated.

**After Situation:**

Diversion is 400 feet long installed using a dozer. Field system meets "T" or "clean" storm water runoff is diverted away from an agricultural waste management system to minimize the volume of runoff that is contaminated by agricultural waste. Associated practices are Critical Area Planting (342), Grassed Waterway (412), Underground Outlet (620), Mulching (484), and Subsurface Drainage (606).

**Feature Measure:** Length of Diversion

**Scenario Unit::** Foot

**Scenario Typical Size:** 400.0

**Scenario Total Cost:** $2,252.91

**Scenario Cost/Unit:** $5.63

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 | $66.13 | 15 | $991.95 |
| Stripping and stockpiling, topsoil | 1199 | Stripping and stockpiling of topsoil adjacent to stripping area. Includes equipment and labor. | Cubic Yard | $0.89 | 222 | $197.58 |
| **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 | $25.31 | 2 | $50.62 |
| 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 | $44.37 | 15 | $665.55 |
| Supervisor 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 | $45.69 | 2 | $91.38 |
| **Mobilization** | | | | | | |
| Mobilization, medium equipment | 1139 | Equipment with 70-150 HP or typical weights between 14,000 and 30,000 pounds. | Each | $255.83 | 1 | $255.83 |

**Practice:** 366 - Anaerobic Digester

**Scenario** #1 - Small Plug Flow upto 1000 AU

**Scenario Description:**

A plug flow anaerobic digester can be part of a waste management system. It provides biological treatment of the waste in the absence of oxygen. This process for manure and other byproducts of animal agricultural operations will manage odors, reduce the net effect of greenhouse gas emissions, and/or reduce pathogens. This scenario is for a plug flow digester with less than 1,000 animal units. Selection of digester type will be based on effluent consistency. Energy generation is not included with this scenario. Potential Associated Practices: Fence (382), Critical Area Planting (342), Nutrient Management (590), Waste Transfer (634), Heavy Use Area Protection (561), Roof and Covers (367), Solid/Liquid Waste Separation Facility (632), Waste Treatment Lagoon (359), and Waste Storage Facility (313).

**Before Situation:**

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

**After Situation:**

Manure and other agricultural by-products are being treated such that odors are managed and/or pathogens are reduced. Effluent from the digester is disposed of or utilized in a proper manner in accordance with a nutrient management plan. A 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:** 910.0

**Scenario Total Cost:** $1,201,757.68

**Scenario Cost/Unit:** $1,320.61

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 | $63.92 | 2 | $127.84 |
| **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 | $1,200,000.00 | 1 | $1,200,000.00 |
| **Mobilization** | | | | | | |
| Mobilization, very small equipment | 1137 | Equipment that is small enough to be transported by a pick-up truck with typical weights less than 3,500 pounds. Can be multiple pieces of equipment if all hauled simultaneously. | Each | $70.64 | 2 | $141.28 |
| Mobilization, medium equipment | 1139 | Equipment with 70-150 HP or typical weights between 14,000 and 30,000 pounds. | Each | $255.83 | 2 | $511.66 |
| Mobilization, large equipment | 1140 | Equipment >150HP or typical weights greater than 30,000 pounds or loads requiring over width or over length permits. | Each | $488.45 | 2 | $976.90 |

**Practice:** 366 - Anaerobic Digester

**Scenario** #4 - Small Complete Mix upto 1000 AU

**Scenario Description:**

A complete mix anaerobic digester can be part of a waste management system. It provides biological treatment of the waste in the absence of oxygen. This process for manure and other byproducts of animal agricultural operations will manage odors, reduce the net effect of greenhouse gas emissions, and/or reduce pathogens. This scenario is for complete mix systems with less than 1,000 animal units. Selection of digester type will be based on effluent consistency. Energy generation is not included with this scenario. Potential Associated Practices: Fence (382), Critical Area Planting (342), Nutrient Management (590), Waste Transfer (634), Heavy Use Area Protection (561), Roof and Covers (367), Solid/Liquid Waste Separation Facility (632), Waste Treatment Lagoon (359), and Waste Storage Facility (313).

**Before Situation:**

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

**After Situation:**

Manure and other agricultural by-products are being treated such that odors are managed and/or pathogens are reduced. Effluent from the digester is disposed of or utilized in a proper manner in accordance with a nutrient management plan. A 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:** 1,039.0

**Scenario Total Cost:** $746,418.71

**Scenario Cost/Unit:** $718.40

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 | $63.92 | 2 | $127.84 |
| **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 | 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 | $70.64 | 2 | $141.28 |
| Mobilization, medium equipment | 1139 | Equipment with 70-150 HP or typical weights between 14,000 and 30,000 pounds. | Each | $255.83 | 2 | $511.66 |
| Mobilization, large equipment | 1140 | Equipment >150HP or typical weights greater than 30,000 pounds or loads requiring over width or over length permits. | Each | $488.45 | 2 | $976.90 |

**Practice:** 366 - Anaerobic Digester

**Scenario** #7 - Covered Lagoon/Holding Pond

**Scenario Description:**

A covered lagoon can be part of a waste management system. It provides biological treatment of the waste in the absence of oxygen. This process for manure and other byproducts of animal agricultural operations will manage odors, reduce the net effect of greenhouse gas emissions, and/or reduce pathogens. This scenario is for all livestock operation sizes. The waste holding/treatment area is covered by waste treatment lagoon (359) or waste storage facility (313) and the cover is addressed under roofs and covers (367). Selection of digester type will be based on effluent consistency. Costs for this scenario are only for system controls, gas collection, and flaring system. Energy generation is not included with this scenario. Potential Associated Practices: Fence (382), Critical Area Planting (342), Nutrient Management (590), Waste Transfer (634), Heavy Use Area Protection (561), Roof and Covers (367), Solid/Liquid Waste Separation Facility (632), Waste Treatment Lagoon (359), and Waste Storage Facility (313).

**Before Situation:**

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

**After Situation:**

Manure and other agricultural by-products are being treated such that odors are managed and/or pathogens are reduced. Effluent from the digester is disposed of or utilized in a proper manner in accordance with a nutrient management plan. A covered lagoon/holding pond typically has a flexible 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:** 1,000.0

**Scenario Total Cost:** $108,716.86

**Scenario Cost/Unit:** $108.72

Cost Details:

| Component Name | ID | Description | Unit | Cost | QTY | Total |
|---|---|---|---|---|---|---|
| **Acquisition of Technical Knowledge** | | | | | | |
| Training, Workshops | 294 | Educational seminar or series of meetings emphasizing interaction and exchange of information among a usually small number of participants. | Each | $63.92 | 1 | $63.92 |
| **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 | $70.64 | 2 | $141.28 |
| Mobilization, medium equipment | 1139 | Equipment with 70-150 HP or typical weights between 14,000 and 30,000 pounds. | Each | $255.83 | 2 | $511.66 |

**Practice:** 367 - Roofs and Covers

**Scenario** #1 - Fabric Roof with Timber Foundation

**Scenario Description:**

104' x 42' hoop structure (4368 SF) with fabric cover with steel trusses and supporting foundation. Steel trusses are supported in 10"x10" PT Timber Posts embedded in the ground 6' and extending 8' above the ground. Posts are placed on 18" footings and are encased in concrete. Associated practices include Heavy Use Area Protection (561), Waste Storage Facility (313), Animal Mortality Facility (316), Composting Facility (317), Roof Runoff Structure (558), and other practices requiring a roof.

**Before Situation:**

Applicable where the exclusion of precipitation from an animal waste storage, composting facilities, heavy use area (barnyard or feedlot) or other appropriate application will improve an existing or planned system. Excess precipitation can cause manure laden runoff and impact surface and ground water resources.

**After Situation:**

Hoop structure with fabric cover with steel trusses and supporting timber foundation. Roof or cover will be engineered and installed in accordance with appropriate building codes and permits. Typical size is 104'x42' or 4,368 square feet. Roof or cover is typically installed over an approved barnyard or feedlot or other practice as an approved component of a CNMP. The system is designed to exclude precipitation and allow proper management of animal wastes (manure or compost streams), thus mitigating the negative factors from the "before practice implementation".

**Feature Measure:** Footprint of the building

**Scenario Unit::** Square Foot

**Scenario Typical Size:** 4,368.0

**Scenario Total Cost:** $53,451.45

**Scenario Cost/Unit:** $12.24

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 | $510.00 | 18 | $9,180.00 |
| Earthfill, Manually Compacted | 50 | Earthfill, manually compacted, includes equipment and labor | Cubic Yard | $5.87 | 20 | $117.40 |
| 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 | $113.75 | 20 | $2,275.00 |
| Auger, Truck Mounted | 2049 | Truck mounted auger for large diameter excavation. Includes equipment and labor. | Hour | $355.86 | 10 | $3,558.60 |
| **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 | $25.31 | 60 | $1,518.60 |
| 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 | $44.37 | 20 | $887.40 |
| 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 | $45.69 | 20 | $913.80 |
| **Materials** | | | | | | |
| Lumber, planks, posts and timbers, treated | 1609 | Treated dimension lumber with nominal thickness greater than 2". Includes lumber and fasteners. Does not include labor. | Board Foot | $1.62 | 3267 | $5,292.54 |
| Roof, Hoop Truss Arch Structure, 30-60' wide | 1668 | Hoop Truss Arch Structure with fabric cover - 30' to 60' width, includes materials, equipment, and installation. Does not include foundation preparation. | Square Foot | $6.54 | 4368 | $28,566.72 |
| **Mobilization** | | | | | | |
| Mobilization, very small equipment | 1137 | Equipment that is small enough to be transported by a pick-up truck with typical weights less than 3,500 pounds. Can be multiple pieces of equipment if all hauled simultaneously. | Each | $70.64 | 2 | $141.28 |
| Mobilization, medium equipment | 1139 | Equipment with 70-150 HP or typical weights between 14,000 and 30,000 pounds. | Each | $255.83 | 2 | $511.66 |
| Mobilization, large equipment | 1140 | Equipment >150HP or typical weights greater than 30,000 pounds or loads requiring over width or over length permits. | Each | $488.45 | 1 | $488.45 |

**Practice:** 367 - Roofs and Covers

**Scenario** #2 - Fabric Roof with Concrete Foundation

**Scenario Description:**

104' x 42' hoop structure (4368 SF) with fabric cover with steel trusses and supporting concrete foundation. Concrete foundation is required due to shallow bedrock conditions and lack of proper embedment depth for timber posts. Steel truss is attached directly to top of concrete wall. Associated practices include Heavy Use Area Protection (561), Waste Storage Facility (313), Animal Mortality Facility (316), Composting Facility (317), Roof Runoff Structure (558), and other practices requiring a roof.

**Before Situation:**

Applicable where the exclusion of precipitation from an animal waste storage, composting facilities, heavy use area (barnyard or feedlot) or other appropriate application will improve an existing or planned system. Excess precipitation can cause manure laden runoff and impact surface and ground water resources.

**After Situation:**

Hoop structure with fabric cover with steel trusses and supporting timber/concrete foundation. Roof or cover will be engineered and installed in accordance with appropriate building codes and permits. Typical size is 104'x42' or 4,368 square feet. Roof or cover is typically installed over an approved barnyard or feedlot or other practice as an approved component of a CNMP. The system is designed to exclude precipitation and allow proper management of animal wastes (manure or compost streams), thus mitigating the negative factors from the "before practice implementation".

**Feature Measure:** Footprint of the building

**Scenario Unit::** Square Foot

**Scenario Typical Size:** 4,368.0

**Scenario Total Cost:** $67,771.73

**Scenario Cost/Unit:** $15.52

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 | $510.00 | 65 | $33,150.00 |
| Earthfill, Manually Compacted | 50 | Earthfill, manually compacted, includes equipment and labor | Cubic Yard | $5.87 | 162 | $950.94 |
| 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 | $113.75 | 20 | $2,275.00 |
| **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 | $44.37 | 20 | $887.40 |
| 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 | $45.69 | 20 | $913.80 |
| **Materials** | | | | | | |
| Roof, Hoop Truss Arch Structure, 30-60' wide | 1668 | Hoop Truss Arch Structure with fabric cover - 30' to 60' width, includes materials, equipment, and installation. Does not include foundation preparation. | Square Foot | $6.54 | 4368 | $28,566.72 |
| **Mobilization** | | | | | | |
| Mobilization, small equipment | 1138 | Equipment <70 HP but can't be transported by a pick-up truck or with typical weights between 3,500 to 14,000 pounds. | Each | $172.07 | 3 | $516.21 |
| Mobilization, medium equipment | 1139 | Equipment with 70-150 HP or typical weights between 14,000 and 30,000 pounds. | Each | $255.83 | 2 | $511.66 |

**Practice:** 367 - Roofs and Covers

**Scenario** #3 - Fabric Roof with No Foundation

**Scenario Description:**

104' x 42' hoop structure (4368 SF) with fabric cover with steel trusses. Roof is designed to be mounted directly on top of another practice, such as a WSF, which has been properly designed to support the roof. Steel trusses typically mounted on top of a concrete wall which has been properly design to support this additional load. Associated practices include Heavy Use Area Protection (561), Waste Storage Facility (313), Animal Mortality Facility (316), Composting Facility (317), Roof Runoff Structure (558), and other practices requiring a roof.

**Before Situation:**

Applicable where the exclusion of precipitation from an animal waste storage, composting facilities, heavy use area (barnyard or feedlot) or other appropriate application will improve an existing or planned system. Excess precipitation can cause manure laden runoff and impact surface and ground water resources.

**After Situation:**

Hoop structure with fabric cover with steel trusses and supporting timber/concrete foundation. Roof or cover will be engineered and installed in accordance with appropriate building codes and permits. Typical size is 104'x42' or 4,368 square feet. Roof or cover is typically installed over an approved barnyard or feedlot or other practice as an approved component of a CNMP. The system is designed to exclude precipitation and allow proper management of animal wastes (manure or compost streams), thus mitigating the negative factors from the "before practice implementation".

**Feature Measure:** Footprint of the building

**Scenario Unit::** Square Foot

**Scenario Typical Size:** 4,368.0

**Scenario Total Cost:** $31,063.89

**Scenario Cost/Unit:** $7.11

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 | $25.31 | 40 | $1,012.40 |
| 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 | $45.69 | 10 | $456.90 |
| **Materials** | | | | | | |
| Roof, Hoop Truss Arch Structure, 30-60' wide | 1668 | Hoop Truss Arch Structure with fabric cover - 30' to 60' width, includes materials, equipment, and installation. Does not include foundation preparation. | Square Foot | $6.54 | 4368 | $28,566.72 |
| **Mobilization** | | | | | | |
| Mobilization, small equipment | 1138 | Equipment <70 HP but can't be transported by a pick-up truck or with typical weights between 3,500 to 14,000 pounds. | Each | $172.07 | 3 | $516.21 |
| Mobilization, medium equipment | 1139 | Equipment with 70-150 HP or typical weights between 14,000 and 30,000 pounds. | Each | $255.83 | 2 | $511.66 |

**Practice:** 367 - Roofs and Covers

**Scenario** #4 - Timber Framed Roof with Timber Foundation

**Scenario Description:**

40' x 64' timber framed building (2560 SF) with timber trusses. 8" x 10" posts are embedded 6' in ground with concrete footing/collar. Bottom chord of truss is 12' off the ground. Scenario is based upon Vermont NRCS Drawing VT124060B-C. Snow Load = 60 pdf and Wind Load = 90 mph. Associated practices include Heavy Use Area Protection (561), Waste Storage Facility (313), Animal Mortality Facility (316), Composting Facility (317), Roof Runoff Structure (558), and other practices requiring a roof.

**Before Situation:**

Applicable where the exclusion of precipitation from an animal waste storage, composting facilities, heavy use area (barnyard or feedlot) or other appropriate application will improve an existing or planned system and is the least cost alternative. Excess precipitation can cause manure laden runoff and impact surface and ground water resources.

**After Situation:**

The system is designed to exclude precipitation and allow proper management of animal wastes (manure or compost streams), thus mitigating the negative factors from the "before practice implementation".

**Feature Measure:** Footprint of the building

**Scenario Unit::** Square Foot

**Scenario Typical Size:** 2,560.0

**Scenario Total Cost:** $40,936.26

**Scenario Cost/Unit:** $15.99

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 | $510.00 | 12 | $6,120.00 |
| Skidsteer, 80 HP | 933 | Skidsteer loader with horsepower range of 60 to 90. Equipment and power unit costs. Labor not included. | Hour | $44.60 | 10 | $446.00 |
| Auger, Truck Mounted | 2049 | Truck mounted auger for large diameter excavation. Includes equipment and labor. | Hour | $355.86 | 10 | $3,558.60 |
| **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 | $44.37 | 10 | $443.70 |
| **Materials** | | | | | | |
| Aggregate, Gravel, Graded | 46 | Gravel, includes materials, equipment and labor to transport and place. Includes washed and unwashed gravel. | Cubic Yard | $34.75 | 10 | $347.50 |
| Roof, Post Frame Building, 30' to 60' Wide, Hazardous Condtions | 2512 | Post Frame Building, no sides, - between 30' and 60' width. Hazardous building sites with snow loads exceeding 30 lbs per square foot and extreme wind exposure in areas of open terrain (flat open areas, grassland, shoreline, etc.). Includes materials, s | Square Foot | $11.00 | 2560 | $28,160.00 |
| **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 | $172.07 | 5 | $860.35 |
| Mobilization, medium equipment | 1139 | Equipment with 70-150 HP or typical weights between 14,000 and 30,000 pounds. | Each | $255.83 | 2 | $511.66 |
| Mobilization, large equipment | 1140 | Equipment >150HP or typical weights greater than 30,000 pounds or loads requiring over width or over length permits. | Each | $488.45 | 1 | $488.45 |

**Practice:** 367 - Roofs and Covers

**Scenario** #5 - Timber Framed Roof with Concrete Foundation

**Scenario Description:**

40' x 80' timber framed building (3,200 SF) with timber trusses and supporting concrete foundation. Concrete foundation is required due shallow bedrock conditions and lack of embedment depth for timber post. 6" x 8" PT posts are mounted on top of 4' concrete knee wall. Knee wall foundation is pinned into bedrock. Bottom chord of truss is 14' off the ground. Scenario is based upon Vermont NRCS Drawing VT084060B-CW. Snow Load = 60 pdf and Wind Load = 90 mph. Associated practices include Heavy Use Area Protection (561), Waste Storage Facility (313), Animal Mortality Facility (316), Composting Facility (317), Roof Runoff Structure (558), and other practices requiring a roof.

**Before Situation:**

Applicable where the exclusion of precipitation from an animal waste storage, composting facilities, heavy use area (barnyard or feedlot) or other appropriate application will improve an existing or planned system and is the least cost alternative. Excess precipitation can cause manure laden runoff and impact surface and ground water resources.

**After Situation:**

The system is designed to exclude precipitation and allow proper management of animal wastes (manure or compost streams), thus mitigating the negative factors from the "before practice implementation".

**Feature Measure:** Footprint of the building

**Scenario Unit::** Square Foot

**Scenario Typical Size:** 3,200.0

**Scenario Total Cost:** $65,562.22

**Scenario Cost/Unit:** $20.49

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 | $510.00 | 50 | $25,500.00 |
| 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 | $113.75 | 16 | $1,820.00 |
| Jack Hammer | 2190 | 60-90 pound jack hammer (electric, pneumatic, or hydraulic). Equipment only. | Hour | $2.13 | 16 | $34.08 |
| **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 | $25.31 | 16 | $404.96 |
| 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 | $44.37 | 16 | $709.92 |
| **Materials** | | | | | | |
| Aggregate, Gravel, Graded | 46 | Gravel, includes materials, equipment and labor to transport and place. Includes washed and unwashed gravel. | Cubic Yard | $34.75 | 15 | $521.25 |
| Roof, Post Frame Building, 30' to 60' Wide, Hazardous Condtions | 2512 | Post Frame Building, no sides, - between 30' and 60' width. Hazardous building sites with snow loads exceeding 30 lbs per square foot and extreme wind exposure in areas of open terrain (flat open areas, grassland, shoreline, etc.). Includes materials, s | Square Foot | $11.00 | 3200 | $35,200.00 |
| **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 | $172.07 | 5 | $860.35 |
| Mobilization, medium equipment | 1139 | Equipment with 70-150 HP or typical weights between 14,000 and 30,000 pounds. | Each | $255.83 | 2 | $511.66 |

**Practice:** 367 - Roofs and Covers

**Scenario** #6 - Timber Framed Roof with No Foundation

**Scenario Description:**

40' x 80' timber framed building with timber trusses. Roof is designed to be mounted on top of another practice, such as a WSF, which as been designed to support the roof. 6" x 8" PT posts are typically mounted on top of a concrete wall which has been properly design to support this additional load. Bottom chord of truss is 14' off the ground. Scenario is based upon Vermont NRCS Drawing VT084060B-CW. Snow Load = 60 pdf and Wind Load = 90 mph. Associated practices include Heavy Use Area Protection (561), Waste Storage Facility (313), Animal Mortality Facility (316), Composting Facility (317), Roof Runoff Structure (558), and other practices requiring a roof.

**Before Situation:**

Applicable where the exclusion of precipitation from an animal waste storage, composting facilities, heavy use area (barnyard or feedlot) or other appropriate application will improve an existing or planned system and is the least cost alternative. Excess precipitation can cause manure laden runoff and impact surface and ground water resources.

**After Situation:**

The system is designed to exclude precipitation and allow proper management of animal wastes (manure or compost streams), thus mitigating the negative factors from the "before practice implementation".

**Feature Measure:** Footprint of the building

**Scenario Unit::** Square Foot

**Scenario Typical Size:** 3,200.0

**Scenario Total Cost:** $39,734.41

**Scenario Cost/Unit:** $12.42

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 | $113.75 | 20 | $2,275.00 |
| **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 | $44.37 | 20 | $887.40 |
| **Materials** | | | | | | |
| Roof, Post Frame Building, 30' to 60' Wide, Hazardous Condtions | 2512 | Post Frame Building, no sides, - between 30' and 60' width. Hazardous building sites with snow loads exceeding 30 lbs per square foot and extreme wind exposure in areas of open terrain (flat open areas, grassland, shoreline, etc.). Includes materials, s | Square Foot | $11.00 | 3200 | $35,200.00 |
| **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 | $172.07 | 5 | $860.35 |
| Mobilization, medium equipment | 1139 | Equipment with 70-150 HP or typical weights between 14,000 and 30,000 pounds. | Each | $255.83 | 2 | $511.66 |

**Practice:** 367 - Roofs and Covers

**Scenario** #7 - Small Timber Framed Roof with No Foundation < 1000 SF

**Scenario Description:**

Scenario is intended for small timber monoslope roofs which are typically less than 1000 SF in size. Typical size is 26' x 9' (overhang not included) timber framed building with rafters and no sides. Roof is designed to be mounted on top of another practice, such as a compost bin, SPCC facility, etc. which has been designed to support the roof. 6" x 8" PT posts are typically mounted on top of a concrete wall which has been properly design to support this additional load. Roof is typically 8' to 10' off the ground. Scenario is based upon Massachusetts Compost Bin Detail. Snow Load = 60 pdf and Wind Load = 90 mph. Associated practices include Heavy Use Area Protection (561), Waste Storage Facility (313), Animal Mortality Facility (316), Composting Facility (317), Roof Runoff Structure (558), and other practices requiring a roof.

**Before Situation:**

Applicable where the exclusion of precipitation from an animal waste storage, composting facilities, heavy use area (barnyard or feedlot) or other appropriate application will improve an existing or planned system and is the least cost alternative. Excess precipitation can cause runoff laden with manure or hydrocarbons to adversely impact surface and ground water resources.

**After Situation:**

The system is designed to exclude precipitation and allow proper management of animal wastes (manure or compost streams), thus mitigating the negative factors from the "before practice implementation".

**Feature Measure:** Footprint of the building

**Scenario Unit::** Square Foot

**Scenario Typical Size:** 234.0

**Scenario Total Cost:** $3,834.62

**Scenario Cost/Unit:** $16.39

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 | $41.76 | 30 | $1,252.80 |
| 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 | $25.31 | 30 | $759.30 |
| **Materials** | | | | | | |
| Corrugated Steel, 22 gauge | 224 | Corrugated or ribbed, galvanized, 22 gauge, includes fasteners, materials only. | Square Foot | $2.29 | 356 | $815.24 |
| Dimension Lumber, Treated | 1044 | Treated dimension lumber with nominal thickness equal or less than 2". Includes lumber and fasteners | Board Foot | $0.90 | 716 | $644.40 |
| Lumber, planks, posts and timbers, treated | 1609 | Treated dimension lumber with nominal thickness greater than 2". Includes lumber and fasteners. Does not include labor. | Board Foot | $1.62 | 224 | $362.88 |

**Practice:** 367 - Roofs and Covers

**Scenario** #8 - Steel Frame and Cover with Concrete Foundation

**Scenario Description:**

A steel framed building with steel "sheet" roof and supporting foundation. Manure is stored as a liquid in basins, tanks, and as a solid on concrete and earthen surfaces. Excess precipitation can cause premature filling of storages or cause nutrients to leach from solid manure piles leading to uncontrolled runoff as well as odor issues. Associated practices include Heavy Use Area Protection (561), Waste Storage Facility (313), Animal Mortality Facility (316), Composting Facility (317), Roof Runoff Structure (558), and other practices requiring a roof.

**Before Situation:**

Applicable where the exclusion of precipitation from an animal waste storage and/or treatment facility will improve of an existing or planned system. Manure is stored as a liquid in basins, tanks, and as a solid on concrete and earthen surfaces. Excess precipitation can cause premature filling of storages or cause nutrients to leach from solid manure piles leading to uncontrolled runoff as well as odor issues.

**After Situation:**

A steel framed building with steel "sheet" roof and supporting foundation. Roof or cover will be engineered and installed in accordance with appropriate building codes and permits. Typical size is 104'x42' or 4,368 square feet and is over an approved barnyard or feedlot as a component of a CNMP. The system is designed to exclude precipitation and allow proper management of animal wastes (manure or compost streams), thus mitigating the negative factors from the "before practice implementation".

**Feature Measure:** Footprint of building

**Scenario Unit::** Square Foot

**Scenario Typical Size:** 4,368.0

**Scenario Total Cost:** $83,965.02

**Scenario Cost/Unit:** $19.22

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 | $510.00 | 65 | $33,150.00 |
| 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 | $113.75 | 20 | $2,275.00 |
| **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 | $44.37 | 20 | $887.40 |
| **Materials** | | | | | | |
| Roof, Steel Frame Monoslope Building, 30' to 60' wide | 1681 | Steel Frame Monoslope Building, 30' to 60' width, includes materials, equipment, and installation. Does not include foundation preparation. | Square Foot | $10.76 | 4368 | $46,999.68 |
| **Mobilization** | | | | | | |
| Mobilization, very small equipment | 1137 | Equipment that is small enough to be transported by a pick-up truck with typical weights less than 3,500 pounds. Can be multiple pieces of equipment if all hauled simultaneously. | Each | $70.64 | 2 | $141.28 |
| Mobilization, medium equipment | 1139 | Equipment with 70-150 HP or typical weights between 14,000 and 30,000 pounds. | Each | $255.83 | 2 | $511.66 |

**Practice:** 367 - Roofs and Covers

**Scenario** #9 - Permeable Composite or Inorganic Cover

**Scenario Description:**

Permeable organic or inorganic cover applied to the liquid surface of a waste storage or treatment facility. Permeable organic or inorganic cover to reduce radiation and wind velocity over the surface of a manure storage to reduce transmission of odors and act as a medium for growth of microorganisms that utilize carbon, nitrogen, and sulfur to decompose odorous compounds. Associated practices 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:** 10,000.0

**Scenario Total Cost:** $77,985.42

**Scenario Cost/Unit:** $7.80

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 | $70.64 | 2 | $141.28 |
| 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 | $172.07 | 2 | $344.14 |

**Practice:** 367 - Roofs and Covers

**Scenario** #10 - Pump Building with No Foundation upto 300 SF

**Scenario Description:**

12' x 18' insulated timber framed pump or hopper building (216 SF). Building is designed to be constructed over a manure pump or a gravity manure hopper to protect practice from freezing and rain. Building is generally constructed with 2" x 6" studded walls with 2" x 8" roof rafters. Building is typically covered with 1/2" plywood sheeting. Roof is finished with asphalt shingles. Building usually includes a door, window and small exhaust fan. Building is constructed on an existing concrete structure which was installed under Pumping Plant (533) or Waste Transfer (634). Associated practices include Pumping Plant (533), Waste Transfer (634), Heavy Use Area Protection (561), Waste Storage Facility (313), Roof Runoff Structure (558), and other practices requiring a roof.

**Before Situation:**

Applicable in cold/humid climates where elements could damage or hinder performance of a pumping plant or waste transfer system. Consequences can be pollution of ground and surface water resources and improper collection of nutrient resources which will not be properly field applied in accordance to an approved CNMP.

**After Situation:**

The system is designed to protect a pumping plant or waste transfer system from rain and cold weather and allow proper management of animal wastes, thus mitigating the negative factors from the "before practice implementation".

**Feature Measure:** Footprint of the building

**Scenario Unit::** Square Foot

**Scenario Typical Size:** 216.0

**Scenario Total Cost:** $2,756.88

**Scenario Cost/Unit:** $12.76

Cost Details:

| Component Name | ID | Description | Unit | Cost | QTY | Total |
|---|---|---|---|---|---|---|
| **Materials** | | | | | | |
| Post Frame Building, enclosed 4 sides | 1046 | Enclosed post frame building, four walls. Building sites with expected snow loads up to 30 lbs per square foot and wind exposure in semi protected areas (wooded or terrain with numerous closely spaced obstructions). Includes materials, shipping, and lab | Square Foot | $9.25 | 216 | $1,998.00 |
| Insulation, Fiberglass or cellulose, R-15 | 1196 | Fiberglass or cellulose insulation R-15, includes materials, equipment and labor to install. | Square Foot | $0.93 | 816 | $758.88 |

**Practice:** 368 - Emergency Animal Mortality Management

**Scenario** #13 - Burial

**Scenario Description:**

This scenario consists of the on-site burial of animal mortalities resulting from catastrophic events not related to disease. An earthen pit is excavated to contain the mortalities, and earth cover is placed over the mortalities to provide protection from predators to minimize pathogen survival or spreading. The purpose of the practice is to address resource concerns related to water quality degradation due to excessive nutrients, organics, and pathogens being transported into surface and groundwater resources. Air quality impacts due to odors will also be addressed. Potential Associated Practices: Pond Sealing or Lining, Bentonite Sealant (521C), Pond Sealing or Lining, Compacted Clay Treatment (521D), Pond Sealing or Lining, Soil Dispersant (521B), Fence (382), Critical Area Planting (342), Nutrient Management (590), Access Road (560), and Diversion (362).

**Before Situation:**

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

**After Situation:**

Catastrophic Animal mortalities resulting from causes not related to disease are being disposed in a manner that prevents non-point source pollution of excessive nutrients, organics, and pathogens being transported into surface and groundwater resources. Proper operation results in little to no odors, and protection from predators to minimize pathogen survival or spreading. An overall plan covers the burial of animals as a result of catastrophic mortality events. This typical scenario was developed based on the disposal of 25 head of mature cattle located near the area where the cattle have been found. The scenario includes equipment time and labor to recover and transport carcasses to the burial location. The scenario also includes a burial trench 4' deep plus 3' additional cover over carcasses. Construct a 6' x 60' (surface dimensions) burial site with appropriate cover. Site can handle mortality for 25 mature beef cattle. On site soils can be re-compacted to meet required imperviousness. Include 3' overfill or mounding excavated material to provide for settlement of the burial site and divert or minimize offsite runoff. Site to be located out of drainage areas, off-site water diverted and any runoff to spread out into a grassed area.

**Feature Measure:** Number of 1000 lbs Animal Units

**Scenario Unit::** Animal Unit

**Scenario Typical Size:** 25.0

**Scenario Total Cost:** $2,535.72

**Scenario Cost/Unit:** $101.43

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 | $3.65 | 94 | $343.10 |
| Tractor, agricultural, 120 HP | 962 | Agricultural tractor with horsepower range of 90 to 140. Equipment and power unit costs. Labor not included. | Hour | $57.70 | 12 | $692.40 |
| 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 | $1.59 | 94 | $149.46 |
| **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 | $25.31 | 12 | $303.72 |
| Equipment Operators, Light | 232 | Includes: Skid Steer Loaders, Hydraulic Excavators <50 HP, Trenchers <12", Ag Equipment <150 HP, Pickup Trucks, Forklifts, Mulchers | Hour | $25.23 | 12 | $302.76 |
| **Mobilization** | | | | | | |
| Mobilization, medium equipment | 1139 | Equipment with 70-150 HP or typical weights between 14,000 and 30,000 pounds. | Each | $255.83 | 1 | $255.83 |
| Mobilization, large equipment | 1140 | Equipment >150HP or typical weights greater than 30,000 pounds or loads requiring over width or over length permits. | Each | $488.45 | 1 | $488.45 |

**Practice:** 368 - Emergency Animal Mortality Management

**Scenario** #14 - In-House Composting

**Scenario Description:**

This scenario consists the emergency disposal of poultry mortality by composting in a static windrow. The cause of mortality is an event not related to disease. Additional carbon based bulking material is added to facilitate aeration and provide a proper C:N ratio. The windrow is turned at least once to go into another heat cycle prior to land application. Access is infrequent. This option may not be desirable for sites with limited area, karst topography, and not isolated from of public view. The purpose of the practice is to address resource concerns related to water quality degradation due to excessive nutrients, organics, and pathogens being transported into surface and groundwater resources. Air quality impacts due to odors will also be addressed. Potential Associated Practices: Pond Sealing or Lining, Bentonite Sealant (521C), Pond Sealing or Lining, Compacted Clay Treatment (521D), Pond Sealing or Lining, Soil Dispersant (521B), Fence (382), Critical Area Planting (342), Nutrient Management (590), Access Road (560), Diversion (362).

**Before Situation:**

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

**After Situation:**

Animal mortality is being done in a manner that prevents non-point source pollution of excessive nutrients, organics, and pathogens being transported into surface and groundwater resources. Proper operation results in little to no odors, complete composting, and protection from predators to minimize pathogen survival or spreading. An overall plan covers normal and catastrophic mortality events. The typical scenario number of birds to be disposed of is 20,000, 4 pound birds which can be composted in-house. Composting requires 1.5 pounds of carbon per pound of bird. There is 0.5 pounds of litter per bird already on site. Wood chips (45 pcf) will be used as the additional carbon source. The composting windrow construction operation consists of 2 pieces of equipment and 2 add'l laborers: 1) stockpiling birds and litter in center of house; 2) construct 2 windrow bases using carbon material; 3) place carcass/litter mix on bases; 4) cover with carbon material; 5) cap windrows with any remaining litter; 6) after first heat cycle remove windrow from house and reconstruct outside house for finishing. Site to be located out of drainage areas, off-site water diverted and any runoff to spread out into a grassed area.

**Feature Measure:** Number of 1000 lbs Animal Units

**Scenario Unit::** Animal Unit

**Scenario Typical Size:** 80.0

**Scenario Total Cost:** $5,414.26

**Scenario Cost/Unit:** $67.68

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 | $44.60 | 28 | $1,248.80 |
| Aggregate, Wood Chips | 1098 | Includes materials, equipment and labor | Cubic Yard | $22.66 | 91 | $2,062.06 |
| **Labor** | | | | | | |
| General Labor | 231 | Labor performed using basic tools such as power tool, shovels, and other tools that do not require extensive training. Ex. pipe layer, herder, concrete placement, materials spreader, flagger, etc. | Hour | $25.31 | 28 | $708.68 |
| Equipment Operators, Light | 232 | Includes: Skid Steer Loaders, Hydraulic Excavators <50 HP, Trenchers <12", Ag Equipment <150 HP, Pickup Trucks, Forklifts, Mulchers | Hour | $25.23 | 28 | $706.44 |
| **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 | $172.07 | 4 | $688.28 |

**Practice:** 372 - Combustion System Improvement

**Scenario** #1 - IC Engine Repower, < 50 bhp

**Scenario Description:**

Older diesel engine replaced with new diesel engine repower (< 50 bhp). The existing diesel engine may be stationary or portable operating an irrigation pump or an auxiliary engine providing mechanical function for agricultural/forestry equipment. Resource Concerns: Air Quality Impacts - Emissions of Ozone Precursors; Air Quality Impacts - Emissions of Particulate Matter (PM) and PM Precursors; Inefficient Energy Use - Equipment and Facilities; Inefficient Energy Use - Farming/Ranching Practices and Field Operations. Associated Practices include: 374 - Farmstead Energy Improvement; 533 - Pumping Plant; 430 - Irrigation Pipeline; 441 - Irrigation System, Microirrigation; 442 - Irrigation System, Sprinkler; 447 - Irrigation System, Tailwater Recovery; 449 - Irrigation Water Management; 516 - Pipeline; 313 - Waste Storage Facility; 634 - Waste Transfer; 614 - Watering Facility; 642 - Water Well, CAP 126 Comprehensive Air Quality Management Plan, CAP 122 Agricultural Energy Management Plan - Headquarters, and CAP 124 Agricultural Energy Management Plan - Landscape.

**Before Situation:**

An old or inefficient diesel engine powers an irrigation pumping plant or grain dryer fan, or is a backup power generation for a farming operation. The emissions of oxides of nitrogen and/or particulate matter from the engine are identified to contribute to an air quality resource concern OR the existing diesel engine is energy inefficient due to a conversion of the irrigation system, reduction in required pump capacity, or age of the power unit. Air Quality Impacts: The existing internal combustion engine emissions are identified to contribute to an air quality resource concern. Inefficient Energy Use: The existing internal combustion engine uses excess fuel to operate an existing irrigation pump, off-road agricultural vehicle or other auxiliary engine providing a mechanical function for agricultural/forestry equipment.

**After Situation:**

The repowered diesel engine (< 50 bhp) replaces the existing older engine; the engine being replaced will be disabled and a certificate of inoperability submitted prior to certification of practice completion. The existing engine is supported by a concrete pad; no costs have been included for a new pad. Additional costs may be incurred if a concrete pad is not present. For Air Quality: The repower diesel engine will be cleaner-burning and will emit less particulate matter and/or oxides of nitrogen than the previous existing engine. For Energy: Energy efficiency will be improved by at least 20%; the increase in energy efficiency for the modified unit must be supported by an energy analysis.

**Feature Measure:** Size of Replacement Engine

**Scenario Unit::** Brake Horse Power

**Scenario Typical Size:** 30.0

**Scenario Total Cost:** $6,486.78

**Scenario Cost/Unit:** $216.23

Cost Details:

| Component Name | ID | Description | Unit | Cost | QTY | Total |
|---|---|---|---|---|---|---|
| **Labor** | | | | | | |
| Skilled Labor | 230 | Labor requiring a high level skill set: Includes carpenters, welders, electricians, conservation professionals involved with data collection, monitoring, and or record keeping, etc. | Hour | $41.76 | 8 | $334.08 |
| **Materials** | | | | | | |
| Motor, IC Engine, 25-49 HP | 1428 | Most current Tier-level Diesel or Cleaner Engine and required appurtenances. 25 to 49 bhp. Materials only. | Horsepower | $205.09 | 30 | $6,152.70 |

**Practice:** 372 - Combustion System Improvement

**Scenario** #2 - IC Engine Repower, 50-99 bhp

**Scenario Description:**

Older diesel engine replaced with new diesel engine repower (50-99 bhp). The existing diesel engine may be stationary or portable operating an irrigation pump or an auxiliary engine providing mechanical function for agricultural/forestry equipment. Resource Concerns: Air Quality Impacts - Emissions of Ozone Precursors; Air Quality Impacts - Emissions of Particulate Matter (PM) and PM Precursors; Inefficient Energy Use - Equipment and Facilities; Inefficient Energy Use - Farming/Ranching Practices and Field Operations. Associated Practices include: 374 - Farmstead Energy Improvement; 533 - Pumping Plant; 430 - Irrigation Pipeline; 441 - Irrigation System, Microirrigation; 442 - Irrigation System, Sprinkler; 447 - Irrigation System, Tailwater Recovery; 449 - Irrigation Water Management; 516 - Pipeline; 313 - Waste Storage Facility; 634 - Waste Transfer; 614 - Watering Facility; 642 - Water Well, CAP 126 Comprehensive Air Quality Management Plan, CAP 122 Agricultural Energy Management Plan - Headquarters, and CAP 124 Agricultural Energy Management Plan - Landscape.

**Before Situation:**

An old or inefficient diesel engine powers an irrigation pumping plant or grain dryer fan, or is a backup power generation for a farming operation. The emissions of oxides of nitrogen and/or particulate matter from the engine are identified to contribute to an air quality resource concern OR the existing diesel engine is energy inefficient due to a conversion of the irrigation system, reduction in required pump capacity, or age of the power unit. Air Quality Impacts: The existing internal combustion engine emissions are identified to contribute to an air quality resource concern. Inefficient Energy Use: The existing internal combustion engine uses excess fuel to operate an existing irrigation pump, off-road agricultural vehicle or other auxiliary engine providing a mechanical function for agricultural/forestry equipment.

**After Situation:**

The repowered diesel engine (50-99 bhp) replaces the existing older engine; the engine being replaced will be disabled and a certificate of inoperability submitted prior to certification of practice completion. The existing engine is supported by a concrete pad; no costs have been included for a new pad. Additional costs may be incurred if a concrete pad is not present. For Air Quality: The repower diesel engine will be cleaner-burning and will emit less particulate matter and/or oxides of nitrogen than the previous existing engine. For Energy: Energy efficiency will be improved by at least 20%; the increase in energy efficiency for the modified unit must be supported by an energy analysis.

**Feature Measure:** Size of Replacement Engine

**Scenario Unit::** Brake Horse Power

**Scenario Typical Size:** 75.0

**Scenario Total Cost:** $16,013.16

**Scenario Cost/Unit:** $213.51

Cost Details:

| Component Name | ID | Description | Unit | Cost | QTY | Total |
|---|---|---|---|---|---|---|
| **Labor** | | | | | | |
| Skilled Labor | 230 | Labor requiring a high level skill set: Includes carpenters, welders, electricians, conservation professionals involved with data collection, monitoring, and or record keeping, etc. | Hour | $41.76 | 16 | $668.16 |
| **Materials** | | | | | | |
| Motor, IC Engine, 50-99 HP | 1429 | Most current Tier-level Diesel or Cleaner Engine and required appurtenances. 50 to 99 bhp. Materials only. | Horsepower | $204.60 | 75 | $15,345.00 |

**Practice:** 372 - Combustion System Improvement

**Scenario** #3 - IC Engine Repower, 100-199 bhp

**Scenario Description:**

Older diesel engine replaced with new diesel engine repower (100-199 bhp). The existing diesel engine may be stationary or portable operating an irrigation pump or an auxiliary engine providing mechanical function for agricultural/forestry equipment. Resource Concerns: Air Quality Impacts - Emissions of Ozone Precursors; Air Quality Impacts - Emissions of Particulate Matter (PM) and PM Precursors; Inefficient Energy Use - Equipment and Facilities; Inefficient Energy Use - Farming/Ranching Practices and Field Operations. Associated Practices include: 374 - Farmstead Energy Improvement; 533 - Pumping Plant; 430 - Irrigation Pipeline; 441 - Irrigation System, Microirrigation; 442 - Irrigation System, Sprinkler; 447 - Irrigation System, Tailwater Recovery; 449 - Irrigation Water Management; 516 - Pipeline; 313 - Waste Storage Facility; 634 - Waste Transfer; 614 - Watering Facility; 642 - Water Well, CAP 126 Comprehensive Air Quality Management Plan, CAP 122 Agricultural Energy Management Plan - Headquarters, and CAP 124 Agricultural Energy Management Plan - Landscape.

**Before Situation:**

An old or inefficient diesel engine powers an irrigation pumping plant or grain dryer fan, or is a backup power generation for a farming operation. The emissions of oxides of nitrogen and/or particulate matter from the engine are identified to contribute to an air quality resource concern OR the existing diesel engine is energy inefficient due to a conversion of the irrigation system, reduction in required pump capacity, or age of the power unit. Air Quality Impacts: The existing internal combustion engine emissions are identified to contribute to an air quality resource concern. Inefficient Energy Use: The existing internal combustion engine uses excess fuel to operate an existing irrigation pump, off-road agricultural vehicle or other auxiliary engine providing a mechanical function for agricultural/forestry equipment.

**After Situation:**

The repowered diesel engine (100-199 bhp) replaces the existing older engine; the engine being replaced will be disabled and a certificate of inoperability submitted prior to certification of practice completion. The existing engine is supported by a concrete pad; no costs have been included for a new pad. Additional costs may be incurred if a concrete pad is not present. For Air Quality: The repower diesel engine will be cleaner-burning and will emit less particulate matter and/or oxides of nitrogen than the previous existing engine. For Energy: Energy efficiency will be improved by at least 20%; the increase in energy efficiency for the modified unit must be supported by an energy analysis.

**Feature Measure:** Size of Replacement Engine

**Scenario Unit::** Brake Horse Power

**Scenario Typical Size:** 150.0

**Scenario Total Cost:** $33,380.16

**Scenario Cost/Unit:** $222.53

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 | $41.76 | 16 | $668.16 |
| **Materials** | | | | | | |
| Motor, IC Engine, 100-199 HP | 1430 | Most current Tier-level Diesel or Cleaner Engine and required appurtenances. 100 to 199 bhp. Materials only. | Horsepower | $218.08 | 150 | $32,712.00 |

**Practice:** 372 - Combustion System Improvement

**Scenario** #4 - IC Engine Repower, >=200 bhp

**Scenario Description:**

Older diesel engine replaced with new diesel engine repower (>= 200 bhp). The existing diesel engine may be stationary or portable operating an irrigation pump or an auxiliary engine providing mechanical function for agricultural/forestry equipment. Resource Concerns: Air Quality Impacts - Emissions of Ozone Precursors; Air Quality Impacts - Emissions of Particulate Matter (PM) and PM Precursors; Inefficient Energy Use - Equipment and Facilities; Inefficient Energy Use - Farming/Ranching Practices and Field Operations. Associated Practices include: 374 - Farmstead Energy Improvement; 533 - Pumping Plant; 430 - Irrigation Pipeline; 441 - Irrigation System, Microirrigation; 442 - Irrigation System, Sprinkler; 447 - Irrigation System, Tailwater Recovery; 449 - Irrigation Water Management; 516 - Pipeline; 313 - Waste Storage Facility; 634 - Waste Transfer; 614 - Watering Facility; 642 - Water Well, CAP 126 Comprehensive Air Quality Management Plan, CAP 122 Agricultural Energy Management Plan - Headquarters, and CAP 124 Agricultural Energy Management Plan - Landscape.

**Before Situation:**

An old or inefficient diesel engine powers an irrigation pumping plant or grain dryer fan, or is a backup power generation for a farming operation. The emissions of oxides of nitrogen and/or particulate matter from the engine are identified to contribute to an air quality resource concern OR the existing diesel engine is energy inefficient due to a conversion of the irrigation system, reduction in required pump capacity, or age of the power unit. Air Quality Impacts: The existing internal combustion engine emissions are identified to contribute to an air quality resource concern. Inefficient Energy Use: The existing internal combustion engine uses excess fuel to operate an existing irrigation pump, off-road agricultural vehicle or other auxiliary engine providing a mechanical function for agricultural/forestry equipment.

**After Situation:**

The repowered diesel engine (>= 200 bhp) replaces the existing older engine; the engine being replaced will be disabled and a certificate of inoperability submitted prior to certification of practice completion. The existing engine is supported by a concrete pad; no costs have been included for a new pad. Additional costs may be incurred if a concrete pad is not present. For Air Quality: The repower diesel engine will be cleaner-burning and will emit less particulate matter and/or oxides of nitrogen than the previous existing engine. For Energy: Energy efficiency will be improved by at least 20%; the increase in energy efficiency for the modified unit must be supported by an energy analysis.

**Feature Measure:** Size of Replacement Engine

**Scenario Unit::** Brake Horse Power

**Scenario Typical Size:** 350.0

**Scenario Total Cost:** $64,753.16

**Scenario Cost/Unit:** $185.01

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 | $41.76 | 16 | $668.16 |
| **Materials** | | | | | | |
| Motor, IC Engine, 300-399 HP | 1433 | Most current Tier-level Diesel or Cleaner Engine and required appurtenances. 300 to 399 bhp. Materials only. | Horsepower | $183.10 | 350 | $64,085.00 |

**Practice:** 372 - Combustion System Improvement

**Scenario** #5 - Reverse Osmosis <=250 GPH

**Scenario Description:**

A reverse osmosis (RO) unit, installed before the evaporator, filters the sap and removes ~ 75% of the water prior to getting to the evaporator. The unit is sized in gallons per hour. The size of the RO is determined based on the existing maple sugaring operation (number of taps and the capacity of the evaporator). This scenario includes units that process <= 250 gallons of sap per hour. With a RO unit able to remove excess water, it takes less time to boil the sap down, thus saving significant energy (oil & wood fuel) used in the process.

**Before Situation:**

A maple sugaring operation uses an evaporator (pan over a furnace) to boil sap to remove water to create syrup. It takes ~20 gallons of sap to make 1 gallon of syrup, which means 19 gallons of water has to be boiled off. A typical oil-fired evaporator consumes 3.5 to 4.5 gallons of fuel oil for each gallon of maple syrup produced.

**After Situation:**

With an efficient RO installed in the process, ~ 75% of the water is removed from the sap, thus cutting the boil time down by ~75%. An efficiency of 1 gallon fuel oil (or equivalent wood) per gallon of maple syrup is possible, thereby reducing energy consumption by 65-75%. Less fuel used yields decreased air emissions.

**Feature Measure:** capacity of unit

**Scenario Unit::** Gallon per Hour

**Scenario Typical Size:** 200.0

**Scenario Total Cost:** $6,401.01

**Scenario Cost/Unit:** $32.01

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 | $41.76 | 20 | $835.20 |
| **Materials** | | | | | | |
| Reverse Osmosis unit, fixed cost portion | 2224 | Fixed cost portion of a reverse osmosis unit used for maple syrup processing. Materials only. | Each | $1,669.81 | 1 | $1,669.81 |
| Reverse Osmosis unit, variable cost portion | 2225 | Variable cost portion of a reverse osmosis unit used for maple syrup processing. Materials only. | Gallon per Hour | $19.48 | 200 | $3,896.00 |

**Practice:** 372 - Combustion System Improvement

**Scenario** #6 - Reverse Osmosis >250 to <1000 GPH

**Scenario Description:**

A reverse osmosis (RO) unit, installed before the evaporator, filters the sap and removes ~ 75% of the water prior to getting to the evaporator. The unit is sized in gallons per hour. The size of the RO is determined based on the existing maple sugaring operation (number of taps and the capacity of the evaporator). This scenario includes units that process >250 to <1000 gallons of sap per hour. With a RO unit able to remove excess water, it takes less time to boil the sap down, thus saving significant energy (oil & wood fuel) used in the process.

**Before Situation:**

A maple sugaring operation uses an evaporator (pan over a furnace) to boil sap to remove water to create syrup. It takes ~20 gallons of sap to make 1 gallon of syrup, which means 19 gallons of water has to be boiled off. A typical oil-fired evaporator consumes 3.5 to 4.5 gallons of fuel oil for each gallon of maple syrup produced.

**After Situation:**

With an efficient RO installed in the process, ~ 75% of the water is removed from the sap, thus cutting the boil time down by ~75%. An efficiency of 1 gallon fuel oil (or equivalent wood) per gallon of maple syrup is possible, thereby reducing energy consumption by 65-75%. Less fuel used yields decreased air emissions.

**Feature Measure:** capacity of unit

**Scenario Unit::** Gallon per Hour

**Scenario Typical Size:** 600.0

**Scenario Total Cost:** $14,484.98

**Scenario Cost/Unit:** $24.14

Cost Details:

| Component Name | ID | Description | Unit | Cost | QTY | Total |
|---|---|---|---|---|---|---|
| **Labor** | | | | | | |
| Skilled Labor | 230 | Labor requiring a high level skill set: Includes carpenters, welders, electricians, conservation professionals involved with data collection, monitoring, and or record keeping, etc. | Hour | $41.76 | 3 | $125.28 |
| **Materials** | | | | | | |
| Reverse Osmosis unit, fixed cost portion | 2224 | Fixed cost portion of a reverse osmosis unit used for maple syrup processing. Materials only. | Each | $1,669.81 | 1.6 | $2,671.70 |
| Reverse Osmosis unit, variable cost portion | 2225 | Variable cost portion of a reverse osmosis unit used for maple syrup processing. Materials only. | Gallon per Hour | $19.48 | 600 | $11,688.00 |

**Practice:** 372 - Combustion System Improvement

**Scenario** #7 - Reverse Osmosis >=1000 GPH

**Scenario Description:**

A reverse osmosis (RO) unit, installed before the evaporator, filters the sap and removes ~ 75% of the water prior to getting to the evaporator. The unit is sized in gallons per hour. The size of the RO is determined based on the existing maple sugaring operation (number of taps and the capacity of the evaporator). This scenario includes units that process >= 1000 gallons of sap per hour. With a RO unit able to remove excess water, it takes less time to boil the sap down, thus saving significant energy (oil & wood fuel) used in the process.

**Before Situation:**

A maple sugaring operation uses an evaporator (pan over a furnace) to boil sap to remove water to create syrup. It takes ~20 gallons of sap to make 1 gallon of syrup, which means 19 gallons of water has to be boiled off. A typical oil-fired evaporator consumes 3.5 to 4.5 gallons of fuel oil for each gallon of maple syrup produced.

**After Situation:**

With an efficient RO installed in the process, ~ 75% of the water is removed from the sap, thus cutting the boil time down by ~75%. An efficiency of 1 gallon fuel oil (or equivalent wood) per gallon of maple syrup is possible, thereby reducing energy consumption by 65-75%. Less fuel used yields decreased air emissions.

**Feature Measure:** capacity of unit

**Scenario Unit::** Gallon per Hour

**Scenario Typical Size:** 1,200.0

**Scenario Total Cost:** $23,501.28

**Scenario Cost/Unit:** $19.58

Cost Details:

| Component Name | ID | Description | Unit | Cost | QTY | Total |
|---|---|---|---|---|---|---|
| **Labor** | | | | | | |
| Skilled Labor | 230 | Labor requiring a high level skill set: Includes carpenters, welders, electricians, conservation professionals involved with data collection, monitoring, and or record keeping, etc. | Hour | $41.76 | 3 | $125.28 |
| **Materials** | | | | | | |
| Reverse Osmosis unit, variable cost portion | 2225 | Variable cost portion of a reverse osmosis unit used for maple syrup processing. Materials only. | Gallon per Hour | $19.48 | 1200 | $23,376.00 |

**Practice:** 372 - Combustion System Improvement

**Scenario** #8 - Steam Enhanced Preheater, <=24 SF

**Scenario Description:**

The unit sets over the evaporator pan and uses steam from the evaporator pan to pre-heat the sap to as high as 200ºF while at the same time injecting air into the sap to promote evaporation. Evaporation rates are increased by 65-75%, based on vendor analysis, leading to 40-43% energy savings. Sap is concentrated from Brix 2% to 4% or more before it enters the flue pan. Steam-enhanced systems require at least 9 feet from floor to ceiling. This scenario includes units <= 24 sq. ft. With increased evaporation, it takes less time to boil the sap down, thus saving significant energy (oil & wood fuel) used in the process, as well as labor.

**Before Situation:**

The evaporative process time for making concentrated maple syrup requires boiling ~20 gallons of sap to make 1 gallon of syrup, which means 19 gallons of water have to be boiled off, using more fuel and labor. A typical oil-fired evaporator consumes 3.5 to 4.5 gallons of fuel oil for each gallon of maple syrup produced.

**After Situation:**

The evaporative process time for making concentrated maple syrup requires boiling ~6 gallons of sap to make 1 gallon of syrup, which means 14 gallons of water were removed by the steam-enhanced system, using less fuel and labor. A typical oil-fired evaporator with a steam pan consumes 2.1 to 2.7 gallons of fuel oil for each gallon of maple syrup produced to remove water from the sap, improving the fuel efficiency and saving labor.

**Feature Measure:** Square Foot of steam pan

**Scenario Unit::** Square Foot

**Scenario Typical Size:** 24.0

**Scenario Total Cost:** $10,193.08

**Scenario Cost/Unit:** $424.71

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 | $41.76 | 6 | $250.56 |
| **Materials** | | | | | | |
| Sap Pre-Heater, High efficiency, fixed cost | 2254 | High efficiency sap pre-heater device, fixed cost portion. Materials only. | Each | $4,539.88 | 1 | $4,539.88 |
| Sap Pre-Heater, High efficiency, variable cost | 2255 | High efficiency sap pre-heater device, variable cost portion. Materials only. | Square Foot | $225.11 | 24 | $5,402.64 |

**Practice:** 372 - Combustion System Improvement

**Scenario** #9 - Steam Enhanced Preheater, >24 SF

**Scenario Description:**

The unit sets over the evaporator pan and uses steam from the evaporator pan to pre-heat the sap to as high as 200ºF while at the same time injecting air into the sap to promote evaporation. Evaporation rates are increased by 65-75%, based on vendor analysis, leading to 40-43% energy savings. Sap is concentrated from Brix 2% to 4% or more before it enters the flue pan. Steam-enhanced systems require at least 9 feet from floor to ceiling. This scenario includes units > 24 sq. ft. installed. With increased evaporation, it takes less time to boil the sap down, thus saving significant energy (oil & wood fuel) used in the process, as well as labor.

**Before Situation:**

The evaporative process time for making concentrated maple syrup requires boiling ~20 gallons of sap to make 1 gallon of syrup, which means 19 gallons of water have to be boiled off, using more fuel and labor. A typical oil-fired evaporator consumes 3.5 to 4.5 gallons of fuel oil for each gallon of maple syrup produced.

**After Situation:**

The evaporative process time for making concentrated maple syrup requires boiling ~6 gallons of sap to make 1 gallon of syrup, which means 14 gallons of water were removed by the steam-enhanced system, using less fuel and labor. A typical oil-fired evaporator with a steam pan consumes 2.1 to 2.7 gallons of fuel oil for each gallon of maple syrup produced to remove water from the sap, improving the fuel efficiency and saving labor.

**Feature Measure:** Square Foot of steam pan

**Scenario Unit::** Square Foot

**Scenario Typical Size:** 40.0

**Scenario Total Cost:** $11,608.42

**Scenario Cost/Unit:** $290.21

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 | $41.76 | 8 | $334.08 |
| **Materials** | | | | | | |
| Sap Pre-Heater, High efficiency, fixed cost | 2254 | High efficiency sap pre-heater device, fixed cost portion. Materials only. | Each | $4,539.88 | 0.5 | $2,269.94 |
| Sap Pre-Heater, High efficiency, variable cost | 2255 | High efficiency sap pre-heater device, variable cost portion. Materials only. | Square Foot | $225.11 | 40 | $9,004.40 |

**Practice:** 372 - Combustion System Improvement

**Scenario** #10 - Sap Preheater

**Scenario Description:**

The unit sets over the evaporator pan and uses steam from the evaporator pan to pre-heat the sap prior to entering the boiling pan. Heated sap takes much less time to boil, therefore decreases the process combustion time. Decreased combustion time means less fuel used and also results in less air emissions released. This device can increase the efficiency of an evaporator pan by 15-20%. This scenario is for units <= 25 sq. ft installed. Resource concerns are energy efficiency and air quality.

**Before Situation:**

The evaporative process time for making concentrated maple syrup requires boiling ~20 gallons of sap to make 1 gallon of syrup, which means 19 gallons of water have to be boiled off, using much fuel and labor. A typical oil-fired evaporator consumes 3.5 to 4.5 gallons of fuel oil for each gallon of maple syrup produced.

**After Situation:**

A sap pre-heater device is installed over the evaporator pan and sap is boiled much faster. Decreasing the boiling time decreases combustion time saving both fuel and reducing air emissions.

**Feature Measure:** Size of preheater in SF

**Scenario Unit::** Square Foot

**Scenario Typical Size:** 10.0

**Scenario Total Cost:** $1,059.92

**Scenario Cost/Unit:** $105.99

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 | $41.76 | 3 | $125.28 |
| **Materials** | | | | | | |
| Sap Pre-Heater Device, <= 25 SF | 1443 | Install sap pre-heater device to reduce atmospheric emissions with an area of 25 square feet or less. Materials only. | Square Foot | $133.52 | 7 | $934.64 |

**Practice:** 372 - Combustion System Improvement

**Scenario** #11 - GH Furnace, Dual Fuel

**Scenario Description:**

In New England nursery operations need to heated during the winter months. Wood and oil fueled furnaces have been commonly used which may not be efficient and yield particulate matter emissions. A new more efficient dual fuel furnace is installed to efficiently burn fuel and reduce the amount of particulate matter coming from the chimney. Typical scenario is based on an average furnace used to heat a 30 by 200 greenhouse. The resource concern is air quality. Converting from wood to either distillate oil or natural gas can reduce total PM emissions by >90%.

**Before Situation:**

A greenhouse operation has an inefficient wood or oil burning furnace. Particulate matter from combustion is released into the air.

**After Situation:**

The furnace is replaced with an efficient wood/oil or gas furnace, resulting in reduced emissions of particulate matter.

**Feature Measure:** Furnace output rating

**Scenario Unit::** 1,000 BTU/Hour

**Scenario Typical Size:** 1,000.0

**Scenario Total Cost:** $33,400.40

**Scenario Cost/Unit:** $33.40

Cost Details:

| Component Name | ID | Description | Unit | Cost | QTY | Total |
|---|---|---|---|---|---|---|
| **Labor** | | | | | | |
| Skilled Labor | 230 | Labor requiring a high level skill set: Includes carpenters, welders, electricians, conservation professionals involved with data collection, monitoring, and or record keeping, etc. | Hour | $41.76 | 40 | $1,670.40 |
| **Materials** | | | | | | |
| Furnace, duel fuel | 1441 | Duel fuel furnace in-lieu of wood/oil heating. Includes materials and shipping only. | 1,000 BTU | $31.73 | 1000 | $31,730.00 |

**Practice:** 374 - FARMSTEAD ENERGY IMPROVEMENT

**Scenario** #1 - Ventilation - 18 inch Exhaust

**Scenario Description:**

Replacement of a conventional exhaust fan with high volume, low speed, efficient exhaust fan. Fans being installed should be models previously tested by BESS Lab or the Air Movement and Control Association and be in top 20 percentile of fans tested. Practice certification will be through receipts and pictures from the applicant. Typical scenario includes the replacement of a 18" fan.

**Before Situation:**

Inefficient ventilation in an agricultural building.

**After Situation:**

High-efficiency ventilation system which reduces energy use. The new ventilation equipment will provide suitable air quality and reduce overall power requirements (kW) compared to the existing ventilation system as evidenced in an energy audit. Associated practices/activities: may include 122-AgEMP - HQ, and other activities within 374-Farmstead Energy Improvement. The resource concern is inefficient use of energy in the farm operation which increases dependence on non-renewable energy sources and can be addressed through improved energy efficiency. Any improvements are based on a Type 2 energy audit meeting the requirements of ASABE S612.

**Feature Measure:** Each fan replaced

**Scenario Unit::** Each

**Scenario Typical Size:** 1.0

**Scenario Total Cost:** $616.18

**Scenario Cost/Unit:** $616.18

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 | $41.76 | 1 | $41.76 |
| **Materials** | | | | | | |
| Fan, exhaust, 18" High Efficiency | 2356 | 18 inch high efficiency exhaust fan, controls, wiring, and associated appurtenances. Materials and shipping only. Exhaust fan, controls, wiring and associated appurtenances (excludes installation) Ventilation - Exhaust Replacement of a conventional exhau | Each | $574.42 | 1 | $574.42 |

**Practice:** 374 - FARMSTEAD ENERGY IMPROVEMENT

**Scenario** #2 - Ventilation - 24 inch Exhaust

**Scenario Description:**

Replacement of a conventional exhaust fan with high volume, low speed, efficient exhaust fan. Fans being installed should be models previously tested by BESS Lab or the Air Movement and Control Association and be in top 20 percentile of fans tested. Practice certification will be through receipts and pictures from the applicant. Typical scenario includes the replacement of a 24" fan.

**Before Situation:**

Inefficient ventilation in an agricultural building.

**After Situation:**

High-efficiency ventilation system which reduces energy use. The new ventilation equipment will provide suitable air quality and reduce overall power requirements (kW) compared to the existing ventilation system as evidenced in an energy audit. Associated practices/activities: may include 122-AgEMP - HQ, and other activities within 374-Farmstead Energy Improvement. The resource concern is inefficient use of energy in the farm operation which increases dependence on non-renewable energy sources and can be addressed through improved energy efficiency. Any improvements are based on a Type 2 energy audit meeting the requirements of ASABE S612.

**Feature Measure:** Each fan replaced

**Scenario Unit::** Each

**Scenario Typical Size:** 1.0

**Scenario Total Cost:** $786.68

**Scenario Cost/Unit:** $786.68

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 | $41.76 | 1 | $41.76 |
| **Materials** | | | | | | |
| Fan, exhaust, 24" High Efficiency | 2357 | 24 inch high efficiency exhaust fan, controls, wiring, and associated appurtenances. Materials and shipping only. Exhaust fan, controls, wiring and associated appurtenances (excludes installation) Ventilation - Exhaust Replacement of a conventional exhau | Each | $744.92 | 1 | $744.92 |

**Practice:** 374 - FARMSTEAD ENERGY IMPROVEMENT

**Scenario** #3 - Ventilation - 36 inch Exhaust

**Scenario Description:**

Replacement of a conventional exhaust fan with high volume, low speed, efficient exhaust fan. Fans being installed should be models previously tested by BESS Lab or the Air Movement and Control Association and be in top 20 percentile of fans tested. Practice certification will be through receipts and pictures from the applicant. Typical scenario includes the replacement of a 36" fan.

**Before Situation:**

Inefficient ventilation in an agricultural building.

**After Situation:**

High-efficiency ventilation system which reduces energy use. The new ventilation equipment will provide suitable air quality and reduce overall power requirements (kW) compared to the existing ventilation system as evidenced in an energy audit. Associated practices/activities: may include 122-AgEMP - HQ, and other activities within 374-Farmstead Energy Improvement. The resource concern is inefficient use of energy in the farm operation which increases dependence on non-renewable energy sources and can be addressed through improved energy efficiency. Any improvements are based on a Type 2 energy audit meeting the requirements of ASABE S612.

**Feature Measure:** Each fan replaced

**Scenario Unit::** Each

**Scenario Typical Size:** 1.0

**Scenario Total Cost:** $1,255.54

**Scenario Cost/Unit:** $1,255.54

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 | $41.76 | 2 | $83.52 |
| **Materials** | | | | | | |
| Fan, exhaust, 36" High Efficiency | 1185 | 36 inch high efficiency exhaust fan, controls, wiring, and associated appurtenances. Materials only. | Each | $1,172.02 | 1 | $1,172.02 |

**Practice:** 374 - FARMSTEAD ENERGY IMPROVEMENT

**Scenario** #4 - Ventilation - 48 inch Exhaust

**Scenario Description:**

Replacement of a conventional exhaust fan with high volume, low speed, efficient exhaust fan. Fans being installed should be models previously tested by BESS Lab or the Air Movement and Control Association and be in top 20 percentile of fans tested. Practice certification will be through receipts and pictures from the applicant. Typical scenario includes the replacement of a 48" fan.

**Before Situation:**

Inefficient ventilation in an agricultural building.

**After Situation:**

High-efficiency ventilation system which reduces energy use. The new ventilation equipment will provide suitable air quality and reduce overall power requirements (kW) compared to the existing ventilation system as evidenced in an energy audit. Associated practices/activities: may include 122-AgEMP - HQ, and other activities within 374-Farmstead Energy Improvement. The resource concern is inefficient use of energy in the farm operation which increases dependence on non-renewable energy sources and can be addressed through improved energy efficiency. Any improvements are based on a Type 2 energy audit meeting the requirements of ASABE S612.

**Feature Measure:** Each fan replaced

**Scenario Unit::** Each

**Scenario Typical Size:** 1.0

**Scenario Total Cost:** $1,485.81

**Scenario Cost/Unit:** $1,485.81

Cost Details:

| Component Name | ID | Description | Unit | Cost | QTY | Total |
|---|---|---|---|---|---|---|
| **Labor** | | | | | | |
| Skilled Labor | 230 | Labor requiring a high level skill set: Includes carpenters, welders, electricians, conservation professionals involved with data collection, monitoring, and or record keeping, etc. | Hour | $41.76 | 3 | $125.28 |
| **Materials** | | | | | | |
| Fan, exhaust, 48" High Efficiency | 1187 | 48 inch high efficiency exhaust fan, controls, wiring, and associated appurtenances. Materials only. | Each | $1,360.53 | 1 | $1,360.53 |

**Practice:** 374 - FARMSTEAD ENERGY IMPROVEMENT

**Scenario** #5 - Ventilation - HAF

**Scenario Description:**

A system of fans are installed to create a horizontal air circulation pattern; the new system promotes efficient heat and moisture distribution. In a typical 10,000 square foot greenhouse, 10 HAF fans are needed. Typical fan size is 20". Fan performance meets Energy Audit efficiency criteria as tested by AMCA or BESS Labs and is usually in the top 20% of fans tested.

**Before Situation:**

Inefficient air circulation system in a greenhouse.

**After Situation:**

Air circulation system which reduces energy use. The new equipment will provide suitable air quality and reduce overall power requirements (kW) compared to the existing system as evidenced in an energy audit. Associated practices/activities: may include 122-AgEMP - HQ, and other activities within 374-Farmstead Energy Improvement. The resource concern is inefficient use of energy in the farm operation which increases dependence on non-renewable energy sources and can be addressed through improved energy efficiency. Any improvements are based on a Type 2 energy audit meeting the requirements of ASABE S612.

**Feature Measure:** Each fan added

**Scenario Unit::** Each

**Scenario Typical Size:** 1.0

**Scenario Total Cost:** $414.59

**Scenario Cost/Unit:** $414.59

Cost Details:

| Component Name | ID | Description | Unit | Cost | QTY | Total |
|---|---|---|---|---|---|---|
| **Materials** | | | | | | |
| Fan, Horizontal, High Efficiency | 2416 | Horizontal air flow fan with a VER rating of at least 13 CFM/Watt. Includes materials only. | Each | $414.59 | 1 | $414.59 |

**Practice:** 374 - FARMSTEAD ENERGY IMPROVEMENT

**Scenario** #6 - Plate Cooler

**Scenario Description:**

The installation of all stainless steel dual pass plate cooler, type 316 stainless steel, with <=499 gal/hr capacity. Practice certification will be through receipts and pictures from the applicant.

**Before Situation:**

Inefficient milk cooling (minimal pre-cooling of milk before entering the bulk tank).

**After Situation:**

High-efficiency milk cooling system which reduces energy use. The new milk cooling equipment will pre-cool the milk and reduce overall power requirements (kW) compared to the existing milk cooling system (where most of the cooling was accomplished in the bulk tank) as evidenced in an energy audit. Associated practices/activities: may include 122-AgEMP - HQ, and other activities within 374-Farmstead Energy Improvement. The resource concern is inefficient use of energy in the farm operation which increases dependence on non-renewable energy sources and can be addressed through improved energy efficiency. Any improvements are based on a Type 2 energy audit meeting the requirements of ASABE S612.

**Feature Measure:** Each

**Scenario Unit::** Each

**Scenario Typical Size:** 1.0

**Scenario Total Cost:** $5,271.70

**Scenario Cost/Unit:** $5,271.70

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 | $41.76 | 8 | $334.08 |
| **Materials** | | | | | | |
| Plate Cooler, <= 499 gal/hr capacity | 1176 | Stainless Steel, dual pass plate cooler with < 499 gallon/hour capacity. Includes materials and shipping only. | Each | $4,937.62 | 1 | $4,937.62 |

**Practice:** 374 - FARMSTEAD ENERGY IMPROVEMENT

**Scenario** #7 - Scroll Compressor

**Scenario Description:**

Install a new scroll compressor, associated controls, wiring, and materials to retrofit an existing refrigeration system. A new condenser is not included in this typical scenario. Typical scenario includes a new 3 horsepower scroll compressor.

**Before Situation:**

Inefficient reciprocating compressor as a key component of the refrigeration system used as part of an agricultural operation, including to cool milk. The compressor is a critical part of the cooling system, affecting product quality, system reliability, and system efficiency.

**After Situation:**

A more efficient scroll compressor, which will reduce energy use, is evidenced by the energy audit. A comparably sized scroll compressor provides refrigeration capacity at a higher efficiency than a reciprocating compressor. Newer scroll compressor systems typically reduce electricity use by 15 to 25 percent compared to reciprocating compressors. Associated practices/activities: may include 122-AgEMP - HQ, and other activities within 374-Farmstead Energy Improvement. The resource concern is inefficient use of energy in the farm operation which increases dependence on non-renewable energy sources and can be addressed through improved energy efficiency. Any improvements are based on a Type 2 energy audit meeting the requirements of ASABE S612.

**Feature Measure:** Horse Power

**Scenario Unit::** Horsepower

**Scenario Typical Size:** 3.0

**Scenario Total Cost:** $5,224.17

**Scenario Cost/Unit:** $1,741.39

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 | $41.76 | 4 | $167.04 |
| **Materials** | | | | | | |
| Scroll Compressor - 3 HP | 1182 | Scroll compressor, 3 Horsepower, controls, wiring, and appurtenances. Materials only. | Each | $1,685.71 | 3 | $5,057.13 |

**Practice:** 374 - FARMSTEAD ENERGY IMPROVEMENT

**Scenario** #8 - Evaporator defrost heater control

**Scenario Description:**

Evaporator heater control to prevent unnecessary defrost cycles in mechanically refrigerated food storage spaces.

**Before Situation:**

Cooler evaporators are prone to frosting due to the relatively low temperature of the refrigerant and relatively high humidity resulting from stored produce (respiration metabolism). Most integrated refrigeration systems include a heater for defrosting the evaporator when frosting occurs. However, most are on timers which results in the heaters being activated whether the evaporator is frozen or not.

**After Situation:**

Defrost controls exist in the commercial market which, instead of working off timers, monitor the conditions of the evaporator and the stored space to determine when a defrost cycle is required. Electrical consumption is reduced due to a) the reduced heater duty and b) reduced cooling to recover from the defrost cycle. Additional benefit is achieved in enterprises storing bulk produce due to better control of consistent temperature and humidity in storage.

**Feature Measure:** Each

**Scenario Unit::** Each

**Scenario Typical Size:** 1.0

**Scenario Total Cost:** $832.24

**Scenario Cost/Unit:** $832.24

Cost Details:

| Component Name | ID | Description | Unit | Cost | QTY | Total |
|---|---|---|---|---|---|---|
| **Labor** | | | | | | |
| Skilled Labor | 230 | Labor requiring a high level skill set: Includes carpenters, welders, electricians, conservation professionals involved with data collection, monitoring, and or record keeping, etc. | Hour | $41.76 | 2 | $83.52 |
| **Materials** | | | | | | |
| Evaporator Defrost Heater Control Unit | 2430 | A control unit to monitor the conditions of the evaporator and the stored space to determine when a defrost cycle is required | Each | $748.72 | 1 | $748.72 |

**Practice:** 374 - FARMSTEAD ENERGY IMPROVEMENT

**Scenario** #9 - Variable Speed Drive < = 10 HP

**Scenario Description:**

The typical scenario consists of a variable speed drive (VSD) and appurtances, such as hook-ups, control panels, wiring, control blocks, filters, switches, pads, etc. attached to an electric motor used to drive a ventilation fan, irrigation pumps, vacuum pump, or similar equipment involved with agricultural production. The motor size, on which the VSD is added, is smaller than or equal to 10 HP.

**Before Situation:**

The system is inefficient when a motor operates at constant speed to satisfy a load which varies as to flow rate and/or pressure requirements.

**After Situation:**

An on-farm energy audit has determined that energy use can be reduced through use of a VSD to control electric motors. After the VSD is applied, the motor speed can be adjusted to reduce power requirements and better match varied flow or pressure requirements. Associated practices/activities: may include 122-AgEMP - HQ, and other activities within 374-Farmstead Energy Improvement. The resource concern is inefficient use of energy in the farm operation which increases dependence on non-renewable energy sources and can be addressed through improved energy efficiency. Any improvements are based on a Type 2 energy audit meeting the requirements of ASABE S612.

**Feature Measure:** Horsepower

**Scenario Unit::** Horsepower

**Scenario Typical Size:** 5.0

**Scenario Total Cost:** $2,787.16

**Scenario Cost/Unit:** $557.43

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 | $41.76 | 8 | $334.08 |
| **Materials** | | | | | | |
| Variable Speed Drive, 10 HP | 1287 | Variable speed drive for 10 Horsepower electric motor. Does not include motor. Materials only. | Horsepower | $360.88 | 2.5 | $902.20 |
| Variable Speed Drive, 5 HP | 2348 | Variable speed drive for 5 Horsepower electric motor. Does not include motor. Materials only. | Horsepower | $620.35 | 2.5 | $1,550.88 |

**Practice:** 374 - FARMSTEAD ENERGY IMPROVEMENT

**Scenario** #10 - Variable Speed Drive > 10 HP

**Scenario Description:**

The typical scenario consists of a variable speed drive (VSD) and appurtances, such as hook-ups, control panels, wiring, control blocks, filters, switches, pads, etc. attached to an electric motor used to drive a ventilation fan, irrigation pumps, vacuum pump, or similar equipment involved with agricultural production. The motor size, on which the VSD is added, is larger than 10 HP.

**Before Situation:**

The system is inefficient when a motor operates at constant speed to satisfy a load which varies as to flow rate and/or pressure requirements.

**After Situation:**

An on-farm energy audit has determined that energy use can be reduced through use of a VSD to control electric motors. After the VSD is applied, the motor speed can be adjusted to reduce power requirements and better match varied flow or pressure requirements. Associated practices/activities: may include 122-AgEMP - HQ, and other activities within 374-Farmstead Energy Improvement. The resource concern is inefficient use of energy in the farm operation which increases dependence on non-renewable energy sources and can be addressed through improved energy efficiency. Any improvements are based on a Type 2 energy audit meeting the requirements of ASABE S612.

**Feature Measure:** Horsepower

**Scenario Unit::** Horsepower

**Scenario Typical Size:** 50.0

**Scenario Total Cost:** $11,044.96

**Scenario Cost/Unit:** $220.90

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 | $41.76 | 8 | $334.08 |
| **Materials** | | | | | | |
| Variable Speed Drive, 50 HP | 1288 | Variable speed drive for 50 Horsepower electric motor. Does not include motor. Materials only. | Horsepower | $243.59 | 12.5 | $3,044.88 |
| Variable Speed Drive, 100 HP | 1289 | Variable speed drive for 100 Horsepower electric motor. Does not include motor. Materials only. | Horsepower | $131.08 | 12.5 | $1,638.50 |
| Variable Speed Drive, 200 HP | 1290 | Variable speed drive for 200 Horsepower electric motor. Does not include motor. Materials only. | Horsepower | $128.30 | 12.5 | $1,603.75 |
| Variable Speed Drive, 25 HP | 2557 | Variable speed drive for 25 Horsepower electric motor. Does not include motor. Materials only. | Horsepower | $353.90 | 12.5 | $4,423.75 |

**Practice:** 374 - FARMSTEAD ENERGY IMPROVEMENT

**Scenario** #11 - Automatic Controller System

**Scenario Description:**

The typical scenario consists of an automatic control system installed on an existing manually controlled agricultural system. Typical components may include any of the following: wiring, sensors, data logger, logic controller, communication link, software, switches, and relay.

**Before Situation:**

A manually controlled system is existing in an agricultural facility that causes the inefficient use of energy, as evidenced by an on-farm energy audit.

**After Situation:**

An on-farm energy audit has determined that energy use can be reduced through use of an automatic controller that helps regulates the energy consumption of the existing system. Associated practices/activities may include: 122-AgEMP - HQ, and other activities within 374-Farmstead Energy Improvement. The resource concern is inefficient use of energy in the farm operation which increases dependence on non-renewable energy sources and can be addressed through improved energy efficiency. Any improvements are based on a Type 2 energy audit meeting the requirements of ASABE S612.

**Feature Measure:** Each system

**Scenario Unit::** Each

**Scenario Typical Size:** 1.0

**Scenario Total Cost:** $1,606.79

**Scenario Cost/Unit:** $1,606.79

Cost Details:

| Component Name | ID | Description | Unit | Cost | QTY | Total |
|---|---|---|---|---|---|---|
| **Labor** | | | | | | |
| Skilled Labor | 230 | Labor requiring a high level skill set: Includes carpenters, welders, electricians, conservation professionals involved with data collection, monitoring, and or record keeping, etc. | Hour | $41.76 | 8 | $334.08 |
| **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 | $655.75 | 1 | $655.75 |
| Switches and Controls, programmable controller | 1193 | Programmable logic controller (with or without wireless telecommunications) commonly used to control pumps and irrigation systems | Each | $167.45 | 1 | $167.45 |
| 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 | $449.51 | 1 | $449.51 |

**Practice:** 374 - FARMSTEAD ENERGY IMPROVEMENT

**Scenario** #12 - Greenhouse Step Controller System

**Scenario Description:**

The typical scenario consists of an automatic control system installed in place of an existing manually controlled system for ventilation, heating, and cooling in a greenhouse. Typical components may include any of the following: wiring, sensors, step controller, switches, and contactor relay panel.

**Before Situation:**

A manually controlled system is existing in a greenhouse that causes the inefficient use of energy for ventilation, heating and cooling, as evidenced by an on-farm energy audit.

**After Situation:**

An on-farm energy audit has determined that energy use can be reduced through use of an automatic controller that helps regulates the energy consumption of the existing greenhouse ventilation, heating and cooling systems. Associated practices/activities may include: 122-AgEMP - HQ, and other activities within 374-Farmstead Energy Improvement. The resource concern is inefficient use of energy in the farm operation which increases dependence on non-renewable energy sources and can be addressed through improved energy efficiency. Any improvements are based on a Type 2 energy audit meeting the requirements of ASABE S612.

**Feature Measure:** Each system

**Scenario Unit::** Each

**Scenario Typical Size:** 1.0

**Scenario Total Cost:** $1,021.08

**Scenario Cost/Unit:** $1,021.08

Cost Details:

| Component Name | ID | Description | Unit | Cost | QTY | Total |
|---|---|---|---|---|---|---|
| **Labor** | | | | | | |
| Skilled Labor | 230 | Labor requiring a high level skill set: Includes carpenters, welders, electricians, conservation professionals involved with data collection, monitoring, and or record keeping, etc. | Hour | $41.76 | 3 | $125.28 |
| **Materials** | | | | | | |
| Temperature Sensors | 2462 | Sensor used to measure and communicate temperature to the controlling mechanism in a refrigeration system. Includes materials and shipping only. | Each | $91.99 | 1 | $91.99 |
| Switches and controls, greenhouse step controller | 2463 | Step controller and associated appurtenances. Part of an electronic environmental control system commonly used in greenhouses. Includes materials and shipping only. | Each | $803.81 | 1 | $803.81 |

**Practice:** 374 - FARMSTEAD ENERGY IMPROVEMENT

**Scenario** #13 - Motor Upgrade = 1 HP

**Scenario Description:**

The typical scenario consists of replacing an existing electric motor used to drive a ventilation fan, irrigation pumps, vacuum pump, or similar equipment involved with agricultural production with a new, high efficiency motor. The motor size is less than or equal to 1 horsepower.

**Before Situation:**

The system is inefficient with a standard efficiency motor.

**After Situation:**

An on-farm energy audit has determined that energy use can be reduced through use of a NEMA premium efficiency motor. Associated practices/activities may include: 122-AgEMP - HQ, and other activities within 374-Farmstead Energy Improvement. The resource concern is inefficient use of energy in the farm operation which increases dependence on non-renewable energy sources and can be addressed through improved energy efficiency. Any improvements are based on a Type 2 energy audit meeting the requirements of ASABE S612.

**Feature Measure:** Each

**Scenario Unit::** Each

**Scenario Typical Size:** 1.0

**Scenario Total Cost:** $657.34

**Scenario Cost/Unit:** $657.34

Cost Details:

| Component Name | ID | Description | Unit | Cost | QTY | Total |
|---|---|---|---|---|---|---|
| **Labor** | | | | | | |
| Skilled Labor | 230 | Labor requiring a high level skill set: Includes carpenters, welders, electricians, conservation professionals involved with data collection, monitoring, and or record keeping, etc. | Hour | $41.76 | 4 | $167.04 |
| **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 | $490.30 | 1 | $490.30 |

**Practice:** 374 - FARMSTEAD ENERGY IMPROVEMENT

**Scenario** #14 - Motor Upgrade > 1 and < 10 HP

**Scenario Description:**

The typical scenario consists of replacing an existing electric motor used to drive a ventilation fan, irrigation pumps, vacuum pump, or similar equipment involved with agricultural production with a new, high efficiency motor. The motor size is larger than 1 and less than 10 horsepower.

**Before Situation:**

The system is inefficient with a standard efficiency motor.

**After Situation:**

An on-farm energy audit has determined that energy use can be reduced through use of a NEMA premium efficiency motor. Associated practices/activities may include: 122-AgEMP - HQ, and other activities within 374-Farmstead Energy Improvement. The resource concern is inefficient use of energy in the farm operation which increases dependence on non-renewable energy sources and can be addressed through improved energy efficiency. Any improvements are based on a Type 2 energy audit meeting the requirements of ASABE S612.

**Feature Measure:** Each

**Scenario Unit::** Each

**Scenario Typical Size:** 1.0

**Scenario Total Cost:** $967.39

**Scenario Cost/Unit:** $967.39

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 | $41.76 | 4 | $167.04 |
| **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 | $800.35 | 1 | $800.35 |

**Practice:** 374 - FARMSTEAD ENERGY IMPROVEMENT

**Scenario** #15 - Motor Upgrade 10 - 100 HP

**Scenario Description:**

The typical scenario consists of replacing an existing electric motor used to drive a ventilation fan, irrigation pumps, vacuum pump, or similar equipment involved with agricultural production with a new, high efficiency motor. The motor size is equal to or larger than 10 and less than or equal to 100 horsepower.

**Before Situation:**

The system is inefficient with a standard efficiency motor.

**After Situation:**

An on-farm energy audit has determined that energy use can be reduced through use of a NEMA premium efficiency motor. Associated practices/activities may include: 122-AgEMP - HQ, and other activities within 374-Farmstead Energy Improvement. The resource concern is inefficient use of energy in the farm operation which increases dependence on non-renewable energy sources and can be addressed through improved energy efficiency. Any improvements are based on a Type 2 energy audit meeting the requirements of ASABE S612.

**Feature Measure:** Each

**Scenario Unit::** Each

**Scenario Typical Size:** 1.0

**Scenario Total Cost:** $4,162.66

**Scenario Cost/Unit:** $4,162.66

Cost Details:

| Component Name | ID | Description | Unit | Cost | QTY | Total |
|---|---|---|---|---|---|---|
| **Labor** | | | | | | |
| Skilled Labor | 230 | Labor requiring a high level skill set: Includes carpenters, welders, electricians, conservation professionals involved with data collection, monitoring, and or record keeping, etc. | Hour | $41.76 | 8 | $334.08 |
| **Materials** | | | | | | |
| Motor, electric, NEMA Premium, 10 HP | 1172 | Premium NEMA approved electric motor, 10 Horsepower and all required appurtenances. Includes materials and shipping only. | Each | $1,264.21 | 0.5 | $632.11 |
| Motor, electric, NEMA Premium, 50 HP | 1173 | Premium NEMA approved electric motor, 50 Horsepower and all required appurtenances. Includes materials and shipping only. | Each | $6,392.95 | 0.5 | $3,196.48 |

**Practice:** 374 - FARMSTEAD ENERGY IMPROVEMENT

**Scenario** #16 - Compressor Heat Recovery

**Scenario Description:**

A compressor heat recovery unit, similar to a water heater, captures waste heat from the compressors (milk cooling process) and uses it to preheat water to ~ 120 deg before it enters the hot water heater. Heat (energy) being lost to the environment will be captured and recycled to save energy in another part of the dairy operation.

**Before Situation:**

A dairy operation uses an electric hot water heater to heat water used for washing the milking equipment and to mix calf feed. The hot water heater needs to heat well water from ~55 deg to ~ 160 degrees for use. The electricity cost for the hot water heater is significant. Meanwhile milk collected is cooled in a bulk tank utilizing one or more compressors to remove the heat. This heat is typically released into the air by condenser fans and is lost energy.

**After Situation:**

The compressor heat recovery unit captures waste heat from the compressors (milk cooling process) and uses it to preheat water to ~ 120 deg before it goes to the hot water heater. Having to only heat the wash water the additional ~40 degrees, saves on energy/electricity needed to run the hotwater heater. This can reduce the annual water heating energy use and costs by ~ 50%.

**Feature Measure:** Each

**Scenario Unit::** Each

**Scenario Typical Size:** 1.0

**Scenario Total Cost:** $3,769.64

**Scenario Cost/Unit:** $3,769.64

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 | $41.76 | 3 | $125.28 |
| **Materials** | | | | | | |
| Compressor heat recovery (CHR) unit, High Efficiency | 1899 | Compressor heat recovery (CHR) units (insulated storage tanks with heat exchangers) added to a refrigeration system, use the heat extracted from a warm fluid (e.g., milk) that passes through the hot gas refrigerant line from the refrigeration system's c | Each | $3,644.36 | 1 | $3,644.36 |

**Practice:** 374 - FARMSTEAD ENERGY IMPROVEMENT

**Scenario** #17 - High Efficiency Hot Water Heater

**Scenario Description:**

An older inefficient hot water heater used at an agricultural operation is replaced with a high efficiency tankless unit.

**Before Situation:**

An agricultural operation uses an inefficient electric or oil-fired hot water heater that is approaching the end of its useful life and is a candidate for replacement. It is used to heat water for washing dairy milking equipment, washing towels, to mix calf feed, etc. The fuel cost for the hot water heater is significant.

**After Situation:**

An on-demand tankless water heater with efficiency rating as per a Type 2 energy audit meeting the requirements of ASABE S612 is installed. This significantly reduces the energy used for heating hot water at the agricultural operation.

**Feature Measure:** Each

**Scenario Unit::** Each

**Scenario Typical Size:** 1.0

**Scenario Total Cost:** $3,079.02

**Scenario Cost/Unit:** $3,079.02

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 | $41.76 | 4 | $167.04 |
| **Materials** | | | | | | |
| Water Heater, High Efficiency | 2485 | Water heater with efficiency rating as per ASABE-S612. Includes materials and shipping only. | Each | $2,911.98 | 1 | $2,911.98 |

**Practice:** 374 - FARMSTEAD ENERGY IMPROVEMENT

**Scenario** #18 - Heating (Building)

**Scenario Description:**

Replace existing low efficiency heaters with new high efficiency heaters. High-efficiency heating systems include any heating unit with annual fuel utilization efficiency (AFUE) of 90%+ for fuel oil and 93%+ for natural gas and propane. Applications may be air heating/building environment and hydronic (boiler) heating for agricultural operations, including under bench, or root zone heating. An alternative to heater replacement might be the addition of climate control system and electronic temperature controls with +/- 1 degree F differential, to reduce the annual run time. HEATER SIZING AND PAYMENT IS BASED ON INPUT BTU RATING.

**Before Situation:**

Buildings heated with low efficiency heaters or heaters without proper electronic climate controls

**After Situation:**

Higher efficiency heaters reduce energy consumption, energy costs, and GHG emissions. These replacement systems can be fueled by natural gas, propane, or fuel oil. Associated practices/activities: 122-AgEMP - HQ and other activities within 374-Farmstead Energy Improvement. The resource concern is inefficient use of energy in the farm operation which increases dependence on non-renewable energy sources and can be addressed through improved energy efficiency. Any improvements are based on a Type 2 energy audit meeting the requirements of ASABE S612. A 2880 sq.ft. hoop-house heated March-June in New England requires a total of at least 250,000 BTU input with 2 unit heaters.

**Feature Measure:** Input BTU Rating

**Scenario Unit::** 1,000 BTU/Hour

**Scenario Typical Size:** 270.0

**Scenario Total Cost:** $8,318.16

**Scenario Cost/Unit:** $30.81

Cost Details:

| Component Name | ID | Description | Unit | Cost | QTY | Total |
|---|---|---|---|---|---|---|
| **Labor** | | | | | | |
| Skilled Labor | 230 | Labor requiring a high level skill set: Includes carpenters, welders, electricians, conservation professionals involved with data collection, monitoring, and or record keeping, etc. | Hour | $41.76 | 16 | $668.16 |
| **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 | $12.24 | 625 | $7,650.00 |

**Practice:** 374 - FARMSTEAD ENERGY IMPROVEMENT

**Scenario** #19 - Greenhouse Roof Vent

**Scenario Description:**

Install a motorized roof vent system along the peak of an existing greenhouse. System includes: roof vent, motor, motor mount, and motor controller.

**Before Situation:**

Greenhouse ventilation is accomplished primarily with a fan installed in the endwall.

**After Situation:**

Greenhouse roof vent allow natural ventilation and eliminates the need to use of ventilation fans. Reduced electrical consumption results in energy savings. Associated practices/activities: may include 122-AgEMP - HQ, 672-Building Envelope Improvement, and other activities within 374-Farmstead Energy Improvement. The resource concern is inefficient use of energy in the farm operation which increases dependence on non-renewable energy sources and can be addressed through improved energy efficiency. Any improvements are based on a Type 2 energy audit meeting the requirements of ASABE S612.

**Feature Measure:** Feet of roof vent installed

**Scenario Unit::** Foot

**Scenario Typical Size:** 125.0

**Scenario Total Cost:** $3,160.20

**Scenario Cost/Unit:** $25.28

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 | $41.76 | 20 | $835.20 |
| **Materials** | | | | | | |
| Vent, Greenhouse, Roof | 2412 | Roof vents installed on existing greenhouses. Typically 48"x 200' long. Comes with controller and wind speed sensor. Includes materials and shipping only. | Square Foot | $18.60 | 125 | $2,325.00 |

**Practice:** 374 - FARMSTEAD ENERGY IMPROVEMENT

**Scenario** #20 - Root Zone Heating - Greenhouse In-Ground Distribution

**Scenario Description:**

Install a greenhouse in-ground root zone heat distribution system. Components include in-ground PEX tubing, manifold and valving, and insulation.

**Before Situation:**

Optimum plant growth temperatures in a greenhouse are maintained by heating the air of the greenhouse.

**After Situation:**

An in ground root zone heating system is installed that provides heat directly to the growing media rather than heating the air of the greenhouse. This approach provides faster production, higher quality crops, and heating energy savings. Heat loss to the outside, and therefore energy consumption, is reduced. Associated practices/activities: may include 122-AgEMP - HQ, and other activities within 374-Farmstead Energy Improvement. The resource concern is inefficient use of energy in the farm operation which increases dependence on non-renewable energy sources and can be addressed through improved energy efficiency. Any improvements are based on a Type 2 energy audit meeting the requirements of ASABE S612.

**Feature Measure:** Linear feet of heating system

**Scenario Unit::** Foot

**Scenario Typical Size:** 1,200.0

**Scenario Total Cost:** $5,243.30

**Scenario Cost/Unit:** $4.37

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 | $41.76 | 70 | $2,923.20 |
| 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 | $25.31 | 70 | $1,771.70 |
| **Materials** | | | | | | |
| In ground PEX tubing | 2460 | Piping used as part of hot water distribution system for in-ground rootzone heating. Includes materials and shipping only. | Foot | $0.36 | 1200 | $432.00 |
| Manifold and Valving (Valve Controllers) | 2461 | Valves and distribution manifolds (4 zones) used as part of a hot water distribution system for in-ground rootzone heating.?? Includes materials and shipping only. | Each | $58.20 | 2 | $116.40 |

**Practice:** 374 - FARMSTEAD ENERGY IMPROVEMENT

**Scenario** #21 - Reverse Osmosis <= 250 GPH

**Scenario Description:**

A reverse osmosis (RO) unit, installed before the evaporator, filters the sap and removes ~ 75% of the water prior to getting to the evaporator. The unit is sized in gallons per hour. The size of the RO is determined based on the existing maple sugaring operation (number of taps and the capacity of the evaporator). With a RO unit able to remove excess water, it takes less time to boil the sap down, thus saving significant energy (oil & wood fuel) used in the process. The system cost includes the RO unit, pump, vessel, membrane, wash tank, and installation. This scenario includes units that process <= 250 gallons of sap per hour.

**Before Situation:**

A maple sugaring operation uses an evaporator (pan over a furnace) to boil sap to remove water to create syrup. It takes ~20 gallons of sap to make 1 gallon of syrup, which means 19 gallons of water has to be boiled off. A typical oil-fired evaporator consumes 3.5 to 4.5 gallons of fuel oil for each gallon of maple syrup produced.

**After Situation:**

With an efficient RO installed in the process, ~ 75% of the water is removed from the sap, thus cutting the boil time down by ~75%. An efficiency of 1 gallon fuel oil (or equivalent wood) per gallon of maple syrup is possible, thereby reducing energy consumption by 65-75%. Associated practices/activities: may include 122-AgEMP - HQ, and other activities within 374-Farmstead Energy Improvement. The resource concern is inefficient use of energy in the farm operation which increases dependence on non-renewable energy sources and can be addressed through improved energy efficiency. Any improvements are based on a Type 2 energy audit meeting the requirements of ASABE S612.

**Feature Measure:** capacity of unit

**Scenario Unit::** Gallon per Hour

**Scenario Typical Size:** 200.0

**Scenario Total Cost:** $6,526.00

**Scenario Cost/Unit:** $32.63

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 | $41.76 | 3 | $125.28 |
| **Materials** | | | | | | |
| Reverse Osmosis unit, fixed cost portion | 2224 | Fixed cost portion of a reverse osmosis unit used for maple syrup processing. Materials only. | Each | $1,669.81 | 1.5 | $2,504.72 |
| Reverse Osmosis unit, variable cost portion | 2225 | Variable cost portion of a reverse osmosis unit used for maple syrup processing. Materials only. | Gallon per Hour | $19.48 | 200 | $3,896.00 |

**Practice:** 374 - FARMSTEAD ENERGY IMPROVEMENT

**Scenario** #22 - Reverse Osmosis >250 - <1000 GPH

**Scenario Description:**

A reverse osmosis (RO) unit, installed before the evaporator, filters the sap and removes ~ 75% of the water prior to getting to the evaporator. The unit is sized in gallons per hour. The size of the RO is determined based on the existing maple sugaring operation (number of taps and the capacity of the evaporator). With a RO unit able to remove excess water, it takes less time to boil the sap down, thus saving significant energy (oil & wood fuel) used in the process. The system costs includes the RO unit, pumps, vessels, membranes, wash tank, and installation. This scenario includes units that process >250 - <1000 gallons of sap per hour.

**Before Situation:**

A maple sugaring operation uses an evaporator (pan over a furnace) to boil sap to remove water to create syrup. It takes ~20 gallons of sap to make 1 gallon of syrup, which means 19 gallons of water has to be boiled off. A typical oil-fired evaporator consumes 3.5 to 4.5 gallons of fuel oil for each gallon of maple syrup produced.

**After Situation:**

With an efficient RO installed in the process, ~ 75% of the water is removed from the sap, thus cutting the boil time down by ~75%. An efficiency of 1 gallon fuel oil (or equivalent wood) per gallon of maple syrup is possible, thereby reducing energy consumption by 65-75%. Associated practices/activities: may include 122-AgEMP - HQ, and other activities within 374-Farmstead Energy Improvement. The resource concern is inefficient use of energy in the farm operation which increases dependence on non-renewable energy sources and can be addressed through improved energy efficiency. Any improvements are based on a Type 2 energy audit meeting the requirements of ASABE S612.

**Feature Measure:** capacity of unit

**Scenario Unit::** Gallon per Hour

**Scenario Typical Size:** 600.0

**Scenario Total Cost:** $14,484.98

**Scenario Cost/Unit:** $24.14

Cost Details:

| Component Name | ID | Description | Unit | Cost | QTY | Total |
|---|---|---|---|---|---|---|
| **Labor** | | | | | | |
| Skilled Labor | 230 | Labor requiring a high level skill set: Includes carpenters, welders, electricians, conservation professionals involved with data collection, monitoring, and or record keeping, etc. | Hour | $41.76 | 3 | $125.28 |
| **Materials** | | | | | | |
| Reverse Osmosis unit, fixed cost portion | 2224 | Fixed cost portion of a reverse osmosis unit used for maple syrup processing. Materials only. | Each | $1,669.81 | 1.6 | $2,671.70 |
| Reverse Osmosis unit, variable cost portion | 2225 | Variable cost portion of a reverse osmosis unit used for maple syrup processing. Materials only. | Gallon per Hour | $19.48 | 600 | $11,688.00 |

**Practice:** 374 - FARMSTEAD ENERGY IMPROVEMENT

**Scenario** #23 - Reverse Osmosis >= 1000 GPH

**Scenario Description:**

A reverse osmosis (RO) unit, installed before the evaporator, filters the sap and removes ~ 75% of the water prior to getting to the evaporator. The unit is sized in gallons per hour. The size of the RO is determined based on the existing maple sugaring operation (number of taps and the capacity of the evaporator). With a RO unit able to remove excess water, it takes less time to boil the sap down, thus saving significant energy (oil & wood fuel) used in the process. The system cost includes the RO unit, pumps, vessels, membranes, wash tank, and installation. This scenario includes units that process >= 1000 gallons of sap per hour.

**Before Situation:**

A maple sugaring operation uses an evaporator (pan over a furnace) to boil sap to remove water to create syrup. It takes ~20 gallons of sap to make 1 gallon of syrup, which means 19 gallons of water has to be boiled off. A typical oil-fired evaporator consumes 3.5 to 4.5 gallons of fuel oil for each gallon of maple syrup produced.

**After Situation:**

With an efficient RO installed in the process, ~ 75% of the water is removed from the sap, thus cutting the boil time down by ~75%. An efficiency of 1 gallon fuel oil (or equivalent wood) per gallon of maple syrup is possible, thereby reducing energy consumption by 65-75%. Associated practices/activities: may include 122-AgEMP - HQ, and other activities within 374-Farmstead Energy Improvement. The resource concern is inefficient use of energy in the farm operation which increases dependence on non-renewable energy sources and can be addressed through improved energy efficiency. Any improvements are based on a Type 2 energy audit meeting the requirements of ASABE S612.

**Feature Measure:** capacity of unit

**Scenario Unit::** Gallon per Hour

**Scenario Typical Size:** 1,200.0

**Scenario Total Cost:** $23,501.28

**Scenario Cost/Unit:** $19.58

Cost Details:

| Component Name | ID | Description | Unit | Cost | QTY | Total |
|---|---|---|---|---|---|---|
| **Labor** | | | | | | |
| Skilled Labor | 230 | Labor requiring a high level skill set: Includes carpenters, welders, electricians, conservation professionals involved with data collection, monitoring, and or record keeping, etc. | Hour | $41.76 | 3 | $125.28 |
| **Materials** | | | | | | |
| Reverse Osmosis unit, variable cost portion | 2225 | Variable cost portion of a reverse osmosis unit used for maple syrup processing. Materials only. | Gallon per Hour | $19.48 | 1200 | $23,376.00 |

**Practice:** 374 - FARMSTEAD ENERGY IMPROVEMENT

**Scenario** #24 - Steam Enhanced PreHeater <= 24 SF

**Scenario Description:**

The unit sets over the evaporator pan and uses steam from the evaporator pan to pre-heat the sap to as high as 200ºF while at the same time injecting air into the sap to promote evaporation. Evaporation rates are increased by 65-75%, based on vendor analysis, leading to 40-43% energy savings. Sap is concentrated from Brix 2% to 4% or more before it enters the flue pan. Steam-enhanced systems require at least 9 feet from floor to ceiling. This scenario includes units <= 24 sq. ft, with installation. With increased evaporation, it takes less time to boil the sap down, thus saving significant energy (oil & wood fuel) used in the process, as well as labor.

**Before Situation:**

The evaporative process time for making concentrated maple syrup requires boiling ~20 gallons of sap to make 1 gallon of syrup, which means 19 gallons of water have to be boiled off, using more fuel and labor. A typical oil-fired evaporator consumes 3.5 to 4.5 gallons of fuel oil for each gallon of maple syrup produced.

**After Situation:**

The evaporative process time for making concentrated maple syrup requires boiling ~6 gallons of sap to make 1 gallon of syrup, which means 14 gallons of water were removed by the steam-enhanced system, using less fuel and labor. A typical oil-fired evaporator with a steam pan consumes 2.1 to 2.7 gallons of fuel oil for each gallon of maple syrup produced to remove water from the sap, improving the fuel efficiency and saving labor. Associated practices/activities: may include 122-AgEMP - HQ, and other activities within 374-Farmstead Energy Improvement. The resource concern is inefficient use of energy in the farm operation which increases dependence on non-renewable energy sources and can be addressed through improved energy efficiency. Any improvements are based on a Type 2 energy audit meeting the requirements of ASABE S612.

**Feature Measure:** Square Foot of steam pan

**Scenario Unit::** Square Foot

**Scenario Typical Size:** 24.0

**Scenario Total Cost:** $10,344.94

**Scenario Cost/Unit:** $431.04

Cost Details:

| Component Name | ID | Description | Unit | Cost | QTY | Total |
|---|---|---|---|---|---|---|
| **Labor** | | | | | | |
| Skilled Labor | 230 | Labor requiring a high level skill set: Includes carpenters, welders, electricians, conservation professionals involved with data collection, monitoring, and or record keeping, etc. | Hour | $41.76 | 6 | $250.56 |
| 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 | $25.31 | 6 | $151.86 |
| **Materials** | | | | | | |
| Sap Pre-Heater, High efficiency, fixed cost | 2254 | High efficiency sap pre-heater device, fixed cost portion. Materials only. | Each | $4,539.88 | 1 | $4,539.88 |
| Sap Pre-Heater, High efficiency, variable cost | 2255 | High efficiency sap pre-heater device, variable cost portion. Materials only. | Square Foot | $225.11 | 24 | $5,402.64 |

**Practice:** 374 - FARMSTEAD ENERGY IMPROVEMENT

**Scenario** #25 - Steam Enhanced PreHeater > 24 SF

**Scenario Description:**

The unit sets over the evaporator pan and uses steam from the evaporator pan to pre-heat the sap to as high as 200ºF while at the same time injecting air into the sap to promote evaporation. Evaporation rates are increased by 65-75%, based on vendor analysis, leading to 40-43% energy savings. Sap is concentrated from Brix 2% to 4% or more before it enters the flue pan. Steam-enhanced systems require at least 9 feet from floor to ceiling. This scenario includes units > 24 sq. ft. with installation. With increased evaporation, it takes less time to boil the sap down, thus saving significant energy (oil & wood fuel) used in the process, as well as labor.

**Before Situation:**

The evaporative process time for making concentrated maple syrup requires boiling ~20 gallons of sap to make 1 gallon of syrup, which means 19 gallons of water have to be boiled off, using more fuel and labor. A typical oil-fired evaporator consumes 3.5 to 4.5 gallons of fuel oil for each gallon of maple syrup produced.

**After Situation:**

The evaporative process time for making concentrated maple syrup requires boiling ~6 gallons of sap to make 1 gallon of syrup, which means 14 gallons of water were removed by the steam-enhanced system, using less fuel and labor. A typical oil-fired evaporator with a steam pan consumes 2.1 to 2.7 gallons of fuel oil for each gallon of maple syrup produced to remove water from the sap, improving the fuel efficiency and saving labor. Associated practices/activities: may include 122-AgEMP - HQ, and other activities within 374-Farmstead Energy Improvement. The resource concern is inefficient use of energy in the farm operation which increases dependence on non-renewable energy sources and can be addressed through improved energy efficiency. Any improvements are based on a Type 2 energy audit meeting the requirements of ASABE S612.

**Feature Measure:** Square Foot of steam pan

**Scenario Unit::** Square Foot

**Scenario Typical Size:** 40.0

**Scenario Total Cost:** $11,810.90

**Scenario Cost/Unit:** $295.27

Cost Details:

| Component Name | ID | Description | Unit | Cost | QTY | Total |
|---|---|---|---|---|---|---|
| **Labor** | | | | | | |
| Skilled Labor | 230 | Labor requiring a high level skill set: Includes carpenters, welders, electricians, conservation professionals involved with data collection, monitoring, and or record keeping, etc. | Hour | $41.76 | 8 | $334.08 |
| 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 | $25.31 | 8 | $202.48 |
| **Materials** | | | | | | |
| Sap Pre-Heater, High efficiency, fixed cost | 2254 | High efficiency sap pre-heater device, fixed cost portion. Materials only. | Each | $4,539.88 | 0.5 | $2,269.94 |
| Sap Pre-Heater, High efficiency, variable cost | 2255 | High efficiency sap pre-heater device, variable cost portion. Materials only. | Square Foot | $225.11 | 40 | $9,004.40 |

**Practice:** 374 - FARMSTEAD ENERGY IMPROVEMENT

**Scenario** #26 - Evaporator Wood-Fired, Air Injected

**Scenario Description:**

This practice is for the replacement of an inefficient evaporator with a new high efficiency evaporator with appurtenances. A high efficiency evaporator is designed to increase BTU output from the fuel source and provide a larger flue pan surface area to increase evaporation, thus reducing energy use. Wood-fired evaporator with air injection or forced draft includes stainless steel sides and bottom, blowers and stainless steel syrup and flue pans. A 3' x 12' high efficiency wood-fired evaporator with air injection or forced draft is common for moderately-sized maple operations in New England.

**Before Situation:**

The evaporative process time for making concentrated maple syrup is extended and more fuel used because the inefficient evaporator requires more boiling to remove water from the sap.

**After Situation:**

The evaporative process time for making concentrated maple syrup is reduced by 50% or more and fuel efficiency by 15% or more over standard wood evaporator. Associated practices/activities: may include 122-AgEMP - HQ, and other activities within 374-Farmstead Energy Improvement. The resource concern is inefficient use of energy in the farm operation which increases dependence on non-renewable energy sources and can be addressed through improved energy efficiency. Any improvements are based on a Type 2 energy audit meeting the requirements of ASABE S612.

**Feature Measure:** Square Foot of unit

**Scenario Unit::** Square Foot

**Scenario Typical Size:** 36.0

**Scenario Total Cost:** $14,884.44

**Scenario Cost/Unit:** $413.46

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 | $41.76 | 4 | $167.04 |
| 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 | $25.31 | 10 | $253.10 |
| **Materials** | | | | | | |
| Evaporator, High efficiency, wood-fired, air injection, fixed cost | 2268 | High efficient wood fired evaporator with air injection used for maple syrup processing. Fixed cost portion. Materials only. | Each | $6,309.22 | 1 | $6,309.22 |
| Evaporator, High efficiency, wood-fired, air injection, variable cost | 2269 | High efficient wood fired evaporator with air injection used for maple syrup processing. Variable cost portion. Materials only. | Square Foot | $226.53 | 36 | $8,155.08 |

**Practice:** 374 - FARMSTEAD ENERGY IMPROVEMENT

**Scenario** #27 - Evaporator Wood-Fired, Gasifier

**Scenario Description:**

This practice is for the replacement of an inefficient evaporator with a new high efficiency evaporator with appurtenances. A high efficiency evaporator is designed to increase BTU output from the fuel source and provide a larger flue pan surface area to increase evaporation, thus reducing energy use. Wood-fired gasifier evaporator includes stainless steel sides and bottom, blowers, and stainless steel syrup and flue pans. A 3' x 12 wood-fired gasifier evaporator is common for moderately-sized maple operations in New England.

**Before Situation:**

The evaporative process time for making concentrated maple syrup is extended and more fuel used because the inefficient evaporator requires more boiling to remove water from the sap.

**After Situation:**

The evaporative process time for making concentrated maple syrup is reduced by 50% or more and fuel efficiency by 40% or more over standard wood evaporator. Associated practices/activities: may include 122-AgEMP - HQ, and other activities within 374-Farmstead Energy Improvement. The resource concern is inefficient use of energy in the farm operation which increases dependence on non-renewable energy sources and can be addressed through improved energy efficiency. Any improvements are based on a Type 2 energy audit meeting the requirements of ASABE S612.

**Feature Measure:** Square Foot of unit

**Scenario Unit::** Square Foot

**Scenario Typical Size:** 36.0

**Scenario Total Cost:** $27,919.04

**Scenario Cost/Unit:** $775.53

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 | $41.76 | 4 | $167.04 |
| 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 | $25.31 | 10 | $253.10 |
| **Materials** | | | | | | |
| Evaporator, High efficiency, wood-fired, gasification system, fixed cost | 2266 | High efficient wood fired evaporator with a gasification system used for maple syrup processing. Fixed cost portion. Materials only. | Each | $16,181.58 | 1 | $16,181.58 |
| Evaporator, High efficiency, wood-fired, gasification system, variable cost | 2267 | High efficient wood fired evaporator with a gasification system used for maple syrup processing. Variable cost portion. Materials only. | Square Foot | $314.37 | 36 | $11,317.32 |

**Practice:** 374 - FARMSTEAD ENERGY IMPROVEMENT

**Scenario** #28 - Evaporator Oil-Fired, Parametric Control

**Scenario Description:**

This practice is for the replacement of an inefficient evaporator with a new high efficiency evaporator with appurtenances. A high efficiency evaporator is designed to increase BTU output from the fuel source and provide a larger flue pan surface area to increase evaporation, thus reducing energy use. Oil-fired evaporator includes stainless steel sides and bottom, oil burner, parametric controls, and stainless steel syrup and flue pans. A 4' x 12' oil-fired evaporator with parametric controls is common for moderately-sized maple operations in New England.

**Before Situation:**

The evaporative process time for making concentrated maple syrup is extended and more fuel used because the inefficient evaporator requires more boiling to remove water from the sap.

**After Situation:**

The evaporative process time for making concentrated maple syrup is reduced by 50% or more and fuel efficiency by 15% or more. Associated practices/activities: may include 122-AgEMP - HQ, and other activities within 374-Farmstead Energy Improvement. The resource concern is inefficient use of energy in the farm operation which increases dependence on non-renewable energy sources and can be addressed through improved energy efficiency. Any improvements are based on a Type 2 energy audit meeting the requirements of ASABE S612.

**Feature Measure:** Square Foot of unit

**Scenario Unit::** Square Foot

**Scenario Typical Size:** 48.0

**Scenario Total Cost:** $42,029.61

**Scenario Cost/Unit:** $875.62

Cost Details:

| Component Name | ID | Description | Unit | Cost | QTY | Total |
|---|---|---|---|---|---|---|
| **Labor** | | | | | | |
| Skilled Labor | 230 | Labor requiring a high level skill set: Includes carpenters, welders, electricians, conservation professionals involved with data collection, monitoring, and or record keeping, etc. | Hour | $41.76 | 8 | $334.08 |
| 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 | $25.31 | 12 | $303.72 |
| **Materials** | | | | | | |
| Evaporator, High efficiency, oil-fired w/ parametric control, <= 52 SF, fixed cost | 2262 | High efficient oil fired evaporator with parametric control used for maple syrup processing. Pan area less than or equal 52 square feet. Fixed cost portion. Materials only. | Each | $25,913.25 | 1 | $25,913.25 |
| Evaporator, High efficiency, oil-fired w/ parametric control, <= 52 SF, Variable cost | 2263 | High efficient oil fired evaporator with parametric control used for maple syrup processing. Pan area less than or equal 52 square feet. Variable cost portion. Materials only. | Square Foot | $322.47 | 48 | $15,478.56 |

**Practice:** 374 - FARMSTEAD ENERGY IMPROVEMENT

**Scenario** #69 - Solar Water Heating System

**Scenario Description:**

Solar collectors are installed to meet 40-60% of hot water needs supplementing an existing electric or fossil-fuel fired hot water heating system. A closed-loop solar water heating system indirectly preheats water to 140 degrees F with a heat exchanger. Hot water is stored in an insulated atmospheric tank. Typically 1SF of solar collection area is installed per gallon of daily hot water demand. The practice addresses inefficient use of energy in the farm operation.

**Before Situation:**

An agricultural operation uses an electric or fossil-fuel-fired hot water system year-round to raise the temperature of well water from 50-55 degrees F to 160 degrees F. Typical applications are in dairies to wash milking equipment, the milking parlor, cheese making equipment, towels, or to mix calf feed, etc.… The energy consumption and inefficiencies associated with the fuel used for the hot water heater is significant.

**After Situation:**

A solar hot water system for a 200 cow dairy farm with daily hot water demand of about 1,500 gals is installed. It includes about 650 SF of collection area which will preheat the water to 140 degrees F. The system components includes about 20 flat-plate solar thermal collectors, a heat exchanger, commercial closed-loop glycol pump, commercial insulated atmospheric water storage tank, and controller. This can reduce water heating energy use by 50-80%. Associated practices may include 128-AgEMP. 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. Improvements are based on a Type 2 energy audit meeting the requirements of ASABE S612.

**Feature Measure:** SF

**Scenario Unit::** Square Foot

**Scenario Typical Size:** 650.0

**Scenario Total Cost:** $97,227.00

**Scenario Cost/Unit:** $149.58

Cost Details:

| Component Name | ID | Description | Unit | Cost | QTY | Total |
|---|---|---|---|---|---|---|
| **Equipment Installation** | | | | | | |
| Solar Water Heating System | 2692 | A solar water heating system. Indirectly preheats water through solar thermal collectors, a heat exchanger, commercial pump, commercial insulated atmospheric water storage tank, and controller. Includes all material, labor, equipment, pump station, heat e | Square Foot | $149.58 | 650 | $97,227.00 |

**Practice:** 374 - FARMSTEAD ENERGY IMPROVEMENT

**Scenario** #70 - Heating (Small Room)

**Scenario Description:**

Replace existing low efficiency heaters with new high efficiency heaters. High-efficiency heating systems include any heating unit with annual fuel utilization efficiency (AFUE) of 90%+ for fuel oil and 93%+ for natural gas and propane. Application is for air heating of small building/ room environments. Typical application is a 30,0000 BTU radiant heater. HEATER SIZING AND PAYMENT IS BASED ON INPUT BTU RATING.

**Before Situation:**

Building rooms heated with low efficiency heaters.

**After Situation:**

Higher efficiency heaters reduce energy consumption, energy costs, and GHG emissions. These replacement systems can be electric or fueled by natural gas, propane, or fuel oil. Associated practices/activities: 122-AgEMP - HQ and other activities within 374-Farmstead Energy Improvement. The resource concern is inefficient use of energy in the farm operation which increases dependence on non-renewable energy sources and can be addressed through improved energy efficiency. Any improvements are based on a Type 2 energy audit meeting the requirements of ASABE S612.

**Feature Measure:** Input BTU Rating

**Scenario Unit::** 1,000 BTU/Hour

**Scenario Typical Size:** 30.0

**Scenario Total Cost:** $450.72

**Scenario Cost/Unit:** $15.02

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 | $41.76 | 2 | $83.52 |
| **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 | $12.24 | 30 | $367.20 |

**Practice:** 378 - Pond

**Scenario** #1 - Excavated Pit

**Scenario Description:**

A low-hazard water impoundment structure on agricultural lands to maintain or improve water quality and to provide water for livestock, fish and wildlife, recreation, fire control, developing renewable energy systems, and other related uses. Pond is created solely by excavation and impounds less than 3 feet against the embankment or spoil. Excavated material is spoiled or hauled off site, not placed in a designed embankment. Earthen spillway is constructed as needed. The resource concerns addressed include inadequate livestock water, excessive suspended sediment and turbidity in surface water, damage from sediment deposition, and reduced capacity of conveyances by sediment deposition.

**Before Situation:**

Area exists where water could naturally pool or run off to create a pond for livestock, wildlife, fire control, developing renewable energy systems, and other related uses, and to maintain or improve water quality. Failure of the pond will not result in loss of life; damage to homes, commercial or industrial buildings, main highways, or railroads; or in interruption of the use or service of public utilities.

**After Situation:**

The typical pond is constructed by excavating 2000 cubic yards and spreading the spoil outside the pool area when possible but most often hauling material offsite using an excavator, dozer, and/or similar excavation equipment. Vegetation will be completed under critical area planting (342). Other associated practices include 382, 516, 521A, 533, 614, 587, 396.

**Feature Measure:** Excavated Volume

**Scenario Unit::** Cubic Yard

**Scenario Typical Size:** 2,000.0

**Scenario Total Cost:** $18,489.50

**Scenario Cost/Unit:** $9.24

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 | $124.03 | 40 | $4,961.20 |
| Hydraulic Excavator, 2 CY | 932 | Track mounted hydraulic excavator with bucket capacity range of 1.5 to 2.5 CY. Equipment and power unit costs. Labor not included. | Hour | $164.46 | 20 | $3,289.20 |
| Hauling, bulk, highway truck | 1615 | Hauling of bulk earthfill, rockfill, waste or debris. One-way travel distance using fully loaded highway dump trucks (typically 16 CY or 20 TN capacity). Includes equipment and labor for truck only. Does not include cost for loading truck. | Cubic Yard Mile | $0.33 | 20000 | $6,600.00 |
| **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 | $44.37 | 60 | $2,662.20 |
| **Mobilization** | | | | | | |
| Mobilization, large equipment | 1140 | Equipment >150HP or typical weights greater than 30,000 pounds or loads requiring over width or over length permits. | Each | $488.45 | 2 | $976.90 |

**Practice:** 378 - Pond

**Scenario** #2 - Embankment Pond without Pipe

**Scenario Description:**

A water impoundment structure on agricultural land to maintain or improve water quality or to provide water for livestock, fish and wildlife, recreation, fire control, developing renewable energy systems, and other related uses. An earthen embankment will be constructed with an earthen auxiliary spillway. The resource concerns addressed include inadequate livestock water, excessive suspended sediment and turbidity in surface water, damage from sediment deposition, and reduced capacity of conveyances by sediment deposition.

**Before Situation:**

Area exists where water could naturally pool or run off to create a pond for livestock, wildlife, fire control, developing renewable energy systems, and other related uses, and to maintain or improve water quality. Failure of the embankment will not result in loss of life or damages of any kind.

**After Situation:**

The typical pond is constructed by excavating the pool area, constructing the auxiliary spillway, preparing the foundation as designed, and using 3100 cubic yards to create an embankment. The product of the storage times the effective height of the dam is less than 3,000. The effective height of the dam is 35 feet or less. The earthen auxiliary spillway will be constructed as designed. No principle spillway pipe will be used. Vegetation will be completed under critical area planting (342). Other associated practices include 382, 516, 521A, 533, 614, 587, 396.

**Feature Measure:** Embankment Volume

**Scenario Unit::** Cubic Yard

**Scenario Typical Size:** 3,100.0

**Scenario Total Cost:** $23,129.55

**Scenario Cost/Unit:** $7.46

Cost Details:

| Component Name | ID | Description | Unit | Cost | QTY | Total |
|---|---|---|---|---|---|---|
| **Equipment Installation** | | | | | | |
| Dozer, 140 HP | 927 | Track mounted Dozer with horsepower range of 125 to 160. Equipment and power unit costs. Labor not included. | Hour | $124.03 | 120 | $14,883.60 |
| Roller, static, towed, tamping foot | 1328 | Towed static tamping foot (sheepsfoot) roller compactor typically 60" diameter drum. Equipment cost only. Does not include pulling equipment. Add Tractor or Dozer. | Hour | $10.35 | 60 | $621.00 |
| **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 | $41.76 | 20 | $835.20 |
| 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 | $44.37 | 120 | $5,324.40 |
| **Mobilization** | | | | | | |
| Mobilization, large equipment | 1140 | Equipment >150HP or typical weights greater than 30,000 pounds or loads requiring over width or over length permits. | Each | $488.45 | 3 | $1,465.35 |

**Practice:** 378 - Pond

**Scenario** #3 - Embankment Pond with Pipe

**Scenario Description:**

A low-hazard water impoundment structure on agricultural land to maintain or improve water quality and to provide water for livestock, fish and wildlife, recreation, fire control, developing renewable energy systems, and other related uses. An earthen embankment will be constructed with a principle spillway conduit and earthen auxiliary spillway, as designed. The resource concerns addressed include inadequate livestock water, excessive suspended sediment and turbidity in surface water, damage from sediment deposition, and reduced capacity of conveyances by sediment deposition.

**Before Situation:**

Area exists where water could naturally pool or run off to create a pond for livestock, wildlife, fire control, developing renewable energy systems, and other related uses, and to maintain or improve water quality. Failure of the embankment will not result in loss of life or damages of any kind.

**After Situation:**

The typical low hazard pond is constructed by excavating the pool area, constructing the auxiliary spillway, preparing the foundation as designed, and using 3100 cubic yards to create an embankment. The product of the storage times the effective height of the dam is less than 3,000. The effective height of the dam is 35 feet or less. The principle spillway is installed using an approved conduit material. The earthen auxiliary spillway will be constructed as designed. Vegetation will be completed under critical area planting (342). Other associated practices include 382, 516, 521A, 533, 614, 587, 396.

**Feature Measure:** Embankment Volume

**Scenario Unit::** Cubic Yard

**Scenario Typical Size:** 3,100.0

**Scenario Total Cost:** $26,894.06

**Scenario Cost/Unit:** $8.68

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 | $510.00 | 3 | $1,530.00 |
| 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 | $2.36 | 1.6 | $3.78 |
| Dozer, 140 HP | 927 | Track mounted Dozer with horsepower range of 125 to 160. Equipment and power unit costs. Labor not included. | Hour | $124.03 | 120 | $14,883.60 |
| Roller, static, towed, tamping foot | 1328 | Towed static tamping foot (sheepsfoot) roller compactor typically 60" diameter drum. Equipment cost only. Does not include pulling equipment. Add Tractor or Dozer. | Hour | $10.35 | 60 | $621.00 |
| **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 | $41.76 | 28 | $1,169.28 |
| 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 | $44.37 | 120 | $5,324.40 |
| **Materials** | | | | | | |
| Aggregate, Sand, Graded, Washed | 45 | Sand, typical ASTM C33 gradation, includes materials, equipment and labor to transport and place | Cubic Yard | $34.29 | 19.6 | $672.08 |
| 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 | $2.31 | 118 | $272.58 |
| Pipe, CMP, 30", 16 Gauge | 1742 | 30" Corrugated Metal Pipe, Galvanized, Uncoated, 16 gage. Material cost only. | Foot | $27.51 | 8 | $220.08 |
| Pipe, CMP, 18", 16 Gauge | 1743 | 18" Corrugated Metal Pipe, Galvanized, Uncoated, 16 gage. Material cost only. | Foot | $17.20 | 98 | $1,685.60 |
| **Mobilization** | | | | | | |
| Mobilization, medium equipment | 1139 | Equipment with 70-150 HP or typical weights between 14,000 and 30,000 pounds. | Each | $255.83 | 2 | $511.66 |

**Practice:** 380 - Windbreak/Shelterbelt Establishment

**Scenario** #1 - 1 row windbreak, shrubs, hand planted

**Scenario Description:**

Single 500 foot row of shrubs for wind protection, wildlife habitat, or snow management. Shrubs planted by hand 4 feet apart. This practice is typically applied to crop, pasture or range lands. Resource Concerns to be addressed may include: Soil Erosion (wind); Excess/Insufficient Water (drifted snow, inefficient moisture management); Water Quality Degradation (excess nutrients in surface waters, excessive sediment in surface waters,); Degraded Plant Condition (undesirable plant productivity and health); Inadequate habitat for Fish and Wildlife (food, cover/shelter, continuity); Inefficient Energy Use (facilities, farming/ranching practices and field operations).

**Before Situation:**

Agricultural field, livestock paddock, feedlot or farmstead needing protection from wind, additional wildlife food and cover, or management of snow deposition

**After Situation:**

Wind velocity suitably reduced to reduce soil erosion, or to manage snow deposition. Additional wildlife food and cover.

**Feature Measure:** length of windbreak row(s)

**Scenario Unit::** Foot

**Scenario Typical Size:** 500.0

**Scenario Total Cost:** $268.96

**Scenario Cost/Unit:** $0.54

Cost Details:

| Component Name | ID | Description | Unit | Cost | QTY | Total |
|---|---|---|---|---|---|---|
| **Equipment Installation** | | | | | | |
| Truck, Pickup | 939 | Equipment and power unit costs. Labor not included. | Hour | $21.79 | 2 | $43.58 |
| 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 | $25.31 | 2 | $50.62 |
| 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 | $45.69 | 2 | $91.38 |
| **Materials** | | | | | | |
| Shrub, seedling or transplant, bare root, 6-18" | 1506 | Bare root hardwood trees 6-18" tall. Includes materials and shipping only. | Each | $0.46 | 125 | $57.50 |
| Wire flags | 1586 | Small vinyl flags attached to wire stakes, typically, 36" in length, for marking tree rows | Each | $0.09 | 20 | $1.80 |

**Practice:** 380 - Windbreak/Shelterbelt Establishment

**Scenario** #2 - 1 row windbreak, trees, hand planted

**Scenario Description:**

Single 500 foot row of conifer tree seedlings for wind protection, wildlife habitat, or snow management. Trees planted by hand 10 feet apart. This practice is typically applied to crop, pasture or range lands. Resource Concerns to be addressed may include: Soil Erosion (wind); Excess/Insufficient Water (drifted snow, inefficient moisture management); Water Quality Degradation (excess nutrients in surface waters, excessive sediment in surface waters,); Degraded Plant Condition (undesirable plant productivity and health); Inadequate habitat for Fish and Wildlife (food, cover/shelter, continuity); Inefficient Energy Use (facilities, farming/ranching practices and field operations).

**Before Situation:**

Agricultural field, livestock paddock, feedlot or farmstead needing protection from wind, additional wildlife food and cover, or management of snow deposition

**After Situation:**

Wind velocity suitably reduced to reduce soil erosion, or to manage snow deposition. Additional wildlife food and cover.

**Feature Measure:** length of windbreak row(s)

**Scenario Unit::** Foot

**Scenario Typical Size:** 500.0

**Scenario Total Cost:** $134.13

**Scenario Cost/Unit:** $0.27

Cost Details:

| Component Name | ID | Description | Unit | Cost | QTY | Total |
|---|---|---|---|---|---|---|
| **Equipment Installation** | | | | | | |
| Truck, Pickup | 939 | Equipment and power unit costs. Labor not included. | Hour | $21.79 | 1 | $21.79 |
| 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 | 1 | $12.04 |
| **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 | $25.31 | 1 | $25.31 |
| Supervisor or Manager | 234 | Labor involving supervision or management activities. Includes crew supervisors, foremen and farm/ranch managers time required for adopting new technology, etc. | Hour | $45.69 | 1 | $45.69 |
| **Materials** | | | | | | |
| Tree, conifer, seedling, containerized, 10 cu. in. | 1519 | Containerized conifer stock, 10 cubic inches (approx 6" plug), 1.7" x 6"). Includes materials and shipping only. | Each | $0.55 | 50 | $27.50 |
| Wire flags | 1586 | Small vinyl flags attached to wire stakes, typically, 36" in length, for marking tree rows | Each | $0.09 | 20 | $1.80 |

**Practice:** 381 - Silvopasture Establishment

**Scenario** #2 - Commercial thinning with establishment of introduced grasses.

**Scenario Description:**

Commercial thinning of an existing stand of trees followed by establishment of introduced grasses.

**Before Situation:**

10-acre forest stand that is overstocked, with a basal area of 100 sq. ft. per acre. There is very little available forage for livestock, due to the dense shade of the tree canopy. Resource Concerns include Degraded Plant Condition - Undesirable Plant Productivity and Health, Inadequate Structure and Composition, Wildfire Hazard, Excessive Biomass Accumulation; Livestock Production Limitation - Inadequate Feed and Forage, and Inadequate Livestock Shelter.

**After Situation:**

The stand is thinned commercially to a basal area of 50 sq. ft. per acre, which will allow adequate sunlight to the forest floor for grass production, yet still provide shade and some protection from the elements for livestock and wildlife. Since thinning is done commercially, no harvesting costs are incurred. Debris is removed, all tree cutting will leave the shortest possible stump height. The soil is prepared for planting using chemical and mechanical means, then a mix of cool-season grasses and legumes will be established, providing forage to livestock and wildlife. All Resource Concerns listed above are addressed.

**Feature Measure:** Acres of silvopasture established

**Scenario Unit::** Acre

**Scenario Typical Size:** 10.0

**Scenario Total Cost:** $3,964.60

**Scenario Cost/Unit:** $396.46

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 | $11.14 | 10 | $111.40 |
| Chemical, ground application | 948 | Chemical application performed by ground equipment. Includes equipment, power unit and labor costs. | Acre | $6.13 | 10 | $61.30 |
| Fertilizer, ground application, dry bulk | 950 | Dry bulk fertilizer application performed by ground equipment. Includes equipment, power unit and labor costs. | Acre | $6.62 | 10 | $66.20 |
| Lime application | 953 | Lime application performed by ground equipment. Includes equipment, power unit and labor costs. | Acre | $10.63 | 10 | $106.30 |
| Seeding Operation, No Till/Grass Drill | 960 | No Till drill or grass drill for seeding. Includes equipment, power unit and labor costs. | Acre | $21.36 | 2 | $42.72 |
| Cultipacking | 1100 | Includes equipment, power unit and labor costs. | Acre | $7.70 | 10 | $77.00 |
| **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 | $110.71 | 8 | $885.68 |
| **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 | $0.65 | 500 | $325.00 |
| Potassium, K2O | 74 | K2O supplied by Muriate Of Potash. Price is not per pound of total product applied, no conversion is needed. | Pound | $0.36 | 500 | $180.00 |
| Lime, ENM | 75 | Fertilizer: Limestone Spread on field. | Ton | $93.23 | 20 | $1,864.60 |
| Tree Marking Paint | 313 | Trees to be cut through tree marking are physically identified through the application of paint on the tree. Typically one quart of paint is used to mark one acre of trees. Includes materials and shipping only. | Acre | $6.96 | 10 | $69.60 |
| Herbicide, Glyphosate | 334 | A broad-spectrum, non-selective systemic herbicide. Refer to WIN-PST for product names and active ingredients. Includes materials and shipping only. | Acre | $17.48 | 10 | $174.80 |

**Practice:** 381 - Silvopasture Establishment

**Scenario** #4 - Non-commercial thinning with establishment of introduced grasses.

**Scenario Description:**

Non-commercial thinning of an existing stand of trees followed by establishment of introduced grasses.

**Before Situation:**

10-acre forest stand that is overstocked, with a basal area of 100 sq. ft. per acre. There is very little available forage for livestock, due to the dense shade of the tree canopy. Resource Concerns include Degraded Plant Condition - Undesirable Plant Productivity and Health, Inadequate Structure and Composition, Wildfire Hazard, Excessive Biomass Accumulation; Livestock Production Limitation - Inadequate Feed and Forage, and Inadequate Livestock Shelter.

**After Situation:**

The stand is thinned non-commercially to a basal area of 50 sq. ft. per acre, which will allow adequate sunlight to the forest floor for grass production, yet still provide shade and some protection from the elements for livestock and wildlife. Debris is removed, all tree cutting will leave the shortest possible stump height. The soil is prepared for planting using chemical and mechanical means, then a mix of cool-season grasses and legumes will be established, providing forage to livestock and wildlife. All Resource Concerns listed above are addressed.

**Feature Measure:** Acres of silvopasture established

**Scenario Unit::** Acre

**Scenario Typical Size:** 10.0

**Scenario Total Cost:** $5,745.40

**Scenario Cost/Unit:** $574.54

Cost Details:

| Component Name | ID | Description | Unit | Cost | QTY | Total |
|---|---|---|---|---|---|---|
| **Equipment Installation** | | | | | | |
| Chainsaw | 937 | Equipment and power unit costs. Labor not included. | Hour | $4.37 | 60 | $262.20 |
| Tillage, Light | 945 | Includes light disking (tandem) or field cultivator. Includes equipment, power unit and labor costs. | Acre | $11.14 | 10 | $111.40 |
| Chemical, ground application | 948 | Chemical application performed by ground equipment. Includes equipment, power unit and labor costs. | Acre | $6.13 | 10 | $61.30 |
| Fertilizer, ground application, dry bulk | 950 | Dry bulk fertilizer application performed by ground equipment. Includes equipment, power unit and labor costs. | Acre | $6.62 | 10 | $66.20 |
| Lime application | 953 | Lime application performed by ground equipment. Includes equipment, power unit and labor costs. | Acre | $10.63 | 10 | $106.30 |
| Seeding Operation, No Till/Grass Drill | 960 | No Till drill or grass drill for seeding. Includes equipment, power unit and labor costs. | Acre | $21.36 | 2 | $42.72 |
| Cultipacking | 1100 | Includes equipment, power unit and labor costs. | Acre | $7.70 | 10 | $77.00 |
| **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 | $25.31 | 60 | $1,518.60 |
| Specialist Labor | 235 | Labor requiring a specialized skill set: Includes Agronomists, Foresters, Biologists, etc. to provide additional technical information during the planning and implementation of the practice. Does not include NRCS or TSP services. | Hour | $110.71 | 8 | $885.68 |
| **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 | $0.65 | 500 | $325.00 |
| Potassium, K2O | 74 | K2O supplied by Muriate Of Potash. Price is not per pound of total product applied, no conversion is needed. | Pound | $0.36 | 500 | $180.00 |
| Lime, ENM | 75 | Fertilizer: Limestone Spread on field. | Ton | $93.23 | 20 | $1,864.60 |
| Tree Marking Paint | 313 | Trees to be cut through tree marking are physically identified through the application of paint on the tree. Typically one quart of paint is used to mark one acre of trees. Includes materials and shipping only. | Acre | $6.96 | 10 | $69.60 |
| Herbicide, Glyphosate | 334 | A broad-spectrum, non-selective systemic herbicide. Refer to WIN-PST for product names and active ingredients. Includes materials and shipping only. | Acre | $17.48 | 10 | $174.80 |

**Practice:** 382 - Fence

**Scenario** #1 - 2-4 Wire Electrified, High Tensile

**Scenario Description:**

Typically used to install a 2-4 wire electrified high tensile fence according to state specifications. Assumes posts, wire, fasteners, gates, fence charger, and labor. Fence will allow for implementation of a grazing management that allows for an adequate rest and recovery period, protection of sensitive area, improved water quality, reduction of noxious and invasive weeds.

**Before Situation:**

On grazing lands health and vigor are negatively impacted by poor grazing distribution, timing of grazing and inadequate rest and recovery periods. Water quality may be impacted by increased erosion and runoff, livestock access to water bodies may be uncontrolled. Reduced vegetative cover increases the opportunity for encroachment of noxious and invasive weeds.

**After Situation:**

Installation of fence will allow for implementation of grazing management that allows for an adequate rest and recovery period, protection of sensitive area, improved water quality, reduction of noxious and invasive weeds. Fence includes posts, wire, fasteners, gates, fence charger, etc... Two to four (three) strand wire is commonly installed. Fence will be installed with wildlife friendly considerations.

**Feature Measure:** Length of Fence

**Scenario Unit::** Foot

**Scenario Typical Size:** 2,640.0

**Scenario Total Cost:** $6,740.35

**Scenario Cost/Unit:** $2.55

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 | $7.31 | 28 | $204.68 |
| Chainsaw | 937 | Equipment and power unit costs. Labor not included. | Hour | $4.37 | 2 | $8.74 |
| Truck, Pickup | 939 | Equipment and power unit costs. Labor not included. | Hour | $21.79 | 20 | $435.80 |
| Tractor, agricultural, 60 HP | 963 | Agricultural tractor with horsepower range of 50 to 90. Equipment and power unit costs. Labor not included. | Hour | $24.77 | 28 | $693.56 |
| All terrain vehicles, ATV | 965 | Includes equipment, power unit and labor costs. | Hour | $28.28 | 10 | $282.80 |
| **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 | $25.31 | 58 | $1,467.98 |
| Equipment Operators, Light | 232 | Includes: Skid Steer Loaders, Hydraulic Excavators <50 HP, Trenchers <12", Ag Equipment <150 HP, Pickup Trucks, Forklifts, Mulchers | Hour | $25.23 | 28 | $706.44 |
| **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 | 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 | 100 | $806.00 |
| Post, Wood, CCA treated, 6" x 8' | 12 | Wood Post, End 6" X 8', CCA Treated. Includes materials and shipping only. | Each | $15.10 | 26 | $392.60 |
| 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 | 1 | $29.98 |
| Electric, Power Surge Protector | 24 | Electric, Power Surge Protector for electric fence. Includes materials and shipping only. | Each | $9.64 | 1 | $9.64 |
| Electric, Cutoff Switch | 25 | Electric, Cutoff Switch for electric fence. Includes materials and shipping only. | Each | $8.53 | 2 | $17.06 |
| Electric, Tester | 26 | Electric, Tester for electric fence. Includes materials and shipping only. | Each | $41.14 | 1 | $41.14 |
| Electric, Energizer, 6 joule | 29 | Electric, Energizer, 6 joule for electric fence. Includes materials and shipping only. | Each | $324.22 | 1 | $324.22 |

| | | | | | | |
|---|---|---|---|---|---|---|
| Fence, Wire Assembly, High Tensile, Electric, 3 Strand | 34 | Brace pins, springs, strainers, battens, clips, crimp sleeves, staples, insulators, wrap around sleeves. Includes materials and shipping only. | Foot | $0.12 | 2640 | $316.80 |
| Gate, Pipe, 14' | 1058 | 6 rail tube gate, 16 gauge. Includes materials and shipping only. | Each | $167.05 | 2 | $334.10 |
| **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 | $172.07 | 2 | $344.14 |

**Practice:** 382 - Fence

**Scenario** #2 - 5-6 Wire, Electrified, High Tensile

**Scenario Description:**

Typically used to install a 5-6 wire electrified high tensile fence according to state specifications. Assumes posts, wire, fasteners, gates, fence charger, and labor. Fence will allow for implementation of a grazing management that allows for an adequate rest and recovery period, protection of sensitive area, improved water quality, reduction of noxious and invasive weeds.

**Before Situation:**

On grazing lands health and vigor are negatively impacted by poor grazing distribution, timing of grazing and inadequate rest and recovery periods. Water quality may be impacted by increased erosion and runoff, livestock access to water bodies may be uncontrolled. Reduced vegetative cover increases the opportunity for encroachment of noxious and invasive weeds.

**After Situation:**

Installation of fence will allow for implementation of grazing management that allows for an adequate rest and recovery period, protection of sensitive area, improved water quality, reduction of noxious and invasive weeds. Fence includes posts, wire, fasteners, gates, fence charger, etc...5 or 6 strand wire is commonly installed. Fence will be installed with wildlife friendly considerations.

**Feature Measure:** Length of Fence

**Scenario Unit::** Foot

**Scenario Typical Size:** 2,640.0

**Scenario Total Cost:** $7,538.89

**Scenario Cost/Unit:** $2.86

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 | $7.31 | 28 | $204.68 |
| Chainsaw | 937 | Equipment and power unit costs. Labor not included. | Hour | $4.37 | 2 | $8.74 |
| Truck, Pickup | 939 | Equipment and power unit costs. Labor not included. | Hour | $21.79 | 20 | $435.80 |
| Tractor, agricultural, 60 HP | 963 | Agricultural tractor with horsepower range of 50 to 90. Equipment and power unit costs. Labor not included. | Hour | $24.77 | 28 | $693.56 |
| All terrain vehicles, ATV | 965 | Includes equipment, power unit and labor costs. | Hour | $28.28 | 10 | $282.80 |
| **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 | $25.31 | 74 | $1,872.94 |
| Equipment Operators, Light | 232 | Includes: Skid Steer Loaders, Hydraulic Excavators <50 HP, Trenchers <12", Ag Equipment <150 HP, Pickup Trucks, Forklifts, Mulchers | Hour | $25.23 | 22 | $555.06 |
| **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 | 4 | $456.32 |
| Post, Wood, CCA treated, 4" x 8' | 10 | Wood Post, Line 4" X 8', CCA Treated. Includes materials and shipping only. | Each | $8.06 | 100 | $806.00 |
| Post, Wood, CCA treated, 6" x 8' | 12 | Wood Post, End 6" X 8', CCA Treated. Includes materials and shipping only. | Each | $15.10 | 26 | $392.60 |
| 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 | 1 | $29.98 |
| Electric, Power Surge Protector | 24 | Electric, Power Surge Protector for electric fence. Includes materials and shipping only. | Each | $9.64 | 1 | $9.64 |
| Electric, Cutoff Switch | 25 | Electric, Cutoff Switch for electric fence. Includes materials and shipping only. | Each | $8.53 | 2 | $17.06 |
| Electric, Tester | 26 | Electric, Tester for electric fence. Includes materials and shipping only. | Each | $41.14 | 1 | $41.14 |
| Electric, Energizer, 6 joule | 29 | Electric, Energizer, 6 joule for electric fence. Includes materials and shipping only. | Each | $324.22 | 1 | $324.22 |

| | | | | | | |
|---|---|---|---|---|---|---|
| Fence, Wire Assembly, High Tensile, Electric, 3 Strand | 34 | Brace pins, springs, strainers, battens, clips, crimp sleeves, staples, insulators, wrap around sleeves. Includes materials and shipping only. | Foot | $0.12 | 5280 | $633.60 |
| Gate, Pipe, 14' | 1058 | 6 rail tube gate, 16 gauge. Includes materials and shipping only. | Each | $167.05 | 2 | $334.10 |
| **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 | $172.07 | 2 | $344.14 |

**Practice:** 382 - Fence

**Scenario** #3 - Woven Wire

**Scenario Description:**

Install a woven wire fence that is typically used for sheep, goats, horses, camelids, wildlife exclusion, shelterbelt/tree protection, etc. Woven wire fence includes posts, wire, fasteners, gates, and labor. Fence is installed according to state specifications and typically includes the use of barbed or electrified smooth wire for predator control. Fence will allow for implementation of a grazing management that allows for an adequate rest and recovery period, protection of sensitive areas, improved water quality, and reduction of noxious and invasive weeds.

**Before Situation:**

On grazing lands health and vigor are negatively impacted by poor grazing distribution, timing of grazing and inadequate rest and recovery periods. Water quality may be impacted by increased erosion and runoff, livestock access to water bodies may be uncontrolled. Reduced vegetative cover increases the opportunity for encroachment of noxious and invasive weeds.

**After Situation:**

Installation of fence will allow for implementation of a rotational grazing plan that allows for an adequate rest and recovery period, protection of sensitive area, improved water quality, reduction of noxious and invasive weeds. Woven wire fence includes posts, wire, fasteners, gates, etc. Woven wire is typically used in applications with sheep, goats, horses and camelids.

**Feature Measure:** Length of Fence

**Scenario Unit::** Foot

**Scenario Typical Size:** 2,640.0

**Scenario Total Cost:** $10,995.09

**Scenario Cost/Unit:** $4.16

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 | $7.31 | 46 | $336.26 |
| Chainsaw | 937 | Equipment and power unit costs. Labor not included. | Hour | $4.37 | 2 | $8.74 |
| Truck, Pickup | 939 | Equipment and power unit costs. Labor not included. | Hour | $21.79 | 30 | $653.70 |
| Tractor, agricultural, 60 HP | 963 | Agricultural tractor with horsepower range of 50 to 90. Equipment and power unit costs. Labor not included. | Hour | $24.77 | 46 | $1,139.42 |
| All terrain vehicles, ATV | 965 | Includes equipment, power unit and labor costs. | Hour | $28.28 | 10 | $282.80 |
| **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 | $25.31 | 97 | $2,455.07 |
| Equipment Operators, Light | 232 | Includes: Skid Steer Loaders, Hydraulic Excavators <50 HP, Trenchers <12", Ag Equipment <150 HP, Pickup Trucks, Forklifts, Mulchers | Hour | $25.23 | 45 | $1,135.35 |
| **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 |
| 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, 4" x 8' | 10 | Wood Post, Line 4" X 8', CCA Treated. Includes materials and shipping only. | Each | $8.06 | 173 | $1,394.38 |
| Post, Wood, CCA treated, 6" x 8' | 12 | Wood Post, End 6" X 8', CCA Treated. Includes materials and shipping only. | Each | $15.10 | 26 | $392.60 |
| 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 | 1 | $29.98 |
| 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 |

| | | | | | | |
|---|---|---|---|---|---|---|
| Fence, Wire Assembly, High Tensile, Electric, 1 Strand | 32 | Brace pins, springs, strainers, battens, clips, crimp sleeves, staples, insulators, wrap around sleeves. Includes materials and shipping only. | Foot | $0.02 | 7920 | $158.40 |
| Fence, Wire Assembly, Woven Wire | 35 | Brace pins, twist sticks, staples. Includes materials and shipping only. | Foot | $0.12 | 2640 | $316.80 |
| Gate, Pipe, 14' | 1058 | 6 rail tube gate, 16 gauge. Includes materials and shipping only. | Each | $167.05 | 2 | $334.10 |
| **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 | $172.07 | 2 | $344.14 |

**Practice:** 382 - Fence

**Scenario** #4 - Barbed Wire

**Scenario Description:**

Install a multi-wire barbed wire according to state specifications. Assumes posts, wire, fasteners, gates, fence charger, and labor. Fence will allow for implementation of a grazing management that allows for an adequate rest and recovery period, protection of sensitive area, improved water quality, reduction of noxious and invasive weeds.

**Before Situation:**

On grazinglands health and vigor are negatively impacted by poor grazing distribution, timing of grazing and inadequate rest and recovery periods. Water quality is impacted by increased erosion and runoff, cattle access to water bodies is uncontrolled. Reduced vegetative cover increases the opportunity for encroachment of noxious and invasive weeds.

**After Situation:**

Installation of fence will allow for implementation of grazing management that allows for an adequate rest and recovery period, protection of sensitive area, improved water quality, reduction of noxious and invasive weeds. Fence includes posts, wire, fasteners, gates, fence charger, etc... Two to three strand wire is commonly installed. Fence will be installed with wildlife friendly considerations.

**Feature Measure:** Length of Fence

**Scenario Unit::** Foot

**Scenario Typical Size:** 2,640.0

**Scenario Total Cost:** $7,884.67

**Scenario Cost/Unit:** $2.99

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 | $7.31 | 46 | $336.26 |
| Chainsaw | 937 | Equipment and power unit costs. Labor not included. | Hour | $4.37 | 2 | $8.74 |
| Truck, Pickup | 939 | Equipment and power unit costs. Labor not included. | Hour | $21.79 | 20 | $435.80 |
| Tractor, agricultural, 60 HP | 963 | Agricultural tractor with horsepower range of 50 to 90. Equipment and power unit costs. Labor not included. | Hour | $24.77 | 46 | $1,139.42 |
| All terrain vehicles, ATV | 965 | Includes equipment, power unit and labor costs. | Hour | $28.28 | 10 | $282.80 |
| **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 | $25.31 | 61 | $1,543.91 |
| Equipment Operators, Light | 232 | Includes: Skid Steer Loaders, Hydraulic Excavators <50 HP, Trenchers <12", Ag Equipment <150 HP, Pickup Trucks, Forklifts, Mulchers | Hour | $25.23 | 20 | $504.60 |
| **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 | 173 | $1,394.38 |
| Post, Wood, CCA treated, 6" x 8' | 12 | Wood Post, End 6" X 8', CCA Treated. Includes materials and shipping only. | Each | $15.10 | 26 | $392.60 |
| Fence, Wire Assembly, Barbed Wire | 30 | Brace pins, battens, clips, staples. Includes materials and shipping only. | Foot | $0.17 | 3520 | $598.40 |
| Gate, Pipe, 14' | 1058 | 6 rail tube gate, 16 gauge. Includes materials and shipping only. | Each | $167.05 | 2 | $334.10 |
| **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 | $172.07 | 2 | $344.14 |

**Practice:** 382 - Fence

**Scenario** #5 - Interior, electrified

**Scenario Description:**

Install permanent or semi-permanent light-duty electrified fence for interior subdivisions for a grazing system. Installation of fence will allow for implementation of a grazing management that allows for an adequate rest and recovery period, protection of sensitive area, improved water quality, reduction of noxious and invasive weeds.

**Before Situation:**

On grazing lands health and vigor are negatively impacted by poor grazing distribution, timing of grazing and inadequate rest and recovery periods. Water quality may be impacted by increased erosion and runoff, livestock access to water bodies may be uncontrolled. Reduced vegetative cover increases the opportunity for encroachment of noxious and invasive weeds.

**After Situation:**

Installation of interior fence will allow for implementation of grazing management that allows for an adequate rest and recovery period, protection of sensitive area, improved water quality, reduction of noxious and invasive weeds. Fence is used for laneways and/or subdivisions of grazing system.

**Feature Measure:** Length of Fence

**Scenario Unit::** Foot

**Scenario Typical Size:** 1,320.0

**Scenario Total Cost:** $1,580.61

**Scenario Cost/Unit:** $1.20

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 | $7.31 | 1 | $7.31 |
| Truck, Pickup | 939 | Equipment and power unit costs. Labor not included. | Hour | $21.79 | 5 | $108.95 |
| Tractor, agricultural, 60 HP | 963 | Agricultural tractor with horsepower range of 50 to 90. Equipment and power unit costs. Labor not included. | Hour | $24.77 | 1 | $24.77 |
| All terrain vehicles, ATV | 965 | Includes equipment, power unit and labor costs. | Hour | $28.28 | 3 | $84.84 |
| **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 | $25.31 | 12 | $303.72 |
| Equipment Operators, Light | 232 | Includes: Skid Steer Loaders, Hydraulic Excavators <50 HP, Trenchers <12", Ag Equipment <150 HP, Pickup Trucks, Forklifts, Mulchers | Hour | $25.23 | 1 | $25.23 |
| **Materials** | | | | | | |
| Wire, Polytape | 7 | Wire, Polytape for electric fence. Rolls of 655' to 825'. Includes materials and shipping only. | Each | $50.07 | 4 | $200.28 |
| Post, Wood, CCA treated, 5" x 8' | 11 | Wood Post, End 5" X 8', CCA Treated. Includes materials and shipping only. | Each | $11.26 | 12 | $135.12 |
| Post, Steel T, 1.33 lbs, 6' | 15 | Steel Post, Studded 6' - 1.33 lb. Includes materials and shipping only. | Each | $6.68 | 44 | $293.92 |
| Fence, Wire Assembly, Barbed Wire | 30 | Brace pins, battens, clips, staples. Includes materials and shipping only. | Foot | $0.17 | 1320 | $224.40 |
| **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 | $172.07 | 1 | $172.07 |

**Practice:** 382 - Fence

**Scenario** #6 - Portable

**Scenario Description:**

Used for portable electrified fence that is manufactured for managing livestock on grazing systems within the confines of a permanent perimeter fence which supplies the electric charge. Typically used for polywire/tape fencing. Fence is installed according to state specifications and will facilitate implementation of grazing management that allows for an adequate rest and recovery period, protection of sensitive areas, improved water quality, reduction of noxious and invasive weeds. This fence might also be used as an extension of a permanent fence where seasonal flooding or other conditions dictate use of a removable fence. Typically one portable fence setup is used for a grazing system, and may be transported to fields within the system.

**Before Situation:**

On grazing lands health and vigor are negatively impacted by poor grazing distribution, timing of grazing and inadequate rest and recovery periods. Water quality may be impacted by increased erosion and runoff, livestock access to water bodies may be uncontrolled. Reduced vegetative cover increases the opportunity for encroachment of noxious and invasive weeds.

**After Situation:**

Pasture is subdivided into appropriately-sized paddocks to control animal access to forage. Fence is comprised of materials manufactured for this use, including poly wire, rope, or tape, fiberglass rods, and reels to hold the conductors. Typical pasture is subdivided with a movable system to control livestock and allow for appropriate rest and recovery of forage.

**Feature Measure:** Length of Fence

**Scenario Unit::** Foot

**Scenario Typical Size:** 1,000.0

**Scenario Total Cost:** $649.14

**Scenario Cost/Unit:** $0.65

Cost Details:

| Component Name | ID | Description | Unit | Cost | QTY | Total |
|---|---|---|---|---|---|---|
| **Materials** | | | | | | |
| Wire, Polytape | 7 | Wire, Polytape for electric fence. Rolls of 655' to 825'. Includes materials and shipping only. | Each | $50.07 | 4 | $200.28 |
| Post, Steel T, 1.33 lbs, 6' | 15 | Steel Post, Studded 6' - 1.33 lb. Includes materials and shipping only. | Each | $6.68 | 2 | $13.36 |
| Post, Fiberglass, 11/16" X 6' | 19 | Fiberglass line post, 11/16" diameter X 6' length. Includes materials and shipping only. | Each | $6.50 | 67 | $435.50 |

**Practice:** 382 - Fence

**Scenario** #7 - Confinement

**Scenario Description:**

Install a rugged wood board or woven wire fence in confinement areas such as HUA's. Typically used on an areas less than 1/4 to 1/2 acre in size, such as a Heavy Use Area, Vegetated Treatment Area, or other situations where installation of fence reduces resource concerns associated with livestock feeding operations.

**Before Situation:**

Lack of HUA and/or appropriate confinement fence results in degradation of pasture, vegetated treatment areas, or other sensitive areas.

**After Situation:**

Installation of fence reduces resource concerns associated with livestock access and/or prevents conflicts between humans and threatened, endangered or sensitive species.

**Feature Measure:** Length of Fence

**Scenario Unit::** Foot

**Scenario Typical Size:** 330.0

**Scenario Total Cost:** $2,905.99

**Scenario Cost/Unit:** $8.81

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 | $7.31 | 11 | $80.41 |
| Truck, Pickup | 939 | Equipment and power unit costs. Labor not included. | Hour | $21.79 | 4 | $87.16 |
| Tractor, agricultural, 60 HP | 963 | Agricultural tractor with horsepower range of 50 to 90. Equipment and power unit costs. Labor not included. | Hour | $24.77 | 16 | $396.32 |
| **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 | $25.31 | 24 | $607.44 |
| Equipment Operators, Light | 232 | Includes: Skid Steer Loaders, Hydraulic Excavators <50 HP, Trenchers <12", Ag Equipment <150 HP, Pickup Trucks, Forklifts, Mulchers | Hour | $25.23 | 16 | $403.68 |
| **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 | 0.5 | $35.60 |
| Wire, Woven, Galvanized, 12.5 Gauge, 48" | 4 | Galvanized 12.5 gauge, 48" - 330' roll. Includes materials and shipping only. | Each | $257.12 | 1 | $257.12 |
| Post, Wood, CCA treated, 4" x 8' | 10 | Wood Post, Line 4" X 8', CCA Treated. Includes materials and shipping only. | Each | $8.06 | 21 | $169.26 |
| Post, Wood, CCA treated, 5" x 8' | 11 | Wood Post, End 5" X 8', CCA Treated. Includes materials and shipping only. | Each | $11.26 | 12 | $135.12 |
| 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 |
| Gate, Pipe, 16' | 1059 | 6 rail tube gate, 16 gauge. Includes materials and shipping only. | Each | $208.54 | 1 | $208.54 |
| **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 | $172.07 | 2 | $344.14 |

**Practice:** 382 - Fence

**Scenario** #8 - Chain Link/Safety

**Scenario Description:**

A barrier (fence) implemented on an NRCS constructed waste storage system according to engineering design to exclude human access. Permanently installed fence built to keep humans away from waste ponds & lagoons.

**Before Situation:**

Where a NRCS designed and constructed waste storage pond is planned, and significant risk to human safety is determined to be evident.

**After Situation:**

A five foot high chain link fence is installed to exclude humans and livestock from the waste storage pond for safety purposes. The fenced area would typically be 100 wide x 175 long with one gate and installed by a fencing contractor.

**Feature Measure:** Length of Fence

**Scenario Unit::** Foot

**Scenario Typical Size:** 500.0

**Scenario Total Cost:** $7,456.55

**Scenario Cost/Unit:** $14.91

Cost Details:

| Component Name | ID | Description | Unit | Cost | QTY | Total |
|---|---|---|---|---|---|---|
| **Materials** | | | | | | |
| Fence, Chain Link | 1079 | Fence, Chain Link, 5' High, 9 ga Wire, Posts in Concrete on 10' Centers. Includes all materials, equipment and labor. | Foot | $14.62 | 500 | $7,310.00 |
| Gate, Chain Link, 18', Slide Gate | 1081 | Chain Link Gate, 18 ' Wide X 5' Tall, Installed in Concrete | Each | $146.55 | 1 | $146.55 |

**Practice:** 384 - Woody Residue Treatment

**Scenario** #1 - Orchard/Vineyard prunings/removals

**Scenario Description:**

Slash created from orchard/vineyard prunings is chipped or mulched and removed from the site in order to accomplish one or more purposes: reducing wildfire fuels and insect/disease substrate; improving access; and/or reducing potential risk to livestock and humans. Air emission reductions are achieved by chipping or shredding the materials in lieu of burning them. Material may be incorporated in the soil, used as a dust suppressant on unpaved roads or traffic areas. Resource concerns include Wildfire hazard from excessive biomass accumulation and Emissions of particulate matter.

**Before Situation:**

Wood waste is either burned, creating an air quality issue, or left in place creating a wildfire hazard, an impediment to access, or a potential site for harboring pests. Energy conservation was not implemented.

**After Situation:**

Treatment of pruning residue results in the reduction in air pollutants, energy conservation occurred, improvement in access, and the reduction of sites that can harbor pests.

**Feature Measure:** Acres of orchard/vineyard with slas

**Scenario Unit::** Acre

**Scenario Typical Size:** 20.0

**Scenario Total Cost:** $4,828.38

**Scenario Cost/Unit:** $241.42

Cost Details:

| Component Name | ID | Description | Unit | Cost | QTY | Total |
|---|---|---|---|---|---|---|
| **Equipment Installation** | | | | | | |
| Skidsteer, 80 HP | 933 | Skidsteer loader with horsepower range of 60 to 90. Equipment and power unit costs. Labor not included. | Hour | $44.60 | 16 | $713.60 |
| Brush Chipper, 6" capacity | 938 | Brush Chipper, 6" capacity, typically 35 HP. Includes chipper and power unit. Labor not included. | Hour | $21.25 | 16 | $340.00 |
| Truck, dump, 8 CY | 1401 | Dump truck for moving bulk material. Typically capacity is 12 ton or 8 cubic yards. Includes equipment only. | Hour | $57.56 | 16 | $920.96 |
| **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 | $25.31 | 48 | $1,214.88 |
| Equipment Operators, Light | 232 | Includes: Skid Steer Loaders, Hydraulic Excavators <50 HP, Trenchers <12", Ag Equipment <150 HP, Pickup Trucks, Forklifts, Mulchers | Hour | $25.23 | 48 | $1,211.04 |
| **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 | $172.07 | 1 | $172.07 |
| Mobilization, medium equipment | 1139 | Equipment with 70-150 HP or typical weights between 14,000 and 30,000 pounds. | Each | $255.83 | 1 | $255.83 |

**Practice:** 384 - Woody Residue Treatment

**Scenario** #2 - Restoration/conservation treatment following catastrophic events

**Scenario Description:**

The use of a combination of hand (chainsaw) and heavy equipment similar to those used in logging to treat slash resulting from catastrophic events such as fire, wind, severe pest outbreak, ice storm, etc. This scenario will remove/treat the larger material the size of which is consistent with the large equipment used. Resource concerns include: Excessive plant pest pressure, Potential emissions of particulate matter, Wildfire hazard from excessive biomass accumulation, and Habitat degradation.

**Before Situation:**

A large amount of slash and woody residue is created as a result of a non-silvicultural event such as a wind storm, wildfire, ice storm, pest outbreak, etc. Because the slash and residue is created by a catastrophic event that can cause tree-lodging, snags, broken tops, etc.; treatment is both difficult and dangerous. The presence of this material causes adverse effects on the forest include limiting access for management purposes, increasing the wildfire hazard, increasing the risk of potential harm to humans and livestock, and providing harboring sites for pests.

**After Situation:**

The material resulting from the catastrophic event is reduced to a level that will minimize the resource concerns.

**Feature Measure:** Acres of affected forest

**Scenario Unit::** Acre

**Scenario Typical Size:** 20.0

**Scenario Total Cost:** $17,864.69

**Scenario Cost/Unit:** $893.23

Cost Details:

| Component Name | ID | Description | Unit | Cost | QTY | Total |
|---|---|---|---|---|---|---|
| **Equipment Installation** | | | | | | |
| Track Loader, 95HP | 935 | Equipment and power unit costs. Labor not included. | Hour | $88.16 | 40 | $3,526.40 |
| Chainsaw | 937 | Equipment and power unit costs. Labor not included. | Hour | $4.37 | 80 | $349.60 |
| Log skidder | 942 | Equipment and power unit costs. Labor not included. | Hour | $127.52 | 40 | $5,100.80 |
| Truck, dump, 8 CY | 1401 | Dump truck for moving bulk material. Typically capacity is 12 ton or 8 cubic yards. Includes equipment only. | Hour | $57.56 | 40 | $2,302.40 |
| **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 | $25.31 | 80 | $2,024.80 |
| Equipment Operators, Light | 232 | Includes: Skid Steer Loaders, Hydraulic Excavators <50 HP, Trenchers <12", Ag Equipment <150 HP, Pickup Trucks, Forklifts, Mulchers | Hour | $25.23 | 80 | $2,018.40 |
| 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 | $44.37 | 40 | $1,774.80 |
| **Mobilization** | | | | | | |
| Mobilization, medium equipment | 1139 | Equipment with 70-150 HP or typical weights between 14,000 and 30,000 pounds. | Each | $255.83 | 3 | $767.49 |

**Practice:** 384 - Woody Residue Treatment

**Scenario** #3 - Woody residue/silvacultural slash treatment-light

**Scenario Description:**

Treating an area of forest slash to reduce hazardous fuels and the risk of insect and disease, improve organic matter and reduce erosion while improving water quality. Slash is treated with both hand (cutting, lopping, etc.) and mechanically (masticating, chipping, etc.). Typically done by hand and light equipment. Resource concerns include: Wildfire hazard from excessive biomass accumulation and potential Excessive plant pest pressure.

**Before Situation:**

Woody material resulting from a silvicultural practice such as pruning or a light thinning operation is causing both fire hazard and pest issues.

**After Situation:**

Fire and pest issues are reduced with slash spread out and in contact with the ground. Additional benefits include reduced soil movement. The soil is protected and/or enhanced.

**Feature Measure:** Acres treated

**Scenario Unit::** Acre

**Scenario Typical Size:** 40.0

**Scenario Total Cost:** $7,886.23

**Scenario Cost/Unit:** $197.16

Cost Details:

| Component Name | ID | Description | Unit | Cost | QTY | Total |
|---|---|---|---|---|---|---|
| **Equipment Installation** | | | | | | |
| Chainsaw | 937 | Equipment and power unit costs. Labor not included. | Hour | $4.37 | 80 | $349.60 |
| Truck, Pickup | 939 | Equipment and power unit costs. Labor not included. | Hour | $21.79 | 40 | $871.60 |
| 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 | $25.31 | 80 | $2,024.80 |
| Equipment Operators, Light | 232 | Includes: Skid Steer Loaders, Hydraulic Excavators <50 HP, Trenchers <12", Ag Equipment <150 HP, Pickup Trucks, Forklifts, Mulchers | Hour | $25.23 | 40 | $1,009.20 |
| **Mobilization** | | | | | | |
| Mobilization, medium equipment | 1139 | Equipment with 70-150 HP or typical weights between 14,000 and 30,000 pounds. | Each | $255.83 | 1 | $255.83 |

**Practice:** 384 - Woody Residue Treatment

**Scenario** #4 - Chipping and hauling off-site

**Scenario Description:**

Reducing woody waste created during forestry, agroforestry and horticultural activities by gathering, chipping, and hauling off site to achieve management objectives. Does not include transport from property to a commercial facility. Resource concerns include potential Emissions of particulate matter, potential Excessive plant pest pressure, and Wildfire hazard from excessive biomass accumulation .

**Before Situation:**

Woody residue causes management issues including resource access, fire hazard and sites for harboring pests.

**After Situation:**

Fire and pest issues are reduced. Air and energy resources are conserved.

**Feature Measure:** Acres treated

**Scenario Unit::** Acre

**Scenario Typical Size:** 20.0

**Scenario Total Cost:** $5,892.90

**Scenario Cost/Unit:** $294.65

Cost Details:

| Component Name | ID | Description | Unit | Cost | QTY | Total |
|---|---|---|---|---|---|---|
| **Equipment Installation** | | | | | | |
| Chainsaw | 937 | Equipment and power unit costs. Labor not included. | Hour | $4.37 | 20 | $87.40 |
| Brush Chipper, 6" capacity | 938 | Brush Chipper, 6" capacity, typically 35 HP. Includes chipper and power unit. Labor not included. | Hour | $21.25 | 20 | $425.00 |
| Log skidder | 942 | Equipment and power unit costs. Labor not included. | Hour | $127.52 | 10 | $1,275.20 |
| Truck, dump, 8 CY | 1401 | Dump truck for moving bulk material. Typically capacity is 12 ton or 8 cubic yards. Includes equipment only. | Hour | $57.56 | 20 | $1,151.20 |
| **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 | $25.31 | 40 | $1,012.40 |
| Equipment Operators, Light | 232 | Includes: Skid Steer Loaders, Hydraulic Excavators <50 HP, Trenchers <12", Ag Equipment <150 HP, Pickup Trucks, Forklifts, Mulchers | Hour | $25.23 | 60 | $1,513.80 |
| **Mobilization** | | | | | | |
| Mobilization, small equipment | 1138 | Equipment <70 HP but can't be transported by a pick-up truck or with typical weights between 3,500 to 14,000 pounds. | Each | $172.07 | 1 | $172.07 |
| Mobilization, medium equipment | 1139 | Equipment with 70-150 HP or typical weights between 14,000 and 30,000 pounds. | Each | $255.83 | 1 | $255.83 |

**Practice:** 384 - Woody Residue Treatment

**Scenario** #5 - Forest Slash Treatment - Med/Heavy

**Scenario Description:**

Treating an area of significant woody plant residues to reduce hazardous fuels and the risk of insect and disease, improve organic matter, decrease unwanted habitat, and reduce erosion while improving water quality. Slash is to be lopped/treated/crushed within a foot of the ground or moved off site to meet state fire hazard reduction standards. Typically heavy equipment are used such as masticators, mulchers, drum choppers, etc. Hand work with chainsaws are used on steep slopes. Resource concerns include potential Emission of particulate matter, Wildfire hazard from excessive biomass accumulation, Excessive plant pest pressure, and Habitat degradation.

**Before Situation:**

Heavy woody material (difficult to walk through) resulting from silvicultural/management operations caused both fire hazard, access, potential harm to humans and animals, and pest issues.

**After Situation:**

Fire, access, and pest issues are reduced with slash spread out and in contact with the ground. An additional benefit is reduced soil movement.

**Feature Measure:** Acres treated

**Scenario Unit::** Acre

**Scenario Typical Size:** 40.0

**Scenario Total Cost:** $18,869.65

**Scenario Cost/Unit:** $471.74

Cost Details:

| Component Name | ID | Description | Unit | Cost | QTY | Total |
|---|---|---|---|---|---|---|
| **Equipment Installation** | | | | | | |
| Chainsaw | 937 | Equipment and power unit costs. Labor not included. | Hour | $4.37 | 40 | $174.80 |
| Truck, Pickup | 939 | Equipment and power unit costs. Labor not included. | Hour | $21.79 | 40 | $871.60 |
| 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 | $159.66 | 80 | $12,772.80 |
| **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 | $25.31 | 40 | $1,012.40 |
| 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 | $44.37 | 80 | $3,549.60 |
| **Mobilization** | | | | | | |
| Mobilization, large equipment | 1140 | Equipment >150HP or typical weights greater than 30,000 pounds or loads requiring over width or over length permits. | Each | $488.45 | 1 | $488.45 |

**Practice:** 386 - Field Border

**Scenario** #5 - Field Border, Native Species

**Scenario Description:**

A strip of permanent vegetation established at the edge or around the perimeter of an agricultural field. Practice includes seedbed prep and planting of organic seed for herbaceous species.

**Before Situation:**

Before practice conditions may vary widely. Fields may have erosion issues from wind or water, a field border may be needed to manage pest populations, protect soil and water quality, provide wildlife food and cover, provide pollinator habitat, or a field border may be used to increase carbon storage and improve air quality. Water quality, soil erosion and/or wildlife food and cover may all be primary resource concerns.

**After Situation:**

The 386 Implementation Requirements have been developed and applied for the site. This practice when applied around a field may support and connect other buffer practices while creating a buffer between organic systems and conventional cropping systems. Native grasses and legumes will be established in the field border to the extent needed to meet the resource needs and producer objectives. Minimum field border widths shall be based on NRCS local design criteria specific to the purpose for installing the practice. Species selected shall be adapted to the site, not function as a host for diseases of a field crop, and have physical characteristics necessary to control wind and water erosion to tolerable levels on the field border area.

**Feature Measure:** number of acres

**Scenario Unit::** Acre

**Scenario Typical Size:** 1.0

**Scenario Total Cost:** $123.84

**Scenario Cost/Unit:** $123.84

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 | $11.14 | 3 | $33.42 |
| Seeding Operation, No Till/Grass Drill | 960 | No Till drill or grass drill for seeding. Includes equipment, power unit and labor costs. | Acre | $21.36 | 1 | $21.36 |
| **Materials** | | | | | | |
| 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 | $69.06 | 1 | $69.06 |

**Practice:** 386 - Field Border

**Scenario** #6 - Field Border, Introduced Species

**Scenario Description:**

A strip of permanent vegetation established at the edge or around the perimeter of an agricultural field. Practice includes seedbed prep and planting of introduced species.

**Before Situation:**

Before practice conditions may vary widely. Fields may have erosion issues from wind or water, a field border may be needed to manage pest populations, protect soil and water quality, provide wildlife food and cover, provide pollinator habitat, or a field border may be used to increase carbon storage and improve air quality. Water quality, soil erosion and/or wildlife food and cover may all be primary resource concerns.

**After Situation:**

The 386 Implementation Requirements have been developed and applied for the site. This practice when applied around a field may support and connect other buffer practices within and between fields. Introduced grasses and legumes will be established in the field border to the extent needed to meet the resource needs and producer objectives. Minimum field border widths shall be based on NRCS local design criteria specific to the purpose for installing the practice. Species selected shall be adapted to site, will not function as a host for diseases of a field crop, and have physical characteristics necessary to control wind and water erosion to tolerable levels on the field border area.

**Feature Measure:** Number of acres

**Scenario Unit::** Acre

**Scenario Typical Size:** 1.0

**Scenario Total Cost:** $92.06

**Scenario Cost/Unit:** $92.06

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 | $11.14 | 1 | $11.14 |
| Seeding Operation, No Till/Grass Drill | 960 | No Till drill or grass drill for seeding. Includes equipment, power unit and labor costs. | Acre | $21.36 | 1 | $21.36 |
| **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 | $0.49 | 30 | $14.70 |
| 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 | $0.65 | 20 | $13.00 |
| One Species, Cool Season, Introduced Perennial Grass | 2313 | Introduced, cool season perennial grass. Includes material and shipping only. | Acre | $31.86 | 1 | $31.86 |

**Practice:** 386 - Field Border

**Scenario** #7 - Field Border, Pollinator

**Scenario Description:**

A strip of permanent vegetation established at the edge or around the perimeter of a field. This practice may also apply to recreation land or other land uses where agronomic crops including forages are grown. Practice includes seedbed prep and planting of pollinator friendly species.

**Before Situation:**

Before practice conditions may vary widely. Fields may have erosion issues from wind or water, a field border may be needed to manage pest populations, protect soil and water quality, provide wildlife food and cover, provide pollinator habitat, or a field border may be used to increase carbon storage and improve air quality. Water quality, soil erosion and/or wildlife food and cover may all be primary resource concerns.

**After Situation:**

The 386 Implementation Requirements have been developed and applied for the site. This practice when applied around a field may support and connect other buffer practices within and between fields. Pollinator herbaceous plantings will provide species which flower throughout the growing season. This provides a source of nectar for adult pollinators and a diversity of herbaceous material for immature pollinator life stages and for nesting. Minimum field border widths shall be based on NRCS local design criteria specific to the purpose for installing the practice. Species selected shall be adapted to site, will not function as a host for diseases of a field crop, and have physical characteristics necessary to control wind and water erosion to tolerable levels on the field border area.

**Feature Measure:** Number of acres

**Scenario Unit::** Acre

**Scenario Typical Size:** 1.0

**Scenario Total Cost:** $181.23

**Scenario Cost/Unit:** $181.23

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 | $11.14 | 3 | $33.42 |
| Seeding Operation, No Till/Grass Drill | 960 | No Till drill or grass drill for seeding. Includes equipment, power unit and labor costs. | Acre | $21.36 | 1 | $21.36 |
| **Materials** | | | | | | |
| Untreated Conventional Seed, Pollinator Mix, Perennial Grass and Forb Mix | 2503 | Untreated conventional grass and legume pollinator mix. Includes material and shipping only. | Acre | $126.45 | 1 | $126.45 |

**Practice:** 386 - Field Border

**Scenario** #28 - Field Border, Native Species, Forgone Income

**Scenario Description:**

A strip of permanent vegetation established at the edge or around the perimeter of an agricultural field. Practice includes seedbed prep and planting of native species. The area of the field border is taken out of production.

**Before Situation:**

Before practice conditions may vary widely. Fields may have erosion issues from wind or water, a field border may be needed to manage pest populations, protect soil and water quality, provide wildlife food and cover, provide pollinator habitat, or a field border may be used to increase carbon storage and improve air quality. Water quality, soil erosion and/or wildlife food and cover may all be primary resource concerns.

**After Situation:**

The 386 Implementation Requirements have been developed and applied for the site. This practice when applied around a field may support and connect other buffer practices within and between fields. Native grasses, legumes and forbs will be established in the field borders to the extent needed to meet the resource needs and producer objectives. Minimum field border widths shall be based on NRCS local design criteria specific to the purpose for installing the practice. Native species shall be selected that do not function as a host for diseases of a field crop and have physical characteristics necessary to control wind and water erosion to tolerable levels on the field border area.

**Feature Measure:** number of acres

**Scenario Unit::** Acre

**Scenario Typical Size:** 1.0

**Scenario Total Cost:** $499.99

**Scenario Cost/Unit:** $499.99

Cost Details:

| Component Name | ID | Description | Unit | Cost | QTY | Total |
|---|---|---|---|---|---|---|
| **Equipment Installation** | | | | | | |
| Tillage, Light | 945 | Includes light disking (tandem) or field cultivator. Includes equipment, power unit and labor costs. | Acre | $11.14 | 3 | $33.42 |
| Seeding Operation, No Till/Grass Drill | 960 | No Till drill or grass drill for seeding. Includes equipment, power unit and labor costs. | Acre | $21.36 | 1 | $21.36 |
| **Foregone Income** | | | | | | |
| FI, Corn Dryland | 1959 | Dryland Corn is Primary Crop | Acre | $376.15 | 1 | $376.15 |
| **Materials** | | | | | | |
| One Species, Warm Season, Native Perennial Grass | 2322 | Native, warm season perennial grass. Includes material and shipping only. | Acre | $69.06 | 1 | $69.06 |

**Practice:** 386 - Field Border

**Scenario** #29 - Field Border, Introduced Species, Forgone Income

**Scenario Description:**

A strip of permanent vegetation established at the edge or around the perimeter of an agricultural field. Practice includes seedbed prep and planting of introduced species. The area of the field border is taken out of production.

**Before Situation:**

Before practice conditions may vary widely. Fields may have erosion issues from wind or water, a field border may be needed to manage pest populations, protect soil and water quality, provide wildlife food and cover, provide pollinator habitat, or a field border may be used to increase carbon storage and improve air quality. Water quality, soil erosion and/or wildlife food and cover may all be primary resource concerns.

**After Situation:**

The 386 Implementation Requirements have been developed and applied for the site. This practice when applied around a field may support and connect other buffer practices within and between fields. Introduced grasses and legumes will be established for the field border to the extent needed to meet the resource needs and producer objectives. Minimum field border widths shall be based on NRCS local design criteria specific to the purpose for installing the practice. Introduced species of grasses, legumes, forbs or shrubs shall be selected that are adapted to site, will not function as a host for diseases of a field crop and have physical characteristics necessary to control wind and water erosion to tolerable levels on the field border area.

**Feature Measure:** Number of acres

**Scenario Unit::** Acre

**Scenario Typical Size:** 1.0

**Scenario Total Cost:** $468.21

**Scenario Cost/Unit:** $468.21

Cost Details:

| Component Name | ID | Description | Unit | Cost | QTY | Total |
|---|---|---|---|---|---|---|
| **Equipment Installation** | | | | | | |
| Tillage, Light | 945 | Includes light disking (tandem) or field cultivator. Includes equipment, power unit and labor costs. | Acre | $11.14 | 1 | $11.14 |
| Seeding Operation, No Till/Grass Drill | 960 | No Till drill or grass drill for seeding. Includes equipment, power unit and labor costs. | Acre | $21.36 | 1 | $21.36 |
| **Foregone Income** | | | | | | |
| FI, Corn Dryland | 1959 | Dryland Corn is Primary Crop | Acre | $376.15 | 1 | $376.15 |
| **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 | $0.49 | 30 | $14.70 |
| 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 | $0.65 | 20 | $13.00 |
| One Species, Cool Season, Introduced Perennial Grass | 2313 | Introduced, cool season perennial grass. Includes material and shipping only. | Acre | $31.86 | 1 | $31.86 |

**Practice:** 386 - Field Border

**Scenario** #30 - Field Border, Pollinator, Forgone Income

**Scenario Description:**

A strip of permanent vegetation established at the edge or around the perimeter of an agricultural field. Practice includes seedbed prep and planting of pollinator friendly herbaceous species. The area of the field border is taken out of production.

**Before Situation:**

Before practice conditions may vary widely. Fields may have erosion issues from wind or water, a field border may be needed to manage pest populations, protect soil and water quality, provide wildlife food and cover, provide pollinator habitat, or a field border may be used to increase carbon storage and improve air quality. Water quality, soil erosion and/or wildlife food and cover may all be primary resource concerns.

**After Situation:**

The 386 Implementation Requirements have been developed and applied for the site. This practice when applied around a field may support and connect other buffer practices within and between fields. Pollinator herbaceous plantings will provide species which flower throughout the growing season. This provides a source of nectar for adult pollinators and a diversity of herbaceous material for immature pollinator life stages and for nesting. Minimum field border widths shall be based on NRCS local design criteria specific to the purpose for installing the practice. Species selected shall meet the pollinator habitat requirements of the state and be adapted to site; not function as a host for diseases of a field crop and; have physical characteristics necessary to control wind and water erosion to tolerable levels on the field border area.

**Feature Measure:** Number of acres

**Scenario Unit::** Acre

**Scenario Typical Size:** 1.0

**Scenario Total Cost:** $557.38

**Scenario Cost/Unit:** $557.38

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 | $11.14 | 3 | $33.42 |
| Seeding Operation, No Till/Grass Drill | 960 | No Till drill or grass drill for seeding. Includes equipment, power unit and labor costs. | Acre | $21.36 | 1 | $21.36 |
| **Foregone Income** | | | | | | |
| FI, Corn Dryland | 1959 | Dryland Corn is Primary Crop | Acre | $376.15 | 1 | $376.15 |
| **Materials** | | | | | | |
| Untreated Conventional Seed, Pollinator Mix, Perennial Grass and Forb Mix | 2503 | Untreated conventional grass and legume pollinator mix. Includes material and shipping only. | Acre | $126.45 | 1 | $126.45 |

**Practice:** 390 - Riparian Herbaceous Cover

**Scenario** #1 - Aquatic Wildlife

**Scenario Description:**

Aquatic Wildlife: 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 intermittent flooding and saturated soils where the existing plant community has been disturbed, destroyed, or the species diversity is unable to provide adequate habitat. Where the establishment of a diverse riparian herbaceous plant community is desired, an adapted mix of grasses, sedges, rushes, ferns, legumes, and/or forbs tolerant to the site conditions will be planted. Grasses such as prairie cordgrass (Spartina pectinata), sedges, rushes, and/or ferns will be planted using plugs. Additional site adapted species of grasses, legumes, and/or forbs may be added by broadcast and/or no-till or range drill seeding methods as necessary to accomplish the intended purpose(s). Where chemical control of undesirable vegetation, including invasives, is required to reduce competition for the desired plant community the Herbaceous Weed Control (315) practice should be used. Seedbed preparation may require LIGHT TILLAGE (disking). WHEN POLLINATOR HABITAT IS A CONSIDERATION: Include 5-10 adapted forb species that bloom sequentially throughout the growing season where feasible. To address the high diversity of riparian plant communities and their adjacent stream types that exist from the tropics to the tundra, and the deserts, prairies, mountains, and lowlands across the various regions and/or MLRA's, up to 20 adapted riparian plant community-specific scenarios may be required.

**Before Situation:**

The riparian zone, the specific area between terrestrial and aquatic habitats, vegetation is currently an undesirable or inadequate stand of perennial or annual vegetation as determined by the NRCS Stream Visual Assessment Protocol score of less than 5 for those elements and natural reseeding or vegetation management is unlikely to improve the plant community within a reasonable amount of time. Existing vegetation does not provide adequate food, cover, and/or connectivity for riparian wildlife, and contributes insufficient amounts of organic matter for stream species food and cover. Riparian vegetation quality and/or quantity have been compromised by human activities and/or access of vehicles, people, and/or livestock to the extent that the riparian area and floodplain are not functioning to provide the necessary stream and riparian habitat components. Existing conditions often require suppression or eradication of current vegetation by conventional mechanical or chemical (Herbaceous Weed Control (315)) methods to ensure establishment success of the new planting. Soil quality may be reduced due to compaction and may require light tillage to prepare a proper seedbed.

**After Situation:**

The riparian zone, the transitional zone between the terrestrial and aquatic habitats, is established to an adapted, diverse vegetative plant community and is under close management to insure long term survival and ecological succession. The quality and quantity of the riparian zone components are managed to support the species that depend on it for habitat as well as the functions it performs for stabilizing the streambank and/or shoreline, dissipating stream energy and trapping sediment, and improving and/or maintaining water quality. These functions include: stream temperature moderation through shading, recruitment of non-woody organic matter, habitat for terrestrial insects and other riparian dependent species, streambank integrity, and filtration of contaminants from surface run-off into the stream.

**Feature Measure:** Acres of Riparian Herbaceous Cove

**Scenario Unit::** Acre

**Scenario Typical Size:** 0.0

**Scenario Total Cost:** $1,325.13

**Scenario Cost/Unit:** #Div/0!

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 | $11.14 | 1 | $11.14 |
| Seeding Operation, No Till/Grass Drill | 960 | No Till drill or grass drill for seeding. Includes equipment, power unit and labor costs. | Acre | $21.36 | 1 | $21.36 |
| Tractor, agricultural, 120 HP | 962 | Agricultural tractor with horsepower range of 90 to 140. Equipment and power unit costs. Labor not included. | Hour | $57.70 | 1 | $57.70 |
| **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 | $25.31 | 40 | $1,012.40 |
| Equipment Operators, Light | 232 | Includes: Skid Steer Loaders, Hydraulic Excavators <50 HP, Trenchers <12", Ag Equipment <150 HP, Pickup Trucks, Forklifts, Mulchers | Hour | $25.23 | 2 | $50.46 |
| **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 | $172.07 | 1 | $172.07 |

**Practice:** 390 - Riparian Herbaceous Cover

**Scenario** #2 - Plugging and Seeding

**Scenario Description:**

Plugging: This scenario addresses inadequate herbaceous plant community function or diversity within the specific transitional zone between terrestrial and aquatic habitats in rangeland, pasture, cropland, and forest where natural seeding methods and/or management is unlikely to improve the plant community within a reasonable time period. This scenario applies to work not covered under NRCS Conservation Practice Range Planting (528), Forage and Biomass Planting (512), Critical Area Planting (342), Filter Strip (393), Restoration and Management of Rare and Declining Habitats (643), Streambank and Shoreline Protection ( 580), Vegetated Treatment Area (635), Wetland Enhancement ( 659), or Wetland Restoration (657). This practice can be used nation wide. The typical setting for this scenario is usually a narrow strip between the aquatic and terrestrial habitats subject to intermittent flooding and saturated soils where the existing plant community has been disturbed, destroyed, or the species diversity is unable to provide proper function and/or adequate habitat. Where the establishment of a diverse riparian herbaceous plant community is desired, an adapted mix of grasses, sedges, rushes, ferns, legumes, and/or forbs tolerant to the site conditions will be planted. Grasses such as prairie cordgrass (Spartina pectinata), sedges, rushes, and/or ferns will be planted using plugs. Additional site adapted species of grasses, legumes, and/or forbs may be added by broadcast and/or no-till or range drill seeding methods as necessary to accomplish the intended purpose(s). Where chemical control of undesirable vegetation, including invasives, is required to reduce competition for the desired plant community the Herbaceous Weed Control (315) practice should be used. Seedbed preparation may require LIGHT TILLAGE (disking). WHEN POLLINATOR HABITAT IS A CONSIDERATION: Include 5-10 adapted forb species that bloom sequentially throughout the growing season where feasible. To address the high diversity of riparian plant communities and their adjacent stream types that exist from the tropics to the tundra, and the deserts, prairies, mountains, and lowlands across the various regions and/or MLRA's, up to 20 adapted riparian plant community-specific scenarios may be required

**Before Situation:**

The riparian zone, the specific area between terrestrial and aquatic habitats, is currently an undesirable or inadequate stand of perennial or annual vegetation and natural reseeding or vegetation management is unlikely to improve the plant community within a reasonable amount of time to adequately address streambank and/or shoreline stability, dissipate stream energy and trap sediment, improve and/or maintain water quality, and/or provide adequate habitat corridors, food and/or cover for fish, wildlife, pollinators, and/or livestock resource concern(s). Existing conditions often require suppression or eradication of current vegetation by conventional mechanical or chemical (Herbaceous Weed Control (315)) methods to ensure establishment success of the new planting.

**After Situation:**

The riparian zone, the transitional zone between the terrestrial and aquatic habitats, is established to an adapted, diverse vegetative plant community and is under close management to insure long term survival and ecological succession. The quality and quantity of the riparian zone components are managed to support the species that depend on it for habitat as well as the functions it performs for stabilizing the streambank and/or shoreline, dissipating stream energy and trapping sediment, and improving and/or maintaining water quality. These functions include: stream temperature moderation through shading, recruitment of non-woody organic matter, habitat for terrestrial insects and other riparian dependent species, streambank integrity, and filtration of contaminants from surface run-off into the stream.

**Feature Measure:** Acres of Riparian Herbaceous Cove

**Scenario Unit::** Acre

**Scenario Typical Size:** 0.0

**Scenario Total Cost:** $12,007.68

**Scenario Cost/Unit:** #Div/0!

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 | $11.14 | 1 | $11.14 |
| **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 | $25.31 | 40 | $1,012.40 |
| **Materials** | | | | | | |
| Native Aquatic Plants, Emergent or Submerged | 2336 | Native aquatic emergent or submerged. All required materials for establishing vegetation. Includes material and shipping. | Each | $1.33 | 8000 | $10,640.00 |
| **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 | $172.07 | 2 | $344.14 |

**Practice:** 390 - Riparian Herbaceous Cover

**Scenario** #3 - Warm Season Grass w/ Forbs

**Scenario Description:**

Warm Season Grasses with Forbs: This scenario addresses inadequate herbaceous plant community function or diversity within the specific transitional zone between terrestrial and aquatic habitats in rangeland, pasture, cropland, and forest where natural seeding methods and/or management is unlikely to improve the plant community within a reasonable time period. This scenario applies to work not covered under NRCS Conservation Practice Range Planting (528), Forage and Biomass Planting (512), Critical Area Planting (342), Filter Strip (393), Restoration and Management of Rare and Declining Habitats (643), Streambank and Shoreline Protection ( 580), Vegetated Treatment Area (635), Wetland Enhancement ( 659), or Wetland Restoration (657). This practice can be used nation wide. The typical setting for this scenario is usually a narrow strip between the aquatic and terrestrial habitats subject to intermittent flooding and saturated soils where the existing plant community has been disturbed, destroyed, or the species diversity is unable to provide proper function and/or adequate habitat. Where the establishment of a diverse riparian herbaceous plant community is desired, an adapted mix of primarily 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 concern(s). Existing conditions often require suppression or eradication of current vegetation by conventional mechanical or chemical (Herbaceous Weed Control (315)) methods to ensure establishment success of the new planting.

**After Situation:**

The riparian zone, the transitional zone between the terrestrial and aquatic habitats, is established to an adapted, diverse vegetative plant community and is under close management to insure long term survival and ecological succession. The quality and quantity of the riparian zone components are managed to support the species that depend on it for habitat as well as the functions it performs for stabilizing the streambank and/or shoreline, dissipating stream energy and trapping sediment, and improving and/or maintaining water quality. These functions include: stream temperature moderation through shading, recruitment of non-woody organic matter, habitat for terrestrial insects and other riparian dependent species, streambank integrity, and filtration of contaminants from surface run-off into the stream.

**Feature Measure:** Acres of Riparian Herbaceous Cove

**Scenario Unit::** Acre

**Scenario Typical Size:** 0.0

**Scenario Total Cost:** $542.50

**Scenario Cost/Unit:** #Div/0!

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 | $11.14 | 1 | $11.14 |
| Seeding Operation, No Till/Grass Drill | 960 | No Till drill or grass drill for seeding. Includes equipment, power unit and labor costs. | Acre | $21.36 | 1 | $21.36 |
| Tractor, agricultural, 120 HP | 962 | Agricultural tractor with horsepower range of 90 to 140. Equipment and power unit costs. Labor not included. | Hour | $57.70 | 2 | $115.40 |
| **Labor** | | | | | | |
| Equipment Operators, Light | 232 | Includes: Skid Steer Loaders, Hydraulic Excavators <50 HP, Trenchers <12", Ag Equipment <150 HP, Pickup Trucks, Forklifts, Mulchers | Hour | $25.23 | 2 | $50.46 |
| **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 | $172.07 | 2 | $344.14 |

**Practice:** 390 - Riparian Herbaceous Cover

**Scenario** #4 - Cool Season Grasses w/ Forbs

**Scenario Description:**

Cool Season Grasses with Forbs: This scenario addresses inadequate herbaceous plant community function or diversity within the specific transitional zone between terrestrial and aquatic habitats in rangeland, pasture, cropland, and forest where natural seeding methods and/or management is unlikely to improve the plant community within a reasonable time period. This scenario applies to work not covered under NRCS Conservation Practice Range Planting (528), Forage and Biomass Planting (512), Critical Area Planting (342), Filter Strip (393), Restoration and Management of Rare and Declining Habitats (643), Streambank and Shoreline Protection ( 580), Vegetated Treatment Area (635), Wetland Enhancement ( 659), or Wetland Restoration (657). This practice can be used nation wide. The typical setting for this scenario is usually a narrow strip between the aquatic and terrestrial habitats subject to intermittent flooding and saturated soils where the existing plant community has been disturbed, destroyed, or the species diversity is unable to provide proper function and/or adequate habitat. Where the establishment of a diverse riparian herbaceous plant community is desired, an adapted mix of primarily cool season grasses, legumes, and/or forbs tolerant to the site conditions will be planted by broadcast and/or no-till or range drill seeding methods as necessary to accomplish the intended purpose(s). Where chemical control of undesirable vegetation, including invasives, is required to reduce competition for the desired plant community the Herbaceous Weed Control (315) practice should be used. Seedbed preparation may require LIGHT TILLAGE (disking). WHEN POLLINATOR HABITAT IS A CONSIDERATION: Include 5-10 adapted forb species that bloom sequentially throughout the growing season where feasible. To address the high diversity of riparian plant communities and their adjacent stream types that exist from the tropics to the tundra, and the deserts, prairies, mountains, and lowlands across the various regions and/or MLRA's, up to 20 adapted riparian plant community-specific scenarios may be required

**Before Situation:**

The riparian zone, the specific area between terrestrial and aquatic habitats, is currently an undesirable or inadequate stand of perennial or annual vegetation and natural reseeding or vegetation management is unlikely to improve the plant community within a reasonable amount of time to adequately address streambank and/or shoreline stability, dissipate stream energy and trap sediment, improve and/or maintain water quality, and/or provide adequate habitat corridors, food and/or cover for fish, wildlife, pollinators, and/or livestock resource concern(s). Existing conditions often require suppression or eradication of current vegetation by conventional mechanical or chemical (Herbaceous Weed Control (315)) methods to ensure establishment success of the new planting. Soil quality may be reduced due to compaction and may require light tillage to prepare a proper seedbed.

**After Situation:**

The riparian zone, the transitional zone between the terrestrial and aquatic habitats, is established to an adapted, diverse vegetative plant community and is under close management to insure long term survival and ecological succession. The quality and quantity of the riparian zone components are managed to support the species that depend on it for habitat as well as the functions it performs for stabilizing the streambank and/or shoreline, dissipating stream energy and trapping sediment, and improving and/or maintaining water quality. These functions include: stream temperature moderation through shading, recruitment of non-woody organic matter, habitat for terrestrial insects and other riparian dependent species, streambank integrity, and filtration of contaminants from surface run-off into the stream.

**Feature Measure:** Acres of Riparian Herbaceous Cove

**Scenario Unit::** Acre

**Scenario Typical Size:** 0.0

**Scenario Total Cost:** $542.50

**Scenario Cost/Unit:** #Div/0!

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 | $11.14 | 1 | $11.14 |
| Seeding Operation, No Till/Grass Drill | 960 | No Till drill or grass drill for seeding. Includes equipment, power unit and labor costs. | Acre | $21.36 | 1 | $21.36 |
| Tractor, agricultural, 120 HP | 962 | Agricultural tractor with horsepower range of 90 to 140. Equipment and power unit costs. Labor not included. | Hour | $57.70 | 2 | $115.40 |
| **Labor** | | | | | | |
| Equipment Operators, Light | 232 | Includes: Skid Steer Loaders, Hydraulic Excavators <50 HP, Trenchers <12", Ag Equipment <150 HP, Pickup Trucks, Forklifts, Mulchers | Hour | $25.23 | 2 | $50.46 |
| **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 | $172.07 | 2 | $344.14 |

**Practice:** 391 - Riparian Forest Buffer

**Scenario** #1 - Bare Root, All Shelters

**Scenario Description:**

Establish a buffer of trees and/or shrubs into a suitably prepared site to restore riparian plant communities and associated benefits. Typically used to plant bare-root trees and/or shrubs according to state specifications . Assumes all hardwood trees have shelters/protectors. Does not include weed barrier - use Mulching (484).

**Before Situation:**

Typical sites include former riparian forests and habitat used for forage, cropland, speculation property, or other nonforest condition which contains undesirable amounts or types of vegetation. Active bank erosion is depositing sediment, nutrients and organics in the riparian area. Water temperature is high due to lack of shade. Habitat is not desirable for wildlife.

**After Situation:**

A buffer of trees and shrubs will be established along the riparian corridor which will provide stability, filtration, shade, and desirable habitat to address the above mentioned resource concerns.

**Feature Measure:** Area of planting

**Scenario Unit::** Acre

**Scenario Typical Size:** 1.0

**Scenario Total Cost:** $2,444.68

**Scenario Cost/Unit:** $2,444.68

Cost Details:

| Component Name | ID | Description | Unit | Cost | QTY | Total |
|---|---|---|---|---|---|---|
| **Equipment Installation** | | | | | | |
| Truck, Pickup | 939 | Equipment and power unit costs. Labor not included. | Hour | $21.79 | 8 | $174.32 |
| All terrain vehicles, ATV | 965 | Includes equipment, power unit and labor costs. | Hour | $28.28 | 8 | $226.24 |
| Trailer, enclosed, small | 1503 | Small enclosed trailer (typically less than 30' in length) pulled by a pickup to transport materials and equipment. Truck not included. | Hour | $7.12 | 8 | $56.96 |
| 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 | $25.31 | 24 | $607.44 |
| 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 | $45.69 | 4 | $182.76 |
| **Materials** | | | | | | |
| Shrub, seedling or transplant, bare root, 18"-36" | 1507 | Bare root hardwood trees 18-36" tall. Includes materials and shipping only. | Each | $0.57 | 100 | $57.00 |
| Tree, hardwood, seedling or transplant, bare root, 16-36" | 1510 | Bare root hardwood trees 18-36" tall. Includes materials and shipping only. | Each | $0.80 | 250 | $200.00 |
| Tree, conifer, seedling, bare root, 1-1 | 1513 | Bare root conifer trees, 1-1 (2 years old). Includes materials and shipping only. | Each | $0.41 | 100 | $41.00 |
| 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 | $2.33 | 250 | $582.50 |
| Stake, bamboo, 3/8" x 36" | 1584 | 3/8" x 36" bamboo stakes to anchor items in place. Inlcudes materials and shipping only. | Each | $0.11 | 250 | $27.50 |

**Practice:** 391 - Riparian Forest Buffer

**Scenario** #2 - Bare Root, Half Shelters

**Scenario Description:**

Establish a buffer of trees and/or shrubs into a suitably prepared site to restore riparian plant communities and associated benefits. Typically used to plant bare-root trees and/or shrubs according to state specifications . Assumes half of the hardwood trees have shelters/protectors. Does not include weed barrier - use Mulching (484).

**Before Situation:**

Typical sites include former riparian forests and habitat used for forage, cropland, speculation property, or other nonforest condition which contains undesirable amounts or types of vegetation. Active bank erosion is depositing sediment, nutrients and organics in the riparian area. Water temperature is high due to lack of shade. Habitat is not desirable for wildlife.

**After Situation:**

A buffer of trees and shrubs will be established along the riparian corridor which will provide stability, filtration, shade, and desirable habitat to address the above mentioned resource concerns.

**Feature Measure:** Area of planting

**Scenario Unit::** Acre

**Scenario Typical Size:** 1.0

**Scenario Total Cost:** $2,153.43

**Scenario Cost/Unit:** $2,153.43

Cost Details:

| Component Name | ID | Description | Unit | Cost | QTY | Total |
|---|---|---|---|---|---|---|
| **Equipment Installation** | | | | | | |
| Truck, Pickup | 939 | Equipment and power unit costs. Labor not included. | Hour | $21.79 | 8 | $174.32 |
| All terrain vehicles, ATV | 965 | Includes equipment, power unit and labor costs. | Hour | $28.28 | 8 | $226.24 |
| Trailer, enclosed, small | 1503 | Small enclosed trailer (typically less than 30' in length) pulled by a pickup to transport materials and equipment. Truck not included. | Hour | $7.12 | 8 | $56.96 |
| 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 | $25.31 | 24 | $607.44 |
| 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 | $45.69 | 4 | $182.76 |
| **Materials** | | | | | | |
| Shrub, seedling or transplant, bare root, 18"-36" | 1507 | Bare root hardwood trees 18-36" tall. Includes materials and shipping only. | Each | $0.57 | 100 | $57.00 |
| Tree, hardwood, seedling or transplant, bare root, 16-36" | 1510 | Bare root hardwood trees 18-36" tall. Includes materials and shipping only. | Each | $0.80 | 250 | $200.00 |
| Tree, conifer, seedling, bare root, 1-1 | 1513 | Bare root conifer trees, 1-1 (2 years old). Includes materials and shipping only. | Each | $0.41 | 100 | $41.00 |
| 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 | $2.33 | 125 | $291.25 |
| Stake, bamboo, 3/8" x 36" | 1584 | 3/8" x 36" bamboo stakes to anchor items in place. Inlcudes materials and shipping only. | Each | $0.11 | 250 | $27.50 |

**Practice:** 391 - Riparian Forest Buffer

**Scenario** #3 - Bare Root, No Shelters

**Scenario Description:**

Establish a buffer of trees and/or shrubs into a suitably prepared site to restore riparian plant communities and associated benefits. Typically used to plant bare-root trees and/or shrubs according to state specifications . Assumes none of the hardwood trees have shelters/protectors. Does not include weed barrier - use Mulching (484).

**Before Situation:**

Typical sites include former riparian forests and habitat used for forage, cropland, speculation property, or other nonforest condition which contains undesirable amounts or types of vegetation. Active bank erosion is depositing sediment, nutrients and organics in the riparian area. Water temperature is high due to lack of shade. Habitat is not desirable for wildlife.

**After Situation:**

A buffer of trees and shrubs will be established along the riparian corridor which will provide stability, filtration, shade, and desirable habitat to address the above mentioned resource concerns.

**Feature Measure:** Area of planting

**Scenario Unit::** Acre

**Scenario Typical Size:** 1.0

**Scenario Total Cost:** $1,862.18

**Scenario Cost/Unit:** $1,862.18

Cost Details:

| Component Name | ID | Description | Unit | Cost | QTY | Total |
|---|---|---|---|---|---|---|
| **Equipment Installation** | | | | | | |
| Truck, Pickup | 939 | Equipment and power unit costs. Labor not included. | Hour | $21.79 | 8 | $174.32 |
| All terrain vehicles, ATV | 965 | Includes equipment, power unit and labor costs. | Hour | $28.28 | 8 | $226.24 |
| Trailer, enclosed, small | 1503 | Small enclosed trailer (typically less than 30' in length) pulled by a pickup to transport materials and equipment. Truck not included. | Hour | $7.12 | 8 | $56.96 |
| 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 | $25.31 | 24 | $607.44 |
| 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 | $45.69 | 4 | $182.76 |
| **Materials** | | | | | | |
| Shrub, seedling or transplant, bare root, 18"-36" | 1507 | Bare root hardwood trees 18-36" tall. Includes materials and shipping only. | Each | $0.57 | 100 | $57.00 |
| Tree, hardwood, seedling or transplant, bare root, 16-36" | 1510 | Bare root hardwood trees 18-36" tall. Includes materials and shipping only. | Each | $0.80 | 250 | $200.00 |
| Tree, conifer, seedling, bare root, 1-1 | 1513 | Bare root conifer trees, 1-1 (2 years old). Includes materials and shipping only. | Each | $0.41 | 100 | $41.00 |
| Stake, bamboo, 3/8" x 36" | 1584 | 3/8" x 36" bamboo stakes to anchor items in place. Inlcudes materials and shipping only. | Each | $0.11 | 250 | $27.50 |

**Practice:** 391 - Riparian Forest Buffer

**Scenario** #4 - Small Container

**Scenario Description:**

Plant small containerized trees and/or shrubs to restore riparian plant communities and associated benefits. Does not include weed barrier - use Mulching (484)

**Before Situation:**

Typical sites include former riparian forests and habitat used for forage, cropland, speculation property, or other nonforest condition which contains undesirable amounts or types of vegetation. Active bank erosion is depositing sediment, nutrients and organics in the riparian area. Water temperature is high due to lack of shade. Habitat is not desirable for wildlife.

**After Situation:**

A buffer of trees and shrubs will be established along the riparian corridor which will provide stability, filtration, shade, and desirable habitat to address the above mentioned resource concerns.

**Feature Measure:** Area of planting

**Scenario Unit::** Acre

**Scenario Typical Size:** 1.0

**Scenario Total Cost:** $5,946.17

**Scenario Cost/Unit:** $5,946.17

Cost Details:

| Component Name | ID | Description | Unit | Cost | QTY | Total |
|---|---|---|---|---|---|---|
| **Equipment Installation** | | | | | | |
| Truck, Pickup | 939 | Equipment and power unit costs. Labor not included. | Hour | $21.79 | 32 | $697.28 |
| All terrain vehicles, ATV | 965 | Includes equipment, power unit and labor costs. | Hour | $28.28 | 16 | $452.48 |
| Trailer, enclosed, large | 1502 | Large enclosed trailer (30' to 50' in length)pulled by a semi truck to transport materials and equipment. Truck not included. | Hour | $8.88 | 16 | $142.08 |
| Hand tools, tree planting | 1590 | Various hand tools for digging holes and planting trees such as augers, dibble bars, planting shovel, hoe-dad. Equipment only. Labor not included. | Hour | $12.04 | 48 | $577.92 |
| **Foregone Income** | | | | | | |
| FI, Corn Dryland | 1959 | Dryland Corn is Primary Crop | Acre | $376.15 | 1 | $376.15 |
| **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 | $25.31 | 48 | $1,214.88 |
| 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 | $45.69 | 16 | $731.04 |
| **Materials** | | | | | | |
| Shrub, seedling or transplant, potted, 1/2 to 1 gal. | 1526 | Potted shrub, 1/2 to 1 gal. Includes materials and shipping only. | Each | $4.52 | 50 | $226.00 |
| Tree, hardwood, seedling or transplant, potted, 1/2 to 1 gal. | 1531 | Potted hardwood tree, 1/2 to 1 gal. Includes materials and shipping only. | Each | $4.54 | 122 | $553.88 |
| Tree, conifer, seedling or transplant, potted, 1/2 to 1 gal. | 1536 | Potted conifer, 1/2 to 1 gal. Includes materials and shipping only. | Each | $4.41 | 50 | $220.50 |
| Tree shelter, solid tube type, 4" x 48" | 1566 | 4" x 48" tree tube for protection from animal damage. Materials only. | Each | $4.14 | 122 | $505.08 |
| Stakes, wood, 1" x 1" x 48" | 1578 | 1" x 1" x 48" wood stakes to fasten items in place. Includes materials only. | Each | $2.04 | 122 | $248.88 |

**Practice:** 391 - Riparian Forest Buffer

**Scenario** #5 - High Risk Areas

**Scenario Description:**

Installation of a riparian buffer on annually tilled cropland which lacks a native seed source of woody plants. In addition, ice scour, droughty soils, undercut banks, and shorter growing seasons create a situation where increasing the planting density improves the success of the buffer in difficult conditions by allowing for mortality.

**Before Situation:**

The riverbank lacks woody vegetation and is in sod or corn which creates a situation where topple along the river bank is common on an annual basis at a rate of up-to 10 feet per year or more. The riverbank is vertical or undercut. Impacts to water quality and wildlife habitat result from a lack of woody riparian vegetation, due to higher water temperatures, siltation, excess nutrients and a lack of escape or nesting cover.

**After Situation:**

Planted woody vegetation begins to shade competing herbaceous vegetation, allowing native regeneration, and developing a faster response to reducing bank erosion. As larger deeply rooted trees and shrubs slide into the river, the riverbank returns to a more normal angle of repose. Bank erosion isn't stopped on outside bends of the river, but the erosion is slowed to a more normal rate.

**Feature Measure:** Area of Planting

**Scenario Unit::** Acre

**Scenario Typical Size:** 1.0

**Scenario Total Cost:** $7,266.11

**Scenario Cost/Unit:** $7,266.11

Cost Details:

| Component Name | ID | Description | Unit | Cost | QTY | Total |
|---|---|---|---|---|---|---|
| **Equipment Installation** | | | | | | |
| Truck, Pickup | 939 | Equipment and power unit costs. Labor not included. | Hour | $21.79 | 16 | $348.64 |
| All terrain vehicles, ATV | 965 | Includes equipment, power unit and labor costs. | Hour | $28.28 | 16 | $452.48 |
| Trailer, enclosed, large | 1502 | Large enclosed trailer (30' to 50' in length)pulled by a semi truck to transport materials and equipment. Truck not included. | Hour | $8.88 | 16 | $142.08 |
| Hand tools, tree planting | 1590 | Various hand tools for digging holes and planting trees such as augers, dibble bars, planting shovel, hoe-dad. Equipment only. Labor not included. | Hour | $12.04 | 48 | $577.92 |
| **Foregone Income** | | | | | | |
| FI, Corn Dryland | 1959 | Dryland Corn is Primary Crop | Acre | $376.15 | 1 | $376.15 |
| **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 | $25.31 | 48 | $1,214.88 |
| 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 | $45.69 | 16 | $731.04 |
| **Materials** | | | | | | |
| Shrub, seedling or transplant, potted, 1/2 to 1 gal. | 1526 | Potted shrub, 1/2 to 1 gal. Includes materials and shipping only. | Each | $4.52 | 100 | $452.00 |
| Tree, hardwood, seedling or transplant, potted, 1/2 to 1 gal. | 1531 | Potted hardwood tree, 1/2 to 1 gal. Includes materials and shipping only. | Each | $4.54 | 236 | $1,071.44 |
| Tree, conifer, seedling or transplant, potted, 1/2 to 1 gal. | 1536 | Potted conifer, 1/2 to 1 gal. Includes materials and shipping only. | Each | $4.41 | 100 | $441.00 |
| Tree shelter, solid tube type, 4" x 48" | 1566 | 4" x 48" tree tube for protection from animal damage. Materials only. | Each | $4.14 | 236 | $977.04 |
| Stakes, wood, 1" x 1" x 48" | 1578 | 1" x 1" x 48" wood stakes to fasten items in place. Includes materials only. | Each | $2.04 | 236 | $481.44 |

**Practice:** 393 - Filter Strip

**Scenario** #5 - Filter Strip, Native species

**Scenario Description:**

A strip or area of herbaceous vegetation that removes contaminants from overland flow. Practice includes seedbed prep and planting of native species.

**Before Situation:**

Annual cropland, grazing land, or disturbed land (including forestland) allows for runoff of suspended solids, dissolved and/or associated contaminants into environmentally-sensitive areas such as wetlands, riparian zones, critical habitat and neighboring nonagricultural properties. Water Quality resource concerns are associated with this practice.

**After Situation:**

The 393 Implementation Requirements are developed for the site and applied. The planned filter strip will be established and maintained per the practice plan that will meet the criteria for the planned purpose(s). The vegetation will consist of native species. The filter strip will have adequate width to filter the planned pollutants. The practice includes seedbed preparation, seeding, and seed. Species selected shall be able to withstand partial burial by sediment and tolerant of herbicides used on contribution area while protecting environmentally-sensitive areas.

**Feature Measure:** number of acres

**Scenario Unit::** Acre

**Scenario Typical Size:** 1.0

**Scenario Total Cost:** $166.26

**Scenario Cost/Unit:** $166.26

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 | $11.14 | 3 | $33.42 |
| Seeding Operation, No Till/Grass Drill | 960 | No Till drill or grass drill for seeding. Includes equipment, power unit and labor costs. | Acre | $21.36 | 1 | $21.36 |
| All terrain vehicles, ATV | 965 | Includes equipment, power unit and labor costs. | Hour | $28.28 | 1.5 | $42.42 |
| **Materials** | | | | | | |
| One Species, Warm Season, Native Perennial Grass | 2322 | Native, warm season perennial grass. Includes material and shipping only. | Acre | $69.06 | 1 | $69.06 |

**Practice:** 393 - Filter Strip

**Scenario** #6 - Filter Strip, Introduced species

**Scenario Description:**

A strip or area of herbaceous vegetation that removes contaminants from overland flow. Practice includes seedbed prep and planting of introduced species.

**Before Situation:**

Annual cropland, grazing land, or disturbed land (including forestland) allows for runoff of suspended solids, dissolved and/or associated contaminants into environmentally-sensitive areas such as wetlands, riparian zones, critical habitat and neighboring nonagricultural properties. Water Quality resource concerns are associated with this practice.

**After Situation:**

The 393 Implementation Requirements are developed for the site and applied. The planned filter strip will be established and maintained per the practice plan that will meet the criteria for the planned purpose(s). The vegetation will consist of introduced species. The filter strip will have adequate width to filter the planned pollutants. The practice includes seedbed preparation, seeding, and seed. Species selected shall be able to withstand partial burial by sediment and tolerant of herbicides used on contribution area while protecting environmentally-sensitive areas.

**Feature Measure:** Number of acres

**Scenario Unit::** Acre

**Scenario Typical Size:** 1.0

**Scenario Total Cost:** $179.86

**Scenario Cost/Unit:** $179.86

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 | $11.14 | 3 | $33.42 |
| Fertilizer, ground application, dry bulk | 950 | Dry bulk fertilizer application performed by ground equipment. Includes equipment, power unit and labor costs. | Acre | $6.62 | 1 | $6.62 |
| Seeding Operation, No Till/Grass Drill | 960 | No Till drill or grass drill for seeding. Includes equipment, power unit and labor costs. | Acre | $21.36 | 1 | $21.36 |
| All terrain vehicles, ATV | 965 | Includes equipment, power unit and labor costs. | Hour | $28.28 | 1.5 | $42.42 |
| **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 | $0.49 | 30 | $14.70 |
| 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 | $0.65 | 20 | $13.00 |
| Four Species Mix, Cool Season, Introduced Perennial (2 grasses, 2 legumes) | 2317 | Cool season grass and legume mix. Includes material and shipping only. | Acre | $48.34 | 1 | $48.34 |

**Practice:** 393 - Filter Strip

**Scenario** #23 - Filter Strip, Native species, Forgone Income

**Scenario Description:**

A strip or area of herbaceous vegetation that removes contaminants from overland flow. Practice includes seedbed prep and planting of native species. The area of the filter strip is taken out of production.

**Before Situation:**

Annual cropland, grazing land, or disturbed land (including forestland) allows for runoff of suspended solids, dissolved and/or associated contaminants into environmentally-sensitive areas such as wetlands, riparian zones, critical habitat and neighboring non-ag properties. Water Quality resource concerns are associated with this practice.

**After Situation:**

The 393 Implementation Requirements are developed for the site and applied. The planned filter strip will be established and maintained per the practice plan that will meet the criteria for the planned purpose(s). The vegetation will consist of native species. The filter strip will have adequate width to filter the planned pollutants. The practice includes seedbed preparation, seeding, and seed. Species selected shall be able to withstand partial burial by sediment and tolerant of herbicides used on the contribution area while protecting environmentally-sensitive areas. The area of the filter strip is taken out of production.

**Feature Measure:** number of acres

**Scenario Unit::** Acre

**Scenario Typical Size:** 1.0

**Scenario Total Cost:** $565.43

**Scenario Cost/Unit:** $565.43

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 | $11.14 | 3 | $33.42 |
| Seeding Operation, No Till/Grass Drill | 960 | No Till drill or grass drill for seeding. Includes equipment, power unit and labor costs. | Acre | $21.36 | 1 | $21.36 |
| All terrain vehicles, ATV | 965 | Includes equipment, power unit and labor costs. | Hour | $28.28 | 1.5 | $42.42 |
| **Foregone Income** | | | | | | |
| FI, Corn Dryland | 1959 | Dryland Corn is Primary Crop | Acre | $376.15 | 1 | $376.15 |
| **Materials** | | | | | | |
| Two Species Mix, Warm Season, Native Perennial Grass | 2325 | Native, warm season perennial grass. Includes material and shipping only. | Acre | $92.08 | 1 | $92.08 |

**Practice:** 393 - Filter Strip

**Scenario** #24 - Filter Strip, Introduced species, Forgone Income

**Scenario Description:**

A strip or area of herbaceous vegetation that removes contaminants from overland flow. Practice includes seedbed prep and planting of introduced species. The area of the filter strip is taken out of production.

**Before Situation:**

Annual cropland, grazing land, or disturbed land (including forestland) allows for runoff of suspended solids, dissolved and/or associated contaminants into environmentally-sensitive areas such as wetlands, riparian zones, critical habitat and neighboring non-ag properties. Water Quality resource concerns are associated with this practice.

**After Situation:**

The 393 Implementation Requirements are developed for the site and applied. The planned filter strip will be established and maintained per the practice plan that will meet the criteria for the planned purpose(s). The vegetation will consist of introduced species. The filter strip will have adequate width to filter the planned pollutants. The practice includes seedbed preparation, seeding, and seed. Species selected shall be able to withstand partial burial by sediment and tolerant of herbicides used on contribution area while protecting environmentally-sensitive areas. The area of the filter strip is taken out of production.

**Feature Measure:** Number of acres

**Scenario Unit::** Acre

**Scenario Typical Size:** 1.0

**Scenario Total Cost:** $556.01

**Scenario Cost/Unit:** $556.01

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 | $11.14 | 3 | $33.42 |
| Fertilizer, ground application, dry bulk | 950 | Dry bulk fertilizer application performed by ground equipment. Includes equipment, power unit and labor costs. | Acre | $6.62 | 1 | $6.62 |
| Seeding Operation, No Till/Grass Drill | 960 | No Till drill or grass drill for seeding. Includes equipment, power unit and labor costs. | Acre | $21.36 | 1 | $21.36 |
| All terrain vehicles, ATV | 965 | Includes equipment, power unit and labor costs. | Hour | $28.28 | 1.5 | $42.42 |
| **Foregone Income** | | | | | | |
| FI, Corn Dryland | 1959 | Dryland Corn is Primary Crop | Acre | $376.15 | 1 | $376.15 |
| **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 | $0.49 | 30 | $14.70 |
| 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 | $0.65 | 20 | $13.00 |
| Four Species Mix, Cool Season, Introduced Perennial (2 grasses, 2 legumes) | 2317 | Cool season grass and legume mix. Includes material and shipping only. | Acre | $48.34 | 1 | $48.34 |

**Practice:** 394 - Firebreak

**Scenario** #1 - Constructed - Light Equipment

**Scenario Description:**

Installation of a bare-ground firebreak of a minimum width of 15' around a 20 acre field/farm using farm equipment (2 passes). Generally water control devices such as water bars are not needed due either to the lack of steep terrain or the temporary nature of the firebreak. Resource concerns include Wildfire hazard from excessive biomass accumulation, Undesirable plant productivity and health, Inadequate plant structure and composition, and Habitat degradation.

**Before Situation:**

Tract, field, or farm lacks adequate firebreaks to either reduce the spread of wildfires or contain a prescribed burn. Installation will be accomplished by making two passes with the use of typical farm equipment such as tractors, plows, disks, or similar implements.

**After Situation:**

The property is adequately protected from wildfire or can be safely prescribe burned.

**Feature Measure:** Length of firebreak

**Scenario Unit::** Square Foot

**Scenario Typical Size:** 60,000.0

**Scenario Total Cost:** $290.98

**Scenario Cost/Unit:** $0.00

Cost Details:

| Component Name | ID | Description | Unit | Cost | QTY | Total |
|---|---|---|---|---|---|---|
| **Equipment Installation** | | | | | | |
| Truck, Pickup | 939 | Equipment and power unit costs. Labor not included. | Hour | $21.79 | 5 | $108.95 |
| Tillage, Light | 945 | Includes light disking (tandem) or field cultivator. Includes equipment, power unit and labor costs. | Acre | $11.14 | 2 | $22.28 |
| Tillage, Primary | 946 | Includes heavy disking (offset) or chisel plow. Includes equipment, power unit and labor costs. | Acre | $16.60 | 2 | $33.20 |
| **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 | $25.31 | 5 | $126.55 |

**Practice:** 394 - Firebreak

**Scenario** #2 - Constructed - Medium equipment, flat-medium slopes

**Scenario Description:**

Use of medium equipment such as small dozers to blade, disk, plow, etc. bare-soil firebreaks on slopes less than 15%. Generally, water control devices such as water bars are limited to 10 or less per 1,000 feet when properly planned and installed using the same equipment. Resource concerns include Wildfire hazards from excessive biomass accumulation, Undesirable plant productivity and health, Inadequate plant structure and composition, and Habitat degradation.

**Before Situation:**

Tract, field, or farm lacks adequate firebreaks to either reduce the spread of wildfires or contain a prescribed burn. Conditions such as topography, the presence of brush and trees, etc. make the use of typical farm equipment impractical.

**After Situation:**

The property is adequately protected from wildfire or can be safely prescribe burned and the potential for excessive erosion from the firebreak is negligible.

**Feature Measure:** Length of firebreak

**Scenario Unit::** Square Foot

**Scenario Typical Size:** 45,000.0

**Scenario Total Cost:** $1,174.83

**Scenario Cost/Unit:** $0.03

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 | $66.13 | 4 | $264.52 |
| 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 | $3.18 | 150 | $477.00 |
| **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 | $44.37 | 4 | $177.48 |
| **Mobilization** | | | | | | |
| Mobilization, medium equipment | 1139 | Equipment with 70-150 HP or typical weights between 14,000 and 30,000 pounds. | Each | $255.83 | 1 | $255.83 |

**Practice:** 394 - Firebreak

**Scenario** #3 - Constructed - Medium equipment, steep slopes

**Scenario Description:**

Use of equipment such as small dozers to blade bare-soil firebreaks on slopes greater than 15%. Water control devices such as water bars placed at approximately 15 to 25 per 1,000 ft section of firebreak, are necessary to control erosion. These will be installed with the same equipment. Resource concerns include Wildfire hazard from excessive biomass accumulation, Undesirable plant productivity and health, Inadequate plant structure and composition, Habitat degradation, Soil erosion, and Excessive sediment in surface waters.

**Before Situation:**

Tract, field, or farm lacks adequate firebreaks to either reduce the spread of wildfires or contain a prescribed burn. Conditions such as topography, the presence of brush and trees, etc. make the use of typical farm equipment impractical. As slopes increase, the potential for excessive erosion increases from soil disturbances. Therefore the installation of water control devices such as water bars will be important in protecting the resource base.

**After Situation:**

The property is adequately protected from wildfire or can be safely prescribe burned and the potential for excessive erosion from the firebreak is minimized.

**Feature Measure:** Length of firebreak

**Scenario Unit::** Square Foot

**Scenario Typical Size:** 20,000.0

**Scenario Total Cost:** $2,049.33

**Scenario Cost/Unit:** $0.10

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 | $66.13 | 4 | $264.52 |
| 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 | $3.18 | 425 | $1,351.50 |
| **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 | $44.37 | 4 | $177.48 |
| **Mobilization** | | | | | | |
| Mobilization, medium equipment | 1139 | Equipment with 70-150 HP or typical weights between 14,000 and 30,000 pounds. | Each | $255.83 | 1 | $255.83 |

**Practice:** 394 - Firebreak

**Scenario** #4 - Vegetated permanent firebreak

**Scenario Description:**

Establishing a 20 foot wide strip of permanent vegetation that will serve as a green firebreak. Scenario includes clearing the site, preparing the seedbed, seeding (typically cool season grasses and/or legumes), and applying needed soil amendments. Clearing will be achieved with the use of a bush hog or similar equipment. Seedbed preparation and vegetation establishment will be accomplished with farm equipment. Soil amendments will be applied according to local FOTG guidance. This scenario does not include follow-up maintenance operations such as weed control. mowing, etc. Resource concerns include Wildfire hazard from excessive biomass accumulation, Soil erosion, and Excessive sediment in surface waters.

**Before Situation:**

Tract, field, or farm lacks adequate firebreaks to either reduce the spread of wildfires or contain a prescribed burn.

**After Situation:**

The property is adequately protected from wildfire or can be safely prescribe burned. Wildlife habitat will also be enhanced and the potential for erosion from the firebreak is minimized.

**Feature Measure:** Length of firebreak

**Scenario Unit::** Square Foot

**Scenario Typical Size:** 60,000.0

**Scenario Total Cost:** $1,095.52

**Scenario Cost/Unit:** $0.02

Cost Details:

| Component Name | ID | Description | Unit | Cost | QTY | Total |
|---|---|---|---|---|---|---|
| **Equipment Installation** | | | | | | |
| Truck, Pickup | 939 | Equipment and power unit costs. Labor not included. | Hour | $21.79 | 8 | $174.32 |
| Mower, Bush Hog | 940 | Equipment and power unit costs. Labor not included. | Hour | $51.91 | 4 | $207.64 |
| Tillage, Light | 945 | Includes light disking (tandem) or field cultivator. Includes equipment, power unit and labor costs. | Acre | $11.14 | 2 | $22.28 |
| Tillage, Primary | 946 | Includes heavy disking (offset) or chisel plow. Includes equipment, power unit and labor costs. | Acre | $16.60 | 4 | $66.40 |
| Fertilizer, ground application, dry bulk | 950 | Dry bulk fertilizer application performed by ground equipment. Includes equipment, power unit and labor costs. | Acre | $6.62 | 1 | $6.62 |
| Lime application | 953 | Lime application performed by ground equipment. Includes equipment, power unit and labor costs. | Acre | $10.63 | 1 | $10.63 |
| Seeding Operation, No Till/Grass Drill | 960 | No Till drill or grass drill for seeding. Includes equipment, power unit and labor costs. | Acre | $21.36 | 1 | $21.36 |
| **Labor** | | | | | | |
| General Labor | 231 | Labor performed using basic tools such as power tool, shovels, and other tools that do not require extensive training. Ex. pipe layer, herder, concrete placement, materials spreader, flagger, etc. | Hour | $25.31 | 8 | $202.48 |
| **Materials** | | | | | | |
| Phosphorus, P2O5 | 73 | Price per pound of P2O5 supplied by Superphosphate. Price is not per pound of total product applied, no conversion is needed. | Pound | $0.65 | 70 | $45.50 |
| Potassium, K2O | 74 | K2O supplied by Muriate Of Potash. Price is not per pound of total product applied, no conversion is needed. | Pound | $0.36 | 70 | $25.20 |
| Lime, ENM | 75 | Fertilizer: Limestone Spread on field. | Ton | $93.23 | 1 | $93.23 |
| One Species, Cool Season, Introduced Perennial Grass | 2313 | Introduced, cool season perennial grass. Includes material and shipping only. | Acre | $31.86 | 1.5 | $47.79 |
| **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 | $172.07 | 1 | $172.07 |

**Practice:** 394 - Firebreak

**Scenario** #5 - Constructed Wide, bladed or disked firebreak

**Scenario Description:**

Installing a bare-ground firebreak with a width of 150' or more and a 1,000' length on gently to strongly sloping slopes with equipment such as a dozer with a heavy disk. Devices will have stable outlets. Resource concerns include Wildfire hazard from excessive biomass accumulation, Undesirable plant productivity and health, Inadequate plant structure and composition, Habitat degradation, Soil erosion, and Excessive sediment in surface waters.

**Before Situation:**

Tract, field, or farm lacks adequate firebreaks to either reduce the spread of wildfires or contain a prescribed burn. Wide firebreaks are needed due to topography, high wildfire risk or to their use as down-wind breaks for prescribed burns. Conditions such as topography, the presence of brush and trees, etc. make the use of typical farm equipment impractical. As slopes increase, the potential for excessive erosion increases from soil disturbances. Therefore the installation of water control devices such as water bars will be important in protecting the resource base.

**After Situation:**

The property is adequately protected from wildfire or can be safely prescribe burned and the potential for excessive erosion from the firebreak is minimized.

**Feature Measure:** Area of firebreak

**Scenario Unit::** Square Foot

**Scenario Typical Size:** 150,000.0

**Scenario Total Cost:** $7,008.74

**Scenario Cost/Unit:** $0.05

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 | $66.13 | 8 | $529.04 |
| Fire Plow | 1306 | Heavy wildland plow or disk used for installing firebreaks. Equipment costs only for plow, use with a dozer component. Labor not included. | Hour | $50.09 | 4 | $200.36 |
| 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 | $3.18 | 1500 | $4,770.00 |
| **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 | $44.37 | 12 | $532.44 |
| **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 | $488.45 | 2 | $976.90 |

**Practice:** 395 - Stream Habitat Improvement and Management

**Scenario** #1 - Riparian Zone Improvement-Forested

**Scenario Description:**

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

**Before Situation:**

Riparian quality and quantity are at risk as determined by the NRCS Stream Visual Assessment Protocol score of less than 5 for those elements. The site does not have adequate food, cover, and/or connectivity for riparian wildlife, and contributes insufficient amounts of organic matter and/or large woody material for stream species food and cover. The site's riparian vegetation is compromised by human activities and/or access of vehicles, people, and/or livestock is not controlled adequately to protect riparian functions and stream habitat quality. Nutrients are transported to surface waters through runoff or soil erosion or to ground water from leaching in quantities that degrade water quality and limit use of intended purposes. Soil quality may be reduced due to compaction. Riparian vegetation quality and/or quantity is compromised to the extent that the riparian area and floodplain are not functioning to provide necessary stream and riparian habitat components.

**After Situation:**

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

**Feature Measure:** acres

**Scenario Unit::** Acre

**Scenario Typical Size:** 2.0

**Scenario Total Cost:** $22,451.67

**Scenario Cost/Unit:** $11,225.84

Cost Details:

| Component Name | ID | Description | Unit | Cost | QTY | Total |
|---|---|---|---|---|---|---|
| **Equipment Installation** | | | | | | |
| Backhoe, 80 HP | 926 | Wheel mounted backhoe excavator with horsepower range of 60 to 90. Equipment and power unit costs. Labor not included. | Hour | $56.05 | 16 | $896.80 |
| Dozer, 80 HP | 929 | Track mounted Dozer with horsepower range of 60 to 90. Equipment and power unit costs. Labor not included. | Hour | $66.13 | 8 | $529.04 |
| **Labor** | | | | | | |
| Skilled Labor | 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 | $41.76 | 160 | $6,681.60 |
| 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 | $25.31 | 40 | $1,012.40 |
| 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 | $44.37 | 24 | $1,064.88 |
| 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 | $45.69 | 40 | $1,827.60 |
| Specialist Labor | 235 | Labor requiring a specialized skill set: Includes Agronomists, Foresters, Biologists, etc. to provide additional technical information during the planning and implementation of the practice. Does not include NRCS or TSP services. | Hour | $110.71 | 40 | $4,428.40 |
| **Materials** | | | | | | |
| Compost | 265 | A mixture of decaying organic matter, as from leaves and manure, used to improve soil structure and provide nutrients. | Ton | $43.27 | 1 | $43.27 |
| Cuttings, woody, large size | 1309 | Woody pole cuttings or posts 2" to 6" in diameter and 6' long. Includes materials and shipping only. | Each | $17.90 | 200 | $3,580.00 |
| Tree, willow | 1426 | Willow tree for planting, 18" to 36" seedling. Includes materials and shipping only. | Each | $0.65 | 200 | $130.00 |
| Tree shelter, wire mesh | 1557 | 5 feet tall, Woven Wire mesh, 6"x 6" opening or smaller, 10 gauge wire (minimum) , cage placed around seedling for animal protection. Materials only. | Each | $2.32 | 200 | $464.00 |
| One Species, Native Forb, Moderate/High Cost | 2331 | Native forb. Includes material and shipping only. | Acre | $641.01 | 2 | $1,282.02 |

**Mobilization**

| | | | | | | |
|---|---|---|---|---|---|---|
| Mobilization, medium equipment | 1139 | Equipment with 70-150 HP or typical weights between 14,000 and 30,000 pounds. | Each | $255.83 | 2 | $511.66 |

**Practice:** 395 - Stream Habitat Improvement and Management

**Scenario** #2 - Instream wood placement

**Scenario Description:**

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

**Before Situation:**

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

**After Situation:**

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

**Feature Measure:** Bankfull width x reach length

**Scenario Unit::** Acre

**Scenario Typical Size:** 1.0

**Scenario Total Cost:** $22,679.19

**Scenario Cost/Unit:** $22,679.19

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 | $164.46 | 16 | $2,631.36 |
| Truck, dump, 12 CY | 1215 | Dump truck for moving bulk material. Typically capacity is 16 ton or 12 cubic yards. Includes equipment only. | Hour | $96.73 | 8 | $773.84 |
| **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 | $25.31 | 40 | $1,012.40 |
| 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 | $44.37 | 24 | $1,064.88 |
| 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 | $45.69 | 16 | $731.04 |
| **Materials** | | | | | | |
| Aggregate, Sand, Graded, Washed | 45 | Sand, typical ASTM C33 gradation, includes materials, equipment and labor to transport and place | Cubic Yard | $34.29 | 20 | $685.80 |
| Aggregate, Gravel, Graded | 46 | Gravel, includes materials, equipment and labor to transport and place. Includes washed and unwashed gravel. | Cubic Yard | $34.75 | 30 | $1,042.50 |
| Compost | 265 | A mixture of decaying organic matter, as from leaves and manure, used to improve soil structure and provide nutrients. | Ton | $43.27 | 1 | $43.27 |
| Cuttings, woody, large size | 1309 | Woody pole cuttings or posts 2" to 6" in diameter and 6' long. Includes materials and shipping only. | Each | $17.90 | 300 | $5,370.00 |
| Boulder | 1761 | Rock boulders (approximately 5 ft dia. 6.67 Tons) Inlcudes materials and delivery (up to 100 miles) only. | Ton | $34.32 | 40 | $1,372.80 |
| Steel, rebar | 1832 | Steel rebar, grade 60. Materials only. | Pound | $0.52 | 50 | $26.00 |
| Aggregate, river rock | 1834 | Well graded, rounded mineral substrates derived from local riverine settings. Includes materials and local delivery | Ton | $29.15 | 15 | $437.25 |
| Log, un-anchored | 2035 | Price of log picked up at the Mill. Includes material only. | Ton | $227.38 | 30 | $6,821.40 |

| | | | | | | |
|---|---|---|---|---|---|---|
| Root Wad | 2045 | Tree stump buried into the streambank with the roots left exposed. Includes material only. | Ton | $8.91 | 20 | $178.20 |
| **Mobilization** | | | | | | |
| Mobilization, large equipment | 1140 | Equipment >150HP or typical weights greater than 30,000 pounds or loads requiring over width or over length permits. | Each | $488.45 | 1 | $488.45 |

**Practice:** 395 - Stream Habitat Improvement and Management

**Scenario** #3 - Instream rock placement

**Scenario Description:**

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

**Before Situation:**

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

**After Situation:**

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

**Feature Measure:** Bankfull width x reach length

**Scenario Unit::** Acre

**Scenario Typical Size:** 1.0

**Scenario Total Cost:** $15,008.19

**Scenario Cost/Unit:** $15,008.19

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 | $164.46 | 16 | $2,631.36 |
| Truck, dump, 12 CY | 1215 | Dump truck for moving bulk material. Typically capacity is 16 ton or 12 cubic yards. Includes equipment only. | Hour | $96.73 | 8 | $773.84 |
| **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 | $25.31 | 16 | $404.96 |
| 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 | $44.37 | 24 | $1,064.88 |
| **Materials** | | | | | | |
| Aggregate, Gravel, Graded | 46 | Gravel, includes materials, equipment and labor to transport and place. Includes washed and unwashed gravel. | Cubic Yard | $34.75 | 150 | $5,212.50 |
| Cuttings, woody, large size | 1309 | Woody pole cuttings or posts 2" to 6" in diameter and 6' long. Includes materials and shipping only. | Each | $17.90 | 100 | $1,790.00 |
| Boulder | 1761 | Rock boulders (approximately 5 ft dia. 6.67 Tons) Inlcudes materials and delivery (up to 100 miles) only. | Ton | $34.32 | 60 | $2,059.20 |
| Aggregate, river rock | 1834 | Well graded, rounded mineral substrates derived from local riverine settings. Includes materials and local delivery | Ton | $29.15 | 20 | $583.00 |
| **Mobilization** | | | | | | |
| Mobilization, large equipment | 1140 | Equipment >150HP or typical weights greater than 30,000 pounds or loads requiring over width or over length permits. | Each | $488.45 | 1 | $488.45 |

**Practice:** 395 - Stream Habitat Improvement and Management

**Scenario** #4 - Rock and wood structures

**Scenario Description:**

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

**Before Situation:**

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

**After Situation:**

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

**Feature Measure:** stream length X bankfull width

**Scenario Unit::** Acre

**Scenario Typical Size:** 1.0

**Scenario Total Cost:** $36,523.27

**Scenario Cost/Unit:** $36,523.27

Cost Details:

| Component Name | ID | Description | Unit | Cost | QTY | Total |
|---|---|---|---|---|---|---|
| **Equipment Installation** | | | | | | |
| Hydraulic Excavator, 2 CY | 932 | Track mounted hydraulic excavator with bucket capacity range of 1.5 to 2.5 CY. Equipment and power unit costs. Labor not included. | Hour | $164.46 | 16 | $2,631.36 |
| Truck, dump, 12 CY | 1215 | Dump truck for moving bulk material. Typically capacity is 16 ton or 12 cubic yards. Includes equipment only. | Hour | $96.73 | 8 | $773.84 |
| **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 | $41.76 | 60 | $2,505.60 |
| 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 | $25.31 | 24 | $607.44 |
| 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 | $44.37 | 24 | $1,064.88 |
| 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 | $45.69 | 180 | $8,224.20 |
| 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 | $110.71 | 32 | $3,542.72 |
| **Materials** | | | | | | |
| Aggregate, Gravel, Graded | 46 | Gravel, includes materials, equipment and labor to transport and place. Includes washed and unwashed gravel. | Cubic Yard | $34.75 | 80 | $2,780.00 |
| Compost | 265 | A mixture of decaying organic matter, as from leaves and manure, used to improve soil structure and provide nutrients. | Ton | $43.27 | 1 | $43.27 |
| Cuttings, woody, large size | 1309 | Woody pole cuttings or posts 2" to 6" in diameter and 6' long. Includes materials and shipping only. | Each | $17.90 | 300 | $5,370.00 |

| | | | | | | |
|---|---|---|---|---|---|---|
| Boulder | 1761 | Rock boulders (approximately 5 ft dia. 6.67 Tons) Inlcudes materials and delivery (up to 100 miles) only. | Ton | $34.32 | 40 | $1,372.80 |
| Steel, rebar | 1832 | Steel rebar, grade 60. Materials only. | Pound | $0.52 | 8 | $4.16 |
| Aggregate, river rock | 1834 | Well graded, rounded mineral substrates derived from local riverine settings. Includes materials and local delivery | Ton | $29.15 | 7 | $204.05 |
| Log, un-anchored | 2035 | Price of log picked up at the Mill. Includes material only. | Ton | $227.38 | 30 | $6,821.40 |
| Root Wad | 2045 | Tree stump buried into the streambank with the roots left exposed. Includes material only. | Ton | $8.91 | 10 | $89.10 |
| **Mobilization** | | | | | | |
| Mobilization, large equipment | 1140 | Equipment >150HP or typical weights greater than 30,000 pounds or loads requiring over width or over length permits. | Each | $488.45 | 1 | $488.45 |

**Practice:** 395 - Stream Habitat Improvement and Management

**Scenario** #5 - Conifer Tree Revetment

**Scenario Description:**

This scenario involves placement of anchored conifer trees along the streambank in order to improve bank stability and aquatic habitat that currently does not meet quality criteria for stream species habitat. A stream assessment (i.e. Stream Visual Assessment Protocol) should be conducted in order to document habitat components lacking for aquatic species (i.e. large wood, pools). A project design for conifer tree revetment will be based on assessment of the target stream reach characteristics and those of a suitable reference reach. These characteristics include channel geometry, channel slope, stream bottom substrate size and composition, and the geomorphic setting influencing the channel form, pattern and profile. Conifer tree revetments should be placed in streams to protect stream banks and create habitat according to NRCS engineering specifications and with close review & approval of a fish habitat biologist. Boulders placed to provide ballast shall only be used if the geomorphic setting and project design demand this component. The planned activity will meet the current 395 standard, and facilitating practice standards utilized, including timing of work windows required for protected aquatic and riparian species, and protecting/restoring vegetation and substrates of/to areas impacted by heavy equipment. Implementation will result in the improvement of bank stability and instream habitat complexity, hiding and resting cover, and/or increased food availability for fish and other stream species. Payment for implementation is to defray the costs of project implementation. Monitoring records demonstrating implementation of this scenario will address resource concerns for stream species of concern are required.

**Before Situation:**

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

**After Situation:**

Stream habitat within the project reach is improving as a result of placing conifer tree revetments or similar wood structures in the channel and/or along the stream bank. Pool habitat in the reach is improved, and hiding cover, food availability and refuge habitat for all stream species is improving.

**Feature Measure:** Cubic Yard of CTR

**Scenario Unit::** Cubic Yard

**Scenario Typical Size:** 200.0

**Scenario Total Cost:** $14,117.65

**Scenario Cost/Unit:** $70.59

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 | $164.46 | 20 | $3,289.20 |
| Chainsaw | 937 | Equipment and power unit costs. Labor not included. | Hour | $4.37 | 20 | $87.40 |
| Log skidder | 942 | Equipment and power unit costs. Labor not included. | Hour | $127.52 | 20 | $2,550.40 |
| Jack Hammer | 2190 | 60-90 pound jack hammer (electric, pneumatic, or hydraulic). Equipment only. | Hour | $2.13 | 20 | $42.60 |
| **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 | $41.76 | 60 | $2,505.60 |
| 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 | $44.37 | 40 | $1,774.80 |
| **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 | $1.30 | 175 | $227.50 |
| Steel cable grips, lockable, 1/4" | 2181 | Lockable wire rope grips for 1/4" galvanized steel cable. Materials and shipping only. | Each | $5.93 | 30 | $177.90 |
| Cable, Galvanized steel | 2182 | Galvanized steel aircraft cable in 7 x 19 strand core. Materials and shipping only. | Foot | $0.47 | 405 | $190.35 |
| Anchor, earthen, low disturbance, large | 2184 | Low disturbance, galvanized or aluminum alloy earthen anchors with holding power greather than 3,000 pounds in normal soil. Materials and shipping only. | Each | $51.00 | 45 | $2,295.00 |
| **Mobilization** | | | | | | |
| Mobilization, large equipment | 1140 | Equipment >150HP or typical weights greater than 30,000 pounds or loads requiring over width or over length permits. | Each | $488.45 | 2 | $976.90 |

**Practice:** 395 - Stream Habitat Improvement and Management

**Scenario** #6 - Constructed Log Jam

**Scenario Description:**

This scenario involves placement of anchored hardwood trees (known as a constructed log jam) along the streambank in order to improve aquatic habitat that currently does not meet quality criteria for stream species habitat. A stream assessment (i.e. Stream Visual Assessment Protocol) should be conducted in order to document habitat components lacking for aquatic species (i.e. large wood, pools). A project design for constructed log jam will be based on assessment of the target stream reach characteristics and those of a suitable reference reach. These characteristics include channel geometry, channel slope, stream bottom substrate size and composition, and the geomorphic setting influencing the channel form, pattern and profile. Constructed log jams should be placed in streams to create habitat according to NRCS engineering specifications and with close review & approval of a fish habitat biologist. Boulders placed to provide ballast shall only be used if the geomorphic setting and project design demand this component. The planned activity will meet the current 395 standard, and facilitating practice standards utilized, including timing of work windows required for protected aquatic and riparian species, and protecting/restoring vegetation and substrates of/to areas impacted by heavy equipment. Implementation will result in the improvement of bank stability and instream habitat complexity, hiding and resting cover, and/or increased food availability for fish and other stream species. Payment for implementation is to defray the costs of project implementation. Monitoring records demonstrating implementation of this scenario will address resource concerns for stream species of concern are required.

**Before Situation:**

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

**After Situation:**

Stream habitat within the project reach is improving as a result of placing constructed log jams or similar wood structures in the channel and/or along the stream bank. Pool habitat in the reach is improved, and hiding cover, food availability and refuge habitat for all stream species is improving.

**Feature Measure:** Cubic Yard of CLJ

**Scenario Unit::** Cubic Yard

**Scenario Typical Size:** 130.0

**Scenario Total Cost:** $11,804.02

**Scenario Cost/Unit:** $90.80

Cost Details:

| Component Name | ID | Description | Unit | Cost | QTY | Total |
|---|---|---|---|---|---|---|
| **Equipment Installation** | | | | | | |
| Hydraulic Excavator, 2 CY | 932 | Track mounted hydraulic excavator with bucket capacity range of 1.5 to 2.5 CY. Equipment and power unit costs. Labor not included. | Hour | $164.46 | 20 | $3,289.20 |
| Chainsaw | 937 | Equipment and power unit costs. Labor not included. | Hour | $4.37 | 20 | $87.40 |
| Log skidder | 942 | Equipment and power unit costs. Labor not included. | Hour | $127.52 | 20 | $2,550.40 |
| Jack Hammer | 2190 | 60-90 pound jack hammer (electric, pneumatic, or hydraulic). Equipment only. | Hour | $2.13 | 20 | $42.60 |
| **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 | $41.76 | 40 | $1,670.40 |
| 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 | $44.37 | 40 | $1,774.80 |
| **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 | $1.30 | 120 | $156.00 |
| Steel cable grips, lockable, 1/4" | 2181 | Lockable wire rope grips for 1/4" galvanized steel cable. Materials and shipping only. | Each | $5.93 | 24 | $142.32 |
| Cable, Galvanized steel | 2182 | Galvanized steel aircraft cable in 7 x 19 strand core. Materials and shipping only. | Foot | $0.47 | 200 | $94.00 |
| Anchor, earthen, low disturbance, large | 2184 | Low disturbance, galvanized or aluminum alloy earthen anchors with holding power greather than 3,000 pounds in normal soil. Materials and shipping only. | Each | $51.00 | 20 | $1,020.00 |
| **Mobilization** | | | | | | |
| Mobilization, large equipment | 1140 | Equipment >150HP or typical weights greater than 30,000 pounds or loads requiring over width or over length permits. | Each | $488.45 | 2 | $976.90 |

**Practice:** 395 - Stream Habitat Improvement and Management

**Scenario** #7 - Boulder Placement

**Scenario Description:**

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

**Before Situation:**

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

**After Situation:**

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

**Feature Measure:** Cubic Yard of Boulder Cluster

**Scenario Unit::** Cubic Yard

**Scenario Typical Size:** 10.0

**Scenario Total Cost:** $2,665.28

**Scenario Cost/Unit:** $266.53

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 | $164.46 | 8 | $1,315.68 |
| **Labor** | | | | | | |
| General Labor | 231 | Labor performed using basic tools such as power tool, shovels, and other tools that do not require extensive training. Ex. pipe layer, herder, concrete placement, materials spreader, flagger, etc. | Hour | $25.31 | 8 | $202.48 |
| 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 | $44.37 | 8 | $354.96 |
| **Materials** | | | | | | |
| Boulder | 1761 | Rock boulders (approximately 5 ft dia. 6.67 Tons) Inlcudes materials and delivery (up to 100 miles) only. | Ton | $34.32 | 8 | $274.56 |
| Aggregate, river rock | 1834 | Well graded, rounded mineral substrates derived from local riverine settings. Includes materials and local delivery | Ton | $29.15 | 1 | $29.15 |
| **Mobilization** | | | | | | |
| Mobilization, large equipment | 1140 | Equipment >150HP or typical weights greater than 30,000 pounds or loads requiring over width or over length permits. | Each | $488.45 | 1 | $488.45 |

**Practice:** 395 - Stream Habitat Improvement and Management

**Scenario** #8 - Complex Stream Structure

**Scenario Description:**

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

**Before Situation:**

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

**After Situation:**

Stream habitat within the project reach is improving as a result of placing complex stream structures including J-Hooks and Rock Vanes in the channel and/or along the stream bank. Hydraulic complexity of the habitat in the reach is increased, and hiding cover, food availability and refuge habitat for stream species is improving. Streambank vegetation is increasing and contributing to stability of the streambanks.

**Feature Measure:** Cubic Yard of Stream Structure

**Scenario Unit::** Cubic Yard

**Scenario Typical Size:** 20.0

**Scenario Total Cost:** $11,251.49

**Scenario Cost/Unit:** $562.57

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 | $164.46 | 32 | $5,262.72 |
| **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 | $25.31 | 40 | $1,012.40 |
| 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 | $44.37 | 32 | $1,419.84 |
| 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 | $45.69 | 32 | $1,462.08 |
| **Materials** | | | | | | |
| Boulder | 1761 | Rock boulders (approximately 5 ft dia. 6.67 Tons) Inlcudes materials and delivery (up to 100 miles) only. | Ton | $34.32 | 40 | $1,372.80 |
| Aggregate, river rock | 1834 | Well graded, rounded mineral substrates derived from local riverine settings. Includes materials and local delivery | Ton | $29.15 | 8 | $233.20 |
| **Mobilization** | | | | | | |
| Mobilization, large equipment | 1140 | Equipment >150HP or typical weights greater than 30,000 pounds or loads requiring over width or over length permits. | Each | $488.45 | 1 | $488.45 |

**Practice:** 395 - Stream Habitat Improvement and Management

**Scenario** #9 - Stream Restoration - Low

**Scenario Description:**

This scenario describes the implementation of a stream habitat improvement and management project where the existing stream shows a low departure from targeted stream conditions but restoration is necessary to increase habitat and functionality of the stream. A combination of structures, excavation, channel shaping, and woody materials are considered based on natural channel design concepts. A stream assessment (i.e. Stream Visual Assessment Protocol) should be conducted in order to document habitat components (such as large wood, pools) are not currently present in the stream or are limited for aquatic species. A project design for restoration of the stream channel (channel shaping, boulder placement, wood, wood structures, etc.) will be based on assessment of (a) the target stream reach characteristics and (b) those of a suitable reference reach. These characteristics include channel geometry, channel slope, stream bottom substrate size and composition, and the geomorphic setting influencing the channel form, pattern and profile. Large rocks/boulders placed in the stream channel will mimic geologic material sizes typically present in the watershed or observed in intact, reference stream reaches in the MLRA where the project is located. Rock boulder sizes should also reflect the geomorphic setting of the stream reach. Large wood placed into the stream under this scenario should be similar in species, age, and size (diameter) as trees found in the surrounding riparian area, to the extent possible. Stream restoration components including wood, boulders and/or boulder clusters will be placed in the stream to create pool habitat and hydraulic complexity according to NRCS engineering specifications and with close review & approval of a fish habitat biologist onsite during the planning and implementation of the project. This scenario involves restoring 0.35 acre of stream. The planned activity will meet the current 395 standard, and facilitating practice standards utilized. Implementation will result in the improvement of instream habitat complexity, hiding and resting cover, and/or increased food availability for fish and other stream species. Payment for implementation is to defray the costs of project implementation. Records demonstrating implementation of this scenario will address resource concerns for stream species of concern will be required.

**Before Situation:**

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

**After Situation:**

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

**Feature Measure:** Area of Stream Restoration determ

**Scenario Unit::** Acre

**Scenario Typical Size:** 0.0

**Scenario Total Cost:** $42,451.64

**Scenario Cost/Unit:** #Div/0!

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 | $164.46 | 60 | $9,867.60 |
| Chainsaw | 937 | Equipment and power unit costs. Labor not included. | Hour | $4.37 | 32 | $139.84 |
| **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 | $41.76 | 60 | $2,505.60 |
| 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 | $44.37 | 60 | $2,662.20 |
| 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 | $45.69 | 30 | $1,370.70 |
| **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 | $1.30 | 400 | $520.00 |
| Cuttings, woody, large size | 1309 | Woody pole cuttings or posts 2" to 6" in diameter and 6' long. Includes materials and shipping only. | Each | $17.90 | 60 | $1,074.00 |
| Boulder | 1761 | Rock boulders (approximately 5 ft dia. 6.67 Tons) Inlcudes materials and delivery (up to 100 miles) only. | Ton | $34.32 | 250 | $8,580.00 |
| Aggregate, river rock | 1834 | Well graded, rounded mineral substrates derived from local riverine settings. Includes materials and local delivery | Ton | $29.15 | 500 | $14,575.00 |
| Root Wad | 2045 | Tree stump buried into the streambank with the roots left exposed. Includes material only. | Ton | $8.91 | 75 | $668.25 |
| **Mobilization** | | | | | | |
| Mobilization, large equipment | 1140 | Equipment >150HP or typical weights greater than 30,000 pounds or loads requiring over width or over length permits. | Each | $488.45 | 1 | $488.45 |

**Practice:** 395 - Stream Habitat Improvement and Management

**Scenario** #10 - Stream Restoration - Moderate

**Scenario Description:**

This scenario describes the implementation of a stream habitat improvement and management project where the existing stream shows a moderate departure from targeted stream conditions and restoration is necessary to increase habitat and functionality of the stream. A combination of structures, excavation, channel shaping, and woody materials are considered based on natural channel design concepts. A stream assessment (i.e. Stream Visual Assessment Protocol) should be conducted in order to document habitat components (such as large wood, pools) are not currently present in the stream or are limited for aquatic species. A project design for restoration of the stream channel (channel shaping, boulder placement, wood, wood structures, etc.) will be based on assessment of (a) the target stream reach characteristics and (b) those of a suitable reference reach. These characteristics include channel geometry, channel slope, stream bottom substrate size and composition, and the geomorphic setting influencing the channel form, pattern and profile. Large rocks/boulders placed in the stream channel will mimic geologic material sizes typically present in the watershed or observed in intact, reference stream reaches in the MLRA where the project is located. Rock boulder sizes should also reflect the geomorphic setting of the stream reach. Large wood placed into the stream under this scenario should be similar in species, age, and size (diameter) as trees found in the surrounding riparian area, to the extent possible. Stream restoration components including wood, boulders and/or boulder clusters will be placed in the stream to create pool habitat and hydraulic complexity according to NRCS engineering specifications and with close review & approval of a fish habitat biologist onsite during the planning and implementation of the project. This scenario involves restoring 0.35 acre of stream. The planned activity will meet the current 395 standard, and facilitating practice standards utilized. Implementation will result in the improvement of instream habitat complexity, hiding and resting cover, and/or increased food availability for fish and other stream species. Payment for implementation is to defray the costs of project implementation. Records demonstrating implementation of this scenario will address resource concerns for stream species of concern will be required.

**Before Situation:**

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

**After Situation:**

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

**Feature Measure:** Area of Stream Restoration determ

**Scenario Unit::** Acre

**Scenario Typical Size:** 0.0

**Scenario Total Cost:** $63,466.05

**Scenario Cost/Unit:** #Div/0!

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 | $164.46 | 80 | $13,156.80 |
| Chainsaw | 937 | Equipment and power unit costs. Labor not included. | Hour | $4.37 | 40 | $174.80 |
| **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 | $41.76 | 80 | $3,340.80 |
| 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 | $44.37 | 80 | $3,549.60 |
| 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 | $45.69 | 40 | $1,827.60 |
| **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 | $1.30 | 800 | $1,040.00 |
| Cuttings, woody, large size | 1309 | Woody pole cuttings or posts 2" to 6" in diameter and 6' long. Includes materials and shipping only. | Each | $17.90 | 80 | $1,432.00 |
| Boulder | 1761 | Rock boulders (approximately 5 ft dia. 6.67 Tons) Inlcudes materials and delivery (up to 100 miles) only. | Ton | $34.32 | 500 | $17,160.00 |
| Aggregate, river rock | 1834 | Well graded, rounded mineral substrates derived from local riverine settings. Includes materials and local delivery | Ton | $29.15 | 700 | $20,405.00 |
| Root Wad | 2045 | Tree stump buried into the streambank with the roots left exposed. Includes material only. | Ton | $8.91 | 100 | $891.00 |
| **Mobilization** | | | | | | |
| Mobilization, large equipment | 1140 | Equipment >150HP or typical weights greater than 30,000 pounds or loads requiring over width or over length permits. | Each | $488.45 | 1 | $488.45 |

**Practice:** 395 - Stream Habitat Improvement and Management

**Scenario** #11 - Stream Restoration - High

**Scenario Description:**

This scenario describes the implementation of a stream habitat improvement and management project where the existing stream shows a high departure from targeted stream conditions and restoration is necessary to increase habitat and functionality of the stream. A combination of structures, excavation, channel shaping, and woody materials are considered based on natural channel design concepts. A stream assessment (i.e. Stream Visual Assessment Protocol) should be conducted in order to document habitat components (such as large wood, pools) are not currently present in the stream or are limited for aquatic species. A project design for restoration of the stream channel (channel shaping, boulder placement, wood, wood structures, etc.) will be based on assessment of (a) the target stream reach characteristics and (b) those of a suitable reference reach. These characteristics include channel geometry, channel slope, stream bottom substrate size and composition, and the geomorphic setting influencing the channel form, pattern and profile. Large rocks/boulders placed in the stream channel will mimic geologic material sizes typically present in the watershed or observed in intact, reference stream reaches in the MLRA where the project is located. Rock boulder sizes should also reflect the geomorphic setting of the stream reach. Large wood placed into the stream under this scenario should be similar in species, age, and size (diameter) as trees found in the surrounding riparian area, to the extent possible. Stream restoration components including wood, boulders and/or boulder clusters will be placed in the stream to create pool habitat and hydraulic complexity according to NRCS engineering specifications and with close review & approval of a fish habitat biologist onsite during the planning and implementation of the project. This scenario involves restoring 0.35 acre of stream. The planned activity will meet the current 395 standard, and facilitating practice standards utilized. Implementation will result in the improvement of instream habitat complexity, hiding and resting cover, and/or increased food availability for fish and other stream species. Payment for implementation is to defray the costs of project implementation. Records demonstrating implementation of this scenario will address resource concerns for stream species of concern will be required.

**Before Situation:**

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

**After Situation:**

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

**Feature Measure:** Area of Stream Restoration determ

**Scenario Unit::** Acre

**Scenario Typical Size:** 0.0

**Scenario Total Cost:** $101,777.25

**Scenario Cost/Unit:** #Div/0!

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 | $164.46 | 160 | $26,313.60 |
| Chainsaw | 937 | Equipment and power unit costs. Labor not included. | Hour | $4.37 | 80 | $349.60 |
| **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 | $41.76 | 120 | $5,011.20 |
| 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 | $44.37 | 160 | $7,099.20 |
| 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 | $45.69 | 80 | $3,655.20 |
| **Materials** | | | | | | |
| Erosion Control Blanket, biodegradable | 1213 | Biodegradable erosion control blanket, typically a composite of natural fibers with reinforcing polymer netting. Materials and shipping only. | Square Yard | $1.30 | 800 | $1,040.00 |
| Cuttings, woody, large size | 1309 | Woody pole cuttings or posts 2" to 6" in diameter and 6' long. Includes materials and shipping only. | Each | $17.90 | 160 | $2,864.00 |
| Boulder | 1761 | Rock boulders (approximately 5 ft dia. 6.67 Tons) Inlcudes materials and delivery (up to 100 miles) only. | Ton | $34.32 | 700 | $24,024.00 |
| Aggregate, river rock | 1834 | Well graded, rounded mineral substrates derived from local riverine settings. Includes materials and local delivery | Ton | $29.15 | 1000 | $29,150.00 |
| Root Wad | 2045 | Tree stump buried into the streambank with the roots left exposed. Includes material only. | Ton | $8.91 | 200 | $1,782.00 |
| **Mobilization** | | | | | | |
| Mobilization, large equipment | 1140 | Equipment >150HP or typical weights greater than 30,000 pounds or loads requiring over width or over length permits. | Each | $488.45 | 1 | $488.45 |

**Practice:** 395 - Stream Habitat Improvement and Management

**Scenario** #18 - Instream soft wood placement

**Scenario Description:**

This scenario involves placement of large wood (trees, and trees with root wads) into a stream channel in order to improve aquatic habitat that currently does not meet quality criteria for stream species habitat. Implementation of this scenario includes the use of only manual equipment and chainsaws. The large wood will not be anchored or cabled. The large wood will be naturally sorted and naturally pinned. Large wood additions implemented as a result of this scenario will use a combination of grip hoist pulled-downed trees (leaving roots attached to the bank or pulled in from the forested landscape) and "cut and drop" techniques. A stream assessment (e.g., Stream Visual Assessment Protocol) should be conducted in order to document habitat components lacking for aquatic species (i.e. large wood, pools). A project design for wood placement will be based on assessment of the target stream reach characteristics and those of a suitable reference reach. These characteristics include channel geometry, channel slope, stream bottom substrate size and composition, and the geomorphic setting influencing the channel form, pattern and profile. Large wood placed into the stream will mimic genus, age, and size of mature trees found in intact, reference riparian areas in the MLRA where the project is located. Large wood should be placed in streams to create pool habitat according to NRCS engineering specifications and with close review & approval of a fish habitat biologist. The planned activity will meet the current 395 standard, and facilitating practice standards, and include work windows to protect aquatic and riparian species, and to protect vegetation and substrates impacted by equipment. Implementation will result in the improvement of instream habitat complexity, hiding and resting cover, and/or increased food availability for fish and other stream species. Payment for implementation is to defray the costs of project implementation. Records demonstrating implementation of this scenario will address resource concerns for stream species of concern are required.

**Before Situation:**

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

**After Situation:**

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

**Feature Measure:** Bankfull width x reach length

**Scenario Unit::** Acre

**Scenario Typical Size:** 1.0

**Scenario Total Cost:** $10,648.21

**Scenario Cost/Unit:** $10,648.21

Cost Details:

| Component Name | ID | Description | Unit | Cost | QTY | Total |
|---|---|---|---|---|---|---|
| **Equipment Installation** | | | | | | |
| Chainsaw | 937 | Equipment and power unit costs. Labor not included. | Hour | $4.37 | 24 | $104.88 |
| **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 | $41.76 | 5 | $208.80 |
| 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 | $25.31 | 36 | $911.16 |
| 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 | $45.69 | 18 | $822.42 |
| 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 | $110.71 | 5 | $553.55 |
| **Materials** | | | | | | |
| Log, un-anchored | 2035 | Price of log picked up at the Mill. Includes material only. | Ton | $227.38 | 35 | $7,958.30 |
| Root Wad | 2045 | Tree stump buried into the streambank with the roots left exposed. Includes material only. | Ton | $8.91 | 10 | $89.10 |

**Practice:** 396 - Aquatic Organism Passage

**Scenario** #1 - Concrete Dam Removal

**Scenario Description:**

Full or partial removal of a concrete dam to restore aquatic organism passage, improve water quality, and promote functional river ecology and geomorphology. The extent of removal (full or partial) is determined through consultations with the dam owner in consideration of prevailing regulations and site historical status. Adjacent floodplain surfaces above and below the target dam are considered in the planning process to account for shifts in streamflow and geomorphic regime. Resulting channel dimensions and profile are determined on a site-specific basis to reflect--to the fullest extent possible--pre-dam conditions. Pre-removal sediment assays are completed to determine the toxicity of sediment stored behind the dam. Planning for the reclamation and management of stored sediments is completed according to geomorphic conditions, prevailing regulations, and the results of sediment toxicity investigations. Removal is done with an assortment of equipment, including tracked excavators outfitted with hydraulic chisels, hammers and/or buckets with "thumbs", bull dozers, skid steers, cranes, front-end loaders, and dump trucks. Alternative demolition techniques may include the use of high explosives, diamond-chain, or similar circular saws to remove the dam in a piecewise manner. Removed materials are trucked away and disposed or recycled off-site. Disturbed areas are revegetated using Critical Area Planting (342). Scenario does not include additional measures needed in the active channel and floodplain to account for post-removal changes to stream plan, pattern, or profile, or reclamation of any former impounded areas. Additional structural measures may be necessary to address constructed features associated with the removed dam including canals, raceways, adjacent spillways, navigation locks, access and maintenance roads, or similar civil works. RESOURCE CONCERNS: INADEQUATE HABITAT FOR FISH AND WILDLIFE –Habitat degradation; EXCESS WATER – Ponding, flooding, seasonal high water table, seeps, and drifted snow; WATER QUALITY DEGRADATION – Elevated water temperature. Payments for these associated practices are made separately and are covered by other typical scenarios and payment schedules. See relevant CPS for additional information. ---Site Preparation and Reclamation associated with project footprint: (326) Clearing and Snagging, (342) Critical Area Planting, (382) Fence, (390) Riparian Herbaceous Cover, (391) Riparian Forest Buffer, (612) Tree/Shrub Establishment ---Reach Planning/Habitat Enhancement: (395) Stream Habitat Improvement and Management, ---Structural Measures Associated with Scenario but outside of project footprint: (410) Grade Stabilization Structure, (584) Channel Bed Stabilization, (580) Streambank and Shoreline Protection, (587) Structure for Water Control

**Before Situation:**

A channel-spanning concrete dam no longer has functional use, may be failing, or creates a hazard to downstream capital infrastructure or communities. The dam blocks upstream aquatic organism migration, and downstream migrants may be diverted into hydraulic structures that increase mortality or result in migration delays or dead-ends. The dam disrupts the downstream cycling and transport of sediment, woody material and nutrients. The pool created by the dam may impair water quality by increasing temperatures, capturing fine sediment--sometimes laden with heavy metals or other pollutants--later mobilized by high flow events, and creating slackwater habitat for invasive aquatic vegetation. Non-native or exotic fish species inhabit the pool and predate upon and/or displace native fish.

**After Situation:**

The existing dam is removed and reach geometry and slope are restored to pre-dam conditions to the fullest extent practicable. Aquatic organism passage and river ecology and geomorphic conditions are restored to pre-dam conditions to the fullest extent practicable. Resource Concerns are addressed within the context of the site.

**Feature Measure:** Cubic Yards of concrete in dam and

**Scenario Unit::** Cubic Yard

**Scenario Typical Size:** 250.0

**Scenario Total Cost:** $136,323.22

**Scenario Cost/Unit:** $545.29

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 | $304.36 | 1.5 | $456.54 |
| 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 | $164.46 | 320 | $52,627.20 |
| Skidsteer, 80 HP | 933 | Skidsteer loader with horsepower range of 60 to 90. Equipment and power unit costs. Labor not included. | Hour | $44.60 | 160 | $7,136.00 |
| Water management, Flooding & dewatering | 969 | Includes equipment and power unit. Labor not included. | Acre Foot | $272.75 | 50 | $13,637.50 |
| Truck, dump, 18 CY | 1400 | Dump truck for moving bulk material. Typically capacity is 25 ton or 18 cubic yards. Includes equipment only. | Hour | $121.65 | 40 | $4,866.00 |
| 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 | $0.33 | 6100 | $2,013.00 |
| **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 | $41.76 | 160 | $6,681.60 |
| 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 | $25.31 | 160 | $4,049.60 |
| 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 | $44.37 | 520 | $23,072.40 |

| | | | | | | |
|---|---|---|---|---|---|---|
| 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 | $45.69 | 80 | $3,655.20 |
| **Materials** | | | | | | |
| Rock Riprap, graded, angular, material and shipping | 1200 | Graded Rock Riprap for all gradation ranges. Includes materials and delivery only. | Ton | $36.46 | 450 | $16,407.00 |
| **Mobilization** | | | | | | |
| Mobilization, medium equipment | 1139 | Equipment with 70-150 HP or typical weights between 14,000 and 30,000 pounds. | Each | $255.83 | 1 | $255.83 |
| Mobilization, large equipment | 1140 | Equipment >150HP or typical weights greater than 30,000 pounds or loads requiring over width or over length permits. | Each | $488.45 | 3 | $1,465.35 |

**Practice:** 396 - Aquatic Organism Passage

**Scenario** #2 - Earthen Dam Removal

**Scenario Description:**

Full removal of an earthen dam to restore aquatic organism passage, improve water quality, and promote functional river ecology and geomorphology. The removal extent is determined through consultations with the dam owner in consideration of prevailing regulations and site historical status. Adjacent floodplain surfaces above and below the target dam are considered in the planning process to account for shifts in streamflow and geomorphic regime. Resulting channel dimensions and profile are determined on a site-specific basis to reflect, to the fullest extent possible, pre-dam conditions. Pre-removal sediment assays are be completed as necessary to determine the toxicity of sediment stored behind the dam. Planning for the reclamation and management of stored sediments is completed according to geomorphic conditions, prevailing regulations, and the results of sediment toxicity investigations. Removal is done with an assortment of equipment, including tracked excavators outfitted with hydraulic chisels, hammers and/or buckets with "thumbs", bull dozers, skid steers, cranes, front-end loaders, and dump trucks. Removed materials are trucked away and disposed or recycled off-site, unless native streambed material found in the embankment can be used in site reclamation. Disturbed areas are revegetated using Critical Area Planting (342). Scenario does not include additional measures needed in the active channel and floodplain to account for post-removal changes to stream plan, pattern, or profile, or reclamation of any former impounded areas. Additional structural measures may be necessary to address constructed features associated with the removed dam including head gates, canals, raceways, access and maintenance roads, or similar civil works. RESOURCE CONCERNS: INADEQUATE HABITAT FOR FISH AND WILDLIFE –Habitat degradation; EXCESS WATER – Ponding, flooding, seasonal high water table, seeps, and drifted snow; WATER QUALITY DEGRADATION – Elevated water temperature. Payments for these associated practices are made separately and are covered by other typical scenarios and payment schedules. See relevant CPS for additional information. ---Site Preparation and Reclamation associated with project footprint: (326) Clearing and Snagging, (342) Critical Area Planting, (382) Fence, (390) Riparian Herbaceous Cover, (391) Riparian Forest Buffer, (612) Tree/Shrub Establishment ---Reach Planning/Habitat Enhancement: (395) Stream Habitat Improvement and Management, ---Structural Measures Associated with Scenario but outside of project footprint: (410) Grade Stabilization Structure, (584) Channel Bed Stabilization, (580) Streambank and Shoreline Protection, (587) Structure for Water Control

**Before Situation:**

A channel-spanning earthen dam no longer has functional use, may be failing, or creates a hazard to downstream capital infrastructure or communities. The dam blocks upstream aquatic organism migration, and downstream migrants may be diverted into hydraulic structures that increase mortality or result in migration delays or dead-ends. The dam disrupts the downstream cycling and transport of sediment, woody material and nutrients. The pool created by the dam may impair water quality by increasing temperatures, capturing fine sediment--sometimes laden with heavy metals or other pollutants--later mobilized by high flow events, and creating slackwater habitat for invasive aquatic vegetation. Non-native or exotic fish species inhabit the pool and predate upon and/or displace native fish.

**After Situation:**

The existing dam is removed and reach geometry and slope are restored to pre-dam conditions to the fullest extent practicable. Aquatic organism passage and river ecology and geomorphic conditions are restored to pre-dam conditions to the fullest extent practicable. Resource Concerns are addressed within the context of the site.

**Feature Measure:** Cubic Yards of earthen embankme

**Scenario Unit::** Cubic Yard

**Scenario Typical Size:** 500.0

**Scenario Total Cost:** $85,791.34

**Scenario Cost/Unit:** $171.58

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 | $304.36 | 3 | $913.08 |
| Dozer, 140 HP | 927 | Track mounted Dozer with horsepower range of 125 to 160. Equipment and power unit costs. Labor not included. | Hour | $124.03 | 40 | $4,961.20 |
| Hydraulic Excavator, 2 CY | 932 | Track mounted hydraulic excavator with bucket capacity range of 1.5 to 2.5 CY. Equipment and power unit costs. Labor not included. | Hour | $164.46 | 100 | $16,446.00 |
| Skidsteer, 80 HP | 933 | Skidsteer loader with horsepower range of 60 to 90. Equipment and power unit costs. Labor not included. | Hour | $44.60 | 100 | $4,460.00 |
| Water management, Flooding & dewatering | 969 | Includes equipment and power unit. Labor not included. | Acre Foot | $272.75 | 50 | $13,637.50 |
| Truck, dump, 18 CY | 1400 | Dump truck for moving bulk material. Typically capacity is 25 ton or 18 cubic yards. Includes equipment only. | Hour | $121.65 | 40 | $4,866.00 |
| 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 | $0.33 | 8600 | $2,838.00 |
| **Labor** | | | | | | |
| Skilled Labor | 230 | Labor requiring a high level skill set: Includes carpenters, welders, electricians, conservation professionals involved with data collection, monitoring, and or record keeping, etc. | Hour | $41.76 | 40 | $1,670.40 |
| 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 | $25.31 | 80 | $2,024.80 |
| 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 | $44.37 | 280 | $12,423.60 |

| | | | | | | |
|---|---|---|---|---|---|---|
| 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 | $45.69 | 80 | $3,655.20 |
| **Materials** | | | | | | |
| Rock Riprap, graded, angular, material and shipping | 1200 | Graded Rock Riprap for all gradation ranges. Includes materials and delivery only. | Ton | $36.46 | 450 | $16,407.00 |
| **Mobilization** | | | | | | |
| Mobilization, medium equipment | 1139 | Equipment with 70-150 HP or typical weights between 14,000 and 30,000 pounds. | Each | $255.83 | 2 | $511.66 |
| Mobilization, large equipment | 1140 | Equipment >150HP or typical weights greater than 30,000 pounds or loads requiring over width or over length permits. | Each | $488.45 | 2 | $976.90 |

**Practice:** 396 - Aquatic Organism Passage

**Scenario** #3 - Blockage Removal

**Scenario Description:**

Removal of passage barriers, including small relict earthen diversions (e.g., splash dams), failing or undersized culverts, and sediment or large woody material (>10cm diameter and 2m length) from mass wasting or major flood events. Instream material associated with the previously mentioned circumstances or structures prevents aquatic organism passage by the creation of channel-spanning blockages, or areas of shallow depth, high velocities, or extensive changes in water surface elevation. In addition, these features may encourage abrupt channel changes that endanger adjacent capital infrastructure or transportation corridors. Excessive streambank erosion by flows deflected around or impounded behind these features may impair water quality by introducing fine sediment out of phase with the natural hydrograph and the life history requirements of native aquatic species. Removal is done with an assortment of equipment, including tracked excavators outfitted with buckets with "thumbs", bull dozers, skid steers, front-end loaders, and dump trucks. The channel and adjacent floodplain are restored to pre-blockage conditions to the fullest extent practicable. Removed materials are trucked away and disposed or recycled off-site, unless native streambed material found in the blockage can be used in site reclamation. Large woody material, if present, is used for instream reclamation, replaced in the channel downstream of the blockage, or trucked offsite for disposal or stockpiling for future projects. Disturbed areas are revegetated using Critical Area Planting (342). Scenario does not include additional measures needed in the active channel and floodplain. RESOURCE CONCERNS: INADEQUATE HABITAT FOR FISH AND WILDLIFE –Habitat degradation; EXCESS WATER – Ponding, flooding, seasonal high water table, seeps, and drifted snow; WATER QUALITY DEGRADATION – Elevated water temperature; SOIL EROSION– Excessive bank erosion from streams shorelines or water conveyance channels Payments for these associated practices are made separately and are covered by other typical scenarios and payment schedules. See relevant CPS for additional information. ---Site Preparation and Reclamation associated with project footprint: (342) Critical Area Planting, (382) Fence, (390) Riparian Herbaceous Cover, (391) Riparian Forest Buffer, (612) Tree/Shrub Establishment; (643) Restoration and Management of Rare and Declining Habitats. ---Reach Planning/Habitat Enhancement: (395) Stream Habitat Improvement and Management, ---Structural Measures Associated with Scenario but outside of project footprint: (410) Grade Stabilization Structure, (584) Channel Bed Stabilization, (580) Streambank and Shoreline Protection

**Before Situation:**

An instream feature spanning the active channel creates hydraulic conditions that exceed the swimming or crawling abilities of native aquatic organisms. Event-driven mass wasting or instream deposits of coarse sediment create channel blockages or areas of shallow, fast-moving water. An instream plug of material transported to the site by flood flows or delivered to the channel from a hillslope failure not only blocks passage, but may deflect the stream toward a new course than endangers adjacent capital infrastructure or transportation corridors. Elevated risks associated with eventual over-topping or failure of the blockage to downstream features or communities are imminent in the event of a blockage that forms a temporary dam. Accelerated instream or lateral channel erosion may introduce fine sediment that impairs water quality.

**After Situation:**

The instream barrier is removed by a combination of methods and equipment and the channel and affected floodplain are restored to pre-blockage conditions to the fullest extent practicable. Resource Concerns are addressed within the context of the site.

**Feature Measure:** Cubic Yards of mineral sediment, fil

**Scenario Unit::** Cubic Yard

**Scenario Typical Size:** 200.0

**Scenario Total Cost:** $27,134.81

**Scenario Cost/Unit:** $135.67

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 | $56.05 | 40 | $2,242.00 |
| 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 | $164.46 | 40 | $6,578.40 |
| Skidsteer, 80 HP | 933 | Skidsteer loader with horsepower range of 60 to 90. Equipment and power unit costs. Labor not included. | Hour | $44.60 | 40 | $1,784.00 |
| Water management, Flooding & dewatering | 969 | Includes equipment and power unit. Labor not included. | Acre Foot | $272.75 | 10 | $2,727.50 |
| Truck, dump, 18 CY | 1400 | Dump truck for moving bulk material. Typically capacity is 25 ton or 18 cubic yards. Includes equipment only. | Hour | $121.65 | 20 | $2,433.00 |
| 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 | $0.33 | 2000 | $660.00 |
| **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 | $41.76 | 40 | $1,670.40 |
| 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 | $44.37 | 140 | $6,211.80 |
| Supervisor or Manager | 234 | Labor involving supervision or management activities. Includes crew supervisors, foremen and farm/ranch managers time required for adopting new technology, etc. | Hour | $45.69 | 40 | $1,827.60 |
| **Mobilization** | | | | | | |

| | | | | | | |
|---|---|---|---|---|---|---|
| Mobilization, medium equipment | 1139 | Equipment with 70-150 HP or typical weights between 14,000 and 30,000 pounds. | Each | $255.83 | 2 | $511.66 |
| Mobilization, large equipment | 1140 | Equipment >150HP or typical weights greater than 30,000 pounds or loads requiring over width or over length permits. | Each | $488.45 | 1 | $488.45 |

**Practice:** 396 - Aquatic Organism Passage

**Scenario** #4 - Nature-Like Fishway

**Scenario Description:**

Nature-like fishways, also known as roughened channels, rock ramps, or bypass channels, are constructed features that provide passage around an instream barrier or in place of a removed barrier. Fishway design is based on simulating or mimicking adjacent stream characteristics, using natural materials, and providing suitable passage conditions over a range of flows for a wide variety of fish species and other aquatic organisms. Nature-like fishways provide enhanced passage conditions compared to concrete or aluminum (Alaskan Steeppass) ladders, and are not as susceptible to debris-related operational issues. When used to bypass an instream barrier, they require a larger footprint than instream structures, and may also require control structures to regulate flow through the fishway or address tailwater fluctuations affecting the fishway entrance (downstream end). Fishway design includes an assessment of adjacent stream characteristics, including channel geometry, slope, sediment texture and composition, and major geomorphic units that govern channel plan, pattern and profile. In the case of a fishway that bypasses an instream barrier, the design is tailored to these elements, the elevation required to ascend the barrier, and the known range of flow variation or operations. For fishways constructed in the place of a removed barrier, the design may be a hybrid approach that meets the same criteria, although in a smaller instream footprint. Nature-like fishways are constructed with an assortment of equipment used for excavation, placing material, and delivering and removing material. Construction elements generally include an assortment of rock used to create riffles, cascades, or riffle-pool sequences with between 6 to 12 inches of water surface elevation drop between adjacent structures. Large woody material is used to create channel structural elements in some settings, when available and where approved by oversight agencies. Removed materials are trucked away and disposed or recycled off-site, unless excavated native streambed material can be used in fishway construction. Large woody material or removed trees, if present, are used for fishway construction trucked offsite for disposal, or trucked offsite for stockpiling for future projects. Disturbed areas are revegetated using Critical Area Planting (342) and access control and signage are provided. Scenario does not include additional measures needed in the active channel and floodplain or at an existing dam necessary to control flow associated with nature-like fishway. Scenario based on a fishway that is 2000 ft long and 50 ft long. RESOURCE CONCERNS: INADEQUATE HABITAT FOR FISH AND WILDLIFE –Habitat degradation; EXCESS WATER – Ponding, flooding, seasonal high water table, seeps, and drifted snow; WATER QUALITY DEGRADATION – Elevated water temperature; EROSION– Excessive bank erosion from streams shorelines or water conveyance channels Payments for these associated practices are made separately and are covered by other typical scenarios and payment schedules. See relevant CPS for additional information. ---Site Preparation and Reclamation associated with project footprint: (326) Clearing and Snagging, (342) Critical Area Planting, (382) Fence, (390) Riparian Herbaceous Cover, (391) Riparian Forest Buffer, (612) Tree/Shrub Establishment ---Reach Planning/Habitat Enhancement: (395) Stream Habitat Improvement and Management, ---Structural Measures Associated with Scenario but outside of project footprint: (410) Grade Stabilization Structure, (582) Open Channel, (584) Channel Bed Stabilization, (580) Streambank and Shoreline Protection, (587) Structure for Water Control

**Before Situation:**

An instream barrier prevents upstream migration of native aquatic organisms and no support exists for removal. Similarly, an instream barrier is removed, and interested parties require maintenance of an upstream pool or pond. The subject stream contains a number of migrating aquatic organisms ranging in size from small to large with a range of propulsion abilities--weak to strong swimmers and animals that crawl along the bottom. In either case--barrier removal or bypassing an existing barrier--local sentiment to preserve existing or natural conditions and the desire to provide passage for a range of aquatic organisms indicate the use of a nature-like fishway. Adequate space for a bypass channel is available, and adjacent landowners approve.

**After Situation:**

A nature-like fishway is constructed in place of a removed barrier or around an existing barrier. The fishway is designed to mimic the adjacent natural stream, and is constructed of rock and/or large woody material that provides quality passage conditions for a number of species and geomorphic stability over a range of flows. Resource Concerns are addressed within the context of the site.

**Feature Measure:** Length of Fishway x Width of Chan

**Scenario Unit::** Square Foot

**Scenario Typical Size:** 100,000.0

**Scenario Total Cost:** $287,790.79

**Scenario Cost/Unit:** $2.88

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 | $304.36 | 3 | $913.08 |
| Geotextile, woven | 42 | Woven Geotextile Fabric. Includes materials, equipment and labor | Square Yard | $2.53 | 12000 | $30,360.00 |
| Backhoe, 80 HP | 926 | Wheel mounted backhoe excavator with horsepower range of 60 to 90. Equipment and power unit costs. Labor not included. | Hour | $56.05 | 160 | $8,968.00 |
| 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 | $164.46 | 160 | $26,313.60 |
| Skidsteer, 80 HP | 933 | Skidsteer loader with horsepower range of 60 to 90. Equipment and power unit costs. Labor not included. | Hour | $44.60 | 200 | $8,920.00 |
| Water management, Flooding & dewatering | 969 | Includes equipment and power unit. Labor not included. | Acre Foot | $272.75 | 25 | $6,818.75 |
| Truck, dump, 18 CY | 1400 | Dump truck for moving bulk material. Typically capacity is 25 ton or 18 cubic yards. Includes equipment only. | Hour | $121.65 | 40 | $4,866.00 |
| **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 | $41.76 | 160 | $6,681.60 |

| | | | | | | |
|---|---|---|---|---|---|---|
| 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 | $25.31 | 240 | $6,074.40 |
| 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 | $44.37 | 560 | $24,847.20 |
| 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 | $45.69 | 120 | $5,482.80 |
| 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 | $110.71 | 480 | $53,140.80 |
| **Materials** | | | | | | |
| Boulder | 1761 | Rock boulders (approximately 5 ft dia. 6.67 Tons) Inlcudes materials and delivery (up to 100 miles) only. | Ton | $34.32 | 1300 | $44,616.00 |
| Aggregate, river rock | 1834 | Well graded, rounded mineral substrates derived from local riverine settings. Includes materials and local delivery | Ton | $29.15 | 2000 | $58,300.00 |
| **Mobilization** | | | | | | |
| Mobilization, medium equipment | 1139 | Equipment with 70-150 HP or typical weights between 14,000 and 30,000 pounds. | Each | $255.83 | 2 | $511.66 |
| Mobilization, large equipment | 1140 | Equipment >150HP or typical weights greater than 30,000 pounds or loads requiring over width or over length permits. | Each | $488.45 | 2 | $976.90 |

**Practice:** 396 - Aquatic Organism Passage

**Scenario** #5 - CMP Culvert

**Scenario Description:**

A corrugated metal (galvanized steel or aluminum) pipe culvert (CMP) of any shape (round, elliptical, or squash) used at a road-stream crossing to provide aquatic organism passage (AOP) and promote stream ecological and geomorphic function. CMPs used for AOP are sized according to geomorphic analyses, not just an estimate of runoff and streamflow at the site from the contributing watershed. In addition, CMPs used for AOP are filled with a mixture of rock and gravel sized to emulate site stream conditions and geomorphic units in the channel. The simulated streambed material is continuous throughout the culvert barrel, and blended with the intact streambed at the culvert inlet and outlet. The first estimate of culvert size--diameter or span--is obtained by analyzing bankfull channel width on a reach of stream not affected by an existing road crossing or other conditions that alter self-formed conditions. In the case of a culvert replacement, bankfull investigations are begun at least 10-20 estimated bankfull channel widths above the existing stream crossing. Culvert diameter or span is then increased according to channel bed composition and texture, bank characteristics, channel alignment at the crossing section, and other parameters that may affect channel dynamics and stability. Once the CMP diameter or span is determined, culvert length will be determined by roadway geometry and loading requirements, and site stream conditions. Concrete headwalls and/or wingwalls may be necessary in shorter installations and/or where fill/roadway cover is limited or the stream alignment is not perpendicular to the road axis. Culvert wall thickness and corrugations are determined by road loading requirements. Stream geomorphic characteristics, including the reach longitudinal profile, channel cross-sectional shape, substrate composition and arrangement, and bank shape and composition are determined. CMPs are installed with an assortment of equipment used for excavation, placing material, and delivering and removing material. Construction elements generally include an assortment of rock used to create riffles, cascades, or riffle-pool sequences with between 6 to 12 inches of water surface elevation drop between adjacent structures. Stream dewatering and diversion around the work site is often required, and temporary road closure or re-routing may also be required. . Channel bed material within the culvert barrel varies according to prevailing stream characteristics at the crossing site. The culvert is placed within the roadway on a subexcavated compacted bed, set at a slope that matches the design longitudinal profile, and backfilled with a bed mixture that mimics adjacent stream characteristics with special attention to channel pattern. Backfill depths are typically at least 20% of the culvert diameter or rise, but may deviate based on the shape of the culvert used, channel dimensions, substrate size, and the site longitudinal profile. Special equipment such as motorized wheelbarrows may be necessary to backfill smaller CMPs. Once the simulated streambed in the culvert barrel is complete, the roadway is replaced and any necessary armoring and revegetating material is placed at the culvert inlet and outlet where it intersects the road fill prism. Other actions include construction staking and signage, soil erosion and pollution control, removal and disposal of the old culvert, and topsoil conservation for site reclamation. Disturbed areas are revegetated using Critical Area Planting (342). Scenario does not include additional measures needed to address channel incision, bank stability, and other factors associated with the presence of the stream crossing. RESOURCE CONCERNS: INADEQUATE HABITAT FOR FISH AND WILDLIFE –Habitat degradation; EXCESS WATER – Ponding, flooding, seasonal high water table, seeps, and drifted snow; WATER QUALITY DEGRADATION – Elevated water temperature; SOIL EROSION– Excessive bank erosion from streams shorelines or water conveyance channels Payments for these associated practices are made separately and are covered by other typical scenarios and payment schedules. See relevant CPS for additional information. ---Site Preparation and Reclamation associated with project footprint: (342) Critical Area Planting, (382) Fence, (390) Riparian Herbaceous Cover, (391) Riparian Forest Buffer, (612) Tree/Shrub Establishment; ---Reach Planning/Habitat Enhancement: (395) Stream Habitat Improvement and Management, ---Structural Measures Associated with Scenario but outside of project footprint: (410) Grade Stabilization Structure, (584) Channel Bed Stabilization, (580) Streambank and Shoreline Protection

**Before Situation:**

An existing undersized culvert as contributed to general bed and bank scour downstream of a road crossing, and may have contributed to the deposition of a wedge of sediment upstream of the road crossing. The road may be overtopped by high flows, resulting in outright failure, landowner accessibility problems, access by and to emergency services, and hamper post-flood recovery efforts. An upstream impoundment created by the undersized culvert has contributed to water quality problems including high water temperatures and the deposition and later mobilization of polluted fine sediment. Native aquatic organisms are unable to pass through the road crossing because the culvert outlet is perched above the downstream pool, and high velocities are not negotiable by animals that are able to leap into the culvert barrel.

**After Situation:**

The undersized culvert is replaced with a CMP sized, placed, and backfilled with material determined by geomorphic analyses performed in a reference reach upstream of the crossing location. Geomorphic and ecological functions are preserved through the crossing site, enhancing AOP, water quality, and culvert longevity. In addition, because the culvert is sized to promote the transport of streamflow and the materials it carries, it requires decreased maintenance activities over time. Landowners are able to access their holdings across a range of flows, and are able to seek and receive emergency and post-flood recovery services. Resource Concerns are addressed within the context of the site.

**Feature Measure:** CMP

**Scenario Unit::** Foot

**Scenario Typical Size:** 40.0

**Scenario Total Cost:** $36,725.48

**Scenario Cost/Unit:** $918.14

Cost Details:

| Component Name | ID | Description | Unit | Cost | QTY | Total |
|---|---|---|---|---|---|---|
| **Equipment Installation** | | | | | | |
| Geotextile, woven | 42 | Woven Geotextile Fabric. Includes materials, equipment and labor | Square Yard | $2.53 | 100 | $253.00 |
| 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 | $164.46 | 40 | $6,578.40 |
| Skidsteer, 80 HP | 933 | Skidsteer loader with horsepower range of 60 to 90. Equipment and power unit costs. Labor not included. | Hour | $44.60 | 40 | $1,784.00 |
| Water management, Flooding & dewatering | 969 | Includes equipment and power unit. Labor not included. | Acre Foot | $272.75 | 25 | $6,818.75 |
| Truck, dump, 18 CY | 1400 | Dump truck for moving bulk material. Typically capacity is 25 ton or 18 cubic yards. Includes equipment only. | Hour | $121.65 | 40 | $4,866.00 |
| **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 | $41.76 | 40 | $1,670.40 |
| 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 | $25.31 | 40 | $1,012.40 |
| 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 | $44.37 | 120 | $5,324.40 |
| 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 | $45.69 | 40 | $1,827.60 |
| **Materials** | | | | | | |
| Aggregate, river rock | 1834 | Well graded, rounded mineral substrates derived from local riverine settings. Includes materials and local delivery | Ton | $29.15 | 75 | $2,186.25 |
| Pipe, CMP, 96", 14 Gauge | 1835 | 96" Corrugated Metal Pipe, Galvanized, Uncoated, 14 gage. Material cost only. | Foot | $91.50 | 40 | $3,660.00 |
| **Mobilization** | | | | | | |
| Mobilization, medium equipment | 1139 | Equipment with 70-150 HP or typical weights between 14,000 and 30,000 pounds. | Each | $255.83 | 1 | $255.83 |
| Mobilization, large equipment | 1140 | Equipment >150HP or typical weights greater than 30,000 pounds or loads requiring over width or over length permits. | Each | $488.45 | 1 | $488.45 |

**Practice:** 396 - Aquatic Organism Passage

**Scenario** #6 - Stream Simulation Culvert -with Headwall

**Scenario Description:**

A multi-plate galvanized steel or aluminum culvert (arch or box) used at a road-stream crossing to provide aquatic organism passage (AOP) and promote stream ecological and geomorphic function. They commonly attach to preformed reinforced or poured-in-place concrete footings. Bottomless culverts used for AOP are sized according to geomorphic analyses, not just an estimate of runoff and streamflow at the site from the contributing watershed. In addition, bottomless culverts used for AOP are filled with a mixture of rock and gravel sized to emulate site stream conditions and geomorphic units in the channel. The simulated streambed material is continuous throughout the culvert barrel, and blended with the intact streambed at the culvert inlet and outlet. The first estimate of culvert span is obtained by analyzing bankfull channel width on a reach of stream not affected by an existing road crossing or other conditions that alter self-formed conditions. In the case of a culvert replacement, bankfull investigations are begun at least 10-20 estimated bankfull channel widths above the existing stream crossing. Culvert span is then increased according to channel bed composition and texture, bank characteristics, channel alignment at the crossing section, and other parameters that may affect channel dynamics and stability. Once the culvert span is determined, culvert length will be dictated by roadway geometry and loading requirements, and site stream conditions. Concrete headwalls and/or wingwalls may be necessary in shorter installations and/or where fill/roadway cover is limited or the stream alignment is not perpendicular to the road axis. Culvert wall thickness and footing requirements are determined by road loading requirements and site geotechnical investigations. Generally, the preferred footing is a T-design with a spread footing with stem wall. Connecting the culvert leg to the footing can be done by welding, grouting, or bolting. Stream geomorphic characteristics, including the reach longitudinal profile, channel cross-sectional shape, substrate composition and arrangement, and bank shape and composition are determined. Bottomless arch or box culverts are commonly delivered in sections and bolted together in the field. Smaller arches can be delivered in one piece. They are installed with an assortment of equipment used for excavation, placing material, and delivering and removing material. Construction elements generally include an assortment of rock used to create riffles, cascades, or riffle-pool sequences with between 6 to 12 inches of water surface elevation drop between adjacent structures. Stream dewatering and diversion around the work site is often required, and temporary road closure or re-routing may also be required. Channel bed material within the culvert barrel varies according to prevailing stream characteristics at the crossing site. Footings are placed or poured, and the new streambed is set at a slope that matches the design longitudinal profile, and backfilled with a bed mixture that mimics adjacent stream characteristics with special attention to channel pattern. Once the simulated streambed between the footings is complete, the culvert sections are assembled and attached to the footings. Larger rock may be placed along the footing/culvert stemwall to protect the connection from damage by transported bedload. The roadway is replaced and any necessary armoring and revegetating material is placed at the culvert inlet and outlet where it intersects the road fill prism. Other actions include construction staking and signage, soil erosion and pollution control, removal and disposal of the old culvert, and topsoil conservation for site reclamation. Disturbed areas are revegetated using Critical Area Planting (342). Scenario does not include additional measures needed to address channel incision, bank stability, and other factors associated with the presence of the stream crossing. Scenario does not include concrete for head or wingwalls. Scenario based on a structure with 16' span and 20' long with bolt on metal footings. RESOURCE CONCERNS: INADEQUATE HABITAT FOR FISH AND WILDLIFE –Habitat degradation; EXCESS WATER – Ponding, flooding, seasonal high water table, seeps, and drifted snow; WATER QUALITY DEGRADATION – Elevated water temperature; SOIL EROSION– Excessive bank erosion from streams shorelines or water conveyance channels Payments for these associated practices are made separately and are covered by other typical scenarios and payment schedules. See relevant CPS for additional information. ---Site Preparation and Reclamation associated with project footprint: (342) Critical Area Planting, (382) Fence, (390) Riparian Herbaceous Cover, (391) Riparian Forest Buffer, (612) Tree/Shrub Establishment; ---Reach Planning/Habitat Enhancement: (395) Stream Habitat Improvement and Management, ---Structural Measures Associated with Scenario but outside of project footprint: (410) Grade Stabilization Structure, (584) Channel Bed Stabilization, (580) Streambank and Shoreline Protection

**Before Situation:**

An existing undersized culvert has contributed to general bed and bank scour downstream of a road crossing, and may have contributed to the deposition of a wedge of sediment upstream of the road crossing. The road may be overtopped by high flows, resulting in outright failure, landowner accessibility problems, access by and to emergency services, and hamper post-flood recovery efforts. An upstream impoundment created by the undersized culvert has contributed to water quality problems including high water temperatures and the deposition and later mobilization of polluted fine sediment. Native aquatic organisms are unable to pass through the road crossing because the culvert outlet is perched above the downstream pool, and high velocities are not negotiable by animals that are able to leap into the culvert barrel.

**After Situation:**

The undersized culvert is replaced with a bottomless arch or box culvert sized, placed, and backfilled with material determined by geomorphic analyses performed in a reference reach upstream of the crossing location. Aluminum headwalls are included with the installation which allows for a shorter installation length. Geomorphic and ecological functions are preserved through the crossing site, enhancing AOP, water quality, and culvert longevity. In addition, because the culvert is sized to promote the transport of streamflow and the materials it carries, it requires decreased maintenance activities over time. Landowners are able to access their holdings across a range of flows, and are able to seek and receive emergency and post-flood recovery services. Resource Concerns are addressed within the context of the site.

**Feature Measure:** horizontal surface area (span x len

**Scenario Unit::** Square Foot

**Scenario Typical Size:** 320.0

**Scenario Total Cost:** $21,490.64

**Scenario Cost/Unit:** $67.16

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 | $2.53 | 100 | $253.00 |
| 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 | $164.46 | 24 | $3,947.04 |
| Truck, dump, 12 CY | 1215 | Dump truck for moving bulk material. Typically capacity is 16 ton or 12 cubic yards. Includes equipment only. | Hour | $96.73 | 24 | $2,321.52 |
| **Labor** | | | | | | |
| General Labor | 231 | Labor performed using basic tools such as power tool, shovels, and other tools that do not require extensive training. Ex. pipe layer, herder, concrete placement, materials spreader, flagger, etc. | Hour | $25.31 | 24 | $607.44 |
| 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 | $44.37 | 24 | $1,064.88 |
| 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 | $45.69 | 24 | $1,096.56 |
| **Materials** | | | | | | |
| Aggregate, river rock | 1834 | Well graded, rounded mineral substrates derived from local riverine settings. Includes materials and local delivery | Ton | $29.15 | 45 | $1,311.75 |
| Culvert, Multi-Plate arch | 1979 | Multi-plate arch culvert, typically 7 Gauge corrugated plate. Includes metal arch materials only, does not include footings. | Pound | $1.30 | 8000 | $10,400.00 |
| **Mobilization** | | | | | | |
| Mobilization, large equipment | 1140 | Equipment >150HP or typical weights greater than 30,000 pounds or loads requiring over width or over length permits. | Each | $488.45 | 1 | $488.45 |

**Practice:** 396 - Aquatic Organism Passage

**Scenario** #7 - Stream Simulation Culvert - no Headwall

**Scenario Description:**

A multi-plate galvanized steel or aluminum culvert (arch or box) used at a road-stream crossing to provide aquatic organism passage (AOP) and promote stream ecological and geomorphic function. They commonly attach to preformed reinforced or poured-in-place concrete footings or a bolt on metal plate footer. Bottomless culverts used for AOP are sized according to geomorphic analyses, not just an estimate of runoff and stream flow at the site from the contributing watershed. In addition, bottomless culverts used for AOP are filled with a mixture of rock and gravel sized to emulate site stream conditions and geomorphic units in the channel. The simulated streambed material is continuous throughout the culvert barrel, and blended with the intact streambed at the culvert inlet and outlet. The first estimate of culvert span is obtained by analyzing bankfull channel width on a reach of stream not affected by an existing road crossing or other conditions that alter self-formed conditions. In the case of a culvert replacement, bankfull investigations are begun at least 10-20 estimated bankfull channel widths above the existing stream crossing. Culvert span is then increased according to channel bed composition and texture, bank characteristics, channel alignment at the crossing section, and other parameters that may affect channel dynamics and stability. Once the culvert span is determined, culvert length will be dictated by roadway geometry and loading requirements, and site stream conditions. Concrete headwalls and/or wingwalls are not included in this scenario. Culvert wall thickness and footing requirements are determined by road loading requirements and site geotechnical investigations. Generally, the preferred footing is a T-design with a spread footing with stem wall. Connecting the culvert leg to the footing can be done by welding, grouting, or bolting. Stream geomorphic characteristics, including the reach longitudinal profile, channel cross-sectional shape, substrate composition and arrangement, and bank shape and composition are determined. Bottomless arch or box culverts are commonly delivered in sections and bolted together in the field. Smaller arches can be delivered in one piece. They are installed with an assortment of equipment used for excavation, placing material, and delivering and removing material. Construction elements generally include an assortment of rock used to create riffles, cascades, or riffle-pool sequences with between 6 to 12 inches of water surface elevation drop between adjacent structures. Stream dewatering and diversion around the work site is often required, and temporary road closure or re-routing may also be required. Channel bed material within the culvert barrel varies according to prevailing stream characteristics at the crossing site. Footings are placed or poured, and the new streambed is set at a slope that matches the design longitudinal profile, and backfilled with a bed mixture that mimics adjacent stream characteristics with special attention to channel pattern. Once the simulated streambed between the footings is complete, the culvert sections are assembled and attached to the footings. Larger rock may be placed along the footing/culvert stemwall to protect the connection from damage by transported bedload. The roadway is replaced and any necessary armoring and revegetating material is placed at the culvert inlet and outlet where it intersects the road fill prism. Other actions include construction staking and signage, soil erosion and pollution control, removal and disposal of the old culvert, and topsoil conservation for site reclamation. Disturbed areas are revegetated using Critical Area Planting (342). Scenario does not include additional measures needed to address channel incision, bank stability, and other factors associated with the presence of the stream crossing. Scenario does not include concrete for head or wingwalls. Scenario based on metal arch culvert 12' span, 48' long RESOURCE CONCERNS: INADEQUATE HABITAT FOR FISH AND WILDLIFE –Habitat degradation; EXCESS WATER – Ponding, flooding, seasonal high water table, seeps, and drifted snow; WATER QUALITY DEGRADATION – Elevated water temperature; SOIL EROSION– Excessive bank erosion from streams shorelines or water conveyance channels Payments for these associated practices are made separately and are covered by other typical scenarios and payment schedules. See relevant CPS for additional information. ---Site Preparation and Reclamation associated with project footprint: (342) Critical Area Planting, (382) Fence, (390) Riparian Herbaceous Cover, (391) Riparian Forest Buffer, (612) Tree/Shrub Establishment; ---Reach Planning/Habitat Enhancement: (395) Stream Habitat Improvement and Management, ---Structural Measures Associated with Scenario but outside of project footprint: (410) Grade Stabilization Structure, (584) Channel Bed Stabilization, (580) Streambank and Shoreline Protection

**Before Situation:**

An existing undersized culvert has contributed to general bed and bank scour downstream of a road crossing, and may have contributed to the deposition of a wedge of sediment upstream of the road crossing. The road may be overtopped by high flows, resulting in outright failure, landowner accessibility problems, access by and to emergency services, and hamper post-flood recovery efforts. An upstream impoundment created by the undersized culvert has contributed to water quality problems including high water temperatures and the deposition and later mobilization of polluted fine sediment. Native aquatic organisms are unable to pass through the road crossing because the culvert outlet is perched above the downstream pool, and high velocities are not negotiable by animals that are able to leap into the culvert barrel.

**After Situation:**

The undersized culvert is replaced with a bottomless arch or box culvert sized, placed, and backfilled with material determined by geomorphic analyses performed in a reference reach upstream of the crossing location. Geomorphic and ecological functions are preserved through the crossing site, enhancing AOP, water quality, and culvert longevity. In addition, because the culvert is sized to promote the transport of streamflow and the materials it carries, it requires decreased maintenance activities over time. Landowners are able to access their holdings across a range of flows, and are able to seek and receive emergency and post-flood recovery services. Resource Concerns are addressed within the context of the site.

**Feature Measure:** horizontal area (span x length)

**Scenario Unit::** Square Foot

**Scenario Typical Size:** 576.0

**Scenario Total Cost:** $39,651.10

**Scenario Cost/Unit:** $68.84

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 | $2.53 | 200 | $506.00 |
| 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 | $164.46 | 24 | $3,947.04 |
| Water management, Flooding & dewatering | 969 | Includes equipment and power unit. Labor not included. | Acre Foot | $272.75 | 25 | $6,818.75 |
| Truck, dump, 12 CY | 1215 | Dump truck for moving bulk material. Typically capacity is 16 ton or 12 cubic yards. Includes equipment only. | Hour | $96.73 | 24 | $2,321.52 |
| **Labor** | | | | | | |
| General Labor | 231 | Labor performed using basic tools such as power tool, shovels, and other tools that do not require extensive training. Ex. pipe layer, herder, concrete placement, materials spreader, flagger, etc. | Hour | $25.31 | 24 | $607.44 |
| 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 | $44.37 | 24 | $1,064.88 |
| 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 | $45.69 | 24 | $1,096.56 |
| **Materials** | | | | | | |
| Aggregate, Gravel, Ungraded, Quarry Run | 1099 | Includes materials, equipment and labor | Cubic Yard | $23.96 | 50 | $1,198.00 |
| Aggregate, river rock | 1834 | Well graded, rounded mineral substrates derived from local riverine settings. Includes materials and local delivery | Ton | $29.15 | 90 | $2,623.50 |
| Footing, concrete, precast | 1836 | Precast spread footing with stemwall, T-shaped, with channel built to accept arched culvert leg. Includes materials only. | Foot | $55.51 | 96 | $5,328.96 |
| Culvert, Multi-Plate arch | 1979 | Multi-plate arch culvert, typically 7 Gauge corrugated plate. Includes metal arch materials only, does not include footings. | Pound | $1.30 | 10500 | $13,650.00 |
| **Mobilization** | | | | | | |
| Mobilization, large equipment | 1140 | Equipment >150HP or typical weights greater than 30,000 pounds or loads requiring over width or over length permits. | Each | $488.45 | 1 | $488.45 |

**Practice:** 396 - Aquatic Organism Passage

**Scenario** #8 - Concrete Box Culvert

**Scenario Description:**

A four-sided precast concrete box (square or rectangular) culvert used at a road-stream crossing to provide aquatic organism passage (AOP) and promote stream ecological and geomorphic function. Concrete box culverts are generally available in sections of 1-foot increments. Concrete box culverts used for AOP are sized according to geomorphic analyses, not just an estimate of runoff and streamflow at the site from the contributing watershed. In addition, concrete box culverts used for AOP are filled with a mixture of rock and gravel sized to emulate site stream conditions and geomorphic units in the channel. The simulated streambed material is continuous throughout the culvert barrel, and blended with the intact streambed at the culvert inlet and outlet. The first estimate of culvert width is obtained by analyzing bankfull channel width on a reach of stream not affected by an existing road crossing or other conditions that alter self-formed conditions. In the case of a culvert replacement, bankfull investigations are begun at least 10-20 estimated bankfull channel widths above the existing stream crossing. Culvert width is then increased according to channel bed composition and texture, bank characteristics, channel alignment at the crossing section, and other parameters that may affect channel dynamics and stability. Once the culvert width is determined, culvert length will be determined by roadway geometry and loading requirements, and site stream conditions. Concrete headwalls and/or wingwalls may be necessary in shorter installations and/or where fill/roadway cover is limited or the stream alignment is not perpendicular to the road axis. Stream geomorphic characteristics, including the reach longitudinal profile, channel cross-sectional shape, substrate composition and arrangement, and bank shape and composition are determined. Concrete box culverts are delivered in sections and assembled onsite, and require adequate bed compaction throughout the crossing section. They are installed with an assortment of equipment used for excavation, placing material, and delivering and removing material. Construction elements generally include an assortment of rock used to create riffles, cascades, or riffle-pool sequences with between 6 to 12 inches of water surface elevation drop between adjacent structures. Stream dewatering and diversion around the work site is often required, and temporary road closure or re-routing may also be required. Channel bed material within the culvert barrel varies according to prevailing stream characteristics at the crossing site. The new streambed is set at a slope that matches the design longitudinal profile, and backfilled with a bed mixture that mimics adjacent stream characteristics with special attention to channel pattern. The roadway is replaced and any necessary armoring and revegetating material is placed at the culvert inlet and outlet where it intersects the road fill prism. Other actions include construction staking and signage, soil erosion and pollution control, removal and disposal of the old culvert, and topsoil conservation for site reclamation. Disturbed areas are revegetated with Critical Area Planting (342). Scenario does not include additional measures needed to address channel incision, bank stability, and other factors associated with the presence of the stream crossing. Scenario based on box culvert with 8' span and 20' long RESOURCE CONCERNS: INADEQUATE HABITAT FOR FISH AND WILDLIFE –Habitat degradation; EXCESS WATER – Ponding, flooding, seasonal high water table, seeps, and drifted snow; WATER QUALITY DEGRADATION – Elevated water temperature; SOIL EROSION– Excessive bank erosion from streams shorelines or water conveyance channels Payments for these associated practices are made separately and are covered by other typical scenarios and payment schedules. See relevant CPS for additional information. ---Site Preparation and Reclamation associated with project footprint: (342) Critical Area Planting, (382) Fence, (390) Riparian Herbaceous Cover, (391) Riparian Forest Buffer, (612) Tree/Shrub Establishment; ---Reach Planning/Habitat Enhancement: (395) Stream Habitat Improvement and Management, ---Structural Measures Associated with Scenario but outside of project footprint: (410) Grade Stabilization Structure, (584) Channel Bed Stabilization, (580) Streambank and Shoreline Protection

**Before Situation:**

An existing undersized culvert as contributed to general bed and bank scour downstream of a road crossing, and may have contributed to the deposition of a wedge of sediment upstream of the road crossing. The road may be overtopped by high flows, resulting in outright failure, landowner accessibility problems, access by and to emergency services, and hamper post-flood recovery efforts. An upstream impoundment created by the undersized culvert has contributed to water quality problems including high water temperatures and the deposition and later mobilization of polluted fine sediment. Native aquatic organisms are unable to pass through the road crossing because the culvert outlet is perched above the downstream pool, and high velocities are not negotiable by animals that are able to leap into the culvert barrel.

**After Situation:**

The undersized culvert is replaced with a concrete box culvert sized, placed, and backfilled with material determined by geomorphic analyses performed in a reference reach upstream of the crossing location. Geomorphic and ecological functions are preserved through the crossing site, enhancing AOP, water quality, and culvert longevity. In addition, because the culvert is sized to promote the transport of streamflow and the materials it carries, it requires decreased maintenance activities over time. Landowners are able to access their holdings across a range of flows, and are able to seek and receive emergency and post-flood recovery services. Resource Concerns are addressed within the context of the site.

**Feature Measure:** horizontal area (span x length)

**Scenario Unit::** Square Foot

**Scenario Typical Size:** 160.0

**Scenario Total Cost:** $21,483.51

**Scenario Cost/Unit:** $134.27

Cost Details:

| Component Name | ID | Description | Unit | Cost | QTY | Total |
|---|---|---|---|---|---|---|
| **Equipment Installation** | | | | | | |
| Geotextile, woven | 42 | Woven Geotextile Fabric. Includes materials, equipment and labor | Square Yard | $2.53 | 100 | $253.00 |
| 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 | $164.46 | 16 | $2,631.36 |
| Water management, Flooding & dewatering | 969 | Includes equipment and power unit. Labor not included. | Acre Foot | $272.75 | 25 | $6,818.75 |
| Truck, dump, 12 CY | 1215 | Dump truck for moving bulk material. Typically capacity is 16 ton or 12 cubic yards. Includes equipment only. | Hour | $96.73 | 16 | $1,547.68 |
| **Labor** | | | | | | |
| General Labor | 231 | Labor performed using basic tools such as power tool, shovels, and other tools that do not require extensive training. Ex. pipe layer, herder, concrete placement, materials spreader, flagger, etc. | Hour | $25.31 | 16 | $404.96 |

| | | | | | | |
|---|---|---|---|---|---|---|
| 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 | $44.37 | 16 | $709.92 |
| 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 | $45.69 | 16 | $731.04 |
| **Materials** | | | | | | |
| Aggregate, river rock | 1834 | Well graded, rounded mineral substrates derived from local riverine settings. Includes materials and local delivery | Ton | $29.15 | 45 | $1,311.75 |
| Culvert, box, 6' x 8' | 2175 | Precast concrete box culvert, 6'X8'. Typically in 4' sections. Materials only. | Foot | $329.33 | 20 | $6,586.60 |
| **Mobilization** | | | | | | |
| Mobilization, large equipment | 1140 | Equipment >150HP or typical weights greater than 30,000 pounds or loads requiring over width or over length permits. | Each | $488.45 | 1 | $488.45 |

**Practice:** 396 - Aquatic Organism Passage

**Scenario** #9 - Bridge, CIP Abutment

**Scenario Description:**

A channel-spanning structure that carries a road or trailway across a river or stream. Constructed of timber, i-beams, or concrete, bridges are attached at either end to prefabricated, reinforced and poured-in-place, or piling abutments capped/surrounded with concrete. Longer span bridges may require instream pilings to support the travel surface. Bridge decking can be timber, concrete, asphalt, or some combination thereof. Bridge design is completed to conform to loading requirements and site conditions. Geotechnical investigations are used to determine the best support structure suited to a given site. The bridge deck is designed to rest on abutments placed on the adjacent floodplain. Bridge components are delivered to the site and assembled by a combination of equipment and manual labor. They are installed with an assortment of equipment used for excavation, placing material, delivering and removing material, and lifting bridge components from delivery trucks onto the constructed bridge support elements. Other actions include construction staking and signage, soil erosion and pollution control, removal and disposal of the old culvert (if applicable), and topsoil conservation for site reclamation. Stream diversion is not necessary since the bridge will be constructed above the active channel. Disturbed areas are revegetated using Critical Area Planting (342). Scenario does not include additional measures needed to address channel incision, bank stability, and other factors associated with the presence of the bridge crossing. RESOURCE CONCERNS: INADEQUATE HABITAT FOR FISH AND WILDLIFE –Habitat degradation; EXCESS WATER – Ponding, flooding, seasonal high water table, seeps, and drifted snow; WATER QUALITY DEGRADATION – Elevated water temperature; SOIL EROSION– Excessive bank erosion from streams shorelines or water conveyance channels Payments for these associated practices are made separately and are covered by other typical scenarios and payment schedules. See relevant CPS for additional information. ---Site Preparation and Reclamation associated with project footprint: (326) Clearing and Snagging, (342) Critical Area Planting, (382) Fence, (390) Riparian Herbaceous Cover, (391) Riparian Forest Buffer, (612) Tree/Shrub Establishment; ---Reach Planning/Habitat Enhancement: (395) Stream Habitat Improvement and Management, ---Structural Measures Associated with Scenario but outside of project footprint: (410) Grade Stabilization Structure, (582) Open Channel, (584) Channel Bed Stabilization, (580) Streambank and Shoreline Protection

**Before Situation:**

An existing stream crossing outfitted with an undersized culvert has a history of maintenance issues and failure. The downstream channel has experienced bed and bank scour, and the crossing may have to the deposition of a wedge of sediment upstream of the road. The road may be overtopped by high flows, resulting in outright failure, landowner accessibility problems, access by and to emergency services, and hamper post-flood recovery efforts. An upstream impoundment created by the undersized culvert has contributed to water quality problems including high water temperatures and the deposition and later mobilization of polluted fine sediment. Native aquatic organisms are unable to pass through the road crossing because the culvert outlet is perched above the downstream pool, and high velocities are not negotiable by animals that are able to leap into the culvert barrel.

**After Situation:**

The undersized culvert is replaced with a timber bridge placed on precast concrete abutments. The bridge deck is composed of timber planks, and elevated, continuous railings run down each side connecting one abutment to its counterpart on the opposite bank. Signs on either approach indicate bridge capacity and weight restrictions. Because the bridge spans the active channel and sits atop the adjacent floodplain surface, geomorphic and ecological functions are preserved through the crossing site, enhancing AOP, water quality, and culvert longevity. Landowners are able to access their holdings across a range of flows, and are able to seek and receive emergency and post-flood recovery services. Resource Concerns are addressed within the context of the site.

**Feature Measure:** Linear feet of bridge deck

**Scenario Unit::** Foot

**Scenario Typical Size:** 30.0

**Scenario Total Cost:** $76,593.88

**Scenario Cost/Unit:** $2,553.13

Cost Details:

| Component Name | ID | Description | Unit | Cost | QTY | Total |
|---|---|---|---|---|---|---|
| **Equipment Installation** | | | | | | |
| Concrete, CIP, formed reinforced | 38 | Steel reinforced concrete formed and cast-in-placed in formed structures such as walls or suspended slabs by chute placement. Typical strength is 3000 to 4000 psi. Includes materials, labor and equipment to transport, place and finish. | Cubic Yard | $510.00 | 32 | $16,320.00 |
| Backhoe, 80 HP | 926 | Wheel mounted backhoe excavator with horsepower range of 60 to 90. Equipment and power unit costs. Labor not included. | Hour | $56.05 | 40 | $2,242.00 |
| 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 | $164.46 | 60 | $9,867.60 |
| Skidsteer, 80 HP | 933 | Skidsteer loader with horsepower range of 60 to 90. Equipment and power unit costs. Labor not included. | Hour | $44.60 | 40 | $1,784.00 |
| Truck, Concrete Pump | 1211 | Concrete pump, normally truck mounted. Use this item in association with other concrete components when job requires placement by other than normal chutes. Include drive and setup time in quantity; therefore, do not include mobilization. Includes equi | Hour | $201.97 | 8 | $1,615.76 |
| Truck, dump, 18 CY | 1400 | Dump truck for moving bulk material. Typically capacity is 25 ton or 18 cubic yards. Includes equipment only. | Hour | $121.65 | 40 | $4,866.00 |
| **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 | $41.76 | 40 | $1,670.40 |
| 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 | $25.31 | 60 | $1,518.60 |

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|---|---|---|---|---|---|---|
| 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 | $44.37 | 180 | $7,986.60 |
| 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 | $45.69 | 40 | $1,827.60 |
| Specialist Labor | 235 | Labor requiring a specialized skill set: Includes Agronomists, Foresters, Biologists, etc. to provide additional technical information during the planning and implementation of the practice. Does not include NRCS or TSP services. | Hour | $110.71 | 120 | $13,285.20 |
| **Materials** | | | | | | |
| Dimension Lumber, Treated | 1044 | Treated dimension lumber with nominal thickness equal or less than 2". Includes lumber and fasteners | Board Foot | $0.90 | 2500 | $2,250.00 |
| Rock Riprap, graded, angular, material and shipping | 1200 | Graded Rock Riprap for all gradation ranges. Includes materials and delivery only. | Ton | $36.46 | 100 | $3,646.00 |
| Epoxy anchor | 1599 | Galvanized bolts anchored into concrete or stone using epoxy adhesive. Includes materials and labor to drill and install. | Each | $19.49 | 12 | $233.88 |
| Steel, structural steel members | 1779 | Structural steel, includes materials and fabrication. | Pound | $1.00 | 5360 | $5,360.00 |
| Pipe, PE, 4", DR 9, perforated | 2140 | Materials: -4" - Perforated PE- 160 psi - ASTM D3035 DR 9 | Foot | $8.74 | 60 | $524.40 |
| Galvanized Bolts, large | 2166 | 5/8" x 12" galvanized timber bolts. Materials only. | Each | $4.47 | 24 | $107.28 |
| **Mobilization** | | | | | | |
| Mobilization, medium equipment | 1139 | Equipment with 70-150 HP or typical weights between 14,000 and 30,000 pounds. | Each | $255.83 | 2 | $511.66 |
| Mobilization, large equipment | 1140 | Equipment >150HP or typical weights greater than 30,000 pounds or loads requiring over width or over length permits. | Each | $488.45 | 2 | $976.90 |

**Practice:** 396 - Aquatic Organism Passage

**Scenario** #10 - Bridge, Precast Abutment

**Scenario Description:**

A channel-spanning structure that carries a road or trailway across a river or stream. Constructed of timber, i-beams, or concrete, bridges are attached at either end to prefabricated or precast concrete. Longer span bridges may require instream pilings to support the travel surface. Bridge decking can be timber, concrete, asphalt, or some combination thereof. Bridge design is completed to conform to loading requirements and site conditions. Geotechnical investigations are used to determine the best support structure suited to a given site. The bridge deck is designed to rest on abutments placed on the adjacent floodplain. Bridge components are delivered to the site and assembled by a combination of equipment and manual labor. They are installed with an assortment of equipment used for excavation, placing material, delivering and removing material, and lifting bridge components from delivery trucks onto the constructed bridge support elements. Other actions include construction staking and signage, soil erosion and pollution control, removal and disposal of the old culvert (if applicable), and topsoil conservation for site reclamation. Stream diversion is not necessary since the bridge will be constructed above the active channel. Disturbed areas are revegetated using Critical Area Planting (342). Scenario does not include additional measures needed to address channel incision, bank stability, and other factors associated with the presence of the bridge crossing. RESOURCE CONCERNS: INADEQUATE HABITAT FOR FISH AND WILDLIFE –Habitat degradation; EXCESS WATER – Ponding, flooding, seasonal high water table, seeps, and drifted snow; WATER QUALITY DEGRADATION – Elevated water temperature; SOIL EROSION– Excessive bank erosion from streams shorelines or water conveyance channels Payments for these associated practices are made separately and are covered by other typical scenarios and payment schedules. See relevant CPS for additional information. ---Site Preparation and Reclamation associated with project footprint: (326) Clearing and Snagging, (342) Critical Area Planting, (382) Fence, (390) Riparian Herbaceous Cover, (391) Riparian Forest Buffer, (612) Tree/Shrub Establishment; ---Reach Planning/Habitat Enhancement: (395) Stream Habitat Improvement and Management, ---Structural Measures Associated with Scenario but outside of project footprint: (410) Grade Stabilization Structure, (582) Open Channel, (584) Channel Bed Stabilization, (580) Streambank and Shoreline Protection

**Before Situation:**

An existing stream crossing outfitted with an undersized culvert has a history of maintenance issues and failure. The downstream channel has experienced bed and bank scour, and the crossing may have to the deposition of a wedge of sediment upstream of the road. The road may be overtopped by high flows, resulting in outright failure, landowner accessibility problems, access by and to emergency services, and hamper post-flood recovery efforts. An upstream impoundment created by the undersized culvert has contributed to water quality problems including high water temperatures and the deposition and later mobilization of polluted fine sediment. Native aquatic organisms are unable to pass through the road crossing because the culvert outlet is perched above the downstream pool, and high velocities are not negotiable by animals that are able to leap into the culvert barrel.

**After Situation:**

The undersized culvert is replaced with a timber bridge placed on precast concrete abutments. The bridge deck is composed of timber planks, and elevated, continuous railings run down each side connecting one abutment to its counterpart on the opposite bank. Signs on either approach indicate bridge capacity and weight restrictions. Because the bridge spans the active channel and sits atop the adjacent floodplain surface, geomorphic and ecological functions are preserved through the crossing site, enhancing AOP, water quality, and culvert longevity. Landowners are able to access their holdings across a range of flows, and are able to seek and receive emergency and post-flood recovery services. Resource Concerns are addressed within the context of the site.

**Feature Measure:** Linear feet of bridge deck

**Scenario Unit::** Foot

**Scenario Typical Size:** 30.0

**Scenario Total Cost:** $60,878.52

**Scenario Cost/Unit:** $2,029.28

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 | $56.05 | 40 | $2,242.00 |
| 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 | $164.46 | 60 | $9,867.60 |
| Skidsteer, 80 HP | 933 | Skidsteer loader with horsepower range of 60 to 90. Equipment and power unit costs. Labor not included. | Hour | $44.60 | 40 | $1,784.00 |
| Truck, dump, 18 CY | 1400 | Dump truck for moving bulk material. Typically capacity is 25 ton or 18 cubic yards. Includes equipment only. | Hour | $121.65 | 40 | $4,866.00 |
| **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 | $41.76 | 40 | $1,670.40 |
| 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 | $25.31 | 60 | $1,518.60 |
| 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 | $44.37 | 180 | $7,986.60 |
| 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 | $45.69 | 40 | $1,827.60 |

| | | | | | | |
|---|---|---|---|---|---|---|
| Specialist Labor | 235 | Labor requiring a specialized skill set: Includes Agronomists, Foresters, Biologists, etc. to provide additional technical information during the planning and implementation of the practice. Does not include NRCS or TSP services. | Hour | $110.71 | 120 | $13,285.20 |
| **Materials** | | | | | | |
| Dimension Lumber, Treated | 1044 | Treated dimension lumber with nominal thickness equal or less than 2". Includes lumber and fasteners | Board Foot | $0.90 | 2500 | $2,250.00 |
| Rock Riprap, graded, angular, material and shipping | 1200 | Graded Rock Riprap for all gradation ranges. Includes materials and delivery only. | Ton | $36.46 | 100 | $3,646.00 |
| Epoxy anchor | 1599 | Galvanized bolts anchored into concrete or stone using epoxy adhesive. Includes materials and labor to drill and install. | Each | $19.49 | 12 | $233.88 |
| Steel, structural steel members | 1779 | Structural steel, includes materials and fabrication. | Pound | $1.00 | 5360 | $5,360.00 |
| Footing, concrete, precast | 1836 | Precast spread footing with stemwall, T-shaped, with channel built to accept arched culvert leg. Includes materials only. | Foot | $55.51 | 40 | $2,220.40 |
| Pipe, PE, 4", DR 9, perforated | 2140 | Materials: -4" - Perforated PE- 160 psi - ASTM D3035 DR 9 | Foot | $8.74 | 60 | $524.40 |
| Galvanized Bolts, large | 2166 | 5/8" x 12" galvanized timber bolts. Materials only. | Each | $4.47 | 24 | $107.28 |
| **Mobilization** | | | | | | |
| Mobilization, medium equipment | 1139 | Equipment with 70-150 HP or typical weights between 14,000 and 30,000 pounds. | Each | $255.83 | 2 | $511.66 |
| Mobilization, large equipment | 1140 | Equipment >150HP or typical weights greater than 30,000 pounds or loads requiring over width or over length permits. | Each | $488.45 | 2 | $976.90 |

**Practice:** 396 - Aquatic Organism Passage

**Scenario** #11 - Bridge, Prefabricated

**Scenario Description:**

A channel-spanning structure constructed from a manufactured concrete or steel bridge structure that has been certified by a PE that carries a road or trailway across a river or stream. Bridge design is completed to conform to loading requirements and site conditions. The bridge deck is designed to rest on abutments placed on the adjacent floodplain. Bridge components are delivered to the site and assembled by a combination of equipment and manual labor. They are installed with an assortment of equipment used for excavation, placing material, delivering and removing material, and lifting bridge components from delivery trucks onto the constructed bridge support elements. Other actions include construction staking and signage, soil erosion and pollution control, removal and disposal of the old culvert (if applicable), and topsoil conservation for site reclamation. Channel diversion or dewatering is required since an existing blockage will be removed for bridge construction. Disturbed areas are revegetated using Critical Area Planting (342). Scenario does not include additional measures needed to address channel incision, bank stability, and other factors associated with the presence of the bridge crossing. RESOURCE CONCERNS: INADEQUATE HABITAT FOR FISH AND WILDLIFE –Habitat degradation; EXCESS WATER – Ponding, flooding, seasonal high water table, seeps, and drifted snow; WATER QUALITY DEGRADATION – Elevated water temperature; SOIL EROSION– Excessive bank erosion from streams shorelines or water conveyance channels Associated Practices: (326) Clearing and Snagging, (342) Critical Area Planting, (382) Fence, (390) Riparian Herbaceous Cover, (391) Riparian Forest Buffer, (612) Tree/Shrub Establishment; (395) Stream Habitat Improvement and Management, (410) Grade Stabilization Structure, (582) Open Channel, (584) Channel Bed Stabilization, (580) Streambank and Shoreline Protection

**Before Situation:**

An existing undersized culvert creates an upstream passage blockage to fish and other aquatic organisms. The existing crossing does not meet State or Federal fish passage guidance.

**After Situation:**

The undersized culvert is replaced with a manufactured bridge placed on precast concrete abutments. The bridge deck is composed of concrete or steel and elevated, continuous railings run down each side connecting one abutment to its counterpart on the opposite bank. Signs on either approach indicate bridge capacity and weight restrictions. Because the bridge spans the active channel and sits atop the adjacent floodplain surface, geomorphic and ecological functions are preserved through the crossing site, enhancing AOP, water quality, and culvert longevity. Resource Concerns are addressed within the context of the site. Typical Scenario is for a 30' span bridge 15' wide on precast concrete abutments.

**Feature Measure:** Linear Feet of Bridge Deck

**Scenario Unit::** Foot

**Scenario Typical Size:** 30.0

**Scenario Total Cost:** $74,932.52

**Scenario Cost/Unit:** $2,497.75

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 | $510.00 | 18 | $9,180.00 |
| Backhoe, 80 HP | 926 | Wheel mounted backhoe excavator with horsepower range of 60 to 90. Equipment and power unit costs. Labor not included. | Hour | $56.05 | 40 | $2,242.00 |
| 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 | $164.46 | 20 | $3,289.20 |
| Water management, Flooding & dewatering | 969 | Includes equipment and power unit. Labor not included. | Acre Foot | $272.75 | 50 | $13,637.50 |
| Truck, dump, 18 CY | 1400 | Dump truck for moving bulk material. Typically capacity is 25 ton or 18 cubic yards. Includes equipment only. | Hour | $121.65 | 10 | $1,216.50 |
| **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 | $41.76 | 34 | $1,419.84 |
| General Labor | 231 | Labor performed using basic tools such as power tool, shovels, and other tools that do not require extensive training. Ex. pipe layer, herder, concrete placement, materials spreader, flagger, etc. | Hour | $25.31 | 60 | $1,518.60 |
| 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 | $44.37 | 70 | $3,105.90 |
| 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 | $45.69 | 20 | $913.80 |
| 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 | $110.71 | 80 | $8,856.80 |
| **Materials** | | | | | | |

| | | | | | | |
|---|---|---|---|---|---|---|
| Painting, steel surface, Impermeable | 2165 | Painting of steel surface with an impermeable coating. Includes materials and application | Square Foot | $0.86 | 1260 | $1,083.60 |
| Bridge, steel or concrete, pre-Manufactured Bridge | 2193 | A premanufactured steel or precast prestressed concrete bridge rated for an HS 25 highway loading. Typical width is 14', length is variable. Includes railing system. Includes materials and shipping only. | Square Foot | $61.61 | 450 | $27,724.50 |
| **Mobilization** | | | | | | |
| Mobilization, medium equipment | 1139 | Equipment with 70-150 HP or typical weights between 14,000 and 30,000 pounds. | Each | $255.83 | 1 | $255.83 |
| Mobilization, large equipment | 1140 | Equipment >150HP or typical weights greater than 30,000 pounds or loads requiring over width or over length permits. | Each | $488.45 | 1 | $488.45 |

**Practice:** 396 - Aquatic Organism Passage

**Scenario** #12 - Concrete Ladder

**Scenario Description:**

Formed, reinforced, poured-in-place concrete structures outfitted with baffles (Denil), vertical slots, pools and weirs, submerged orifices, chutes or some combination thereof to provide upstream passage for aquatic organisms over dams and other hydraulic structures. Although fish ladder designs vary according to target species and site conditions, they can generally be described as a three-sided concrete channel with integrated hydraulic features that provide a gradual elevation increase across some distance that allows aquatic organism to swim over a barrier--they convert the total barrier head elevation into passable increments. Concrete ladders are often constructed with resting pools and may have switchbacks. The primary water source for a concrete ladder comes from streamflow diverted into the ladder exit (upstream end) and since it is passed through the ladder to the river below, it is not a consumptive use. These ladders often require flow control and regulating devices (sometimes automated), gates, and may need auxiliary pumps to provide attraction flows at the ladder entrance (downstream end) or augment flow in the ladder. Gages above and below the dam are required to inform ladder operation. Trash racks are used at the upstream end to block debris from entering the ladder. Concrete ladders also require frequent maintenance, and flow through unautomated ladders may need to be adjusted manually when adjacent river conditions or dam operations change. Concrete ladder designs can be complex and require interactions between engineering and ecological sciences for successful implementation. For example, the ladder entrance is one of the most important elements of the structure, and placement of this entrance in the downstream reach is a function of site characteristics and aquatic organism biology. In addition, some aquatic animals will not swim through a submerged orifice, so use of pool-orifice ladders is not recommended. Partners associated with dam ownership and operation, regulatory agencies, and others are consulted and included in the design and construction process. Ladder designs account for run volume and timing, and the swimming capabilities of target species. Some ladders in highly visible areas are finished with masonry facades to blend the ladder to the site in the interest of aesthetics or to conform with historic appearances. Concrete ladders are constructed with equipment for excavation, placing material, and delivering and removing material. Lifts or booms are required to place concrete into forms. Because ladders are often attached to existing dams, personnel familiar with the dam structure are involved at all phases of the process to ensure that plans conform with site requirements. Bed and bank excavation are necessary to create the location for concrete ladders, so site isolation and sediment and erosion control measures are used. Disturbed areas are revegetated using Critical Area Planting (342) and access control and signage are provided. Scenario does not include additional measures in the adjacent active channel necessary to control flow, address channel elevation or stability, or encourage fish guidance into the concrete ladder. Scenario does not include structures used as counting stations or to trap and sample upstream migrants. RESOURCE CONCERNS: INADEQUATE HABITAT FOR FISH AND WILDLIFE –Habitat degradation Payments for these associated practices are made separately and are covered by other typical scenarios and payment schedules. See relevant CPS for additional information. ---Site Preparation and Reclamation associated with project footprint: (326) Clearing and Snagging, (342) Critical Area Planting, (382) Fence, (390) Riparian Herbaceous Cover, (391) Riparian Forest Buffer, (612) Tree/Shrub Establishment ---Reach Planning/Habitat Enhancement: (395) Stream Habitat Improvement and Management, ---Structural Measures Associated with Scenario but outside of project footprint: (410) Grade Stabilization Structure, (582) Open Channel, (584) Channel Bed Stabilization, (580) Streambank and Shoreline Protection, (587) Structure for Water Control

**Before Situation:**

An operational, low hazard class fixed crest concrete dam becomes the target of parties interested in providing fish passage. The dam presently blocks the upstream migration of a number of native aquatic organisms, and suitable spawning and rearing habitats for targeted fish species exists in upstream river reaches. Assessment of site conditions, dam operation, and target species swimming abilities indicate that a concrete ladder will provide suitable passage conditions during the migration season and pass the expected run volume without excessive delays.

**After Situation:**

A concrete pool and chute ladder outfitted with aluminum internal features and 2 turn/resting pool is installed. The ladder is attached to the face and abutment of the dam, and the entrance is located along the streambank where migrating aquatic organisms are likely to encounter it. The ladder passes the estimated run volume with minimal delays, and native aquatic animals are able to reach upstream spawning and rearing areas and successfully produce offspring that become part of the population. The ladder has an operating plan that stipulates actions and responsible parties for every month of the year. The ladder is fenced to control access and signage indicating its function and relevant warnings is provided at numerous locations. Resource Concerns are addressed within the context of the site.

**Feature Measure:** Barrier height (feet)

**Scenario Unit::** Foot

**Scenario Typical Size:** 20.0

**Scenario Total Cost:** $342,342.34

**Scenario Cost/Unit:** $17,117.12

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 | $510.00 | 500 | $255,000.00 |
| Clearing and Grubbing | 40 | Clearing and Grubbing, includes materials, equipment and labor | Acre | $304.36 | 3 | $913.08 |
| Backhoe, 80 HP | 926 | Wheel mounted backhoe excavator with horsepower range of 60 to 90. Equipment and power unit costs. Labor not included. | Hour | $56.05 | 60 | $3,363.00 |
| 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 | $164.46 | 80 | $13,156.80 |
| Skidsteer, 80 HP | 933 | Skidsteer loader with horsepower range of 60 to 90. Equipment and power unit costs. Labor not included. | Hour | $44.60 | 80 | $3,568.00 |
| Water management, Flooding & dewatering | 969 | Includes equipment and power unit. Labor not included. | Acre Foot | $272.75 | 6 | $1,636.50 |

| | | | | | | |
|---|---|---|---|---|---|---|
| Truck, Concrete Pump | 1211 | Concrete pump, normally truck mounted. Use this item in association with other concrete components when job requires placement by other than normal chutes. Include drive and setup time in quantity; therefore, do not include mobilization. Includes equi | Hour | $201.97 | 60 | $12,118.20 |
| Truck, dump, 12 CY | 1215 | Dump truck for moving bulk material. Typically capacity is 16 ton or 12 cubic yards. Includes equipment only. | Hour | $96.73 | 60 | $5,803.80 |
| **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 | $41.76 | 80 | $3,340.80 |
| 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 | $25.31 | 60 | $1,518.60 |
| 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 | $44.37 | 280 | $12,423.60 |
| 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 | $45.69 | 80 | $3,655.20 |
| 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 | $110.71 | 220 | $24,356.20 |
| **Mobilization** | | | | | | |
| Mobilization, medium equipment | 1139 | Equipment with 70-150 HP or typical weights between 14,000 and 30,000 pounds. | Each | $255.83 | 2 | $511.66 |
| Mobilization, large equipment | 1140 | Equipment >150HP or typical weights greater than 30,000 pounds or loads requiring over width or over length permits. | Each | $488.45 | 2 | $976.90 |

**Practice:** 396 - Aquatic Organism Passage

**Scenario** #13 - Complex Denil

**Scenario Description:**

Denil fishways are roughened chutes that employ baffles connected to the walls and floor of the chute to provide near continuous energy dissipation throughout the fishway length. Denils are often reinforced, poured-in-place concrete structures outfitted with removable baffles constructed with treated wood that fits into channels incorporated into the ladder walls. These fishways have excellent attraction characteristics when properly sited and provide good passage conditions using relatively low flow amounts. They often do not require auxiliary (pumped) attraction or fishway flow, but are sensitive to tailwater fluctuations. Denil fishways are used mainly for sites where the fishway can be closely monitored, such as off-ladder fish trap designs or temporary fishways used during construction of permanent passage facilities. Because of their baffle geometry and narrow flow paths, Denil fishways are especially susceptible to debris accumulation. Denil fishways are designed with a sloped channel that has a constant discharge for a given normal depth, chute gradient, and baffle configuration. Energy is dissipated consistently throughout the length of the fishway via channel roughness, and results in an average velocity compatible with the swimming ability of native aquatic organisms. Target species' mobility data are important factors in determining the length of a Denil or steeppass because there are no resting locations within a given length of these fishways. Once an animal starts to ascend a length of Denil, it must pass all the way upstream and exit the fishway, or risk injury when falling back downstream. If the Denil or steeppass fishway is long, intermediate resting pools may be included in the design, located at intervals determined by the swimming ability of the weakest target species. Denil ladders are constructed with equipment used for excavation, placing material, and delivering and removing material. Lifts or booms may be required to place concrete into forms or lift ladder elements into place. Because ladders are often attached to existing dams, personnel familiar with the dam structure are involved at all phases of the process to ensure that plans conform with site requirements. Bed and bank excavation may be necessary to create the location for fishway components, so site isolation and sediment and erosion control measures are used. Disturbed areas are revegetated using Critical Area Planting (342) and access control and signage are provided. Scenario does not include additional measures in the adjacent active channel necessary to control flow, address channel elevation or stability, or encourage fish guidance into the concrete ladder. Scenario does not include structures used as counting stations or to trap and sample upstream migrants. RESOURCE CONCERNS: INADEQUATE HABITAT FOR FISH AND WILDLIFE –Habitat degradation Payments for these associated practices are made separately and are covered by other typical scenarios and payment schedules. See relevant CPS for additional information. ---Site Preparation and Reclamation associated with project footprint: (326) Clearing and Snagging, (342) Critical Area Planting, (382) Fence, (390) Riparian Herbaceous Cover, (391) Riparian Forest Buffer, (612) Tree/Shrub Establishment ---Reach Planning/Habitat Enhancement: (395) Stream Habitat Improvement and Management, ---Structural Measures Associated with Scenario but outside of project footprint: (410) Grade Stabilization Structure, (582) Open Channel, (584) Channel Bed Stabilization, (580) Streambank and Shoreline Protection, (587) Structure for Water Control

**Before Situation:**

An operational, low hazard class fixed crest concrete dam becomes the target of parties interested in providing fish passage. The dam presently blocks the upstream migration of a number of native aquatic organisms, and suitable spawning and rearing habitats for targeted fish species exists in upstream river reaches. Assessment of site conditions, dam operation, and target species swimming abilities indicate that a concrete ladder will provide suitable passage conditions during the migration season and pass the expected run volume without excessive delays.

**After Situation:**

A concrete Denil ladder outfitted with treated wood baffles and a turn/resting pool is installed. The ladder is attached to the face and abutment of the dam, and the entrance is located along the streambank where migrating native fish are likely to encounter it. The ladder passes the estimated run volume with minimal delays, and native aquatic animals are able to reach upstream spawning and rearing areas and successfully produce offspring that become part of the population. The ladder has an operating plan that stipulates actions and responsible parties for every month of the year. Resource Concerns are addressed within the context of the site.

**Feature Measure:** Barrier Height (ft)

**Scenario Unit::** Foot

**Scenario Typical Size:** 12.0

**Scenario Total Cost:** $684,912.71

**Scenario Cost/Unit:** $57,076.06

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 | $304.36 | 1 | $304.36 |
| Backhoe, 80 HP | 926 | Wheel mounted backhoe excavator with horsepower range of 60 to 90. Equipment and power unit costs. Labor not included. | Hour | $56.05 | 60 | $3,363.00 |
| 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 | $164.46 | 60 | $9,867.60 |
| Skidsteer, 80 HP | 933 | Skidsteer loader with horsepower range of 60 to 90. Equipment and power unit costs. Labor not included. | Hour | $44.60 | 60 | $2,676.00 |
| Water management, Flooding & dewatering | 969 | Includes equipment and power unit. Labor not included. | Acre Foot | $272.75 | 25 | $6,818.75 |
| **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 | $41.76 | 80 | $3,340.80 |
| 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 | $25.31 | 60 | $1,518.60 |
| 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 | $44.37 | 180 | $7,986.60 |

| | | | | | | |
|---|---|---|---|---|---|---|
| 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 | $45.69 | 80 | $3,655.20 |
| 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 | $110.71 | 240 | $26,570.40 |
| **Materials** | | | | | | |
| Dimension Lumber, Treated | 1044 | Treated dimension lumber with nominal thickness equal or less than 2". Includes lumber and fasteners | Board Foot | $0.90 | 200 | $180.00 |
| Denil Ladder | 1838 | Denil Ladder, designed to meet species passage requirements and site characteristics. Cost is per vertical foot of dam at site, and includes concrete, gates, trash racks, baffles, turn/resting pools, and ladder entrance or exit works. Includes materials | Foot | $51,428.57 | 12 | $617,142.84 |
| **Mobilization** | | | | | | |
| Mobilization, medium equipment | 1139 | Equipment with 70-150 HP or typical weights between 14,000 and 30,000 pounds. | Each | $255.83 | 2 | $511.66 |
| Mobilization, large equipment | 1140 | Equipment >150HP or typical weights greater than 30,000 pounds or loads requiring over width or over length permits. | Each | $488.45 | 2 | $976.90 |

**Practice:** 396 - Aquatic Organism Passage

**Scenario** #14 - Alaskan Steeppass

**Scenario Description:**

Alaskan Steeppass fishways are roughened chutes that employ baffles connected to the walls and floor of the chute to provide near continuous energy dissipation throughout the fishway length. A Steeppass is commonly constructed of welded aluminum at an offsite fabrication facility that is later transported to the project site and lowered in place with a boom truck or crane. Steeppasses can be composed of a single length of chute, or chutes connected by reinforced, poured-in-place resting/turn pools at complex or higher barrier sites. These fishways have excellent attraction characteristics when properly sited and provide good passage conditions using relatively low flow amounts. They often do not require auxiliary (pumped) attraction or fishway flow, but are sensitive to tailwater fluctuations. Steeppass fishways are used mainly for sites where the fishway can be closely monitored, such as off-ladder fish trap designs or temporary fishways used during construction of permanent passage facilities. Because of their baffle geometry and narrow flow paths, steeppass fishways are especially susceptible to debris accumulation. Steeppass fishways are designed with a sloped channel that has a constant discharge for a given normal depth, chute gradient, and baffle configuration. Energy is dissipated consistently throughout the length of the fishway via channel roughness, and results in an average velocity compatible with the swimming ability of native aquatic organisms. Target species' mobility data are important factors in determining the length of a Denil or steeppass because there are no resting locations within a given length of these fishways. Once an animal starts to ascend a length of steeppass, it must pass all the way upstream and exit the fishway, or risk injury when falling back downstream. If the steeppass fishway is long, intermediate resting pools may be included in the design, located at intervals determined by the swimming ability of the weakest target species. Steeppass fishways are constructed with equipment used for excavation, placing material, and delivering and removing material. Lifts or booms may be required to place concrete into forms or lift steeppass sections into place. Because ladders are often attached to existing dams, personnel familiar with the dam structure are involved at all phases of the process to ensure that plans conform with site requirements. Bed and bank excavation may be necessary to create the location for fishway components, so site isolation and sediment and erosion control measures are used. Disturbed areas are revegetated using Critical Area Planting (342) and access control and signage are provided. Scenario does not include additional measures in the adjacent active channel necessary to control flow, address channel elevation or stability, or encourage fish guidance into the concrete ladder. Scenario does not include structures used as counting stations or to trap and sample upstream migrants. RESOURCE CONCERNS: INADEQUATE HABITAT FOR FISH AND WILDLIFE –Habitat degradation Payments for these associated practices are made separately and are covered by other typical scenarios and payment schedules. See relevant CPS for additional information. ---Site Preparation and Reclamation associated with project footprint: (326) Clearing and Snagging, (342) Critical Area Planting, (382) Fence, (390) Riparian Herbaceous Cover, (391) Riparian Forest Buffer, (612) Tree/Shrub Establishment ---Reach Planning/Habitat Enhancement: (395) Stream Habitat Improvement and Management, ---Structural Measures Associated with Scenario but outside of project footprint: (410) Grade Stabilization Structure, (582) Open Channel, (584) Channel Bed Stabilization, (580) Streambank and Shoreline Protection, (587) Structure for Water Control

**Before Situation:**

An operational, low hazard class fixed crest concrete dam becomes the target of parties interested in providing fish passage. The dam presently blocks the upstream migration of a number of native aquatic organisms, and suitable spawning and rearing habitats for targeted fish species exists in upstream river reaches. Assessment of site conditions, dam operation, and target species swimming abilities indicate that a concrete ladder will provide suitable passage conditions during the migration season and pass the expected run volume without excessive delays.

**After Situation:**

Four sections of Alaskan Steeppass separated by 2 turn/resting pools are installed. The ladder is attached to the face and abutment of the dam, and the entrance is located along the streambank where migrating native fish are likely to encounter it. The ladder passes the estimated run volume with minimal delays, and native aquatic animals are able to reach upstream spawning and rearing areas and successfully produce offspring that become part of the population. The ladder has an operating plan that stipulates actions and responsible parties for every month of the year. Resource Concerns are addressed within the context of the site.

**Feature Measure:** Barrier Height (ft)

**Scenario Unit::** Foot

**Scenario Typical Size:** 8.0

**Scenario Total Cost:** $105,092.28

**Scenario Cost/Unit:** $13,136.54

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 | $510.00 | 36 | $18,360.00 |
| Clearing and Grubbing | 40 | Clearing and Grubbing, includes materials, equipment and labor | Acre | $304.36 | 0.5 | $152.18 |
| Backhoe, 80 HP | 926 | Wheel mounted backhoe excavator with horsepower range of 60 to 90. Equipment and power unit costs. Labor not included. | Hour | $56.05 | 40 | $2,242.00 |
| 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 | $164.46 | 80 | $13,156.80 |
| Skidsteer, 80 HP | 933 | Skidsteer loader with horsepower range of 60 to 90. Equipment and power unit costs. Labor not included. | Hour | $44.60 | 40 | $1,784.00 |
| Water management, Flooding & dewatering | 969 | Includes equipment and power unit. Labor not included. | Acre Foot | $272.75 | 25 | $6,818.75 |
| Truck, Concrete Pump | 1211 | Concrete pump, normally truck mounted. Use this item in association with other concrete components when job requires placement by other than normal chutes. Include drive and setup time in quantity; therefore, do not include mobilization. Includes equi | Hour | $201.97 | 24 | $4,847.28 |
| **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 | $41.76 | 40 | $1,670.40 |
| 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 | $25.31 | 60 | $1,518.60 |
| 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 | $44.37 | 160 | $7,099.20 |
| 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 | $45.69 | 40 | $1,827.60 |
| Specialist Labor | 235 | Labor requiring a specialized skill set: Includes Agronomists, Foresters, Biologists, etc. to provide additional technical information during the planning and implementation of the practice. Does not include NRCS or TSP services. | Hour | $110.71 | 120 | $13,285.20 |
| **Materials** | | | | | | |
| Steepass fish ladder, 10' | 1839 | 10' aluminum chute installed in water passage to slow water enabling fish to pass easily. Includes all joint plates and fasteners. Materials and shipping only. | Each | $6,752.57 | 4 | $27,010.28 |
| Adapter plate, steepass, upstream | 2228 | Aluminum angle adapter without flanges, upstream configuration. Includes stainless steel fasteners for joining fishway. Materials and shipping only. | Each | $1,864.29 | 1 | $1,864.29 |
| Adapter plate, steepass, downstream | 2229 | Aluminum angle adapter without flanges, downstream configuration. Includes stainless steel fasteners for joining fishway. Materials and shipping only. | Each | $1,967.14 | 1 | $1,967.14 |
| **Mobilization** | | | | | | |
| Mobilization, medium equipment | 1139 | Equipment with 70-150 HP or typical weights between 14,000 and 30,000 pounds. | Each | $255.83 | 2 | $511.66 |
| Mobilization, large equipment | 1140 | Equipment >150HP or typical weights greater than 30,000 pounds or loads requiring over width or over length permits. | Each | $488.45 | 2 | $976.90 |

**Practice:** 396 - Aquatic Organism Passage

**Scenario** #15 - Low Water Crossing

**Scenario Description:**

Structure installed on low volume or on unimproved roads at watercourse crossings. Primary use is to allow livestock and equipment access to other parcels of land or operational units. Low-water crossings provide safe and stable stream crossings that don't negatively impact water and ecological quality while remaining stable across a wide range of flows. Variations exist, but a common application consists of an improved or hardened ford located above a hydraulic control (e.g., bedrock outcropping, riffle, or step composed of coarse substrates). Properly designed and installed low water crossings provide aquatic organism passage (AOP), promote stream ecological and geomorphic function, remain stable over time, and can pass sediment and woody debris. Conservation planning and interaction with the landowner is vital to determine if existing crossings can be consolidated into fewer, more reliable locations. Characterizing a site according to its watershed position and geomorphic function will aid design decisions. Optimal AOP conditions are usually realized when the backfill is composed of a mixture that mimics bed material as evaluated from a reference reach adjacent to the crossing—preferably at least 10-20 estimated bankfull channel widths above an existing crossing to avoid effects that alter channel geometry or bedform composition and spacing. Low water crossings are installed with an assortment of equipment used for excavation, placing material, and delivering and removing material. Low water crossings provide the best mix of function and longevity when they are designed and built to conform to existing channel geometry and slope, constructed to match the shape of the existing channel, and oriented to cross the stream at a 90 degree angle. Crossing width, measured along the downstream axis, should not exceed 2X bankfull width. Low water crossings are commonly constructed by overexcavating the crossing section 6-12 inches below the existing streambed and backfilling the void with well-graded rock back to natural bed elevation. Geotextile lining may be required in some settings. Rock size and gradation is the smallest mix needed to remain stable under prevailing flow conditions—larger rock can endanger livestock and turbulence impairs passage. Sand or soil may be added into the mix to seal the section to ensure that the stream doesn't percolate into the crossing substrate. Smaller material increases bed diversity, chokes voids between bigger stones, and helps preserve passage quality. Smaller rock smaller (< 2 inches) at the finished surface may become lodged in livestock hooves. The road/trail surface of the crossing should be extended to an elevation that exceeds the known high water level on each side of the crossing. The downstream edge of the crossing should not produce a sharp drop in water surface to preserve AOP quality and discourage sediment deposition and debris accumulation. Other actions include construction staking and signage, soil erosion and pollution control, removal and disposal of the old culvert, and topsoil conservation for site reclamation. Disturbed areas are revegetated using Critical Area Planting (342). Scenario does not include additional measures needed to address channel incision, bank stability, and other factors associated with the presence of the stream crossing. Stream corridor fencing should be considered to control livestock access and preserve water and riparian quality. RESOURCE CONCERNS: INADEQUATE HABITAT FOR FISH AND WILDLIFE –Habitat degradation Payments for these associated practices are made separately and are covered by other typical scenarios and payment schedules. See relevant CPS for additional information. ---Site Preparation and Reclamation associated with project footprint: (326) Clearing and Snagging, (342) Critical Area Planting, (382) Fence, (390) Riparian Herbaceous Cover, (391) Riparian Forest Buffer, (612) Tree/Shrub Establishment ---Reach Planning/Habitat Enhancement: (395) Stream Habitat Improvement and Management, ---Structural Measures Associated with Scenario but outside of project footprint: (410) Grade Stabilization Structure, (582) Open Channel, (584) Channel Bed Stabilization, (580) Streambank and Shoreline Protection, (587) Structure for Water Control

**Before Situation:**

A small farming operation has a mixture of pastures, hay meadows, and crops that all require seasonal movement of equipment and livestock between parcels. Four unimproved stream crossings provide unreliable access across the property and require yearly maintenance to clear debris and sediment. Farm equipment has gotten stuck in the past, and uncontrolled livestock access and frequent crossing or loafing in the stream contributes to chronic water quality problems associated with elevated fine sediment, high water temperatures, invasive aquatic vegetation, and fecal coliform bacteria. Livestock avoid three of the crossings when streamflow increases moderately. Two of the crossings are overwide and shallow, and impair AOP. The property and landowner's yearly operations are reviewed by conservation planners and—with the input and agreement of the landowner—it is decided that three of the four crossings can be eliminated and consolidated at one site above a cobble/boulder deposit in the stream.

**After Situation:**

An improved ford is constructed by excavating the channel just upstream of the boulder/cobble hydraulic control. The cut is lined with geotextile to control seepage and subsurface flow, and backfilled up to the existing bed elevation with a well-graded mix of rock sized to mimic the material in the channel upstream of the crossing. The finished crossing surface is at grade with the up and downstream channel elevation, and no drop exists along the downstream edge. Approaches on either side of the crossing are extended up to the adjacent floodplain surface, and the finished instream portion of the ford matches the existing channel cross section. Approach slopes are shallow enough for expected equipment traffic, including towed combinations, and armored as needed with larger rock to protect against erosion that may occur when the floodplain is inundated. The crossing is fenced and gated to control livestock access and provide greater flexibility to the landowner's grazing needs. AOP is provided, and the crossing remains stable across a range of flow and sediment and debris transport events. Resource Concerns are addressed within the context of the site.

**Feature Measure:** Cubic Yard of Crossing Material

**Scenario Unit::** Cubic Yard

**Scenario Typical Size:** 42.0

**Scenario Total Cost:** $11,876.87

**Scenario Cost/Unit:** $282.78

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 | $304.36 | 0.5 | $152.18 |
| Geotextile, woven | 42 | Woven Geotextile Fabric. Includes materials, equipment and labor | Square Yard | $2.53 | 85 | $215.05 |
| Earthfill, Manually Compacted | 50 | Earthfill, manually compacted, includes equipment and labor | Cubic Yard | $5.87 | 24 | $140.88 |
| 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 | $164.46 | 16 | $2,631.36 |
| Skidsteer, 80 HP | 933 | Skidsteer loader with horsepower range of 60 to 90. Equipment and power unit costs. Labor not included. | Hour | $44.60 | 16 | $713.60 |
| Truck, dump, 18 CY | 1400 | Dump truck for moving bulk material. Typically capacity is 25 ton or 18 cubic yards. Includes equipment only. | Hour | $121.65 | 16 | $1,946.40 |

| | | | | | | |
|---|---|---|---|---|---|---|
| **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 | $41.76 | 16 | $668.16 |
| 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 | $25.31 | 16 | $404.96 |
| 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 | $44.37 | 48 | $2,129.76 |
| 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 | $45.69 | 16 | $731.04 |
| **Materials** | | | | | | |
| Aggregate, river rock | 1834 | Well graded, rounded mineral substrates derived from local riverine settings. Includes materials and local delivery | Ton | $29.15 | 48 | $1,399.20 |
| **Mobilization** | | | | | | |
| Mobilization, medium equipment | 1139 | Equipment with 70-150 HP or typical weights between 14,000 and 30,000 pounds. | Each | $255.83 | 1 | $255.83 |
| Mobilization, large equipment | 1140 | Equipment >150HP or typical weights greater than 30,000 pounds or loads requiring over width or over length permits. | Each | $488.45 | 1 | $488.45 |

**Practice:** 396 - Aquatic Organism Passage

**Scenario** #16 - Step Pool Weir

**Scenario Description:**

Step pool weirs are constructed features that provide passage around an instream barrier or in place of a removed barrier. Step Pool Weirs are constructed with an assortment of equipment used for excavation, placing material, and delivering and removing material. Disturbed areas are revegetated using Critical Area Planting (342) and access control and signage are provided. Scenario does not include additional measures needed in the active channel and floodplain or at an existing dam necessary to control flow associated with nature-like fishway. RESOURCE CONCERNS: INADEQUATE HABITAT FOR FISH AND WILDLIFE –Habitat degradation; EXCESS WATER – Ponding, flooding, seasonal high water table, seeps, and drifted snow; WATER QUALITY DEGRADATION – Elevated water temperature; EROSION– Excessive bank erosion from streams shorelines or water conveyance channels Associated Practices (326) Clearing and Snagging, (342) Critical Area Planting, (382) Fence, (390) Riparian Herbaceous Cover, (391) Riparian Forest Buffer, (612) Tree/Shrub Establishment, 580 Streambank and Shoreline Protection, (395) Stream Habitat Improvement and Management, (410) Grade Stabilization Structure, (582) Open Channel, (584) Channel Bed Stabilization, (580) Streambank and Shoreline Protection, (587) Structure for Water Control580 Streambank and Shoreline Protection

**Before Situation:**

An instream barrier prevents upstream migration of native aquatic organisms and no support exists for removal. Similarly, an instream barrier is removed, and interested parties require maintenance of an upstream pool or pond.

**After Situation:**

A step pool weir is constructed in place of a removed barrier. The step pool weir is constructed of rock that provides quality passage conditions for a number of species and geomorphic stability over a range of flows. Resource Concerns are addressed within the context of the site. The typical scenario is for a 35' wide channel 100 feet long with weirs every 10'.

**Feature Measure:** Cubic Yard of Material

**Scenario Unit::** Cubic Yard

**Scenario Typical Size:** 800.0

**Scenario Total Cost:** $95,863.90

**Scenario Cost/Unit:** $119.83

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 | $2.53 | 390 | $986.70 |
| Hydraulic Excavator, 2 CY | 932 | Track mounted hydraulic excavator with bucket capacity range of 1.5 to 2.5 CY. Equipment and power unit costs. Labor not included. | Hour | $164.46 | 80 | $13,156.80 |
| Skidsteer, 80 HP | 933 | Skidsteer loader with horsepower range of 60 to 90. Equipment and power unit costs. Labor not included. | Hour | $44.60 | 80 | $3,568.00 |
| Water management, Flooding & dewatering | 969 | Includes equipment and power unit. Labor not included. | Acre Foot | $272.75 | 10 | $2,727.50 |
| Truck, dump, 18 CY | 1400 | Dump truck for moving bulk material. Typically capacity is 25 ton or 18 cubic yards. Includes equipment only. | Hour | $121.65 | 40 | $4,866.00 |
| **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 | $41.76 | 22 | $918.72 |
| 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 | $25.31 | 40 | $1,012.40 |
| 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 | $44.37 | 200 | $8,874.00 |
| 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 | $45.69 | 10 | $456.90 |
| 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 | $110.71 | 80 | $8,856.80 |
| **Materials** | | | | | | |
| Boulder | 1761 | Rock boulders (approximately 5 ft dia. 6.67 Tons) Inlcudes materials and delivery (up to 100 miles) only. | Ton | $34.32 | 1200 | $41,184.00 |
| Aggregate, river rock | 1834 | Well graded, rounded mineral substrates derived from local riverine settings. Includes materials and local delivery | Ton | $29.15 | 292 | $8,511.80 |
| **Mobilization** | | | | | | |
| Mobilization, medium equipment | 1139 | Equipment with 70-150 HP or typical weights between 14,000 and 30,000 pounds. | Each | $255.83 | 1 | $255.83 |

| | | | | | | |
|---|---|---|---|---|---|---|
| Mobilization, large equipment | 1140 | Equipment >150HP or typical weights greater than 30,000 pounds or loads requiring over width or over length permits. | Each | $488.45 | 1 | $488.45 |

**Practice:** 396 - Aquatic Organism Passage

**Scenario** #45 - Timber Bridge with Block Abutments

**Scenario Description:**

Install a bridge to allow stream flows to cross under access road or animal trail. Bridge opening determined by sizing for storm event dictated in standard. Scenario includes dewatering, abutments, girders, decking. Work consists of site preparation, dewatering, acquiring and installing abutments, girders, decking with necessary hardware, backfilling abutments, and armoring with geotextile and riprap. Riprap and geotextile are used to stabilize and protect abutments as needed. Scenario based on precast concrete block abutments, steel girders, and timber deck. Travel surface shall be wooden or concrete deck surface. Load is H-25. Width is 16 feet including curbs. Abutments are <= 6 feet. Typical size: 20' long, 16' wide with 6' abutments.

**Before Situation:**

An undersized structure is causing a velocity, depth, or jump barrier for aquatic organisms. Existing structure may also be causing stream or road erosion.

**After Situation:**

Access and water flow are able to cross each other in a stable manner while providing for passage of aquatic organisms. Stream flow is not impeded and a stable base exists for equipment, people and/or animals to cross. Associated practices could be (342) Critical Area Planting, (560) Access Road, (575) Animal Trails and Walkways, (566) Recreational Trails and Walkways, (500) Obstruction Removal, or (584) Channel Stabilization.

**Feature Measure:** square footage of bridge deck

**Scenario Unit::** Square Foot

**Scenario Typical Size:** 320.0

**Scenario Total Cost:** $22,828.43

**Scenario Cost/Unit:** $71.34

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 | $164.46 | 24 | $3,947.04 |
| Skidsteer, 80 HP | 933 | Skidsteer loader with horsepower range of 60 to 90. Equipment and power unit costs. Labor not included. | Hour | $44.60 | 24 | $1,070.40 |
| Truck, dump, 18 CY | 1400 | Dump truck for moving bulk material. Typically capacity is 25 ton or 18 cubic yards. Includes equipment only. | Hour | $121.65 | 24 | $2,919.60 |
| **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 | $25.31 | 8 | $202.48 |
| 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 | $25.31 | 48 | $1,214.88 |
| 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 | $44.37 | 24 | $1,064.88 |
| 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 | $45.69 | 24 | $1,096.56 |
| **Materials** | | | | | | |
| Aggregate, Gravel, Ungraded, Quarry Run | 1099 | Includes materials, equipment and labor | Cubic Yard | $23.96 | 57 | $1,365.72 |
| Block, pre-cast concrete, modular | 1496 | Pre-cast concrete blocks, typically 2ft x 2ft x 6ft , includes installation and delivery. | Cubic Yard | $99.83 | 13 | $1,297.79 |
| Steel, structural steel members | 1779 | Structural steel, includes materials and fabrication. | Pound | $1.00 | 3700 | $3,700.00 |
| Structural Timber Piles, Treated Timber Bridge | 2583 | Timber Piles for timber bridge abutments, Includes materials only. | Board Foot | $1.80 | 2336 | $4,204.80 |
| **Mobilization** | | | | | | |
| Mobilization, medium equipment | 1139 | Equipment with 70-150 HP or typical weights between 14,000 and 30,000 pounds. | Each | $255.83 | 1 | $255.83 |
| Mobilization, large equipment | 1140 | Equipment >150HP or typical weights greater than 30,000 pounds or loads requiring over width or over length permits. | Each | $488.45 | 1 | $488.45 |

**Practice:** 396 - Aquatic Organism Passage

**Scenario** #46 - Bridge, CIP abutment, Geotech Investigation

**Scenario Description:**

A channel-spanning structure that carries a road or trailway across a river or stream. Constructed of timber, i-beams, or concrete, bridges are attached at either end to prefabricated, reinforced and poured-in-place, or piling abutments capped/surrounded with concrete. Longer span bridges may require instream pilings to support the travel surface. Bridge decking can be timber, concrete, asphalt, or some combination thereof. Bridge design is completed to conform to loading requirements and site conditions. Geotechnical investigations are used to determine the best support structure suited to a given site. The bridge deck is designed to rest on abutments placed on the adjacent floodplain. Bridge components are delivered to the site and assembled by a combination of equipment and manual labor. They are installed with an assortment of equipment used for excavation, placing material, delivering and removing material, and lifting bridge components from delivery trucks onto the constructed bridge support elements. Other actions include construction staking and signage, soil erosion and pollution control, removal and disposal of the old culvert (if applicable), and topsoil conservation for site reclamation. Stream diversion is not necessary since the bridge will be constructed above the active channel. Disturbed areas are revegetated using Critical Area Planting (342). Scenario does not include additional measures needed to address channel incision, bank stability, and other factors associated with the presence of the bridge crossing. RESOURCE CONCERNS: INADEQUATE HABITAT FOR FISH AND WILDLIFE –Habitat degradation; EXCESS WATER – Ponding, flooding, seasonal high water table, seeps, and drifted snow; WATER QUALITY DEGRADATION – Elevated water temperature; SOIL EROSION– Excessive bank erosion from streams shorelines or water conveyance channels Payments for these associated practices are made separately and are covered by other typical scenarios and payment schedules. See relevant CPS for additional information. ---Site Preparation and Reclamation associated with project footprint: (326) Clearing and Snagging, (342) Critical Area Planting, (382) Fence, (390) Riparian Herbaceous Cover, (391) Riparian Forest Buffer, (612) Tree/Shrub Establishment; ---Reach Planning/Habitat Enhancement: (395) Stream Habitat Improvement and Management, ---Structural Measures Associated with Scenario but outside of project footprint: (410) Grade Stabilization Structure, (582) Open Channel, (584) Channel Bed Stabilization, (580) Streambank and Shoreline Protection

**Before Situation:**

An existing stream crossing outfitted with an undersized culvert has a history of maintenance issues and failure. The downstream channel has experienced bed and bank scour, and the crossing may have to the deposition of a wedge of sediment upstream of the road. The road may be overtopped by high flows, resulting in outright failure, landowner accessibility problems, access by and to emergency services, and hamper post-flood recovery efforts. An upstream impoundment created by the undersized culvert has contributed to water quality problems including high water temperatures and the deposition and later mobilization of polluted fine sediment. Native aquatic organisms are unable to pass through the road crossing because the culvert outlet is perched above the downstream pool, and high velocities are not negotiable by animals that are able to leap into the culvert barrel.

**After Situation:**

The undersized culvert is replaced with a timber bridge placed on precast concrete abutments. The bridge deck is composed of timber planks, and elevated, continuous railings run down each side connecting one abutment to its counterpart on the opposite bank. Signs on either approach indicate bridge capacity and weight restrictions. Because the bridge spans the active channel and sits atop the adjacent floodplain surface, geomorphic and ecological functions are preserved through the crossing site, enhancing AOP, water quality, and culvert longevity. Landowners are able to access their holdings across a range of flows, and are able to seek and receive emergency and post-flood recovery services. Resource Concerns are addressed within the context of the site.

**Feature Measure:** Linear feet of bridge deck

**Scenario Unit::** Linear Foot

**Scenario Typical Size:** 30.0

**Scenario Total Cost:** $77,082.33

**Scenario Cost/Unit:** $2,569.41

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 | $510.00 | 32 | $16,320.00 |
| Backhoe, 80 HP | 926 | Wheel mounted backhoe excavator with horsepower range of 60 to 90. Equipment and power unit costs. Labor not included. | Hour | $56.05 | 40 | $2,242.00 |
| 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 | $164.46 | 60 | $9,867.60 |
| Skidsteer, 80 HP | 933 | Skidsteer loader with horsepower range of 60 to 90. Equipment and power unit costs. Labor not included. | Hour | $44.60 | 40 | $1,784.00 |
| Truck, Concrete Pump | 1211 | Concrete pump, normally truck mounted. Use this item in association with other concrete components when job requires placement by other than normal chutes. Include drive and setup time in quantity; therefore, do not include mobilization. Includes equi | Hour | $201.97 | 8 | $1,615.76 |
| Truck, dump, 18 CY | 1400 | Dump truck for moving bulk material. Typically capacity is 25 ton or 18 cubic yards. Includes equipment only. | Hour | $121.65 | 40 | $4,866.00 |
| **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 | $41.76 | 40 | $1,670.40 |
| 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 | $25.31 | 60 | $1,518.60 |

| | | | | | | |
|---|---|---|---|---|---|---|
| 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 | $44.37 | 180 | $7,986.60 |
| 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 | $45.69 | 40 | $1,827.60 |
| Specialist Labor | 235 | Labor requiring a specialized skill set: Includes Agronomists, Foresters, Biologists, etc. to provide additional technical information during the planning and implementation of the practice. Does not include NRCS or TSP services. | Hour | $110.71 | 120 | $13,285.20 |
| **Materials** | | | | | | |
| Dimension Lumber, Treated | 1044 | Treated dimension lumber with nominal thickness equal or less than 2". Includes lumber and fasteners | Board Foot | $0.90 | 2500 | $2,250.00 |
| Rock Riprap, graded, angular, material and shipping | 1200 | Graded Rock Riprap for all gradation ranges. Includes materials and delivery only. | Ton | $36.46 | 100 | $3,646.00 |
| Epoxy anchor | 1599 | Galvanized bolts anchored into concrete or stone using epoxy adhesive. Includes materials and labor to drill and install. | Each | $19.49 | 12 | $233.88 |
| Steel, structural steel members | 1779 | Structural steel, includes materials and fabrication. | Pound | $1.00 | 5360 | $5,360.00 |
| Pipe, PE, 4", DR 9, perforated | 2140 | Materials: -4" - Perforated PE- 160 psi - ASTM D3035 DR 9 | Foot | $8.74 | 60 | $524.40 |
| Galvanized Bolts, large | 2166 | 5/8" x 12" galvanized timber bolts. Materials only. | Each | $4.47 | 24 | $107.28 |
| **Mobilization** | | | | | | |
| Mobilization, medium equipment | 1139 | Equipment with 70-150 HP or typical weights between 14,000 and 30,000 pounds. | Each | $255.83 | 2 | $511.66 |
| Mobilization, large equipment | 1140 | Equipment >150HP or typical weights greater than 30,000 pounds or loads requiring over width or over length permits. | Each | $488.45 | 2 | $976.90 |
| Mobilization, large equipment | 1140 | Equipment >150HP or typical weights greater than 30,000 pounds or loads requiring over width or over length permits. | Each | $488.45 | 1 | $488.45 |

**Practice:** 400 - Bivalve Aquaculture Gear and Biofouling Control

**Scenario** #2 - Infaunal Culture Yrs 2&3

**Scenario Description:**

The acquisition and use of additional aquaculture gear and biofouling control on 1 acre of bivalves, usually clams that are seeded in the substrate, in intertidal marine areas where biofouling of aquaculture production gear occurs. The biofouled gear is removed from the farm site and taken on land to be cleaned using environmentally appropriate biofoul control methods, including but not limited to air drying, brine dip, vinegar dip, fresh water dip, sweeping, power washing, and/or a combination of the aforementioned methods. The gear is cleaned and stored on land at an acceptable location, such as a heavy use area suitable for the size and intensity of the aquaculture operation. The planned practice will meet the current 400 conservation practice standard. Implementation will result in the proper rate, method and timing of gear and biofouling controls, including increased level of monitoring, frequency of cleaning, cycling/rotating and hauling gear, disposing of waste gear, and keeping records demonstrating implementation of the 400 criteria. Payment for implementation is to defray the costs of increased labor above normal operating procedures and recordkeeping for the first year of the growth cycle.

**Before Situation:**

Aquaculture gear (predator exclusion apparatus) is overgrown with biofouling organisms; water flow and food supply is significantly reduced endangering shellfish health and growth. Increased drag increases risk of gear escaping into the marine environment; escaped gear presents entanglement hazards to marine wildlife. Organic loading and aquatic nuisance species release are negative impacts of in-water gear cleaning activities.

**After Situation:**

The aquaculturist has additional gear (approximately 20%) which is cycled with biofouled gear in the water. The biofouled gear is cleaned using environmentally appropriate biofoul control methods, including but not limited to air drying, brine dip, vinegar dip, fresh water dip, sweeping, power washing, or a combination of methods. The gear is cleaned and stored on land at an acceptable location for the size and intensity of the aquaculture operation. Damaged gear is removed from the farm site and transported on shore for proper disposal. Records documenting the cycling of gear are maintained. Additional conservation practices such as 561- Heavy Use Area, and 422- Hedgerow Planting should be considered and planned under the respective scenarios. The material removed from the cage will be land applied, composted, or land filled as appropriate. The influx of biofouling to the marine environment as a result of cleaning gear is eliminated.

**Feature Measure:** 20 beds/acre; 900sf/bed

**Scenario Unit::** Acre

**Scenario Typical Size:** 1.0

**Scenario Total Cost:** $607.44

**Scenario Cost/Unit:** $607.44

Cost Details:

| Component Name | ID | Description | Unit | Cost | QTY | Total |
|---|---|---|---|---|---|---|
| **Labor** | | | | | | |
| General Labor | 231 | Labor performed using basic tools such as power tool, shovels, and other tools that do not require extensive training. Ex. pipe layer, herder, concrete placement, materials spreader, flagger, etc. | Hour | $25.31 | 24 | $607.44 |

**Practice:** 400 - Bivalve Aquaculture Gear and Biofouling Control

**Scenario** #5 - Epifaunal-Bags Only-Yrs.2&3

**Scenario Description:**

The acquisition and use of additional aquaculture gear to cycle with production gear in near-shore, intertidal and sub tidal marine areas where biofouling of aquaculture production gear occurs. The cultured organisms are transferred from the biofouled gear to the "clean gear" and returned to the water. The biofouled gear is removed from the farm site and taken on land to be cleaned using environmentally appropriate biofoul control methods, including but not limited to air drying, brine dip, vinegar dip, fresh water dip, sweeping, power washing, and/or a combination of the aforementioned methods. The gear is cleaned and stored on land at an acceptable location, such as a heavy use area suitable for the size and intensity of the aquaculture operation. The planned practice will meet the current 400 conservation practice standard. Implementation will result in the proper rate, method and timing of gear and biofouling controls, including increased level of monitoring, frequency of cleaning, cycling/rotating and hauling gear, disposing of waste gear, and keeping records demonstrating implementation of the 400 criteria. Payment for implementation is to defray the costs of increased labor above normal operating procedures and recordkeeping for the second and third year of the growth cycle.

**Before Situation:**

Aquaculture gear (predator exclusion apparatus) is overgrown with biofouling organisms; water flow and food supply is significantly reduced endangering shellfish health and growth. Increased drag increases risk of gear escaping into the marine environment; escaped gear presents entanglement hazards to marine wildlife. Organic loading and aquatic nuisance species release are negative impacts of in-water gear cleaning activities.

**After Situation:**

The aquaculturist has additional gear (approximately 20%) which is cycled with biofouled gear in the water. The biofouled gear is cleaned using environmentally appropriate biofoul control methods, including but not limited to air drying, brine dip, vinegar dip, fresh water dip, sweeping, power washing, or a combination of methods. The gear is cleaned and stored on land at an acceptable location for the size and intensity of the aquaculture operation. Damaged gear is removed from the farm site and transported on shore for proper disposal. Records documenting the cycling of gear are maintained. Additional conservation practices such as 561- Heavy Use Area, and 422- Hedgerow Planting should be considered and planned under the respective scenarios. The material removed from the cage will be land applied, composted, or land filled as appropriate. The influx of biofouling to the marine environment as a result of cleaning gear is eliminated.

**Feature Measure:** 50,000 bivalves

**Scenario Unit::** Each

**Scenario Typical Size:** 1.0

**Scenario Total Cost:** $531.51

**Scenario Cost/Unit:** $531.51

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 | $25.31 | 21 | $531.51 |

**Practice:** 400 - Bivalve Aquaculture Gear and Biofouling Control

**Scenario** #10 - Epifaunal-Cage Cycling-Yrs.2&3

**Scenario Description:**

The acquisition and use of additional aquaculture gear to cycle with production gear in near-shore, intertidal and sub tidal marine areas where biofouling of aquaculture production gear occurs. The cultured organisms are transferred from the biofouled gear to the "clean gear" and returned to the water. The biofouled gear is removed from the farm site and taken on land to be cleaned using environmentally appropriate biofoul control methods, including but not limited to air drying, brine dip, vinegar dip, fresh water dip, sweeping, power washing, and/or a combination of the aforementioned methods. The gear is cleaned and stored on land at an acceptable location, such as a heavy use area suitable for the size and intensity of the aquaculture operation. The planned practice will meet the current 400 conservation practice standard. Implementation will result in the proper rate, method and timing of gear and biofouling controls, including increased level of monitoring, frequency of cleaning, cycling/rotating and hauling gear, disposing of waste gear, and keeping records demonstrating implementation of the 400 criteria. Payment for implementation is to defray the costs of increased labor above normal operating procedures and recordkeeping for the second and third year of the growth cycle.

**Before Situation:**

Aquaculture gear (predator exclusion apparatus) is overgrown with biofouling organisms; water flow and food supply is significantly reduced endangering shellfish health and growth. Increased drag increases risk of gear escaping into the marine environment; escaped gear presents entanglement hazards to marine wildlife. Organic loading and aquatic nuisance species release are negative impacts of in-water gear cleaning activities.

**After Situation:**

The aquaculturist has additional gear (approximately 20%) which is cycled with biofouled gear in the water. The biofouled gear is cleaned using environmentally appropriate biofoul control methods, including but not limited to air drying, brine dip, vinegar dip, fresh water dip, sweeping, power washing, or a combination of methods. The gear is cleaned and stored on land at an acceptable location for the size and intensity of the aquaculture operation. Damaged gear is removed from the farm site and transported on shore for proper disposal. Records documenting the cycling of gear are maintained. Additional conservation practices such as 561- Heavy Use Area, and 422- Hedgerow Planting should be considered and planned under the respective scenarios. The material removed from the cage will be land applied, composted, or land filled as appropriate. The influx of biofouling to the marine environment as a result of cleaning gear is eliminated.

**Feature Measure:** 50,000 bivalves

**Scenario Unit::** Each

**Scenario Typical Size:** 1.0

**Scenario Total Cost:** $1,974.18

**Scenario Cost/Unit:** $1,974.18

Cost Details:

| Component Name | ID | Description | Unit | Cost | QTY | Total |
|---|---|---|---|---|---|---|
| **Labor** | | | | | | |
| General Labor | 231 | Labor performed using basic tools such as power tool, shovels, and other tools that do not require extensive training. Ex. pipe layer, herder, concrete placement, materials spreader, flagger, etc. | Hour | $25.31 | 78 | $1,974.18 |

**Practice:** 400 - Bivalve Aquaculture Gear and Biofouling Control

**Scenario** #11 - Epifaunal-Trip- Cage Cyc-Yrs.2&3

**Scenario Description:**

The acquisition and use of additional aquaculture gear to cycle with production gear in near-shore, intertidal and sub tidal marine areas where biofouling of aquaculture production gear occurs. The cultured organisms are transferred from the biofouled gear to the "clean gear" and returned to the water. The biofouled gear is removed from the farm site and taken on land to be cleaned using environmentally appropriate biofoul control methods, including but not limited to air drying, brine dip, vinegar dip, fresh water dip, sweeping, power washing, and/or a combination of the aforementioned methods. The gear is cleaned and stored on land at an acceptable location, such as a heavy use area suitable for the size and intensity of the aquaculture operation. The planned practice will meet the current 400 conservation practice standard. Implementation will result in the proper rate, method and timing of gear and biofouling controls, including increased level of monitoring, frequency of cleaning, cycling/rotating and hauling gear, disposing of waste gear, and keeping records demonstrating implementation of the 400 criteria. Payment for implementation is to defray the costs of increased labor above normal operating procedures and recordkeeping for the second and third year of the growth cycle.

**Before Situation:**

Aquaculture gear (predator exclusion apparatus) is overgrown with biofouling organisms; water flow and food supply is significantly reduced endangering shellfish health and growth. Increased drag increases risk of gear escaping into the marine environment; escaped gear presents entanglement hazards to marine wildlife. Organic loading and aquatic nuisance species release are negative impacts of in-water gear cleaning activities.

**After Situation:**

The aquaculturist has additional gear (approximately 20%) which is cycled with biofouled gear in the water. The biofouled gear is cleaned using environmentally appropriate biofoul control methods, including but not limited to air drying, brine dip, vinegar dip, fresh water dip, sweeping, power washing, or a combination of methods. The gear is cleaned and stored on land at an acceptable location for the size and intensity of the aquaculture operation. Damaged gear is removed from the farm site and transported on shore for proper disposal. Records documenting the cycling of gear are maintained. Additional conservation practices such as 561- Heavy Use Area, and 422- Hedgerow Planting should be considered and planned under the respective scenarios. The material removed from the cage will be land applied, composted, or land filled as appropriate. The influx of biofouling to the marine environment as a result of cleaning gear is eliminated.

**Feature Measure:** 50,000 bivalves

**Scenario Unit::** Each

**Scenario Typical Size:** 1.0

**Scenario Total Cost:** $1,063.02

**Scenario Cost/Unit:** $1,063.02

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 | $25.31 | 42 | $1,063.02 |

**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:** 126.0

**Scenario Total Cost:** $8,421.38

**Scenario Cost/Unit:** $66.84

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 | $1.59 | 160 | $254.40 |
| **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 | $25.31 | 20 | $506.20 |
| **Materials** | | | | | | |
| Rock Riprap, Placed with geotextile | 44 | Rock Riprap, placed with geotextile, includes materials, equipment and labor to transport and place | Cubic Yard | $79.57 | 84 | $6,683.88 |
| **Mobilization** | | | | | | |
| Mobilization, large equipment | 1140 | Equipment >150HP or typical weights greater than 30,000 pounds or loads requiring over width or over length permits. | Each | $488.45 | 2 | $976.90 |

**Practice:** 410 - Grade Stabilization Structure

**Scenario** #2 - Embankment, Pipe <= 6 inch

**Scenario Description:**

An earthen embankment dam with a principal spillway pipe of 6 inches or less. Assessment shows anti-seep collars or sand diaphragms are not required. To stabilized the grade and control erosion in natural or artificial channels, to prevent the formation or advancing of gullies, and to enhance environmental quality and reduce pollution hazards. Applied in areas where the concentration and flow velocity of water require structures to stabilize the grade in channels or to control gully erosion. Cost estimate is based upon a typical amount of earthfill of 2,000 cubic yards, and 80 feet of pipe 6" PVC pipe with a canopy inlet. A small, non-lined plunge pool protects the outlet channel. Disturbed areas are protected with permanent vegetative cover. Addresses resource concerns such as soil erosion-concentrated flow erosion and water quality degradation.

**Before Situation:**

The operator presently has gullies forming and/or worsening on the farmland and impacting the useable area and the downstream water quality. Erosion from the gullies is allowing soil and possibly nutrients to be transported to downstream receiving waters degrading water quality and causing soil loss.

**After Situation:**

Area is stabilized. The advancement and/or formation of gullies is stopped, soil from gullies no longer leaves the farm, useable farm area is increased, sedimentation and other pollution hazards are decreased, and water quality downstream is protected. Any needed re-vegetation of disturbed areas use Critical Area Planting (342). Other associated practices such as; Pond (378), Dam (402), Fence (382), Pumping Plant (533), Watering Facility (614), and Livestock Pipeline (516) will use the corresponding Standard(s) as appropriate.

**Feature Measure:** Cubic Yards of Earthfill

**Scenario Unit::** Cubic Yard

**Scenario Typical Size:** 2,000.0

**Scenario Total Cost:** $12,525.38

**Scenario Cost/Unit:** $6.26

Cost Details:

| Component Name | ID | Description | Unit | Cost | QTY | Total |
|---|---|---|---|---|---|---|
| **Equipment Installation** | | | | | | |
| Earthfill, Roller Compacted | 49 | Earthfill, roller or machine compacted, includes equipment and labor | Cubic Yard | $4.45 | 2000 | $8,900.00 |
| Earthfill, Manually Compacted | 50 | Earthfill, manually compacted, includes equipment and labor | Cubic Yard | $5.87 | 20 | $117.40 |
| 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 | $113.75 | 8 | $910.00 |
| **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 | $41.76 | 20 | $835.20 |
| 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 | $25.31 | 16 | $404.96 |
| 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 | $44.37 | 8 | $354.96 |
| **Materials** | | | | | | |
| Pipe, PVC, 6", SCH 40 | 980 | Materials: - 6" - PVC - SCH 40 - ASTM D1785 | Foot | $6.14 | 80 | $491.20 |
| **Mobilization** | | | | | | |
| Mobilization, medium equipment | 1139 | Equipment with 70-150 HP or typical weights between 14,000 and 30,000 pounds. | Each | $255.83 | 2 | $511.66 |

**Practice:** 410 - Grade Stabilization Structure

**Scenario** #3 - Embankment, Pipe 8-12 inch

**Scenario Description:**

An earthen embankment dam with a principle spillway pipe between 8 and 12 inches, anti-seep collars or sand diaphragm, and excavated plunge pool basin. Installed to stabilized the grade and control erosion in natural or artificial channels, to prevent the formation or advancing of gullies, and to enhance environmental quality and reduce pollution hazards. Applied in areas where the concentration and flow velocity of water require structures to stabilize the grade in channels or to control gully erosion. Cost estimate is based upon a typical amount of earthfill of 2,500 cubic yards, 90 feet of 10" PVC pipe with a canopy inlet, and 3 cubic yard sand diaphragm. A non-lined plunge pool protects the outlet channel. Disturbed areas are protected with permanent vegetative cover. Addresses resource concerns such as soil erosion-concentrated flow erosion and water quality degradation.

**Before Situation:**

The operator presently has gullies forming and/or worsening on the farmland and impacting the useable area and the downstream water quality. Erosion from the gullies is allowing soil and possibly nutrients to be transported to downstream receiving waters degrading water quality and causing soil loss.

**After Situation:**

Area is stabilized. The advancement and/or formation of gullies is stopped, soil from gullies no longer leaves the farm, useable farm area is increased, sedimentation and other pollution hazards are decreased, and water quality downstream is protected. Any needed re-vegetation of disturbed areas use Critical Area Planting (342). Other associated practices such as; Pond (378), Dam (402), Fence (382), Pumping Plant (533), Watering Facility (614), and Livestock Pipeline (516) will use the corresponding Standard(s) as appropriate.

**Feature Measure:** Cubic Yards of Earthfill

**Scenario Unit::** Cubic Yard

**Scenario Typical Size:** 2,500.0

**Scenario Total Cost:** $18,596.79

**Scenario Cost/Unit:** $7.44

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 | $4.45 | 2500 | $11,125.00 |
| Earthfill, Manually Compacted | 50 | Earthfill, manually compacted, includes equipment and labor | Cubic Yard | $5.87 | 30 | $176.10 |
| 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 | $113.75 | 16 | $1,820.00 |
| **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 | $41.76 | 30 | $1,252.80 |
| 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 | $25.31 | 30 | $759.30 |
| 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 | $44.37 | 16 | $709.92 |
| **Materials** | | | | | | |
| Aggregate, Sand, Graded, Washed | 45 | Sand, typical ASTM C33 gradation, includes materials, equipment and labor to transport and place | Cubic Yard | $34.29 | 3 | $102.87 |
| Pipe, PVC, 2", SCH 40 | 976 | Materials: - 2" - PVC - SCH 40 - ASTM D1785 | Foot | $1.34 | 60 | $80.40 |
| Pipe, PVC, 10", SCH 80 | 1351 | Materials: - 10" - PVC - SCH 80 - ASTM D1785 | Foot | $22.09 | 90 | $1,988.10 |
| **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 | $70.64 | 1 | $70.64 |
| Mobilization, medium equipment | 1139 | Equipment with 70-150 HP or typical weights between 14,000 and 30,000 pounds. | Each | $255.83 | 2 | $511.66 |

**Practice:** 410 - Grade Stabilization Structure

**Scenario** #4 - Embankment, Pipe >12 inch

**Scenario Description:**

An earthen embankment dam with a principle spillway pipe greater than 12 inches. Installed to stabilized the grade and control erosion in natural or artificial channels, to prevent the formation or advancing of gullies, and to enhance environmental quality and reduce pollution hazards. Applied in areas where the concentration and flow velocity of water require structures to stabilize the grade in channels or to control gully erosion. Cost estimate is based upon a typical amount of earthfill of 2,500 cubic yards, smooth steel drop inlet principle spillway with a 7 ft riser and 90 ft barrel, and 82 Square feet of anti-seep collars. A rock lined plunge pool protects the outlet channel. Disturbed areas are protected with permanent vegetative cover. Addresses resource concerns such as soil erosion-concentrated flow erosion and water quality degradation.

**Before Situation:**

The operator presently has gullies forming and/or worsening on the farmland and impacting the useable area and the downstream water quality. Erosion from the gullies is allowing soil and possibly nutrients to be transported to downstream receiving waters degrading water quality and causing soil loss.

**After Situation:**

Area is stabilized. The advancement and/or formation of gullies is stopped, soil from gullies no longer leaves the farm, useable farm area is increased, sedimentation and other pollution hazards are decreased, and water quality downstream is protected. Any needed re-vegetation of disturbed areas use Critical Area Planting (342). Other associated practices such as; Pond (378), Dam (402), Fence (382), Pumping Plant (533), Watering Facility (614), and Livestock Pipeline (516) will use the corresponding Standard(s) as appropriate.

**Feature Measure:** Cubic Yards of Earthfill

**Scenario Unit::** Cubic Yard

**Scenario Typical Size:** 2,500.0

**Scenario Total Cost:** $23,157.87

**Scenario Cost/Unit:** $9.26

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 | $161.60 | 1 | $161.60 |
| Concrete, CIP, formed reinforced | 38 | Steel reinforced concrete formed and cast-in-placed in formed structures such as walls or suspended slabs by chute placement. Typical strength is 3000 to 4000 psi. Includes materials, labor and equipment to transport, place and finish. | Cubic Yard | $510.00 | 2 | $1,020.00 |
| Earthfill, Roller Compacted | 49 | Earthfill, roller or machine compacted, includes equipment and labor | Cubic Yard | $4.45 | 2500 | $11,125.00 |
| Earthfill, Manually Compacted | 50 | Earthfill, manually compacted, includes equipment and labor | Cubic Yard | $5.87 | 129 | $757.23 |
| 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 | $113.75 | 20 | $2,275.00 |
| **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 | $41.76 | 40 | $1,670.40 |
| 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 | $25.31 | 48 | $1,214.88 |
| 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 | $44.37 | 16 | $709.92 |
| **Materials** | | | | | | |
| Rock Riprap, Placed with geotextile | 44 | Rock Riprap, placed with geotextile, includes materials, equipment and labor to transport and place | Cubic Yard | $79.57 | 14 | $1,113.98 |
| Dimension Lumber, Treated | 1044 | Treated dimension lumber with nominal thickness equal or less than 2". Includes lumber and fasteners | Board Foot | $0.90 | 30 | $27.00 |
| Steel, Plate, 1/8" | 1047 | Flat Steel Plate, 1/8" thick, materials only. | Square Foot | $3.86 | 82 | $316.52 |
| Pipe, Steel, 12", Std Wt, USED | 1356 | Materials: - USED - 12" - Steel Std Wt | Foot | $22.01 | 90 | $1,980.90 |
| Pipe, Steel, 16", Std Wt, USED | 1357 | Materials: - USED - 16" - Steel Std Wt | Foot | $29.02 | 7 | $203.14 |
| **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 | $70.64 | 1 | $70.64 |

| | | | | | | |
|---|---|---|---|---|---|---|
| Mobilization, medium equipment | 1139 | Equipment with 70-150 HP or typical weights between 14,000 and 30,000 pounds. | Each | $255.83 | 2 | $511.66 |

**Practice:** 410 - Grade Stabilization Structure

**Scenario** #5 - Embankment, Soil Treatment

**Scenario Description:**

An earthen embankment dam with a principal spillway pipe where on site soils are not acceptable and require extra processing or hauling from off farm, distances greater than one mile. Installed to stabilized the grade and control erosion in natural or artificial channels, to prevent the formation or advancing of gullies, and to enhance environmental quality and reduce pollution hazards. Applied in areas where the concentration and flow velocity of water require structures to stabilize the grade in channels or to control gully erosion. Cost estimate is based upon a typical amount of earthfill of 2,500 cubic yards, 90 feet of 10" PVC, pipe with a canopy inlet, and 3 cubic yard sand diaphragm. A non-lined plunge pool protects the outlet channel. Disturbed areas are protected with permanent vegetative cover. Addresses resource concerns such as soil erosion-concentrated flow erosion and water quality degradation.

**Before Situation:**

The operator presently has gullies forming and/or worsening on the farmland and impacting the useable area and the downstream water quality. Erosion from the gullies is allowing soil and possibly nutrients to be transported to downstream receiving waters degrading water quality and causing soil loss.

**After Situation:**

Area is stabilized. The advancement and/or formation of gullies is stopped, soil from gullies no longer leaves the farm, useable farm area is increased, sedimentation and other pollution hazards are decreased, and water quality downstream is protected. Any needed re-vegetation of disturbed areas use Critical Area Planting (342). Other associated practices such as; Pond (378), Dam (402), Fence (382), Pumping Plant (533), Watering Facility (614), and Livestock Pipeline (516) will use the corresponding Standard(s) as appropriate.

**Feature Measure:** Cubic Yards of Earthfill

**Scenario Unit::** Cubic Yard

**Scenario Typical Size:** 2,500.0

**Scenario Total Cost:** $26,829.12

**Scenario Cost/Unit:** $10.73

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 | $4.45 | 2500 | $11,125.00 |
| Earthfill, Manually Compacted | 50 | Earthfill, manually compacted, includes equipment and labor | Cubic Yard | $5.87 | 29 | $170.23 |
| 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 | $113.75 | 10 | $1,137.50 |
| 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 | $0.33 | 25000 | $8,250.00 |
| **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 | $41.76 | 40 | $1,670.40 |
| 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 | $25.31 | 40 | $1,012.40 |
| 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 | $44.37 | 16 | $709.92 |
| **Materials** | | | | | | |
| Aggregate, Sand, Graded, Washed | 45 | Sand, typical ASTM C33 gradation, includes materials, equipment and labor to transport and place | Cubic Yard | $34.29 | 3 | $102.87 |
| Pipe, PVC, 2", SCH 40 | 976 | Materials: - 2" - PVC - SCH 40 - ASTM D1785 | Foot | $1.34 | 60 | $80.40 |
| Pipe, PVC, 10", SCH 80 | 1351 | Materials: - 10" - PVC - SCH 80 - ASTM D1785 | Foot | $22.09 | 90 | $1,988.10 |
| **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 | $70.64 | 1 | $70.64 |
| Mobilization, medium equipment | 1139 | Equipment with 70-150 HP or typical weights between 14,000 and 30,000 pounds. | Each | $255.83 | 2 | $511.66 |

**Practice:** 410 - Grade Stabilization Structure

**Scenario** #6 - Pipe Drop, Plastic

**Scenario Description:**

A full flow pipe drop (i.e.: riser and barrel) grade stabilization structure designed and constructed using plastic pipe without anti-seep collars. This is typically a earthen dry dam structure with no permanent storage (water or sediment), however some structures may have some permanent pool / storage but do not have 35 years of sediment life. Payment rate is based upon the riser weir length (Diameter x 3.14) in feet times the length of the pipe barrel in (feet). Installed to stabilized the grade and control erosion in natural or artificial channels, to prevent the formation or advancing of gullies, and to enhance environmental quality and reduce pollution hazards. Applied in areas where the concentration and flow velocity of water require structures to stabilize the grade in channels or to control gully erosion. Cost estimate is based upon 6 ft high 18" (1.5') PVC riser with a 40 ft long barrel (1.5' x 3.14 x 40' = 188 SF). Disturbed areas are protected with permanent vegetative cover. Addresses resource concerns such as soil erosion-concentrated flow erosion and water quality degradation.

**Before Situation:**

The operator presently has gullies forming and/or worsening on the farmland and impacting the useable area and the downstream water quality. Erosion from the gullies is allowing soil and possibly nutrients to be transported to downstream receiving waters degrading water quality and causing soil loss.

**After Situation:**

Area is stabilized. The advancement and/or formation of gullies is stopped, soil from gullies no longer leaves the farm, useable farm area is increased, sedimentation and other pollution hazards are decreased, and water quality downstream is protected. Any needed re-vegetation of disturbed areas use Critical Area Planting (342). Other associated practices such as; Pond (378), Dam (402), Fence (382), Channel Bed Stabilization (584), Dike (356), Grassed Waterway (412), Structure for Water Control (587), and Irrigation Canal or Lateral (320) will use the corresponding Standard(s) as appropriate.

**Feature Measure:** Riser Weir Length x Barrel Length

**Scenario Unit::** Square Foot

**Scenario Typical Size:** 188.0

**Scenario Total Cost:** $6,276.40

**Scenario Cost/Unit:** $33.39

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 | $510.00 | 1 | $510.00 |
| Earthfill, Roller Compacted | 49 | Earthfill, roller or machine compacted, includes equipment and labor | Cubic Yard | $4.45 | 100 | $445.00 |
| Earthfill, Manually Compacted | 50 | Earthfill, manually compacted, includes equipment and labor | Cubic Yard | $5.87 | 20 | $117.40 |
| 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 | $113.75 | 8 | $910.00 |
| **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 | $25.31 | 8 | $202.48 |
| 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 | $44.37 | 8 | $354.96 |
| **Materials** | | | | | | |
| Pipe, PVC, 18", SCH 40 | 1373 | Materials: - 18" - PVC - SCH 40 - ASTM D1785 | Foot | $37.01 | 40 | $1,480.40 |
| Coupling, PVC, Tee, 24x18, SCH 40 | 1374 | Materials: - Tee, 24"x18" - PVC - SCH 40 - ASTM D1785 | Each | $1,642.11 | 1 | $1,642.11 |
| Pipe, PVC, 24", SCH 40 | 2046 | Materials: - 24" - PVC - SCH 40 - ASTM D1785 | Foot | $47.93 | 6 | $287.58 |
| **Mobilization** | | | | | | |
| Mobilization, very small equipment | 1137 | Equipment that is small enough to be transported by a pick-up truck with typical weights less than 3,500 pounds. Can be multiple pieces of equipment if all hauled simultaneously. | Each | $70.64 | 1 | $70.64 |
| Mobilization, medium equipment | 1139 | Equipment with 70-150 HP or typical weights between 14,000 and 30,000 pounds. | Each | $255.83 | 1 | $255.83 |

**Practice:** 410 - Grade Stabilization Structure

**Scenario** #7 - Pipe Drop, Steel

**Scenario Description:**

A full flow pipe drop (i.e.: riser and barrel) grade stabilization structure designed and constructed with a metal anti-seep collar. This is typically a earthen dry dam structure with no permanent storage (water or sediment), however some structures may have some permanent pool / storage but do not have 35 years of sediment life. Payment rate is based upon the riser weir length (Diameter x 3.14) in feet times the length of the pipe barrel in (feet). Installed to stabilized the grade and control erosion in natural or artificial channels, to prevent the formation or advancing of gullies, and to enhance environmental quality and reduce pollution hazards. Applied in areas where the concentration and flow velocity of water require structures to stabilize the grade in channels or to control gully erosion. Cost estimate is based upon a smooth steel pipe drop structure with a 36", 12' tall riser and a 100' long 30" barrel (Riser Weir length x Barrel Length = 3ft x 3.14 x 30ft = 940). Disturbed areas are protected with permanent vegetative cover. Addresses resource concerns such as soil erosion-concentrated flow erosion and water quality degradation.

**Before Situation:**

The operator presently has gullies forming and/or worsening on the farmland and impacting the useable area and the downstream water quality. Erosion from the gullies is allowing soil and possibly nutrients to be transported to downstream receiving waters degrading water quality and causing soil loss.

**After Situation:**

Area is stabilized. The advancement and/or formation of gullies is stopped, soil from gullies no longer leaves the farm, useable farm area is increased, sedimentation and other pollution hazards are decreased, and water quality downstream is protected. Any needed re-vegetation of disturbed areas use Critical Area Planting (342). Other associated practices such as; Pond (378), Dam (402), Fence (382), Channel Bed Stabilization (584), Dike (356), Grassed Waterway (412), Structure for Water Control (587), and Irrigation Canal or Lateral (320) will use the corresponding Standard(s) as appropriate.

**Feature Measure:** Riser Weir Length x Barrel Length

**Scenario Unit::** Square Foot

**Scenario Typical Size:** 940.0

**Scenario Total Cost:** $30,937.54

**Scenario Cost/Unit:** $32.91

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 | $4.45 | 600 | $2,670.00 |
| Earthfill, Manually Compacted | 50 | Earthfill, manually compacted, includes equipment and labor | Cubic Yard | $5.87 | 100 | $587.00 |
| 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 | $113.75 | 4 | $455.00 |
| **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 | $41.76 | 16 | $668.16 |
| 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 | $25.31 | 16 | $404.96 |
| 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 | $44.37 | 8 | $354.96 |
| **Materials** | | | | | | |
| Steel, Plate, 1/8" | 1047 | Flat Steel Plate, 1/8" thick, materials only. | Square Foot | $3.86 | 30 | $115.80 |
| Pipe, Steel, 30", Std Wt | 1369 | Materials: - 30" - Steel Std Wt | Foot | $218.44 | 100 | $21,844.00 |
| Pipe, Steel, 36", Std Wt | 1370 | Materials: - 36" - Steel Std Wt | Foot | $262.82 | 12 | $3,153.84 |
| Steel, Plate, 3/8" | 1375 | Flat steel plate, 3/8" thickness. Materials only. | Square Foot | $11.28 | 9 | $101.52 |
| **Mobilization** | | | | | | |
| Mobilization, very small equipment | 1137 | Equipment that is small enough to be transported by a pick-up truck with typical weights less than 3,500 pounds. Can be multiple pieces of equipment if all hauled simultaneously. | Each | $70.64 | 1 | $70.64 |
| Mobilization, medium equipment | 1139 | Equipment with 70-150 HP or typical weights between 14,000 and 30,000 pounds. | Each | $255.83 | 2 | $511.66 |

**Practice:** 410 - Grade Stabilization Structure

**Scenario** #8 - Weir Drop Structures

**Scenario Description:**

A Straight, semicircular, or Box Drop structure composed of metal or reinforced concrete used to stabilized the grade and control erosion in natural or artificial channels, to prevent the formation or advancing of gullies, and to enhance environmental quality and reduce pollution hazards. Applied in areas where the concentration and flow velocity of water require structures to stabilize the grade in channels or to control gully erosion. Cost estimate is based upon a semicircular steel toe wall structure with a drop of 3ft and weir length of 30ft (90 square feet). The unit of payment measurement is defined as weir length times drop in "feet". The drop (feet) is defined as the structure inlet crest elevation minus the control outlet elevation (i.e.: 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:** 90.0

**Scenario Total Cost:** $10,234.20

**Scenario Cost/Unit:** $113.71

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 | $510.00 | 9 | $4,590.00 |
| Geotextile, woven | 42 | Woven Geotextile Fabric. Includes materials, equipment and labor | Square Yard | $2.53 | 9 | $22.77 |
| Excavation, Common Earth, side cast, small equipment | 48 | Bulk excavation and side casting of common earth with hydraulic excavator with less than 1 CY capacity. Includes equipment and labor. | Cubic Yard | $2.36 | 40 | $94.40 |
| Earthfill, Roller Compacted | 49 | Earthfill, roller or machine compacted, includes equipment and labor | Cubic Yard | $4.45 | 75 | $333.75 |
| 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 | $113.75 | 5 | $568.75 |
| **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 | $41.76 | 16 | $668.16 |
| 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 | $25.31 | 40 | $1,012.40 |
| 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 | $44.37 | 8 | $354.96 |
| **Materials** | | | | | | |
| Aggregate, Gravel, Graded | 46 | Gravel, includes materials, equipment and labor to transport and place. Includes washed and unwashed gravel. | Cubic Yard | $34.75 | 3 | $104.25 |
| Rock Riprap, graded, angular, material and shipping | 1200 | Graded Rock Riprap for all gradation ranges. Includes materials and delivery only. | Ton | $36.46 | 11 | $401.06 |
| 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 | $10.10 | 2 | $20.20 |
| **Mobilization** | | | | | | |
| Mobilization, medium equipment | 1139 | Equipment with 70-150 HP or typical weights between 14,000 and 30,000 pounds. | Each | $255.83 | 2 | $511.66 |

**Practice:** 410 - Grade Stabilization Structure

**Scenario** #9 - Rock Drop Structures

**Scenario Description:**

A Straight Drop structure constructed of rock riprap held in place by galvanized wire, such as, gabion baskets, fence panels, or "sausage" baskets. This structure could also be constructed of non reinforced concrete blocks. These structures are used to stabilized the grade and control erosion in natural or artificial channels, to prevent the formation or advancing of gullies, and to enhance environmental quality and reduce pollution hazards. Applied in areas where the concentration and flow velocity of water require structures to stabilize the grade in channels or to control gully erosion. Cost estimate is based upon a gabion wall structure with a drop of 3ft and weir length of 8ft (48 square feet). The unit of payment measurement is defined as weir length times drop in "feet". The drop (feet) is defined as the structure inlet crest elevation minus the control outlet elevation (i.e.: 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:** 48.0

**Scenario Total Cost:** $4,885.84

**Scenario Cost/Unit:** $101.79

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 | $2.53 | 23 | $58.19 |
| Excavation, Common Earth, side cast, small equipment | 48 | Bulk excavation and side casting of common earth with hydraulic excavator with less than 1 CY capacity. Includes equipment and labor. | Cubic Yard | $2.36 | 7 | $16.52 |
| Earthfill, Roller Compacted | 49 | Earthfill, roller or machine compacted, includes equipment and labor | Cubic Yard | $4.45 | 40 | $178.00 |
| 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 | $113.75 | 5 | $568.75 |
| Tractor, agricultural, 210 HP | 1201 | Agricultural tractor with horsepower range of 190 to 240. Equipment and power unit costs. Labor not included. | Hour | $107.08 | 8 | $856.64 |
| **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 | $25.31 | 16 | $404.96 |
| 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 | $44.37 | 8 | $354.96 |
| 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 | $45.69 | 16 | $731.04 |
| **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 | $172.16 | 7 | $1,205.12 |
| **Mobilization** | | | | | | |
| Mobilization, medium equipment | 1139 | Equipment with 70-150 HP or typical weights between 14,000 and 30,000 pounds. | Each | $255.83 | 2 | $511.66 |

**Practice:** 410 - Grade Stabilization Structure

**Scenario** #10 - Log Drop Structures

**Scenario Description:**

A Straight Drop structure constructed using bioengineering principles. In this instance the drop structure is constructed of logs, rock riprap, and earthfill. These structures are used to stabilized the grade and control erosion in natural or artificial channels, to prevent the formation or advancing of gullies, and to enhance environmental quality and reduce pollution hazards. Applied in areas where the concentration and flow velocity of water require structures to stabilize the grade in channels or to control gully erosion. Cost estimate is based upon an 8 foot weir length and 3 foot drop. The unit of payment measurement is each. Disturbed areas are protected with permanent vegetative cover. Addresses resource concerns such as soil erosion-concentrated flow erosion and water quality degradation.

**Before Situation:**

The operator presently has gullies forming and/or worsening on the farmland and impacting the useable area and the downstream water quality. Erosion from the gullies is allowing soil and possibly nutrients to be transported to downstream receiving waters degrading water quality and causing soil loss.

**After Situation:**

Area is stabilized using 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), Structure for Water Control (587), Subsurface Drain (606), and Underground Outlet (620) will use the corresponding Standard(s) as appropriate.

**Feature Measure:** Each

**Scenario Unit::** Each

**Scenario Typical Size:** 1.0

**Scenario Total Cost:** $6,564.93

**Scenario Cost/Unit:** $6,564.93

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 | $2.53 | 11 | $27.83 |
| 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 | $2.36 | 10 | $23.60 |
| Earthfill, Roller Compacted | 49 | Earthfill, roller or machine compacted, includes equipment and labor | Cubic Yard | $4.45 | 40 | $178.00 |
| 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 | $113.75 | 12 | $1,365.00 |
| Chainsaw | 937 | Equipment and power unit costs. Labor not included. | Hour | $4.37 | 4 | $17.48 |
| Truck, Pickup | 939 | Equipment and power unit costs. Labor not included. | Hour | $21.79 | 4 | $87.16 |
| Tractor, agricultural, 210 HP | 1201 | Agricultural tractor with horsepower range of 190 to 240. Equipment and power unit costs. Labor not included. | Hour | $107.08 | 20 | $2,141.60 |
| Trailer, flatbed, small | 1505 | Small flatbed trailer (typically less than 30' in length) pulled by a pickup to transport materials and equipment. Truck not included. | Hour | $15.90 | 4 | $63.60 |
| **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 | $25.31 | 20 | $506.20 |
| Equipment Operators, Light | 232 | Includes: Skid Steer Loaders, Hydraulic Excavators <50 HP, Trenchers <12", Ag Equipment <150 HP, Pickup Trucks, Forklifts, Mulchers | Hour | $25.23 | 8 | $201.84 |
| 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 | $44.37 | 16 | $709.92 |
| 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 | $45.69 | 16 | $731.04 |
| **Mobilization** | | | | | | |
| Mobilization, medium equipment | 1139 | Equipment with 70-150 HP or typical weights between 14,000 and 30,000 pounds. | Each | $255.83 | 2 | $511.66 |

**Practice:** 410 - Grade Stabilization Structure

**Scenario** #11 - Sheetpile Weir

**Scenario Description:**

A Straight, Square, or Box Drop structure composed of steel sheetpile used to stabilize the grade and control erosion in natural or artificial channels, to prevent the formation or advancing of gullies, and to enhance environmental quality and reduce pollution hazards. Applied in areas where the concentration and flow velocity of water require structures to stabilize the grade in channels or to control gully erosion. Cost estimate is based upon a semicircular steel toe wall structure with a drop of 3ft and weir length of 30ft (90 square feet). The unit of payment measurement is defined as weir length times drop in "feet". The drop (feet) is defined as the structure inlet crest elevation minus the control outlet elevation (i.e.: 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:** 90.0

**Scenario Total Cost:** $25,246.50

**Scenario Cost/Unit:** $280.52

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 | $3.65 | 250 | $912.50 |
| Excavation, common earth, wet, side cast, large equipment | 1228 | Bulk excavation and side casting of wet common earth with hydraulic excavator or dragline with greater than 1 CY capacity. Includes equipment and labor. | Cubic Yard | $4.32 | 250 | $1,080.00 |
| Sheet piling, steel, 15' | 1337 | Steel sheet pile, panels or barrier driven up to 15 feet and left in place. Includes materials, equipment and labor. | Square Foot | $28.71 | 750 | $21,532.50 |
| **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 | $41.76 | 20 | $835.20 |
| **Materials** | | | | | | |
| Rock Riprap, Placed with geotextile | 44 | Rock Riprap, placed with geotextile, includes materials, equipment and labor to transport and place | Cubic Yard | $79.57 | 5 | $397.85 |
| **Mobilization** | | | | | | |
| Mobilization, large equipment | 1140 | Equipment >150HP or typical weights greater than 30,000 pounds or loads requiring over width or over length permits. | Each | $488.45 | 1 | $488.45 |

**Practice:** 410 - Grade Stabilization Structure

**Scenario** #12 - Concrete Weir

**Scenario Description:**

A Straight Drop structure constructed of reinforced concrete. These structures are used to stabilized the grade and control erosion in natural or artificial channels, to prevent the formation or advancing of gullies, and to enhance environmental quality and reduce pollution hazards. Applied in areas where the concentration and flow velocity of water require structures to stabilize the grade in channels or to control gully erosion. Cost estimate is based upon a reinforced concrete structure with a drop of 3ft and weir length of 8ft (48 square feet). The unit of payment measurement is defined as weir length times drop in "feet". The drop (feet) is defined as the structure inlet crest elevation minus the control outlet elevation (i.e.: 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:** 48.0

**Scenario Total Cost:** $13,339.47

**Scenario Cost/Unit:** $277.91

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 | $510.00 | 15 | $7,650.00 |
| Earthfill, Dumped and Spread | 51 | Earthfill, dumped and spread without compaction effort, includes equipment and labor | Cubic Yard | $3.65 | 300 | $1,095.00 |
| Excavation, common earth, wet, side cast, large equipment | 1228 | Bulk excavation and side casting of wet common earth with hydraulic excavator or dragline with greater than 1 CY capacity. Includes equipment and labor. | Cubic Yard | $4.32 | 300 | $1,296.00 |
| **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 | $41.76 | 40 | $1,670.40 |
| **Materials** | | | | | | |
| Rock Riprap, Placed with geotextile | 44 | Rock Riprap, placed with geotextile, includes materials, equipment and labor to transport and place | Cubic Yard | $79.57 | 6 | $477.42 |
| Aggregate, Gravel, Graded | 46 | Gravel, includes materials, equipment and labor to transport and place. Includes washed and unwashed gravel. | Cubic Yard | $34.75 | 5 | $173.75 |
| **Mobilization** | | | | | | |
| Mobilization, large equipment | 1140 | Equipment >150HP or typical weights greater than 30,000 pounds or loads requiring over width or over length permits. | Each | $488.45 | 2 | $976.90 |

**Practice:** 410 - Grade Stabilization Structure

**Scenario** #13 - Catch Basin and Pipe =< 24 inch

**Scenario Description:**

A catch basin structure constructed of concrete and a grate with an outlet pipe. These structures are used to stabilized the grade and control erosion in natural or artificial channels, to prevent the formation or advancing of gullies, and to enhance environmental quality and reduce pollution hazards. Applied in areas where the concentration and flow velocity of water require structures to stabilize the grade in channels or to control gully erosion. Cost estimate is based upon a standard catch basin plus length of pipe. Disturbed areas are protected with permanent vegetative cover. Addresses resource concerns such as soil erosion-concentrated flow erosion and water quality degradation.

**Before Situation:**

The operator presently has gullies forming and/or worsening on the farmland and impacting the useable area and the downstream water quality. Erosion from the gullies is allowing soil and possibly nutrients to be transported to downstream receiving waters degrading water quality and causing soil loss.

**After Situation:**

Area is stabilized. The advancement and/or formation of gullies is stopped, soil from gullies no longer leaves the farm, useable farm area is increased, sedimentation and other pollution hazards are decreased, and water quality downstream is protected. Any needed re-vegetation of disturbed areas use Critical Area Planting (342). Other associated practices such as; Pond (378), Dam (402), Fence (382), Channel Bed Stabilization (584), Dike (356), Grassed Waterway (412), Structure for Water Control (587), Subsurface Drain (606), and Underground Outlet (620) will use the corresponding Standard(s) as appropriate.

**Feature Measure:** Catch Basin Structure

**Scenario Unit::** Each

**Scenario Typical Size:** 1.0

**Scenario Total Cost:** $6,988.21

**Scenario Cost/Unit:** $6,988.21

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 | $5.87 | 100 | $587.00 |
| Excavation, common earth, large equipment, 150 ft | 1223 | Bulk excavation of common earth including sand and gravel with dozer >100 HP with average push distance of 150 feet. Includes equipment and labor. | Cubic Yard | $3.77 | 100 | $377.00 |
| **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 | $25.31 | 40 | $1,012.40 |
| **Materials** | | | | | | |
| 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 | $12.76 | 200 | $2,552.00 |
| Catch Basin, concrete, 60" dia. | 1754 | Precast 60-in diameter catch basin, 6' deep, with collar and grate cover. Materials only. | Each | $1,971.36 | 1 | $1,971.36 |
| **Mobilization** | | | | | | |
| Mobilization, large equipment | 1140 | Equipment >150HP or typical weights greater than 30,000 pounds or loads requiring over width or over length permits. | Each | $488.45 | 1 | $488.45 |

**Practice:** 410 - Grade Stabilization Structure

**Scenario** #14 - Catch Basin and Pipe >24 inch

**Scenario Description:**

A catch basin structure constructed of concrete and a grate with an outlet pipe. These structures are used to stabilized the grade and control erosion in natural or artificial channels, to prevent the formation or advancing of gullies, and to enhance environmental quality and reduce pollution hazards. Applied in areas where the concentration and flow velocity of water require structures to stabilize the grade in channels or to control gully erosion. Cost estimate is based upon a standard catch basin plus length of pipe. Disturbed areas are protected with permanent vegetative cover. Addresses resource concerns such as soil erosion-concentrated flow erosion and water quality degradation.

**Before Situation:**

The operator presently has gullies forming and/or worsening on the farmland and impacting the useable area and the downstream water quality. Erosion from the gullies is allowing soil and possibly nutrients to be transported to downstream receiving waters degrading water quality and causing soil loss.

**After Situation:**

Area is stabilized. The advancement and/or formation of gullies is stopped, soil from gullies no longer leaves the farm, useable farm area is increased, sedimentation and other pollution hazards are decreased, and water quality downstream is protected. Any needed re-vegetation of disturbed areas use Critical Area Planting (342). Other associated practices such as; Pond (378), Dam (402), Fence (382), Channel Bed Stabilization (584), Dike (356), Grassed Waterway (412), Structure for Water Control (587), Subsurface Drain (606), and Underground Outlet (620) will use the corresponding Standard(s) as appropriate.

**Feature Measure:** Catch Basin Structure

**Scenario Unit::** Each

**Scenario Typical Size:** 1.0

**Scenario Total Cost:** $12,114.21

**Scenario Cost/Unit:** $12,114.21

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 | $5.87 | 100 | $587.00 |
| Excavation, common earth, large equipment, 150 ft | 1223 | Bulk excavation of common earth including sand and gravel with dozer >100 HP with average push distance of 150 feet. Includes equipment and labor. | Cubic Yard | $3.77 | 100 | $377.00 |
| **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 | $25.31 | 40 | $1,012.40 |
| **Materials** | | | | | | |
| 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 | $38.39 | 200 | $7,678.00 |
| Catch Basin, concrete, 60" dia. | 1754 | Precast 60-in diameter catch basin, 6' deep, with collar and grate cover. Materials only. | Each | $1,971.36 | 1 | $1,971.36 |
| **Mobilization** | | | | | | |
| Mobilization, large equipment | 1140 | Equipment >150HP or typical weights greater than 30,000 pounds or loads requiring over width or over length permits. | Each | $488.45 | 1 | $488.45 |

**Practice:** 410 - Grade Stabilization Structure

**Scenario** #15 - Rock Chute

**Scenario Description:**

A Rock Chute structure constructed of rock riprap, bedding, and geotextile. Structure includes inlet and outlet apron. These structures are used to stabilized the grade and control erosion in natural or artificial channels, to prevent the formation or advancing of gullies, and to enhance environmental quality and reduce pollution hazards. Applied in areas where the concentration and flow velocity of water require structures to stabilize the grade in channels or to control gully erosion. Cost estimate is based upon an 8' bottom width chute with 3:1 side slopes. Costs developed from scenario created using NRCS Rock Chute spreadsheet. Disturbed areas are protected with permanent vegetative cover. Addresses resource concerns such as soil erosion-concentrated flow erosion and water quality degradation.

**Before Situation:**

The operator presently has gullies forming and/or worsening on the farmland and impacting the useable area and the downstream water quality. Erosion from the gullies is allowing soil and possibly nutrients to be transported to downstream receiving waters degrading water quality and causing soil loss.

**After Situation:**

Area is stabilized. The advancement and/or formation of gullies is stopped, soil from gullies no longer leaves the farm, useable farm area is increased, sedimentation and other pollution hazards are decreased, and water quality downstream is protected. Any needed re-vegetation of disturbed areas use Critical Area Planting (342). Other associated practices such as; Pond (378), Dam (402), Fence (382), Channel Bed Stabilization (584), Dike (356), Grassed Waterway (412), Structure for Water Control (587), Subsurface Drain (606), and Underground Outlet (620) will use the corresponding Standard(s) as appropriate.

**Feature Measure:** Cubic Yard of Rock Chute Material

**Scenario Unit::** Cubic Yard

**Scenario Typical Size:** 200.0

**Scenario Total Cost:** $20,095.93

**Scenario Cost/Unit:** $100.48

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 | $4.45 | 500 | $2,225.00 |
| Excavation, common earth, wet, side cast, large equipment | 1228 | Bulk excavation and side casting of wet common earth with hydraulic excavator or dragline with greater than 1 CY capacity. Includes equipment and labor. | Cubic Yard | $4.32 | 700 | $3,024.00 |
| **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 | $25.31 | 20 | $506.20 |
| **Materials** | | | | | | |
| Rock Riprap, Placed with geotextile | 44 | Rock Riprap, placed with geotextile, includes materials, equipment and labor to transport and place | Cubic Yard | $79.57 | 154 | $12,253.78 |
| Aggregate, Gravel, Graded | 46 | Gravel, includes materials, equipment and labor to transport and place. Includes washed and unwashed gravel. | Cubic Yard | $34.75 | 46 | $1,598.50 |
| **Mobilization** | | | | | | |
| Mobilization, large equipment | 1140 | Equipment >150HP or typical weights greater than 30,000 pounds or loads requiring over width or over length permits. | Each | $488.45 | 1 | $488.45 |

**Practice:** 412 - Grassed Waterway

**Scenario** #1 - Base Waterway

**Scenario Description:**

Typical grassed waterway is 500 ' long, 12' bottom, 8:1 side slopes, 1.5' depth, half excavation. A grassed waterway that is a shaped or graded channel and is established with suitable vegetation to carry surface water at a non-erosive velocity to a stable outlet. This practice addresses Concentrated Flow Erosion (Classic Gully & Ephemeral Erosion) and Excessive Sediment in surface waters. Waterway area measured from top of bank to top of bank. Seeding area is 20% greater than waterway area to account for disturbed areas. Costs include excavation 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, terraces, diversions, or water control structures or similar practices to a suitable, stable outlet.

**After Situation:**

Installed grassed waterway is 500 ' long, 12' bottom, 8:1 side slopes, 1.5' depth. 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 according to Subsurface Drain (606). Outlets, if needed will be installed using Structure for Water Control (587). If inlet Structures are needed with the drainage tile, then those will be installed using Underground Outlet (620).

**Feature Measure:** Length of Waterway

**Scenario Unit::** Square Foot

**Scenario Typical Size:** 15,000.0

**Scenario Total Cost:** $3,813.59

**Scenario Cost/Unit:** $0.25

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 | $2.50 | 1350 | $3,375.00 |
| **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 | $45.69 | 4 | $182.76 |
| **Mobilization** | | | | | | |
| Mobilization, medium equipment | 1139 | Equipment with 70-150 HP or typical weights between 14,000 and 30,000 pounds. | Each | $255.83 | 1 | $255.83 |

**Practice:** 412 - Grassed Waterway

**Scenario** #2 - Base Waterway, Seeding

**Scenario Description:**

Typical grassed waterway is 500 ' long, 12' bottom, 8:1 side slopes, 1.5' depth, half excavation. (Foot print of waterway = 500' x 36' = 18,000 SF). A grassed waterway that is a shaped or graded channel and is established with suitable vegetation to carry surface water at a non-erosive velocity to a stable outlet. This practice addresses Concentrated Flow Erosion (Classic Gully & Ephemeral Erosion) and Excessive Sediment in surface waters. Waterway area measured from top of bank to top of bank. Seeding area is 20% greater than waterway area to account for disturbed areas. Costs include excavation, associated work to construct the overall shape and grade of the waterway as well as lime, fertilizer, and seed.

**Before Situation:**

The field has a small gulley which is cutting deeper into the field as time goes on, so it needs to be stopped or controlled. Excessive sedimentation and soil erosion as a result from ephemeral or classic gully erosion. Gully has formed in field as a result of excessive runoff and poor cropping techniques. Grassed waterway is also commonly installed to covey runoff from concentrated flows, terraces, diversions, or water control structures or similar practices to a suitable, stable outlet.

**After Situation:**

Installed grassed waterway is 500 ' long, 12' bottom, 8:1 side slopes, 1.5' depth. (Foot print of waterway = 500' x 36' = 18,000 SF). The practice is installed using a dozer. If erosion control blankets for seedbed establishment/protection is needed, use conservation practice Mulching (484). Drainage tile, if needed, will be installed according to Subsurface Drain (606). Outlets, if needed will be installed using Structure for Water Control (587). If inlet Structures are needed with the drainage tile, then those will be installed using Underground Outlet (620).

**Feature Measure:** Area of Waterway in Square Feet

**Scenario Unit::** Square Foot

**Scenario Typical Size:** 18,000.0

**Scenario Total Cost:** $5,197.49

**Scenario Cost/Unit:** $0.29

Cost Details:

| Component Name | ID | Description | Unit | Cost | QTY | Total |
|---|---|---|---|---|---|---|
| **Equipment Installation** | | | | | | |
| Tillage, Light | 945 | Includes light disking (tandem) or field cultivator. Includes equipment, power unit and labor costs. | Acre | $11.14 | 1 | $11.14 |
| Fertilizer, ground application, dry bulk | 950 | Dry bulk fertilizer application performed by ground equipment. Includes equipment, power unit and labor costs. | Acre | $6.62 | 1 | $6.62 |
| Lime application | 953 | Lime application performed by ground equipment. Includes equipment, power unit and labor costs. | Acre | $10.63 | 1 | $10.63 |
| 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 | $12.60 | 1 | $12.60 |
| Cultipacking | 1100 | Includes equipment, power unit and labor costs. | Acre | $7.70 | 1 | $7.70 |
| 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 | $2.50 | 1340 | $3,350.00 |
| **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 | $25.31 | 11 | $278.41 |
| Supervisor 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 | $45.69 | 4 | $182.76 |
| **Materials** | | | | | | |
| Nitrogen (N), Urea | 71 | Price per pound of N supplied by Urea. Price is not per pound of total product applied, no conversion is needed. | Pound | $0.49 | 25 | $12.25 |
| 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 | $0.65 | 25 | $16.25 |
| Potassium, K2O | 74 | K2O supplied by Muriate Of Potash. Price is not per pound of total product applied, no conversion is needed. | Pound | $0.36 | 25 | $9.00 |
| Lime, ENM | 75 | Fertilizer: Limestone Spread on field. | Ton | $93.23 | 1 | $93.23 |
| Straw bales | 2186 | Straw bales buried at defined intervals to halt rill and gulley formation. Materials and shipping only. | Each | $5.00 | 65 | $325.00 |
| Three Species Mix, Cool Season, Introduced Perennial Grass | 2315 | Cool season, introduced grass mix. Includes material and shipping only. | Acre | $45.35 | 1 | $45.35 |
| One Species, Warm Season, Native Perennial Grass | 2322 | Native, warm season perennial grass. Includes material and shipping only. | Acre | $69.06 | 1 | $69.06 |
| **Mobilization** | | | | | | |

| | | | | | | |
|---|---|---|---|---|---|---|
| Mobilization, medium equipment | 1139 | Equipment with 70-150 HP or typical weights between 14,000 and 30,000 pounds. | Each | $255.83 | 3 | $767.49 |

**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 nectar throughout the growing season by establishing a diverse mixture of flowering plants. Typically a mixture of 5 or more species is planted to improve diversity so that pollen and nectar are available as long as possible. Typical installation is in or at the edge of cropland or pasture. Typical installation involves tillage to prepare the site for planting. Flowering trees and shrubs adapted for local climatic and edaphic conditions are typically planted at eight foot intervals (this will vary with species selection and density goals). A native grass adapted to the local climatic and edaphic conditions will be drilled into the site at a rate that will achieve a minimum of 20 seeds per square foot. A locally adapted mixture of at 3 pollen and nectar producing plants will be drilled into the site. The species list in the component section of this scenario are strictly for deriving a cost. Species adapted to local climatic and edaphic conditions will be listed in the specification for the site. There is tremendous overlap between this practice and conservation practice 380 Windbreak/Shelterbelt establishment. The main difference is that conservation practice 380 is exclusively woody plants where practice 422 provides for the use of herbaceous materials. If a fence is needed to facilitate establishment use practice 382, Fence.

**Before Situation:**

Pollen and nectar sources are lacking or are only available for part of the growing season. Large cropland tracks lack undisturbed areas for ground nesting bees

**After Situation:**

Flowering plants supply pollen and nectar throughout the growing season. Undisturbed areas provide nesting sites for bees and other native pollinators.

**Feature Measure:** Length of Hedgerow

**Scenario Unit::** Foot

**Scenario Typical Size:** 800.0

**Scenario Total Cost:** $2,887.27

**Scenario Cost/Unit:** $3.61

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 | $16.60 | 0.25 | $4.15 |
| Seeding Operation, No Till/Grass Drill | 960 | No Till drill or grass drill for seeding. Includes equipment, power unit and labor costs. | Acre | $21.36 | 0.25 | $5.34 |
| **Labor** | | | | | | |
| General Labor | 231 | Labor performed using basic tools such as power tool, shovels, and other tools that do not require extensive training. Ex. pipe layer, herder, concrete placement, materials spreader, flagger, etc. | Hour | $25.31 | 100 | $2,531.00 |
| **Materials** | | | | | | |
| Tree, conifer, seedling, containerized, 15 cu. in. | 1520 | Containerized conifer stock, 15 cubic inches (e.g. 2.0" x 6"). Includes materials and shipping only. | Each | $0.59 | 100 | $59.00 |
| Tree shelter, mesh tree tube, 24" | 1555 | 24" tall vexar or other open weave tubular tree shelter to protect from animal damage. Materials only. | Each | $0.52 | 100 | $52.00 |
| Animal repellent, chemical | 1907 | Chemical animal repellent to protect trees from animal damage. Includes materials and shipping only. | Gallon | $28.77 | 0.25 | $7.19 |
| Three Species Mix, Native Forb | 2333 | Native forb mix. Includes material and shipping only. | Acre | $571.46 | 0.4 | $228.58 |

**Practice:** 422 - Hedgerow Planting

**Scenario** #2 - Contour

**Scenario Description:**

Typically installation of this scenario is within an annually cropped field. The hedge row is planted on the contour to provide a physical and visual aid to contour farming. This scenario is used to facilitate additional measures that address the resource concerns of; sheet and rill soil erosion and Water Quality Degradation, excess sediment in surface waters. Trees, shrubs, and grasses adapted for local climatic and edaphic conditions are typically planted at eight foot intervals (this will vary with species selection and density goals). Species selected should be at least three feet tall at maturity. There is tremendous overlap between this practice and conservation practice 380 Windbreak/Shelterbelt establishment. The main difference is that conservation practice 380 is exclusively woody plants where practice 422 provides for the use of herbaceous materials. If a fence is needed to facilitate establishment use practice 382, Fence.

**Before Situation:**

Contour farming practices are made difficult or less effective due to a lack of visual clues as to the location of the contours. Soil is lost to sheet and rill erosion. Sediments are deposited into surface waters.

**After Situation:**

Hedgerow planted on the contour presents a physical and visual guide for tillage and planting operations on the contour. Soil erosion from sheet and rill sources is reduced and the resultant deposition of sediment to surface waters is in turn reduced.

**Feature Measure:** Length of Hedgerow

**Scenario Unit::** Foot

**Scenario Typical Size:** 800.0

**Scenario Total Cost:** $3,058.82

**Scenario Cost/Unit:** $3.82

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 | $16.60 | 0.25 | $4.15 |
| Seeding Operation, No Till/Grass Drill | 960 | No Till drill or grass drill for seeding. Includes equipment, power unit and labor costs. | Acre | $21.36 | 0.25 | $5.34 |
| **Labor** | | | | | | |
| General Labor | 231 | Labor performed using basic tools such as power tool, shovels, and other tools that do not require extensive training. Ex. pipe layer, herder, concrete placement, materials spreader, flagger, etc. | Hour | $25.31 | 100 | $2,531.00 |
| **Materials** | | | | | | |
| Tree, conifer, seedling or transplant, potted, 1/2 to 1 gal. | 1536 | Potted conifer, 1/2 to 1 gal. Includes materials and shipping only. | Each | $4.41 | 100 | $441.00 |
| Tree shelter, mesh tree tube, 24" | 1555 | 24" tall vexar or other open weave tubular tree shelter to protect from animal damage. Materials only. | Each | $0.52 | 100 | $52.00 |
| Animal repellent, chemical | 1907 | Chemical animal repellent to protect trees from animal damage. Includes materials and shipping only. | Gallon | $28.77 | 0.25 | $7.19 |
| Three Species Mix, Cool Season, Introduced Perennial Grass | 2315 | Cool season, introduced grass mix. Includes material and shipping only. | Acre | $45.35 | 0.4 | $18.14 |

**Practice:** 422 - Hedgerow Planting

**Scenario** #4 - Wildlife, Warm Season Grass

**Scenario Description:**

Typically installed in or at the edge of cropland or pasture this scenario is used to address the Inadequate Habitat for Fish and Wildlife resource concern. Specifically, the establishment of dense vegetation in a linear design can be used to provide for several habitat elements depending on the needs identified in the habitat assessment. This scenario can provide: habitat connectivity, food, and cover for wildlife depending on design and plant species selection. The 422 standard for wildlife criteria calls for a minimum of two species of native plants. Typical installation involves tillage to prepare the site for planting. 2 Trees and/or shrubs adapted for local climatic and edaphic conditions are typically plant at eight foot intervals (this will vary with species selection and density goals). A mix of 2 native warm season grasses adapted to the local climatic and edaphic conditions will be drilled into the site at a rate that will achieve a minimum of 20 seeds per square foot. The species list in the component section of this scenario are strictly for deriving a cost. Plant species adapted to the local climatic and edaphic conditions that address the resource concern will be stated in the specification for the site. There is tremendous overlap between this practice and conservation practice 380 Windbreak/Shelterbelt establishment. The main difference is that conservation practice 380 is exclusively woody plants where practice 422 provides for the use of herbaceous materials. If a fence is needed to facilitate establishment use practice 382, Fence.

**Before Situation:**

Habitat patches lack connectivity. Cover is inadequate to allow wildlife to exploit cropland food resources. Berries and mast are limited.

**After Situation:**

Inadequate habitat for fish and wildlife is addressed for needs identified in the resource assessment. Habitat patches are connected by dense hedgerow vegetation. Food resources in crop fields are made available by their proximity to hedgerow cover. Planting may include fruit and mast bearing species, improving food supply, depending on needs being addressed.

**Feature Measure:** Length of Hedgerow

**Scenario Unit::** Foot

**Scenario Typical Size:** 800.0

**Scenario Total Cost:** $3,077.51

**Scenario Cost/Unit:** $3.85

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 | $16.60 | 0.25 | $4.15 |
| Seeding Operation, No Till/Grass Drill | 960 | No Till drill or grass drill for seeding. Includes equipment, power unit and labor costs. | Acre | $21.36 | 0.25 | $5.34 |
| **Labor** | | | | | | |
| General Labor | 231 | Labor performed using basic tools such as power tool, shovels, and other tools that do not require extensive training. Ex. pipe layer, herder, concrete placement, materials spreader, flagger, etc. | Hour | $25.31 | 100 | $2,531.00 |
| **Materials** | | | | | | |
| Tree, conifer, seedling or transplant, potted, 1/2 to 1 gal. | 1536 | Potted conifer, 1/2 to 1 gal. Includes materials and shipping only. | Each | $4.41 | 100 | $441.00 |
| Tree shelter, mesh tree tube, 24" | 1555 | 24" tall vexar or other open weave tubular tree shelter to protect from animal damage. Materials only. | Each | $0.52 | 100 | $52.00 |
| Animal repellent, chemical | 1907 | Chemical animal repellent to protect trees from animal damage. Includes materials and shipping only. | Gallon | $28.77 | 0.25 | $7.19 |
| Two Species Mix, Warm Season, Native Perennial Grass | 2325 | Native, warm season perennial grass. Includes material and shipping only. | Acre | $92.08 | 0.4 | $36.83 |

**Practice:** 422 - Hedgerow Planting

**Scenario** #6 - Wildlife Cool Season

**Scenario Description:**

Typically installed in or at the edge of cropland or pasture this scenario is used to address the Inadequate Habitat for Fish and Wildlife resource concern. Specifically, the establishment of dense vegetation in a linear design can be used to provide for several habitat elements depending on the needs identified in the habitat assessment. This scenario can provide: habitat connectivity, food, and cover for wildlife depending on design and plant species selection. The 422 standard for wildlife criteria calls for a minimum of two species of native plants. Typical installation involves tillage to prepare the site for planting. 2 Trees and/or shrubs adapted for local climatic and edaphic conditions are typically plant at eight foot intervals (this will vary with species selection and density goals). A native cool season grass adapted to the local climatic and edaphic conditions will be drilled into the site at a rate that will achieve a minimum of 20 seeds per square foot. The species list in the component section of this scenario are strictly for deriving a cost. Plant species adapted to the local climatic and edaphic conditions that address the resource concern will be stated in the specification for the site. There is tremendous overlap between this practice and conservation practice 380 Windbreak/Shelterbelt establishment. The main difference is that conservation practice 380 is exclusively woody plants where practice 422 provides for the use of herbaceous materials. If a fence is needed to facilitate establishment use practice 382, Fence.

**Before Situation:**

Habitat patches lack connectivity. Cover is inadequate to allow wildlife to exploit cropland food resources. Berries and mast are limited.

**After Situation:**

Inadequate habitat for fish and wildlife is addressed for needs identified in the resource assessment. Habitat patches are connected by dense hedgerow vegetation. Food resources in crop fields are made available by their proximity to hedgerow cover. Planting may include fruit and mast bearing species, improving food supply, depending on needs being addressed.

**Feature Measure:** Length of Hedgerow

**Scenario Unit::** Foot

**Scenario Typical Size:** 800.0

**Scenario Total Cost:** $3,280.27

**Scenario Cost/Unit:** $4.10

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 | $16.60 | 0.25 | $4.15 |
| Seeding Operation, No Till/Grass Drill | 960 | No Till drill or grass drill for seeding. Includes equipment, power unit and labor costs. | Acre | $21.36 | 0.25 | $5.34 |
| **Labor** | | | | | | |
| General Labor | 231 | Labor performed using basic tools such as power tool, shovels, and other tools that do not require extensive training. Ex. pipe layer, herder, concrete placement, materials spreader, flagger, etc. | Hour | $25.31 | 100 | $2,531.00 |
| **Materials** | | | | | | |
| Shrub, seedling or transplant, potted, 1/2 to 1 gal. | 1526 | Potted shrub, 1/2 to 1 gal. Includes materials and shipping only. | Each | $4.52 | 100 | $452.00 |
| Tree shelter, mesh tree tube, 24" | 1555 | 24" tall vexar or other open weave tubular tree shelter to protect from animal damage. Materials only. | Each | $0.52 | 100 | $52.00 |
| Animal repellent, chemical | 1907 | Chemical animal repellent to protect trees from animal damage. Includes materials and shipping only. | Gallon | $28.77 | 0.25 | $7.19 |
| Three Species Mix, Native Forb | 2333 | Native forb mix. Includes material and shipping only. | Acre | $571.46 | 0.4 | $228.58 |

**Practice:** 422 - Hedgerow Planting

**Scenario** #7 - Hedgerow Existing Understory

**Scenario Description:**

Typically installed in or at the edge of cropland or pasture where there is existing vegetation such as grasses or forbes. Trees and shrubs are planted directly into the grass/forb area. this scenario is used to address the Inadequate Habitat for Fish and Wildlife resource concern. Specifically, the establishment of dense vegetation in a linear design can be used to provide for several habitat elements depending on the needs identified in the habitat assessment. This scenario can provide: habitat connectivity, 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 is a 30 foot wide hedgerow with four line of trees or shrubs planted 10 feet apart. 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. 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. Wildlife food may be limited.

**After Situation:**

Inadequate habitat for fish and wildlife is addressed for needs identified in the resource assessment. Habitat patches are connected by dense hedgerow vegetation. Food resources in crop fields are made available by their proximity to hedgerow cover. Planting may include fruit and mast bearing species, improving food supply, depending on needs being addressed.

**Feature Measure:** Length of Hedgerow

**Scenario Unit::** Foot

**Scenario Typical Size:** 800.0

**Scenario Total Cost:** $1,310.56

**Scenario Cost/Unit:** $1.64

Cost Details:

| Component Name | ID | Description | Unit | Cost | QTY | Total |
|---|---|---|---|---|---|---|
| **Labor** | | | | | | |
| General Labor | 231 | Labor performed using basic tools such as power tool, shovels, and other tools that do not require extensive training. Ex. pipe layer, herder, concrete placement, materials spreader, flagger, etc. | Hour | $25.31 | 16 | $404.96 |
| **Materials** | | | | | | |
| Shrub, seedling or transplant, potted, 1/2 to 1 gal. | 1526 | Potted shrub, 1/2 to 1 gal. Includes materials and shipping only. | Each | $4.52 | 160 | $723.20 |
| Tree shelter, solid tube type, 4" x 18" | 1562 | 4" x 18" tree tube for protection from animal damage. Materials only. | Each | $1.14 | 160 | $182.40 |

**Practice:** 422 - Hedgerow Planting

**Scenario** #8 - Urban Suburban Hedgerow

**Scenario Description:**

Typically installed in or at the edge of cropland in an urban or suburban setting this scenario is used to address a number of resource concerns including: Inadequate Habitat for Fish and Wildlife resource concern; . Specifically, the establishment of dense vegetation in a linear design can be used to provide for several habitat elements depending on the needs identified in the habitat assessment. This scenario can provide: habitat connectivity, 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 will be completed using hand tools such as shovels and rakes. The typical size farm is between 0.25-2.0 acres. Typical sixe hedge is 100 feet by 10 feet. Normally 2 lines of shrubs are installed. A mix of 2 native warm season grasses, cool season grasses or native forbes are hand broadcast at 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:**

Urban -Suburban small farm does not have hedgerow established. Hedgerows are need to provide wildlife habitat, as well as, provide screening from excessive traffic.

**After Situation:**

Urban -Suburban small farm have hedgerow established. Hedgerows provide wildlife habitat, as well as, provide screening from excessive traffic.

**Feature Measure:** <Unknown>

**Scenario Unit::** Each

**Scenario Typical Size:** 1.0

**Scenario Total Cost:** $488.59

**Scenario Cost/Unit:** $488.59

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 | 4 | $48.16 |
| **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 | $25.31 | 8 | $202.48 |
| **Materials** | | | | | | |
| Shrub, seedling or transplant, potted, 1/2 to 1 gal. | 1526 | Potted shrub, 1/2 to 1 gal. Includes materials and shipping only. | Each | $4.52 | 40 | $180.80 |
| Three Species Mix, Native Forb | 2333 | Native forb mix. Includes material and shipping only. | Acre | $571.46 | 0.1 | $57.15 |

**Practice:** 430 - Irrigation Pipeline

**Scenario** #1 - PVC (Iron Pipe Size) 8in or less diam

**Scenario Description:**

Description: Below ground installation of PVC (Iron Pipe Size) pipeline. PVC (IPS) is manufactured in sizes (nominal diameter) from ½-inch to 36-inch; typical practice sizes range from 2-inch to 24-inch; and typical scenario size is 6-inch. Construct 1,000 feet of 6-inch, Class 125 (SDR-32.5), PVC pipeline with appurtenances, installed below ground with a minimum of 2.5 feet of ground cover. The unit is weight of pipe material in pounds. 1,000 feet of 6-inch, Class 125 (SDR-32.5) PVC pipe weighs 2.596 lb/ft, or a total of 2,596 pounds. Appurtenances include: couplings, fittings, air vents, pressure relief valves, thrust blocks, risers, and inline valves, and are included in the cost of pipe material (additional 10% of pipe material quantity). Cost of appurtenances does not include flow meters or backflow preventers. Typical installation applies to soils with no special bedding requirements. Resource Concerns: Inefficient Use of Irrigation Water; Inefficient Energy Use. Associated Practices: 436 - Irrigation Reservoir; 441 - Irrigation System, Microirrigation; 442 - Irrigation System, Sprinkler; 443 - Irrigation System, Surface & Subsurface; 447 - Irrigation System, Tailwater Recovery; 533 - Pumping Plant; 634 - Waste Transfer.

**Before Situation:**

Pipeline needed to replace or supplement inefficient irrigation conveyance systems.

**After Situation:**

1,000 LF of 6" Diam PVC 125 psi pipeline is installed to convey and/or distribute water to irrigation systems or reservoirs, minimizing non-beneficial water use, reducing soil erosion, and/or reducing energy use.

**Feature Measure:** Weight of Pipe

**Scenario Unit::** Pound

**Scenario Typical Size:** 2,596.0

**Scenario Total Cost:** $8,859.06

**Scenario Cost/Unit:** $3.41

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 | $2.36 | 250 | $590.00 |
| Backhoe, 80 HP | 926 | Wheel mounted backhoe excavator with horsepower range of 60 to 90. Equipment and power unit costs. Labor not included. | Hour | $56.05 | 8 | $448.40 |
| **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 | $41.76 | 16 | $668.16 |
| 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 | $25.31 | 40 | $1,012.40 |
| Equipment Operators, Light | 232 | Includes: Skid Steer Loaders, Hydraulic Excavators <50 HP, Trenchers <12", Ag Equipment <150 HP, Pickup Trucks, Forklifts, Mulchers | Hour | $25.23 | 12 | $302.76 |
| **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 | $1.84 | 2856 | $5,255.04 |
| **Mobilization** | | | | | | |
| Mobilization, very small equipment | 1137 | Equipment that is small enough to be transported by a pick-up truck with typical weights less than 3,500 pounds. Can be multiple pieces of equipment if all hauled simultaneously. | Each | $70.64 | 1 | $70.64 |
| Mobilization, medium equipment | 1139 | Equipment with 70-150 HP or typical weights between 14,000 and 30,000 pounds. | Each | $255.83 | 2 | $511.66 |

**Practice:** 430 - Irrigation Pipeline

**Scenario** #2 - PVC (Iron Pipe Size) 8in or less diameter with 4 in sand bedding

**Scenario Description:**

Description: Below ground installation of PVC (Iron Pipe Size) pipeline. PVC (IPS) is manufactured in sizes (nominal diameter) from ½-inch to 36-inch; typical practice sizes range from 2-inch to 24-inch; and typical scenario size is 6-inch. Construct 1,000 feet of 6-inch, Class 125 (SDR-32.5), PVC pipeline with appurtenances, installed below ground with a minimum of 2.5 feet of ground cover. The unit is weight of pipe material in pounds. 1,000 feet of 6-inch, Class 125 (SDR-32.5) PVC pipe weighs 2.596 lb/ft, or a total of 2,596 pounds. Appurtenances include: couplings, fittings, air vents, pressure relief valves, thrust blocks, risers, and inline valves, and are included in the cost of pipe material (additional 10% of pipe material quantity). Cost of appurtenances does not include flow meters or backflow preventers. Typical installation applies to rocky soils which require 4" of sand bedding. Resource Concerns: Inefficient Use of Irrigation Water; Inefficient Energy Use. Associated Practices: 436 - Irrigation Reservoir; 441 - Irrigation System, Microirrigation; 442 - Irrigation System, Sprinkler; 443 - Irrigation System, Surface & Subsurface; 447 - Irrigation System, Tailwater Recovery; 533 - Pumping Plant; 634 - Waste Transfer.

**Before Situation:**

Pipeline needed to replace or supplement inefficient irrigation conveyance systems.

**After Situation:**

1,000 LF of 6" Diam PVC 125 psi pipeline with 4" of sand bedding is installed to convey and/or distribute water to irrigation systems or reservoirs, minimizing non-beneficial water use, reducing soil erosion, and/or reducing energy use.

**Feature Measure:** Weight of Pipe

**Scenario Unit::** Pound

**Scenario Typical Size:** 2,596.0

**Scenario Total Cost:** $9,270.81

**Scenario Cost/Unit:** $3.57

Cost Details:

| Component Name | ID | Description | Unit | Cost | QTY | Total |
|---|---|---|---|---|---|---|
| **Equipment Installation** | | | | | | |
| Excavation, Common Earth, side cast, small equipment | 48 | Bulk excavation and side casting of common earth with hydraulic excavator with less than 1 CY capacity. Includes equipment and labor. | Cubic Yard | $2.36 | 250 | $590.00 |
| Backhoe, 80 HP | 926 | Wheel mounted backhoe excavator with horsepower range of 60 to 90. Equipment and power unit costs. Labor not included. | Hour | $56.05 | 8 | $448.40 |
| 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 | $0.33 | 250 | $82.50 |
| **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 | $41.76 | 16 | $668.16 |
| 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 | $25.31 | 40 | $1,012.40 |
| Equipment Operators, Light | 232 | Includes: Skid Steer Loaders, Hydraulic Excavators <50 HP, Trenchers <12", Ag Equipment <150 HP, Pickup Trucks, Forklifts, Mulchers | Hour | $25.23 | 12 | $302.76 |
| **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 | $1.84 | 2856 | $5,255.04 |
| Earthfill Material, purchased, common | 2060 | Purchased earthfill materials includes both silt or clay. Material only. | Cubic Yard | $13.17 | 25 | $329.25 |
| **Mobilization** | | | | | | |
| Mobilization, very small equipment | 1137 | Equipment that is small enough to be transported by a pick-up truck with typical weights less than 3,500 pounds. Can be multiple pieces of equipment if all hauled simultaneously. | Each | $70.64 | 1 | $70.64 |
| Mobilization, medium equipment | 1139 | Equipment with 70-150 HP or typical weights between 14,000 and 30,000 pounds. | Each | $255.83 | 2 | $511.66 |

**Practice:** 430 - Irrigation Pipeline

**Scenario** #3 - PVC (Iron Pipe Size) 10in or more diameter

**Scenario Description:**

Description: Below ground installation of PVC (Iron Pipe Size) pipeline. PVC (IPS) is manufactured in sizes (nominal diameter) from ½-inch to 36-inch; typical practice sizes range from 2-inch to 24-inch; and typical scenario size is 12-inch. Construct 1,000 feet of 12-inch, Class 200 (SDR-21), PVC pipeline with appurtenances, installed below ground with a minimum of 2.5 feet of ground cover. The unit is weight of pipe material in pounds. 1,000 feet of 12-inch, Class 200 (SDR-21) PVC pipe weighs 14.43 lb/ft, or a total of 14,430 pounds. Appurtenances include: couplings, fittings, air vents, pressure relief valves, thrust blocks, risers, and inline valves, and are included in the cost of pipe material (additional 10% of pipe material quantity). Cost of appurtenances does not include flow meters or backflow preventers. Typical installation applies to soils with no special bedding requirements. Resource Concerns: Inefficient Use of Irrigation Water; Inefficient Energy Use. Associated Practices: 436 - Irrigation Reservoir; 441 - Irrigation System, Microirrigation; 442 - Irrigation System, Sprinkler; 443 - Irrigation System, Surface & Subsurface; 447 - Irrigation System, Tailwater Recovery; 533 - Pumping Plant; 634 - Waste Transfer.

**Before Situation:**

Pipeline needed to replace or supplement inefficient irrigation conveyance systems.

**After Situation:**

1,000 LF of 12" Diam PVC 200 psi pipeline is installed to convey and/or distribute water to irrigation systems or reservoirs, minimizing non-beneficial water use, reducing soil erosion, and/or reducing energy use.

**Feature Measure:** Weight of Pipe

**Scenario Unit::** Pound

**Scenario Typical Size:** 14,430.0

**Scenario Total Cost:** $33,493.14

**Scenario Cost/Unit:** $2.32

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 | $2.36 | 260 | $613.60 |
| Backhoe, 80 HP | 926 | Wheel mounted backhoe excavator with horsepower range of 60 to 90. Equipment and power unit costs. Labor not included. | Hour | $56.05 | 12 | $672.60 |
| **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 | $41.76 | 24 | $1,002.24 |
| 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 | $25.31 | 40 | $1,012.40 |
| Equipment Operators, Light | 232 | Includes: Skid Steer Loaders, Hydraulic Excavators <50 HP, Trenchers <12", Ag Equipment <150 HP, Pickup Trucks, Forklifts, Mulchers | Hour | $25.23 | 16 | $403.68 |
| **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 | $1.84 | 15873 | $29,206.32 |
| **Mobilization** | | | | | | |
| Mobilization, very small equipment | 1137 | Equipment that is small enough to be transported by a pick-up truck with typical weights less than 3,500 pounds. Can be multiple pieces of equipment if all hauled simultaneously. | Each | $70.64 | 1 | $70.64 |
| Mobilization, medium equipment | 1139 | Equipment with 70-150 HP or typical weights between 14,000 and 30,000 pounds. | Each | $255.83 | 2 | $511.66 |

**Practice:** 430 - Irrigation Pipeline

**Scenario** #4 - PVC (Iron Pipe Size) 10in or more diameter with 4 in sand bedding

**Scenario Description:**

Description: Below ground installation of PVC (Iron Pipe Size) pipeline. PVC (IPS) is manufactured in sizes (nominal diameter) from ½-inch to 36-inch; typical practice sizes range from 2-inch to 24-inch; and typical scenario size is 12-inch. Construct 1,000 feet of 12-inch, Class 200 (SDR-21), PVC pipeline with appurtenances, installed below ground with a minimum of 2.5 feet of ground cover. The unit is weight of pipe material in pounds. 1,000 feet of 12-inch, Class 200 (SDR-21) PVC pipe weighs 14.43 lb/ft, or a total of 14,430 pounds. Appurtenances include: couplings, fittings, air vents, pressure relief valves, thrust blocks, risers, and inline valves, and are included in the cost of pipe material (additional 10% of pipe material quantity). Cost of appurtenances does not include flow meters or backflow preventers. Typical installation applies to soils with no special bedding requirements. Resource Concerns: Inefficient Use of Irrigation Water; Inefficient Energy Use. Associated Practices: 436 - Irrigation Reservoir; 441 - Irrigation System, Microirrigation; 442 - Irrigation System, Sprinkler; 443 - Irrigation System, Surface & Subsurface; 447 - Irrigation System, Tailwater Recovery; 533 - Pumping Plant; 634 - Waste Transfer.

**Before Situation:**

Pipeline needed to replace or supplement inefficient irrigation conveyance systems.

**After Situation:**

1,000 LF of 12" Diam PVC 200 psi pipeline is installed to convey and/or distribute water to irrigation systems or reservoirs, minimizing non-beneficial water use, reducing soil erosion, and/or reducing energy use.

**Feature Measure:** Weight of Pipe

**Scenario Unit::** Pound

**Scenario Typical Size:** 14,430.0

**Scenario Total Cost:** $33,904.89

**Scenario Cost/Unit:** $2.35

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 | $2.36 | 260 | $613.60 |
| Backhoe, 80 HP | 926 | Wheel mounted backhoe excavator with horsepower range of 60 to 90. Equipment and power unit costs. Labor not included. | Hour | $56.05 | 12 | $672.60 |
| 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 | $0.33 | 250 | $82.50 |
| **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 | $41.76 | 24 | $1,002.24 |
| 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 | $25.31 | 40 | $1,012.40 |
| Equipment Operators, Light | 232 | Includes: Skid Steer Loaders, Hydraulic Excavators <50 HP, Trenchers <12", Ag Equipment <150 HP, Pickup Trucks, Forklifts, Mulchers | Hour | $25.23 | 16 | $403.68 |
| **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 | $1.84 | 15873 | $29,206.32 |
| Earthfill Material, purchased, common | 2060 | Purchased earthfill materials includes both silt or clay. Material only. | Cubic Yard | $13.17 | 25 | $329.25 |
| **Mobilization** | | | | | | |
| Mobilization, very small equipment | 1137 | Equipment that is small enough to be transported by a pick-up truck with typical weights less than 3,500 pounds. Can be multiple pieces of equipment if all hauled simultaneously. | Each | $70.64 | 1 | $70.64 |
| Mobilization, medium equipment | 1139 | Equipment with 70-150 HP or typical weights between 14,000 and 30,000 pounds. | Each | $255.83 | 2 | $511.66 |

**Practice:** 430 - Irrigation Pipeline

**Scenario** #5 - HDPE (Iron Pipe Size & Tubing) 8in or less diameter

**Scenario Description:**

Description: Below ground installation of HDPE (Iron Pipe Size & Tubing) pipeline. HDPE (IPS & Tubing) is manufactured in sizes (nominal diameter) from ½-inch to 24-inch; typical practice sizes range from 2-inch to 24-inch; and typical scenario size is 6-inch. Construct 1,000 feet of 6-inch, Class 100 (SDR-17), HDPE pipeline with appurtenances, installed below ground with a minimum 2.5 feet of ground cover. The unit is weight of pipe material in pounds. 1,000 feet of 6-inch, Class 100 (SDR-17), HDPE weighs 3.251 lb/ft, or a total of 3,251 pounds. Appurtenances include: fittings, air vents, pressure relief valves, thrust blocks, risers, and inline valves, and are included in the cost of pipe material (additional 10% of pipe material quantity). Cost of appurtenances does not include flow meters or backflow preventers. Typical installation applies to soils with no special bedding requirements. Resource Concerns: Inefficient Use of Irrigation Water; Inefficient Energy Use. Associated Practices: 436 - Irrigation Reservoir; 441 - Irrigation System, Microirrigation; 442 - Irrigation System, Sprinkler; 443 - Irrigation System, Surface & Subsurface; 447 - Irrigation System, Tailwater Recovery; 533 - Pumping Plant; 634 - Waste Transfer.

**Before Situation:**

Pipeline needed to replace or supplement inefficient irrigation conveyance systems.

**After Situation:**

1,000 LF of 6" Diam HDPE 100 psi pipeline is installed to convey and/or distribute water to irrigation systems or reservoirs, minimizing non-beneficial water use, reducing soil erosion, and/or reducing energy use.

**Feature Measure:** Weight of Pipe

**Scenario Unit::** Pound

**Scenario Typical Size:** 3,251.0

**Scenario Total Cost:** $11,982.09

**Scenario Cost/Unit:** $3.69

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 | $2.36 | 250 | $590.00 |
| Backhoe, 80 HP | 926 | Wheel mounted backhoe excavator with horsepower range of 60 to 90. Equipment and power unit costs. Labor not included. | Hour | $56.05 | 8 | $448.40 |
| 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 | 13 | $309.27 |
| **Labor** | | | | | | |
| Skilled Labor | 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 | $41.76 | 16 | $668.16 |
| 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 | $25.31 | 48 | $1,214.88 |
| Equipment Operators, Light | 232 | Includes: Skid Steer Loaders, Hydraulic Excavators <50 HP, Trenchers <12", Ag Equipment <150 HP, Pickup Trucks, Forklifts, Mulchers | Hour | $25.23 | 12 | $302.76 |
| **Materials** | | | | | | |
| Pipe, HDPE, smooth wall, weight priced | 1379 | High Density Polyethylene (HDPE) compound manufactured into smooth wall pipe. Materials only. | Pound | $2.18 | 3576 | $7,795.68 |
| **Mobilization** | | | | | | |
| Mobilization, very small equipment | 1137 | Equipment that is small enough to be transported by a pick-up truck with typical weights less than 3,500 pounds. Can be multiple pieces of equipment if all hauled simultaneously. | Each | $70.64 | 2 | $141.28 |
| Mobilization, medium equipment | 1139 | Equipment with 70-150 HP or typical weights between 14,000 and 30,000 pounds. | Each | $255.83 | 2 | $511.66 |

**Practice:** 430 - Irrigation Pipeline

**Scenario** #6 - HDPE (Iron Pipe Size & Tubing) 10in or more diameter

**Scenario Description:**

Description: Below ground installation of HDPE (Iron Pipe Size & Tubing) pipeline. HDPE (IPS & Tubing) is manufactured in sizes (nominal diameter) from ½-inch to 24-inch; typical practice sizes range from 2-inch to 24-inch; and typical scenario size is 12-inch. Construct 1,000 feet of 12-inch, Class 130 (SDR-13.5), HDPE pipeline with appurtenances, installed below ground with a minimum 2 feet of ground cover. The unit is weight of pipe material in pounds. 1,000 feet of 12-inch, Class 130 (SDR-13.5), HDPE weighs 14.89 lb/ft, or a total of 14,890 pounds. Appurtenances include: fittings, air vents, pressure relief valves, thrust blocks, risers, and inline valves, and are included in the cost of pipe material (additional 10% of pipe material quantity). Cost of appurtenances does not include flow meters or backflow preventers. Typical installation applies to soils with no special bedding requirements. Resource Concerns: Inefficient Use of Irrigation Water; Inefficient Energy Use. Associated Practices: 436 - Irrigation Reservoir; 441 - Irrigation System, Microirrigation; 442 - Irrigation System, Sprinkler; 443 - Irrigation System, Surface & Subsurface; 447 - Irrigation System, Tailwater Recovery; 533 - Pumping Plant; 634 - Waste Transfer.

**Before Situation:**

Pipeline needed to replace or supplement inefficient irrigation conveyance systems.

**After Situation:**

1,000 LF of 12" Diam HDPE 130 psi pipeline installed to convey and/or distribute water to irrigation systems or reservoirs, minimizing non-beneficial water use, reducing soil erosion, and/or reducing energy use.

**Feature Measure:** Weight of Pipe

**Scenario Unit::** Pound

**Scenario Typical Size:** 14,890.0

**Scenario Total Cost:** $40,241.35

**Scenario Cost/Unit:** $2.70

Cost Details:

| Component Name | ID | Description | Unit | Cost | QTY | Total |
|---|---|---|---|---|---|---|
| **Equipment Installation** | | | | | | |
| Excavation, Common Earth, side cast, small equipment | 48 | Bulk excavation and side casting of common earth with hydraulic excavator with less than 1 CY capacity. Includes equipment and labor. | Cubic Yard | $2.36 | 260 | $613.60 |
| Backhoe, 80 HP | 926 | Wheel mounted backhoe excavator with horsepower range of 60 to 90. Equipment and power unit costs. Labor not included. | Hour | $56.05 | 12 | $672.60 |
| 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 | 13 | $309.27 |
| **Labor** | | | | | | |
| Skilled Labor | 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 | $41.76 | 16 | $668.16 |
| 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 | $25.31 | 48 | $1,214.88 |
| Equipment Operators, Light | 232 | Includes: Skid Steer Loaders, Hydraulic Excavators <50 HP, Trenchers <12", Ag Equipment <150 HP, Pickup Trucks, Forklifts, Mulchers | Hour | $25.23 | 16 | $403.68 |
| **Materials** | | | | | | |
| Pipe, HDPE, smooth wall, weight priced | 1379 | High Density Polyethylene (HDPE) compound manufactured into smooth wall pipe. Materials only. | Pound | $2.18 | 16379 | $35,706.22 |
| **Mobilization** | | | | | | |
| Mobilization, very small equipment | 1137 | Equipment that is small enough to be transported by a pick-up truck with typical weights less than 3,500 pounds. Can be multiple pieces of equipment if all hauled simultaneously. | Each | $70.64 | 2 | $141.28 |
| Mobilization, medium equipment | 1139 | Equipment with 70-150 HP or typical weights between 14,000 and 30,000 pounds. | Each | $255.83 | 2 | $511.66 |

**Practice:** 430 - Irrigation Pipeline

**Scenario** #7 - Surface HDPE (Iron Pipe Size & Tubing)

**Scenario Description:**

Description: On-ground surface installation of HDPE (Iron Pipe Size & Tubing) pipeline. HDPE (IPS & Tubing) is manufactured in sizes (nominal diameter) from ½-inch to 24-inch; typical practice sizes range from 2-inch to 24-inch; and typical scenario size is 2-inch. Construct 1,000 ft of 2-inch, Class 200 (SDR-9.0), HDPE pipeline with appurtenances, installed on the ground surface. The unit is weight of pipe material in pounds. 1,000 feet of 2-inch, Class 200 (SDR-9.0), HDPE weighs 0.744 lb/ft, or a total of 744 pounds. Appurtenances include: fittings, air vents, pressure relief valves, anchors, thrust blocks, risers, and inline valves, and are included in the cost of pipe material (additional 15% of pipe material quantity). Cost of appurtenances does not include flow meters or backflow preventers. Typical installation applies to soils with no special bedding requirements. Resource Concerns: Inefficient Use of Irrigation Water; Inefficient Energy Use. Associated Practices: 436 - Irrigation Reservoir; 441 - Irrigation System, Microirrigation; 442 - Irrigation System, Sprinkler; 443 - Irrigation System, Surface & Subsurface; 447 - Irrigation System, Tailwater Recovery; 533 - Pumping Plant; 634 - Waste Transfer.

**Before Situation:**

Pipeline needed to replace or supplement inefficient irrigation conveyance systems.

**After Situation:**

1000 LF of 2" HDPE 200 psi pipeline is installed to convey and/or distribute water to irrigation systems or reservoirs, minimizing non-beneficial water use, reducing soil erosion, and/or reducing energy use.

**Feature Measure:** Weight of Pipe

**Scenario Unit::** Pound

**Scenario Typical Size:** 744.0

**Scenario Total Cost:** $2,555.06

**Scenario Cost/Unit:** $3.43

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 | 6 | $142.74 |
| **Labor** | | | | | | |
| General Labor | 231 | Labor performed using basic tools such as power tool, shovels, and other tools that do not require extensive training. Ex. pipe layer, herder, concrete placement, materials spreader, flagger, etc. | Hour | $25.31 | 16 | $404.96 |
| **Materials** | | | | | | |
| Pipe, HDPE, smooth wall, weight priced | 1379 | High Density Polyethylene (HDPE) compound manufactured into smooth wall pipe. Materials only. | Pound | $2.18 | 856 | $1,866.08 |
| **Mobilization** | | | | | | |
| Mobilization, very small equipment | 1137 | Equipment that is small enough to be transported by a pick-up truck with typical weights less than 3,500 pounds. Can be multiple pieces of equipment if all hauled simultaneously. | Each | $70.64 | 2 | $141.28 |

**Practice:** 430 - Irrigation Pipeline

**Scenario** #8 - Horizontal Boring

**Scenario Description:**

Install an irrigation pipeline under a road using directional drilling or horizontal boring equipment. Boring is done approximately 50" below the road surface. Road is approximately 30' wide and length of boring is 50'. This scenario shall only be used if no other alignment is feasible. The only length of pipeline included is the scenario is for the road crossing. This scenario only pertains to horizontal boring through overburden material, not rock. Typical installation applies to soils with no special bedding requirements. The typical scenario costs include a12" steel carrier pipe, 6" PVC irrigation pipeline, horizontal boring equipment, excavator and misc. labor. Associated Practices: 436 - Irrigation Reservoir; 441 - Irrigation System, Microirrigation; 442 - Irrigation System, Sprinkler; 443 - Irrigation System, Surface & Subsurface; 447 - Irrigation System, Tailwater Recovery; 533 - Pumping Plant; 634 - Waste Transfer.

**Before Situation:**

Pipeline needed to replace or supplement inefficient irrigation conveyance systems.

**After Situation:**

50 LF of 6" PVC irrigation pipeline will be installed with a carrier pipe to convey and/or distribute water to irrigation systems or reservoirs, minimizing non-beneficial water use, reducing soil erosion, and/or reducing energy use.

**Feature Measure:** Foot of Pipe

**Scenario Unit::** Foot

**Scenario Typical Size:** 50.0

**Scenario Total Cost:** $7,630.26

**Scenario Cost/Unit:** $152.61

Cost Details:

| Component Name | ID | Description | Unit | Cost | QTY | Total |
|---|---|---|---|---|---|---|
| **Equipment Installation** | | | | | | |
| Horizontal Boring, Greater Than 3" diameter | 1132 | Includes equipment, labor and setup. | Foot | $85.82 | 50 | $4,291.00 |
| **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 | $25.31 | 8 | $202.48 |
| **Materials** | | | | | | |
| Pipe, PVC, 6", SDR 26 | 990 | Materials: - 6" - PVC - SDR 26 160 psi - ASTM D2241 | Foot | $5.94 | 50 | $297.00 |
| 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 | $0.87 | 2676 | $2,328.12 |
| **Mobilization** | | | | | | |
| Mobilization, medium equipment | 1139 | Equipment with 70-150 HP or typical weights between 14,000 and 30,000 pounds. | Each | $255.83 | 2 | $511.66 |

**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:** 4,500.0

**Scenario Total Cost:** $25,394.74

**Scenario Cost/Unit:** $5.64

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 | $4.45 | 4500 | $20,025.00 |
| **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 | $25.31 | 16 | $404.96 |
| 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 | $45.69 | 8 | $365.52 |
| **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 | $6.76 | 36 | $243.36 |
| 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 | $12.76 | 120 | $1,531.20 |
| 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 | $255.83 | 2 | $511.66 |
| Mobilization, large equipment | 1140 | Equipment >150HP or typical weights greater than 30,000 pounds or loads requiring over width or over length permits. | Each | $488.45 | 2 | $976.90 |

**Practice:** 436 - Irrigation Reservoir

**Scenario** #2 - Embankment Reservoir under 30 Acre-Feet

**Scenario Description:**

This is a small rectangular embankment reservoir with a 10" diameter principal spillway through the embankment controlled by a canal-type gate. It is designed to accumulate, store, and deliver water by gravity to an open ditch or non-pressurized pipeline, in excess of 5 cfs. It will have an inside dimension of about 375 feet square, with 12 feet of fill and about 1600 feet total length of embankment (along the centerline). The embankment top will be 10 feet wide and the side slopes will no steeper than 2.5 H to 1 V inside and out. It will be built with approximately 28,500 cubic yards of on-site material. It will have a maximum water depth of 10 feet with 2 feet of freeboard and no auxiliary spillway. Volume is approximately 30 ac-ft (10,000,000 gallons). Resource Concern: Insufficient Water - Inefficient use of irrigation water. Associated Practices: 521 - Pond Sealing or Lining (various); 320 - Irrigation Canal or Lateral; 430 - Irrigation Pipeline; 428 - Irrigation Ditch Lining; 533 - Pumping Plant; 440 series - Irrigation Systems; 447 - Irrigation System, Tailwater Recovery; 378 - Pond; 484 - Mulching; and 342 - Critical Area Planting.

**Before Situation:**

Current system relies on an intermittent or low-flow rate water source. This results in untimely and/or inefficient water application.

**After Situation:**

The square reservoir will be built on a relatively flat site and be used to accumulate and store water for timely application through an irrigation system. The water source could be a stream, an irrigation well, or an irrigation district canal.

**Feature Measure:** Volume of Compacted Earthfill

**Scenario Unit::** Cubic Yard

**Scenario Typical Size:** 28,500.0

**Scenario Total Cost:** $131,543.41

**Scenario Cost/Unit:** $4.62

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 | $4.45 | 28500 | $126,825.00 |
| **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 | $25.31 | 16 | $404.96 |
| 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 | $45.69 | 8 | $365.52 |
| **Materials** | | | | | | |
| 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 | $6.00 | 100 | $600.00 |
| Screw gate, cast iron, 10" diameter, 10/0 head | 1916 | 10" diameter cast iron screw (canal) gate rated at 10 seating head 0 feet unseating head. Materials only. | Each | $726.17 | 1 | $726.17 |
| Catwalk, metal | 1918 | Metal pedestrian walk way giving access to the valve on a structure, typically 3' wide with railing. Materials only. | Foot | $56.66 | 20 | $1,133.20 |
| **Mobilization** | | | | | | |
| Mobilization, medium equipment | 1139 | Equipment with 70-150 HP or typical weights between 14,000 and 30,000 pounds. | Each | $255.83 | 2 | $511.66 |
| Mobilization, large equipment | 1140 | Equipment >150HP or typical weights greater than 30,000 pounds or loads requiring over width or over length permits. | Each | $488.45 | 2 | $976.90 |

**Practice:** 436 - Irrigation Reservoir

**Scenario** #3 - Embankment Reservoir over 30 Acre-Feet

**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:** 104,200.0

**Scenario Total Cost:** $483,513.52

**Scenario Cost/Unit:** $4.64

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 | $4.45 | 104200 | $463,690.00 |
| **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 | $25.31 | 16 | $404.96 |
| 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 | $45.69 | 16 | $731.04 |
| **Materials** | | | | | | |
| Pipe, Steel, 18", Std Wt | 1366 | Materials: - 18" - Steel Std Wt | Foot | $130.77 | 100 | $13,077.00 |
| 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 | $56.66 | 50 | $2,833.00 |
| **Mobilization** | | | | | | |
| Mobilization, medium equipment | 1139 | Equipment with 70-150 HP or typical weights between 14,000 and 30,000 pounds. | Each | $255.83 | 1 | $255.83 |
| Mobilization, large equipment | 1140 | Equipment >150HP or typical weights greater than 30,000 pounds or loads requiring over width or over length permits. | Each | $488.45 | 3 | $1,465.35 |

**Practice:** 436 - Irrigation Reservoir

**Scenario** #4 - 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:** 20,000.0

**Scenario Total Cost:** $30,284.53

**Scenario Cost/Unit:** $1.51

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 | $44.60 | 10 | $446.00 |
| Plate compactor | 1915 | Manually guided vibratroy plate compactor. Equipment only. | Hour | $5.07 | 16 | $81.12 |
| **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 | $25.31 | 80 | $2,024.80 |
| 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 | $44.37 | 16 | $709.92 |
| 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 | $45.69 | 40 | $1,827.60 |
| **Materials** | | | | | | |
| Aggregate, Sand, Graded, Washed | 45 | Sand, typical ASTM C33 gradation, includes materials, equipment and labor to transport and place | Cubic Yard | $34.29 | 8 | $274.32 |
| Aggregate, Gravel, Ungraded, Quarry Run | 1099 | Includes materials, equipment and labor | Cubic Yard | $23.96 | 12 | $287.52 |
| 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 | $70.64 | 2 | $141.28 |
| Mobilization, medium equipment | 1139 | Equipment with 70-150 HP or typical weights between 14,000 and 30,000 pounds. | Each | $255.83 | 2 | $511.66 |

**Practice:** 436 - Irrigation Reservoir

**Scenario** #5 - Plastic Tank

**Scenario Description:**

A 3,000 Gallon, above-ground, High Density Polyethylene plastic enclosed tank, is installed on 6" of well-compacted drain rock or a 4" thick reinforced concrete support pad, to store water from a reliable source for irrigation of an area less than one acre. The scenario assumes the typical dimensions of the tank are 102" in diameter and 93" tall. The scenario also assumes a 126" diameter gravel base or concrete pad to extend a minimum of 12" past the base of tank for adequate foundation support. This cost estimate scenario is for cost of the tank and pad only and does not include estimate for pumps, pipe, or connecting fittings. Resource Concern: Insufficient Water - Inefficient use of irrigation water. Associated Practices: 430 - Irrigation Pipeline; 441 - Irrigation System, Microirrigation; 442 - Irrigation System, Sprinkler; 533 - Pumping Plant; 447 - Irrigation System, Tailwater Recovery.

**Before Situation:**

Insufficient volume of water to complete an irrigation cycle at the required flow rate.

**After Situation:**

An above-ground plastic tank, constructed to withstand the elements, is used to accumulate and store water between irrigation cycles for a very small irrigation system. This allows for an improved flow rate and timing of water application. Sources of water could be a well, a domestic water system, a large roof area, a water ram , or a pump drawing water from a stream.

**Feature Measure:** Volume of Tank Storage

**Scenario Unit::** Gallon

**Scenario Typical Size:** 3,000.0

**Scenario Total Cost:** $5,585.92

**Scenario Cost/Unit:** $1.86

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 | $44.60 | 6 | $267.60 |
| Plate compactor | 1915 | Manually guided vibratroy plate compactor. Equipment only. | Hour | $5.07 | 4 | $20.28 |
| **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 | $25.31 | 32 | $809.92 |
| 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 | $44.37 | 6 | $266.22 |
| Supervisor or Manager | 234 | Labor involving supervision or management activities. Includes crew supervisors, foremen and farm/ranch managers time required for adopting new technology, etc. | Hour | $45.69 | 16 | $731.04 |
| **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 | $23.96 | 2 | $47.92 |
| **Mobilization** | | | | | | |
| Mobilization, very small equipment | 1137 | Equipment that is small enough to be transported by a pick-up truck with typical weights less than 3,500 pounds. Can be multiple pieces of equipment if all hauled simultaneously. | Each | $70.64 | 2 | $141.28 |
| Mobilization, medium equipment | 1139 | Equipment with 70-150 HP or typical weights between 14,000 and 30,000 pounds. | Each | $255.83 | 2 | $511.66 |

**Practice:** 436 - Irrigation Reservoir

**Scenario** #6 - Plastic Tank Buried

**Scenario Description:**

A 3,000 Gallon, High Density Polyethylene plastic enclosed tank, is buried with a gravel base and 2' of cover, to store water from a reliable source for greenhouse irrigation of an area less than one acre. The tank is buried to prevent freezing if water is needed in the winter when seedling are started. The scenario assumes the typical dimensions of the tank are 102" in diameter and 93" tall. The scenario also assumes a 126" diameter gravel base to extend a minimum of 12" past the base of tank for adequate foundation support. This cost estimate scenario is for cost of the tank, gravel base, excavation and backfill only and does not include estimate for pumps, pipe, or connecting fittings. Resource Concern: Insufficient Water - Inefficient use of irrigation water. Associated Practices: 430 - Irrigation Pipeline; 441 - Irrigation System, Microirrigation; 442 - Irrigation System, Sprinkler; 533 - Pumping Plant; 447 - Irrigation System, Tailwater Recovery.

**Before Situation:**

Insufficient volume of water to complete an irrigation cycle at the required flow rate.

**After Situation:**

A buried plastic tank is used to accumulate and store water between irrigation cycles for a very small irrigation system. This allows for an improved flow rate and timing of water application. Sources of water could be a well, a domestic water system, a large roof area, a water ram , or a pump drawing water from a stream.

**Feature Measure:** Volume of Tank Storage

**Scenario Unit::** Gallon

**Scenario Typical Size:** 3,000.0

**Scenario Total Cost:** $6,239.68

**Scenario Cost/Unit:** $2.08

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 | $4.45 | 90 | $400.50 |
| 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 | $3.77 | 120 | $452.40 |
| **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 | $25.31 | 32 | $809.92 |
| 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 | $44.37 | 8 | $354.96 |
| 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 | $45.69 | 16 | $731.04 |
| **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 | $23.96 | 2 | $47.92 |
| **Mobilization** | | | | | | |
| Mobilization, very small equipment | 1137 | Equipment that is small enough to be transported by a pick-up truck with typical weights less than 3,500 pounds. Can be multiple pieces of equipment if all hauled simultaneously. | Each | $70.64 | 2 | $141.28 |
| Mobilization, medium equipment | 1139 | Equipment with 70-150 HP or typical weights between 14,000 and 30,000 pounds. | Each | $255.83 | 2 | $511.66 |

**Practice:** 436 - Irrigation Reservoir

**Scenario** #7 - Fiberglass Tank

**Scenario Description:**

A 10,000 Gallon above ground, enclosed, fiberglass tank, is installed on 6" of well compacted drain rock support pad. The tank is used to store water from a reliable source for irrigation of areas less than 3 acres. The scenario assumes the typical dimensions of the tank are 15 feet in diameter and 8 feet tall. The scenario also assumes a 19 feet diameter gravel base pad to extend a minimum of 2 feet past the base of tank for adequate foundation support. This cost estimate scenario is for cost of the tank and pad only and does not include estimate for pumps, pipe, fittings for the pipeline, or catchment area. Resource Concern: Insufficient Water - Inefficient use of irrigation water. Associated Practices: 430 - Irrigation Pipeline; 441 - Irrigation System, Microirrigation; 442 - Irrigation System, Sprinkler; 533 - Pumping Plant; 447 - Irrigation System, Tailwater Recovery.

**Before Situation:**

Insufficient volume of water to complete an irrigation cycle at the required flow rate.

**After Situation:**

A large fiberglass enclosed tank, capable of withstanding the elements, is used to accumulate and store water between irrigation cycles for a very small irrigation system. This allows for an improved flow rate and timing of water application and better efficiency. Sources of water could be a well, a domestic water system, a very large roof area, a water ram , or a pump drawing water from a stream.

**Feature Measure:** Volume of Tank Storage

**Scenario Unit::** Gallon

**Scenario Typical Size:** 10,000.0

**Scenario Total Cost:** $11,599.56

**Scenario Cost/Unit:** $1.16

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 | $44.60 | 8 | $356.80 |
| Plate compactor | 1915 | Manually guided vibratroy plate compactor. Equipment only. | Hour | $5.07 | 4 | $20.28 |
| **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 | $25.31 | 40 | $1,012.40 |
| 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 | $44.37 | 8 | $354.96 |
| 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 | $45.69 | 24 | $1,096.56 |
| **Materials** | | | | | | |
| Aggregate, Gravel, Ungraded, Quarry Run | 1099 | Includes materials, equipment and labor | Cubic Yard | $23.96 | 6 | $143.76 |
| 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 | $70.64 | 2 | $141.28 |
| Mobilization, medium equipment | 1139 | Equipment with 70-150 HP or typical weights between 14,000 and 30,000 pounds. | Each | $255.83 | 2 | $511.66 |

**Practice:** 436 - Irrigation Reservoir

**Scenario** #8 - Excavated Spread On Site

**Scenario Description:**

A reservoir with top width and lengths of 100'x100', 10ft deep, 1ft freeboard, 2:1 slopes is excavated in a relatively flat site and earthfill is spread on site. It is designed to accumulate, store, deliver or regulate water for a surface irrigation system. Resource concern: Insufficient Water - Inefficient use of irrigation water. Associated Practices: 521 - Pond Sealing or Lining (various); 320 - Irrigation Canal or Lateral; 430 - Irrigation Pipeline; 428 - Irrigation Ditch Lining; 533 - Pumping Plant; 440 series - Irrigation Systems; 447 - Irrigation System, Tailwater Recovery; 378 - Pond; 484 - Mulching; and 342 - Critical Area Planting.

**Before Situation:**

Current system relies on an intermittent or low-flow rate water source. This results in untimely and/or inefficient water application.

**After Situation:**

An excavated reservoir will be built on a relatively flat site and be used to accumulate and store water for timely application through an irrigation system. The water source could be a stream or a spring.

**Feature Measure:** Volume of excavated earth

**Scenario Unit::** Cubic Yard

**Scenario Typical Size:** 2,400.0

**Scenario Total Cost:** $16,836.82

**Scenario Cost/Unit:** $7.02

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 | $194.15 | 24 | $4,659.60 |
| 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 | $3.97 | 2400 | $9,528.00 |
| **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 | $25.31 | 24 | $607.44 |
| 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 | $44.37 | 24 | $1,064.88 |
| **Mobilization** | | | | | | |
| Mobilization, large equipment | 1140 | Equipment >150HP or typical weights greater than 30,000 pounds or loads requiring over width or over length permits. | Each | $488.45 | 2 | $976.90 |

**Practice:** 436 - Irrigation Reservoir

**Scenario** #9 - Excavated Spread Off Site

**Scenario Description:**

A reservoir with top width and lengths of 100'x100', 10ft deep, 1ft freeboard, 2:1 slopes is excavated in a relatively flat site and earthfill is hauled for spreading off site. It is designed to accumulate, store, deliver or regulate water for a surface irrigation system. Resource concern: Insufficient Water - Inefficient use of irrigation water. Associated Practices: 521 - Pond Sealing or Lining (various); 320 - Irrigation Canal or Lateral; 430 - Irrigation Pipeline; 428 - Irrigation Ditch Lining; 533 - Pumping Plant; 440 series - Irrigation Systems; 447 - Irrigation System, Tailwater Recovery; 378 - Pond; 484 - Mulching; and 342 - Critical Area Planting.

**Before Situation:**

Current system relies on an intermittent or low-flow rate water source. This results in untimely and/or inefficient water application.

**After Situation:**

An excavated reservoir will be built on a relatively flat site and be used to accumulate and store water for timely application through an irrigation system. The water source could be a stream or a spring.

**Feature Measure:** Volume of excavated earth

**Scenario Unit::** Cubic Yard

**Scenario Typical Size:** 2,400.0

**Scenario Total Cost:** $20,796.82

**Scenario Cost/Unit:** $8.67

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 | $194.15 | 24 | $4,659.60 |
| 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 | $3.97 | 2400 | $9,528.00 |
| 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 | $0.33 | 12000 | $3,960.00 |
| **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 | $25.31 | 24 | $607.44 |
| 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 | $44.37 | 24 | $1,064.88 |
| **Mobilization** | | | | | | |
| Mobilization, large equipment | 1140 | Equipment >150HP or typical weights greater than 30,000 pounds or loads requiring over width or over length permits. | Each | $488.45 | 2 | $976.90 |

**Practice:** 436 - Irrigation Reservoir

**Scenario** #10 - Tailwater Recovery Greenhouse

**Scenario Description:**

A 1,000 Gallon, High Density Polyethylene plastic enclosed tank, is installed in a greenhouse to recover, store, and re-use tailwater from ebb and flow benches. Typical sizing would be 0.5 gal/SF of bench area. The tank are typically installed below the greenhouse floor. The scenario assumes a typical 1,000 gal tank dimensions of 100" L x 52" X 66" H. Sand gravel mix is assumed for backfill up to 30". This cost estimate scenario is for cost of the tank and pad only and does not include estimate for pumps, pipe, or connecting fittings. Resource Concern: Insufficient Water - Inefficient use of irrigation water. Associated Practices: 430 - Irrigation Pipeline; 441 - Irrigation System, Microirrigation; 442 - Irrigation System, Sprinkler; 533 - Pumping Plant; 447 - Irrigation System, Tailwater Recovery.

**Before Situation:**

Insufficient volume of water to complete an irrigation cycle at the required flow rate.

**After Situation:**

A below ground plastic tank, is used to accumulate and store water between irrigation cycles for a very small irrigation system. This allows for an improved flow rate and timing of water application. Sources of water could be a well, a domestic water system, a large roof area, a water ram , or a pump drawing water from a stream.

**Feature Measure:** Volume of Tank Storage

**Scenario Unit::** Gallon

**Scenario Typical Size:** 1,000.0

**Scenario Total Cost:** $4,567.70

**Scenario Cost/Unit:** $4.57

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 | $44.60 | 8 | $356.80 |
| Plate compactor | 1915 | Manually guided vibratroy plate compactor. Equipment only. | Hour | $5.07 | 4 | $20.28 |
| **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 | $25.31 | 40 | $1,012.40 |
| 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 | $44.37 | 8 | $354.96 |
| 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 | $45.69 | 24 | $1,096.56 |
| **Materials** | | | | | | |
| Tank, Poly Enclosed Storage, >1,000 | 1075 | Water storage tanks. Includes materials and shipping only. | Gallon | $0.93 | 1000 | $930.00 |
| Aggregate, Gravel, Ungraded, Quarry Run | 1099 | Includes materials, equipment and labor | Cubic Yard | $23.96 | 6 | $143.76 |
| **Mobilization** | | | | | | |
| Mobilization, very small equipment | 1137 | Equipment that is small enough to be transported by a pick-up truck with typical weights less than 3,500 pounds. Can be multiple pieces of equipment if all hauled simultaneously. | Each | $70.64 | 2 | $141.28 |
| Mobilization, medium equipment | 1139 | Equipment with 70-150 HP or typical weights between 14,000 and 30,000 pounds. | Each | $255.83 | 2 | $511.66 |

**Practice:** 436 - Irrigation Reservoir

**Scenario** #19 - Excavated Tailwater Pit

**Scenario Description:**

This is an excavated pit with a control structure. It is designed to accumulate, store, deliver or regulate water for a surface irrigation system. It will have a bottom width of 20 ft and length of 1,250 feet. The side slopes will be no steeper than 1.5 H to 1 V inside and out. It will be built with approximately 20,000 cubic yards of on-site material. It will have a maximum water depth of 10 feet with 1 feet of freeboard. Volume is approximately 12 ac-ft (3,950,303 gallons). Resource concern: Insufficient Water - Inefficient use of irrigation water. Associated Practices: 521 - Pond Sealing or Lining (various); 320 - Irrigation Canal or Lateral; 430 - Irrigation Pipeline; 428 - Irrigation Ditch Lining; 533 - Pumping Plant; 440 series - Irrigation Systems; 447 - Irrigation System, Tailwater Recovery; 378 - Pond; 484 - Mulching; and 342 - Critical Area Planting.

**Before Situation:**

Current system relies on an intermittent or low-flow rate water source. This results in untimely and/or inefficient water application.

**After Situation:**

An excavated regulating reservoir will be built on a relatively flat site and be used to accumulate and store water for timely application through an irrigation system. The water source could be a stream or an irrigation district canal.

**Feature Measure:** Volume of Earth Excavated

**Scenario Unit::** Cubic Yard

**Scenario Typical Size:** 19,600.0

**Scenario Total Cost:** $47,488.73

**Scenario Cost/Unit:** $2.42

Cost Details:

| Component Name | ID | Description | Unit | Cost | QTY | Total |
|---|---|---|---|---|---|---|
| **Equipment Installation** | | | | | | |
| Excavation, Common Earth, side cast, small equipment | 48 | Bulk excavation and side casting of common earth with hydraulic excavator with less than 1 CY capacity. Includes equipment and labor. | Cubic Yard | $2.36 | 19600 | $46,256.00 |
| **Mobilization** | | | | | | |
| Mobilization, medium equipment | 1139 | Equipment with 70-150 HP or typical weights between 14,000 and 30,000 pounds. | Each | $255.83 | 1 | $255.83 |
| Mobilization, large equipment | 1140 | Equipment >150HP or typical weights greater than 30,000 pounds or loads requiring over width or over length permits. | Each | $488.45 | 2 | $976.90 |

**Practice:** 441 - Irrigation System, Microirrigation

**Scenario** #1 - SDI (Subsurface Drip Irrigation)

**Scenario Description:**

A subsurface drip irrigation system (SDI) with a lateral spacing between 37-59 inches. This buried drip irrigation system utilizes a thinwall dripperline (drip tube) or durable 10 to 15 mil tape with inline emitters at a uniform spacing for the system laterals. The dripperline or tape is normally installed by being plowed in approx 10-14 inches deep with a chisel shank type plow equipped with tape reels. This type of drip irrigation system utilizes a buried supply manifold with automated zone control valves and a buried flush manifold with manual flush valves. This permanent micro-irrigation system includes an automated filter station, flow meter, backflow prevention device, automated control box or timer, the thinwall dipperline or tape for laterals, both a supply and a flushing manifold and numerous types of water control valves. This is an all-inclusive system starting with the filter station including all required system components out to the flush valves. The water supply line from the water source to the filter station is an irrigation pipeline (430) and is not included as part of this system. Resource Concerns: Insufficient Water - Inefficient use of irrigation water, Degraded Plant Condition - Undesirable plant productivity and health, Water Quality Degradation - Excessive sediment in surface waters, and Inefficient Energy Use - Equipment and facilities. Associated Practices: 533-Pumping Plant, 449- Irrigation Water Management, 430 - Irrigation Pipeline, 610 - Salinity & Sodic Soil Management, 328-Conservation Crop Rotation, and 590 - Nutrient Management.

**Before Situation:**

Typical before irrigation situation would normally be an existing inefficient surface or sprinkler irrigation system on a cropland or hayland field. The existing irrigation system would experience poor, non-uniform irrigation applications and significant water losses affecting both water quantity and water quality

**After Situation:**

A typical practice would be the installation of a subsurface drip irrigation system (SDI) on a 15 acre of permanent crops such as berries. The system lateral (thinwall dripperline or tape) spacing would 6ft. This highly efficient SDI (buried) irrigation system provides irrigation water directly to the plant root zone eliminating application losses resulting in a very high water application efficiency and properly designed these SDI systems are capable of very uniform water applications. Typical field size is 15 acres.

**Feature Measure:** Acres in System

**Scenario Unit::** Acre

**Scenario Typical Size:** 15.0

**Scenario Total Cost:** $25,094.60

**Scenario Cost/Unit:** $1,672.97

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 | $1.38 | 2000 | $2,760.00 |
| Trenching, Pipeline Plowing | 1096 | Includes equipment and labor for plowing small diameter lines in common earth (< 3") | Foot | $1.12 | 820 | $918.40 |
| 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, HDPE, smooth wall, weight priced | 1379 | High Density Polyethylene (HDPE) compound manufactured into smooth wall pipe. Materials only. | Pound | $2.18 | 868 | $1,892.24 |
| 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 |
| Water Meter, Microirrigation, <= 2???, with Volume Totalizer | 2437 | Microirrigation water meter less than or equal to 2 inch diameter, with volume totalizer. Includes materials only. | Each | $286.05 | 1 | $286.05 |
| Micro Irrigation, Media Filter, 12??? to 24??? Dia. tank, Equipped for Auto Flush | 2466 | Sand or media filter for Micro irrigation system. Includes filter, plumbing, connections and automatic controller. Unit is complete and installed. Unit is each Filter in a filter station that normally includes 2 or more filters. | Each | $2,025.62 | 2 | $4,051.24 |
| Micro Irrigation, buried drip tape | 2521 | Tape that is installed underground for sub-surface drip irrigation, includes installation, and connections to the supply and flushing laterals.?? Tape is a minimum of 10 mil thick thick and has emitters built in. Includes labor and installtion. | Foot | $0.10 | 118125 | $11,812.50 |
| 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 | $172.07 | 1 | $172.07 |
| Mobilization, medium equipment | 1139 | Equipment with 70-150 HP or typical weights between 14,000 and 30,000 pounds. | Each | $255.83 | 1 | $255.83 |

**Practice:** 441 - Irrigation System, Microirrigation

**Scenario** #2 - Automated Surface Permanent PE Tube with Media Filter Laterals 9 ft oc

**Scenario Description:**

An permanent automated micro-irrigation system is installed above-ground or on trellis utilizing surface UV resistant PE tubing with integrated emitters to provide irrigation for an orchard, vineyard, or other perennial crop grown in a grid pattern. The typical system is a permanent system installed on a 10 acre orchard. The orchard has a plant spacing of 8 feet x 9 feet. Laterals are spaced 9 feet apart. This system typically includes automatic controls, a media filter system, PE tubing laterals, PVC manifolds, and submains, valves, fittings, emitters, etc. This practice applies to systems designed to discharge < 60 gal/hr at each individual lateral discharge point. Does not include the pumping plant, power source, or water source (well or reservoir). Resource Concerns: Insufficient Water - Inefficient use of irrigation water, Degraded Plant Condition - Undesirable plant productivity and health, Water Quality Degradation - Excessive sediment in surface waters, and Inefficient Energy Use - Equipment and facilities. Associated Practices: 533-Pumping Plant, 449- Irrigation Water Management, 430 - Irrigation Pipeline, 610 - Salinity & Sodic Soil Management, 328-Conservation Crop Rotation, and 590 - Nutrient Management.

**Before Situation:**

An orchard has an inefficient surface irrigation system causing irrigation water loss that impacts water quality and water quantity.

**After Situation:**

An automated surface microirrigation system with media filter with laterals at 9ft o.c. is utilized to provide highly efficient irrigation to an orchard. Water applications are reduced and runoff eliminated. Offsite water quality is improved, and on site water use is reduced.

**Feature Measure:** Acres in System

**Scenario Unit::** Acre

**Scenario Typical Size:** 10.0

**Scenario Total Cost:** $29,699.84

**Scenario Cost/Unit:** $2,969.98

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 | $1.38 | 1500 | $2,070.00 |
| Micro Irrigation, chemical injection equipment | 1987 | Chemical Injector Pump, plus chemigation check valve, injector ports, and appurtenances, Installation included. | Each | $1,470.45 | 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 | $25.31 | 40 | $1,012.40 |
| **Materials** | | | | | | |
| Pipe, HDPE, smooth wall, weight priced | 1379 | High Density Polyethylene (HDPE) compound manufactured into smooth wall pipe. Materials only. | Pound | $2.18 | 650 | $1,417.00 |
| Micro Irrigation, control valves and timers | 1485 | Automatic controller and timer, to turn on and off the sets for micro irrigation, installation and valves. Based on control unit, not number of valves controlled. | Each | $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 | 52640 | $17,897.60 |
| Water Meter, Microirrigation, <= 2???, with Volume Totalizer | 2437 | Microirrigation water meter less than or equal to 2 inch diameter, with volume totalizer. Includes materials only. | Each | $286.05 | 1 | $286.05 |
| Micro Irrigation, Media Filter, 12??? to 24??? Dia. tank, Equipped for Auto Flush | 2466 | Sand or media filter for Micro irrigation system. Includes filter, plumbing, connections and automatic controller. Unit is complete and installed. Unit is each Filter in a filter station that normally includes 2 or more filters. | Each | $2,025.62 | 2 | $4,051.24 |
| **Mobilization** | | | | | | |
| Mobilization, small equipment | 1138 | Equipment <70 HP but can't be transported by a pick-up truck or with typical weights between 3,500 to 14,000 pounds. | Each | $172.07 | 1 | $172.07 |

**Practice:** 441 - Irrigation System, Microirrigation

**Scenario** #3 - Surface Permanent PE tube with Media Filter Laterals 9 ft oc

**Scenario Description:**

An permanent micro-irrigation system is installed utilizing surface UV resistant PE tubing with integrated emitters to provide irrigation for an orchard, vineyard, or other perennial crop. The typical system is a permanent system installed on a 10 acre orchard on the ground surface or attached to a trellis. The orchard has a plant spacing of 8 feet x 9 feet. Laterals are spaced 9 feet apart. This system typically includes manual controls, a media filter system, PE tubing laterals, PVC manifolds, and submains, valves, fittings, emitters, etc. This practice applies to systems designed to discharge < 60 gal/hr at each individual lateral discharge point. Does not include the pumping plant, power source, or water source (well or reservoir). Resource Concerns: Insufficient Water - Inefficient use of irrigation water, Degraded Plant Condition - Undesirable plant productivity and health, Water Quality Degradation - Excessive sediment in surface waters, and Inefficient Energy Use - Equipment and facilities. Associated Practices: 533-Pumping Plant, 449- Irrigation Water Management, 430 - Irrigation Pipeline, 610 - Salinity & Sodic Soil Management, 328-Conservation Crop Rotation, and 590 - Nutrient Management.

**Before Situation:**

An orchard has an inefficient surface irrigation system causing irrigation water loss that impacts water quality and water quantity.

**After Situation:**

A surface microirrigation system with media filter with laterals at 9ft o.c. is utilized to provide highly efficient irrigation to an orchard. Water applications are reduced and runoff eliminated. Offsite water quality is improved, and on site water use is reduced.

**Feature Measure:** Acres in System

**Scenario Unit::** Acre

**Scenario Typical Size:** 10.0

**Scenario Total Cost:** $27,986.81

**Scenario Cost/Unit:** $2,798.68

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 | $1.12 | 1500 | $1,680.00 |
| 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 |
| **Labor** | | | | | | |
| General Labor | 231 | Labor performed using basic tools such as power tool, shovels, and other tools that do not require extensive training. Ex. pipe layer, herder, concrete placement, materials spreader, flagger, etc. | Hour | $25.31 | 40 | $1,012.40 |
| **Materials** | | | | | | |
| Pipe, HDPE, smooth wall, weight priced | 1379 | High Density Polyethylene (HDPE) compound manufactured into smooth wall pipe. Materials only. | Pound | $2.18 | 650 | $1,417.00 |
| Micro Irrigation, surface drip tubing | 1488 | Tubing is installed above ground for surface drip irrigation, includes installation, and connections to the supply and flushing laterals.?? Tubing has emitters built in. | Foot | $0.34 | 52640 | $17,897.60 |
| Water Meter, Microirrigation, <= 2???, with Volume Totalizer | 2437 | Microirrigation water meter less than or equal to 2 inch diameter, with volume totalizer. Includes materials only. | Each | $286.05 | 1 | $286.05 |
| Micro Irrigation, Media Filter, 12??? to 24??? Dia. tank, Equipped for Auto Flush | 2466 | Sand or media filter for Micro irrigation system. Includes filter, plumbing, connections and automatic controller. Unit is complete and installed. Unit is each Filter in a filter station that normally includes 2 or more filters. | Each | $2,025.62 | 2 | $4,051.24 |
| **Mobilization** | | | | | | |
| Mobilization, small equipment | 1138 | Equipment <70 HP but can't be transported by a pick-up truck or with typical weights between 3,500 to 14,000 pounds. | Each | $172.07 | 1 | $172.07 |

**Practice:** 441 - Irrigation System, Microirrigation

**Scenario** #4 - Surface Permanent PE Tube Disk or Screen Filter Laterals 9 ft oc

**Scenario Description:**

An permanent micro-irrigation system is installed utilizing surface UV resistant PE tubing with integrated emitters to provide irrigation for an orchard, vineyard, or other perennial crop. The typical system is a permanent system installed on a 10 acre orchard on the ground surface or attached to a trellis. The orchard has a plant spacing of 8 feet x 9 feet. Laterals are spaced 9 feet apart. This system typically includes manual controls, disk or screen filters, PE tubing laterals, PVC manifolds, and submains, valves, fittings, emitters, etc. This practice applies to systems designed to discharge < 60 gal/hr at each individual lateral discharge point. This scenario assumes a well water source. Does not include the pumping plant, power source, or water source (well or reservoir). Resource Concerns: Insufficient Water - Inefficient use of irrigation water, Degraded Plant Condition - Undesirable plant productivity and health, Water Quality Degradation - Excessive sediment in surface waters, and Inefficient Energy Use - Equipment and facilities. Associated Practices: 533-Pumping Plant, 449- Irrigation Water Management, 430 - Irrigation Pipeline, 610 - Salinity & Sodic Soil Management, 328-Conservation Crop Rotation, and 590 - Nutrient Management.

**Before Situation:**

Ann orchard has an inefficient surface irrigation system causing irrigation water loss that impacts water quality and water quantity.

**After Situation:**

A surface microirrigation system with disk or screen filters with laterals at 9ft o.c. is utilized to provide highly efficient irrigation to an orchard. Water applications are reduced and runoff eliminated. Offsite water quality is improved, and on site water use is reduced.

**Feature Measure:** Acres in System

**Scenario Unit::** Acre

**Scenario Typical Size:** 10.0

**Scenario Total Cost:** $24,609.07

**Scenario Cost/Unit:** $2,460.91

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 | $1.12 | 1500 | $1,680.00 |
| 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 |
| **Labor** | | | | | | |
| General Labor | 231 | Labor performed using basic tools such as power tool, shovels, and other tools that do not require extensive training. Ex. pipe layer, herder, concrete placement, materials spreader, flagger, etc. | Hour | $25.31 | 40 | $1,012.40 |
| **Materials** | | | | | | |
| Pipe, HDPE, smooth wall, weight priced | 1379 | High Density Polyethylene (HDPE) compound manufactured into smooth wall pipe. Materials only. | Pound | $2.18 | 650 | $1,417.00 |
| Micro Irrigation, screen filter, => 100 gpm | 1484 | Screen filter for Micro irrigation system with 100 gpm or greater capacity.?? Includes plumbing, connections and automatic controller.?? Unit is complete and installed. Unit price per filter, not per filter station. | Each | $336.75 | 2 | $673.50 |
| Micro Irrigation, surface drip tubing | 1488 | Tubing is installed above ground for surface drip irrigation, includes installation, and connections to the supply and flushing laterals.?? Tubing has emitters built in. | Foot | $0.34 | 52640 | $17,897.60 |
| Water Meter, Microirrigation, <= 2???, with Volume Totalizer | 2437 | Microirrigation water meter less than or equal to 2 inch diameter, with volume totalizer. Includes materials only. | Each | $286.05 | 1 | $286.05 |
| **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 | $172.07 | 1 | $172.07 |

**Practice:** 441 - Irrigation System, Microirrigation

**Scenario** #5 - Automated Surface Permanent PE Tube with Media Filter Laterals 14 ft oc

**Scenario Description:**

An permanent automated micro-irrigation system is installed utilizing surface UV resistant PE tubing with integrated emitters to provide irrigation for an orchard, vineyard, or other permanent crop. The typical system is installed on a 10 acre orchard on the ground surface or attached to a trellis. The orchard has a plant spacing of 12 feet x 14 feet. Laterals are spaced 14 feet apart. This system typically includes automatic controls, a media filter system, PE tubing laterals, PVC manifolds, and submains, valves, fittings, emitters, etc. This practice applies to systems designed to discharge < 60 gal/hr at each individual lateral discharge point. Does not include the pumping plant, power source, or water source (well or reservoir). Resource Concerns: Insufficient Water - Inefficient use of irrigation water, Degraded Plant Condition - Undesirable plant productivity and health, Water Quality Degradation - Excessive sediment in surface waters, and Inefficient Energy Use - Equipment and facilities. Associated Practices: 533-Pumping Plant, 449- Irrigation Water Management, 430 - Irrigation Pipeline, 610 - Salinity & Sodic Soil Management, 328-Conservation Crop Rotation, and 590-Nutrient Management.

**Before Situation:**

An orchard has an inefficient surface irrigation system causing irrigation water loss that impacts water quality and water quantity.

**After Situation:**

An automated surface microirrigation system with media filter and laterals at 14 ft o.c. is utilized to provide highly efficient irrigation to an orchard. Water applications are reduced and runoff eliminated. Offsite water quality is improved, and on site water use is reduced.

**Feature Measure:** Acres in System

**Scenario Unit::** Acre

**Scenario Typical Size:** 10.0

**Scenario Total Cost:** $22,802.24

**Scenario Cost/Unit:** $2,280.22

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 | $1.12 | 1500 | $1,680.00 |
| 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 |
| **Labor** | | | | | | |
| General Labor | 231 | Labor performed using basic tools such as power tool, shovels, and other tools that do not require extensive training. Ex. pipe layer, herder, concrete placement, materials spreader, flagger, etc. | Hour | $25.31 | 40 | $1,012.40 |
| **Materials** | | | | | | |
| Pipe, HDPE, smooth wall, weight priced | 1379 | High Density Polyethylene (HDPE) compound manufactured into smooth wall pipe. Materials only. | Pound | $2.18 | 650 | $1,417.00 |
| Micro Irrigation, control valves and timers | 1485 | Automatic controller and timer, to turn on and off the sets for micro irrigation, installation and valves. Based on control unit, not number of valves controlled. | Each | $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 | 33500 | $11,390.00 |
| Water Meter, Microirrigation, <= 2???, with Volume Totalizer | 2437 | Microirrigation water meter less than or equal to 2 inch diameter, with volume totalizer. Includes materials only. | Each | $286.05 | 1 | $286.05 |
| Micro Irrigation, Media Filter, 12??? to 24??? Dia. tank, Equipped for Auto Flush | 2466 | Sand or media filter for Micro irrigation system. Includes filter, plumbing, connections and automatic controller. Unit is complete and installed. Unit is each Filter in a filter station that normally includes 2 or more filters. | Each | $2,025.62 | 2 | $4,051.24 |
| **Mobilization** | | | | | | |
| Mobilization, small equipment | 1138 | Equipment <70 HP but can't be transported by a pick-up truck or with typical weights between 3,500 to 14,000 pounds. | Each | $172.07 | 1 | $172.07 |

**Practice:** 441 - Irrigation System, Microirrigation

**Scenario** #6 - Surface Permanent PE Tube with Media Filter Laterals 14 ft oc

**Scenario Description:**

An permanent micro-irrigation system is installed utilizing surface UV resistant PE tubing with integrated emitters to provide irrigation for an orchard, vineyard, or other permanent crop. The typical system is installed on a 10 acre orchard on the ground surface or attached to a trellis. The orchard has a plant spacing of 12 feet x 14 feet. Laterals are spaced 14 feet apart. This system typically includes manual controls, a media filter system, PE tubing laterals, PVC manifolds, and submains, valves, fittings, emitters, etc. This practice applies to systems designed to discharge < 60 gal/hr at each individual lateral discharge point. Does not include the pumping plant, power source, or water source (well or reservoir). Resource Concerns: Insufficient Water - Inefficient use of irrigation water, Degraded Plant Condition - Undesirable plant productivity and health, Water Quality Degradation - Excessive sediment in surface waters, and Inefficient Energy Use - Equipment and facilities. Associated Practices: 533-Pumping Plant, 449- Irrigation Water Management, 430 - Irrigation Pipeline, 610 - Salinity & Sodic Soil Management, 328-Conservation Crop Rotation, and 590-Nutrient Management.

**Before Situation:**

Ann orchard has an inefficient surface irrigation system causing irrigation water loss that impacts water quality and water quantity.

**After Situation:**

A surface microirrigation system with media filter and laterals at 14 ft o.c. is utilized to provide highly efficient irrigation to an orchard. Water applications are reduced and runoff eliminated. Offsite water quality is improved, and on site water use is reduced.

**Feature Measure:** Acres in System

**Scenario Unit::** Acre

**Scenario Typical Size:** 10.0

**Scenario Total Cost:** $21,479.21

**Scenario Cost/Unit:** $2,147.92

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 | $1.12 | 1500 | $1,680.00 |
| 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 |
| **Labor** | | | | | | |
| General Labor | 231 | Labor performed using basic tools such as power tool, shovels, and other tools that do not require extensive training. Ex. pipe layer, herder, concrete placement, materials spreader, flagger, etc. | Hour | $25.31 | 40 | $1,012.40 |
| **Materials** | | | | | | |
| Pipe, HDPE, smooth wall, weight priced | 1379 | High Density Polyethylene (HDPE) compound manufactured into smooth wall pipe. Materials only. | Pound | $2.18 | 650 | $1,417.00 |
| Micro Irrigation, surface drip tubing | 1488 | Tubing is installed above ground for surface drip irrigation, includes installation, and connections to the supply and flushing laterals.?? Tubing has emitters built in. | Foot | $0.34 | 33500 | $11,390.00 |
| Water Meter, Microirrigation, <= 2???, with Volume Totalizer | 2437 | Microirrigation water meter less than or equal to 2 inch diameter, with volume totalizer. Includes materials only. | Each | $286.05 | 1 | $286.05 |
| Micro Irrigation, Media Filter, 12??? to 24??? Dia. tank, Equipped for Auto Flush | 2466 | Sand or media filter for Micro irrigation system. Includes filter, plumbing, connections and automatic controller. Unit is complete and installed. Unit is each Filter in a filter station that normally includes 2 or more filters. | Each | $2,025.62 | 2 | $4,051.24 |
| **Mobilization** | | | | | | |
| Mobilization, small equipment | 1138 | Equipment <70 HP but can't be transported by a pick-up truck or with typical weights between 3,500 to 14,000 pounds. | Each | $172.07 | 1 | $172.07 |

**Practice:** 441 - Irrigation System, Microirrigation

**Scenario** #7 - Surface Permanent PE Tube with Disk or Screen filter laterals 14 ft oc

**Scenario Description:**

An permanent micro-irrigation system is installed utilizing surface UV resistant PE tubing with integrated emitters to provide irrigation for an orchard, vineyard, or other permanent crop. The typical system is installed on a 10 acre orchard on the ground surface or attached to a trellis. The orchard has a plant spacing of 12 feet x 14 feet. Laterals are spaced 14 feet apart. This system typically includes manual controls, a disk or screen filter system, PE tubing laterals, PVC manifolds, and submains, valves, fittings, emitters, etc. This practice applies to systems designed to discharge < 60 gal/hr at each individual lateral discharge point. Does not include the pumping plant, power source, or water source (well or reservoir). Resource Concerns: Insufficient Water - Inefficient use of irrigation water, Degraded Plant Condition - Undesirable plant productivity and health, Water Quality Degradation - Excessive sediment in surface waters, and Inefficient Energy Use - Equipment and facilities. Associated Practices: 533-Pumping Plant, 449- Irrigation Water Management, 430 - Irrigation Pipeline, 610 - Salinity & Sodic Soil Management, 328-Conservation Crop Rotation, and 590-Nutrient Management.

**Before Situation:**

An orchard has an inefficient surface irrigation system causing irrigation water loss that impacts water quality and water quantity.

**After Situation:**

A surface microirrigation system with disk or screen filter and laterals at 14 ft o.c. is utilized to provide highly efficient irrigation to an orchard. Water applications are reduced and runoff eliminated. Offsite water quality is improved, and on site water use is reduced.

**Feature Measure:** Acres in System

**Scenario Unit::** Acre

**Scenario Typical Size:** 10.0

**Scenario Total Cost:** $18,101.47

**Scenario Cost/Unit:** $1,810.15

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 | $1.12 | 1500 | $1,680.00 |
| 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 |
| **Labor** | | | | | | |
| General Labor | 231 | Labor performed using basic tools such as power tool, shovels, and other tools that do not require extensive training. Ex. pipe layer, herder, concrete placement, materials spreader, flagger, etc. | Hour | $25.31 | 40 | $1,012.40 |
| **Materials** | | | | | | |
| Pipe, HDPE, smooth wall, weight priced | 1379 | High Density Polyethylene (HDPE) compound manufactured into smooth wall pipe. Materials only. | Pound | $2.18 | 650 | $1,417.00 |
| Micro Irrigation, screen filter, => 100 gpm | 1484 | Screen filter for Micro irrigation system with 100 gpm or greater capacity.?? Includes plumbing, connections and automatic controller.?? Unit is complete and installed. Unit price per filter, not per filter station. | Each | $336.75 | 2 | $673.50 |
| Micro Irrigation, surface drip tubing | 1488 | Tubing is installed above ground for surface drip irrigation, includes installation, and connections to the supply and flushing laterals.?? Tubing has emitters built in. | Foot | $0.34 | 33500 | $11,390.00 |
| Water Meter, Microirrigation, <= 2???, with Volume Totalizer | 2437 | Microirrigation water meter less than or equal to 2 inch diameter, with volume totalizer. Includes materials only. | Each | $286.05 | 1 | $286.05 |
| **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 | $172.07 | 1 | $172.07 |

**Practice:** 441 - Irrigation System, Microirrigation

**Scenario** #8 - Microjet with Filter

**Scenario Description:**

A micro-irrigation system, utilizing micro-jets to provide irrigation and\or frost protection for an orchard or other specialty crops grown in a grid pattern. The system is installed with all fittings, control valves, pressure reducing/regulating valves, air/vacuum release, disc filters, pressure gauges, submains, lateral lines, and micro-jet sprayers to deliver water to the trees. This practice applies to systems designed to discharge < 60 gal/hr at each individual lateral discharge point. Does not include Pump, Power source, Water source (well or reservoir). The typical installation is a permanent, microjet -irrigation system installed on a 60 acre orchard. Typical tree spacing is 20' x 20' feet. The water supply line from the water source to the zone valves is an irrigation pipeline (430) and is not included as part of this system. Resource Concerns: Insufficient Water - Inefficient use of irrigation water, Degraded Plant Condition - Undesirable plant productivity and health, Water Quality Degradation - Excessive sediment in surface waters, and Inefficient Energy Use - Equipment and facilities. Associated Practices: 533-Pumping Plant, 449- Irrigation Water Management, 430 - Irrigation Pipeline, 610 - Salinity & Sodic Soil Management, 328-Conservation Crop Rotation, and 590-Nutrient Management.

**Before Situation:**

An orchard has an inefficient irrigation system causing irrigation water loss that impacts water quality and water quantity.

**After Situation:**

A micro-spray microirrigation system is utilized to provide highly efficient irrigation to an orchard. Water applications are reduced and runoff eliminated. Offsite water quality is improved, and on site water use is reduced.

**Feature Measure:** Acres in System

**Scenario Unit::** Acre

**Scenario Typical Size:** 60.0

**Scenario Total Cost:** $165,567.57

**Scenario Cost/Unit:** $2,759.46

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 | $1.12 | 3520 | $3,942.40 |
| 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 | $25.31 | 24 | $607.44 |
| **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 | $1.84 | 4800 | $8,832.00 |
| Micro Irrigation, control valves and timers | 1485 | Automatic controller and timer, to turn on and off the sets for micro irrigation, installation and valves. Based on control unit, not number of valves controlled. | Each | $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 |
| Micro Irrigation, Media Filter, 12??? to 24??? Dia. tank, Equipped for Auto Flush | 2466 | Sand or media filter for Micro irrigation system. Includes filter, plumbing, connections and automatic controller. Unit is complete and installed. Unit is each Filter in a filter station that normally includes 2 or more filters. | Each | $2,025.62 | 2 | $4,051.24 |
| Water Meter, Microirrigation, >2" and <= 8", with Volume Totalizer | 2523 | Microirrigation water meter greater than 2" and less than or equal to 8 inch diameter, with volume totalizer. Includes materials only. | Each | $1,420.94 | 1 | $1,420.94 |
| **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 | $172.07 | 1 | $172.07 |

**Practice:** 441 - Irrigation System, Microirrigation

**Scenario** #9 - Surface Tape <5 acres

**Scenario Description:**

A micro-irrigation system using drip tape or similar type micro-irrigation material placed on the soil surface for vegetables or field crops. Spacing of drip tape or similar type micro irrigation material is based on soil type or row alignment but will typically vary from 18" to 36". This system typically includes a filter system, PE manifolds fittings, drip tape, etc. This practice applies to systems designed to discharge < 60 gal/hr at each individual discharge point. Does not include the pumping plant, power source, or water source. Surface placed drip tape will not meet the 441 practice life and will normally need replacement every year. After first installation drip tape will be replaced as operation and maintenance issue as required for proper operation of the system. Resource Concerns: Insufficient Water - Inefficient use of irrigation water, Degraded Plant Condition - Undesirable plant productivity and health, Water Quality Degradation - Excessive sediment in surface waters, and Inefficient Energy Use - Equipment and Facilities. Associated Practices: 533-Pumping Plant, 449-Irrigation Water Management, 430 - Irrigation Pipeline, 610 - Salinity & Sodic Soil Management, 328-Conservation Crop Rotation, 590 Nutrient Management, and 595-Itegrated Pest Management.

**Before Situation:**

A typical before irrigation situation would normally be an existing inefficient sprinkler or surface irrigation system for vegetable or other crop production system. The existing irrigation system would experience poor, nonuniform irrigation applications and significant water losses affecting both water quantity and water quality.

**After Situation:**

A surface placed microirrigation system is utilized to provide highly efficient irrigation to a field. Water applications are reduced and runoff eliminated. Offsite water quality is improved, and on site water use is reduced. Drip tape will be replaced as operation and maintenance issue as required for proper operation of the system. A typical scenario consists of a 1/2 acre irrigated field with lateral spacing of 2 feet.

**Feature Measure:** Acres in System

**Scenario Unit::** Acre

**Scenario Typical Size:** 0.0

**Scenario Total Cost:** $1,524.24

**Scenario Cost/Unit:** #Div/0!

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 | $25.31 | 4 | $101.24 |
| **Materials** | | | | | | |
| Pipe, HDPE, smooth wall, weight priced | 1379 | High Density Polyethylene (HDPE) compound manufactured into smooth wall pipe. Materials only. | Pound | $2.18 | 49 | $106.82 |
| 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 | 11979 | $838.53 |
| 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 | 2 | $305.58 |
| **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 | $172.07 | 1 | $172.07 |

**Practice:** 441 - Irrigation System, Microirrigation

**Scenario** #10 - Surface Tape > or = 5 acres

**Scenario Description:**

A micro-irrigation system using drip tape or similar type micro-irrigation material placed on the soil surface for vegetables or other field crops. Spacing of drip tape similar type micro irrigation material is based on soil type or row alignment but will typically vary from 18" to 36". This system typically includes a filter system, PE manifolds fittings, drip tape, etc. Does not include the pumping plant, power source, or water source. Surface placed drip tape will not meet the 441 practice life and will normally need replacement every year. After first installation drip tape will be replaced as a part of regular operation and maintenance as required for proper operation of the system. Resource Concerns: Insufficient Water - Inefficient use of irrigation water, Degraded Plant Condition - Undesirable plant productivity and health, Water Quality Degradation - Excessive sediment in surface waters, and Inefficient Energy Use - Equipment and Facilities. Associated Practices: 533-Pumping Plant, 449-Irrigation Water Management, 430 - Irrigation Pipeline, 610 - Salinity & Sodic Soil Management, 328-Conservation Crop Rotation, 590 Nutrient Management, and 595-Itegrated Pest Management.

**Before Situation:**

A typical before irrigation situation would include an existing inefficient sprinkler or surface irrigation system used to irrigate vegetables or other crops. The existing irrigation system would supply excessive or inadequate non-uniform irrigation applications with significant water losses affecting both water quantity and water quality.

**After Situation:**

A surface placed microirrigation system is utilized to provide highly efficient irrigation to a field. Crop water requirements are met. Water applications are normally reduced and runoff eliminated. Offsite water quality is improved, and on site water use reduced. Drip tape will be replaced as operation and maintenance issue as required for proper operation of the system. A typical scenario consists of a 20 acre irrigated field with lateral spacing of 2 feet.

**Feature Measure:** Acres in System

**Scenario Unit::** Acre

**Scenario Typical Size:** 20.0

**Scenario Total Cost:** $39,695.15

**Scenario Cost/Unit:** $1,984.76

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 | $1.38 | 1500 | $2,070.00 |
| Micro Irrigation, chemical injection equipment | 1987 | Chemical Injector Pump, plus chemigation check valve, injector ports, and appurtenances, Installation included. | Each | $1,470.45 | 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 | $25.31 | 32 | $809.92 |
| **Materials** | | | | | | |
| Valve, Air Vacuum Release, Manual | 1041 | Materials for <2" Manual Air/Vacuum Relief Valve | Each | $32.73 | 2 | $65.46 |
| Pipe, HDPE, smooth wall, weight priced | 1379 | High Density Polyethylene (HDPE) compound manufactured into smooth wall pipe. Materials only. | Pound | $2.18 | 650 | $1,417.00 |
| Micro Irrigation, control valves and timers | 1485 | Automatic controller and timer, to turn on and off the sets for micro irrigation, installation and valves. Based on control unit, not number of valves controlled. | Each | $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, <= 2???, 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, 12??? to 24??? Dia. tank, Equipped for Auto Flush | 2466 | Sand or media filter for Micro irrigation system. Includes filter, plumbing, connections and automatic controller. Unit is complete and installed. Unit is each Filter in a filter station that normally includes 2 or more filters. | Each | $2,025.62 | 2 | $4,051.24 |
| 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 | 348480 | $24,393.60 |
| Micro Irrigation, screen or disc filter, < 3" | 2524 | Micro Irrigation, small manual flush screen or disc filter, <3 inch nominal size. Includes materials only. | Each | $152.79 | 2 | $305.58 |
| **Mobilization** | | | | | | |
| Mobilization, medium equipment | 1139 | Equipment with 70-150 HP or typical weights between 14,000 and 30,000 pounds. | Each | $255.83 | 1 | $255.83 |

**Practice:** 441 - Irrigation System, Microirrigation

**Scenario** #11 - Multiple Outlet Drip

**Scenario Description:**

A micro-irrigation system is installed in a commercial greenhouse or nursery. The system is installed with all fittings, control valves, pressure reducing/regulating valves, air/vacuum release, screen filter, pressure gauges, submain, lateral lines, and emitters to deliver water to potted plants or in-ground crops. Multiple outlet drip (MOD) emitters or micro sprays are used. Associated Practices: Irrigation Pipeline (430), Irrigation Water Management (449)

**Before Situation:**

Crops in a 5,000 SF greenhouse have an inefficient irrigation system causing irrigation water loss. A surface water source is available.

**After Situation:**

A micro-spray or multiple outlet drip microirrigation system is utilized to provide highly efficient irrigation to a greenhouse. Water applications are reduced and runoff eliminated. Offsite water quality is improved, and on site water use is reduced.

**Feature Measure:** Sq Ft in Green House system.

**Scenario Unit::** Square Foot

**Scenario Typical Size:** 5,000.0

**Scenario Total Cost:** $2,226.95

**Scenario Cost/Unit:** $0.45

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 | $1.12 | 500 | $560.00 |
| **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 | $25.31 | 12 | $303.72 |
| **Materials** | | | | | | |
| Pipe, HDPE, smooth wall, weight priced | 1379 | High Density Polyethylene (HDPE) compound manufactured into smooth wall pipe. Materials only. | Pound | $2.18 | 131 | $285.58 |
| 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 | 5000 | $600.00 |
| Micro Irrigation, screen or disc filter, < 3" | 2524 | Micro Irrigation, small manual flush screen or disc filter, <3 inch nominal size. Includes materials only. | Each | $152.79 | 2 | $305.58 |
| **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 | $172.07 | 1 | $172.07 |

**Practice:** 441 - Irrigation System, Microirrigation

**Scenario** #12 - Hoop House Surface Microirrigation

**Scenario Description:**

Surface Microirrigation system for 30' x 96' seasonal high tunnel, 24" rows with emitters on a 12" spacing. Resource Concerns: Insufficient Water - Inefficient use of irrigation water, Degraded Plant Condition - Undesirable plant productivity and health, Water Quality Degradation - Excessive sediment in surface waters, and Inefficient Energy Use - Equipment and facilities. Associated Practices: 533-Pumping Plant, 449- Irrigation Water Management, 430 - Irrigation Pipeline, 328-Conservation Crop Rotation, and 590 Nutrient Management.

**Before Situation:**

A field has an inefficient garden-hose based sprinkler irrigation system causing irrigation water loss that impacts water quality and water quantity.

**After Situation:**

A surface placed microirrigation system is utilized to provide highly efficient irrigation to an area. Water applications are reduced and runoff eliminated. Offsite water quality is improved, and on site water use is reduced.

**Feature Measure:** Microirrigation area

**Scenario Unit::** Square Foot

**Scenario Typical Size:** 2,880.0

**Scenario Total Cost:** $599.63

**Scenario Cost/Unit:** $0.21

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 | $25.31 | 4 | $101.24 |
| **Materials** | | | | | | |
| Micro Irrigation, drip irrigation system, small scale | 2170 | An above ground, small scale, micro-irrigation system. Includes miniature emitters, tubes, or applicators placed along a water delivery line. Includes materials and shipping only. | Square Foot | $0.12 | 2880 | $345.60 |
| Micro Irrigation, screen or disc filter, < 3" | 2524 | Micro Irrigation, small manual flush screen or disc filter, <3 inch nominal size. Includes materials only. | Each | $152.79 | 1 | $152.79 |

**Practice:** 442 - Sprinkler System

**Scenario** #1 - Center Pivot System < or =1000 LF

**Scenario Description:**

Installation of a low pressure center pivot system with flow meter. 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 35 acre field is irrigated with a high flow sprinkler system. Application of irrigation water is inefficient and non-uniform. Irrigation water is typically over applied in some parts of the field, and under applied in others. Deep percolation from the excess irrigation delivers excess nutrients salts, and chemicals to the ground water. Runoff from the field contains excess nutrients and degrades the receiving waters. Irrigated induced erosion is excessive.

**After Situation:**

The existing surface irrigation system is converted to a low pressure center pivot. Corners are converted to non-irrigated cropland. The pivot is 700 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:** 700.0

**Scenario Total Cost:** $60,124.59

**Scenario Cost/Unit:** $85.89

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 | 700 | $49,378.00 |
| 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 |
| **Mobilization** | | | | | | |
| Mobilization, very small equipment | 1137 | Equipment that is small enough to be transported by a pick-up truck with typical weights less than 3,500 pounds. Can be multiple pieces of equipment if all hauled simultaneously. | Each | $70.64 | 2 | $141.28 |
| Mobilization, medium equipment | 1139 | Equipment with 70-150 HP or typical weights between 14,000 and 30,000 pounds. | Each | $255.83 | 2 | $511.66 |

**Practice:** 442 - Sprinkler System

**Scenario** #2 - Center Pivot System > 1000 LF

**Scenario Description:**

Installation of a low pressure center pivot system with flow meter. 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 irrigated with a high flow sprinkler system. Application of irrigation water is inefficient and non-uniform. Irrigation water is typically over applied in some parts of the field, and under applied in others. Deep percolation from the excess irrigation delivers excess nutrients salts, and chemicals to the ground water. Runoff from the field contains excess nutrients and degrades the receiving waters. Irrigated induced erosion is excessive.

**After Situation:**

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:** 1,300.0

**Scenario Total Cost:** $102,448.59

**Scenario Cost/Unit:** $78.81

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 |
| 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 | $70.64 | 2 | $141.28 |
| Mobilization, medium equipment | 1139 | Equipment with 70-150 HP or typical weights between 14,000 and 30,000 pounds. | Each | $255.83 | 2 | $511.66 |

**Practice:** 442 - Sprinkler System

**Scenario** #3 - Lateral Move System > 1000 LF

**Scenario Description:**

Installation of a linear or lateral move sprinkler system with flow meter and with sprinklers on drops with or without drag hoses to improve irrigation efficiency and reduce soil erosion. Resource concerns include: Soil Erosion (Concentrated flow erosion e.g. irrigation induced), Insufficient Water (Inefficient use of irrigation water), Water Quality Degradation (Excess nutrients in surface and ground waters, Excessive salts in surface and ground waters, Excess pathogens and chemicals from manure, bio-solids or compost applications), Inefficient Energy Use (Equipment and facilities e.g. pumping) Associated Practices: Irrigation Pipeline (430), Pumping Plant (533), Irrigation Water Management (449) Payment rate is figured per foot of installed hardware length.

**Before Situation:**

A 76 acre field is irrigated with a high flow sprinkler system. Application of irrigation water is inefficient and non-uniform. Irrigation water is typically over applied in some parts of the field, and under applied in others. Deep percolation from the excess irrigation delivers excess nutrients salts, and chemicals to the ground water. Runoff from the field contains excess nutrients and degrades the receiving waters. Irrigated induced erosion is excessive.

**After Situation:**

A typical unit is approximately 76 acres in size with the sprinkler system up to 1280 feet in length with drop tubes that have a minimum of 30" spacing. The new irrigation system has a coefficient of uniformity above 85%. Irrigation water is efficiently and uniformly applied to maintain adequate soil water for the desired level of plant growth. Deep percolation and field runoff is eliminated and there are no excess nutrients, salts or pathogens delivered to the receiving waters. Irrigation induced runoff is eliminated.

**Feature Measure:** Length of Linear Move Lateral

**Scenario Unit::** Foot

**Scenario Typical Size:** 1,280.0

**Scenario Total Cost:** $141,586.10

**Scenario Cost/Unit:** $110.61

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 |
| Irrigation, Lateral Move Pivot, Fixed Cost Portion | 2448 | Fixed cost portion of a lateral move pivot system with appurtenances. This portion includes all sprinkers, installation, pipe, tower. | Each | $1.06 | 1 | $1.06 |
| Irrigation, Lateral Move Pivot, Variable Cost Portion | 2449 | Variable cost portion of lateral move pivot system with appurtenances. This portion includes all sprinkers, installation, pipe, tower. | Foot | $114.40 | 1200 | $137,280.00 |
| **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 | $70.64 | 2 | $141.28 |
| Mobilization, medium equipment | 1139 | Equipment with 70-150 HP or typical weights between 14,000 and 30,000 pounds. | Each | $255.83 | 2 | $511.66 |

**Practice:** 442 - Sprinkler System

**Scenario** #4 - Lateral Move System < or = 1000 LF

**Scenario Description:**

Installation of a linear or lateral move sprinkler system with flow meter and with sprinklers on drops with or without drag hoses to improve irrigation efficiency and reduce soil erosion. Resource concerns include: Soil Erosion (Concentrated flow erosion e.g. irrigation induced), Insufficient Water (Inefficient use of irrigation water), Water Quality Degradation (Excess nutrients in surface and ground waters, Excessive salts in surface and ground waters, Excess pathogens and chemicals from manure, bio-solids or compost applications), Inefficient Energy Use (Equipment and facilities e.g. pumping) Associated Practices: Irrigation Pipeline (430), Pumping Plant (533), Irrigation Water Management (449) Payment rate is figured per foot of installed hardware length.

**Before Situation:**

A 30 acre field is irrigated with a high flow sprinkler system. Application of irrigation water is inefficient and non-uniform. Irrigation water is typically over applied in some parts of the field, and under applied in others. Deep percolation from the excess irrigation delivers excess nutrients salts, and chemicals to the ground water. Runoff from the field contains excess nutrients and degrades the receiving waters. Irrigated induced erosion is excessive.

**After Situation:**

A typical unit is approximately 30 acres in size with the sprinkler system up to 500 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:** 500.0

**Scenario Total Cost:** $61,506.10

**Scenario Cost/Unit:** $123.01

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 |
| Irrigation, Lateral Move Pivot, Fixed Cost Portion | 2448 | Fixed cost portion of a lateral move pivot system with appurtenances. This portion includes all sprinkers, installation, pipe, tower. | Each | $1.06 | 1 | $1.06 |
| Irrigation, Lateral Move Pivot, Variable Cost Portion | 2449 | Variable cost portion of lateral move pivot system with appurtenances. This portion includes all sprinkers, installation, pipe, tower. | Foot | $114.40 | 500 | $57,200.00 |
| **Mobilization** | | | | | | |
| Mobilization, very small equipment | 1137 | Equipment that is small enough to be transported by a pick-up truck with typical weights less than 3,500 pounds. Can be multiple pieces of equipment if all hauled simultaneously. | Each | $70.64 | 2 | $141.28 |
| Mobilization, medium equipment | 1139 | Equipment with 70-150 HP or typical weights between 14,000 and 30,000 pounds. | Each | $255.83 | 2 | $511.66 |

**Practice:** 442 - Sprinkler System

**Scenario** #5 - 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:** 1,280.0

**Scenario Total Cost:** $21,900.28

**Scenario Cost/Unit:** $17.11

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 | $172.07 | 2 | $344.14 |

**Practice:** 442 - Sprinkler System

**Scenario** #6 - Solid Set System

**Scenario Description:**

A solid set irrigation system. Resource concerns include: Soil Erosion (Concentrated flow erosion e.g. irrigation induced), Insufficient Water (Inefficient use of irrigation water), Water Quality Degradation (Excess nutrients in surface and ground waters, Excessive salts in surface and ground waters, Excess pathogens and chemicals from manure, bio-solids or compost applications) Associated Practices: Irrigation Pipeline (430), Pumping Plant (533), Irrigation Water Management (449)

**Before Situation:**

The typical installation will be on cropland with some existing inefficient irrigation. The farm is typically producing specialty crops, such as fresh vegetables.

**After Situation:**

The typical system is installed on 4 acres. The installed solid set system has 1-6 inch pipe sizes and sprinklers set 30 - 50 ft apart. Improved distribution uniformity and irrigation efficiency will result.

**Feature Measure:** Area of Irrigation System

**Scenario Unit::** Acre

**Scenario Typical Size:** 4.0

**Scenario Total Cost:** $19,307.96

**Scenario Cost/Unit:** $4,826.99

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 | 4 | $19,166.68 |
| **Mobilization** | | | | | | |
| Mobilization, very small equipment | 1137 | Equipment that is small enough to be transported by a pick-up truck with typical weights less than 3,500 pounds. Can be multiple pieces of equipment if all hauled simultaneously. | Each | $70.64 | 2 | $141.28 |

**Practice:** 442 - Sprinkler System

**Scenario** #7 - Traveling Gun System, < 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 5 acres. The irrigation system is installed with all necessary appurtenances. Resource concerns: Soil Erosion (Concentrated flow erosion, e.g. overflowing waste storage) and Water Quality Degradation (Excess nutrients in surface and ground waters, Excessive salts in surface and ground waters, Excess pathogens and chemicals from liquid manure) Associated Practices: Irrigation Pipeline (430), Pumping Plant (533), Irrigation Water Management (449), Conservation Crop Rotation (328), Cover Crop (340), Nutrient Management (590), Waste Utilization (633), Manure Transfer (634)

**Before Situation:**

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

**After Situation:**

A small traveling gun irrigation system is installed to irrigate 5 acres based on the determined spacing needs. Irrigation is applied efficiently and uniformly to maintain adequate soil water for plant growth without causing excessive water loss, erosion, or water quality degradation The irrigation system is installed with all necessary appurtenances.

**Feature Measure:** Number of Traveling Gun Systems

**Scenario Unit::** Each

**Scenario Typical Size:** 1.0

**Scenario Total Cost:** $17,918.58

**Scenario Cost/Unit:** $17,918.58

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 | $11,945.72 | 1.5 | $17,918.58 |

**Practice:** 442 - Sprinkler System

**Scenario** #8 - Traveling Gun System, 2 inch to 3 inch Hose

**Scenario Description:**

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

**Before Situation:**

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

**After Situation:**

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

**Feature Measure:** Number of Traveling Gun Systems

**Scenario Unit::** Each

**Scenario Typical Size:** 1.0

**Scenario Total Cost:** $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** #9 - Traveling Gun System, > 3 inch Hose

**Scenario Description:**

A portable big gun system used to apply waste water from animal feeding operations. This traveling big gun unit includes a sprinkler, towable cart, 1200’ or more of PE hard hose, a self propelled reel that moves the sprinkler toward the reel during operation. The reel attaches to a mainline with appropriately designed towpath width. The scenario describes an irrigation system that is typical to confined animal feeding operations. Resource concerns: Soil Erosion (Concentrated flow erosion, e.g. overflowing waste storage) and Water Quality Degradation (Excess nutrients in surface and ground waters, Excessive salts in surface and ground waters, Excess pathogens and chemicals from liquid manure) Associated Practices: Irrigation Pipeline (430), Pumping Plant (533), Irrigation Water Management (449), Conservation Crop Rotation (328), Cover Crop (340), Nutrient Management (590), Waste Utilization (633), Manure Transfer (634)

**Before Situation:**

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

**After Situation:**

The big gun applies animal manure in an appropriate quantity and location that eliminates both runoff of the manure and deep percolation of excess nutrients, salts, and pathogens. The big gun system is typically located on 50 acres or less of hay/pasture land, or 100 acres or less of cropland. The system includes a large irrigation gun with 1” to 1½” orifice mounted onto a movable cart. 1200’ or more flexible 4” PE pipe is attached to the cart on one end and a large reel on the other end. The reel serves as storage are for the pipe as the cart moves back to the reel. The reel is turned by a small engine which gradually pulls the flexible pipe and cart back to the reel/base.

**Feature Measure:** Number of Traveling Gun Systems

**Scenario Unit::** Each

**Scenario Typical Size:** 1.0

**Scenario Total Cost:** $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** #10 - Pod System

**Scenario Description:**

A portable irrigation system consisting of Polyethylene (PE) pipe and pods that have attached sprinklers. This scenario addresses installation of all pod style irrigation sprinkler systems. Resource concerns include: Soil Erosion (Concentrated flow erosion e.g. irrigation induced), Insufficient Water (Inefficient use of irrigation water), Water Quality Degradation (Excess nutrients in surface and ground waters, Excessive salts in surface and ground waters, Excess pathogens and chemicals from manure, bio-solids or compost applications) Associated Practices: Irrigation Pipeline (430), Pumping Plant (533), Irrigation Water Management (449)

**Before Situation:**

Pastureland is flood irrigated and has poor irrigation efficiency and distribution uniformity. The slope and irregular shape of the field limit the potential for improved management to improve the irrigation efficiency or the distribution uniformity. Irrigation water moves both within the field and off it, resulting in wet areas, runoff and deep percolation. Runoff from the field flows into streams, water courses, and other water bodies. Excess applied irrigation water infiltrates into ground water causing degradation to the receiving waters.

**After Situation:**

A 10 acre irrigated pasture with a medium pressure irrigation system consisting of sprinkler pods along a PE line is installed. The pods and PE line are placed in different sections of the pasture by dragging both with a four wheeler. The PE line is 660 feet in length and has 14 pods evenly spaced along its length. The improved distribution uniformity and irrigation efficiency reduces the inefficient use of water on irrigated land, reducing irrigation water applied and energy use. Water application rates meet the pasture vegetation consumptive use requirements. Runoff and deep percolation as a result of irrigation are eliminated, and the receiving waters are no longer degraded.

**Feature Measure:** Number of Sprinkler Pods

**Scenario Unit::** Each

**Scenario Typical Size:** 14.0

**Scenario Total Cost:** $3,607.26

**Scenario Cost/Unit:** $257.66

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 | $70.64 | 2 | $141.28 |

**Practice:** 442 - Sprinkler System

**Scenario** #11 - Center Pivot or Linear Move Renozzling > 1000 LF

**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:** 1,300.0

**Scenario Total Cost:** $10,799.67

**Scenario Cost/Unit:** $8.31

Cost Details:

| Component Name | ID | Description | Unit | Cost | QTY | Total |
|---|---|---|---|---|---|---|
| **Equipment Installation** | | | | | | |
| Aerial lift, telescoping bucket | 1893 | Aerial lift, bucket truck or cherry picker, typical 40' boom. Equipment only. | Hour | $42.19 | 8 | $337.52 |
| **Labor** | | | | | | |
| General Labor | 231 | Labor performed using basic tools such as power tool, shovels, and other tools that do not require extensive training. Ex. pipe layer, herder, concrete placement, materials spreader, flagger, etc. | Hour | $25.31 | 8 | $202.48 |
| Equipment Operators, Light | 232 | Includes: Skid Steer Loaders, Hydraulic Excavators <50 HP, Trenchers <12", Ag Equipment <150 HP, Pickup Trucks, Forklifts, Mulchers | Hour | $25.23 | 8 | $201.84 |
| **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 | $7.54 | 1300 | $9,802.00 |
| **Mobilization** | | | | | | |
| Mobilization, medium equipment | 1139 | Equipment with 70-150 HP or typical weights between 14,000 and 30,000 pounds. | Each | $255.83 | 1 | $255.83 |

**Practice:** 442 - Sprinkler System

**Scenario** #12 - Center Pivot or Linear Move Renozzling < or = 1,000 LF

**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 400 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 400 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:** 400.0

**Scenario Total Cost:** $3,642.75

**Scenario Cost/Unit:** $9.11

Cost Details:

| Component Name | ID | Description | Unit | Cost | QTY | Total |
|---|---|---|---|---|---|---|
| **Equipment Installation** | | | | | | |
| Aerial lift, telescoping bucket | 1893 | Aerial lift, bucket truck or cherry picker, typical 40' boom. Equipment only. | Hour | $42.19 | 4 | $168.76 |
| **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 | $25.31 | 4 | $101.24 |
| Equipment Operators, Light | 232 | Includes: Skid Steer Loaders, Hydraulic Excavators <50 HP, Trenchers <12", Ag Equipment <150 HP, Pickup Trucks, Forklifts, Mulchers | Hour | $25.23 | 4 | $100.92 |
| **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 | $7.54 | 400 | $3,016.00 |
| **Mobilization** | | | | | | |
| Mobilization, medium equipment | 1139 | Equipment with 70-150 HP or typical weights between 14,000 and 30,000 pounds. | Each | $255.83 | 1 | $255.83 |

**Practice:** 442 - Sprinkler System

**Scenario** #14 - Cranberry Replace

**Scenario Description:**

A solid-set irrigation system on a cranberry bog is replaced by changing lateral and moving or replacing heads with heads meeting high emission uniformity criteria. Resource concerns include: Insufficient Water (Inefficient use of irrigation water), Water Quality Degradation (Excess nutrients in surface and ground waters). Associated Practices: Irrigation Pipeline (430), Pumping Plant (533), Irrigation Water Management (449)

**Before Situation:**

An existing permanent irrigation system in a cranberry bogs does not meet coefficient of uniformity (CU), distribution uniformity (DU) criteria. Low/high application rates result in damage to crop and poor delivery of chemigation.

**After Situation:**

A planned irrigation system is retrofitted such that all components necessary are installed to efficiently apply water. The retrofitted system meets or exceeds the high criteria of CU>or= 87% and DU >or= 78% and SC <or= 1.2, Min. in/hr >or= 0.095, Avg in/hr <or= 0.18. This 15 acre scenario is based on a systems for 3 5-acre bogs. The replacement includes changes in laterals sizes and location.

**Feature Measure:** Area of Irrigation System

**Scenario Unit::** Acre

**Scenario Typical Size:** 15.0

**Scenario Total Cost:** $64,643.94

**Scenario Cost/Unit:** $4,309.60

Cost Details:

| Component Name | ID | Description | Unit | Cost | QTY | Total |
|---|---|---|---|---|---|---|
| **Materials** | | | | | | |
| Irrigation, Cranberry, Replace | 1122 | Replace a solid set system with a high uniformity layout and heads | Acre | $4,226.18 | 15 | $63,392.70 |
| Irrigation, Cranberry, Inline, Screen, Filter, 1,125 Gallon per Minute Capacity | 2446 | Custom made in-line screen filter for cranberry irrigation on 15 ac (1,125gpm) capacity. | Each | $1,079.17 | 1 | $1,079.17 |
| **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 | $172.07 | 1 | $172.07 |

**Practice:** 443 - Irrigation System, Surface and Subsurface

**Scenario** #1 - Flood Floor Irrigation

**Scenario Description:**

The scenario consists of a concrete floor and under floor water distribution system. The plants receive water from the flooded floor through the root zone. Only needed water is taken up by the soil medium. After irrigation completed all water is cycled to the holding tank and is reused for the next irrigation cycle. For pumps - use 533 - Pumping Plant , for piping use 430 - Irrigation Pipeline. Based on flood floor design.

**Before Situation:**

The greenhouse plants are watered by hand or by sprinkler system. Water drips onto the floor and sinks into the earthen floor, runs off or evaporates. Water is lost to the plants and can become contaminated with fertilizers or pesticides.

**After Situation:**

Greenhouse irrigation water is supplied by a Flood-Floor irrigation system. Water is taken up by the soil medium. All remaining water is recycled for reuse. No water is wasted or contaminated.

**Feature Measure:** Square foot of flooded area

**Scenario Unit::** Square Foot

**Scenario Typical Size:** 21,600.0

**Scenario Total Cost:** $141,183.64

**Scenario Cost/Unit:** $6.54

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 | $327.92 | 300 | $98,376.00 |
| 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 |
| **Labor** | | | | | | |
| Skilled Labor | 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 | $41.76 | 48 | $2,004.48 |
| 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 | $25.31 | 128 | $3,239.68 |
| **Materials** | | | | | | |
| Pipe, PVC, 6", SCH 40 | 980 | Materials: - 6" - PVC - SCH 40 - ASTM D1785 | Foot | $6.14 | 400 | $2,456.00 |
| Pipe, PVC, 8", SCH 40 | 981 | Materials: - 8" - PVC - SCH 40 - ASTM D1785 | Foot | $8.62 | 2125 | $18,317.50 |
| Tank, Poly enclosed Storage, 300-1000 gal | 1074 | Water storage tanks. Includes materials and shipping only. | Gallon | $0.90 | 14000 | $12,600.00 |
| Tank, Float Valve Assembly | 1077 | Float Valve, Stem, Swivel, Float Ball | Each | $24.16 | 1 | $24.16 |
| 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 |
| 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 |

**Practice:** 443 - Irrigation System, Surface and Subsurface

**Scenario** #2 - Flood (Ebb and Flow) Bench Irrigation

**Scenario Description:**

The scenario consists of an aluminum flood bench system. The plants receive water from the flooded bench through the root zone. Only needed water is taken up by the soil medium. After irrigation completed all water is cycled to the holding tank and is reused for the next irrigation cycle. For pumps - use 533 - Pumping Plant, for holding tank use 436 - Irrigation Reservoir , for piping use 430 - Irrigation Pipeline. The component includes the piping and manifold distribution system for the benches. Also includes the return piping to the holding tank.

**Before Situation:**

The greenhouse plants are watered by hand or by sprinkler system. Water drips onto the floor and sinks into the earthen floor, runs off or evaporates. Water is lost to the plants and can become contaminated with fertilizers or pesticides.

**After Situation:**

Greenhouse plants are irrigated with an aluminum flood bench (Ebb and Flow) system. The plants receive water from the flooded bench through the root zone. Water is taken up by the soil medium. All remaining water is recycled for reuse. No water is wasted or contaminated.

**Feature Measure:** Square foot of bench installed

**Scenario Unit::** Square Foot

**Scenario Typical Size:** 2,000.0

**Scenario Total Cost:** $23,523.03

**Scenario Cost/Unit:** $11.76

Cost Details:

| Component Name | ID | Description | Unit | Cost | QTY | Total |
|---|---|---|---|---|---|---|
| **Equipment Installation** | | | | | | |
| Irrigation Flood Bench system | 2231 | Sliding benches or troughs used for potted plant irrigation. Distribution system is included in benches. Includes materials, labor, and equipment costs. | Square Foot | $11.10 | 2000 | $22,200.00 |
| **Materials** | | | | | | |
| Micro Irrigation, control valves and timers | 1485 | Automatic controller and timer, to turn on and off the sets for micro irrigation, installation and valves. Based on control unit, not number of valves controlled. | Each | $1,323.03 | 1 | $1,323.03 |

**Practice:** 449 - Irrigation Water Management

**Scenario** #1 - Basic IWM = 30 acres

**Scenario Description:**

A low Intensity irrigation water management system for producers using a checkbook method (crop grown, soil moisture conditions prior to irrigation, dates of irrigation start and stop, depths of irrigation applied, duration of irrigations, and amount of rainfall). For a typical scenario, soil moisture is determined by the feel method, volumes of irrigation water are based on energy or water district bills, records are kept on paper copies, and calculations are made by hand. Resource Concerns: Insufficient Water Supply-Inefficient use of irrigation water; Degraded Plant Condition-Undesirable plant productivity and health, and Inefficient Energy Use-Equipment and facilities. Associated Practices: 441-Irrigation System Microirrigation, 442-Irrigation System Sprinkler, 443-Irrigation System Surface and Subsurface.

**Before Situation:**

The irrigator decides when to irrigate based on general crop or soil appearance or limited soil moisture monitoring. System run times are based on past apparent success. The typical irrigated field is a 30 acre corn field with a surface irrigation system.

**After Situation:**

Irrigations are scheduled based on measured crop water requirements. Records are used to evaluate results of past irrigation events and influence future irrigations. The irrigator keeps records of soil moisture, crop water use, rainfall amounts and irrigation timing and amounts. At the end of the irrigation season all the data has been reviewed and evaluated. Improvements planned for the next season have been determined.

**Feature Measure:** Irrigated Area Managed

**Scenario Unit::** Acre

**Scenario Typical Size:** 30.0

**Scenario Total Cost:** $1,096.56

**Scenario Cost/Unit:** $36.55

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 | $45.69 | 24 | $1,096.56 |

**Practice:** 449 - Irrigation Water Management

**Scenario** #2 - Basic IWM > 30 acres

**Scenario Description:**

A low Intensity irrigation water management system for producers using a checkbook method (crop grown, soil moisture conditions prior to irrigation, dates of irrigation start and stop, depths of irrigation applied, duration of irrigations, and amount of rainfall). For a typical scenario, soil moisture is determined by the feel method, volumes of irrigation water are based on energy or water district bills, records are kept on paper copies, and calculations are made by hand. Resource Concerns: Insufficient Water Supply-Inefficient use of irrigation water; Degraded Plant Condition-Undesirable plant productivity and health, and Inefficient Energy Use-Equipment and facilities. Associated Practices: 441-Irrigation System Microirrigation, 442-Irrigation System Sprinkler, and 443-Irrigation System Surface and Subsurface.

**Before Situation:**

The irrigator decides when to irrigate based on general crop or soil appearance or limited soil moisture monitoring. System run times are based on past apparent success. The typical irrigated field is a 125 acre corn field with a sprinkler irrigation system.

**After Situation:**

Irrigations are scheduled based on measured crop water requirements. Records are used to evaluate results of past irrigation events and influence future irrigations. The irrigator keeps records of soil moisture, crop water use, rainfall amounts and irrigation timing and amounts. At the end of the irrigation season all the data has been reviewed and evaluated. Improvements planned for the next season have been determined.

**Feature Measure:** Irrigated Area Managed

**Scenario Unit::** Acre

**Scenario Typical Size:** 125.0

**Scenario Total Cost:** $1,664.56

**Scenario Cost/Unit:** $13.32

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 | $25.31 | 8 | $202.48 |
| Supervisor or Manager | 234 | Labor involving supervision or management activities. Includes crew supervisors, foremen and farm/ranch managers time required for adopting new technology, etc. | Hour | $45.69 | 32 | $1,462.08 |

**Practice:** 449 - Irrigation Water Management

**Scenario** #3 - Intermediate IWM = 30 acres

**Scenario Description:**

A medium intensity irrigation water management system for producers using a checkbook method (crop grown, soil moisture conditions prior to irrigation, dates of irrigation start and stop, depths of irrigation applied, duration of irrigations, and amount of rainfall). For a typical scenario, soil moisture is determined by in-field moisture sensors with manual downloads. Irrigation amounts are recorded from a flow meter near the pump. Records are input manually into an irrigation scheduling computer program. Resource Concerns: Insufficient Water Supply-Inefficient use of irrigation water; Degraded Plant Condition-Undesirable plant productivity and health, and Inefficient Energy Use-Equipment and facilities. Associated Practices: 441-Irrigation System Microirrigation, 442-Irrigation System Sprinkler, and 443-Irrigation System Surface and Subsurface.

**Before Situation:**

The farmer decides when to irrigate based on general crop or soil appearance or limited soil moisture monitoring. System run times are based on past apparent success. The typical irrigated field is a 30 acre corn field with a surface irrigation system.

**After Situation:**

Irrigations are scheduled based on measured crop water requirements. Records are used to evaluate results of past irrigation events and influence future irrigations. The irrigator keeps records of soil moisture, crop water use, rainfall amounts and irrigation timing and amounts. At the end of the irrigation season all the data has been reviewed and evaluated. Improvements planned for the next season have been determined.

**Feature Measure:** Irrigated Area Managed

**Scenario Unit::** Acre

**Scenario Typical Size:** 30.0

**Scenario Total Cost:** $1,462.08

**Scenario Cost/Unit:** $48.74

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 | $45.69 | 32 | $1,462.08 |

**Practice:** 449 - Irrigation Water Management

**Scenario** #4 - Intermediate IWM > 30 acres

**Scenario Description:**

A medium intensity irrigation water management system for producers using a checkbook method (crop grown, soil moisture conditions prior to irrigation, dates of irrigation start and stop, depths of irrigation applied, duration of irrigations, and amount of rainfall). For a typical scenario, soil moisture is determined by in field moisture sensors with manual downloads. Irrigation amounts are recorded from a flow meter near the pump. Records are input manually into an irrigation scheduling computer program. Resource Concerns: Insufficient Water Supply-Inefficient use of irrigation water; Degraded Plant Condition-Undesirable plant productivity and health, and Inefficient Energy Use-Equipment and facilities. Associated Practices: 441-Irrigation System Microirrigation, 442-Irrigation System Sprinkler, and 443-Irrigation System Surface and Subsurface.

**Before Situation:**

The farmer decides when to irrigate based on general crop or soil appearance or limited soil moisture monitoring. System run times are based on past apparent success. The typical irrigated field is a 125 acre corn field with a sprinkler irrigation system.

**After Situation:**

Irrigations are scheduled based on measured crop water requirements. Records are used to evaluate results of past irrigation events and influence future irrigations. The irrigator keeps records of soil moisture, crop water use, rainfall amounts and irrigation timing and amounts. At the end of the irrigation season all the data has been reviewed and evaluated. Improvements planned for the next season have been determined.

**Feature Measure:** Irrigated Area Managed

**Scenario Unit::** Acre

**Scenario Typical Size:** 125.0

**Scenario Total Cost:** $2,131.32

**Scenario Cost/Unit:** $17.05

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 | $25.31 | 12 | $303.72 |
| 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 | $45.69 | 40 | $1,827.60 |

**Practice:** 449 - Irrigation Water Management

**Scenario** #5 - Advanced IWM = 30 acres

**Scenario Description:**

A high intensity irrigation water management system for producers using a checkbook method with advanced methods of determining irrigation water applied, and estimating crop evapotranspiration, monitoring field soil moisture, or monitoring crop temperature stress. Typical methods include flow measurement, daily record keeping, and use of real-time evapotranspiration estimates (such as those provided dedicated weather stations) and/or soil moisture sensors with automated data logging to monitor field soil moisture content and/or crop temperature. For this scenario, soil moisture is determined by automated soil moisture monitoring stations equipped with telemetry data. Irrigation amounts are recorded from a flow meter near the pump. Telemetry data is automatically sent to a computer with irrigation software. Irrigator also receives real time data via mobile phone applications. Some data such as total water applied may be entered into computer software manually. Resource Concerns: Insufficient Water Supply-Inefficient use of irrigation water; Degraded Plant Condition-Undesirable plant productivity and health, and Inefficient Energy Use-Equipment and facilities. Associated Practices: 441-Irrigation System Microirrigation, 442-Irrigation System Sprinkler, and 443-Irrigation System Surface and Subsurface.

**Before Situation:**

The farmer decides when to irrigate based on general crop or soil appearance or limited soil moisture monitoring. System run times are based on past apparent success. The typical irrigated field is a 30 acre corn field with a surface irrigation system.

**After Situation:**

Irrigations are scheduled based on measured crop water requirements. Records are used to evaluate results of past irrigation events and influence future irrigations. The irrigator keeps records of soil moisture, crop water use, rainfall amounts and irrigation timing and amounts. At the end of the irrigation season all the data has been reviewed and evaluated. Improvements planned for the next season have been determined.

**Feature Measure:** Irrigated Area Managed

**Scenario Unit::** Acre

**Scenario Typical Size:** 30.0

**Scenario Total Cost:** $1,827.60

**Scenario Cost/Unit:** $60.92

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 | $45.69 | 40 | $1,827.60 |

**Practice:** 449 - Irrigation Water Management

**Scenario** #6 - Advanced IWM > 30 acres

**Scenario Description:**

A high intensity irrigation water management system for producers using a checkbook method with advanced methods of determining irrigation water applied, and estimating crop evapotranspiration, monitoring field soil moisture, or monitoring crop temperature stress. Typical methods include flow measurement, daily record keeping, and use of real-time evapotranspiration estimates (such as those provided dedicated weather stations) and/or soil moisture sensors with automated data logging to monitor field soil moisture content and/or crop temperature. For this scenario, soil moisture is determined by automated soil moisture monitoring stations equipped with telemetry data. Irrigation amounts are recorded from a flow meter near the pump. Telemetry data is automatically sent to a computer with irrigation software. Irrigator also receives real time data via mobile phone applications. Some data such as total water applied may be entered into computer software manually. Resource Concerns: Insufficient Water Supply-Inefficient use of irrigation water; Degraded Plant Condition-Undesirable plant productivity and health, and Inefficient Energy Use-Equipment and facilities. Associated Practices: 441-Irrigation System Microirrigation, 442-Irrigation System Sprinkler, and 443-Irrigation System Surface and Subsurface.

**Before Situation:**

The farmer decides when to irrigate based on general crop or soil appearance or limited soil moisture monitoring. System run times are based on past apparent success. The typical irrigated field is a 125 acre corn field with sprinkler irrigation.

**After Situation:**

Irrigations are scheduled based on measured crop water requirements. Records are used to evaluate results of past irrigation events and influence future irrigations. The irrigator keeps records of soil moisture, crop water use, rainfall amounts and irrigation timing and amounts. At the end of the irrigation season all the data has been reviewed and evaluated. Improvements planned for the next season have been determined.

**Feature Measure:** Irrigated Area Managed

**Scenario Unit::** Acre

**Scenario Typical Size:** 125.0

**Scenario Total Cost:** $2,598.08

**Scenario Cost/Unit:** $20.78

Cost Details:

| Component Name | ID | Description | Unit | Cost | QTY | Total |
|---|---|---|---|---|---|---|
| **Labor** | | | | | | |
| General Labor | 231 | Labor performed using basic tools such as power tool, shovels, and other tools that do not require extensive training. Ex. pipe layer, herder, concrete placement, materials spreader, flagger, etc. | Hour | $25.31 | 16 | $404.96 |
| 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 | $45.69 | 48 | $2,193.12 |

**Practice:** 449 - Irrigation Water Management

**Scenario** #7 - Soil Moisture Sensors_1st Year

**Scenario Description:**

This practice includes the installation of soil moisture sensors such as tensiometers, gyp blocks, capacitance sensors etc., that are installed and read to determine point in time soil moisture by depth; and the labor of using the equipment for the first year. The installation includes the purchase of soil moisture meters and sensors, installation equipment, and labor to install and utilize sensors and readings in making IWM decisions during first year. Typical Scenario involves installation of resistance sensor blocks in a 80 acre field of irrigated cropland. Producer periodically monitors soil moisture sensors during the growing season. Meters used to read sensors may be portable. This scenario only applies to year one IWM. The appropriate labor on ly IWM scenario applies in subsequent contract years. Resource Concerns: Insufficient Water - Inefficient use of irrigation water, and Degraded Plant Condition - Undesirable plant productivity and health, and Inefficient Energy Use - Equipment and facilities. Associated Practices: 441-Irrigation System Microirrigation, 442-Irrigation System Sprinkler, and 443-Irrigation System Surface and Subsurface, 587-Structure for water Control, 328-Conservation Crop Rotation, and 590-Nutrient Management.

**Before Situation:**

Producer uses feel method to estimate soil moisture for scheduling irrigation.

**After Situation:**

Producer has installed four sensors at each monitoring site to a depth of four feet with one sensor representing each foot of depth. Producer uses periodic soil moisture measurements to schedule irrigation resulting in improved irrigation water management and reduced energy use.

**Feature Measure:** Number of Measuring Sites

**Scenario Unit::** Each

**Scenario Typical Size:** 2.0

**Scenario Total Cost:** $2,852.02

**Scenario Cost/Unit:** $1,426.01

Cost Details:

| Component Name | ID | Description | Unit | Cost | QTY | Total |
|---|---|---|---|---|---|---|
| **Labor** | | | | | | |
| General Labor | 231 | Labor performed using basic tools such as power tool, shovels, and other tools that do not require extensive training. Ex. pipe layer, herder, concrete placement, materials spreader, flagger, etc. | Hour | $25.31 | 12 | $303.72 |
| 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 | $45.69 | 40 | $1,827.60 |
| **Materials** | | | | | | |
| 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 | $70.64 | 2 | $141.28 |

**Practice:** 449 - Irrigation Water Management

**Scenario** #8 - Soil Moisture Sensors with Data Recorder_1stYear

**Scenario Description:**

This practice includes the installation of electrical soil moisture sensors such as capacitance or resistance sensors that are monitored to determine soil moisture. The installation includes the purchase of soil moisture sensors, installation equipment (probe or auger), and a data logger to log continuous soil moisture data that can be downloaded to a personal computer and associated graphing software. The scenario also includes the labor associated with using the equipment for the first year. Typical Scenario involves installation of resistance sensor blocks in a 120 acre field of sprinkler irrigated cropland. Producer periodically monitors soil moisture sensors during the growing season. This scenario only applies to year one of the IWM. The appropriate labor only IWM scenario applies in subsequent contract years. Resource Concerns: Insufficient Water - Inefficient use of irrigation water, and Degraded Plant Condition - Undesirable plant productivity and health, and Inefficient Energy Use - Equipment and facilities. Associated Practices: 441-Irrigation System Microirrigation, 442-Irrigation System Sprinkler, and 443-Irrigation System Surface and Subsurface, 587-Structure for water Control, 328-Conservation Crop Rotation, and 590-Nutrient Management.

**Before Situation:**

Producer uses feel method to estimate soil moisture for scheduling irrigation in the field.

**After Situation:**

Producer has installed four sensors at each monitoring site to a depth of four feet with one sensor representing each foot of depth. Producer periodically downloads continuously recorded soil moisture measurements that are used to schedule irrigation more effectively resulting in improved irrigation water management and reduced energy use.

**Feature Measure:** Number of Measuring Sites

**Scenario Unit::** Each

**Scenario Typical Size:** 2.0

**Scenario Total Cost:** $4,087.80

**Scenario Cost/Unit:** $2,043.90

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 | $25.31 | 12 | $303.72 |
| 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 | $45.69 | 40 | $1,827.60 |
| **Materials** | | | | | | |
| Data Logger | 1453 | Data Logger W/Graphic Output for water management. Materials only. | Each | $760.64 | 2 | $1,521.28 |
| 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 | $70.64 | 2 | $141.28 |

**Practice:** 449 - Irrigation Water Management

**Scenario** #9 - Cranberry Auto Start

**Scenario Description:**

An auto start system designed to remotely monitor and control irrigation, frost protection, and crop cooling through user-defined start and stop settings for temperature and soil moisture. This is the installation of a self-contained control unit, custom harness, one pump-house master radio, two field radios with up to 1 mile line of sight in protective enclosure each with wireless temperature and soil moisture sensors, heavy-duty discharge pressure sensor, and cellular communications kit. An internet connection is required. One auto-start system is required for each irrigation pump. Typical scenario is a 15 acre irrigated cranberry bog. Resource concerns: Insufficient water - Inefficient use of irrigation water; Inefficient energy use - Equipment and facilities and Farming/ranching practices and field operations. Associated Practices: 374 - Farmstead Energy Improvement; 430 - Irrigation Pipeline; 441-Irrigation System Microirrigation, 442-Irrigation System Sprinkler, and 443-Irrigation System Surface and Subsurface.

**Before Situation:**

Irrigation Setting: Producer uses feel method to estimate soil moisture for scheduling irrigation in the fields, traveling to and from multiple pumps to manually start and stop them. Result is over/under water application, runoff, water loss and energy loss. Frost Protection Setting: Producer uses weather forecasts and thermometers to estimate air temperature in the fields, traveling to and from multiple pumps to manually start and stop them. Result is over/under water application, runoff, water loss and energy loss. Crop Cooling Setting: Producer uses weather forecasts, thermometers, and visual observation to estimate air temperature and crop stress in the fields, traveling to and from multiple pumps to manually start and stop them. Result is over/under water application, runoff, water loss and energy loss.

**After Situation:**

An auto start system is installed on an existing pumping plant meeting Nebraska performance criteria. The pump is remotely controlled allowing user-defined start and stop settings based on real-time data collected by soil moisture sensors and wireless temperature sensors in the fields, reducing water, energy usage, and runoff.

**Feature Measure:** Number of pumps

**Scenario Unit::** Each

**Scenario Typical Size:** 1.0

**Scenario Total Cost:** $7,295.17

**Scenario Cost/Unit:** $7,295.17

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 | $41.76 | 20 | $835.20 |
| **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 incl | 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 ma | Kilowatt | $8,258.60 | 0.1 | $825.86 |
| 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 | $655.75 | 1 | $655.75 |
| 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 | $449.51 | 1 | $449.51 |
| Weather Station, Advanced | 2550 | Advance Weather Station which collects and records recording rainfall, humidity, barometric pressure, wind speed, temperature, and solar radiation from a solar powered self-standing tripod to an advance weather recording console. Used for both 449 advance | Each | $1,070.10 | 1 | $1,070.10 |
| Switches and Controls, Telemetry System, Irrigation, Wireless, Advanced or Complex | 2689 | Programmable telemetry logic controller for advanced irrigation systems. Includes cellular modem, wireless receiver, antennas, high-current relay module in waterproof enclosure. Also has the capacity to support, wireless sensors, solar panels, GPS locat | Each | $1,672.77 | 1 | $1,672.77 |
| Switches and Controls - Engine Controller, Advanced or Complex | 2690 | Configurable input and output engine controller for manual or automatic control on either mechanically or electronically governed engines. Controls start/stop and advanced throttling options, | Each | $1,254.83 | 1 | $1,254.83 |
| **Mobilization** | | | | | | |
| Mobilization, very small equipment | 1137 | Equipment that is small enough to be transported by a pick-up truck with typical weights less than 3,500 pounds. Can be multiple pieces of equipment if all hauled simultaneously. | Each | $70.64 | 1 | $70.64 |

**Practice:** 449 - Irrigation Water Management

**Scenario** #14 - IWM w weather station

**Scenario Description:**

This practice includes the installation of a weather station that is monitored to determine crop water use, status of heat and/or frost conditions to permit the producer to make informed irrigation decisions. The installation includes the purchase and installation of equipment, and a data logger to log continuous weather data including rainfall, temp, solar radiation, humidity, wind speed and soil moisture sensors that can be downloaded to a personal computer and associated graphing software. Typical Scenario involves installation on a 120 acre field of irrigated cropland. Producer periodically monitors the station during the growing season to determine timing and amounts of water to apply based on soil moisture sensors, field checks and weather station data. Producer keeps records of collected data and resulting irrigation decisions. This scenario only applies to year one of IWM. The appropriate labor-only IWM scenario applies in subsequent contract years. Resource Concerns: Insufficient Water Supply-Inefficient use of irrigation water; Water Quality; Degraded Plant Condition-Undesirable plant productivity and health, and Inefficient Energy Use-Equipment and facilities. Associated Practices: 441-Irrigation System Microirrigation, 442-Irrigation System Sprinkler, 443-Irrigation System Surface and Subsurface

**Before Situation:**

To meet crop water requirements, the producer schedules irrigations based on the calendar and what has apparently worked in the past. For cooling/frost protection, irrigation start and run times are based on broad regional weather forecasts.

**After Situation:**

Producer has installed a weather station and periodically downloads continuously recorded data that is used to schedule irrigation more effectively resulting in improved irrigation water management and reduced energy use. Field checks are made by irrigator to ground truth station data with crop.

**Feature Measure:** Number of weather stations

**Scenario Unit::** Each

**Scenario Typical Size:** 1.0

**Scenario Total Cost:** $5,244.46

**Scenario Cost/Unit:** $5,244.46

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 | $25.31 | 20 | $506.20 |
| 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 | $110.71 | 4 | $442.84 |
| **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 incl | Each | $460.51 | 1 | $460.51 |
| 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 | $655.75 | 1 | $655.75 |
| 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 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 | 2 | $73.48 |
| Weather Station, Advanced | 2550 | Advance Weather Station which collects and records recording rainfall, humidity, barometric pressure, wind speed, temperature, and solar radiation from a solar powered self-standing tripod to an advance weather recording console. Used for both 449 advance | Each | $1,070.10 | 1 | $1,070.10 |
| **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 | $70.64 | 1 | $70.64 |

**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 workability issues. Typically less than 100 cy/acre material moved.

**After Situation:**
Land level, backhoe, bulldozer or other heavy equipment used to correct irregularities and address drainage or workability issues.

**Feature Measure:** Acres of land treated

**Scenario Unit::** Acre

**Scenario Typical Size:** 40.0

**Scenario Total Cost:** $4,610.25

**Scenario Cost/Unit:** $115.26

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 | $124.03 | 25 | $3,100.75 |
| Scraper, pull, 7 CY | 1206 | Pull type earthmoving scraper with 7 CY capacity. Does not include pulling equipment or labor. Add Tractor or Dozer, 160 HP typically required for single scraper. | Hour | $16.01 | 25 | $400.25 |
| **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 | $44.37 | 25 | $1,109.25 |

**Practice:** 466 - Land Smoothing

**Scenario** #2 - Cranberry Bog Leveling

**Scenario Description:**
Leveling of the base of cranberry bogs during bog renovation to reduce water needs during flooding and improve equipment operation and efficiency

**Before Situation:**
Uneven old bogs require excessive water for flooding.

**After Situation:**
Irregularities in the land surface are removed using a laser level and dozer. Multiple small bog cells are accessed for treatment.

**Feature Measure:** Acres of land treated

**Scenario Unit::** Acre

**Scenario Typical Size:** 5.0

**Scenario Total Cost:** $3,038.41

**Scenario Cost/Unit:** $607.68

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 | $124.03 | 14 | $1,736.42 |
| **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 | $25.31 | 14 | $354.34 |
| 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 | $44.37 | 14 | $621.18 |
| **Mobilization** | | | | | | |
| Mobilization, very small equipment | 1137 | Equipment that is small enough to be transported by a pick-up truck with typical weights less than 3,500 pounds. Can be multiple pieces of equipment if all hauled simultaneously. | Each | $70.64 | 1 | $70.64 |
| Mobilization, medium equipment | 1139 | Equipment with 70-150 HP or typical weights between 14,000 and 30,000 pounds. | Each | $255.83 | 1 | $255.83 |

**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:** 4,500.0

**Scenario Total Cost:** $3,593.49

**Scenario Cost/Unit:** $0.80

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 | $2.36 | 90 | $212.40 |
| **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 | $45.69 | 4 | $182.76 |
| **Materials** | | | | | | |
| Turf reinforcement mat | 1212 | Synthetic turf reinforcement mat with staple anchoring. Includes materials, equipment and labor. | Square Yard | $5.50 | 535 | $2,942.50 |
| **Mobilization** | | | | | | |
| Mobilization, medium equipment | 1139 | Equipment with 70-150 HP or typical weights between 14,000 and 30,000 pounds. | Each | $255.83 | 1 | $255.83 |

**Practice:** 468 - Lined Waterway or Outlet

**Scenario** #2 - Riprap

**Scenario Description:**

Install 300 ' long by 15' wide by 1.5' deep trapezoidal or parabolic shaped waterway lined with riprap (D100 = 9", Velocity ~ 8 ft/sec). Volume of riprap placed = 205 CY. 1/2 the channel depth is excavated, before excavation for riprap. Excess excavation is spoiled in the immediate area. Riprap is installed over 100% of the width of the waterway to prevent scour. Cost include excavation, spoiling of excess material, geotextile underlayment and installing 9" Rock Riprap. Lined waterway width is measured from top of bank to top of bank.

**Before Situation:**

Excessive sedimentation and soil erosion as a result of ephemeral or classic gully erosion. Velocities are generally too high or saturated soil conditions make it difficult to establish a grassed waterway.

**After Situation:**

Rock lined waterway is 300 ' long by 15' wide by 1.5' deep (Riprap = 205 CY). Waterway is excavated and rock is placed using a hydraulic excavator. Geotextile underlayment is installed by laborers. Associated practices are Subsurface Drain (606), Underground Outlet (620), Structure for Water Control (587), and Critical Area Seeding (342).

**Feature Measure:** Cubic Yards of Riprap Placed

**Scenario Unit::** Cubic Yard

**Scenario Typical Size:** 205.0

**Scenario Total Cost:** $17,547.88

**Scenario Cost/Unit:** $85.60

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 | $2.36 | 295 | $696.20 |
| **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 | $25.31 | 4 | $101.24 |
| 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 | $45.69 | 4 | $182.76 |
| **Materials** | | | | | | |
| Rock Riprap, Placed with geotextile | 44 | Rock Riprap, placed with geotextile, includes materials, equipment and labor to transport and place | Cubic Yard | $79.57 | 205 | $16,311.85 |
| **Mobilization** | | | | | | |
| Mobilization, medium equipment | 1139 | Equipment with 70-150 HP or typical weights between 14,000 and 30,000 pounds. | Each | $255.83 | 1 | $255.83 |

**Practice:** 468 - Lined Waterway or Outlet

**Scenario** #3 - Concrete

**Scenario Description:**

Install 300 ' long by 15' wide by 1.5' deep trapezoidal or parabolic shaped waterway lined with concrete. 1/2 the channel is excavated, before excavation for concrete and subgrade material. Excess excavation is spoiled in the immediate area. Concrete is installed over 100% of the width of the waterway to prevent scour. Cost include excavation, spoiling of excess material, 6" of clean sand or gravel subgrade, and 5" reinforced concrete slab. Lined waterway width is measured from top of bank to top of bank.

**Before Situation:**

Excessive sedimentation and soil erosion as a result of ephemeral or classic gully erosion. Velocities are generally too high or saturated soil conditions make it difficult to establish a grassed waterway. Usually installed in locations where rock or other lining materials are not readily available.

**After Situation:**

Concrete lined waterway is 300 ' long by 15' wide by 1.5' deep. Waterway is excavated using a hydraulic excavator. Concrete slab is placed on 6" of clean sand or #57 stone. Concrete is placed, graded and screened 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:** 4,500.0

**Scenario Total Cost:** $31,256.73

**Scenario Cost/Unit:** $6.95

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 | $327.92 | 80 | $26,233.60 |
| Excavation, Common Earth, side cast, small equipment | 48 | Bulk excavation and side casting of common earth with hydraulic excavator with less than 1 CY capacity. Includes equipment and labor. | Cubic Yard | $2.36 | 280 | $660.80 |
| **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 | $25.31 | 4 | $101.24 |
| 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 | $45.69 | 4 | $182.76 |
| **Materials** | | | | | | |
| Aggregate, Gravel, Graded | 46 | Gravel, includes materials, equipment and labor to transport and place. Includes washed and unwashed gravel. | Cubic Yard | $34.75 | 110 | $3,822.50 |
| **Mobilization** | | | | | | |
| Mobilization, medium equipment | 1139 | Equipment with 70-150 HP or typical weights between 14,000 and 30,000 pounds. | Each | $255.83 | 1 | $255.83 |

**Practice:** 468 - Lined Waterway or Outlet

**Scenario** #4 - 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:** 4,500.0

**Scenario Total Cost:** $32,980.26

**Scenario Cost/Unit:** $7.33

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 | $2.53 | 535 | $1,353.55 |
| 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 | $2.36 | 90 | $212.40 |
| **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 | $25.31 | 12 | $303.72 |
| 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 | $45.69 | 4 | $182.76 |
| **Materials** | | | | | | |
| Synthetic Liner, 40 mil | 1387 | Synthetic 40 mil HDPE, LLDPE, EPDM, etc membrane liner material. Includes materials and shipping only. | Square Yard | $6.39 | 4800 | $30,672.00 |
| **Mobilization** | | | | | | |
| Mobilization, medium equipment | 1139 | Equipment with 70-150 HP or typical weights between 14,000 and 30,000 pounds. | Each | $255.83 | 1 | $255.83 |

**Practice:** 468 - Lined Waterway or Outlet

**Scenario** #5 - 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:**

Concrete 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:** 540.0

**Scenario Total Cost:** $2,550.50

**Scenario Cost/Unit:** $4.72

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 | $2.53 | 65 | $164.45 |
| 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 | $2.36 | 32 | $75.52 |
| **Labor** | | | | | | |
| General Labor | 231 | Labor performed using basic tools such as power tool, shovels, and other tools that do not require extensive training. Ex. pipe layer, herder, concrete placement, materials spreader, flagger, etc. | Hour | $25.31 | 24 | $607.44 |
| 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 | $45.69 | 4 | $182.76 |
| **Materials** | | | | | | |
| Aggregate, Gravel, Graded | 46 | Gravel, includes materials, equipment and labor to transport and place. Includes washed and unwashed gravel. | Cubic Yard | $34.75 | 6 | $208.50 |
| Block, concrete | 253 | Concrete block, hollow, normal weight, 3500 psi. Includes both full and partial sizes. Material only | Each | $1.65 | 640 | $1,056.00 |
| **Mobilization** | | | | | | |
| Mobilization, medium equipment | 1139 | Equipment with 70-150 HP or typical weights between 14,000 and 30,000 pounds. | Each | $255.83 | 1 | $255.83 |

**Practice:** 468 - Lined Waterway or Outlet

**Scenario** #6 - Geocell

**Scenario Description:**

Install 300 ' long by 15' wide by 1.5' deep trapezoidal or parabolic shaped waterway lined with gravel and geocell. 1/2 the channel is excavated, before excavation for geocell and subgrade material. Excess excavation is spoiled in the immediate area. Geocell is installed over 100% of the width of the waterway to prevent scour. Cost include excavation, spoiling of excess material, geotextile, 6" of clean sand or gravel subgrade, gravel to fill geocells, and 4" geocell. 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:**

Geocell with gravel lined waterway is 300 ' long by 15' wide by 1.5' deep. Waterway is excavated using a hydraulic excavator. Geocell is placed on 6" of clean sand or #57 stone and geotextile and gravel is placed within the geocell. Geocell is placed and graded 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:** 4,500.0

**Scenario Total Cost:** $23,811.14

**Scenario Cost/Unit:** $5.29

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 | $2.36 | 140 | $330.40 |
| **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 | $25.31 | 24 | $607.44 |
| 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 | $45.69 | 8 | $365.52 |
| **Materials** | | | | | | |
| 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 | $32.55 | 535 | $17,414.25 |
| Aggregate, Gravel, Ungraded, Quarry Run | 1099 | Includes materials, equipment and labor | Cubic Yard | $23.96 | 105 | $2,515.80 |
| Geotextile, non-woven, heavy weight | 1210 | Non-woven greater than 8 ounce/square yard geotextile with staple anchoring. Materials and shipping only. | Square Yard | $4.34 | 535 | $2,321.90 |
| **Mobilization** | | | | | | |
| Mobilization, medium equipment | 1139 | Equipment with 70-150 HP or typical weights between 14,000 and 30,000 pounds. | Each | $255.83 | 1 | $255.83 |

**Practice:** 468 - Lined Waterway or Outlet

**Scenario** #9 - Stone Centered Grassed Waterway

**Scenario Description:**

Typical stone centered grassed waterway is 500 ' long, 8' bottom, 8:1 side slopes, 1.0' depth, half excavation. A stone centered grassed waterway is a shaped or graded channel with the middle one third of the channel lined with rock or stone. Waterway is established with suitable vegetation to carry surface water at a non-erosive velocity to a stable outlet. This practice addresses Concentrated Flow Erosion (Classic Gully & Ephemeral Erosion) and Excessive Sediment in surface waters. Stone Centered Grassed Waterway area is measured from top of bank to top of bank. Seeding area is 20% greater than foot print of the waterway area to account for disturbed areas. Costs include excavation, rock center with geotextile and associated work to construct the overall shape and grade of the waterway.

**Before Situation:**

The field has a small gulley which is cutting deeper into the field as time goes on, so it needs to be stopped or controlled. Excessive sedimentation and soil erosion as a result from ephemeral or classic gully erosion. Gully has formed in field as a result of excessive runoff and poor cropping techniques. Stone Centered Grassed Waterway is also commonly installed to covey runoff from concentrated flows, terraces, diversions, or water control structures or similar practices to a suitable, stable outlet. A stone centered grassed waterway is used in areas where design velocity is slightly high (2 fps) than the allowable velocity of the soil.

**After Situation:**

Installed stone centered grassed waterway is 500 ' long, 8' bottom, 8:1 side slopes, 1.0' depth. The practice is installed using a dozer. Use Critical Area Planting (342) for establishment of waterway vegetation. If erosion control blankets or mulching for seedbed establishment/protection are needed, use conservation practice Mulching (484). Drainage tile, if needed, will be installed according to Subsurface Drain (606). Outlets, if needed will be installed using Structure for Water Control (587). If inlet Structures are needed with the drainage tile, then those will be installed using Underground Outlet (620).

**Feature Measure:** Total Area of Waterway in Square F

**Scenario Unit::** Square Foot

**Scenario Typical Size:** 12,000.0

**Scenario Total Cost:** $14,755.70

**Scenario Cost/Unit:** $1.23

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 | $2.36 | 115 | $271.40 |
| Tillage, Light | 945 | Includes light disking (tandem) or field cultivator. Includes equipment, power unit and labor costs. | Acre | $11.14 | 1 | $11.14 |
| Fertilizer, ground application, dry bulk | 950 | Dry bulk fertilizer application performed by ground equipment. Includes equipment, power unit and labor costs. | Acre | $6.62 | 1 | $6.62 |
| Seeding Operation, No Till/Grass Drill | 960 | No Till drill or grass drill for seeding. Includes equipment, power unit and labor costs. | Acre | $21.36 | 1 | $21.36 |
| Cultipacking | 1100 | Includes equipment, power unit and labor costs. | Acre | $7.70 | 1 | $7.70 |
| 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 | $2.50 | 300 | $750.00 |
| **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 | $25.31 | 12 | $303.72 |
| 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 | $45.69 | 4 | $182.76 |
| **Materials** | | | | | | |
| Rock Riprap, Placed with geotextile | 44 | Rock Riprap, placed with geotextile, includes materials, equipment and labor to transport and place | Cubic Yard | $79.57 | 115 | $9,150.55 |
| 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 | $0.49 | 17 | $8.33 |
| 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 | $0.65 | 17 | $11.05 |
| Potassium, K2O | 74 | K2O supplied by Muriate Of Potash. Price is not per pound of total product applied, no conversion is needed. | Pound | $0.36 | 17 | $6.12 |
| Lime, ENM | 75 | Fertilizer: Limestone Spread on field. | Ton | $93.23 | 1 | $93.23 |
| Mulching, straw or hay | 1214 | Use of straw or hay for temporary ground cover. Includes application and methods necessary to keep in place such as tacking or crimping. Includes materials, equipment and labor. | Acre | $3,371.72 | 1 | $3,371.72 |
| Four Species Mix, Cool Season, Introduced Perennial (2 grasses, 2 legumes) | 2317 | Cool season grass and legume mix. Includes material and shipping only. | Acre | $48.34 | 1 | $48.34 |

**Mobilization**

| | | | | | | |
|---|---|---|---|---|---|---|
| Mobilization, medium equipment | 1139 | Equipment with 70-150 HP or typical weights between 14,000 and 30,000 pounds. | Each | $255.83 | 2 | $511.66 |

**Practice:** 472 - Access Control

**Scenario** #1 - Trails/Roads Access Control

**Scenario Description:**

Restricting access to the use of forest/farm roads and trails by the use of a gate and limited fencing. Resource concerns include Undesirable plant productivity and health, Concentrated flow erosion, Soil compaction, Excessive sediment in surface waters, and Wildlife habitat degradation.

**Before Situation:**

Roads are damaged or misused, illegal activities occur and/or forest resources are at risk. Extensive amount of fencing (other than that needed to restrict access at the site of ingress) is not included in this scenario, but instead will be planned and installed with the Fence practice (382).

**After Situation:**

Roads are protected, illegal activities are stopped and/or forest resources are secure.

**Feature Measure:** Number

**Scenario Unit::** Each

**Scenario Typical Size:** 1.0

**Scenario Total Cost:** $590.73

**Scenario Cost/Unit:** $590.73

Cost Details:

| Component Name | ID | Description | Unit | Cost | QTY | Total |
|---|---|---|---|---|---|---|
| **Equipment Installation** | | | | | | |
| Auger, Post driver attachment | 934 | Auger or post driver attachment to a tractor or skidsteer. Does not include power unit. Labor not included. | Hour | $7.31 | 2 | $14.62 |
| Truck, Pickup | 939 | Equipment and power unit costs. Labor not included. | Hour | $21.79 | 4 | $87.16 |
| Tractor, agricultural, 60 HP | 963 | Agricultural tractor with horsepower range of 50 to 90. Equipment and power unit costs. Labor not included. | Hour | $24.77 | 4 | $99.08 |
| **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 | $25.31 | 4 | $101.24 |
| **Materials** | | | | | | |
| 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 | 4 | $25.04 |
| Post, Wood, CCA treated, 6" x 8' | 12 | Wood Post, End 6" X 8', CCA Treated. Includes materials and shipping only. | Each | $15.10 | 4 | $60.40 |
| Gate, Pipe, 12' | 1057 | 6 rail tube gate, 16 gauge. Includes materials and shipping only. | Each | $166.29 | 1 | $166.29 |
| Concrete mix, bag | 1226 | Pre-mixed dry concrete mix in 60 pound bag. Materials only. | Each | $3.69 | 10 | $36.90 |

**Practice:** 472 - Access Control

**Scenario** #2 - Animal exclusion from sensitive areas

**Scenario Description:**

Excluding animals from an area in order to address identified resource concerns. This is for facilitating exclusion of animals to protect or enhance natural resource values. Control will be by temporary electric fencing. Any need for permanent fencing will be planned and installed using the Fence practice (382). Clearing of brush and trees is not necessary. Resource concerns include Wildlife Habitat degradation, Undesirable plant productivity and health, and/or Excessive sediment in surface waters.

**Before Situation:**

Sensitive areas are threatened by the adverse actions of domestic and/or wild animals. The importance of the sensitive areas can include (but are not limited to): wildlife habitat, plant species composition, newly established trees and/or plants, stream bank stability, and/or water quality.

**After Situation:**

Sensitive areas are protected from the adverse actions of domestic and/or wild animals by excluding them from the area.

**Feature Measure:** Length of fence

**Scenario Unit::** Foot

**Scenario Typical Size:** 500.0

**Scenario Total Cost:** $989.58

**Scenario Cost/Unit:** $1.98

Cost Details:

| Component Name | ID | Description | Unit | Cost | QTY | Total |
|---|---|---|---|---|---|---|
| **Equipment Installation** | | | | | | |
| Truck, Pickup | 939 | Equipment and power unit costs. Labor not included. | Hour | $21.79 | 4 | $87.16 |
| Fence, Wire Assembly, High Tensile Electric, 5 Strand | 1087 | Brace pins, springs, strainers, battens, clips, crimp sleeves, staples, insulators, wrap around sleeves. Includes materials and shipping only. | Foot | $0.18 | 500 | $90.00 |
| **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 | $25.31 | 20 | $506.20 |
| **Materials** | | | | | | |
| Post, Wood, CCA treated, 4" x 8' | 10 | Wood Post, Line 4" X 8', CCA Treated. Includes materials and shipping only. | Each | $8.06 | 10 | $80.60 |
| Property/Safety Signs | 293 | Plastic Fence safety or property sign - Printed on both sides 6 pre-drilled holes for hanging or nailing. 7.5" x 4.75". Includes materials and shipping only. | Each | $1.53 | 35 | $53.55 |
| **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 | $172.07 | 1 | $172.07 |

**Practice:** 472 - Access Control

**Scenario** #3 - Forest/Farm Access Control

**Scenario Description:**

Restricting human access to a field/farm/property through use of signage and other markings. Resource concerns include Undesirable plant productivity and health, Excessive sediment in surface waters, Concentrated flow erosion, and Wildlife habitat degradation.

**Before Situation:**

A 20 acre tract (field, farm. forests, etc.) is being damaged or misused by illegal activities that put the resources/property at risk or needs controlled access due to an active management operation such as pest management or timber harvesting. The perimeter needs marking with paint (at 100 foot intervals) and signs at points of ingress. Surveying is not necessary.

**After Situation:**

The property is adequately marked and protected, illegal activities are stopped and/or forest resources are secure.

**Feature Measure:** <Unknown>

**Scenario Unit::** Foot

**Scenario Typical Size:** 1,500.0

**Scenario Total Cost:** $261.06

**Scenario Cost/Unit:** $0.17

Cost Details:

| Component Name | ID | Description | Unit | Cost | QTY | Total |
|---|---|---|---|---|---|---|
| **Equipment Installation** | | | | | | |
| Truck, Pickup | 939 | Equipment and power unit costs. Labor not included. | Hour | $21.79 | 4 | $87.16 |
| **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 | $25.31 | 4 | $101.24 |
| **Materials** | | | | | | |
| Property/Safety Signs | 293 | Plastic Fence safety or property sign - Printed on both sides 6 pre-drilled holes for hanging or nailing. 7.5" x 4.75". Includes materials and shipping only. | Each | $1.53 | 2 | $3.06 |
| 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 | $6.96 | 10 | $69.60 |

**Practice:** 472 - Access Control

**Scenario** #4 - Navigational Delineation

**Scenario Description:**

Marine bivalve aquaculture operations or restored native oyster reefs located in tidal and subtidal working waters that are controlled by the operator and leased from state local authorities. Growing areas average 2 acres in size and are typically sited in close proximity to other aquaculture operations/facilities, and interface with other resource uses including public boating and swimming. Restored reef areas range in size from 1/4 acres to 1 acre . Reef are being delineated to prevent harvesting since they are located in established sanctuaries. Natural resource concerns addressed by this option include water quality degradation - Excessive Sediment in Surface Waters and Petroleum, Heavy Metals and Other Pollutants Transported to Surface Water , and resulting from uncontrolled access by boats and other human activities. Resource concerns addressed by delineating restored reefs include: Water Quality Degradation, Excessive Nutrient in Surface Water and Fish and Wildlife – Inadequate Habitat – Inadequate Habitat Cover/Shelter.

**Before Situation:**

Shellfish aquaculture operations and restored oyster reefs that are located in tidal and subtidal working waters that are controlled by the participant and leased from local authorities are not delineated . The shellfish beds average 2 acres in size and are typically sited in close proximity to other aquaculture operations/facilities, and interface with other resource uses including public boating and swimming. The danger of boats or swimmers accidentally coming in contact with shellfish beds is much greater if beds are not delineated with navigational boundaries. Restored reefs are located in sanctuaries where harvesting is prohibited. It is difficult for recreational users of the tidal areas to know where the sanctuaries are located

**After Situation:**

Shellfish producer shall install standard navigational delineation devices to mark the boundaries of shellfish growing areas to avoid boat strikes, petrochemical spills, and accidental intrusions by small craft (kayaks) or swimmers. Restored reefs are protected from harvesting since both recreational and commercial harvesters know these areas are protected.

**Feature Measure:** Buoy/rope system for delineation

**Scenario Unit::** Each

**Scenario Typical Size:** 1.0

**Scenario Total Cost:** $770.39

**Scenario Cost/Unit:** $770.39

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 | $25.31 | 4 | $101.24 |
| **Materials** | | | | | | |
| Buoy | 2037 | 20??? inflatable polyform ball. Includes materials and shipping only. | Each | $107.47 | 4 | $429.88 |
| Buoy tether | 2038 | 3/8???polypropylene line (marine quality). Includes materials and shipping only. | Foot | $0.18 | 200 | $36.00 |
| Screw Pin Anchor Shackles, Galvanize-Steel, 1/4" | 2040 | Tether connectors for buoy and anchor. Includes materials and shipping only. | Each | $3.90 | 8 | $31.20 |
| **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 | $172.07 | 1 | $172.07 |

**Practice:** 472 - Access Control

**Scenario** #5 - Hibernaculum Bat Gate

**Scenario Description:**

Installation of a gate to control access to caves and other natural formation that provide bat roosting and hibernation sites. Bats are most vulnerable when they are hibernating. Human intrusion stirs and wakes up the bats, causing them to deplete their fat supplies at an accelerated rate and reducing their chances of surviving the winter. Gating hibernacula entrances to prevent trespass is one of the chief measures of protecting bat species. Additionally, gates prevent human access to dangerous and unstable mines, reducing chances of serious accidents. Gates allow bats to pass through, don't interfere with air circulation, and prevent unauthorized access.

**Before Situation:**

Caves and other natural formations that provide roosting and hibernating habitat have can be accessed during all times of the years. Access by humans for recreation disturbs the bats during critical life cycles. This can cause a decrease in population of these important animals.

**After Situation:**

Hibernaculum gates are installed to control access to important bat roosting and hibernating sites. The controlled access will help protect the colonies of bats

**Feature Measure:** <Unknown>

**Scenario Unit::** Square Foot

**Scenario Typical Size:** 100.0

**Scenario Total Cost:** $7,613.17

**Scenario Cost/Unit:** $76.13

Cost Details:

| Component Name | ID | Description | Unit | Cost | QTY | Total |
|---|---|---|---|---|---|---|
| **Materials** | | | | | | |
| Property/Safety Signs | 293 | Plastic Fence safety or property sign - Printed on both sides 6 pre-drilled holes for hanging or nailing. 7.5" x 4.75". Includes materials and shipping only. | Each | $1.53 | 1 | $1.53 |
| Bat Gate | 1129 | Bat Gate Assembly, Includes materials, equipment and labor. | Square Foot | $70.41 | 100 | $7,041.00 |
| **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 i | Dollar | $1.00 | 500 | $500.00 |
| Mobilization, very small equipment | 1137 | Equipment that is small enough to be transported by a pick-up truck with typical weights less than 3,500 pounds. Can be multiple pieces of equipment if all hauled simultaneously. | Each | $70.64 | 1 | $70.64 |

**Practice:** 472 - Access Control

**Scenario** #6 - BioSecurity Access Control

**Scenario Description:**

Restricting access in the use of farm roads by the use of signage, a gate and limited fencing. A well-constructed and maintained operation strengthens a biosecurity plan by aiding cleaning and disinfection processes and by reducing the risks associated with visitors, service personnel, and pests. Resource concerns include Domestic Animals - Stress and Mortality.

**Before Situation:**

People, vehicles and equipment entering and moving unrestricted within the farm pose a serious biosecurity threat; they can carry pests, soil, and crop debris. The risk is increased with shared, contracted, and second-hand vehicles and equipment, due to their use on other farms with unknown biosecurity status. Care must also be taken with people's activities, non-agricultural vehicles and equipment that must travel within the farm (e.g. earth-moving equipment, gas exploration equipment, utility service vehicles).

**After Situation:**

Access of people and vehicles is controlled aiding in the cleaning and disinfection processes and by reducing the risks associated with visitors, service personnel, and pests.

**Feature Measure:** <Unknown>

**Scenario Unit::** Foot

**Scenario Typical Size:** 50.0

**Scenario Total Cost:** $1,168.98

**Scenario Cost/Unit:** $23.38

Cost Details:

| Component Name | ID | Description | Unit | Cost | QTY | Total |
|---|---|---|---|---|---|---|
| **Equipment Installation** | | | | | | |
| Auger, Post driver attachment | 934 | Auger or post driver attachment to a tractor or skidsteer. Does not include power unit. Labor not included. | Hour | $7.31 | 2 | $14.62 |
| Truck, Pickup | 939 | Equipment and power unit costs. Labor not included. | Hour | $21.79 | 8 | $174.32 |
| Tractor, agricultural, 60 HP | 963 | Agricultural tractor with horsepower range of 50 to 90. Equipment and power unit costs. Labor not included. | Hour | $24.77 | 4 | $99.08 |
| **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 | $25.31 | 16 | $404.96 |
| **Materials** | | | | | | |
| 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 | 4 | $25.04 |
| Post, Wood, CCA treated, 6" x 8' | 12 | Wood Post, End 6" X 8', CCA Treated. Includes materials and shipping only. | Each | $15.10 | 4 | $60.40 |
| Property/Safety Signs | 293 | Plastic Fence safety or property sign - Printed on both sides 6 pre-drilled holes for hanging or nailing. 7.5" x 4.75". Includes materials and shipping only. | Each | $1.53 | 10 | $15.30 |
| Gate, Pipe, 12' | 1057 | 6 rail tube gate, 16 gauge. Includes materials and shipping only. | Each | $166.29 | 1 | $166.29 |
| Concrete mix, bag | 1226 | Pre-mixed dry concrete mix in 60 pound bag. Materials only. | Each | $3.69 | 10 | $36.90 |
| **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 | $172.07 | 1 | $172.07 |

**Practice:** 484 - Mulching

**Scenario** #1 - Straw or Hay, Manual Application

**Scenario Description:**

Manual application of straw/hay mulch or other state approved natural material to reduce erosion, moderate soil temperature, conserve soil moisture and/or facilitate the establishment of vegetative cover.

**Before Situation:**

Typical scenario ranges from a 0.1 to 1.0 acre disturbed site around a newly constructed structural practice to a 5-10 acre irrigated orchard/vineyard. Water quantity and soil moisture is a concern. The potential for soil erosion is high and mulch is needed to stabilize the soil, facilitate the establishment of vegetative cover.

**After Situation:**

Straw mulch has been applied to areas needing mulch. Erosion and sedimentation is reduced, water and soil quality is protected, and vegetative cover is established. Soil moisture is conserved, energy use associated with irrigation is decreased.

**Feature Measure:** Area Covered by Mulch

**Scenario Unit::** Acre

**Scenario Typical Size:** 1.0

**Scenario Total Cost:** $584.82

**Scenario Cost/Unit:** $584.82

Cost Details:

| Component Name | ID | Description | Unit | Cost | QTY | Total |
|---|---|---|---|---|---|---|
| **Equipment Installation** | | | | | | |
| Truck, Pickup | 939 | Equipment and power unit costs. Labor not included. | Hour | $21.79 | 0.5 | $10.90 |
| **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 | $25.31 | 10 | $253.10 |
| **Materials** | | | | | | |
| Straw | 1237 | Small grain straw (non organic and certified organic). Includes materials only. | Ton | $128.33 | 2.5 | $320.83 |

**Practice:** 484 - Mulching

**Scenario** #2 - Straw or Hay, Mechanical Application

**Scenario Description:**

Mechanical application of straw/hay mulch using large round hay bales and a bale mulcher/processor. Practice will reduce erosion, moderate soil temperature, conserve soil moisture and/or facilitate the establishment of vegetative cover.

**Before Situation:**

Potatoes or other crops are harvested too late to establish winter cover in northern regions. Harvest churns up soil form digging/harvest and ground is left bare through winter. Fall and spring rains, along with snow melt, cause excessive soil loss.

**After Situation:**

Mulch is applied to fields using large round hay bales and a bale mulcher/processor. Erosion and sedimentation is reduced, water and soil quality is protected, and vegetative cover is established. Soil moisture is conserved, energy use associated with irrigation is decreased.

**Feature Measure:** Area Covered by Mulch

**Scenario Unit::** Acre

**Scenario Typical Size:** 10.0

**Scenario Total Cost:** $2,424.45

**Scenario Cost/Unit:** $242.45

Cost Details:

| Component Name | ID | Description | Unit | Cost | QTY | Total |
|---|---|---|---|---|---|---|
| **Equipment Installation** | | | | | | |
| Truck, Pickup | 939 | Equipment and power unit costs. Labor not included. | Hour | $21.79 | 3 | $65.37 |
| Tractor, agricultural, 60 HP | 963 | Agricultural tractor with horsepower range of 50 to 90. Equipment and power unit costs. Labor not included. | Hour | $24.77 | 6 | $148.62 |
| Mulcher, straw blower | 1305 | Straw bale mulcher/blower to mechanically spread small or large straw bales. Labor not included. | Hour | $44.71 | 3 | $134.13 |
| **Labor** | | | | | | |
| Equipment Operators, Light | 232 | Includes: Skid Steer Loaders, Hydraulic Excavators <50 HP, Trenchers <12", Ag Equipment <150 HP, Pickup Trucks, Forklifts, Mulchers | Hour | $25.23 | 6 | $151.38 |
| **Materials** | | | | | | |
| Straw | 1237 | Small grain straw (non organic and certified organic). Includes materials only. | Ton | $128.33 | 15 | $1,924.95 |

**Practice:** 484 - Mulching

**Scenario** #3 - Aggregate

**Scenario Description:**

Application of bark, wood chips, peat/sand mix or other state approved aggregate material where mulch is needed. Typically used to prevent erosion, improve vegetative cover, improve soil quality, or conserve soil moisture.

**Before Situation:**

Vegetative cover is poor/declining. The potential for soil erosion is high and mulch is needed to stabilize the soil.

**After Situation:**

Exposed soil is mulched with appropriate materials according to state specifications. Erosion and sedimentation is reduced, water and soil quality is protected.

**Feature Measure:** Area mulched

**Scenario Unit::** 1,000 Square Foot

**Scenario Typical Size:** 1.0

**Scenario Total Cost:** $206.32

**Scenario Cost/Unit:** $206.32

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 | $24.77 | 0.5 | $12.39 |
| Aggregate, Wood Chips | 1098 | Includes materials, equipment and labor | Cubic Yard | $22.66 | 8 | $181.28 |
| **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 | $25.31 | 0.5 | $12.66 |

**Practice:** 484 - Mulching

**Scenario** #4 - Erosion Control Blanket

**Scenario Description:**

Installation of erosion control blanket on critical areas with steep slopes, grassed waterways or diversions. Blanket is typically made of coconut coir, wood fiber, or straw and is typically covered on both sides with polypropylene netting. Used to help control erosion and establish vegetative cover.

**Before Situation:**

There are areas of concentrated flow and a grassed waterway is being installed. Soil erosion is a concern and there is little to no vegetation.

**After Situation:**

The erosion control blanket is placed on concentrated flow areas and secured with ground staples. Soil erosion is minimized and vegetative cover is established.

**Feature Measure:** Area Covered by Mulch

**Scenario Unit::** 1,000 Square Foot

**Scenario Typical Size:** 10.0

**Scenario Total Cost:** $1,943.46

**Scenario Cost/Unit:** $194.35

Cost Details:

| Component Name | ID | Description | Unit | Cost | QTY | Total |
|---|---|---|---|---|---|---|
| **Equipment Installation** | | | | | | |
| Truck, Pickup | 939 | Equipment and power unit costs. Labor not included. | Hour | $21.79 | 2 | $43.58 |
| **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 | $25.31 | 18 | $455.58 |
| **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 | $1.30 | 1111 | $1,444.30 |

**Practice:** 484 - Mulching

**Scenario** #6 - Tree and Shrub

**Scenario Description:**

Weed barrier fabric or other suitable natural or synthetic mulch is installed with a new tree and shrub planting. Typically used to prevent erosion and conserve soil moisture during the installation of conservation practices. Rate is per tree/shrub.

**Before Situation:**

Site conditions vary. Typical scenario is an installation of 100 native trees and shrubs to enhance wildlife habitat. Sites are often remote and trees may not be planted in rows, requiring each tree to be mulched individually

**After Situation:**

Weed barrier squares are installed around individual trees and shrubs. Soil moisture is conserved and establishment of trees/shrubs is improved. Erosion is minimized.

**Feature Measure:** Number of Trees Mulched

**Scenario Unit::** Each

**Scenario Typical Size:** 100.0

**Scenario Total Cost:** $126.50

**Scenario Cost/Unit:** $1.27

Cost Details:

| Component Name | ID | Description | Unit | Cost | QTY | Total |
|---|---|---|---|---|---|---|
| **Equipment Installation** | | | | | | |
| Geotextile, woven | 42 | Woven Geotextile Fabric. Includes materials, equipment and labor | Square Yard | $2.53 | 50 | $126.50 |

**Practice:** 490 - Tree/Shrub Site Preparation

**Scenario** #1 - Mechanical - Heavy

**Scenario Description:**

This practice involves the use of heavy machinery to treat an area in order to improve site conditions for establishing trees and/or shrubs. Typical sites include trees and brush cover that is not appropriate to the site or providing the desired condition for the landowner. This practice is typically used to address the following resource concerns: degraded plant condition - undesirable plant productivity and health and inadequate structure and composition and soil quality degradation - soil erosion - sheet and rill.

**Before Situation:**

The site is dominated by undesirable vegetation including herbaceous plants and significant amounts of woody vegetation (trees and brush) occupying the site. There is also a significant component of woody debris onsite. Noxious and invasive species may also be present on the site. Soils are compacted as a result of past heavy equipment activities or from other land uses. Sheet and rill erosion is occurring in areas where the soil was severely disturbed exposing bare soil. If left untreated, soil compaction and erosion issues will result in poor survival or reduced growth of trees/shrubs to be established on the site.

**After Situation:**

Undesirable vegetation has been removed using mechanical methods reducing competition for target trees and/or shrubs. Woody debris has been removed to facilitate tree/shrub planting operations. Soil compaction has been alleviated, allowing penetration of moisture and allowing roots to grow properly. Site conditions are favorable for successful establishment of trees and/or shrubs. The typical size is 40 acres.

**Feature Measure:** Area of Treatment

**Scenario Unit::** Acre

**Scenario Typical Size:** 40.0

**Scenario Total Cost:** $10,994.31

**Scenario Cost/Unit:** $274.86

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 | $219.95 | 24 | $5,278.80 |
| 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 | $190.32 | 24 | $4,567.68 |
| **Labor** | | | | | | |
| General Labor | 231 | Labor performed using basic tools such as power tool, shovels, and other tools that do not require extensive training. Ex. pipe layer, herder, concrete placement, materials spreader, flagger, etc. | Hour | $25.31 | 8 | $202.48 |
| Supervisor or Manager | 234 | Labor involving supervision or management activities. Includes crew supervisors, foremen and farm/ranch managers time required for adopting new technology, etc. | Hour | $45.69 | 10 | $456.90 |
| **Mobilization** | | | | | | |
| Mobilization, large equipment | 1140 | Equipment >150HP or typical weights greater than 30,000 pounds or loads requiring over width or over length permits. | Each | $488.45 | 1 | $488.45 |

**Practice:** 490 - Tree/Shrub Site Preparation

**Scenario** #2 - Mechanical - Light

**Scenario Description:**

This practice involves the use of light/moderate machinery to clear above ground vegetation and to also rip/cut/lift underground root systems in order to improve site conditions for establishing trees and/or shrubs. Typical sites include abandoned fields, pastures, rangelands, agricultural fields or forestlands that have been harvested. This following resource concerns: soil quality degradation - compaction, soil erosion - sheet and rill, and degraded plant condition - undesirable plant productivity and health and inadequate structure and composition.

**Before Situation:**

Undesirable vegetation is present on the site including herbaceous plants and sparse woody competition. Noxious and invasive species may also be present on the site. If left uncontrolled, undesirable vegetation will inhibit successful establishment of target species of trees and/or shrubs. Soils are compacted as a result of harvesting heavy equipment activities or other land uses.

**After Situation:**

Undesirable vegetation has been removed using a bush hog to knock down stand vegetation and heavy tillage equipment is used to breakup and lift root systems, breakup plow pans (<18" deep), thus enhancing the conditions for planting and survival of trees and/or shrubs. Soil compaction has been alleviated, allowing penetration of moisture and allowing roots to grow properly. Site conditions are favorable for successful establishment of trees and/or shrubs. The typical size of the practice is 40 acres.

**Feature Measure:** Area of Treatment

**Scenario Unit::** Acre

**Scenario Typical Size:** 40.0

**Scenario Total Cost:** $3,044.53

**Scenario Cost/Unit:** $76.11

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 | $51.91 | 20 | $1,038.20 |
| Tillage, Primary | 946 | Includes heavy disking (offset) or chisel plow. Includes equipment, power unit and labor costs. | Acre | $16.60 | 30 | $498.00 |
| **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 | $25.31 | 5 | $126.55 |
| Equipment Operators, Light | 232 | Includes: Skid Steer Loaders, Hydraulic Excavators <50 HP, Trenchers <12", Ag Equipment <150 HP, Pickup Trucks, Forklifts, Mulchers | Hour | $25.23 | 20 | $504.60 |
| 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 | $45.69 | 8 | $365.52 |
| **Mobilization** | | | | | | |
| Mobilization, medium equipment | 1139 | Equipment with 70-150 HP or typical weights between 14,000 and 30,000 pounds. | Each | $255.83 | 2 | $511.66 |

**Practice:** 490 - Tree/Shrub Site Preparation

**Scenario** #3 - Chemical - Ground Application

**Scenario Description:**

This practice involves the use of various herbicides applied using ground-based machinery (and some hack-n-squirt treatment of select trees) in order to remove undesirable vegetation and improve site conditions for establishing trees and/or shrubs. Typical sites include abandoned fields, pastures, rangelands, agricultural fields or forestland that was recently harvested. This practice is typically used to address the following resource concerns: degraded plant condition - undesirable plant productivity and health and inadequate structure and composition.

**Before Situation:**

Undesirable vegetation is present on the site including herbaceous plants and woody vegetation. Noxious and invasive species may also be present on the site. If left uncontrolled, undesirable vegetation will inhibit successful establishment of target species of trees and/or shrubs.

**After Situation:**

Undesirable vegetation has been treated using appropriate herbicides, reducing competition for target trees and/or shrubs. Site conditions are favorable for successful establishment of trees and/or shrubs. The typical size of the practice is 40 acres.

**Feature Measure:** Area of Treatment

**Scenario Unit::** Acre

**Scenario Typical Size:** 40.0

**Scenario Total Cost:** $8,065.11

**Scenario Cost/Unit:** $201.63

Cost Details:

| Component Name | ID | Description | Unit | Cost | QTY | Total |
|---|---|---|---|---|---|---|
| **Equipment Installation** | | | | | | |
| Chemical, spot treatment, single stem application | 964 | Ground applied chemical to individual plants or group of plants, e.g., backpack sprayer treatment. Equipment and labor cost included. | Hour | $64.90 | 20 | $1,298.00 |
| 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 | $116.94 | 40 | $4,677.60 |
| **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 | $45.69 | 20 | $913.80 |
| **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 | $17.48 | 40 | $699.20 |
| Herbicide, Triclopyor | 338 | Refer to WIN-PST for product names and active ingredients. Materials and shipping | Acre | $42.37 | 4 | $169.48 |
| 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 shi | Acre | $1.28 | 40 | $51.20 |
| **Mobilization** | | | | | | |
| Mobilization, medium equipment | 1139 | Equipment with 70-150 HP or typical weights between 14,000 and 30,000 pounds. | Each | $255.83 | 1 | $255.83 |

**Practice:** 490 - Tree/Shrub Site Preparation

**Scenario** #4 - Chemical - Aerial Application

**Scenario Description:**

This practice involves the use of herbicides applied by helicopter in order to remove undesirable vegetation and improve site conditions for establishing trees and/or shrubs. This typical scenario includes open land such as abandoned fields, pastures or forestlands that were recently harvested. This practice is typically used to address the following resource concerns: degraded plant condition - undesirable plant productivity and health and inadequate structure and composition.

**Before Situation:**

Undesirable vegetation is present on the site including herbaceous plants and woody competition. Noxious and invasive species may also be present on the site. If left uncontrolled, undesirable vegetation will inhibit successful establishment of target species of trees and/or shrubs.

**After Situation:**

Undesirable vegetation has been treated using appropriate herbicides, reducing competition for target trees and/or shrubs. Site conditions are favorable for successful establishment of trees and/or shrubs. The typical size of the practice is 40 acres.

**Feature Measure:** Area of Treatment

**Scenario Unit::** Acre

**Scenario Typical Size:** 40.0

**Scenario Total Cost:** $2,596.00

**Scenario Cost/Unit:** $64.90

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 | $25.31 | 8 | $202.48 |
| Supervisor or Manager | 234 | Labor involving supervision or management activities. Includes crew supervisors, foremen and farm/ranch managers time required for adopting new technology, etc. | Hour | $45.69 | 8 | $365.52 |
| **Materials** | | | | | | |
| Herbicide, Glyphosate | 334 | A broad-spectrum, non-selective systemic herbicide. Refer to WIN-PST for product names and active ingredients. Includes materials and shipping only. | Acre | $17.48 | 40 | $699.20 |
| 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 shi | Acre | $1.28 | 40 | $51.20 |

**Practice:** 490 - Tree/Shrub Site Preparation

**Scenario** #5 - Chemical - Hand Application

**Scenario Description:**

This practice involves the use of various herbicides applied using backpack sprayer or similar equipment, and hack-n-squirt for tree control, in order to remove undesirable vegetation and improve site conditions for establishing trees and/or shrubs. Typical sites include lands such as old fields, pastures, rangelands, agricultural fields, previous forestlands that have been abandoned and are now covered with a mixture of grasses, forbs, shrubs and some remnant trees. Resource concerns are: degraded plant condition - undesirable plant productivity and health and inadequate structure and composition.

**Before Situation:**

Undesirable vegetation, including woody and herbaceous plants, occupy 100 % of the on the site. Noxious and invasive species may also be present on the site. If left uncontrolled, undesirable vegetation will inhibit successful establishment of target species of trees and/or shrubs.

**After Situation:**

Undesirable vegetation has been treated using appropriate herbicides, reducing competition for target trees and/or shrubs. Site conditions are favorable for successful establishment of trees and/or shrubs. The typical size of the practice is 40 acres.

**Feature Measure:** area of treatment

**Scenario Unit::** Acre

**Scenario Typical Size:** 40.0

**Scenario Total Cost:** $4,760.72

**Scenario Cost/Unit:** $119.02

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 | $64.90 | 40 | $2,596.00 |
| **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 | $45.69 | 20 | $913.80 |
| **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 | $26.28 | 40 | $1,051.20 |
| 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 | $37.13 | 4 | $148.52 |
| 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 shi | Acre | $1.28 | 40 | $51.20 |

**Practice:** 490 - Tree/Shrub Site Preparation

**Scenario** #6 - Hand site preparation

**Scenario Description:**

This practice typically involves grubbing all vegetation from the area of ground prior to the establishment of trees and/or shrubs. Typical sites include land such as old fields, pastures, rangelands, agricultural fields, or abandoned forests that are mostly grass or weed covered. This practice is typically used to address the following resource concerns: degraded plant condition - undesirable plant productivity and health and inadequate structure.

**Before Situation:**

The site contains undesirable vegetation including herbaceous and woody plants. Noxious and invasive species may also be present on the site. If left uncontrolled, undesirable vegetation will inhibit successful establishment of target species of trees and/or shrubs. Soils are compacted as a result of recent timber harvesting activities or other land uses. If left untreated poor survival or reduced growth of trees/shrubs will occur and wildlife habitat conditions will not improve.

**After Situation:**

All undesirable vegetation has been grubbed out of a 4 ft by 4 ft area, leaving bare soil, at each planting spot. Tree seedlings and/or shrubs are planted at each spot. Adequate moisture, space and light is available allowing plants to grow properly. Site conditions are favorable for successful establishment of trees and/or shrubs. The typical size is 10 acres.

**Feature Measure:** Area of Treatment

**Scenario Unit::** Acre

**Scenario Typical Size:** 10.0

**Scenario Total Cost:** $2,488.61

**Scenario Cost/Unit:** $248.86

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 | $25.31 | 55 | $1,392.05 |
| Supervisor 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 | $45.69 | 24 | $1,096.56 |

**Practice:** 490 - Tree/Shrub Site Preparation

**Scenario** #7 - WindBreak - Site Preparation

**Scenario Description:**

This practice involves the use of various chemical/tillage methods to allow for the planting of a windbreak. Site preparation includes chemically killing vegetation prior to mechanical site preparation that includes appropriate methods to allow for planting of the site which may include one or all of the following, ripping, disking, and harrowing. This practice may be applied on all lands needing treatment to facilitate establishment of trees and/or shrubs to facilitate establishment of a windbreak. Typical sites include open land such as old fields, pastures, rangelands and agricultural fields. Resource concerns: Soil erosion--Wind erosion, .

**Before Situation:**

Undesirable vegetation, including woody and herbaceous plants, is present on the site. Noxious and invasive species may also be present on the site. If left uncontrolled, undesirable vegetation will inhibit successful establishment of target species of trees and/or shrubs. Soil is compacted as a result of prior land management activities.

**After Situation:**

Undesirable vegetation has been treated using appropriate herbicides, reducing competition for target trees and/or shrubs. Site conditions are favorable for successful establishment of trees and/or shrubs. The typical size is 1.5 acres.

**Feature Measure:** area of treatment

**Scenario Unit::** Acre

**Scenario Typical Size:** 1.0

**Scenario Total Cost:** $372.15

**Scenario Cost/Unit:** $372.15

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 | $11.14 | 1.5 | $16.71 |
| Chemical, ground application | 948 | Chemical application performed by ground equipment. Includes equipment, power unit and labor costs. | Acre | $6.13 | 1.5 | $9.20 |
| **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 | $25.31 | 2 | $50.62 |
| **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 | $7.77 | 1.5 | $11.66 |
| 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 | $17.48 | 1.5 | $26.22 |
| 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 shi | Acre | $1.28 | 1.5 | $1.92 |
| **Mobilization** | | | | | | |
| Mobilization, medium equipment | 1139 | Equipment with 70-150 HP or typical weights between 14,000 and 30,000 pounds. | Each | $255.83 | 1 | $255.83 |

**Practice:** 500 - Obstruction Removal

**Scenario** #1 - Removal and Disposal of Brush and Trees upto 6 inch Diameter

**Scenario Description:**

Remove and disposal of brush and trees < 6 inches in diameter by demolition, excavation or other means required for removal. Dispose of all brush and trees so that it does not impede subsequent work or cause onsite or offsite damage. Dispose of all brush and trees by removal to an approved landfill, wood chipping and or land distribution, or recycling center, burial at an approved location or burning. If burning is used, implement appropriate smoke management to protect public health and safety. Remove and dispose of brush and trees in order to apply conservation practices or facilitate the planned land use. Brush and tree removal will address the resource concerns of the prevention or hindrance to the installation of conservation practices or present a hazard to their use and enjoyment.

**Before Situation:**

On any land where existing obstructions interfere with planned land use development, public safety or infrastructure. The site may be abandoned mine lands, construction sites, recreation areas, farms, ranches, and areas affected by natural disasters. This is not intended for the removal of obstructions from aquatic environments.

**After Situation:**

The typical area will be a 2.0 acre impaired area. The removal of brush and trees < 6 inch diameter will be performed with the use of equipment and hand labor. Dispose of all brush and trees from the obstruction removal so that it does not impede subsequent work or cause onsite or offsite damage. Revegetate or otherwise protect from erosion disturbed areas as soon as possible. Refer to NRCS Conservation Practice Standard 342, Critical Area Planting for seedbed preparation, seeding, fertilizing, and mulching requirements. The practice is to improve site conditions in order to apply conservation practices or facilitate better use of the landscape.

**Feature Measure:** Land Area

**Scenario Unit::** Acre

**Scenario Typical Size:** 2.0

**Scenario Total Cost:** $2,330.79

**Scenario Cost/Unit:** $1,165.40

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 | $124.03 | 8 | $992.24 |
| Brush Chipper, 6" capacity | 938 | Brush Chipper, 6" capacity, typically 35 HP. Includes chipper and power unit. Labor not included. | Hour | $21.25 | 8 | $170.00 |
| Truck, Pickup | 939 | Equipment and power unit costs. Labor not included. | Hour | $21.79 | 8 | $174.32 |
| **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 | $41.76 | 8 | $334.08 |
| 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 | $25.31 | 8 | $202.48 |
| Equipment Operators, Light | 232 | Includes: Skid Steer Loaders, Hydraulic Excavators <50 HP, Trenchers <12", Ag Equipment <150 HP, Pickup Trucks, Forklifts, Mulchers | Hour | $25.23 | 8 | $201.84 |
| **Mobilization** | | | | | | |
| Mobilization, medium equipment | 1139 | Equipment with 70-150 HP or typical weights between 14,000 and 30,000 pounds. | Each | $255.83 | 1 | $255.83 |

**Practice:** 500 - Obstruction Removal

**Scenario** #2 - Removal and Disposal of Brush and Trees over 6 inch Diameter

**Scenario Description:**

Remove and disposal of brush and trees > 6 inches in diameter by demolition, excavation or other means required for removal. Dispose of all brush and trees so that it does not impede subsequent work or cause onsite or offsite damage. Dispose of all brush and trees by removal to an approved landfill, wood chipping and or land distribution, or recycling center, burial at an approved location or burning. If burning is used, implement appropriate smoke management to protect public health and safety. Remove and dispose of brush and trees in order to apply conservation practices or facilitate the planned land use. Brush and tree removal will address the resource concerns of the prevention or hindrance to the installation of conservation practices or present a hazard to their use and enjoyment.

**Before Situation:**

On any land where existing obstructions interfere with planned land use development, public safety or infrastructure. The site may be abandoned mine lands, construction sites, recreation areas, farms, ranches, and areas affected by natural disasters. This is not intended for the removal of obstructions from aquatic environments.

**After Situation:**

The typical area will be a 2.0 acre impaired area. The removal of brush and trees > 6 inch diameter will be performed with the use of equipment and hand labor. Dispose of all brush and trees from the obstruction removal so that it does not impede subsequent work or cause onsite or offsite damage. Revegetate or otherwise protect from erosion disturbed areas as soon as possible. Refer to NRCS Conservation Practice Standard 342, Critical Area Planting for seedbed preparation, seeding, fertilizing, and mulching requirements. The practice is to improve site conditions in order to apply conservation practices or facilitate better use of the landscape.

**Feature Measure:** Land Area

**Scenario Unit::** Acre

**Scenario Typical Size:** 2.0

**Scenario Total Cost:** $4,711.08

**Scenario Cost/Unit:** $2,355.54

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 | $194.15 | 12 | $2,329.80 |
| Truck, Pickup | 939 | Equipment and power unit costs. Labor not included. | Hour | $21.79 | 12 | $261.48 |
| Brush Chipper, 15" capacity | 1868 | Brush Chipper, 15" capacity, typically 165 HP. Includes chipper and power unit. Does not include labor. | Hour | $65.21 | 12 | $782.52 |
| **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 | $41.76 | 12 | $501.12 |
| General Labor | 231 | Labor performed using basic tools such as power tool, shovels, and other tools that do not require extensive training. Ex. pipe layer, herder, concrete placement, materials spreader, flagger, etc. | Hour | $25.31 | 12 | $303.72 |
| 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 | $44.37 | 12 | $532.44 |

**Practice:** 500 - Obstruction Removal

**Scenario** #3 - Removal and Disposal of Fence

**Scenario Description:**

Remove and disposal of all existing fences by demolition, excavation or other means required for removal. Dispose of all fence materials from the site so that it does not impede subsequent work or cause onsite or offsite damage. Dispose of all materials by removal to an approved landfill, wood chipping and land distribution, or recycling center, burial at an approved location or burning. If burning is used, implement appropriate smoke management to protect public health and safety. Remove and dispose of the unwanted fence obstruction in order to apply conservation practices such as Upland Wildlife Habitat Management (645) or facilitate the planned land use. Fence removal will address the resource concerns of the prevention or hindrance to the installation of conservation practices or present a hazard to their use and enjoyment and reduce hazards to wildlife.

**Before Situation:**

On any land where existing fence interferes with planned land use development, public safety, wildlife movement and habitat, or infrastructure. The site may be abandoned mine lands, construction sites, recreation areas, farms, ranches, and areas affected by natural disasters. This is not intended for the removal of obstructions from aquatic environments.

**After Situation:**

The typical fence will be 2640 in linear feet. The removal of the fence will be performed with the use of equipment and hand labor. Dispose of all debris from the fence removal so that it does not impede subsequent work or cause onsite or offsite damage. Revegetate or otherwise protect from erosion disturbed areas as soon as possible. Refer to NRCS Conservation Practice Standard 342, Critical Area Planting for seedbed preparation, seeding, fertilizing, and mulching requirements. The practice is to improve site conditions in order to apply conservation practices or facilitate better use of the landscape such as Upland Wildlife Habitat Management (645).

**Feature Measure:** Length of Fence

**Scenario Unit::** Foot

**Scenario Typical Size:** 2,640.0

**Scenario Total Cost:** $2,594.43

**Scenario Cost/Unit:** $0.98

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 | $44.60 | 20 | $892.00 |
| Truck, Pickup | 939 | Equipment and power unit costs. Labor not included. | Hour | $21.79 | 20 | $435.80 |
| **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 | $25.31 | 20 | $506.20 |
| Equipment Operators, Light | 232 | Includes: Skid Steer Loaders, Hydraulic Excavators <50 HP, Trenchers <12", Ag Equipment <150 HP, Pickup Trucks, Forklifts, Mulchers | Hour | $25.23 | 20 | $504.60 |
| **Mobilization** | | | | | | |
| Mobilization, medium equipment | 1139 | Equipment with 70-150 HP or typical weights between 14,000 and 30,000 pounds. | Each | $255.83 | 1 | $255.83 |

**Practice:** 500 - Obstruction Removal

**Scenario** #4 - Removal and Disposal of Rock and or Boulders

**Scenario Description:**

Remove and disposal of rock and or boulders by drilling, blasting, demolition, excavation or other means required for removal. Dispose of all rocks and or boulders so that it does not impede subsequent work or cause onsite or offsite damage. Dispose of all rock and or boulders by removal to an approved location, or reuse location. Remove and dispose all rock and or boulders in order to apply conservation practices or facilitate the planned land use. Rocks and or boulders will address the resource concerns of the prevention or hindrance to the installation of conservation practices or present a hazard to their use and enjoyment.

**Before Situation:**

On any land where existing obstructions interfere with planned land use development, public safety or infrastructure. The site may be abandoned mine lands, construction sites, recreation areas, farms, ranches, and areas affected by natural disasters. This is not intended for the removal of obstructions from aquatic environments.

**After Situation:**

The typical area will be a 20 acre impaired area. The removal of rock and or boulders will be performed by drilling, blasting, demolition, excavation or other means required for removal with the use of heavy equipment and hand labor. Dispose of all rocks and boulders from the obstruction removal so that it does not impede subsequent work or cause onsite or offsite damage. Revegetate or otherwise protect from erosion disturbed areas as soon as possible. Refer to NRCS Conservation Practice Standard 342, Critical Area Planting for seedbed preparation, seeding, fertilizing, and mulching requirements. The practice is to improve site conditions in order to apply conservation practices or facilitate better use of the landscape.

**Feature Measure:** Area

**Scenario Unit::** Acre

**Scenario Typical Size:** 20.0

**Scenario Total Cost:** $70,999.20

**Scenario Cost/Unit:** $3,549.96

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 | $62.74 | 240 | $15,057.60 |
| Truck, dump, 18 CY | 1400 | Dump truck for moving bulk material. Typically capacity is 25 ton or 18 cubic yards. Includes equipment only. | Hour | $121.65 | 240 | $29,196.00 |
| **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 | $41.76 | 240 | $10,022.40 |
| 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 | $25.31 | 240 | $6,074.40 |
| 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 | $44.37 | 240 | $10,648.80 |

**Practice:** 500 - Obstruction Removal

**Scenario** #5 - Removal and Disposal of Steel and or Concrete Structures

**Scenario Description:**

Remove and disposal of steel and or concrete structures by demolition, excavation or other means required for removal. Dispose of all steel and or concrete structures so that it does not impede subsequent work or cause onsite or offsite damage. Dispose of all steel and or concrete structures by removal to an approved location, or reuse location. Remove and dispose all steel and or concrete structures in order to apply conservation practices or facilitate the planned land use. Steel and or concrete structure removal will address the resource concerns of the prevention or hindrance to the installation of conservation practices or present a hazard to their use and enjoyment.

**Before Situation:**

On any land where existing obstructions interfere with planned land use development, public safety or infrastructure. The site may be abandoned mine lands, construction sites, recreation areas, farms, ranches, and areas affected by natural disasters. This is not intended for the removal of obstructions from aquatic environments.

**After Situation:**

The typical area will be a 2000 square feet of impaired land. The removal of steel and or concrete structures will be performed by demolition, excavation or other means required for removal with the use of heavy equipment and hand labor. Dispose of all steel and or concrete structures from the obstruction removal so that it does not impede subsequent work or cause onsite or offsite damage. Revegetate or otherwise protect from erosion disturbed areas as soon as possible. Refer to NRCS Conservation Practice Standard 342, Critical Area Planting for seedbed preparation, seeding, fertilizing, and mulching requirements. The practice is to improve site conditions in order to apply conservation practices or facilitate better use of the landscape.

**Feature Measure:** Land Area

**Scenario Unit::** Square Foot

**Scenario Typical Size:** 2,000.0

**Scenario Total Cost:** $31,358.72

**Scenario Cost/Unit:** $15.68

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 | $194.15 | 64 | $12,425.60 |
| 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 | $62.74 | 64 | $4,015.36 |
| Truck, dump, 18 CY | 1400 | Dump truck for moving bulk material. Typically capacity is 25 ton or 18 cubic yards. Includes equipment only. | Hour | $121.65 | 64 | $7,785.60 |
| **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 | $41.76 | 64 | $2,672.64 |
| 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 | $25.31 | 64 | $1,619.84 |
| 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 | $44.37 | 64 | $2,839.68 |

**Practice:** 500 - Obstruction Removal

**Scenario** #6 - Removal and Disposal of Wood Structures

**Scenario Description:**

Remove and disposal of wood structures by demolition, excavation or other means required for removal. Dispose of all wood structures so that it does not impede subsequent work or cause onsite or offsite damage. Dispose of all wood structures by removal to an approved location, landfill, or reuse location. Remove and dispose all wood structures in order to apply conservation practices or facilitate the planned land use. Wood structure removal will address the resource concerns of the prevention or hindrance to the installation of conservation practices or present a hazard to their use and enjoyment.

**Before Situation:**

On any land where existing obstructions interfere with planned land use development, public safety or infrastructure. The site may be abandoned mine lands, construction sites, recreation areas, farms, ranches, and areas affected by natural disasters. This is not intended for the removal of obstructions from aquatic environments.

**After Situation:**

The typical area will be a 2000 square feet of impaired land. The removal of wood structures will be performed by demolition, excavation or other means required for removal with the use of heavy equipment and hand labor. Dispose of all wood structures from the obstruction removal so that it does not impede subsequent work or cause onsite or offsite damage. Revegetate or otherwise protect from erosion disturbed areas as soon as possible. Refer to NRCS Conservation Practice Standard 342, Critical Area Planting for seedbed preparation, seeding, fertilizing, and mulching requirements. The practice is to improve site conditions in order to apply conservation practices or facilitate better use of the landscape.

**Feature Measure:** Land Area

**Scenario Unit::** Square Foot

**Scenario Typical Size:** 2,000.0

**Scenario Total Cost:** $15,679.36

**Scenario Cost/Unit:** $7.84

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 | $194.15 | 32 | $6,212.80 |
| Hydraulic Excavator, .5 CY | 930 | Track mounted hydraulic excavator with bucket capacity range of 0.3 to 0.8 CY. Equipment and power unit costs. Labor not included. | Hour | $62.74 | 32 | $2,007.68 |
| Truck, dump, 18 CY | 1400 | Dump truck for moving bulk material. Typically capacity is 25 ton or 18 cubic yards. Includes equipment only. | Hour | $121.65 | 32 | $3,892.80 |
| **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 | $41.76 | 32 | $1,336.32 |
| 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 | $25.31 | 32 | $809.92 |
| 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 | $44.37 | 32 | $1,419.84 |

**Practice:** 500 - Obstruction Removal

**Scenario** #7 - Rock Excavation

**Scenario Description:**

Drilling, blasting, excavation and removal of "competent" (non-rippable) rock. Rock is excavated so that it does not impede the installation of a conservation practice. Excavated rock is hauled to an approved staging area for reuse or disposal area. Rock excavation is necessary to install a conservation practices or to facilitate the planned land use. Resource concerns is the prevention and/or hindrance of installing a conservation practices or removal of a safety hazard.

**Before Situation:**

On any land where "competent rock" interferes with planned land use development, public safety or infrastructure. The site may be abandoned mine lands, construction sites, recreation areas, farms, ranches, and areas affected by natural disasters. This is not intended for the removal of obstructions from aquatic environments.

**After Situation:**

The excavation of "competent" (non-rippable) rock will be performed by drilling, blasting, excavation, demolition, or other means required for removal with the use of heavy equipment. Rock shall be removed from the sites so that it does not impede in the subsequent installation of conservation practices or cause a safety hazard. Revegetate or otherwise protect from erosion disturbed areas as soon as possible. Refer to NRCS Conservation Practice Standard 342, Critical Area Planting for seedbed preparation, seeding, fertilizing, and mulching requirements. The practice is to improve site conditions in order to apply conservation practices or facilitate better use of the landscape.

**Feature Measure:** Cubic Yards of Rock to be Excavate

**Scenario Unit::** Cubic Yard

**Scenario Typical Size:** 200.0

**Scenario Total Cost:** $8,485.14

**Scenario Cost/Unit:** $42.43

Cost Details:

| Component Name | ID | Description | Unit | Cost | QTY | Total |
|---|---|---|---|---|---|---|
| **Equipment Installation** | | | | | | |
| Excavation, common earth, wet, side cast, large equipment | 1228 | Bulk excavation and side casting of wet common earth with hydraulic excavator or dragline with greater than 1 CY capacity. Includes equipment and labor. | Cubic Yard | $4.32 | 200 | $864.00 |
| Drilling & Blasting Rock, Bulk with blasting mats | 1397 | Bulk drilling & Blasting of rock or boulders in locations requiring the use of blasting mats (Min. 175 CY, Max 1500 CY). Includes all equipment, labor and supplies to complete the blast. | Cubic Yard | $18.39 | 200 | $3,678.00 |
| Truck, dump, 18 CY | 1400 | Dump truck for moving bulk material. Typically capacity is 25 ton or 18 cubic yards. Includes equipment only. | Hour | $121.65 | 15 | $1,824.75 |
| **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 | $44.37 | 15 | $665.55 |
| Supervisor 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 | $45.69 | 15 | $685.35 |
| **Mobilization** | | | | | | |
| Mobilization, medium equipment | 1139 | Equipment with 70-150 HP or typical weights between 14,000 and 30,000 pounds. | Each | $255.83 | 3 | $767.49 |

**Practice:** 500 - Obstruction Removal

**Scenario** #8 - Concrete Slab Removal

**Scenario Description:**

Cutting, demolition, excavation and removal of concrete slab. Concrete slab is demolished and removed so that it does not impede the installation of a conservation practice. Excavated concrete rubble is hauled to an approved disposal area. Concrete slab demolition and removal is necessary to install a conservation practices or to facilitate the planned land use. Resource concerns is the prevention and/or hindrance of installing a conservation practices or removal of a safety hazard.

**Before Situation:**

On any land where an existing concrete slab interferes with planned land use development, public safety or infrastructure. The site may be an existing heavy use area (barnyard), waste storage facility, building foundation, etc.

**After Situation:**

The demolition and removal of a concrete slab will be performed by cutting the concrete with a diamond saw, breaking and removing the concrete with an excavator, removing the concrete rubble from the construction site with a skidsteer load and hauling the rubble off site with a dump truck. Concrete slab shall be removed from the sites so that it does not impede in the subsequent installation of conservation practices or cause a safety hazard. Revegetate or otherwise protect from erosion disturbed areas as soon as possible. The practice is to improve site conditions in order to apply conservation practices or facilitate better use of the landscape. Other associated practices are 313 - Waste Storage Facility, 561 - Heavy Use Area Protection, 634 - Waste Transfer, 533 - Pumping Plant, 558 - Roof Runoff Structure, etc.

**Feature Measure:** Square Feet of Concrete Slab to be

**Scenario Unit::** Square Foot

**Scenario Typical Size:** 750.0

**Scenario Total Cost:** $2,875.64

**Scenario Cost/Unit:** $3.83

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 | $113.75 | 5 | $568.75 |
| Skidsteer, 80 HP | 933 | Skidsteer loader with horsepower range of 60 to 90. Equipment and power unit costs. Labor not included. | Hour | $44.60 | 5 | $223.00 |
| Truck, dump, 12 CY | 1215 | Dump truck for moving bulk material. Typically capacity is 16 ton or 12 cubic yards. Includes equipment only. | Hour | $96.73 | 5 | $483.65 |
| **Labor** | | | | | | |
| General Labor | 231 | Labor performed using basic tools such as power tool, shovels, and other tools that do not require extensive training. Ex. pipe layer, herder, concrete placement, materials spreader, flagger, etc. | Hour | $25.31 | 3 | $75.93 |
| Equipment Operators, Light | 232 | Includes: Skid Steer Loaders, Hydraulic Excavators <50 HP, Trenchers <12", Ag Equipment <150 HP, Pickup Trucks, Forklifts, Mulchers | Hour | $25.23 | 5 | $126.15 |
| 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 | $44.37 | 10 | $443.70 |
| 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 | $45.69 | 1 | $45.69 |
| **Mobilization** | | | | | | |
| Mobilization, very small equipment | 1137 | Equipment that is small enough to be transported by a pick-up truck with typical weights less than 3,500 pounds. Can be multiple pieces of equipment if all hauled simultaneously. | Each | $70.64 | 2 | $141.28 |
| Mobilization, medium equipment | 1139 | Equipment with 70-150 HP or typical weights between 14,000 and 30,000 pounds. | Each | $255.83 | 3 | $767.49 |

**Practice:** 511 - Forage Harvest Management

**Scenario** #1 - Improved Forage Quality

**Scenario Description:**

Improved cultural practices and recordkeeping result in better forage quality and better livestock performance.

**Before Situation:**

Forage cutting heights are as close to the ground as equipment will allow resulting in very low stubble height. Plant regrowth is very slow. Forage quality tests are not regularly done. Records of forage quality components, cutting heights, moisture content, and harvest schedule are not regularly kept.

**After Situation:**

Forage cutting heights are raised to leave at least 3-4" stubble height for cool season grasses and 6- 8" (use a boot on the mower) for warm season grasses. Increased residual forage results in much faster plant regrowth. Forage quality tests are submitted to an accredited lab for analysis. Records of forage quality components, cutting heights, moisture content, and harvest schedule are regularly kept to track increased forage quality and improved livestock performance.

**Feature Measure:** Improved Relative Feed Value

**Scenario Unit::** Acre

**Scenario Typical Size:** 30.0

**Scenario Total Cost:** $130.29

**Scenario Cost/Unit:** $4.34

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 | $63.92 | 1 | $63.92 |
| **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 | $41.76 | 1 | $41.76 |
| **Materials** | | | | | | |
| Test, Plant Tissue Test | 301 | Tissue analysis for crops. Includes materials and shipping only. | Each | $24.61 | 1 | $24.61 |

**Practice:** 511 - Forage Harvest Management

**Scenario** #2 - Organic Preemptive Harvest

**Scenario Description:**

Preemptive harvest of forage crops to prevent damage from insects (such as leafhopper on alfalfa) or other pests results in better forage quality and better livestock performance.

**Before Situation:**

Forage pests are usually controlled with pesticides.

**After Situation:**

In organic or transitioning to organic systems, forage pests are controlled by executing a preemptive harvest before pests can damage forage quality. Forage yields are reduced because of immature stage of forage growth and forage quality may also be affected. Forage tests are submitted to an accredited lab for analysis to verify forage quality. Records of forage quality components are used to adjust feeding rations.

**Feature Measure:** Relative Feed Value Maintained

**Scenario Unit::** Acre

**Scenario Typical Size:** 30.0

**Scenario Total Cost:** $463.29

**Scenario Cost/Unit:** $15.44

Cost Details:

| Component Name | ID | Description | Unit | Cost | QTY | Total |
|---|---|---|---|---|---|---|
| **Acquisition of Technical Knowledge** | | | | | | |
| Training, Workshops | 294 | Educational seminar or series of meetings emphasizing interaction and exchange of information among a usually small number of participants. | Each | $63.92 | 1 | $63.92 |
| **Foregone Income** | | | | | | |
| FI, Grazing AUMs | 2079 | Grazing is the Primary Land Use | Animal Unit Month | $16.65 | 20 | $333.00 |
| **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 | $41.76 | 1 | $41.76 |
| **Materials** | | | | | | |
| Test, Plant Tissue Test | 301 | Tissue analysis for crops. Includes materials and shipping only. | Each | $24.61 | 1 | $24.61 |

**Practice:** 511 - Forage Harvest Management

**Scenario** #3 - Perennial Crops - Delayed Mowing

**Scenario Description:**

In perennial forage crops, the delaying the harvest of the first cutting to promote the reproduction of ground nesting birds. Delaying the harvest of the first cutting will benefit ground nesting birds; research at the University of Vermont showed that breeding success for declining grassland songbirds (e.g. Bobolink) went from 0 on a regularly harvested hay field to 2.8 fledglings per female per year when the first harvest on a hayfield was delayed until August 1st. Bobolinks, Eastern Meadowlarks, and Savannah Sparrows require a nesting period to fledge young that lasts through the end of July in most parts of the eastern US. The delayed harvest results in a decrease in overall forage quality. Farmers could see as much as a 50% reduction in market value due to declines in protein (~50%) and digestibility (~20%), making the forage crop less palatable and lower in relative feed value. The selected fields should be large enough to promote ground nesting birds. After young have fledged the field will be harvested for dry forages.

**Before Situation:**

Perennial forage crops are produced and harvested; ground nesting birds are disturbed and/or fledgling birds are killed in the process.

**After Situation:**

Annual crops are harvested with a delayed mowing; forage quality is compromised, however, the survival of ground nesting birds is promoted.

**Feature Measure:** Increased grassland bird populatio

**Scenario Unit::** Acre

**Scenario Typical Size:** 30.0

**Scenario Total Cost:** $629.79

**Scenario Cost/Unit:** $20.99

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 | $63.92 | 1 | $63.92 |
| **Foregone Income** | | | | | | |
| FI, Grazing AUMs | 2079 | Grazing is the Primary Land Use | Animal Unit Month | $16.65 | 30 | $499.50 |
| **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 | $41.76 | 1 | $41.76 |
| **Materials** | | | | | | |
| Test, Plant Tissue Test | 301 | Tissue analysis for crops. Includes materials and shipping only. | Each | $24.61 | 1 | $24.61 |

**Practice:** 512 - Forage and Biomass Planting

**Scenario** #1 - Cool Season, Establish or Reseed

**Scenario Description:**

Establish/reeseed adapted perennial introduced cool season grasses and legumes. Used for either conventional or no-till seeding of perennial introduced cool season grasses for pasture or hayland. Assumes fertilizer, seed, equipment and labor for seed bed prep, tillage, seeding ,and spreading. Does not include foregone income for conversion of cropland.

**Before Situation:**

Typically installed on an a poor or nonexistent stand of grass species. Resource concerns include: sheet and rill erosion, ephemeral gully erosion, decreased water quality from runoff of sediment, low soil quality (including organic matter depletion) and low species diversity.

**After Situation:**

Field is prepared for seeding, and lime and nutrients are spread according to soil test results. Cool season grasses and legumes are established on pasture or hayland. Erosion is minimized and there is reduced sedimentation and nutrient runoff. Water and soil quality is improved (including an increase in organic matter).

**Feature Measure:** Acres of Forage and Biomass Planti

**Scenario Unit::** Acre

**Scenario Typical Size:** 10.0

**Scenario Total Cost:** $4,244.01

**Scenario Cost/Unit:** $424.40

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 | $11.14 | 10 | $111.40 |
| Tillage, Primary | 946 | Includes heavy disking (offset) or chisel plow. Includes equipment, power unit and labor costs. | Acre | $16.60 | 10 | $166.00 |
| Fertilizer, ground application, dry bulk | 950 | Dry bulk fertilizer application performed by ground equipment. Includes equipment, power unit and labor costs. | Acre | $6.62 | 10 | $66.20 |
| Lime application | 953 | Lime application performed by ground equipment. Includes equipment, power unit and labor costs. | Acre | $10.63 | 10 | $106.30 |
| Seeding Operation, No Till/Grass Drill | 960 | No Till drill or grass drill for seeding. Includes equipment, power unit and labor costs. | Acre | $21.36 | 10 | $213.60 |
| Cultipacking | 1100 | Includes equipment, power unit and labor costs. | Acre | $7.70 | 10 | $77.00 |
| **Materials** | | | | | | |
| Nitrogen (N), Urea | 71 | Price per pound of N supplied by Urea. Price is not per pound of total product applied, no conversion is needed. | Pound | $0.49 | 500 | $245.00 |
| 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 | $0.65 | 500 | $325.00 |
| Potassium, K2O | 74 | K2O supplied by Muriate Of Potash. Price is not per pound of total product applied, no conversion is needed. | Pound | $0.36 | 1000 | $360.00 |
| Lime, ENM | 75 | Fertilizer: Limestone Spread on field. | Ton | $93.23 | 20 | $1,864.60 |
| Test, Soil Test, Standard | 299 | Includes materials, shiping, labor, and equipment costs. | Each | $10.04 | 1 | $10.04 |
| 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 | $52.68 | 10 | $526.80 |
| **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 | $172.07 | 1 | $172.07 |

**Practice:** 512 - Forage and Biomass Planting

**Scenario** #2 - Cool Season, Establish or Reseed, Foregone Income

**Scenario Description:**

Establish adapted perennial introduced cool season grasses and legumes. Used for either conventional or no-till seeding of perennial introduced cool season grasses for pasture or hayland. Assumes fertilizer, seed, equipment and labor for seed bed prep, tillage, seeding ,and spreading. Includes foregone income for conversion of cropland, typically silage corn, to pasture or hay.

**Before Situation:**

Typically installed on a 10 acre corn field that being converted to long-term grazing or hay. Resource concerns include: sheet and rill erosion, ephemeral gully erosion, decreased water quality from runoff of sediment and/or manure from the field, and low soil quality (including organic matter depletion) from continuous cropping of silage corn.

**After Situation:**

Field is prepared for seeding, and lime and nutrients are spread according to soil test results. Cool season grasses and legumes are established on pasture or hayland. Erosion is minimized and there is reduced sedimentation and nutrient runoff. Water and soil quality is improved (including an increase in organic matter).

**Feature Measure:** Acres of Forage and Biomass Planti

**Scenario Unit::** Acre

**Scenario Typical Size:** 10.0

**Scenario Total Cost:** $7,367.71

**Scenario Cost/Unit:** $736.77

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 | $11.14 | 10 | $111.40 |
| Tillage, Primary | 946 | Includes heavy disking (offset) or chisel plow. Includes equipment, power unit and labor costs. | Acre | $16.60 | 10 | $166.00 |
| Fertilizer, ground application, dry bulk | 950 | Dry bulk fertilizer application performed by ground equipment. Includes equipment, power unit and labor costs. | Acre | $6.62 | 10 | $66.20 |
| Lime application | 953 | Lime application performed by ground equipment. Includes equipment, power unit and labor costs. | Acre | $10.63 | 10 | $106.30 |
| Seeding Operation, No Till/Grass Drill | 960 | No Till drill or grass drill for seeding. Includes equipment, power unit and labor costs. | Acre | $21.36 | 10 | $213.60 |
| Cultipacking | 1100 | Includes equipment, power unit and labor costs. | Acre | $7.70 | 10 | $77.00 |
| **Foregone Income** | | | | | | |
| FI, Corn Dryland | 1959 | Dryland Corn is Primary Crop | Acre | $376.15 | 10 | $3,761.50 |
| FI, Hay, General Grass | 2122 | General Grass Hay is Primary Land Use | Ton | $42.52 | -15 | ($637.80) |
| **Materials** | | | | | | |
| Nitrogen (N), Urea | 71 | Price per pound of N supplied by Urea. Price is not per pound of total product applied, no conversion is needed. | Pound | $0.49 | 500 | $245.00 |
| 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 | $0.65 | 500 | $325.00 |
| Potassium, K2O | 74 | K2O supplied by Muriate Of Potash. Price is not per pound of total product applied, no conversion is needed. | Pound | $0.36 | 1000 | $360.00 |
| Lime, ENM | 75 | Fertilizer: Limestone Spread on field. | Ton | $93.23 | 20 | $1,864.60 |
| Test, Soil Test, Standard | 299 | Includes materials, shiping, labor, and equipment costs. | Each | $10.04 | 1 | $10.04 |
| 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 | $52.68 | 10 | $526.80 |
| **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 | $172.07 | 1 | $172.07 |

**Practice:** 512 - Forage and Biomass Planting

**Scenario** #3 - Cool Season, Establish or Reseed, Organic

**Scenario Description:**

Establish/reseed adapted organic perennial introduced cool season grasses and legumes. Used for either conventional or no-till seeding of perennial introduced cool season grasses for pasture or hayland. Assumes nutrients, seed, equipment and labor for seed bed prep, tillage, seeding ,and spreading.

**Before Situation:**

Typically installed on an a poor or nonexistent stand of grass species that is certified organic or transitioning to organic. Resource concerns include: sheet and rill erosion, ephemeral gully erosion, decreased water quality from runoff of sediment, low soil quality (including organic matter depletion) and low species diversity.

**After Situation:**

Field is prepared for seeding, and lime and nutrients are spread according to soil test results. Organic cool season grasses and legumes are established on pasture or hayland. Erosion is minimized and there is reduced sedimentation and nutrient runoff. Water and soil quality is improved (including an increase in organic matter).

**Feature Measure:** Acres of Forage and Biomass Planti

**Scenario Unit::** Acre

**Scenario Typical Size:** 10.0

**Scenario Total Cost:** $4,963.87

**Scenario Cost/Unit:** $496.39

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 | $11.14 | 10 | $111.40 |
| Tillage, Primary | 946 | Includes heavy disking (offset) or chisel plow. Includes equipment, power unit and labor costs. | Acre | $16.60 | 10 | $166.00 |
| Fertilizer, ground application, dry bulk | 950 | Dry bulk fertilizer application performed by ground equipment. Includes equipment, power unit and labor costs. | Acre | $6.62 | 10 | $66.20 |
| Lime application | 953 | Lime application performed by ground equipment. Includes equipment, power unit and labor costs. | Acre | $10.63 | 10 | $106.30 |
| Manure, compost, application | 955 | Loading, hauling and spreading manure/compost by ground equipment. Includes equipment, power unit and labor costs. | Hour | $112.69 | 4 | $450.76 |
| Seeding Operation, No Till/Grass Drill | 960 | No Till drill or grass drill for seeding. Includes equipment, power unit and labor costs. | Acre | $21.36 | 10 | $213.60 |
| Cultipacking | 1100 | Includes equipment, power unit and labor costs. | Acre | $7.70 | 10 | $77.00 |
| **Materials** | | | | | | |
| Lime, ENM | 75 | Fertilizer: Limestone Spread on field. | Ton | $93.23 | 20 | $1,864.60 |
| Manure | 264 | Organic matter can be used as organic fertilizer in agriculture | Ton | $18.96 | 50 | $948.00 |
| Potassium, Organic | 268 | ORGANIC Potassium | Pound | $0.20 | 500 | $100.00 |
| Test, Soil Test, Standard | 299 | Includes materials, shiping, labor, and equipment costs. | Each | $10.04 | 1 | $10.04 |
| 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 | $67.79 | 10 | $677.90 |
| **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 | $172.07 | 1 | $172.07 |

**Practice:** 512 - Forage and Biomass Planting

**Scenario** #4 - Cool Season, Establish or Reseed, Organic, Foregone Income

**Scenario Description:**

Establish/reseed adapted organic perennial introduced cool season grasses and legumes. Used for either conventional or no-till seeding of perennial introduced cool season grasses for pasture or hayland. Assumes nutrients, seed, equipment and labor for seed bed prep, tillage, seeding ,and spreading. Includes foregone income for conversion of certified organic cropland, typically silage corn, to pasture or hay.

**Before Situation:**

Typically installed on an a poor or nonexistent stand of grass species that is certified organic or transitioning to organic. Resource concerns include: sheet and rill erosion, ephemeral gully erosion, decreased water quality from runoff of sediment, low soil quality (including organic matter depletion) and low species diversity.

**After Situation:**

Field is prepared for seeding, and lime and nutrients are spread according to soil test results. Organic cool season grasses and legumes are established on pasture or hayland. Erosion is minimized and there is reduced sedimentation and nutrient runoff. Water and soil quality is improved (including an increase in organic matter).

**Feature Measure:** Acres of Forage and Biomass Planti

**Scenario Unit::** Acre

**Scenario Typical Size:** 10.0

**Scenario Total Cost:** $8,651.77

**Scenario Cost/Unit:** $865.18

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 | $11.14 | 10 | $111.40 |
| Tillage, Primary | 946 | Includes heavy disking (offset) or chisel plow. Includes equipment, power unit and labor costs. | Acre | $16.60 | 10 | $166.00 |
| Fertilizer, ground application, dry bulk | 950 | Dry bulk fertilizer application performed by ground equipment. Includes equipment, power unit and labor costs. | Acre | $6.62 | 10 | $66.20 |
| Lime application | 953 | Lime application performed by ground equipment. Includes equipment, power unit and labor costs. | Acre | $10.63 | 10 | $106.30 |
| Manure, compost, application | 955 | Loading, hauling and spreading manure/compost by ground equipment. Includes equipment, power unit and labor costs. | Hour | $112.69 | 4 | $450.76 |
| Seeding Operation, No Till/Grass Drill | 960 | No Till drill or grass drill for seeding. Includes equipment, power unit and labor costs. | Acre | $21.36 | 10 | $213.60 |
| Cultipacking | 1100 | Includes equipment, power unit and labor costs. | Acre | $7.70 | 10 | $77.00 |
| **Foregone Income** | | | | | | |
| FI, Hay, General Grass | 2122 | General Grass Hay is Primary Land Use | Ton | $42.52 | -15 | ($637.80) |
| FI, Organic, Corn Dryland | 2232 | Organic Dryland Corn is Primary Crop | Acre | $432.57 | 10 | $4,325.70 |
| **Materials** | | | | | | |
| Lime, ENM | 75 | Fertilizer: Limestone Spread on field. | Ton | $93.23 | 20 | $1,864.60 |
| Manure | 264 | Organic matter can be used as organic fertilizer in agriculture | Ton | $18.96 | 50 | $948.00 |
| Potassium, Organic | 268 | ORGANIC Potassium | Pound | $0.20 | 500 | $100.00 |
| Test, Soil Test, Standard | 299 | Includes materials, shiping, labor, and equipment costs. | Each | $10.04 | 1 | $10.04 |
| 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 | $67.79 | 10 | $677.90 |
| **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 | $172.07 | 1 | $172.07 |

**Practice:** 512 - Forage and Biomass Planting

**Scenario** #5 - Warm Season, Native, Establish or Reseed

**Scenario Description:**

Establish or reseed adapted perennial native warm season grasses. Used for either conventional or organic perennial native warm season grasses for pasture, hayland, or biomass crops. Assumes nutrients, seed, equipment and labor for seed bed prep, tillage, seeding ,and spreading.

**Before Situation:**

Typically installed on an overgrazed, 10 acre pasture that is a weedy mix of cool season grasses. Plant productivity is poor, weed species dominate, and low water quantity and high temperatures during the summer months suppress the growth of the cool season forages. Resource concerns include: decreased water quality from runoff of sediment and/or manure from the field, low organic matter and soil fertility, poor plant health and vigor, and invasive or noxious weeds.

**After Situation:**

Field is prepared for seeding, lime and nutrients are spread according to soil test results, and warm season grasses are established. Weeds are managed during establishment through mowing and chemical control. Pasture is managed for long-term grazing. Erosion is minimized and there is reduced sedimentation and nutrient runoff, and improved water and soil quality (including an increase in organic matter and fertility). Plant productivity during the "summer slump" increases and weed composition decreases. Livestock nutrition is improved and energy is saved by producing on-farm forage crops and reducing amount of imported feed.

**Feature Measure:** Acres of Forage and Biomass Planti

**Scenario Unit::** Acre

**Scenario Typical Size:** 10.0

**Scenario Total Cost:** $5,762.81

**Scenario Cost/Unit:** $576.28

Cost Details:

| Component Name | ID | Description | Unit | Cost | QTY | Total |
|---|---|---|---|---|---|---|
| **Equipment Installation** | | | | | | |
| Tillage, Light | 945 | Includes light disking (tandem) or field cultivator. Includes equipment, power unit and labor costs. | Acre | $11.14 | 10 | $111.40 |
| Tillage, Primary | 946 | Includes heavy disking (offset) or chisel plow. Includes equipment, power unit and labor costs. | Acre | $16.60 | 10 | $166.00 |
| Chemical, ground application | 948 | Chemical application performed by ground equipment. Includes equipment, power unit and labor costs. | Acre | $6.13 | 10 | $61.30 |
| Fertilizer, ground application, dry bulk | 950 | Dry bulk fertilizer application performed by ground equipment. Includes equipment, power unit and labor costs. | Acre | $6.62 | 10 | $66.20 |
| Lime application | 953 | Lime application performed by ground equipment. Includes equipment, power unit and labor costs. | Acre | $10.63 | 10 | $106.30 |
| Seeding Operation, No Till/Grass Drill | 960 | No Till drill or grass drill for seeding. Includes equipment, power unit and labor costs. | Acre | $21.36 | 10 | $213.60 |
| Cultipacking | 1100 | Includes equipment, power unit and labor costs. | Acre | $7.70 | 10 | $77.00 |
| **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 | $0.65 | 500 | $325.00 |
| Potassium, K2O | 74 | K2O supplied by Muriate Of Potash. Price is not per pound of total product applied, no conversion is needed. | Pound | $0.36 | 1000 | $360.00 |
| Lime, ENM | 75 | Fertilizer: Limestone Spread on field. | Ton | $93.23 | 20 | $1,864.60 |
| Test, Soil Test, Standard | 299 | Includes materials, shiping, labor, and equipment costs. | Each | $10.04 | 1 | $10.04 |
| 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 | $7.77 | 10 | $77.70 |
| Three plus Species Mix, Warm Season, Native Perennial | 2327 | Native, warm season perennial grass. Includes material and shipping only. | Acre | $215.16 | 10 | $2,151.60 |
| **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 | $172.07 | 1 | $172.07 |

**Practice:** 512 - Forage and Biomass Planting

**Scenario** #6 - Warm Season, Native, Establish or Reseed, Foregone Income

**Scenario Description:**

Establish or reseed adapted perennial native warm season grasses. Used for either conventional or organic perennial native warm season grasses for pasture, hayland, or biomass crops. Assumes nutrients, seed, equipment and labor for seed bed prep, tillage, seeding ,and spreading. Includes foregone income for conversion of cropland, typically silage corn, to native/warm season pasture or hay.

**Before Situation:**

Typically installed on an overgrazed, 10 acre pasture that is a weedy mix of cool season grasses. Plant productivity is poor, weed species dominate, and low water quantity and high temperatures during the summer months suppress the growth of the cool season forages. Resource concerns include: decreased water quality from runoff of sediment and/or manure from the field, low organic matter and soil fertility, poor plant health and vigor, and invasive or noxious weeds.

**After Situation:**

Field is prepared for seeding, lime and nutrients are spread according to soil test results, and warm season grasses are established. Weeds are managed during establishment through mowing and chemical control. Pasture is managed for long-term grazing. Erosion is minimized and there is reduced sedimentation and nutrient runoff, and improved water and soil quality (including an increase in organic matter and fertility). Plant productivity during the "summer slump" increases and weed composition decreases. Livestock nutrition is improved and energy is saved by producing on-farm forage crops and reducing amount of imported feed.

**Feature Measure:** Acres of Forage and Biomass Planti

**Scenario Unit::** Acre

**Scenario Typical Size:** 10.0

**Scenario Total Cost:** $8,886.51

**Scenario Cost/Unit:** $888.65

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 | $11.14 | 10 | $111.40 |
| Tillage, Primary | 946 | Includes heavy disking (offset) or chisel plow. Includes equipment, power unit and labor costs. | Acre | $16.60 | 10 | $166.00 |
| Chemical, ground application | 948 | Chemical application performed by ground equipment. Includes equipment, power unit and labor costs. | Acre | $6.13 | 10 | $61.30 |
| Fertilizer, ground application, dry bulk | 950 | Dry bulk fertilizer application performed by ground equipment. Includes equipment, power unit and labor costs. | Acre | $6.62 | 10 | $66.20 |
| Lime application | 953 | Lime application performed by ground equipment. Includes equipment, power unit and labor costs. | Acre | $10.63 | 10 | $106.30 |
| Seeding Operation, No Till/Grass Drill | 960 | No Till drill or grass drill for seeding. Includes equipment, power unit and labor costs. | Acre | $21.36 | 10 | $213.60 |
| Cultipacking | 1100 | Includes equipment, power unit and labor costs. | Acre | $7.70 | 10 | $77.00 |
| **Foregone Income** | | | | | | |
| FI, Corn Dryland | 1959 | Dryland Corn is Primary Crop | Acre | $376.15 | 10 | $3,761.50 |
| FI, Hay, General Grass | 2122 | General Grass Hay is Primary Land Use | Ton | $42.52 | -15 | ($637.80) |
| **Materials** | | | | | | |
| Phosphorus, P2O5 | 73 | Price per pound of P2O5 supplied by Superphosphate. Price is not per pound of total product applied, no conversion is needed. | Pound | $0.65 | 500 | $325.00 |
| Potassium, K2O | 74 | K2O supplied by Muriate Of Potash. Price is not per pound of total product applied, no conversion is needed. | Pound | $0.36 | 1000 | $360.00 |
| Lime, ENM | 75 | Fertilizer: Limestone Spread on field. | Ton | $93.23 | 20 | $1,864.60 |
| Test, Soil Test, Standard | 299 | Includes materials, shiping, labor, and equipment costs. | Each | $10.04 | 1 | $10.04 |
| 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 | $7.77 | 10 | $77.70 |
| Three plus Species Mix, Warm Season, Native Perennial | 2327 | Native, warm season perennial grass. Includes material and shipping only. | Acre | $215.16 | 10 | $2,151.60 |
| **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 | $172.07 | 1 | $172.07 |

**Practice:** 512 - Forage and Biomass Planting

**Scenario** #7 - Rejuvenate

**Scenario Description:**

Used to rejuvenate rundown pasture or hayland by applying nutrients and overseeding/sodseeding (frost, dormant, no-till, after aerator etc.) adapted legumes or grass/legume mixes. Assumes lime, potassium and seeding costs.

**Before Situation:**

Typical situation is a 10 acre pasture/hayfield with invasive weeds and poor legume composition. Existing stand of perennial grasses is in poor condition and percent ground cover is low. Overall plant diversity is low and is contributing to a decrease in soil quality. Biological nitrogen fixation is low and the reliance on nitrogen fertilizer is increasing.

**After Situation:**

Approved legumes or grass/legume mixed are established and lime and potassium is spread to soil test recommendations. Ground cover and plant diversity improves and results in lower weed pressure. Plant productivity and soil quality improves from the increase in biological nitrogen fixation. Energy is saved through the use of legume nitrogen versus Haber-Bosch nitrogen

**Feature Measure:** Acres of Forage and Biomass Planti

**Scenario Unit::** Acre

**Scenario Typical Size:** 10.0

**Scenario Total Cost:** $3,319.61

**Scenario Cost/Unit:** $331.96

Cost Details:

| Component Name | ID | Description | Unit | Cost | QTY | Total |
|---|---|---|---|---|---|---|
| **Equipment Installation** | | | | | | |
| Fertilizer, ground application, dry bulk | 950 | Dry bulk fertilizer application performed by ground equipment. Includes equipment, power unit and labor costs. | Acre | $6.62 | 10 | $66.20 |
| Lime application | 953 | Lime application performed by ground equipment. Includes equipment, power unit and labor costs. | Acre | $10.63 | 10 | $106.30 |
| Seeding Operation, No Till/Grass Drill | 960 | No Till drill or grass drill for seeding. Includes equipment, power unit and labor costs. | Acre | $21.36 | 10 | $213.60 |
| **Materials** | | | | | | |
| Potassium, K2O | 74 | K2O supplied by Muriate Of Potash. Price is not per pound of total product applied, no conversion is needed. | Pound | $0.36 | 1000 | $360.00 |
| Lime, ENM | 75 | Fertilizer: Limestone Spread on field. | Ton | $93.23 | 20 | $1,864.60 |
| Test, Soil Test, Standard | 299 | Includes materials, shiping, labor, and equipment costs. | Each | $10.04 | 1 | $10.04 |
| 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 | $52.68 | 10 | $526.80 |
| **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 | $172.07 | 1 | $172.07 |

**Practice:** 512 - Forage and Biomass Planting

**Scenario** #8 - Rejuvenate, Organic

**Scenario Description:**

Used to rejuvenate rundown pasture or hayland on organic or transitioning to organic land by applying nutrients and overseeding/sodseeding (frost, dormant, no-till, after aerator etc.) adapted legumes or grass/legume mixes. Assumes lime, potassium and seeding costs.

**Before Situation:**

Typical situation is a 10 acre organic or transitioning to organic pasture/hayfield with invasive weeds and poor legume composition. Existing stand of perennial grasses is in poor condition and percent ground cover is low. Overall plant diversity is low and is contributing to a decrease in soil quality. Biological nitrogen fixation is low.

**After Situation:**

Approved organic legumes or grass/legume mixed are established and lime and potassium is spread to soil test recommendations. Ground cover and plant diversity improves and results in lower weed pressure. Plant productivity and soil quality improves from the increase in biological nitrogen fixation.

**Feature Measure:** Acres of Forage and Biomass Planti

**Scenario Unit::** Acre

**Scenario Typical Size:** 10.0

**Scenario Total Cost:** $3,470.71

**Scenario Cost/Unit:** $347.07

Cost Details:

| Component Name | ID | Description | Unit | Cost | QTY | Total |
|---|---|---|---|---|---|---|
| **Equipment Installation** | | | | | | |
| Fertilizer, ground application, dry bulk | 950 | Dry bulk fertilizer application performed by ground equipment. Includes equipment, power unit and labor costs. | Acre | $6.62 | 10 | $66.20 |
| Lime application | 953 | Lime application performed by ground equipment. Includes equipment, power unit and labor costs. | Acre | $10.63 | 10 | $106.30 |
| Seeding Operation, No Till/Grass Drill | 960 | No Till drill or grass drill for seeding. Includes equipment, power unit and labor costs. | Acre | $21.36 | 10 | $213.60 |
| **Materials** | | | | | | |
| Potassium, K2O | 74 | K2O supplied by Muriate Of Potash. Price is not per pound of total product applied, no conversion is needed. | Pound | $0.36 | 1000 | $360.00 |
| Lime, ENM | 75 | Fertilizer: Limestone Spread on field. | Ton | $93.23 | 20 | $1,864.60 |
| Test, Soil Test, Standard | 299 | Includes materials, shiping, labor, and equipment costs. | Each | $10.04 | 1 | $10.04 |
| 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 | $67.79 | 10 | $677.90 |
| **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 | $172.07 | 1 | $172.07 |

**Practice:** 516 - Livestock Pipeline

**Scenario** #1 - PE Pipe less than or equal to 1 in. Dia., Buried 4 ft Deep

**Scenario Description:**

Description: Install 1" dia. polyethylene pipe, buried below frost depth to supply water for livestock watering facility. Practice is installed in conjunction with 614 - Watering Facility. Construct 1000 FT of 1 inch, Polyethylene (PE) pipeline with appurtenances, installed below ground a minimum 4 feet of ground cover. Appurtenances include: couplings, fittings, thrust blocks, gate valves (2), air release valves (2), drain valve (1), and pressure relief valve (1), and Frost free hydrant. Revegetation is not included. Resource Concerns: Inadequate Livestock Water, Inefficient Energy Use. Associated Practices: Critical Area Planting (342), Pumping Plant (533), and Watering Facility (614).

**Before Situation:**

Water supplies need to be conveyed through pipelines for use by livestock or wildlife.

**After Situation:**

Pipeline(s) convey and/or distribute water to storage and/or watering facilities, for use by livestock or wildlife.

**Feature Measure:** Length of Pipe

**Scenario Unit::** Foot

**Scenario Typical Size:** 1,000.0

**Scenario Total Cost:** $2,911.98

**Scenario Cost/Unit:** $2.91

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 | $56.05 | 16 | $896.80 |
| **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 | $25.31 | 8 | $202.48 |
| Equipment Operators, Light | 232 | Includes: Skid Steer Loaders, Hydraulic Excavators <50 HP, Trenchers <12", Ag Equipment <150 HP, Pickup Trucks, Forklifts, Mulchers | Hour | $25.23 | 16 | $403.68 |
| **Materials** | | | | | | |
| Freeze Proof Hydrant, <= 3' Bury | 240 | Freeze Proof Hydrant, 3 foot or less bury. Materials only. | Each | $78.59 | 4 | $314.36 |
| Pipe, PE, 1", DR 9 | 997 | Materials: - 1" - PE - 160 psi - ASTM D3035 DR 9 | Foot | $0.53 | 1100 | $583.00 |
| **Mobilization** | | | | | | |
| Mobilization, medium equipment | 1139 | Equipment with 70-150 HP or typical weights between 14,000 and 30,000 pounds. | Each | $255.83 | 2 | $511.66 |

**Practice:** 516 - Livestock Pipeline

**Scenario** #2 - PE Pipe, 1< and <2 in. Dia., Buried 4 ft Deep

**Scenario Description:**

Description: Install 1.5" dia. polyethylene pipe, buried below frost depth to supply water for livestock watering facility. Practice is installed in conjunction with 614 - Watering Facility. Construct 1000 FT of 1.5 inch, Polyethylene (PE) pipeline with appurtenances, installed below ground a minimum 4 feet of ground cover. Appurtenances include: couplings, fittings, thrust blocks, gate valves (2), air release valves (2), drain valve (1), and pressure relief valve (1), and Frost free hydrant. Revegetation is not included. Resource Concerns: Inadequate Livestock Water, Inefficient Energy Use. Associated Practices: Critical Area Planting (342), Pumping Plant (533), and Watering Facility (614).

**Before Situation:**

Water supplies need to be conveyed through pipelines for use by livestock or wildlife.

**After Situation:**

Pipeline(s) convey and/or distribute water to storage and/or watering facilities, for use by livestock or wildlife.

**Feature Measure:** Length of Pipe

**Scenario Unit::** Foot

**Scenario Typical Size:** 1,000.0

**Scenario Total Cost:** $3,469.12

**Scenario Cost/Unit:** $3.47

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 | $56.05 | 16 | $896.80 |
| **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 | $25.31 | 8 | $202.48 |
| Equipment Operators, Light | 232 | Includes: Skid Steer Loaders, Hydraulic Excavators <50 HP, Trenchers <12", Ag Equipment <150 HP, Pickup Trucks, Forklifts, Mulchers | Hour | $25.23 | 16 | $403.68 |
| **Materials** | | | | | | |
| Freeze Proof Hydrant, <= 3' Bury | 240 | Freeze Proof Hydrant, 3 foot or less bury. Materials only. | Each | $78.59 | 4 | $314.36 |
| Pipe, HDPE, smooth wall, weight priced | 1379 | High Density Polyethylene (HDPE) compound manufactured into smooth wall pipe. Materials only. | Pound | $2.18 | 523 | $1,140.14 |
| **Mobilization** | | | | | | |
| Mobilization, medium equipment | 1139 | Equipment with 70-150 HP or typical weights between 14,000 and 30,000 pounds. | Each | $255.83 | 2 | $511.66 |

**Practice:** 516 - Livestock Pipeline

**Scenario** #3 - PE Pipe, >=2 in Dia., Buried 4ft Deep

**Scenario Description:**

Description: Install 2" dia. polyethylene pipe, buried below frost depth to supply water for livestock watering facility. Practice is installed in conjunction with 614 - Watering Facility. Construct 1000 FT of 1 inch, Polyethylene (PE) pipeline with appurtenances, installed below ground a minimum 4 feet of ground cover. Appurtenances include: couplings, fittings, thrust blocks, gate valves (2), air release valves (2), drain valve (1), and pressure relief valve (1), and Frost free hydrant. Revegetation is not included. Resource Concerns: Inadequate Livestock Water, Inefficient Energy Use. Associated Practices: Critical Area Planting (342), Pumping Plant (533), and Watering Facility (614).

**Before Situation:**

Water supplies need to be conveyed through pipelines for use by livestock or wildlife.

**After Situation:**

Pipeline(s) convey and/or distribute water to storage and/or watering facilities, for use by livestock or wildlife.

**Feature Measure:** Length of Pipe

**Scenario Unit::** Foot

**Scenario Typical Size:** 1,000.0

**Scenario Total Cost:** $4,112.22

**Scenario Cost/Unit:** $4.11

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 | $56.05 | 16 | $896.80 |
| **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 | $25.31 | 8 | $202.48 |
| Equipment Operators, Light | 232 | Includes: Skid Steer Loaders, Hydraulic Excavators <50 HP, Trenchers <12", Ag Equipment <150 HP, Pickup Trucks, Forklifts, Mulchers | Hour | $25.23 | 16 | $403.68 |
| **Materials** | | | | | | |
| Freeze Proof Hydrant, <= 3' Bury | 240 | Freeze Proof Hydrant, 3 foot or less bury. Materials only. | Each | $78.59 | 4 | $314.36 |
| Pipe, HDPE, smooth wall, weight priced | 1379 | High Density Polyethylene (HDPE) compound manufactured into smooth wall pipe. Materials only. | Pound | $2.18 | 818 | $1,783.24 |
| **Mobilization** | | | | | | |
| Mobilization, medium equipment | 1139 | Equipment with 70-150 HP or typical weights between 14,000 and 30,000 pounds. | Each | $255.83 | 2 | $511.66 |

**Practice:** 516 - Livestock Pipeline

**Scenario** #4 - PE Pipe <=1 in. Dia., Buried 4ft Deep w/sand bedding

**Scenario Description:**

Description: Install 1" dia. polyethylene pipe with sand bedding, buried below frost depth to supply water for livestock watering facility. Practice is installed in conjunction with 614 - Watering Facility. Construct 1000 FT of 1 inch, Polyethylene (PE) pipeline with appurtenances, installed below ground a minimum 4 feet of ground cover. Appurtenances include: couplings, fittings, thrust blocks, gate valves (2), air release valves (2), drain valve (1), and pressure relief valve (1), and Frost free hydrant. Revegetation is not included. Resource Concerns: Inadequate Livestock Water, Inefficient Energy Use. Associated Practices: Critical Area Planting (342), Pumping Plant (533), and Watering Facility (614).

**Before Situation:**

Water supplies need to be conveyed through pipelines for use by livestock or wildlife.

**After Situation:**

Pipeline(s) convey and/or distribute water to storage and/or watering facilities, for use by livestock or wildlife.

**Feature Measure:** Length of Pipe

**Scenario Unit::** Foot

**Scenario Typical Size:** 1,000.0

**Scenario Total Cost:** $7,983.00

**Scenario Cost/Unit:** $7.98

Cost Details:

| Component Name | ID | Description | Unit | Cost | QTY | Total |
|---|---|---|---|---|---|---|
| **Equipment Installation** | | | | | | |
| Trenching, Earth, 24" x 60" | 1460 | Trenching, earth, 24" wide x 60" depth, includes equipment and labor for trenching and backfilling. | Foot | $3.80 | 1000 | $3,800.00 |
| **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 | $25.31 | 8 | $202.48 |
| **Materials** | | | | | | |
| Aggregate, Gravel, Graded | 46 | Gravel, includes materials, equipment and labor to transport and place. Includes washed and unwashed gravel. | Cubic Yard | $34.75 | 74 | $2,571.50 |
| Freeze Proof Hydrant, <= 3' Bury | 240 | Freeze Proof Hydrant, 3 foot or less bury. Materials only. | Each | $78.59 | 4 | $314.36 |
| Pipe, PE, 1", DR 9 | 997 | Materials: - 1" - PE - 160 psi - ASTM D3035 DR 9 | Foot | $0.53 | 1100 | $583.00 |
| **Mobilization** | | | | | | |
| Mobilization, medium equipment | 1139 | Equipment with 70-150 HP or typical weights between 14,000 and 30,000 pounds. | Each | $255.83 | 2 | $511.66 |

**Practice:** 516 - Livestock Pipeline

**Scenario** #5 - 1< and < 2 in. Dia. PE Pipe, Buried 4ft Deep w/ sand bedding

**Scenario Description:**

Description: Install 1.5" dia. polyethylene pipe with sand bedding, buried below frost depth to supply water for livestock watering facility. Practice is installed in conjunction with 614 - Watering Facility. Construct 1000 FT of 1.5 inch, Polyethylene (PE) pipeline with appurtenances, installed below ground a minimum 4 feet of ground cover. Appurtenances include: couplings, fittings, thrust blocks, gate valves (2), air release valves (2), drain valve (1), and pressure relief valve (1), and Frost free hydrant. Revegetation is not included. Resource Concerns: Inadequate Livestock Water, Inefficient Energy Use. Associated Practices: Critical Area Planting (342), Pumping Plant (533), and Watering Facility (614).

**Before Situation:**

Water supplies need to be conveyed through pipelines for use by livestock or wildlife.

**After Situation:**

Pipeline(s) convey and/or distribute water to storage and/or watering facilities, for use by livestock or wildlife.

**Feature Measure:** Length of Pipe

**Scenario Unit::** Foot

**Scenario Typical Size:** 1,000.0

**Scenario Total Cost:** $8,540.14

**Scenario Cost/Unit:** $8.54

Cost Details:

| Component Name | ID | Description | Unit | Cost | QTY | Total |
|---|---|---|---|---|---|---|
| **Equipment Installation** | | | | | | |
| Trenching, Earth, 24" x 60" | 1460 | Trenching, earth, 24" wide x 60" depth, includes equipment and labor for trenching and backfilling. | Foot | $3.80 | 1000 | $3,800.00 |
| **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 | $25.31 | 8 | $202.48 |
| **Materials** | | | | | | |
| Aggregate, Gravel, Graded | 46 | Gravel, includes materials, equipment and labor to transport and place. Includes washed and unwashed gravel. | Cubic Yard | $34.75 | 74 | $2,571.50 |
| Freeze Proof Hydrant, <= 3' Bury | 240 | Freeze Proof Hydrant, 3 foot or less bury. Materials only. | Each | $78.59 | 4 | $314.36 |
| Pipe, HDPE, smooth wall, weight priced | 1379 | High Density Polyethylene (HDPE) compound manufactured into smooth wall pipe. Materials only. | Pound | $2.18 | 523 | $1,140.14 |
| **Mobilization** | | | | | | |
| Mobilization, medium equipment | 1139 | Equipment with 70-150 HP or typical weights between 14,000 and 30,000 pounds. | Each | $255.83 | 2 | $511.66 |

**Practice:** 516 - Livestock Pipeline

**Scenario** #6 - PE Pipe, >=2 in Dia., Buried 4ft Deep w/ sand bedding

**Scenario Description:**

Description: Install 2" dia. polyethylene pipe with sand bedding, buried below frost depth to supply water for livestock watering facility. Practice is installed in conjunction with 614 - Watering Facility. Construct 1000 FT of 1 inch, Polyethylene (PE) pipeline with appurtenances, installed below ground a minimum 4 feet of ground cover. Appurtenances include: couplings, fittings, thrust blocks, gate valves (2), air release valves (2), drain valve (1), and pressure relief valve (1), and Frost free hydrant. Revegetation is not included. Resource Concerns: Inadequate Livestock Water, Inefficient Energy Use. Associated Practices: Critical Area Planting (342), Pumping Plant (533), and Watering Facility (614).

**Before Situation:**

Water supplies need to be conveyed through pipelines for use by livestock or wildlife.

**After Situation:**

Pipeline(s) convey and/or distribute water to storage and/or watering facilities, for use by livestock or wildlife.

**Feature Measure:** Length of Pipe

**Scenario Unit::** Foot

**Scenario Typical Size:** 1,000.0

**Scenario Total Cost:** $9,183.24

**Scenario Cost/Unit:** $9.18

Cost Details:

| Component Name | ID | Description | Unit | Cost | QTY | Total |
|---|---|---|---|---|---|---|
| **Equipment Installation** | | | | | | |
| Trenching, Earth, 24" x 60" | 1460 | Trenching, earth, 24" wide x 60" depth, includes equipment and labor for trenching and backfilling. | Foot | $3.80 | 1000 | $3,800.00 |
| **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 | $25.31 | 8 | $202.48 |
| **Materials** | | | | | | |
| Aggregate, Gravel, Graded | 46 | Gravel, includes materials, equipment and labor to transport and place. Includes washed and unwashed gravel. | Cubic Yard | $34.75 | 74 | $2,571.50 |
| Freeze Proof Hydrant, <= 3' Bury | 240 | Freeze Proof Hydrant, 3 foot or less bury. Materials only. | Each | $78.59 | 4 | $314.36 |
| Pipe, HDPE, smooth wall, weight priced | 1379 | High Density Polyethylene (HDPE) compound manufactured into smooth wall pipe. Materials only. | Pound | $2.18 | 818 | $1,783.24 |
| **Mobilization** | | | | | | |
| Mobilization, medium equipment | 1139 | Equipment with 70-150 HP or typical weights between 14,000 and 30,000 pounds. | Each | $255.83 | 2 | $511.66 |

**Practice:** 516 - Livestock Pipeline

**Scenario** #7 - PE Pipe <= 1in. Dia., Buried 2ft Deep

**Scenario Description:**

Description: Install 1" dia. polyethylene pipe, buried less than 2 feet below the ground surface to supply water for livestock watering facility. Practice is installed in conjunction with 614 - Watering Facility. Construct 1000 FT of 1 inch, Polyethylene (PE) pipeline with appurtenances, installed below ground with less than 2 feet of ground cover. Appurtenances include: couplings, fittings, thrust blocks, gate valves (2), air release valves (2), drain valve (1), and pressure relief valve (1), and Frost free hydrant. Revegetation is not included. Resource Concerns: Inadequate Livestock Water, Inefficient Energy Use. Associated Practices: Critical Area Planting (342), Pumping Plant (533), and Watering Facility (614).

**Before Situation:**

Water supplies need to be conveyed through pipelines for use by livestock or wildlife.

**After Situation:**

Pipeline(s) convey and/or distribute water to storage and/or watering facilities, for use by livestock or wildlife.

**Feature Measure:** Length of Pipe

**Scenario Unit::** Foot

**Scenario Typical Size:** 1,000.0

**Scenario Total Cost:** $1,941.97

**Scenario Cost/Unit:** $1.94

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 | $56.05 | 5 | $280.25 |
| **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 | $25.31 | 5 | $126.55 |
| Equipment Operators, Light | 232 | Includes: Skid Steer Loaders, Hydraulic Excavators <50 HP, Trenchers <12", Ag Equipment <150 HP, Pickup Trucks, Forklifts, Mulchers | Hour | $25.23 | 5 | $126.15 |
| **Materials** | | | | | | |
| Freeze Proof Hydrant, <= 3' Bury | 240 | Freeze Proof Hydrant, 3 foot or less bury. Materials only. | Each | $78.59 | 4 | $314.36 |
| Pipe, PE, 1", DR 9 | 997 | Materials: - 1" - PE - 160 psi - ASTM D3035 DR 9 | Foot | $0.53 | 1100 | $583.00 |
| **Mobilization** | | | | | | |
| Mobilization, medium equipment | 1139 | Equipment with 70-150 HP or typical weights between 14,000 and 30,000 pounds. | Each | $255.83 | 2 | $511.66 |

**Practice:** 516 - Livestock Pipeline

**Scenario** #8 - PE Pipe, 1< and <2 in. Dia., Buried 2ft Deep

**Scenario Description:**

Description: Install 1.5" dia. polyethylene pipe, buried less than 2 feet below the ground surface to supply water for livestock watering facility. Practice is installed in conjunction with 614 - Watering Facility. Construct 1000 FT of 1.5 inch, Polyethylene (PE) pipeline with appurtenances, installed below ground with less than 2 feet of ground cover. Appurtenances include: couplings, fittings, thrust blocks, gate valves (2), air release valves (2), drain valve (1), and pressure relief valve (1), and Frost free hydrant. Revegetation is not included. Resource Concerns: Inadequate Livestock Water, Inefficient Energy Use. Associated Practices: Critical Area Planting (342), Pumping Plant (533), and Watering Facility (614).

**Before Situation:**

Water supplies need to be conveyed through pipelines for use by livestock or wildlife.

**After Situation:**

Pipeline(s) convey and/or distribute water to storage and/or watering facilities, for use by livestock or wildlife.

**Feature Measure:** Length of Pipe

**Scenario Unit::** Foot

**Scenario Typical Size:** 1,000.0

**Scenario Total Cost:** $2,499.11

**Scenario Cost/Unit:** $2.50

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 | $56.05 | 5 | $280.25 |
| **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 | $25.31 | 5 | $126.55 |
| Equipment Operators, Light | 232 | Includes: Skid Steer Loaders, Hydraulic Excavators <50 HP, Trenchers <12", Ag Equipment <150 HP, Pickup Trucks, Forklifts, Mulchers | Hour | $25.23 | 5 | $126.15 |
| **Materials** | | | | | | |
| Freeze Proof Hydrant, <= 3' Bury | 240 | Freeze Proof Hydrant, 3 foot or less bury. Materials only. | Each | $78.59 | 4 | $314.36 |
| Pipe, HDPE, smooth wall, weight priced | 1379 | High Density Polyethylene (HDPE) compound manufactured into smooth wall pipe. Materials only. | Pound | $2.18 | 523 | $1,140.14 |
| **Mobilization** | | | | | | |
| Mobilization, medium equipment | 1139 | Equipment with 70-150 HP or typical weights between 14,000 and 30,000 pounds. | Each | $255.83 | 2 | $511.66 |

**Practice:** 516 - Livestock Pipeline

**Scenario** #9 - PE Pipe, >= 2in. Dia., Buried 2ft Deep

**Scenario Description:**

Description: Install 2" dia. polyethylene pipe, buried less than 2 feet below the ground surface to supply water for livestock watering facility. Practice is installed in conjunction with 614 - Watering Facility. Construct 1000 FT of 2 inch, Polyethylene (PE) pipeline with appurtenances, installed below ground with less than 2 feet of ground cover. Appurtenances include: couplings, fittings, thrust blocks, gate valves (2), air release valves (2), drain valve (1), and pressure relief valve (1), and Frost free hydrant. Revegetation is not included. Resource Concerns: Inadequate Livestock Water, Inefficient Energy Use. Associated Practices: Critical Area Planting (342), Pumping Plant (533), and Watering Facility (614).

**Before Situation:**

Water supplies need to be conveyed through pipelines for use by livestock or wildlife.

**After Situation:**

Pipeline(s) convey and/or distribute water to storage and/or watering facilities, for use by livestock or wildlife.

**Feature Measure:** Length of Pipe

**Scenario Unit::** Foot

**Scenario Typical Size:** 1,000.0

**Scenario Total Cost:** $3,142.21

**Scenario Cost/Unit:** $3.14

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 | $56.05 | 5 | $280.25 |
| **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 | $25.31 | 5 | $126.55 |
| Equipment Operators, Light | 232 | Includes: Skid Steer Loaders, Hydraulic Excavators <50 HP, Trenchers <12", Ag Equipment <150 HP, Pickup Trucks, Forklifts, Mulchers | Hour | $25.23 | 5 | $126.15 |
| **Materials** | | | | | | |
| Freeze Proof Hydrant, <= 3' Bury | 240 | Freeze Proof Hydrant, 3 foot or less bury. Materials only. | Each | $78.59 | 4 | $314.36 |
| Pipe, HDPE, smooth wall, weight priced | 1379 | High Density Polyethylene (HDPE) compound manufactured into smooth wall pipe. Materials only. | Pound | $2.18 | 818 | $1,783.24 |
| **Mobilization** | | | | | | |
| Mobilization, medium equipment | 1139 | Equipment with 70-150 HP or typical weights between 14,000 and 30,000 pounds. | Each | $255.83 | 2 | $511.66 |

**Practice:** 516 - Livestock Pipeline

**Scenario** #10 - PE Pipe, <= 1 in. Dia., Above Ground

**Scenario Description:**

Description: Install 1" dia. polyethylene pipe, above ground to supply water for livestock watering facility. Practice is installed in conjunction with 614 - Watering Facility. Construct 1000 FT of 1 inch, Polyethylene (PE) pipeline with appurtenances, installed above ground. Appurtenances include: couplings, fittings, thrust blocks, gate valves (2), air release valves (2), drain valve (1), and pressure relief valve (1), and Frost free hydrant. Revegetation is not included. Resource Concerns: Inadequate Livestock Water, Inefficient Energy Use. Associated Practices: Critical Area Planting (342), Pumping Plant (533), and Watering Facility (614).

**Before Situation:**

Water supplies need to be conveyed through pipelines for use by livestock or wildlife.

**After Situation:**

Pipeline(s) convey and/or distribute water to storage and/or watering facilities, for use by livestock or wildlife.

**Feature Measure:** Length of Pipe

**Scenario Unit::** Foot

**Scenario Typical Size:** 1,000.0

**Scenario Total Cost:** $1,279.74

**Scenario Cost/Unit:** $1.28

Cost Details:

| Component Name | ID | Description | Unit | Cost | QTY | Total |
|---|---|---|---|---|---|---|
| **Labor** | | | | | | |
| General Labor | 231 | Labor performed using basic tools such as power tool, shovels, and other tools that do not require extensive training. Ex. pipe layer, herder, concrete placement, materials spreader, flagger, etc. | Hour | $25.31 | 5 | $126.55 |
| **Materials** | | | | | | |
| Freeze Proof Hydrant, <= 3' Bury | 240 | Freeze Proof Hydrant, 3 foot or less bury. Materials only. | Each | $78.59 | 4 | $314.36 |
| Pipe, PE, 1", DR 9 | 997 | Materials: - 1" - PE - 160 psi - ASTM D3035 DR 9 | Foot | $0.53 | 1100 | $583.00 |
| **Mobilization** | | | | | | |
| Mobilization, medium equipment | 1139 | Equipment with 70-150 HP or typical weights between 14,000 and 30,000 pounds. | Each | $255.83 | 1 | $255.83 |

**Practice:** 516 - Livestock Pipeline

**Scenario** #11 - PE Pipe, 1< and < 2 in. Dia., Above Ground

**Scenario Description:**

Description: Install 1.5" dia. polyethylene pipe, above ground to supply water for livestock watering facility. Practice is installed in conjunction with 614 - Watering Facility. Construct 1000 FT of 1.5 inch, Polyethylene (PE) pipeline with appurtenances, installed above ground. Appurtenances include: couplings, fittings, thrust blocks, gate valves (2), air release valves (2), drain valve (1), and pressure relief valve (1), and Frost free hydrant. Revegetation is not included. Resource Concerns: Inadequate Livestock Water, Inefficient Energy Use. Associated Practices: Critical Area Planting (342), Pumping Plant (533), and Watering Facility (614).

**Before Situation:**

Water supplies need to be conveyed through pipelines for use by livestock or wildlife.

**After Situation:**

Pipeline(s) convey and/or distribute water to storage and/or watering facilities, for use by livestock or wildlife.

**Feature Measure:** Length of Pipe

**Scenario Unit::** Foot

**Scenario Typical Size:** 1,000.0

**Scenario Total Cost:** $1,836.88

**Scenario Cost/Unit:** $1.84

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 | $25.31 | 5 | $126.55 |
| **Materials** | | | | | | |
| Freeze Proof Hydrant, <= 3' Bury | 240 | Freeze Proof Hydrant, 3 foot or less bury. Materials only. | Each | $78.59 | 4 | $314.36 |
| Pipe, HDPE, smooth wall, weight priced | 1379 | High Density Polyethylene (HDPE) compound manufactured into smooth wall pipe. Materials only. | Pound | $2.18 | 523 | $1,140.14 |
| **Mobilization** | | | | | | |
| Mobilization, medium equipment | 1139 | Equipment with 70-150 HP or typical weights between 14,000 and 30,000 pounds. | Each | $255.83 | 1 | $255.83 |

**Practice:** 516 - Livestock Pipeline

**Scenario** #12 - PE Pipe, 2in. <= Dia., Above Ground

**Scenario Description:**

Description: Install 2" dia. polyethylene pipe, above ground to supply water for livestock watering facility. Practice is installed in conjunction with 614 - Watering Facility. Construct 1000 FT of 2 inch, Polyethylene (PE) pipeline with appurtenances, installed above ground. Appurtenances include: couplings, fittings, thrust blocks, gate valves (2), air release valves (2), drain valve (1), and pressure relief valve (1), and Frost free hydrant. Revegetation is not included. Resource Concerns: Inadequate Livestock Water, Inefficient Energy Use. Associated Practices: Critical Area Planting (342), Pumping Plant (533), and Watering Facility (614).

**Before Situation:**

Water supplies need to be conveyed through pipelines for use by livestock or wildlife.

**After Situation:**

Pipeline(s) convey and/or distribute water to storage and/or watering facilities, for use by livestock or wildlife.

**Feature Measure:** Length of Pipe

**Scenario Unit::** Foot

**Scenario Typical Size:** 1,000.0

**Scenario Total Cost:** $2,735.81

**Scenario Cost/Unit:** $2.74

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 | $25.31 | 5 | $126.55 |
| **Materials** | | | | | | |
| Freeze Proof Hydrant, <= 3' Bury | 240 | Freeze Proof Hydrant, 3 foot or less bury. Materials only. | Each | $78.59 | 4 | $314.36 |
| Pipe, HDPE, smooth wall, weight priced | 1379 | High Density Polyethylene (HDPE) compound manufactured into smooth wall pipe. Materials only. | Pound | $2.18 | 818 | $1,783.24 |
| **Mobilization** | | | | | | |
| Mobilization, medium equipment | 1139 | Equipment with 70-150 HP or typical weights between 14,000 and 30,000 pounds. | Each | $255.83 | 2 | $511.66 |

## USDA - Natural Resources Conservation Service

**Massachusetts**

**Practice:** 521A - Pond Sealing or Lining, Flexible Membrane

**Scenario** #1 - 40 mil Flexible Membrane Liner up to 15K Square Feet

**Scenario Description:**

Installation of a flexible geosynthetic membrane liner, uncovered, to reduce seepage from ponds or waste storage impoundment structures. Total quantity of synthetic liner <= 15,000 square feet. Cost includes all labor, materials and equipment to install a 40 mil LLDPE, HDPE, EDPM, etc. membrane liner, 8 oz non-woven geotextile underlayment, excavation and backfill of anchor trench, specialist to weld seams and install "boots", leak detection manhole. Quantity is inside surface are of the earthen waste storage facility plus an additional 10' around the inside top of berm to accommodate the anchor trench. Assumed quantity = 10,000 SF. Associated practices include 378- Pond, 313 - Waste Storage Facility, 561 - Heavy Use Area Protection, etc. Under drain system for leak detection shall be paid for under 606 - Subsurface Drain.

**Before Situation:**

In-place soils exhibit seepage rates in excess of acceptable limits. Ref. AWMFH Appendix 10D.

**After Situation:**

Water conservation and environmental protection provided by limiting seepage losses from ponds or waste storage impoundments.

**Feature Measure:** Surface area of Liner Material (incl

**Scenario Unit::** Square Foot

**Scenario Typical Size:** 10,000.0

**Scenario Total Cost:** $22,482.93

**Scenario Cost/Unit:** $2.25

Cost Details:

| Component Name | ID | Description | Unit | Cost | QTY | Total |
|---|---|---|---|---|---|---|
| **Equipment Installation** | | | | | | |
| Geotextile, woven | 42 | Woven Geotextile Fabric. Includes materials, equipment and labor | Square Yard | $2.53 | 1111 | $2,810.83 |
| Earthfill, Manually Compacted | 50 | Earthfill, manually compacted, includes equipment and labor | Cubic Yard | $5.87 | 53 | $311.11 |
| 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 | $113.75 | 16 | $1,820.00 |
| Roller, static, smooth, self propelled | 1392 | Self propelled smooth drum static roller compactor, typically 1.5 ton with 34" roller. Equipment cost only. Does not include labor. | Hour | $15.27 | 5 | $76.35 |
| **Labor** | | | | | | |
| General Labor | 231 | Labor performed using basic tools such as power tool, shovels, and other tools that do not require extensive training. Ex. pipe layer, herder, concrete placement, materials spreader, flagger, etc. | Hour | $25.31 | 64 | $1,619.84 |
| 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 | $44.37 | 21 | $931.77 |
| Supervisor 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 | $45.69 | 8 | $365.52 |
| Specialist Labor | 235 | Labor requiring a specialized skill set: Includes Agronomists, Foresters, Biologists, etc. to provide additional technical information during the planning and implementation of the practice. Does not include NRCS or TSP services. | Hour | $110.71 | 32 | $3,542.72 |
| **Materials** | | | | | | |
| Synthetic Liner, 40 mil | 1387 | Synthetic 40 mil HDPE, LLDPE, EPDM, etc membrane liner material. Includes materials and shipping only. | Square Yard | $6.39 | 1111 | $7,099.29 |
| Manhole, 4' x 12' | 2290 | Precast Manhole with base and top delivered. 4' diameter x 12' depth. Includes materials, equipment and labor. | Each | $2,638.01 | 1 | $2,638.01 |
| **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 i | Dollar | $1.00 | 500 | $500.00 |
| Mobilization, medium equipment | 1139 | Equipment with 70-150 HP or typical weights between 14,000 and 30,000 pounds. | Each | $255.83 | 3 | $767.49 |

## USDA - Natural Resources Conservation Service

**Massachusetts**

**Practice:** 521A - Pond Sealing or Lining, Flexible Membrane

**Scenario** #2 - 40 mil Flexible Membrane Liner over 15K Square Feet

**Scenario Description:**

Installation of a flexible geosynthetic membrane liner, uncovered, to reduce seepage from ponds or waste storage impoundment structures. Total quantity of synthetic liner > 15,000 square feet. Cost includes all labor, materials and equipment to install a 40 mil LLDPE, HDPE, EDPM, etc. membrane liner, 8 oz non-woven geotextile underlayment, excavation and backfill of anchor trench, specialist to weld seams and install "boots", leak detection manhole. Quantity is inside surface area of the earthen waste storage facility plus an additional 10' around the inside top of berm to accommodate the anchor trench. Assumed quantity = 22,500 SF. Associated practices include 378- Pond, 313 - Waste Storage Facility, 561 - Heavy Use Area Protection, etc. Under drain system for leak detection shall be paid for under 606 - Subsurface Drain.

**Before Situation:**

In-place soils exhibit seepage rates in excess of acceptable limits. Ref. AWMFH Appendix 10D.

**After Situation:**

Water conservation and environmental protection provided by limiting seepage losses from ponds or waste storage impoundments.

**Feature Measure:** Surface area of Liner Material (incl

**Scenario Unit::** Square Foot

**Scenario Typical Size:** 22,500.0

**Scenario Total Cost:** $42,140.15

**Scenario Cost/Unit:** $1.87

Cost Details:

| Component Name | ID | Description | Unit | Cost | QTY | Total |
|---|---|---|---|---|---|---|
| **Equipment Installation** | | | | | | |
| Geotextile, woven | 42 | Woven Geotextile Fabric. Includes materials, equipment and labor | Square Yard | $2.53 | 2500 | $6,325.00 |
| Earthfill, Manually Compacted | 50 | Earthfill, manually compacted, includes equipment and labor | Cubic Yard | $5.87 | 83 | $487.21 |
| 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 | $113.75 | 24 | $2,730.00 |
| Roller, static, smooth, self propelled | 1392 | Self propelled smooth drum static roller compactor, typically 1.5 ton with 34" roller. Equipment cost only. Does not include labor. | Hour | $15.27 | 10 | $152.70 |
| **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 | $25.31 | 128 | $3,239.68 |
| 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 | $44.37 | 34 | $1,508.58 |
| 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 | $45.69 | 16 | $731.04 |
| Specialist Labor | 235 | Labor requiring a specialized skill set: Includes Agronomists, Foresters, Biologists, etc. to provide additional technical information during the planning and implementation of the practice. Does not include NRCS or TSP services. | Hour | $110.71 | 64 | $7,085.44 |
| **Materials** | | | | | | |
| Synthetic Liner, 40 mil | 1387 | Synthetic 40 mil HDPE, LLDPE, EPDM, etc membrane liner material. Includes materials and shipping only. | Square Yard | $6.39 | 2500 | $15,975.00 |
| Manhole, 4' x 12' | 2290 | Precast Manhole with base and top delivered. 4' diameter x 12' depth. Includes materials, equipment and labor. | Each | $2,638.01 | 1 | $2,638.01 |
| **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 i | Dollar | $1.00 | 500 | $500.00 |
| Mobilization, medium equipment | 1139 | Equipment with 70-150 HP or typical weights between 14,000 and 30,000 pounds. | Each | $255.83 | 3 | $767.49 |

## USDA - Natural Resources Conservation Service

**Massachusetts**

**Practice:** 521A - Pond Sealing or Lining, Flexible Membrane

**Scenario** #45 - 60 Mil Flexible Membrane Liner over 15K Square Feet

**Scenario Description:**

Installation of a flexible geosynthetic membrane liner, uncovered, to reduce seepage from ponds or waste storage impoundment structures. Total quantity of synthetic liner > 15,000 square feet. Cost includes all labor, materials and equipment to install a 60 mil LLDPE, HDPE, EDPM, etc. membrane liner, 8 oz non-woven geotextile underlayment, excavation and backfill of anchor trench, specialist to weld seams and install "boots", leak detection manhole. Quantity is inside surface area of the earthen waste storage facility plus an additional 10' around the inside top of berm to accommodate the anchor trench. Assumed quantity = 22,500 SF. Associated practices include 378- Pond, 313 - Waste Storage Facility, 561 - Heavy Use Area Protection, etc. Under drain system for leak detection shall be paid for under 606 - Subsurface Drain.

**Before Situation:**

In-place soils exhibit seepage rates in excess of acceptable limits. Ref. AWMFH Appendix 10D.

**After Situation:**

Water conservation and environmental protection provided by limiting seepage losses from ponds or waste storage impoundments.

**Feature Measure:** Total Area of Liner including Ancho

**Scenario Unit::** Square Yard

**Scenario Typical Size:** 22,500.0

**Scenario Total Cost:** $53,191.78

**Scenario Cost/Unit:** $2.36

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 | $2.53 | 2500 | $6,325.00 |
| Earthfill, Manually Compacted | 50 | Earthfill, manually compacted, includes equipment and labor | Cubic Yard | $5.87 | 135 | $792.45 |
| 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 | $113.75 | 24 | $2,730.00 |
| Roller, static, smooth, self propelled | 1392 | Self propelled smooth drum static roller compactor, typically 1.5 ton with 34" roller. Equipment cost only. Does not include labor. | Hour | $15.27 | 8 | $122.16 |
| **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 | $25.31 | 160 | $4,049.60 |
| 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 | $44.37 | 24 | $1,064.88 |
| 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 | $45.69 | 16 | $731.04 |
| Specialist Labor | 235 | Labor requiring a specialized skill set: Includes Agronomists, Foresters, Biologists, etc. to provide additional technical information during the planning and implementation of the practice. Does not include NRCS or TSP services. | Hour | $110.71 | 65 | $7,196.15 |
| **Materials** | | | | | | |
| Synthetic Liner, 60 mil | 2109 | Synthetic 60 mil HDPE, LLDPE, EPDM, etc membrane liner material. Includes materials and shipping only. | Square Foot | $1.19 | 22500 | $26,775.00 |
| Manhole, 4' x 12' | 2290 | Precast Manhole with base and top delivered. 4' diameter x 12' depth. Includes materials, equipment and labor. | Each | $2,638.01 | 1 | $2,638.01 |
| **Mobilization** | | | | | | |
| Mobilization, medium equipment | 1139 | Equipment with 70-150 HP or typical weights between 14,000 and 30,000 pounds. | Each | $255.83 | 3 | $767.49 |

## USDA - Natural Resources Conservation Service

**Massachusetts**

**Practice:** 521A - Pond Sealing or Lining, Flexible Membrane

**Scenario** #46 - 60 Mil Flexible Membrane Liner upto 15K Square Feet

**Scenario Description:**

Installation of a flexible geosynthetic membrane liner, uncovered, to reduce seepage from ponds or waste storage impoundment structures. Total quantity of synthetic liner <= 15,000 square feet. Cost includes all labor, materials and equipment to install a 60 mil LLDPE, HDPE, EDPM, etc. membrane liner, 8 oz non-woven geotextile underlayment, excavation and backfill of anchor trench, specialist to weld seams and install "boots", leak detection manhole. Quantity is inside surface are of the earthen waste storage facility plus an additional 10' around the inside top of berm to accommodate the anchor trench. Assumed quantity = 10,000 SF. Associated practices include 378- Pond, 313 - Waste Storage Facility, 561 - Heavy Use Area Protection, etc. Under drain system for leak detection shall be paid for under 606 - Subsurface Drain.

**Before Situation:**

In-place soils exhibit seepage rates in excess of acceptable limits. Ref. AWMFH Appendix 10D.

**After Situation:**

Water conservation and environmental protection provided by limiting seepage losses from ponds or waste storage impoundments.

**Feature Measure:** Square Feet of Liner, including anc

**Scenario Unit::** Square Foot

**Scenario Typical Size:** 10,000.0

**Scenario Total Cost:** $26,966.75

**Scenario Cost/Unit:** $2.70

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 | $2.53 | 1111 | $2,810.83 |
| Earthfill, Manually Compacted | 50 | Earthfill, manually compacted, includes equipment and labor | Cubic Yard | $5.87 | 53 | $311.11 |
| 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 | $113.75 | 16 | $1,820.00 |
| Roller, static, smooth, self propelled | 1392 | Self propelled smooth drum static roller compactor, typically 1.5 ton with 34" roller. Equipment cost only. Does not include labor. | Hour | $15.27 | 5 | $76.35 |
| **Labor** | | | | | | |
| General Labor | 231 | Labor performed using basic tools such as power tool, shovels, and other tools that do not require extensive training. Ex. pipe layer, herder, concrete placement, materials spreader, flagger, etc. | Hour | $25.31 | 80 | $2,024.80 |
| 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 | $44.37 | 16 | $709.92 |
| 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 | $45.69 | 8 | $365.52 |
| Specialist Labor | 235 | Labor requiring a specialized skill set: Includes Agronomists, Foresters, Biologists, etc. to provide additional technical information during the planning and implementation of the practice. Does not include NRCS or TSP services. | Hour | $110.71 | 32 | $3,542.72 |
| **Materials** | | | | | | |
| Synthetic Liner, 60 mil | 2109 | Synthetic 60 mil HDPE, LLDPE, EPDM, etc membrane liner material. Includes materials and shipping only. | Square Foot | $1.19 | 10000 | $11,900.00 |
| Manhole, 4' x 12' | 2290 | Precast Manhole with base and top delivered. 4' diameter x 12' depth. Includes materials, equipment and labor. | Each | $2,638.01 | 1 | $2,638.01 |
| **Mobilization** | | | | | | |
| Mobilization, medium equipment | 1139 | Equipment with 70-150 HP or typical weights between 14,000 and 30,000 pounds. | Each | $255.83 | 3 | $767.49 |

**Practice:** 521C - Pond Sealing or Lining, Bentonite Sealant

**Scenario** #3 - 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:** 1,613.0

**Scenario Total Cost:** $123,239.50

**Scenario Cost/Unit:** $76.40

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 | $4.45 | 3227 | $14,360.15 |
| Tractor, agricultural, 120 HP | 962 | Agricultural tractor with horsepower range of 90 to 140. Equipment and power unit costs. Labor not included. | Hour | $57.70 | 6 | $346.20 |
| **Labor** | | | | | | |
| Equipment Operators, Light | 232 | Includes: Skid Steer Loaders, Hydraulic Excavators <50 HP, Trenchers <12", Ag Equipment <150 HP, Pickup Trucks, Forklifts, Mulchers | Hour | $25.23 | 7 | $176.61 |
| Supervisor or Manager | 234 | Labor involving supervision or management activities. Includes crew supervisors, foremen and farm/ranch managers time required for adopting new technology, etc. | Hour | $45.69 | 2 | $91.38 |
| Specialist Labor | 235 | Labor requiring a specialized skill set: Includes Agronomists, Foresters, Biologists, etc. to provide additional technical information during the planning and implementation of the practice. Does not include NRCS or TSP services. | Hour | $110.71 | 3 | $332.13 |
| **Materials** | | | | | | |
| Bentonite | 41 | Bentonite, includes materials (50# bag) | Each | $20.60 | 5227 | $107,676.20 |
| **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 i | 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 | $255.83 | 1 | $255.83 |

**Practice:** 521C - Pond Sealing or Lining, Bentonite Sealant

**Scenario** #4 - 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:** 1,613.0

**Scenario Total Cost:** $116,057.20

**Scenario Cost/Unit:** $71.95

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 | $4.45 | 1613 | $7,177.85 |
| Tractor, agricultural, 120 HP | 962 | Agricultural tractor with horsepower range of 90 to 140. Equipment and power unit costs. Labor not included. | Hour | $57.70 | 6 | $346.20 |
| **Labor** | | | | | | |
| Equipment Operators, Light | 232 | Includes: Skid Steer Loaders, Hydraulic Excavators <50 HP, Trenchers <12", Ag Equipment <150 HP, Pickup Trucks, Forklifts, Mulchers | Hour | $25.23 | 7 | $176.61 |
| Supervisor or Manager | 234 | Labor involving supervision or management activities. Includes crew supervisors, foremen and farm/ranch managers time required for adopting new technology, etc. | Hour | $45.69 | 2 | $91.38 |
| Specialist Labor | 235 | Labor requiring a specialized skill set: Includes Agronomists, Foresters, Biologists, etc. to provide additional technical information during the planning and implementation of the practice. Does not include NRCS or TSP services. | Hour | $110.71 | 3 | $332.13 |
| **Materials** | | | | | | |
| Bentonite | 41 | Bentonite, includes materials (50# bag) | Each | $20.60 | 5227 | $107,676.20 |
| **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 i | 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 | $255.83 | 1 | $255.83 |

**Practice:** 521D - Pond Sealing or Lining, Compacted Clay Treatment

**Scenario** #7 - Material haul < 1 mile

**Scenario Description:**

Construction of a compacted soil liner, treated with compacted clay, to reduce seepage from ponds or waste storage impoundment structures. Practice implementation includes compaction of the soil liner under proper moisture conditions to the designed liner thickness, and soil cover to protect the finished liner. Material haul < 1 mile. Associated practices include PS378, PS313, & other waste water impoundments.

**Before Situation:**

In-place soils at site exhibit seepage rates in excess of acceptable limits. An adequate quantity of soil suitable for constructing a clay liner without amendments is available at an economical haul distance. Material haul < 1 mile.

**After Situation:**

Water conservation and environmental protection provided by limiting seepage losses from ponds or waste storage impoundments.

**Feature Measure:** Volume of Liner Material (including

**Scenario Unit::** Cubic Yard

**Scenario Typical Size:** 2,420.0

**Scenario Total Cost:** $33,777.06

**Scenario Cost/Unit:** $13.96

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 | $4.45 | 2420 | $10,769.00 |
| 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 | $6.58 | 1613 | $10,613.54 |
| 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 | $3.77 | 2420 | $9,123.40 |
| **Labor** | | | | | | |
| Specialist Labor | 235 | Labor requiring a specialized skill set: Includes Agronomists, Foresters, Biologists, etc. to provide additional technical information during the planning and implementation of the practice. Does not include NRCS or TSP services. | Hour | $110.71 | 14 | $1,549.94 |
| **Mobilization** | | | | | | |
| Mobilization, medium equipment | 1139 | Equipment with 70-150 HP or typical weights between 14,000 and 30,000 pounds. | Each | $255.83 | 1 | $255.83 |
| Mobilization, large equipment | 1140 | Equipment >150HP or typical weights greater than 30,000 pounds or loads requiring over width or over length permits. | Each | $488.45 | 3 | $1,465.35 |

**Practice:** 521D - Pond Sealing or Lining, Compacted Clay Treatment

**Scenario** #8 - Material haul > 1 mile

**Scenario Description:**

Construction of a compacted soil liner, treated with compacted clay, to reduce seepage from ponds or waste storage impoundment structures. Practice implementation includes compaction of the soil liner under proper moisture conditions to the designed liner thickness, and protection of the finished liner. Material haul > 1 mile. Associated practices include PS378, PS313, & other waste water impoundments.

**Before Situation:**

In-place soils at site exhibit seepage rates in excess of acceptable limits. An adequate quantity of soil suitable for constructing a clay liner without amendments is available at an economical haul distance.

**After Situation:**

Water conservation and environmental protection provided by limiting seepage losses from ponds or waste storage impoundments.

**Feature Measure:** Volume of Liner Material (including

**Scenario Unit::** Cubic Yard

**Scenario Typical Size:** 2,420.0

**Scenario Total Cost:** $31,536.17

**Scenario Cost/Unit:** $13.03

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 | $2.36 | 2420 | $5,711.20 |
| Earthfill, Roller Compacted | 49 | Earthfill, roller or machine compacted, includes equipment and labor | Cubic Yard | $4.45 | 2420 | $10,769.00 |
| Excavation, common earth, large equipment, 150 ft | 1223 | Bulk excavation of common earth including sand and gravel with dozer >100 HP with average push distance of 150 feet. Includes equipment and labor. | Cubic Yard | $3.77 | 2420 | $9,123.40 |
| 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 | $0.33 | 8065 | $2,661.45 |
| **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 | $110.71 | 14 | $1,549.94 |
| **Mobilization** | | | | | | |
| Mobilization, medium equipment | 1139 | Equipment with 70-150 HP or typical weights between 14,000 and 30,000 pounds. | Each | $255.83 | 1 | $255.83 |
| Mobilization, large equipment | 1140 | Equipment >150HP or typical weights greater than 30,000 pounds or loads requiring over width or over length permits. | Each | $488.45 | 3 | $1,465.35 |

**Practice:** 528 - Prescribed Grazing

**Scenario** #1 - Weekly moves

**Scenario Description:**

Animals are moved to new ground weekly. Paddocks are designed to allow at least 30 days rest. Design and implementation of a grazing system will enhance pasture condition and ecosystem function as well as optimize efficiency.

**Before Situation:**

Current grazing system is continuous, without rest and rotation. Inefficient use of forage plants has a negative impact on pasture condition, as well as soil and water resources. Stocking rates are likely higher than the current level of production and efficiency of use can support without management changes. There is currently no monitoring plan in place to evaluate change on the landscape.

**After Situation:**

Typical scenario is a small beef or sheep producer who has adequate land base for number of livestock, has at least 5 paddocks, and moves animals at least once per week. Management is centered on maintaining desired residual forage heights. Prescribed grazing system is designed to protect the health and vigor of the plant communities that are in place. Livestock are managed in a way that enhances pasture condition and function through protection of sensitive areas, and efficient harvest of forage resources. Grazing system success will be evaluated through short term monitoring.

**Feature Measure:** <Unknown>

**Scenario Unit::** Acre

**Scenario Typical Size:** 20.0

**Scenario Total Cost:** $772.60

**Scenario Cost/Unit:** $38.63

Cost Details:

| Component Name | ID | Description | Unit | Cost | QTY | Total |
|---|---|---|---|---|---|---|
| **Acquisition of Technical Knowledge** | | | | | | |
| Training, Workshops | 294 | Educational seminar or series of meetings emphasizing interaction and exchange of information among a usually small number of participants. | Each | $63.92 | 1 | $63.92 |
| **Labor** | | | | | | |
| General Labor | 231 | Labor performed using basic tools such as power tool, shovels, and other tools that do not require extensive training. Ex. pipe layer, herder, concrete placement, materials spreader, flagger, etc. | Hour | $25.31 | 28 | $708.68 |

**Practice:** 528 - Prescribed Grazing

**Scenario** #2 - Twice weekly moves

**Scenario Description:**

Animals are moved to new ground at least twice weekly. Paddocks are designed to allow at least 30 days rest. Design and implementation of a grazing system will enhance pasture condition and ecosystem function as well as optimize efficiency.

**Before Situation:**

Current grazing system is continuous, without rest and rotation. Inefficient use of forage plants has a negative impact on pasture condition, as well as soil and water resources. Stocking rates are likely higher than the current level of production and efficiency of use can support without management changes. There is currently no monitoring plan in place to evaluate change on the landscape.

**After Situation:**

Typical scenario is a small beef or sheep producer who has adequate land base for number of livestock, has at least 9 paddocks, and moves animals at least twice per week. Management is centered on maintaining desired residual forage heights. Prescribed grazing system is designed to protect the health and vigor of the plant communities that are in place. Livestock are managed in a way that enhances pasture condition and function through protection of sensitive areas, and efficient harvest of forage resources. Grazing system success will be evaluated through short term monitoring.

**Feature Measure:** <Unknown>

**Scenario Unit::** Acre

**Scenario Typical Size:** 20.0

**Scenario Total Cost:** $2,273.12

**Scenario Cost/Unit:** $113.66

Cost Details:

| Component Name | ID | Description | Unit | Cost | QTY | Total |
|---|---|---|---|---|---|---|
| **Acquisition of Technical Knowledge** | | | | | | |
| Training, Workshops | 294 | Educational seminar or series of meetings emphasizing interaction and exchange of information among a usually small number of participants. | Each | $63.92 | 1 | $63.92 |
| **Equipment Installation** | | | | | | |
| All terrain vehicles, ATV | 965 | Includes equipment, power unit and labor costs. | Hour | $28.28 | 28 | $791.84 |
| **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 | $25.31 | 56 | $1,417.36 |

**Practice:** 528 - Prescribed Grazing

**Scenario** #3 - Intensive

**Scenario Description:**

Animals are moved to new ground daily or twice per day. Paddocks are designed to allow at least 30 days rest. Design and implementation of a grazing system will enhance pasture condition and ecosystem function as well as optimize efficiency.

**Before Situation:**

Current grazing system is a long rotation, without sufficient rest and rotation to achieve highest production possible. Inefficient use of forage plants has a negative impact on pasture condition, as well as soil and water resources. Stocking rates are likely higher than the current level of production and efficiency of use can support without management changes. There is currently no monitoring plan in place to evaluate change on the landscape.

**After Situation:**

Typical scenario is a small dairy operation, but may be any operation that moves animals daily or every other day minimum and maintains desired residual forage heights. Prescribed grazing system is designed to protect the health and vigor of the plant communities that are in place. Livestock are managed in a way that enhances pasture condition and function through proper rest and recovery periods, protection of sensitive areas, proper utilization, and efficient harvest of forage resources. Grazing system success will be evaluated through long term monitoring.

**Feature Measure:** <Unknown>

**Scenario Unit::** Acre

**Scenario Typical Size:** 50.0

**Scenario Total Cost:** $6,608.36

**Scenario Cost/Unit:** $132.17

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 | $63.92 | 1 | $63.92 |
| **Equipment Installation** | | | | | | |
| All terrain vehicles, ATV | 965 | Includes equipment, power unit and labor costs. | Hour | $28.28 | 56 | $1,583.68 |
| **Labor** | | | | | | |
| General Labor | 231 | Labor performed using basic tools such as power tool, shovels, and other tools that do not require extensive training. Ex. pipe layer, herder, concrete placement, materials spreader, flagger, etc. | Hour | $25.31 | 196 | $4,960.76 |

**Practice:** 528 - Prescribed Grazing

**Scenario** #4 - Deferred grazing

**Scenario Description:**

Defer the pasture for 90 days and up to a growing season to manage for invasive weeds when necessary, to improve the health of the plants and/or provide nesting habitat for wildlife species. Keep records of dates out and monitor to determine when desired objectives of deferment are met. Associated Practices: Brush Management (314), Herbaceous Weed Control (315) Fence (382), Access Control (472), Forage and Biomass Planting (512), Nutrient Management (590), Feed Management (592), Upland Wildlife Habitat Management (645).

**Before Situation:**

Over-grazed pasture, a pasture with a low condition score, or a newly established pasture converted from cropland with a need for proper grazing management.

**After Situation:**

Improve the health and vigor of the sward, through deferment of grazing and improve the nesting habitat for wildlife.

**Feature Measure:** <Unknown>

**Scenario Unit::** Acre

**Scenario Typical Size:** 20.0

**Scenario Total Cost:** $801.18

**Scenario Cost/Unit:** $40.06

Cost Details:

| Component Name | ID | Description | Unit | Cost | QTY | Total |
|---|---|---|---|---|---|---|
| **Equipment Installation** | | | | | | |
| Truck, Pickup | 939 | Equipment and power unit costs. Labor not included. | Hour | $21.79 | 1 | $21.79 |
| 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 | $5.57 | 2 | $11.14 |
| **Foregone Income** | | | | | | |
| FI, Grazing AUMs | 2079 | Grazing is the Primary Land Use | Animal Unit Month | $16.65 | 26 | $432.90 |
| **Labor** | | | | | | |
| Skilled Labor | 230 | Labor requiring a high level skill set: Includes carpenters, welders, electricians, conservation professionals involved with data collection, monitoring, and or record keeping, etc. | Hour | $41.76 | 5 | $208.80 |
| 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 | $25.31 | 5 | $126.55 |

**Practice:** 533 - Pumping Plant

**Scenario** #1 - Electric Powered Pump less than 3 Hp

**Scenario Description:**

A 1 Hp submersible electric-powered pump is installed in a well or structure; or a close-coupled 1 Hp electric-powered centrifugal pump is mounted on a platform. It is used for watering livestock as part of a prescribed grazing system; or for pressurizing a small irrigation system; or for transferring liquid waste in a waste transfer system. Resource Concerns: Livestock Production Limitation - Inadequate livestock water; Water Quality degradation - Excess nutrients in surface and ground waters; Insufficient water - Inefficient use of irrigation water. Associated Practices include: 374 - Farmstead Energy Improvement; 430 - Irrigation Pipeline; 441 - Irrigation System, Microirrigation; 449 - Irrigation Water Management; 516 - Livestock Pipeline; 313 - Waste Storage Facility; 634 - Waste Transfer; and 614 - Watering Facility.

**Before Situation:**

Livestock: The present gravity flow system is inadequate to provide the proper flow rate for a prescribed grazing system. Irrigation: Available water is at an insufficient pressure to allow for even distribution of water. Waste Transfer: Contaminated water needs to be moved to a containment facility.

**After Situation:**

Livestock: Water is transferred at a sufficient rate and pressure to meet the requirements of a prescribed grazing system. Irrigation: A properly designed pump is installed to improve irrigation efficiency and reduce energy usage. Waste Transfer: Liquid wastes that have been collected through a waste transfer system are now efficiently transferred to an appropriate treatment or storage facility.

**Feature Measure:** Pump Power Requirement

**Scenario Unit::** Brake Horse Power

**Scenario Typical Size:** 1.0

**Scenario Total Cost:** $1,761.24

**Scenario Cost/Unit:** $1,761.24

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 | $327.92 | 1 | $327.92 |
| Truck, Pickup | 939 | Equipment and power unit costs. Labor not included. | Hour | $21.79 | 2 | $43.58 |
| **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 | $25.31 | 6 | $151.86 |
| 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 | $45.69 | 6 | $274.14 |
| **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 moto | Horsepower | $413.86 | 1 | $413.86 |

**Practice:** 533 - Pumping Plant

**Scenario** #2 - Electric Powered Pump Less Than 3 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:** 1.0

**Scenario Total Cost:** $2,224.91

**Scenario Cost/Unit:** $2,224.91

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 | $327.92 | 1 | $327.92 |
| Truck, Pickup | 939 | Equipment and power unit costs. Labor not included. | Hour | $21.79 | 2 | $43.58 |
| **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 | $25.31 | 6 | $151.86 |
| 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 | $45.69 | 6 | $274.14 |
| **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 moto | 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 3 up to less than 10 HP

**Scenario Description:**

A 7.5 Hp submersible electric-powered pump is installed in a well or structure; or a close-coupled 7.5 Hp electric-powered centrifugal pump is mounted on a platform. It is used for a large, high-pressure (200psi) livestock pipeline as part of a prescribed grazing system; or for pressurizing a medium-sized (200gpm at 40psi) irrigation system; or a medium-sized (400gpm at 20 psi) waste transfer system. Resource Concerns: Livestock Production Limitation - Inadequate livestock water; Water Quality degradation - Excess nutrients in surface and ground waters; Insufficient water - Inefficient use of irrigation water. Associated Practices include: 374 - Farmstead Energy Improvement; 430 - Irrigation Pipeline; 441 - Irrigation System, Microirrigation; 449 - Irrigation Water Management; 516 - Livestock Pipeline; 313 - Waste Storage Facility; 634 - Waste Transfer; and 614 - Watering Facility.

**Before Situation:**

Livestock: Current system consists of a series of medium pressure and inefficient pump stations to transport water to a distant and higher-elevation watering facility. Irrigation: An existing irrigation system employs an inefficient, improperly sized pump, that prevents efficient water application resulting in water loss and high energy use. Waste Transfer: Various types of semi-solid or liquid waste are uncollected causing surface and ground water issues. Due to topography, gravity transfer is not possible and a properly sized pump is needed to transfer waste as part of a waste transfer system.

**After Situation:**

Livestock: A single, efficient, high-pressure pumping plant is installed, eliminating intermediate pump stations, reducing energy use and enabling better system management. Irrigation: A properly designed and efficient pumping plant is installed, reducing energy use and improving irrigation efficiency. Waste Transfer: Collected wastes are now efficiently transferred to an appropriate treatment or storage facility.

**Feature Measure:** Pump Power Requirement

**Scenario Unit::** Brake Horse Power

**Scenario Typical Size:** 7.0

**Scenario Total Cost:** $6,303.39

**Scenario Cost/Unit:** $900.48

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 | $327.92 | 2 | $655.84 |
| Truck, Pickup | 939 | Equipment and power unit costs. Labor not included. | Hour | $21.79 | 24 | $522.96 |
| **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 | $25.31 | 24 | $607.44 |
| 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 | $45.69 | 24 | $1,096.56 |
| **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 | 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 | 7.5 | $939.98 |
| **Mobilization** | | | | | | |
| Mobilization, medium equipment | 1139 | Equipment with 70-150 HP or typical weights between 14,000 and 30,000 pounds. | Each | $255.83 | 2 | $511.66 |

**Practice:** 533 - Pumping Plant

**Scenario** #4 - Electric-Powered Pump 3 up to less than 10 HP with Pressure Tank

**Scenario Description:**

A 7.5 Hp submersible electric-powered pump is installed in a well or structure; or a close-coupled 7.5 Hp electric-powered centrifugal pump is mounted on a platform. It is used for a large, high-pressure (200psi) livestock pipeline as part of a prescribed grazing system; or for pressurizing a medium-sized (200gpm at 40psi) irrigation system; or a medium-sized (400gpm at 20 psi) waste transfer system. Resource Concerns: Livestock Production Limitation - Inadequate livestock water; Water Quality degradation - Excess nutrients in surface and ground waters; Insufficient water - Inefficient use of irrigation water. Associated Practices include: 374 - Farmstead Energy Improvement; 430 - Irrigation Pipeline; 441 - Irrigation System, Microirrigation; 449 - Irrigation Water Management; 516 - Livestock Pipeline; 313 - Waste Storage Facility; 634 - Waste Transfer; and 614 - Watering Facility.

**Before Situation:**

Livestock: Current system consists of a series of medium pressure and inefficient pump stations to transport water to a distant and higher-elevation watering facility. Irrigation: An existing irrigation system employs an inefficient, improperly sized pump, that prevents efficient water application resulting in water loss and high energy use. Waste Transfer: Various types of semi-solid or liquid waste are uncollected causing surface and ground water issues. Due to topography, gravity transfer is not possible and a properly sized pump is needed to transfer waste as part of a waste transfer system.

**After Situation:**

Livestock: A single, efficient, high-pressure pumping plant is installed, eliminating intermediate pump stations, reducing energy use and enabling better system management. Irrigation: A properly designed and efficient pumping plant is installed, reducing energy use and improving irrigation efficiency. Waste Transfer: Collected wastes are now efficiently transferred to an appropriate treatment or storage facility.

**Feature Measure:** Pump Power Requirement

**Scenario Unit::** Brake Horse Power

**Scenario Typical Size:** 7.0

**Scenario Total Cost:** $6,959.40

**Scenario Cost/Unit:** $994.20

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 | $327.92 | 2 | $655.84 |
| Truck, Pickup | 939 | Equipment and power unit costs. Labor not included. | Hour | $21.79 | 24 | $522.96 |
| **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 | $25.31 | 24 | $607.44 |
| 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 | $45.69 | 24 | $1,096.56 |
| **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 | 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 | 7.5 | $939.98 |
| Pressure Tank, 80 gallon | 1039 | Pressure Tank, 80 gallon. Includes materials and shipping only. | Each | $656.01 | 1 | $656.01 |
| **Mobilization** | | | | | | |
| Mobilization, medium equipment | 1139 | Equipment with 70-150 HP or typical weights between 14,000 and 30,000 pounds. | Each | $255.83 | 2 | $511.66 |

**Practice:** 533 - Pumping Plant

**Scenario** #5 - Electric-Powered Pump 10 to 40 HP

**Scenario Description:**

This is a close-coupled, 3-phase, 20 Hp electric-powered centrifugal pump mounted on a platform for pressurizing a medium-sized (500 gpm and 50 psi) sprinkler or large microirrigation (1,000 gpm and 30 psi) system or a large-sized surface irrigation system (1,500 gpm) or a large-sized (1,200 gpm and 25 psi) waste transfer system. Resource Concerns: Water Quality degradation - Excess nutrients in surface and ground waters; Insufficient water - Inefficient use of irrigation water. Associated Practices include: 374 - Farmstead Energy Improvement; 430 - Irrigation Pipeline; 441 - Irrigation System, Microirrigation; 449 - Irrigation Water Management; 313 - Waste Storage Facility; 634 - Waste Transfer; and 614 - Watering Facility.

**Before Situation:**

Irrigation: An existing irrigation system employs an inefficient, improperly sized pump that prevents efficient water application resulting in water loss and high energy use. Waste Transfer: Various types of semi-solid or liquid waste are uncollected causing surface and ground water issues. Due to topography, gravity transfer is not possible and a properly sized pump is needed to transfer waste as part of a waste transfer system.

**After Situation:**

Irrigation: A properly designed and efficient pumping plant is installed, reducing energy use and improving irrigation efficiency. Waste Transfer: Collected wastes are now efficiently transferred to an appropriate treatment or storage facility or to a distribution system.

**Feature Measure:** Pump Power Requirement

**Scenario Unit::** Brake Horse Power

**Scenario Typical Size:** 20.0

**Scenario Total Cost:** $11,976.73

**Scenario Cost/Unit:** $598.84

Cost Details:

| Component Name | ID | Description | Unit | Cost | QTY | Total |
|---|---|---|---|---|---|---|
| **Equipment Installation** | | | | | | |
| Concrete, CIP, slab on grade, reinforced | 37 | Steel reinforced concrete formed and cast-in-placed as a slab on grade by chute placement. Typical strength is 3000 to 4000 psi. Includes materials, labor and equipment to transport, place and finish. | Cubic Yard | $327.92 | 2 | $655.84 |
| Backhoe, 80 HP | 926 | Wheel mounted backhoe excavator with horsepower range of 60 to 90. Equipment and power unit costs. Labor not included. | Hour | $56.05 | 8 | $448.40 |
| Truck, Pickup | 939 | Equipment and power unit costs. Labor not included. | Hour | $21.79 | 56 | $1,220.24 |
| **Labor** | | | | | | |
| Skilled Labor | 230 | Labor requiring a high level skill set: Includes carpenters, welders, electricians, conservation professionals involved with data collection, monitoring, and or record keeping, etc. | Hour | $41.76 | 8 | $334.08 |
| 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 | $25.31 | 56 | $1,417.36 |
| 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 | $44.37 | 8 | $354.96 |
| 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 | $45.69 | 56 | $2,558.64 |
| **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 | 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 | $255.83 | 2 | $511.66 |

**Practice:** 533 - Pumping Plant

**Scenario** #6 - Electric-Powered Pump over 40 HP

**Scenario Description:**

This is a close-coupled, 3-phase, 50 Hp electric-powered centrifugal pump mounted on a platform for pressurizing a large-sized (1,200 gpm and 50 psi) sprinkler or very large microirrigation (1,700 gpm and 35 psi) system or a very large-sized surface irrigation system (2,800 gpm) or a very large-sized (2,400 gpm and 25 psi) waste transfer system. Resource Concerns: Water Quality degradation - Excess nutrients in surface and ground waters; Insufficient water - Inefficient use of irrigation water. Associated Practices include: 374 - Farmstead Energy Improvement; 430 - Irrigation Pipeline; 441 - Irrigation System, Microirrigation; 442 - Irrigation System, Sprinkler; 449 - Irrigation Water Management; 313 - Waste Storage Facility; and 634 - Waste Transfer.

**Before Situation:**

Irrigation: An existing irrigation system employs an inefficient, improperly sized pump that prevents efficient water application resulting in water loss and high energy use.

**After Situation:**

Irrigation: A properly designed and efficient pumping plant is installed, reducing energy use and improving irrigation efficiency.

**Feature Measure:** Pump Power Requirement

**Scenario Unit::** Brake Horse Power

**Scenario Typical Size:** 50.0

**Scenario Total Cost:** $20,881.00

**Scenario Cost/Unit:** $417.62

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 | $327.92 | 2 | $655.84 |
| Backhoe, 80 HP | 926 | Wheel mounted backhoe excavator with horsepower range of 60 to 90. Equipment and power unit costs. Labor not included. | Hour | $56.05 | 16 | $896.80 |
| Truck, Pickup | 939 | Equipment and power unit costs. Labor not included. | Hour | $21.79 | 56 | $1,220.24 |
| Portable Welder | 1407 | Portable field welder. Equipment only. Labor not included. | Hour | $20.41 | 16 | $326.56 |
| Crane, truck mounted, hydraulic, 12 ton | 1734 | 12 ton capacity truck mounted hydraulic crane. Equipment cost only. | Hour | $91.52 | 16 | $1,464.32 |
| **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 | $41.76 | 56 | $2,338.56 |
| 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 | $25.31 | 16 | $404.96 |
| 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 | $44.37 | 24 | $1,064.88 |
| 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 | $45.69 | 56 | $2,558.64 |
| **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 | 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 | 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 | $255.83 | 2 | $511.66 |

**Practice:** 533 - Pumping Plant

**Scenario** #7 - Variable Frequency Drive 10HP or less

**Scenario Description:**

This is an installation of electrical and electronic components designed to vary the frequency of the voltage to an electric motor and thus the ability to vary the speed of the motor. This directly affects pressure and flowrate. This also could give the operator the flexibility to operate several systems separately or at the same time. Resource concerns: Insufficient water - Inefficient use of irrigation water; Inefficient energy use - Equipment and facilities and Farming/ranching practices and field operations. Associated Practices: 374 - Farmstead Energy Improvement; 430 - Irrigation Pipeline; 441 - Irrigation System, Microirrigation; 449 - Irrigation Water Management; 516 - Livestock Pipeline; and 614 - Watering Facility.

**Before Situation:**

Standard electrical connection from electrical utility to pump motor. No capability to match pump output pressure and/or flowrate to field(s) need(s). Result is over/under pressure(s) and/or flow rate(s), possible hydraulic anomalies, energy loss, and or inefficient water application in the irrigation system.

**After Situation:**

VFD Modifications are implemented on an existing pumping plant meeting Nebraska performance criteria to allow for varying the speed of a 1.5 Hp electric motor to match the pressure and flow requirements for small microirrigation system.

**Feature Measure:** Pump Power Requirement

**Scenario Unit::** Horsepower

**Scenario Typical Size:** 1.0

**Scenario Total Cost:** $930.53

**Scenario Cost/Unit:** $930.53

Cost Details:

| Component Name | ID | Description | Unit | Cost | QTY | Total |
|---|---|---|---|---|---|---|
| **Materials** | | | | | | |
| Variable Speed Drive, 5 HP | 2348 | Variable speed drive for 5 Horsepower electric motor. Does not include motor. Materials only. | Horsepower | $620.35 | 1.5 | $930.53 |

**Practice:** 533 - Pumping Plant

**Scenario** #8 - Variable Frequency Drive over 10HP

**Scenario Description:**

This is an installation of electrical and electronic components designed to vary the frequency of the voltage to an electric motor and thus the ability to vary the speed of the motor. This directly affects pressure and flowrate. This also could give the operator the flexibility to operate several systems separately or at the same time. Resource concerns: Insufficient water - Inefficient use of irrigation water; Inefficient energy use - Equipment and facilities and Farming/ranching practices and field operations. Associated Practices: 374 - Farmstead Energy Improvement; 430 - Irrigation Pipeline; 441 - Irrigation System, Microirrigation; 449 - Irrigation Water Management; 516 - Livestock Pipeline; and 614 - Watering Facility.

**Before Situation:**

Standard electrical connection from electrical utility to pump motor. No capability to match pump output pressure and/or flowrate to field(s) need(s). Result is over/under pressure(s) and/or flow rate(s), possible hydraulic anomalies, energy loss, and or inefficient water application in the irrigation system.

**After Situation:**

VFD Modifications are implemented on an existing pumping plant meeting Nebraska performance criteria to allow for varying the speed of a 10 Hp electric motor to match the pressure and flow requirements for an irrigation system.

**Feature Measure:** Pump Power Requirement

**Scenario Unit::** Horsepower

**Scenario Typical Size:** 10.0

**Scenario Total Cost:** $3,539.00

**Scenario Cost/Unit:** $353.90

Cost Details:

| Component Name | ID | Description | Unit | Cost | QTY | Total |
|---|---|---|---|---|---|---|
| **Materials** | | | | | | |
| Variable Speed Drive, 25 HP | 2557 | Variable speed drive for 25 Horsepower electric motor. Does not include motor. Materials only. | Horsepower | $353.90 | 10 | $3,539.00 |

**Practice:** 533 - Pumping Plant

**Scenario** #9 - Internal Combustion Powered Pump less than 7½ HP

**Scenario Description:**

The typical scenario supports replacement of a pump in an existing irrigation system on cropland with a 5 HP pump. Size of pump is determined by required GPM and pressure derived from a design for specific irrigation system on cropland. Scenario could also be used for a 5 HP pump for silage leachate, barnyard runoff, and milk house waste (as part of a waste transfer system) at farm headquarters. The combination of higher solids content and volume require a larger horse power pump. This liquid manure pump is used to transfer semi-solid manure from a small reception pit located either below a barnyard or at the end of a free-stall barn or scrape alley. Resource Concerns: Livestock Production Limitation - Inadequate livestock water; Water Quality degradation - Excess nutrients in surface and ground waters; Insufficient water - Inefficient use of irrigation water. Associated Practices include: 374 - Farmstead Energy Improvement; 430 - Irrigation Pipeline; 441 - Irrigation System, Microirrigation; 442 - Irrigation System, Sprinkler; 449 - Irrigation Water Management; 516 - Livestock Pipeline; 313 - Waste Storage Facility; 634 - Waste Transfer; and 614 - Watering Facility.

**Before Situation:**

Irrigation: Either an existing irrigation system employs an inefficient, improperly-sized pump that leads to inefficient water delivery resulting in high energy costs, or Waste Transfer: various types of semi-solid or liquid waste at the headquarters is uncollected causing surface and ground water issues.

**After Situation:**

Irrigation Setting: For irrigation system, a properly designed pump is installed, reducing water and energy usage. Waste Transfer Setting: For semi-solid or liquid waste, wastes that have been collected through a waste transfer system are now efficiently transferred to appropriate treatment or storage facilities or crop application. Due to topography, gravity transfer is not possible and a properly sized pump is needed to transfer waste as part of a waste transfer system.

**Feature Measure:** Pump Power Requirement

**Scenario Unit::** Brake Horse Power

**Scenario Typical Size:** 5.0

**Scenario Total Cost:** $4,244.46

**Scenario Cost/Unit:** $848.89

Cost Details:

| Component Name | ID | Description | Unit | Cost | QTY | Total |
|---|---|---|---|---|---|---|
| **Equipment Installation** | | | | | | |
| Concrete, CIP, slab on grade, reinforced | 37 | Steel reinforced concrete formed and cast-in-placed as a slab on grade by chute placement. Typical strength is 3000 to 4000 psi. Includes materials, labor and equipment to transport, place and finish. | Cubic Yard | $327.92 | 1 | $327.92 |
| Truck, Pickup | 939 | Equipment and power unit costs. Labor not included. | Hour | $21.79 | 2 | $43.58 |
| **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 | $25.31 | 4 | $101.24 |
| 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 | $45.69 | 4 | $182.76 |
| **Materials** | | | | | | |
| Pump, < 50 HP, Pump & ICE power unit | 1027 | Materials, labor, controls: < 50 HP Pump & ICE power unit | Horsepower | $615.46 | 5 | $3,077.30 |
| **Mobilization** | | | | | | |
| Mobilization, medium equipment | 1139 | Equipment with 70-150 HP or typical weights between 14,000 and 30,000 pounds. | Each | $255.83 | 2 | $511.66 |

**Practice:** 533 - Pumping Plant

**Scenario** #10 - Internal Combustion-Powered Pump 7½ to 75 HP

**Scenario Description:**

The typical scenario supports installation of a pump in an existing irrigation system or installation of a new pump on cropland with a 45 BHP pump. Size of pump is determined by required GPM and pressure derived from a design for specific irrigation system on cropland. The combination of higher solids content and volume require a larger horse power pump. This liquid manure pump is used to transfer semi-solid manure from a small reception pit located either below a barnyard or at the end of a free-stall barn or scrape alley. Resource Concerns: Water Quality degradation - Excess nutrients in surface and ground waters; Insufficient water - Inefficient use of irrigation water. Associated Practices include: 374 - Farmstead Energy Improvement; 430 - Irrigation Pipeline; 441 - Irrigation System, Microirrigation; 449 - Irrigation Water Management; 313 - Waste Storage Facility; 634 - Waste Transfer; 436 - Irrigation Reservoir; and 447 - Irrigation System, Tailwater Recovery; and 614 - Watering Facility.

**Before Situation:**

Irrigation: Either an existing irrigation system employs an inefficient, improperly-sized pump that leads to inefficient water delivery resulting in high energy costs, or Waste Transfer: various types of semi-solid or liquid waste at the headquarters is uncollected causing surface and ground water issues.

**After Situation:**

Irrigation Setting: For irrigation system, a properly designed pump is installed, reducing water and energy usage. Waste Transfer Setting: For semi-solid or liquid waste, wastes that have been collected through a waste transfer system are now efficiently transferred to appropriate treatment or storage facilities or crop application. Due to topography, gravity transfer is not possible and a properly sized pump is needed to transfer waste as part of a waste transfer system.

**Feature Measure:** Pump Power Requirement

**Scenario Unit::** Brake Horse Power

**Scenario Typical Size:** 45.0

**Scenario Total Cost:** $31,300.84

**Scenario Cost/Unit:** $695.57

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 | $327.92 | 1 | $327.92 |
| Backhoe, 80 HP | 926 | Wheel mounted backhoe excavator with horsepower range of 60 to 90. Equipment and power unit costs. Labor not included. | Hour | $56.05 | 8 | $448.40 |
| Truck, Pickup | 939 | Equipment and power unit costs. Labor not included. | Hour | $21.79 | 4 | $87.16 |
| **Labor** | | | | | | |
| Skilled Labor | 230 | Labor requiring a high level skill set: Includes carpenters, welders, electricians, conservation professionals involved with data collection, monitoring, and or record keeping, etc. | Hour | $41.76 | 8 | $334.08 |
| 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 | $25.31 | 32 | $809.92 |
| 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 | $44.37 | 8 | $354.96 |
| 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 | $45.69 | 16 | $731.04 |
| **Materials** | | | | | | |
| Pump, < 50 HP, Pump & ICE power unit | 1027 | Materials, labor, controls: < 50 HP Pump & ICE power unit | Horsepower | $615.46 | 45 | $27,695.70 |
| **Mobilization** | | | | | | |
| Mobilization, medium equipment | 1139 | Equipment with 70-150 HP or typical weights between 14,000 and 30,000 pounds. | Each | $255.83 | 2 | $511.66 |

**Practice:** 533 - Pumping Plant

**Scenario** #11 - Internal Combustion-Powered Pump over 75 HP

**Scenario Description:**

The typical scenario supports replacement of a pump in an existing irrigation system or installation of a new pump on cropland that is 75 break HP pump or larger. Size of pump is determined by required GPM and pressure derived from a design for specific irrigation system on cropland. Scenario could also be used for a pump for silage leachate, barnyard runoff, and milk house waste (as part of a waste transfer system) at farm headquarters. Resource Concerns: Water Quality degradation - Excess nutrients in surface and ground waters; Insufficient water - Inefficient use of irrigation water. Associated Practices include: 374 - Farmstead Energy Improvement; 430 - Irrigation Pipeline; 441 - Irrigation System, Microirrigation; 449 - Irrigation Water Management; 313 - Waste Storage Facility; 634 - Waste Transfer; and 614 - Watering Facility.

**Before Situation:**

Irrigation: Either an existing irrigation system employs an inefficient, improperly-sized pump that leads to inefficient water delivery resulting in high energy costs, or Waste Transfer: various types of semi-solid or liquid waste at the headquarters is uncollected causing surface and ground water issues.

**After Situation:**

Irrigation Setting: For irrigation system, a properly designed pump is installed, reducing water and energy usage. Waste Transfer Setting: For semi-solid or liquid waste, wastes that have been collected through a waste transfer system are now efficiently transferred to appropriate treatment or storage facilities or crop application. Due to topography, gravity transfer is not possible and a properly sized pump is needed to transfer waste as part of a waste transfer system.

**Feature Measure:** Pump Power Requirement

**Scenario Unit::** Brake Horse Power

**Scenario Typical Size:** 100.0

**Scenario Total Cost:** $42,197.12

**Scenario Cost/Unit:** $421.97

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 | $327.92 | 2 | $655.84 |
| Backhoe, 80 HP | 926 | Wheel mounted backhoe excavator with horsepower range of 60 to 90. Equipment and power unit costs. Labor not included. | Hour | $56.05 | 8 | $448.40 |
| Truck, Pickup | 939 | Equipment and power unit costs. Labor not included. | Hour | $21.79 | 6 | $130.74 |
| **Labor** | | | | | | |
| Skilled Labor | 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 | $41.76 | 8 | $334.08 |
| 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 | $25.31 | 48 | $1,214.88 |
| 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 | $44.37 | 8 | $354.96 |
| 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 | $45.69 | 24 | $1,096.56 |
| **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 | $255.83 | 2 | $511.66 |

**Practice:** 533 - Pumping Plant

**Scenario** #12 - Tractor Power Take Off (PTO) Pump

**Scenario Description:**

This scenario involves a PTO driven pump to either transfer water for an irrigation system from a Pond - 378 (includes backflow prevention as appropriate) to cropland or; to transfer semi-solid/ liquid manure (as part of a waste transfer system) at the farm headquarters from a Waste Storage Facility - 313, to an irrigation system or waste treatment facility. In both cases, a PTO driven pump is selected because the landowner has equipment available to supply power to the pump. Electricity is not readily available and/or a stationary engine is not a practical alternative. Resource Concerns: Water Quality degradation - Excess nutrients in surface and ground waters; Insufficient water - Inefficient use of irrigation water. Associated Practices include: 430 - Irrigation Pipeline; 442 - Irrigation System, Sprinkler; 449 - Irrigation Water Management; 590 - Nutrient Management; 378 - Pond; 313 - Waste Storage Facility; and 634 - Waste Transfer.

**Before Situation:**

Irrigation Setting: An existing surface irrigation system employs an inefficient, improperly sized pump that leads to inefficient water delivery resulting in high energy costs; Waste Transfer Setting: various types of semi-solid or liquid waste at the headquarters are uncollected causing surface and ground water issues. A transfer method for waste is needed. Due to topography, gravity transfer is not possible and a properly sized pump is needed to transfer waste as part of a waste transfer system.

**After Situation:**

Irrigation Setting: A properly designed PTO-driven pump is installed, to transfer water to an Irrigation Pipeline (430) or Irrigation Canal or Lateral (320). Waste Transfer Setting: Wastes that have been collected through a waste transfer system are now efficiently transferred from a Waste Storage Facility (313) to an appropriate treatment facility or to an irrigation system. The pump typically will move 2,000 gallons per minute and is portable so that it can be used at several locations.

**Feature Measure:** Pump Power Requirement

**Scenario Unit::** Brake Horse Power

**Scenario Typical Size:** 60.0

**Scenario Total Cost:** $11,740.85

**Scenario Cost/Unit:** $195.68

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 | $327.92 | 2 | $655.84 |
| Truck, Pickup | 939 | Equipment and power unit costs. Labor not included. | Hour | $21.79 | 16 | $348.64 |
| **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 | $25.31 | 16 | $404.96 |
| 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 | $45.69 | 16 | $731.04 |
| **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** #13 - Photovoltaic-Powered Pump 0.25 HP

**Scenario Description:**

The typical scenario assumes installation of a photovoltaic-powered pumping plant with a design operating total head on pump less than 250 feet in a well, pond or a live stream. The installation includes the pump, wiring, drop pipe, solar panels, mounts, inverter, and all appurtenances. Note: It is generally not advisable to use a storage battery for a number of reasons. A storage tank is generally the most efficient method to store energy. Grazing - Livestock exclusion from surface water will result in improved surface water quality and reduced erosion. Irrigation - energy consumption will be reduced and the increased pressure and flow rates will improve irrigation efficiency. Resource Concerns: Insufficient stockwater. Associated Practices include: 374 - Farmstead Energy Improvement; 382 - Fence; 430 - Irrigation Pipeline; 436 - Irrigation Reservoir; 516 - Livestock Pipeline; 561 - Heavy Use Area Protection; and, 614 - Watering Facility.

**Before Situation:**

Livestock: Inadequate supply or location of water for a prescribed grazing system. Eroded stream banks and degraded water quality due to livestock access to stream. Cattle are not well-distributed because of remote water location. Irrigation: Pressure and flow rate is insufficient for uniform irrigation.

**After Situation:**

The typical scenario assumes installation of a 230-watt photovoltaic (PV) panel, capable of operating a 1/4 Hp (0.25 Hp) solar-powered submersible pump in a well or other water source (Notes: 1) A PV panel is rated under standard and ideal conditions which will most likely not be replicated in the field; 2) 1 Hp is defined as 746 watts; 3) It is reasonable to expect a 1/4 Hp solar-powered submersible pump to deliver about 1.5 gpm and develop a pressure at the pump outlet of about 60 psi. 4) The installation includes the pump, wiring, pipeline in the well, solar panels, frame mounts, inverter, and all appurtenances. Water will be pumped to an existing storage tank at a higher elevation from which it will be used to pressurize the Livestock Pipeline (516) or Irrigation Pipeline (430). Grazing - Livestock exclusion from surface water will result in improved surface water quality and reduced erosion. Grazing has potential to be well distributed. Irrigation: Improved pressure and flow rate will improve irrigation efficiency.

**Feature Measure:** Each Pumping Plant

**Scenario Unit::** Each

**Scenario Typical Size:** 1.0

**Scenario Total Cost:** $4,497.97

**Scenario Cost/Unit:** $4,497.97

Cost Details:

| Component Name | ID | Description | Unit | Cost | QTY | Total |
|---|---|---|---|---|---|---|
| **Equipment Installation** | | | | | | |
| Truck, Pickup | 939 | Equipment and power unit costs. Labor not included. | Hour | $21.79 | 16 | $348.64 |
| **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 | $25.31 | 16 | $404.96 |
| 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 | $45.69 | 16 | $731.04 |
| **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 moto | Horsepower | $413.86 | 0.25 | $103.47 |
| 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 incl | 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 ma | Kilowatt | $8,258.60 | 0.23 | $1,899.48 |

**Practice:** 533 - Pumping Plant

**Scenario** #14 - Photovoltaic-Powered Pump 0.5 to 1.0 HP

**Scenario Description:**

The typical scenario assumes installation of a photovoltaic-powered pumping plant with a design operating total head on pump greater between 251 and 400 feet in a well, pond or a live stream. The installation includes the pump, wiring, drop pipe, solar panels, mounts, inverter, and all appurtenances. Note: It is generally not advisable to use a storage battery for a number of reasons. A storage tank is generally the most efficient method to store energy. Grazing - Livestock exclusion from surface water will result in improved surface water quality and reduced erosion. Irrigation - energy consumption will be reduced and the increased pressure and flow rates will improve irrigation efficiency. Resource Concerns: Insufficient stockwater. Associated Practices include: 374 - Farmstead Energy Improvement; 382 - Fence; 430 - Irrigation Pipeline; 436 - Irrigation Reservoir; 516 - Livestock Pipeline; 561 - Heavy Use Area Protection; and, 614 - Watering Facility.

**Before Situation:**

Livestock: Inadequate supply or location of water for a prescribed grazing system. Eroded stream banks and degraded water quality due to livestock access to stream. Cattle are not well-distributed because of remote water location. Irrigation: Pressure and flow rate is insufficient for uniform irrigation.

**After Situation:**

The typical scenario assumes installation of a 930-watt photovoltaic (PV) panel, capable of operating a 1 Hp solar-powered submersible pump in a well or other water source (Notes: 1) A PV panel is rated under standard and ideal conditions which will most likely not be replicated in the field; 2) 1 Hp is defined as 746 watts; 3) It is reasonable to expect a 1 Hp solar-powered submersible pump to deliver about 7 gpm and develop a pressure at the pump outlet of about 60 psi. 4) The installation includes the pump, wiring, pipeline in the well, solar panels, frame mounts, inverter, and all appurtenances. Water will be pumped to an existing storage tank at a higher elevation from which it will be used to pressurize the Livestock Pipeline (516) or Irrigation Pipeline (430). Grazing - Livestock exclusion from surface water will result in improved surface water quality and reduced erosion. Grazing has potential to be well distributed. Irrigation: Improved pressure and flow rate will improve irrigation efficiency.

**Feature Measure:** Each Pumping Plant

**Scenario Unit::** Each

**Scenario Typical Size:** 1.0

**Scenario Total Cost:** $10,589.39

**Scenario Cost/Unit:** $10,589.39

Cost Details:

| Component Name | ID | Description | Unit | Cost | QTY | Total |
|---|---|---|---|---|---|---|
| **Equipment Installation** | | | | | | |
| Truck, Pickup | 939 | Equipment and power unit costs. Labor not included. | Hour | $21.79 | 16 | $348.64 |
| **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 | $25.31 | 16 | $404.96 |
| 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 | $45.69 | 16 | $731.04 |
| **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 moto | 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 incl | 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 ma | Kilowatt | $8,258.60 | 0.93 | $7,680.50 |

**Practice:** 533 - Pumping Plant

**Scenario** #15 - Photovoltaic-Powered Pump 1.5 HP

**Scenario Description:**

The typical scenario assumes installation of a photovoltaic-powered pumping plant with a design operating total head on pump greater than 400 feet in a well, pond or a live stream. The installation includes the pump, wiring, drop pipe, solar panels, mounts, inverter, and all appurtenances. Note: It is generally not advisable to use a storage battery for a number of reasons. A storage tank is generally the most efficient method to store energy. Grazing - Livestock exclusion from surface water will result in improved surface water quality and reduced erosion. Irrigation - energy consumption will be reduced and the increased pressure and flow rates will improve irrigation efficiency. Resource Concerns: Insufficient stockwater. Associated Practices include: 374 - Farmstead Energy Improvement; 382 - Fence; 430 - Irrigation Pipeline; 436 - Irrigation Reservoir; 516 - Livestock Pipeline; 561 - Heavy Use Area Protection; and, 614 - Watering Facility.

**Before Situation:**

Livestock: Inadequate supply or location of water for a prescribed grazing system. Eroded stream banks and degraded water quality due to livestock access to stream. Cattle are not well-distributed because of remote water location. Irrigation: Pressure and flow rate is insufficient for uniform irrigation.

**After Situation:**

The typical scenario assumes installation of a 1.4 Kwatt photovoltaic (PV) panel, capable of operating a 1.5 Hp solar-powered submersible pump in a well or other water source (Notes: 1) A PV panel is rated under standard and ideal conditions which will most likely not be replicated in the field; 2) 1 Hp is defined as 746 watts; 3) It is reasonable to expect a 1.5 Hp solar-powered submersible pump to deliver about 10 gpm and develop a pressure at the pump outlet of about 60 psi. 4) The installation includes the pump, wiring, pipeline in the well, solar panels, frame mounts, inverter, and all appurtenances. Water will be pumped to an existing storage tank at a higher elevation from which it will be used to pressurize the Livestock Pipeline (516) or Irrigation Pipeline (430). Grazing - Livestock exclusion from surface water will result in improved surface water quality and reduced erosion. Grazing has potential to be well distributed. Irrigation: Improved pressure and flow rate will improve irrigation efficiency.

**Feature Measure:** Each Pumping Plant

**Scenario Unit::** Each

**Scenario Typical Size:** 1.0

**Scenario Total Cost:** $14,677.86

**Scenario Cost/Unit:** $14,677.86

Cost Details:

| Component Name | ID | Description | Unit | Cost | QTY | Total |
|---|---|---|---|---|---|---|
| **Equipment Installation** | | | | | | |
| Truck, Pickup | 939 | Equipment and power unit costs. Labor not included. | Hour | $21.79 | 16 | $348.64 |
| **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 | $25.31 | 16 | $404.96 |
| 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 | $45.69 | 16 | $731.04 |
| **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 moto | Horsepower | $413.86 | 1.5 | $620.79 |
| 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 incl | 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 ma | Kilowatt | $8,258.60 | 1.4 | $11,562.04 |

**Practice:** 533 - Pumping Plant

**Scenario** #16 - Livestock Nose Pump

**Scenario Description:**

A Nose Pump is a diaphragm pump located in a pasture for the purpose of providing water to cattle. For a permanent installation, it is typical to also install Heavy Use Area Protection (561) (separate contract item) where the cattle congregate around the pump. It is powered and operated by cattle to transfer water from a stream to a drinking bowl. The objective is to provide water to the cattle outside of a live stream or other natural water source thereby eliminating a significant erosion situation and while also improving water quality. The cattle thus have access to drinking water without having to enter the stream. Generally one nose pump is adequate for 20 cattle. Resource Concerns: Insufficient stockwater; Inefficient energy use - Equipment and facilities. Associated Practices include: 374 - Farmstead Energy Improvement; 382 - Fence; 516 - Livestock Pipeline; 561 - Heavy Use Area Protection; and, 614 - Watering Facility.

**Before Situation:**

Livestock have open access to a live stream or other existing natural water supply. Water supply is contaminated due to animal activity and stream banks are eroded on a daily basis. Improper cattle distribution results in poor water quality, poor grazing distribution, over grazing, and soil erosion.

**After Situation:**

One nose pump is installed with all appurtenances anchored to concrete pad with 6"x6"x10 Gauge reinforcement wire (9 ft x 4 ft x 5 in) or other appropriate secure base to supply water to cattle for improved livestock herd management. Additional Heavy Use Area Protection (561) in the form of crushed rock and at least 5 feet wide, may be installed (separate contract item) surrounding the concrete pad. Improved: water quality, soil quality, grazing management, plant diversity, and animal health.

**Feature Measure:** Number of Pumps

**Scenario Unit::** Each

**Scenario Typical Size:** 1.0

**Scenario Total Cost:** $1,280.42

**Scenario Cost/Unit:** $1,280.42

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 | $327.92 | 0.5 | $163.96 |
| Truck, Pickup | 939 | Equipment and power unit costs. Labor not included. | Hour | $21.79 | 8 | $174.32 |
| **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 | $25.31 | 8 | $202.48 |
| Supervisor or Manager | 234 | Labor involving supervision or management activities. Includes crew supervisors, foremen and farm/ranch managers time required for adopting new technology, etc. | Hour | $45.69 | 8 | $365.52 |
| **Materials** | | | | | | |
| Nose Pump | 1052 | Materials and delivery. | Each | $374.14 | 1 | $374.14 |

**Practice:** 533 - Pumping Plant

**Scenario** #17 - Solid Piston Manure Pump

**Scenario Description:**

Install a 16" solid piston manure pump to transfer manure from a barn to a waste storage facility. Costs include pump, delivery, appurtenances, and installation. Associated practices include: Waste Transfer (634), Waste Storage Facility (313), Roofs and Covers (367)

**Before Situation:**

Manure from the barn and barnyard is not collected or contained and is allowed to flow into nearby surface and subsurface water resources.

**After Situation:**

A solid piston manure pump, hydraulically actuated, 12" or greater discharge, 7.5 HP w/ accessories is installed in conjunction with a manure transfer pipe (634-Waste Transfer) to convey manure from the barn to the waste storage facility. The transferred waste is disposed of in accordance with the CNMP.

**Feature Measure:** Number of Pumps

**Scenario Unit::** Each

**Scenario Typical Size:** 1.0

**Scenario Total Cost:** $47,035.48

**Scenario Cost/Unit:** $47,035.48

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 | $327.92 | 4 | $1,311.68 |
| Concrete, CIP, formed reinforced | 38 | Steel reinforced concrete formed and cast-in-placed in formed structures such as walls or suspended slabs by chute placement. Typical strength is 3000 to 4000 psi. Includes materials, labor and equipment to transport, place and finish. | Cubic Yard | $510.00 | 26 | $13,260.00 |
| 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 | $113.75 | 20 | $2,275.00 |
| **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 | $41.76 | 20 | $835.20 |
| 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 | $25.31 | 20 | $506.20 |
| 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 | $44.37 | 20 | $887.40 |
| 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 | $45.69 | 10 | $456.90 |
| **Materials** | | | | | | |
| Pump, Manure, Solid Piston | 2157 | Pump, Manure, Solid Piston, Hydraulically Actuated, 12" or greater discharge, 7.5 HP w/ accessories. Includes delivery. | Each | $27,503.10 | 1 | $27,503.10 |

**Practice:** 533 - Pumping Plant

**Scenario** #18 - Hollow Piston Manure Pump

**Scenario Description:**

Install a hollow piston manure pump to transfer manure from a barn to a waste storage facility. Costs include pump, delivery, appurtenances, and installation. Associated practices include: Waste Transfer (634), Waste Storage Facility (313), Roofs and Covers (367)

**Before Situation:**

Manure from the barn and barnyard is not collected or contained and is allowed to flow into nearby surface and subsurface water resources.

**After Situation:**

A hollow piston manure pump mechanically actuated, 12" or greater discharge, 10 HP w/ accessories is installed in conjunction with a manure transfer pipe (634-Waste Transfer) to convey manure from the barn to the waste storage facility. The transferred waste is disposed of in accordance with the CNMP.

**Feature Measure:** Number of Pumps

**Scenario Unit::** Each

**Scenario Typical Size:** 1.0

**Scenario Total Cost:** $28,287.09

**Scenario Cost/Unit:** $28,287.09

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 | $510.00 | 12 | $6,120.00 |
| 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 | $113.75 | 10 | $1,137.50 |
| **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 | $41.76 | 20 | $835.20 |
| 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 | $25.31 | 20 | $506.20 |
| 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 | $44.37 | 10 | $443.70 |
| 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 | $45.69 | 10 | $456.90 |
| **Materials** | | | | | | |
| Pump, Manure, Hollow Piston | 2158 | Pump, Manure, Hollow Piston, Mechanically Actuated, 12" or greater discharge, 10 HP w/ accessories. Includes delivery. | Each | $18,787.59 | 1 | $18,787.59 |

**Practice:** 533 - Pumping Plant

**Scenario** #19 - Manure PTO Vertical Shaft Pump

**Scenario Description:**

Install a PTO manure pump to transfer manure from a barn to a waste storage facility. Costs include pump, delivery, appurtenances, installation, and a small insulated pump house installed to protect pump and appurtenances from freezing and wet weather. Associated practices include: Waste Transfer (634), Waste Storage Facility (313)

**Before Situation:**

Manure from the barn and barnyard is not collected or contained and is allowed to flow into nearby surface and subsurface water resources.

**After Situation:**

A vertical shaft PTO manure pump, 6" discharge, HP 70 to 110 (540 RPM) or HP 125 to 140 (1000 RPM), with agitating nozzle and propeller is installed to convey manure from the barn to the waste storage facility. The transferred waste is disposed of in accordance with the CNMP.

**Feature Measure:** Number of Pumps

**Scenario Unit::** Each

**Scenario Typical Size:** 1.0

**Scenario Total Cost:** $14,355.61

**Scenario Cost/Unit:** $14,355.61

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 | $41.76 | 4 | $167.04 |
| 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 | $25.31 | 4 | $101.24 |
| 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 | $45.69 | 2 | $91.38 |
| **Materials** | | | | | | |
| Pump, Manure, PTO, Vertical Shaft | 2159 | Pump, Manure, PTO, Vertical Shaft, 6" discharge, HP 70 to 110 (540 RPM) or HP 125 to 140 (1000 RPM), with agitating nozzle and propeller. Includes delivery. | Each | $13,995.95 | 1 | $13,995.95 |

**Practice:** 533 - Pumping Plant

**Scenario** #20 - PTO Side Mounted upto 50,000 CF

**Scenario Description:**

Install a PTO driven side mounted unloading pump to unload manure from an above ground waste storage facility which is less than or equal to 50,000 CF strike full volume. Costs include pump, delivery, appurtenances, and installation. Associated practices include: Waste Transfer (634), Waste Storage Facility (313)

**Before Situation:**

Manure from the barn and barnyard is not collected or contained and is allowed to flow into nearby surface and subsurface water resources.

**After Situation:**

Side mounted pump allows manure to be unloaded from an above ground waste storage facility into a manure spreader or irrigation system so manure can be properly transported and field applied in accordance with an approved the CNMP.

**Feature Measure:** Number of Pumps

**Scenario Unit::** Each

**Scenario Typical Size:** 1.0

**Scenario Total Cost:** $14,141.89

**Scenario Cost/Unit:** $14,141.89

Cost Details:

| Component Name | ID | Description | Unit | Cost | QTY | Total |
|---|---|---|---|---|---|---|
| **Materials** | | | | | | |
| Pump, Manure, PTO, Side Mounted Unloading Pump for WSF < 50,000 CF "Strike Full" Capacity | 2420 | Side mounted manure unloading pump for above ground waste storage facility structures with less than 50,000 CF capacity. Costs include side mounted pump, center agitation unit, and "S-Tube Riser". Includes materials and shipping only. | Each | $14,141.89 | 1 | $14,141.89 |

**Practice:** 533 - Pumping Plant

**Scenario** #21 - PTO Side Mounted over 50,000 CF

**Scenario Description:**

Install a PTO driven side mounted unloading pump to unload manure from an above ground waste storage facility which is greater than 50,000 cf strike full volume. Costs include pump, delivery, appurtenances, and installation. Associated practices include: Waste Transfer (634), Waste Storage Facility (313)

**Before Situation:**

Manure from the barn and barnyard is not collected or contained and is allowed to flow into nearby surface and subsurface water resources.

**After Situation:**

Side mounted pump allows manure to be unloaded from an above ground waste storage facility into a manure spreader or irrigation system so manure can be properly transported and field applied in accordance with an approved the CNMP.

**Feature Measure:** Number of Pumps

**Scenario Unit::** Each

**Scenario Typical Size:** 1.0

**Scenario Total Cost:** $20,857.73

**Scenario Cost/Unit:** $20,857.73

Cost Details:

| Component Name | ID | Description | Unit | Cost | QTY | Total |
|---|---|---|---|---|---|---|
| **Materials** | | | | | | |
| Pump, Manure, PTO, Side Mounted Unloading Pump for WSF between 50,000 and 200,000 CF "Strike Full" Capacity | 2421 | Side mounted manure unloading pump for above ground waste storage facility structures between 50,000 and 200,000 CF capacity. Costs include side mounted pump, center agitation unit, and "S-Tube Riser". Includes materials and shipping only. | Each | $20,857.73 | 1 | $20,857.73 |

**Practice:** 533 - Pumping Plant

**Scenario** #22 - PTO Lagoon Trailer Pump

**Scenario Description:**

Provide a PTO driven lagoon trailer pump to unload manure from an in-ground earthen waste storage facility. Costs include pump and delivery. Associated practices include: Waste Transfer (634), Waste Storage Facility (313)

**Before Situation:**

Manure from the barn and barnyard is not collected or contained and is allowed to flow into nearby surface and subsurface water resources.

**After Situation:**

Lagoon trailer pump allows manure to be unloaded from an in-ground earthen waste storage facility into a manure spreader or irrigation system so manure can be properly transported and field applied in accordance with an approved the CNMP.

**Feature Measure:** Number of Pumps

**Scenario Unit::** Each

**Scenario Typical Size:** 1.0

**Scenario Total Cost:** $14,609.26

**Scenario Cost/Unit:** $14,609.26

Cost Details:

| Component Name | ID | Description | Unit | Cost | QTY | Total |
|---|---|---|---|---|---|---|
| **Materials** | | | | | | |
| Pump, Manure, PTO, Lagoon Type | 2423 | PTO driven manure pump for lagoon systems. Includes a 6" discharge with a 42 ' tow behind. Includes material and shipping only. | Each | $14,609.26 | 1 | $14,609.26 |

**Practice:** 533 - Pumping Plant

**Scenario** #23 - Solids Handling Wastewater Pump upto 2Hp

**Scenario Description:**

Install a solids handling wastewater pump <or= 2 Hp to transfer wastewater to a storage or treatment area. Costs include pump, delivery, appurtenances, installation. Associated practices include: Waste Transfer (634), Waste Storage Facility (313)

**Before Situation:**

Wastewater is not collected or contained and is allowed to flow into nearby surface and subsurface water resources.

**After Situation:**

A submersible 2" solids handling pump with 2" to 3" Discharge, 0.5 to 2 HP is installed.

**Feature Measure:** Number of Pumps

**Scenario Unit::** Each

**Scenario Typical Size:** 1.0

**Scenario Total Cost:** $3,535.88

**Scenario Cost/Unit:** $3,535.88

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 | $41.76 | 4 | $167.04 |
| 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 | $25.31 | 4 | $101.24 |
| 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 | $45.69 | 2 | $91.38 |
| **Materials** | | | | | | |
| Pump, Wastewater, Solids Handling, 1 to 5 HP | 2515 | Wastewater solid handling pump with 1 to 5 horsepower. Pumping capacity of 100 gallons per minute at 30 feet of Total Dynamic Head. Includes materials and shipping only. | Each | $3,176.22 | 1 | $3,176.22 |

**Practice:** 533 - Pumping Plant

**Scenario** #24 - Solids Handling Wastewater Pump over 2Hp

**Scenario Description:**

Install a solids handling wastewater pump > 2Hp to transfer wastewater to a storage or treatment area. Costs include pump, delivery, appurtenances, installation. Associated practices include: Waste Transfer (634), Waste Storage Facility (313)

**Before Situation:**

Wastewater is not collected or contained and is allowed to flow into nearby surface and subsurface water resources.

**After Situation:**

A submersible 2" solids handling pump, recessed impeller, with 2" to 3" Discharge, > 2 HP is installed.

**Feature Measure:** Number of Pumps

**Scenario Unit::** Each

**Scenario Typical Size:** 1.0

**Scenario Total Cost:** $8,204.17

**Scenario Cost/Unit:** $8,204.17

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 | $41.76 | 4 | $167.04 |
| 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 | $25.31 | 4 | $101.24 |
| 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 | $45.69 | 2 | $91.38 |
| **Materials** | | | | | | |
| Pump, Wastewater, Solids Handling, > 5 HP | 2516 | Wastewater solid handling pump greater than 5 horsepower. Pumping capacity of 400 gallons per minute at 40 feet of Total Dynamic Head. Includes materials and shipping only. | Each | $7,844.51 | 1 | $7,844.51 |

**Practice:** 533 - Pumping Plant

**Scenario** #74 - Recirculating Aquaculture System

**Scenario Description:**

The typical scenario involves the installation of a complete pumping plant, including a rotary drum filter, pump sump, electric-powered recirculating pumps, UV sterilizer, bioreactor, gas control column, concrete pad, and all necessary appurtenances needed to cycle water in a Recirculating Aquaculture System (RAS). Resource concerns include, Water quality degradation - excess nutrients in surface and ground waters, water quality degradation – excess pathogens, Insufficient water, Livestock Production Limitation – Inadequate livestock water. Associated practices include: 397-Aquaculture Ponds, 398-Fish Raceway or Tank, 367-Roofs and Covers, 516-Livestock Pipeline, 587-Structure For Water Control, 632-Waste Separation Facility, and 642-Water Well.

**Before Situation:**

An existing aquaculture facility is operating a single or multi-use flow-through system relying on groundwater and/or surface water sources. Water quality and water quantity do not meet the resource needs of the culture water and/or the receiving waterway.

**After Situation:**

A complete pumping plant, including a rotary drum filter, pump sump, electric-powered recirculating pumps, UV sterilizer, bioreactor, gas control column, concrete pad, and all necessary appurtenances capable of recirculating the designed flow rate is installed. The flow-through rearing system is converted to RAS, and water quality and quantity needs are addressed. The pumping plant is installed in combination with other necessary conservations practices ( e.g. 397-Aquaculture Ponds, 398-Fish Raceway or Tank, 367-Roofs and Covers, 516-Livestock Pipeline, 587-Structure For Water Control, 632-Waste Separation Facility, and 642-Water Well) to result in a complete RAS culture system.

**Feature Measure:** System Installed

**Scenario Unit::** Each

**Scenario Typical Size:** 1.0

**Scenario Total Cost:** $76,887.04

**Scenario Cost/Unit:** $76,887.04

Cost Details:

| Component Name | ID | Description | Unit | Cost | QTY | Total |
|---|---|---|---|---|---|---|
| **Equipment Installation** | | | | | | |
| Concrete, CIP, formed reinforced | 38 | Steel reinforced concrete formed and cast-in-placed in formed structures such as walls or suspended slabs by chute placement. Typical strength is 3000 to 4000 psi. Includes materials, labor and equipment to transport, place and finish. | Cubic Yard | $510.00 | 8 | $4,080.00 |
| **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 | $41.76 | 12 | $501.12 |
| General Labor | 231 | Labor performed using basic tools such as power tool, shovels, and other tools that do not require extensive training. Ex. pipe layer, herder, concrete placement, materials spreader, flagger, etc. | Hour | $25.31 | 40 | $1,012.40 |
| 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 | $45.69 | 8 | $365.52 |
| **Materials** | | | | | | |
| Aggregate, Gravel, Graded | 46 | Gravel, includes materials, equipment and labor to transport and place. Includes washed and unwashed gravel. | Cubic Yard | $34.75 | 8 | $278.00 |
| Pumping System, Aquaculture | 2688 | Aquaculture water pumping system. System includes all equipment and installation of filter, sump pump, tangential inlet with overflow, reticulating pump, ultra violet sterilizer, cyclonic bioreactor, gas control column with degassing fan. FRP Constructio | Gallon per Minute | $157.00 | 450 | $70,650.00 |

**Practice:** 558 - Roof Runoff Structure

**Scenario** #1 - Roof Gutter, Small

**Scenario Description:**

A roof runoff structure, consisting of gutter(s) <=6", downspout(s), and appropriate outlet facilities. Used to keep roof clean water runoff uncontaminated and provide a stable outlet to ground surface. Facilitates waste management and protects environment by minimizing clean water additions to waste systems and addresses water quality concerns. Associated practices include Waste Storage Facility (313), Composting Facility (317), Heavy Use Area Protection (561), Watering Facility (614), Underground Outlet (620), Diversion (362), and any relevant irrigation practices.

**Before Situation:**

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

**After Situation:**

A gutter and downspout system servicing the portion of the building roof that would otherwise drain into a waste management system or create erosion. Roof line of 200 ft serviced with aluminum gutter and 6 aluminum downspouts. Cost include aluminum gutter, aluminum downspout, hangers and miscellaneous hardware. Cost also include heavy duty PVC pipe to protect downspout damage by livestock. Underground pipe outlet shall be included with 620 - Underground Outlet.

**Feature Measure:** Length of Gutter

**Scenario Unit::** Foot

**Scenario Typical Size:** 200.0

**Scenario Total Cost:** $1,722.90

**Scenario Cost/Unit:** $8.61

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 | $25.31 | 16 | $404.96 |
| **Materials** | | | | | | |
| Pipe, PVC, 6", SCH 40 | 980 | Materials: - 6" - PVC - SCH 40 - ASTM D1785 | Foot | $6.14 | 40 | $245.60 |
| Gutter, Aluminum, Small | 1689 | Aluminum gutter (4" to 6") in width with hangers. Materials only. | Foot | $2.81 | 200 | $562.00 |
| Downspout, Aluminum, Small | 1700 | Aluminum downspout (3" to 5") in width with hangers. Materials only. | Foot | $2.77 | 60 | $166.20 |
| **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 | $172.07 | 2 | $344.14 |

**Practice:** 558 - Roof Runoff Structure

**Scenario** #2 - Roof Gutter, Large

**Scenario Description:**

A roof runoff structure, consisting of gutter(s) >=6", downspout(s), measures for snow protection (is needed), and appropriate outlet facilities. Used to keep roof clean water runoff uncontaminated and provide a stable outlet to ground surface. Facilitates waste management and protects environment by minimizing clean water additions to waste systems and addresses water quality concerns. Associated practices include Waste Storage Facility (313), Composting Facility (317), Heavy Use Area Protection (561), Watering Facility (614), Underground Outlet (620), Diversion (362), and any relevant irrigation practices.

**Before Situation:**

Applicable where: (1) a roof runoff management facility is included in an overall plan for an overall plan for a waste management system; (2) roof runoff needs to be diverted away from structures or contaminated areas; (3) there is a need to collect, control, and transport runoff from roofs to a stable outlet; and/or (4) where a heavy duty gutter system is needed for snow protection.

**After Situation:**

A gutter and downspout system servicing the portion of the building roof that would otherwise drain into a waste management system or create erosion. Roof line of 200 ft serviced with aluminum gutter, snow protection measures, and aluminum downspouts. Cost include aluminum gutter, aluminum downspout, hangers and miscellaneous hardware. Underground pipe outlet shall be included with 620 - Underground Outlet.

**Feature Measure:** Length of Gutter

**Scenario Unit::** Foot

**Scenario Typical Size:** 200.0

**Scenario Total Cost:** $2,879.34

**Scenario Cost/Unit:** $14.40

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 | $25.31 | 16 | $404.96 |
| **Materials** | | | | | | |
| Gutter, Aluminum, Medium | 1690 | Aluminum gutter (7" to 9") in width with hangers. Materials only. | Foot | $9.39 | 200 | $1,878.00 |
| Downspout, Aluminum | 1701 | Aluminum downspout with hangers. Materials only. Deletion Scheduled for FY 2018 Payment Schedule Cycle | Foot | $2.56 | 30 | $76.80 |
| Gutter, Wrap-around Straps | 2176 | Roof gutter snow and Ice supports, 28 gauge. Materials only. | Each | $3.44 | 51 | $175.44 |
| **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 | $172.07 | 2 | $344.14 |

**Practice:** 558 - Roof Runoff Structure

**Scenario** #3 - Concrete Swale

**Scenario Description:**

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

**Before Situation:**

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

**After Situation:**

A concrete channel with curbs constructed to divert roof runoff. Concrete curb is 6" high and extends the length roof (200'). Typically installed to divert "clean" roof runoff away from waste management systems or to stop erosion caused by concentrated roof runoff.

**Feature Measure:** Length of Swale

**Scenario Unit::** Foot

**Scenario Typical Size:** 200.0

**Scenario Total Cost:** $3,715.59

**Scenario Cost/Unit:** $18.58

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 | $161.60 | 15 | $2,424.00 |
| 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 | $2.36 | 30 | $70.80 |
| Demolition, concrete | 1498 | Demolition and disposal of reinforced concrete structures including slabs and walls. Includes labor and equipment. | Cubic Yard | $11.85 | 7.5 | $88.88 |
| 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 | $0.33 | 300 | $99.00 |
| **Materials** | | | | | | |
| Aggregate, Gravel, Graded | 46 | Gravel, includes materials, equipment and labor to transport and place. Includes washed and unwashed gravel. | Cubic Yard | $34.75 | 15 | $521.25 |
| **Mobilization** | | | | | | |
| Mobilization, medium equipment | 1139 | Equipment with 70-150 HP or typical weights between 14,000 and 30,000 pounds. | Each | $255.83 | 2 | $511.66 |

**Practice:** 558 - Roof Runoff Structure

**Scenario** #4 - Trench Drain, 4 in.

**Scenario Description:**

A roof runoff structure, consisting of a trench filled with rock, with 4 inch polyethylene, corrugated, perforated drain tile installed in trench bottom. Used to keep roof clean water runoff uncontaminated and provide a stable outlet to ground surface. Environmental/design considerations, for example – snow loads, or a building without proper structural support needed for gutters dictate the use of a trench drain. Facilitates waste management and protects the environment by minimizing clean water additions to waste systems and addresses water quality concerns. Associated practices include Waste Storage Facility (313), Composting Facility (317), Heavy Use Area Protection (561), Underground Outlet (620), and Diversion (362).

**Before Situation:**

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

**After Situation:**

A 2' deep by 3' wide by 200' long trench filled with clean stone w/ 4-8" tile drained. Trench drain typically installed at ground level under the eave of a roof. Outlet from "Trench Drain" to stable outlet shall be covered under 620 - Underground Outlet. Typically installed to divert "clean" roof runoff away from waste management systems or to stop erosion caused by concentrated roof runoff.

**Feature Measure:** Length of Trench Drained

**Scenario Unit::** Foot

**Scenario Typical Size:** 200.0

**Scenario Total Cost:** $2,927.70

**Scenario Cost/Unit:** $14.64

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 | $2.53 | 222 | $561.66 |
| Excavation, Common Earth, side cast, small equipment | 48 | Bulk excavation and side casting of common earth with hydraulic excavator with less than 1 CY capacity. Includes equipment and labor. | Cubic Yard | $2.36 | 44 | $103.84 |
| 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 | $0.33 | 440 | $145.20 |
| **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 | $25.31 | 6 | $151.86 |
| **Materials** | | | | | | |
| Aggregate, Gravel, Graded | 46 | Gravel, includes materials, equipment and labor to transport and place. Includes washed and unwashed gravel. | Cubic Yard | $34.75 | 44 | $1,529.00 |
| Pipe, HDPE, 4", PCPT, Single Wall | 1270 | Pipe, Corrugated Plastic Tubing, Single Wall, Perforated, 4" diameter - ASTM F405. Material cost only. | Foot | $0.46 | 200 | $92.00 |
| **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 | $172.07 | 2 | $344.14 |

**Practice:** 558 - Roof Runoff Structure

**Scenario** #5 - Trench Drain, 6 in.

**Scenario Description:**

A roof runoff structure, consisting of a trench filled with rock, with 6 inch polyethylene, corrugated, perforated drain tile installed in trench bottom. Used to keep roof clean water runoff uncontaminated and provide a stable outlet to ground surface. Environmental/design considerations, for example – snow loads, or a building without proper structural support needed for gutters dictate the use of a trench drain. Facilitates waste management and protects the environment by minimizing clean water additions to waste systems and addresses water quality concerns. Associated practices include Waste Storage Facility (313), Composting Facility (317), Heavy Use Area Protection (561), Underground Outlet (620), and Diversion (362).

**Before Situation:**

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

**After Situation:**

A 2' deep by 3' wide by 200' long trench filled with clean stone w/ 4-8" tile drained. Trench drain typically installed at ground level under the eave of a roof. Outlet from "Trench Drain" to stable outlet shall be covered under 620 - Underground Outlet. Typically installed to divert "clean" roof runoff away from waste management systems or to stop erosion caused by concentrated roof runoff.

**Feature Measure:** Length of Trench Drained

**Scenario Unit::** Foot

**Scenario Typical Size:** 200.0

**Scenario Total Cost:** $3,083.70

**Scenario Cost/Unit:** $15.42

Cost Details:

| Component Name | ID | Description | Unit | Cost | QTY | Total |
|---|---|---|---|---|---|---|
| **Equipment Installation** | | | | | | |
| Geotextile, woven | 42 | Woven Geotextile Fabric. Includes materials, equipment and labor | Square Yard | $2.53 | 222 | $561.66 |
| Excavation, Common Earth, side cast, small equipment | 48 | Bulk excavation and side casting of common earth with hydraulic excavator with less than 1 CY capacity. Includes equipment and labor. | Cubic Yard | $2.36 | 44 | $103.84 |
| 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 | $0.33 | 440 | $145.20 |
| **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 | $25.31 | 6 | $151.86 |
| **Materials** | | | | | | |
| Aggregate, Gravel, Graded | 46 | Gravel, includes materials, equipment and labor to transport and place. Includes washed and unwashed gravel. | Cubic Yard | $34.75 | 44 | $1,529.00 |
| Pipe, HDPE, 6", PCPT, Single Wall | 2548 | Pipe, Corrugated Plastic Tubing, Single Wall, Perforated, 6" diameter - ASTM F405. Includes material cost only. | Foot | $1.24 | 200 | $248.00 |
| **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 | $172.07 | 2 | $344.14 |

**Practice:** 558 - Roof Runoff Structure

**Scenario** #6 - Trench Drain, 8 in.

**Scenario Description:**

A roof runoff structure, consisting of a trench filled with rock, with 8 inch polyethylene, corrugated, perforated drain tile installed in trench bottom. Used to keep roof clean water runoff uncontaminated and provide a stable outlet to ground surface. Environmental/design considerations, for example – snow loads, or a building without proper structural support needed for gutters dictate the use of a trench drain. Facilitates waste management and protects the environment by minimizing clean water additions to waste systems and addresses water quality concerns. Associated practices include Waste Storage Facility (313), Composting Facility (317), Heavy Use Area Protection (561), Underground Outlet (620), and Diversion (362).

**Before Situation:**

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

**After Situation:**

A 2' deep by 3' wide by 200' long trench filled with clean stone w/ 4-8" tile drained. Trench drain typically installed at ground level under the eave of a roof. Outlet from "Trench Drain" to stable outlet shall be covered under 620 - Underground Outlet. Typically installed to divert "clean" roof runoff away from waste management systems or to stop erosion caused by concentrated roof runoff.

**Feature Measure:** Length of Trench Drained

**Scenario Unit::** Foot

**Scenario Typical Size:** 200.0

**Scenario Total Cost:** $3,233.70

**Scenario Cost/Unit:** $16.17

Cost Details:

| Component Name | ID | Description | Unit | Cost | QTY | Total |
|---|---|---|---|---|---|---|
| **Equipment Installation** | | | | | | |
| Geotextile, woven | 42 | Woven Geotextile Fabric. Includes materials, equipment and labor | Square Yard | $2.53 | 222 | $561.66 |
| Excavation, Common Earth, side cast, small equipment | 48 | Bulk excavation and side casting of common earth with hydraulic excavator with less than 1 CY capacity. Includes equipment and labor. | Cubic Yard | $2.36 | 44 | $103.84 |
| 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 | $0.33 | 440 | $145.20 |
| **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 | $25.31 | 6 | $151.86 |
| **Materials** | | | | | | |
| Aggregate, Gravel, Graded | 46 | Gravel, includes materials, equipment and labor to transport and place. Includes washed and unwashed gravel. | Cubic Yard | $34.75 | 44 | $1,529.00 |
| Pipe, HDPE, 8", PCPT, Single Wall | 1272 | Pipe, Corrugated Plastic Tubing, Single Wall, Perforated, 8" diameter - ASTM F667. Material cost only. | Foot | $1.99 | 200 | $398.00 |
| **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 | $172.07 | 2 | $344.14 |

**Practice:** 560 - Access Road

**Scenario** #1 - New earth road in dry, level terrain.

**Scenario Description:**

Newly constructed compacted earth road in relatively level terrain and dry areas. Terrain should be considered level for slopes of 0-5%. A properly constructed, well defined access road will address resource concerns related with compaction, emissions of fugitive dust, and excessive sediment in surface water. It also improves the plant productivity, vigor and health and substantially reduces the chance of wild fire hazards. Short term air quality deterioration may result if proper dust control measures are not implemented during the practice installation. Costs include excavation, shaping, grading, surface material, vegetation of disturbed areas, and all equipment, labor and incidental materials necessary to install the practice.

**Before Situation:**

An agricultural enterprise which requires, but does not have, a fixed travelway for equipment and vehicles for various resource activities and where use of equipment and vehicles within the enterprise without a defined access road would result in compaction, excessive sediment and turbidity in surface water, reduced visibility, and emissions of fugitive dust. This scenario is applicable where the resource activity areas consist of relatively dry and level terrain lands.

**After Situation:**

The road will be 14 feet wide at the top, mostly in embankment less than 3 feet in height, (average 2 ft) typical side slopes 2:1. A properly constructed, well defined access road will greatly reduce or eliminate compaction in land use areas where it is harmful, reduce emissions of fugitive dust and also reduce excessive sediment in surface water by reducing uncontrolled sediment transport and improving drainage of irrigated lands. Planned grades will include all dips and water bars. If clearing and grubbing of land in the alignment area is required, use Land Clearing (460). Pipe culverts installed as part of access road should be covered by either Structures for Water Control (587) or Stream Crossings (578) depending on the type of structure. Earthfill embankment above the culvert structure would still be covered by this Practice. Diversions constructed as part of access road should be covered by Diversion (362). All seeding or revegetation of disturbed areas is provided. Dust control must be addressed under Dust Control on Unpaved Roads and Surfaces (373). Mulching should be addressed under Mulching (484).

**Feature Measure:** Length of Roadway

**Scenario Unit::** Foot

**Scenario Typical Size:** 500.0

**Scenario Total Cost:** $4,565.58

**Scenario Cost/Unit:** $9.13

Cost Details:

| Component Name | ID | Description | Unit | Cost | QTY | Total |
|---|---|---|---|---|---|---|
| **Equipment Installation** | | | | | | |
| Excavation, Common Earth, side cast, small equipment | 48 | Bulk excavation and side casting of common earth with hydraulic excavator with less than 1 CY capacity. Includes equipment and labor. | Cubic Yard | $2.36 | 210 | $495.60 |
| Earthfill, Roller Compacted | 49 | Earthfill, roller or machine compacted, includes equipment and labor | Cubic Yard | $4.45 | 670 | $2,981.50 |
| Fertilizer, ground application, dry bulk | 950 | Dry bulk fertilizer application performed by ground equipment. Includes equipment, power unit and labor costs. | Acre | $6.62 | 0.12 | $0.79 |
| Lime application | 953 | Lime application performed by ground equipment. Includes equipment, power unit and labor costs. | Acre | $10.63 | 0.12 | $1.28 |
| **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 | $41.76 | 10 | $417.60 |
| **Materials** | | | | | | |
| One Species, Warm Season, Native Perennial Grass | 2322 | Native, warm season perennial grass. Includes material and shipping only. | Acre | $69.06 | 0.12 | $8.29 |
| **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 | $172.07 | 1 | $172.07 |
| Mobilization, large equipment | 1140 | Equipment >150HP or typical weights greater than 30,000 pounds or loads requiring over width or over length permits. | Each | $488.45 | 1 | $488.45 |

**Practice:** 560 - Access Road

**Scenario** #2 - New 12 inch gravel road in wet, level terrain

**Scenario Description:**

Newly Constructed gravel road with min. 12 inch thick compacted gravel surface over geotextile in relatively level ground in wet areas. Terrain should be considered level for slopes of 0-5%. A properly constructed, well defined access road will address resource concerns related with compaction, emissions of fugitive dust, and excessive sediment in surface water. It also improves the plant productivity, vigor and health and substantially reduces the chance of wild fire hazards. Short term air quality deterioration may result if proper dust control measures are not implemented during the practice installation. Costs include excavation, shaping, grading, surface material, vegetation of disturbed areas, and all equipment, labor and incidental materials necessary to install the practice.

**Before Situation:**

An agricultural enterprise which requires, but does not have, a fixed travel way for equipment and vehicles for various resource activities and where use of equipment and vehicles within the enterprise without a defined access road would result in compaction, excessive sediment and turbidity in surface water, reduced visibility, and emissions of fugitive dust. This scenario is applicable where the resource activity areas consist of relatively wet and swampy but level terrain lands.

**After Situation:**

The road will be 14 feet wide with geotextile and 12 inch gravel surfacing at the top. It is mostly in embankment less than 3 feet in height, (average 2 ft) typical side slopes 2:1. A properly constructed, well defined access road will greatly reduce sheet, rill and wind erosion, eliminate compaction in land use areas where it is harmful, reduce emissions of particulate matter (PM) and PM precursors and also reduce excessive sediment in surface water by reducing uncontrolled sediment transport. Planned grades will include all dips and water bars. If clearing and grubbing of land in the alignment area is required, use Land Clearing (460). Pipe culverts installed as part of access road should be covered by either Structures for Water Control (587) or Stream Crossings (578) depending on the type of structure. Earthfill embankment above the culvert structure would still be covered by this Practice. Diversions constructed as part of access road should be covered by Diversion (362). All seeding or revegetation of disturbed areas is provided. Dust control must be addressed under Dust Control on Unpaved Roads and Surfaces (373). Mulching should be addressed under Mulching (484).

**Feature Measure:** Length of Roadway

**Scenario Unit::** Foot

**Scenario Typical Size:** 500.0

**Scenario Total Cost:** $13,255.56

**Scenario Cost/Unit:** $26.51

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 | $2.53 | 1000 | $2,530.00 |
| Earthfill, Roller Compacted | 49 | Earthfill, roller or machine compacted, includes equipment and labor | Cubic Yard | $4.45 | 410 | $1,824.50 |
| Fertilizer, ground application, dry bulk | 950 | Dry bulk fertilizer application performed by ground equipment. Includes equipment, power unit and labor costs. | Acre | $6.62 | 0.12 | $0.79 |
| Lime application | 953 | Lime application performed by ground equipment. Includes equipment, power unit and labor costs. | Acre | $10.63 | 0.12 | $1.28 |
| 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 | $4.32 | 210 | $907.20 |
| **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 | $41.76 | 10 | $417.60 |
| **Materials** | | | | | | |
| Aggregate, Gravel, Ungraded, Quarry Run | 1099 | Includes materials, equipment and labor | Cubic Yard | $23.96 | 275 | $6,589.00 |
| One Species, Warm Season, Native Perennial Grass | 2322 | Native, warm season perennial grass. Includes material and shipping only. | Acre | $69.06 | 0.12 | $8.29 |
| **Mobilization** | | | | | | |
| Mobilization, large equipment | 1140 | Equipment >150HP or typical weights greater than 30,000 pounds or loads requiring over width or over length permits. | Each | $488.45 | 2 | $976.90 |

**Practice:** 560 - Access Road

**Scenario** #3 - New geocell road in wet, level terrain

**Scenario Description:**

Newly Constructed geotextile, gravel, and geocell road with min. 6 inch thick compacted gravel with geocell surface in relatively level ground in wet areas. Terrain should be considered level for slopes of 0-5%. A properly constructed, well defined access road will address resource concerns related with compaction, emissions of fugitive dust, and excessive sediment in surface water. It also improves the plant productivity, vigor and health and substantially reduces the chance of wild fire hazards. Short term air quality deterioration may result if proper dust control measures are not implemented during the practice installation. Costs include excavation, shaping, grading, surface material, vegetation of disturbed areas, and all equipment, labor and incidental materials necessary to install the practice.

**Before Situation:**

An agricultural enterprise which requires, but does not have, a fixed travel way for equipment and vehicles for various resource activities and where use of equipment and vehicles within the enterprise without a defined access road would result in compaction, excessive sediment and turbidity in surface water, reduced visibility, and emissions of fugitive dust. This scenario is applicable where the resource activity areas consist of relatively wet and swampy but level terrain lands.

**After Situation:**

The road will be 14 feet wide with geotextile, 6 inch gravel, and geocell surfacing. It is mostly in embankment less than 3 feet in height, (average 2 ft) typical side slopes 2:1. A properly constructed, well defined access road will greatly reduce sheet, rill and wind erosion, eliminate compaction in land use areas where it is harmful, reduce emissions of particulate matter (PM) and PM precursors and also reduce excessive sediment in surface water by reducing uncontrolled sediment transport. Planned grades will include all dips and water bars. If clearing and grubbing of land in the alignment area is required, use Land Clearing (460). Pipe culverts installed as part of access road should be covered by either Structures for Water Control (587) or Stream Crossings (578) depending on the type of structure. Earthfill embankment above the culvert structure would still be covered by this Practice. Diversions constructed as part of access road should be covered by Diversion (362). All seeding or revegetation of disturbed areas is provided. Dust control must be addressed under Dust Control on Unpaved Roads and Surfaces (373). Mulching should be addressed under Mulching (484).

**Feature Measure:** Length of Roadway

**Scenario Unit::** Foot

**Scenario Typical Size:** 500.0

**Scenario Total Cost:** $42,603.56

**Scenario Cost/Unit:** $85.21

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 | $2.53 | 1000 | $2,530.00 |
| Earthfill, Roller Compacted | 49 | Earthfill, roller or machine compacted, includes equipment and labor | Cubic Yard | $4.45 | 410 | $1,824.50 |
| Fertilizer, ground application, dry bulk | 950 | Dry bulk fertilizer application performed by ground equipment. Includes equipment, power unit and labor costs. | Acre | $6.62 | 0.12 | $0.79 |
| Lime application | 953 | Lime application performed by ground equipment. Includes equipment, power unit and labor costs. | Acre | $10.63 | 0.12 | $1.28 |
| 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 | $4.32 | 210 | $907.20 |
| **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 | $41.76 | 10 | $417.60 |
| **Materials** | | | | | | |
| Aggregate, Gravel, Ungraded, Quarry Run | 1099 | Includes materials, equipment and labor | Cubic Yard | $23.96 | 175 | $4,193.00 |
| Geocell, 6" | 1842 | 6-inch thick cellular confinement system, three-dimensional, expandable panels made from high-density polyethylene (HDPE), polyester or another polymer material. Includes materials, labor and equipment for the geocell only, does not include backfill. | Square Yard | $39.68 | 800 | $31,744.00 |
| One Species, Warm Season, Native Perennial Grass | 2322 | Native, warm season perennial grass. Includes material and shipping only. | Acre | $69.06 | 0.12 | $8.29 |
| **Mobilization** | | | | | | |
| Mobilization, large equipment | 1140 | Equipment >150HP or typical weights greater than 30,000 pounds or loads requiring over width or over length permits. | Each | $488.45 | 2 | $976.90 |

**Practice:** 560 - Access Road

**Scenario** #4 - Rehabilitation of existing earth road in dry, level terrain

**Scenario Description:**

Repair and rehabilitation of compacted earth road in existing alignment in dry, level terrain. Terrain should be considered level for slopes of 0-5%. The extent of construction work over an existing alignment is assumed to average 30% of the work for a new installation. A properly constructed, well defined access road will address resource concerns related with compaction, emissions of fugitive dust, and excessive sediment in surface water. It also improves the plant productivity, vigor and health and substantially reduces the chance of wild fire hazards. Short term air quality deterioration may result if proper dust control measures are not implemented during the practice installation. Costs include excavation, shaping, grading, surface material, vegetation of disturbed areas, and all equipment, labor and incidental materials necessary to install the practice.

**Before Situation:**

An agricultural enterprise with an existing access road which is beyond its useful lifespan, can no longer be used as intended without rehabilitation. If left in its current condition , it will result in continued compaction, excessive sediment in surface water and emissions of fugitive dusts. This scenario is applicable where the resource activity areas with an existing but dilapidated access road consist of relatively dry and level terrain lands.

**After Situation:**

The damaged portions of the road will be repaired to a full 14 feet width at the top, mostly in embankment less than 3 feet in height, (average 2 ft), typical side slopes 2:1. A properly repaired access road will greatly reduce or eliminate compaction in land use areas where it is harmful, reduce emissions of fugitive dust and also reduce excessive sediment in surface water by reducing uncontrolled sediment transport and improving drainage of irrigated lands. Planned grades will include all dips and water bars. If clearing and grubbing of land in the alignment area is required, use Land Clearing (460). Pipe culverts installed as part of access road should be covered by either Structures for Water Control (587) or Stream Crossings (578) depending on the type of structure. Earthfill embankment above the culvert structure would still be covered by this Practice. Diversions constructed as part of access road should be covered by Diversion (362). All seeding or revegetation of disturbed areas is provided. Dust control must be addressed under Dust Control on Unpaved Roads and Surfaces (373). Mulching should be addressed under Mulching (484).

**Feature Measure:** Length of Roadway

**Scenario Unit::** Foot

**Scenario Typical Size:** 500.0

**Scenario Total Cost:** $2,154.13

**Scenario Cost/Unit:** $4.31

Cost Details:

| Component Name | ID | Description | Unit | Cost | QTY | Total |
|---|---|---|---|---|---|---|
| **Equipment Installation** | | | | | | |
| Excavation, Common Earth, side cast, small equipment | 48 | Bulk excavation and side casting of common earth with hydraulic excavator with less than 1 CY capacity. Includes equipment and labor. | Cubic Yard | $2.36 | 65 | $153.40 |
| Earthfill, Roller Compacted | 49 | Earthfill, roller or machine compacted, includes equipment and labor | Cubic Yard | $4.45 | 205 | $912.25 |
| Fertilizer, ground application, dry bulk | 950 | Dry bulk fertilizer application performed by ground equipment. Includes equipment, power unit and labor costs. | Acre | $6.62 | 0.12 | $0.79 |
| Lime application | 953 | Lime application performed by ground equipment. Includes equipment, power unit and labor costs. | Acre | $10.63 | 0.12 | $1.28 |
| **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 | $41.76 | 10 | $417.60 |
| **Materials** | | | | | | |
| One Species, Warm Season, Native Perennial Grass | 2322 | Native, warm season perennial grass. Includes material and shipping only. | Acre | $69.06 | 0.12 | $8.29 |
| **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 | $172.07 | 1 | $172.07 |
| Mobilization, large equipment | 1140 | Equipment >150HP or typical weights greater than 30,000 pounds or loads requiring over width or over length permits. | Each | $488.45 | 1 | $488.45 |

**Practice:** 560 - Access Road

**Scenario** #5 - Rehabilitation of existing road using gravel in wet, level terrain

**Scenario Description:**

Repair and rehabilitation of a compacted earth or gravel road where it is determined that gravel is needed for the repair with min. 12 inch thick compacted gravel surface over geotextile on existing alignment in wet, level terrain. Terrain should be considered level for slopes of 0-5%. The extent of construction work over an existing alignment is assumed to average 30% of the work for a new installation. A properly constructed, well defined access road will address resource concerns related with compaction, emissions of fugitive dust, and excessive sediment in surface water. It also improves the plant productivity, vigor and health and substantially reduces the chance of wild fire hazards. Short term air quality deterioration may result if proper dust control measures are not implemented during the practice installation. Costs include excavation, shaping, grading, surface materials, vegetation of disturbed areas, and all equipment, labor and incidental materials necessary to install the practice.

**Before Situation:**

An agricultural enterprise with an existing access road which is beyond its useful lifespan, can no longer be used as intended without rehabilitation. If left in its current condition , it will result in continued compaction, excessive sediment in surface water and emissions of fugitive dusts. This scenario is applicable where the resource activity areas with an existing but dilapidated access road consist of relatively wet and swampy but level terrain lands.

**After Situation:**

The damaged portions of the road will be repaired to a full 14 feet width with a geotextile and 12" gravel surface at the top, mostly in embankment less than 3 feet in height, (average 2 ft), typical side slopes 2:1. A properly repaired access road will greatly reduce or eliminate compaction in land use areas where it is harmful, reduce emissions of fugitive dust and also reduce excessive sediment in surface water by reducing uncontrolled sediment transport and improving drainage of irrigated lands. Planned grades will include all dips and water bars. If clearing and grubbing of land in the alignment area is required, use Land Clearing (460). Pipe culverts installed as part of access road should be covered by either Structures for Water Control (587) or Stream Crossings (578) depending on the type of structure. Earthfill embankment above the culvert structure would still be covered by this Practice. Diversions constructed as part of access road should be covered by Diversion (362). All seeding or revegetation of disturbed areas is provided.. Dust control must be addressed under Dust Control on Unpaved Roads and Surfaces (373). Mulching should be addressed under Mulching (484).

**Feature Measure:** Length of Roadway

**Scenario Unit::** Foot

**Scenario Typical Size:** 500.0

**Scenario Total Cost:** $5,037.51

**Scenario Cost/Unit:** $10.08

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 | $2.53 | 300 | $759.00 |
| Earthfill, Roller Compacted | 49 | Earthfill, roller or machine compacted, includes equipment and labor | Cubic Yard | $4.45 | 125 | $556.25 |
| Fertilizer, ground application, dry bulk | 950 | Dry bulk fertilizer application performed by ground equipment. Includes equipment, power unit and labor costs. | Acre | $6.62 | 0.12 | $0.79 |
| Lime application | 953 | Lime application performed by ground equipment. Includes equipment, power unit and labor costs. | Acre | $10.63 | 0.12 | $1.28 |
| 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 | $4.32 | 65 | $280.80 |
| **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 | $41.76 | 10 | $417.60 |
| **Materials** | | | | | | |
| Aggregate, Gravel, Ungraded, Quarry Run | 1099 | Includes materials, equipment and labor | Cubic Yard | $23.96 | 85 | $2,036.60 |
| One Species, Warm Season, Native Perennial Grass | 2322 | Native, warm season perennial grass. Includes material and shipping only. | Acre | $69.06 | 0.12 | $8.29 |
| **Mobilization** | | | | | | |
| Mobilization, large equipment | 1140 | Equipment >150HP or typical weights greater than 30,000 pounds or loads requiring over width or over length permits. | Each | $488.45 | 2 | $976.90 |

**Practice:** 560 - Access Road

**Scenario** #6 - Rehabilitation of existing road using geocell in wet, level terrain

**Scenario Description:**

Repair and rehabilitation of compacted earth, gravel, or geocell road where it is determined that geocell is required for the repair with min. 6 inch thick compacted gravel with geocell surface on existing alignment in wet, level terrain. Terrain should be considered level for slopes of 0-5%. The extent of construction work over an existing alignment is assumed to average 30% of the work for a new installation. A properly constructed, well defined access road will address resource concerns related with compaction, emissions of fugitive dust, and excessive sediment in surface water. It also improves the plant productivity, vigor and health and substantially reduces the chance of wild fire hazards. Short term air quality deterioration may result if proper dust control measures are not implemented during the practice installation. Costs include excavation, shaping, grading, surface material, vegetation of disturbed areas, and all equipment, labor and incidental materials necessary to install the practice.

**Before Situation:**

An agricultural enterprise with an existing access road which is beyond its useful lifespan, can no longer be used as intended without rehabilitation. If left in its current condition , it will result in continued compaction, excessive sediment in surface water and emissions of fugitive dusts. This scenario is applicable where the resource activity areas with an existing but dilapidated access road consist of relatively wet and swampy but level terrain lands.

**After Situation:**

The road will be 14 feet wide with geotextile, 6 inch gravel, and geocell surfacing. It is mostly in embankment less than 3 feet in height, (average 2 ft) typical side slopes 2:1. A properly constructed, well defined access road will greatly reduce sheet, rill and wind erosion, eliminate compaction in land use areas where it is harmful, reduce emissions of particulate matter (PM) and PM precursors and also reduce excessive sediment in surface water by reducing uncontrolled sediment transport. Planned grades will include all dips and water bars. If clearing and grubbing of land in the alignment area is required, use Land Clearing (460). Pipe culverts installed as part of access road should be covered by either Structures for Water Control (587) or Stream Crossings (578) depending on the type of structure. Earthfill embankment above the culvert structure would still be covered by this Practice. Diversions constructed as part of access road should be covered by Diversion (362). All seeding or revegetation of disturbed areas is provided. Dust control must be addressed under Dust Control on Unpaved Roads and Surfaces (373). Mulching should be addressed under Mulching (484).

**Feature Measure:** Length of Roadway

**Scenario Unit::** Foot

**Scenario Typical Size:** 500.0

**Scenario Total Cost:** $13,841.91

**Scenario Cost/Unit:** $27.68

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 | $2.53 | 300 | $759.00 |
| Earthfill, Roller Compacted | 49 | Earthfill, roller or machine compacted, includes equipment and labor | Cubic Yard | $4.45 | 125 | $556.25 |
| Fertilizer, ground application, dry bulk | 950 | Dry bulk fertilizer application performed by ground equipment. Includes equipment, power unit and labor costs. | Acre | $6.62 | 0.12 | $0.79 |
| Lime application | 953 | Lime application performed by ground equipment. Includes equipment, power unit and labor costs. | Acre | $10.63 | 0.12 | $1.28 |
| 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 | $4.32 | 65 | $280.80 |
| **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 | $41.76 | 10 | $417.60 |
| **Materials** | | | | | | |
| Aggregate, Gravel, Ungraded, Quarry Run | 1099 | Includes materials, equipment and labor | Cubic Yard | $23.96 | 55 | $1,317.80 |
| Geocell, 6" | 1842 | 6-inch thick cellular confinement system, three-dimensional, expandable panels made from high-density polyethylene (HDPE), polyester or another polymer material. Includes materials, labor and equipment for the geocell only, does not include backfill. | Square Yard | $39.68 | 240 | $9,523.20 |
| One Species, Warm Season, Native Perennial Grass | 2322 | Native, warm season perennial grass. Includes material and shipping only. | Acre | $69.06 | 0.12 | $8.29 |
| **Mobilization** | | | | | | |
| Mobilization, large equipment | 1140 | Equipment >150HP or typical weights greater than 30,000 pounds or loads requiring over width or over length permits. | Each | $488.45 | 2 | $976.90 |

**Practice:** 560 - Access Road

**Scenario** #7 - New earth road in dry, sloped terrain

**Scenario Description:**

Newly constructed compacted earth road in steep sloped terrain but relatively dry areas. Terrain should be considered sloped for slopes of >5%. A properly constructed, well defined access road will address resource concerns related with compaction, emissions of fugitive dust, and excessive sediment in surface water. It also improves the plant productivity, vigor and health and substantially reduces the chance of wild fire hazards. Short term air quality deterioration may result if proper dust control measures are not implemented during the practice installation. Costs include excavation, shaping, grading, surface material, vegetation of disturbed areas, and all equipment, labor and incidental materials necessary to install the practice.

**Before Situation:**

An agricultural enterprise which requires, but does not have, a fixed travelway for equipment and vehicles for various resource activities and where use of equipment and vehicles within the enterprise without a defined access road would result in compaction, excessive sediment and turbidity in surface water, reduced visibility, and emissions of fugitive dust. This scenario is applicable where the resource activity areas consist of relatively dry lands with steep slopes.

**After Situation:**

The road will be 14 feet wide at the top, 50% in embankment and 50% in excavation less than 3 feet in height, (average 2 ft) typical cut and fill side slopes 2:1. Out of total excavation, 60% is considered common earth and 40% hard dig or rocks. A properly constructed, well defined access road will greatly reduce or eliminate compaction in land use areas where it is harmful, reduce emissions of fugitive dust and also reduce excessive sediment in surface water by reducing uncontrolled sediment transport and improving drainage of irrigated lands. Planned grades will include all dips and water bars. If clearing and grubbing of land in the alignment area is required, use Land Clearing (460). Pipe culverts installed as part of access road should be covered by either Structures for Water Control (587) or Stream Crossings (578) depending on the type of structure. Earthfill embankment above the culvert structure would still be covered by this Practice. Diversions constructed as part of access road should be covered by Diversion (362). All seeding or revegetation of disturbed areas is provided. Dust control must be addressed under Dust Control on Unpaved Roads and Surfaces (373). Mulching should be addressed under Mulching (484).

**Feature Measure:** Length of Roadway

**Scenario Unit::** Foot

**Scenario Typical Size:** 500.0

**Scenario Total Cost:** $6,324.53

**Scenario Cost/Unit:** $12.65

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 | $4.99 | 265 | $1,322.35 |
| Excavation, Common Earth, side cast, small equipment | 48 | Bulk excavation and side casting of common earth with hydraulic excavator with less than 1 CY capacity. Includes equipment and labor. | Cubic Yard | $2.36 | 395 | $932.20 |
| Earthfill, Roller Compacted | 49 | Earthfill, roller or machine compacted, includes equipment and labor | Cubic Yard | $4.45 | 670 | $2,981.50 |
| Fertilizer, ground application, dry bulk | 950 | Dry bulk fertilizer application performed by ground equipment. Includes equipment, power unit and labor costs. | Acre | $6.62 | 0.12 | $0.79 |
| Lime application | 953 | Lime application performed by ground equipment. Includes equipment, power unit and labor costs. | Acre | $10.63 | 0.12 | $1.28 |
| **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 | $41.76 | 10 | $417.60 |
| **Materials** | | | | | | |
| One Species, Warm Season, Native Perennial Grass | 2322 | Native, warm season perennial grass. Includes material and shipping only. | Acre | $69.06 | 0.12 | $8.29 |
| **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 | $172.07 | 1 | $172.07 |
| Mobilization, large equipment | 1140 | Equipment >150HP or typical weights greater than 30,000 pounds or loads requiring over width or over length permits. | Each | $488.45 | 1 | $488.45 |

**Practice:** 560 - Access Road

**Scenario** #8 - New 12 inch gravel road in wet, sloped terrain

**Scenario Description:**

Newly Constructed gravel road with min. 12 inch thick compacted gravel surface over geotextile in steep sloped ground in wet areas. Terrain should be considered sloped for slopes of >5%. A properly constructed, well defined access road will address resource concerns related with compaction, emissions of fugitive dust, and excessive sediment in surface water. It also improves the plant productivity, vigor and health and substantially reduces the chance of wild fire hazards. Short term air quality deterioration may result if proper dust control measures are not implemented during the practice installation. Costs include excavation, shaping, grading, surface material, vegetation of disturbed areas, and all equipment, labor and incidental materials necessary to install the practice.

**Before Situation:**

An agricultural enterprise which requires, but does not have, a fixed travelway for equipment and vehicles for various resource activities and where use of equipment and vehicles within the enterprise without a defined access road would result in compaction, excessive sediment and turbidity in surface water, reduced visibility, and emissions of fugitive dust. This scenario is applicable where the resource activity areas consist of wet and swampy land areas with steep sloped terrain.

**After Situation:**

The road will be 14 feet wide with a geotextile and 12 inch gravel surfacing at the top. It is 50% in embankment and 50% in excavation less than 3 feet in height, (average 2 ft) typical side slopes 2:1. Out of total excavation, 60% is considered common earth and 40% hard dig or rocks. A properly constructed, well defined access road will greatly reduce sheet, rill and wind erosion, eliminate compaction in land use areas where it is harmful, reduce emissions of particulate matter (PM) and PM precursors and also reduce excessive sediment in surface water by reducing uncontrolled sediment transport. Planned grades will include all dips and water bars. If clearing and grubbing of land in the alignment area is required, use Land Clearing (460). Pipe culverts installed as part of access road should be covered by either Structures for Water Control (587) or Stream Crossings (578) depending on the type of structure. Earthfill embankment above the culvert structure would still be covered by this Practice. Diversions constructed as part of access road should be covered by Diversion (362). All seeding or revegetation of disturbed areas is provided. Dust control must be addressed under Dust Control on Unpaved Roads and Surfaces (373). Mulching should be addressed under Mulching (484).

**Feature Measure:** Length of Roadway

**Scenario Unit::** Foot

**Scenario Typical Size:** 500.0

**Scenario Total Cost:** $15,377.11

**Scenario Cost/Unit:** $30.75

Cost Details:

| Component Name | ID | Description | Unit | Cost | QTY | Total |
|---|---|---|---|---|---|---|
| **Equipment Installation** | | | | | | |
| Geotextile, woven | 42 | Woven Geotextile Fabric. Includes materials, equipment and labor | Square Yard | $2.53 | 1000 | $2,530.00 |
| Excavation, Rock, Ripping | 47 | Excavation, rock, mechanical ripping, includes equipment and labor | Cubic Yard | $4.99 | 265 | $1,322.35 |
| Earthfill, Roller Compacted | 49 | Earthfill, roller or machine compacted, includes equipment and labor | Cubic Yard | $4.45 | 410 | $1,824.50 |
| Fertilizer, ground application, dry bulk | 950 | Dry bulk fertilizer application performed by ground equipment. Includes equipment, power unit and labor costs. | Acre | $6.62 | 0.12 | $0.79 |
| Lime application | 953 | Lime application performed by ground equipment. Includes equipment, power unit and labor costs. | Acre | $10.63 | 0.12 | $1.28 |
| 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 | $4.32 | 395 | $1,706.40 |
| **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 | $41.76 | 10 | $417.60 |
| **Materials** | | | | | | |
| Aggregate, Gravel, Ungraded, Quarry Run | 1099 | Includes materials, equipment and labor | Cubic Yard | $23.96 | 275 | $6,589.00 |
| One Species, Warm Season, Native Perennial Grass | 2322 | Native, warm season perennial grass. Includes material and shipping only. | Acre | $69.06 | 0.12 | $8.29 |
| **Mobilization** | | | | | | |
| Mobilization, large equipment | 1140 | Equipment >150HP or typical weights greater than 30,000 pounds or loads requiring over width or over length permits. | Each | $488.45 | 2 | $976.90 |

**Practice:** 560 - Access Road

**Scenario** #9 - New geocell road in wet, sloped terrain

**Scenario Description:**

Newly Constructed geotextile, gravel, and geocell road with min. 6 inch thick compacted gravel and geocell surface in steep sloped ground in wet areas. Terrain should be considered sloped for slopes of >5%. A properly constructed, well defined access road will address resource concerns related with compaction, emissions of fugitive dust, and excessive sediment in surface water. It also improves the plant productivity, vigor and health and substantially reduces the chance of wild fire hazards. Short term air quality deterioration may result if proper dust control measures are not implemented during the practice installation. Costs include excavation, shaping, grading, surface material, vegetation of disturbed areas, and all equipment, labor and incidental materials necessary to install the practice.

**Before Situation:**

An agricultural enterprise which requires, but does not have, a fixed travel way for equipment and vehicles for various resource activities and where use of equipment and vehicles within the enterprise without a defined access road would result in compaction, excessive sediment and turbidity in surface water, reduced visibility, and emissions of fugitive dust. This scenario is applicable where the resource activity areas consist of relatively wet and swampy but level terrain lands.

**After Situation:**

The road will be 14 feet wide with geotextile, 6 inch gravel, and geocell surfacing. It is mostly in embankment less than 3 feet in height, (average 2 ft) typical side slopes 2:1. Out of total excavation, 60% is considered common earth and 40% hard dig or rocks. A properly constructed, well defined access road will greatly reduce sheet, rill and wind erosion, eliminate compaction in land use areas where it is harmful, reduce emissions of particulate matter (PM) and PM precursors and also reduce excessive sediment in surface water by reducing uncontrolled sediment transport. Planned grades will include all dips and water bars. If clearing and grubbing of land in the alignment area is required, use Land Clearing (460). Pipe culverts installed as part of access road should be covered by either Structures for Water Control (587) or Stream Crossings (578) depending on the type of structure. Earthfill embankment above the culvert structure would still be covered by this Practice. Diversions constructed as part of access road should be covered by Diversion (362). All seeding or revegetation of disturbed areas is provided. Dust control must be addressed under Dust Control on Unpaved Roads and Surfaces (373). Mulching should be addressed under Mulching (484).

**Feature Measure:** Length of Roadway

**Scenario Unit::** Foot

**Scenario Typical Size:** 500.0

**Scenario Total Cost:** $44,725.11

**Scenario Cost/Unit:** $89.45

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 | $2.53 | 1000 | $2,530.00 |
| Excavation, Rock, Ripping | 47 | Excavation, rock, mechanical ripping, includes equipment and labor | Cubic Yard | $4.99 | 265 | $1,322.35 |
| Earthfill, Roller Compacted | 49 | Earthfill, roller or machine compacted, includes equipment and labor | Cubic Yard | $4.45 | 410 | $1,824.50 |
| Fertilizer, ground application, dry bulk | 950 | Dry bulk fertilizer application performed by ground equipment. Includes equipment, power unit and labor costs. | Acre | $6.62 | 0.12 | $0.79 |
| Lime application | 953 | Lime application performed by ground equipment. Includes equipment, power unit and labor costs. | Acre | $10.63 | 0.12 | $1.28 |
| 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 | $4.32 | 395 | $1,706.40 |
| **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 | $41.76 | 10 | $417.60 |
| **Materials** | | | | | | |
| Aggregate, Gravel, Ungraded, Quarry Run | 1099 | Includes materials, equipment and labor | Cubic Yard | $23.96 | 175 | $4,193.00 |
| Geocell, 6" | 1842 | 6-inch thick cellular confinement system, three-dimensional, expandable panels made from high-density polyethylene (HDPE), polyester or another polymer material. Includes materials, labor and equipment for the geocell only, does not include backfill. | Square Yard | $39.68 | 800 | $31,744.00 |
| One Species, Warm Season, Native Perennial Grass | 2322 | Native, warm season perennial grass. Includes material and shipping only. | Acre | $69.06 | 0.12 | $8.29 |
| **Mobilization** | | | | | | |
| Mobilization, large equipment | 1140 | Equipment >150HP or typical weights greater than 30,000 pounds or loads requiring over width or over length permits. | Each | $488.45 | 2 | $976.90 |

**Practice:** 560 - Access Road

**Scenario** #10 - Rehabilitation of existing earth road in wet, sloped terrain

**Scenario Description:**

Repair and rehabilitation of compacted earth road in existing alignment in relatively dry but steep sloped terrain. Terrain should be considered sloped for slopes of >5%. The extent of construction work over an existing alignment is assumed to average 30% of the work for a new installation. A properly constructed, well defined access road will address resource concerns related with compaction, emissions of fugitive dust, and excessive sediment in surface water. It also improves the plant productivity, vigor and health and substantially reduces the chance of wild fire hazards. Short term air quality deterioration may result if proper dust control measures are not implemented during the practice installation. Costs include excavation, shaping, grading, surface material, vegetation of disturbed areas, and all equipment, labor and incidental materials necessary to install the practice.

**Before Situation:**

An agricultural enterprise with an existing access road which is beyond its useful lifespan, can no longer be used as intended without rehabilitation. If left in its current condition , it will result in continued compaction, excessive sediment in surface water and emissions of fugitive dusts. This scenario is applicable where the resource activity areas with an existing but dilapidated access road consist of relatively dry lands with steep sloped terrain.

**After Situation:**

The damaged portions of the road will be repaired to a full 14 feet width at the top, 50% in embankment and 50% in excavation less than 3 feet in height, (average 2 ft), typical side slopes 2:1. Out of total excavation, 60% is considered common earth excavation and 40% hard dig or rocks. A properly repaired access road will greatly reduce or eliminate compaction in land use areas where it is harmful, reduce emissions of fugitive dust and also reduce excessive sediment in surface water by reducing uncontrolled sediment transport and improving drainage of irrigated lands. Planned grades will include all dips and water bars. If clearing and grubbing of land in the alignment area is required, use Land Clearing (460). Pipe culverts installed as part of access road should be covered by either Structures for Water Control (587) or Stream Crossings (578) depending on the type of structure. Earthfill embankment above the culvert structure would still be covered by this Practice. Diversions constructed as part of access road should be covered by Diversion (362). All seeding or revegetation of disturbed areas is provided. Dust control must be addressed under Dust Control on Unpaved Roads and Surfaces (373). Mulching should be addressed under Mulching (484).

**Feature Measure:** Length of Roadway

**Scenario Unit::** Foot

**Scenario Typical Size:** 500.0

**Scenario Total Cost:** $2,660.88

**Scenario Cost/Unit:** $5.32

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 | $4.99 | 80 | $399.20 |
| Excavation, Common Earth, side cast, small equipment | 48 | Bulk excavation and side casting of common earth with hydraulic excavator with less than 1 CY capacity. Includes equipment and labor. | Cubic Yard | $2.36 | 120 | $283.20 |
| Earthfill, Roller Compacted | 49 | Earthfill, roller or machine compacted, includes equipment and labor | Cubic Yard | $4.45 | 200 | $890.00 |
| Fertilizer, ground application, dry bulk | 950 | Dry bulk fertilizer application performed by ground equipment. Includes equipment, power unit and labor costs. | Acre | $6.62 | 0.12 | $0.79 |
| Lime application | 953 | Lime application performed by ground equipment. Includes equipment, power unit and labor costs. | Acre | $10.63 | 0.12 | $1.28 |
| **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 | $41.76 | 10 | $417.60 |
| **Materials** | | | | | | |
| One Species, Warm Season, Native Perennial Grass | 2322 | Native, warm season perennial grass. Includes material and shipping only. | Acre | $69.06 | 0.12 | $8.29 |
| **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 | $172.07 | 1 | $172.07 |
| Mobilization, large equipment | 1140 | Equipment >150HP or typical weights greater than 30,000 pounds or loads requiring over width or over length permits. | Each | $488.45 | 1 | $488.45 |

**Practice:** 560 - Access Road

**Scenario** #11 - Rehabilitation of existing road using gravel in wet, sloped terrain

**Scenario Description:**

Repair and rehabilitation of compacted earth or gravel road where it is determined that gravel is needed for the repair with min. 12 inch thick compacted gravel surface over geotextile on existing alignment in wet, steep sloped terrain. Terrain should be considered sloped for slopes of >5%. The extent of construction work over an existing alignment is assumed to average 30% of the work for a new installation. A properly constructed, well defined access road will address resource concerns related with compaction, emissions of fugitive dust, and excessive sediment in surface water. It also improves the plant productivity, vigor and health and substantially reduces the chance of wild fire hazards. Short term air quality deterioration may result if proper dust control measures are not implemented during the practice installation. Costs include excavation, shaping, grading, surface material, vegetation of disturbed areas, and all equipment, labor and incidental materials necessary to install the practice.

**Before Situation:**

An agricultural enterprise with an existing access road which is beyond its useful lifespan, can no longer be used as intended without rehabilitation. If left in its current condition , it will result in continued compaction, excessive sediment in surface water and emissions of fugitive dust. This scenario is applicable where the resource activity areas with an existing but dilapidated access road consist of relatively wet and swampy land with steep sloped terrain.

**After Situation:**

The damaged portions of the road will be repaired to a full 14 feet width with a geotextile and 12" gravel surface at the top, 50% in embankment and 50% in excavation less than 3 feet in height, (average 2 ft), typical side slopes 2:1. Out of total excavation, 60% is considered common earth and 40% hard dig or rocks. A properly repaired access road will greatly reduce or eliminate compaction in land use areas where it is harmful, reduce emissions of fugitive dust and also reduce excessive sediment in surface water by reducing uncontrolled sediment transport and improving drainage of irrigated lands. Planned grades will include all dips and water bars. If clearing and grubbing of land in the alignment area is required, use Land Clearing (460). Pipe culverts installed as part of access road should be covered by either Structures for Water Control (587) or Stream Crossings (578) depending on the type of structure. Earthfill embankment above the culvert structure would still be covered by this Practice. Diversions constructed as part of access road should be covered by Diversion (362). All seeding or revegetation of disturbed areas is provided. Dust control must be addressed under Dust Control on Unpaved Roads and Surfaces (373). Mulching should be addressed under Mulching (484).

**Feature Measure:** Length of Roadway

**Scenario Unit::** Foot

**Scenario Typical Size:** 500.0

**Scenario Total Cost:** $5,674.31

**Scenario Cost/Unit:** $11.35

Cost Details:

| Component Name | ID | Description | Unit | Cost | QTY | Total |
|---|---|---|---|---|---|---|
| **Equipment Installation** | | | | | | |
| Geotextile, woven | 42 | Woven Geotextile Fabric. Includes materials, equipment and labor | Square Yard | $2.53 | 300 | $759.00 |
| Excavation, Rock, Ripping | 47 | Excavation, rock, mechanical ripping, includes equipment and labor | Cubic Yard | $4.99 | 80 | $399.20 |
| Earthfill, Roller Compacted | 49 | Earthfill, roller or machine compacted, includes equipment and labor | Cubic Yard | $4.45 | 125 | $556.25 |
| Fertilizer, ground application, dry bulk | 950 | Dry bulk fertilizer application performed by ground equipment. Includes equipment, power unit and labor costs. | Acre | $6.62 | 0.12 | $0.79 |
| Lime application | 953 | Lime application performed by ground equipment. Includes equipment, power unit and labor costs. | Acre | $10.63 | 0.12 | $1.28 |
| 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 | $4.32 | 120 | $518.40 |
| **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 | $41.76 | 10 | $417.60 |
| **Materials** | | | | | | |
| Aggregate, Gravel, Ungraded, Quarry Run | 1099 | Includes materials, equipment and labor | Cubic Yard | $23.96 | 85 | $2,036.60 |
| One Species, Warm Season, Native Perennial Grass | 2322 | Native, warm season perennial grass. Includes material and shipping only. | Acre | $69.06 | 0.12 | $8.29 |
| **Mobilization** | | | | | | |
| Mobilization, large equipment | 1140 | Equipment >150HP or typical weights greater than 30,000 pounds or loads requiring over width or over length permits. | Each | $488.45 | 2 | $976.90 |

**Practice:** 560 - Access Road

**Scenario** #12 - Rehabilitation of existing road using geocell in wet, sloped terrain

**Scenario Description:**

Repair and rehabilitation of compacted earth, gravel, or geocell road where it is determined that geocell is needed for the repair with min. 6 inch thick compacted gravel with geocell surface on existing alignment in wet, steep sloped terrain. Terrain should be considered sloped for slopes of >5%. The extent of construction work over an existing alignment is assumed to average 30% of the work for a new installation. A properly constructed, well defined access road will address resource concerns related with compaction, emissions of fugitive dust, and excessive sediment in surface water. It also improves the plant productivity, vigor and health and substantially reduces the chance of wild fire hazards. Short term air quality deterioration may result if proper dust control measures are not implemented during the practice installation. Costs include excavation, shaping, grading, surface material, vegetation of disturbed areas, and all equipment, labor and incidental materials necessary to install the practice.

**Before Situation:**

An agricultural enterprise with an existing access road which is beyond its useful lifespan, can no longer be used as intended without rehabilitation. If left in its current condition , it will result in continued compaction, excessive sediment in surface water and emissions of fugitive dusts. This scenario is applicable where the resource activity areas with an existing but dilapidated access road consist of relatively wet and swampy but level terrain lands.

**After Situation:**

The road will be 14 feet wide with geotextile, 6 inch gravel, and geocell surfacing. It is mostly in embankment less than 3 feet in height, (average 2 ft) typical side slopes 2:1. Out of total excavation, 60% is considered common earth and 40% hard dig or rocks. A properly constructed, well defined access road will greatly reduce sheet, rill and wind erosion, eliminate compaction in land use areas where it is harmful, reduce emissions of particulate matter (PM) and PM precursors and also reduce excessive sediment in surface water by reducing uncontrolled sediment transport. Planned grades will include all dips and water bars. If clearing and grubbing of land in the alignment area is required, use Land Clearing (460). Pipe culverts installed as part of access road should be covered by either Structures for Water Control (587) or Stream Crossings (578) depending on the type of structure. Earthfill embankment above the culvert structure would still be covered by this Practice. Diversions constructed as part of access road should be covered by Diversion (362). All seeding or revegetation of disturbed areas is provided. Dust control must be addressed under Dust Control on Unpaved Roads and Surfaces (373). Mulching should be addressed under Mulching (484).

**Feature Measure:** Length of Roadway

**Scenario Unit::** Foot

**Scenario Typical Size:** 500.0

**Scenario Total Cost:** $14,478.71

**Scenario Cost/Unit:** $28.96

Cost Details:

| Component Name | ID | Description | Unit | Cost | QTY | Total |
|---|---|---|---|---|---|---|
| **Equipment Installation** | | | | | | |
| Geotextile, woven | 42 | Woven Geotextile Fabric. Includes materials, equipment and labor | Square Yard | $2.53 | 300 | $759.00 |
| Excavation, Rock, Ripping | 47 | Excavation, rock, mechanical ripping, includes equipment and labor | Cubic Yard | $4.99 | 80 | $399.20 |
| Earthfill, Roller Compacted | 49 | Earthfill, roller or machine compacted, includes equipment and labor | Cubic Yard | $4.45 | 125 | $556.25 |
| Fertilizer, ground application, dry bulk | 950 | Dry bulk fertilizer application performed by ground equipment. Includes equipment, power unit and labor costs. | Acre | $6.62 | 0.12 | $0.79 |
| Lime application | 953 | Lime application performed by ground equipment. Includes equipment, power unit and labor costs. | Acre | $10.63 | 0.12 | $1.28 |
| 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 | $4.32 | 120 | $518.40 |
| **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 | $41.76 | 10 | $417.60 |
| **Materials** | | | | | | |
| Aggregate, Gravel, Ungraded, Quarry Run | 1099 | Includes materials, equipment and labor | Cubic Yard | $23.96 | 55 | $1,317.80 |
| Geocell, 6" | 1842 | 6-inch thick cellular confinement system, three-dimensional, expandable panels made from high-density polyethylene (HDPE), polyester or another polymer material. Includes materials, labor and equipment for the geocell only, does not include backfill. | Square Yard | $39.68 | 240 | $9,523.20 |
| One Species, Warm Season, Native Perennial Grass | 2322 | Native, warm season perennial grass. Includes material and shipping only. | Acre | $69.06 | 0.12 | $8.29 |
| **Mobilization** | | | | | | |
| Mobilization, large equipment | 1140 | Equipment >150HP or typical weights greater than 30,000 pounds or loads requiring over width or over length permits. | Each | $488.45 | 2 | $976.90 |

**Practice:** 561 - Heavy Use Area Protection

**Scenario** #1 - Gravel - Pad

**Scenario Description:**

Gravel pad installed to stabilize areas around watering troughs, barn entrances, etc. The stabilization of an area that is frequently and intensively used by people, livestock and equipment by surfacing with rock and or gravel on a geotextile fabric foundation to provide a stable, non-eroding surface. Installation includes all materials, equipment, and labor to install this practice, The stabilized area will address the resource concerns of soil erosion and water quality degradation.

**Before Situation:**

This practice applies to all land uses where frequently and/or intensively used areas requiring treatment to address soil erosion and water quality degradation.

**After Situation:**

Typical scenario is a pad which is 25' x 25'. Typically, site is excavated below topsoil. ~12" of bankrun gravel or similar material is directly placed by dump truck on non-woven geotextile and compacted to form a hard durable surface. Practice will address soil erosion and water quality degradation. 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 Gravel Pad

**Scenario Unit::** Square Foot

**Scenario Typical Size:** 625.0

**Scenario Total Cost:** $2,398.10

**Scenario Cost/Unit:** $3.84

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 | $2.53 | 70 | $177.10 |
| 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 | $2.36 | 24 | $56.64 |
| Earthfill, Manually Compacted | 50 | Earthfill, manually compacted, includes equipment and labor | Cubic Yard | $5.87 | 24 | $140.88 |
| Dozer, 140 HP | 927 | Track mounted Dozer with horsepower range of 125 to 160. Equipment and power unit costs. Labor not included. | Hour | $124.03 | 3 | $372.09 |
| **Labor** | | | | | | |
| General Labor | 231 | Labor performed using basic tools such as power tool, shovels, and other tools that do not require extensive training. Ex. pipe layer, herder, concrete placement, materials spreader, flagger, etc. | Hour | $25.31 | 3 | $75.93 |
| 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 | $44.37 | 3 | $133.11 |
| Supervisor 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 | $45.69 | 1 | $45.69 |
| **Materials** | | | | | | |
| Aggregate, Gravel, Graded | 46 | Gravel, includes materials, equipment and labor to transport and place. Includes washed and unwashed gravel. | Cubic Yard | $34.75 | 15 | $521.25 |
| Aggregate, Gravel, Ungraded, Quarry Run | 1099 | Includes materials, equipment and labor | Cubic Yard | $23.96 | 8 | $191.68 |
| **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 | $172.07 | 1 | $172.07 |
| Mobilization, medium equipment | 1139 | Equipment with 70-150 HP or typical weights between 14,000 and 30,000 pounds. | Each | $255.83 | 2 | $511.66 |

**Practice:** 561 - Heavy Use Area Protection

**Scenario** #2 - Curb with Footer

**Scenario Description:**

The stabilization of areas around facilities that are frequently and intensively used by people, animals or vehicles by surfacing with reinforced concrete with curb on a sand or gravel foundation to provide a stable, non-eroding surface. Curb is necessary to directly contaminated runoff to proper location. Installation includes all materials, equipment, and labor to install this practice, The stabilized area will address the resource concerns soil erosion and water quality degradation.

**Before Situation:**

This practice applies to all land uses where frequently and/or intensively used areas requiring treatment to address soil erosion and water quality degradation.

**After Situation:**

Curb is installed to direct contaminated runoff to proper location and to assist in the movement, handling and management of manure. Concrete curb is 24" tall and 8" wide and 100' long. Footing is 3' wide and 6" deep. Curbing is reinforced with rebar. Curb is underlain by 6" of drainfill. Area is frequently and intensively used by people, animals or vehicles and will address soil erosion and water quality degradation. Associated practices are Access Road (560), Stream Crossing (578), Critical Area Planting (342). Provisions to store, utilize, and/or treat contaminated runoff shall be addressed under Sediment Basin (350), Waste Storage Facility (313), or Waste Treatment (629) as appropriate. To reduce the potential for air quality problems from particulate matter associated with heavy use areas, consider the use of Windbreak/Shelterbelt Establishment (380) or Herbaceous Wind Barriers (603).

**Feature Measure:** Length of Curb

**Scenario Unit::** Foot

**Scenario Typical Size:** 100.0

**Scenario Total Cost:** $6,140.25

**Scenario Cost/Unit:** $61.40

Cost Details:

| Component Name | ID | Description | Unit | Cost | QTY | Total |
|---|---|---|---|---|---|---|
| **Equipment Installation** | | | | | | |
| Concrete, CIP, slab on grade, reinforced | 37 | Steel reinforced concrete formed and cast-in-placed as a slab on grade by chute placement. Typical strength is 3000 to 4000 psi. Includes materials, labor and equipment to transport, place and finish. | Cubic Yard | $327.92 | 6 | $1,967.52 |
| 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 | $510.00 | 5 | $2,550.00 |
| 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 | $2.36 | 11 | $25.96 |
| Earthfill, Manually Compacted | 50 | Earthfill, manually compacted, includes equipment and labor | Cubic Yard | $5.87 | 6 | $35.22 |
| Skidsteer, 80 HP | 933 | Skidsteer loader with horsepower range of 60 to 90. Equipment and power unit costs. Labor not included. | Hour | $44.60 | 4 | $178.40 |
| **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 | $25.31 | 5 | $126.55 |
| Equipment Operators, Light | 232 | Includes: Skid Steer Loaders, Hydraulic Excavators <50 HP, Trenchers <12", Ag Equipment <150 HP, Pickup Trucks, Forklifts, Mulchers | Hour | $25.23 | 4 | $100.92 |
| 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 | $45.69 | 2 | $91.38 |
| **Materials** | | | | | | |
| Aggregate, Gravel, Graded | 46 | Gravel, includes materials, equipment and labor to transport and place. Includes washed and unwashed gravel. | Cubic Yard | $34.75 | 6 | $208.50 |
| **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 | $172.07 | 2 | $344.14 |
| Mobilization, medium equipment | 1139 | Equipment with 70-150 HP or typical weights between 14,000 and 30,000 pounds. | Each | $255.83 | 2 | $511.66 |

**Practice:** 561 - Heavy Use Area Protection

**Scenario** #3 - Curb without Footer

**Scenario Description:**

The stabilization of areas around facilities that are frequently and intensively used by people, animals or vehicles by surfacing with reinforced concrete with curb on a sand or gravel foundation to provide a stable, non-eroding surface. Curb is necessary to directly contaminated runoff to proper location. Installation includes all materials, equipment, and labor to install this practice, The stabilized area will address the resource concerns soil erosion and water quality degradation.

**Before Situation:**

This practice applies to all land uses where frequently and/or intensively used areas requiring treatment to address soil erosion and water quality degradation.

**After Situation:**

Curb is installed to direct contaminated runoff to proper location and to assist in the movement, handling and management of manure. Concrete curb is 24" tall and 8" wide and 100' long. Curb is installed on top of existing slab, no footing. Hole are drilled into existing slab to accommodate vertical rebar. Area is frequently and intensively used by people, animals or vehicles and will address soil erosion and water quality degradation. Associated practices are Access Road (560), Stream Crossing (578), Critical Area Planting (342). Provisions to store, utilize, and/or treat contaminated runoff shall be addressed under Sediment Basin (350), Waste Storage Facility (313), or Waste Treatment (629) as appropriate. To reduce the potential for air quality problems from particulate matter associated with heavy use areas, consider the use of Windbreak/Shelterbelt Establishment (380) or Herbaceous Wind Barriers (603).

**Feature Measure:** Length of Curb

**Scenario Unit::** Foot

**Scenario Typical Size:** 100.0

**Scenario Total Cost:** $3,238.62

**Scenario Cost/Unit:** $32.39

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 | $510.00 | 5 | $2,550.00 |
| **Labor** | | | | | | |
| General Labor | 231 | Labor performed using basic tools such as power tool, shovels, and other tools that do not require extensive training. Ex. pipe layer, herder, concrete placement, materials spreader, flagger, etc. | Hour | $25.31 | 10 | $253.10 |
| 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 | $45.69 | 2 | $91.38 |
| **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 | $172.07 | 2 | $344.14 |

**Practice:** 561 - Heavy Use Area Protection

**Scenario** #4 - Concrete with Curb upto 1000 SF

**Scenario Description:**

The stabilization of areas around facilities that are frequently and intensively used by people, animals or vehicles by surfacing with reinforced concrete with curb on a sand or gravel foundation to provide a stable, non-eroding surface. Curb is necessary to directly contaminated runoff to proper location. Installation includes all materials, equipment, and labor to install this practice, The stabilized area will address the resource concerns soil erosion and water quality degradation.

**Before Situation:**

This practice applies to all land uses where frequently and/or intensively used areas requiring treatment to address soil erosion and water quality degradation.

**After Situation:**

Unstable area is surfaced with 630 square feet of concrete with curbing. Curb is installed to direct contaminated runoff to proper location and to assist in the movement, handling and management of manure. Concrete slab is 5" thick with 6" of compacted dranifill underneath. Concrete curb is 24" tall and 8" wide with 3' wide footing, with reinforcing steel. Assume seeding is equal to 50% of the HUAP size (315 sf). Area is frequently and intensively used by people, animals or vehicles and will address soil erosion and water quality degradation. Associated practices are Access Road (560), Stream Crossing (578), etc. Provisions to store, utilize, and/or treat contaminated runoff shall be addressed under Sediment Basin (350), Waste Storage Facility (313), or Waste Treatment (629) as appropriate. To reduce the potential for air quality problems from particulate matter associated with heavy use areas, consider the use of Windbreak/Shelterbelt Establishment (380) or Herbaceous Wind Barriers (603).

**Feature Measure:** Area of Concrete Pad

**Scenario Unit::** Square Foot

**Scenario Typical Size:** 630.0

**Scenario Total Cost:** $7,560.15

**Scenario Cost/Unit:** $12.00

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 | $327.92 | 10 | $3,279.20 |
| 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 | $510.00 | 5 | $2,550.00 |
| 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 | $2.36 | 47 | $110.92 |
| Earthfill, Manually Compacted | 50 | Earthfill, manually compacted, includes equipment and labor | Cubic Yard | $5.87 | 12 | $70.44 |
| Tillage, Light | 945 | Includes light disking (tandem) or field cultivator. Includes equipment, power unit and labor costs. | Acre | $11.14 | 0.1 | $1.11 |
| Fertilizer, ground application, dry bulk | 950 | Dry bulk fertilizer application performed by ground equipment. Includes equipment, power unit and labor costs. | Acre | $6.62 | 0.1 | $0.66 |
| Lime application | 953 | Lime application performed by ground equipment. Includes equipment, power unit and labor costs. | Acre | $10.63 | 0.1 | $1.06 |
| 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 | $12.60 | 0.1 | $1.26 |
| Cultipacking | 1100 | Includes equipment, power unit and labor costs. | Acre | $7.70 | 0.1 | $0.77 |
| **Labor** | | | | | | |
| General Labor | 231 | Labor performed using basic tools such as power tool, shovels, and other tools that do not require extensive training. Ex. pipe layer, herder, concrete placement, materials spreader, flagger, etc. | Hour | $25.31 | 6 | $151.86 |
| 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 | $45.69 | 2 | $91.38 |
| **Materials** | | | | | | |
| Aggregate, Sand, Graded, Washed | 45 | Sand, typical ASTM C33 gradation, includes materials, equipment and labor to transport and place | Cubic Yard | $34.29 | 12 | $411.48 |
| 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 | $0.49 | 0.4 | $0.20 |
| 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 | $0.65 | 0.4 | $0.26 |
| Potassium, K2O | 74 | K2O supplied by Muriate Of Potash. Price is not per pound of total product applied, no conversion is needed. | Pound | $0.36 | 0.4 | $0.14 |

| | | | | | | |
|---|---|---|---|---|---|---|
| Lime, ENM | 75 | Fertilizer: Limestone Spread on field. | Ton | $93.23 | 0.1 | $9.32 |
| Straw | 1237 | Small grain straw (non organic and certified organic). Includes materials only. | Ton | $128.33 | 0.1 | $12.83 |
| Three Species Mix, Cool Season, Introduced Perennial Grass | 2315 | Cool season, introduced grass mix. Includes material and shipping only. | Acre | $45.35 | 0.1 | $4.54 |
| One Species, Warm Season, Native Perennial Grass | 2322 | Native, warm season perennial grass. Includes material and shipping only. | Acre | $69.06 | 0.1 | $6.91 |
| **Mobilization** | | | | | | |
| Mobilization, small equipment | 1138 | Equipment <70 HP but can't be transported by a pick-up truck or with typical weights between 3,500 to 14,000 pounds. | Each | $172.07 | 2 | $344.14 |
| Mobilization, medium equipment | 1139 | Equipment with 70-150 HP or typical weights between 14,000 and 30,000 pounds. | Each | $255.83 | 2 | $511.66 |

**Practice:** 561 - Heavy Use Area Protection

**Scenario** #5 - Concrete/Asphalt without Curb upto 1000 SF

**Scenario Description:**

The stabilization of areas around facilities that are frequently and intensively used by people, animals or vehicles by surfacing with reinforced concrete or asphalt on a sand or gravel foundation to provide a stable, non-eroding surface. Installation includes all materials, equipment, and labor to install this practice, The stabilized area will address the resource concerns soil erosion and water quality degradation.

**Before Situation:**

This practice applies to all land uses where frequently and/or intensively used areas requiring treatment to address soil erosion and water quality degradation.

**After Situation:**

Unstable area is surfaced with 630 square feet of concrete or asphalt, no curbing. Concrete/Asphalt slab is 5" thick with 6" of compacted dranifill underneath. Asphalt may require additional compacted drainfill. Assume 0.1 acres of seeding. Area is frequently and intensively used by people, animals or vehicles and will address soil erosion and water quality degradation. Associated practices are Access Road (560), Stream Crossing (578), Critical Area Planting (342). Provisions to store, utilize, and/or treat contaminated runoff shall be addressed under Sediment Basin (350), Waste Storage Facility (313), or Waste Treatment (629) as appropriate. To reduce the potential for air quality problems from particulate matter associated with heavy use areas, consider the use of Windbreak/Shelterbelt Establishment (380) or Herbaceous Wind Barriers (603).

**Feature Measure:** Area of Concrete Pad

**Scenario Unit::** Square Foot

**Scenario Typical Size:** 630.0

**Scenario Total Cost:** $4,920.46

**Scenario Cost/Unit:** $7.81

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 | $327.92 | 10 | $3,279.20 |
| Excavation, Common Earth, side cast, small equipment | 48 | Bulk excavation and side casting of common earth with hydraulic excavator with less than 1 CY capacity. Includes equipment and labor. | Cubic Yard | $2.36 | 47 | $110.92 |
| Earthfill, Manually Compacted | 50 | Earthfill, manually compacted, includes equipment and labor | Cubic Yard | $5.87 | 12 | $70.44 |
| **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 | $25.31 | 4 | $101.24 |
| 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 | $45.69 | 2 | $91.38 |
| **Materials** | | | | | | |
| Aggregate, Sand, Graded, Washed | 45 | Sand, typical ASTM C33 gradation, includes materials, equipment and labor to transport and place | Cubic Yard | $34.29 | 12 | $411.48 |
| **Mobilization** | | | | | | |
| Mobilization, small equipment | 1138 | Equipment <70 HP but can't be transported by a pick-up truck or with typical weights between 3,500 to 14,000 pounds. | Each | $172.07 | 2 | $344.14 |
| Mobilization, medium equipment | 1139 | Equipment with 70-150 HP or typical weights between 14,000 and 30,000 pounds. | Each | $255.83 | 2 | $511.66 |

**Practice:** 561 - Heavy Use Area Protection

**Scenario** #6 - Concrete with Curb over 1000 SF

**Scenario Description:**

The stabilization of areas around facilities that are frequently and intensively used by people, animals or vehicles by surfacing with reinforced concrete with curb on a sand or gravel foundation to provide a stable, non-eroding surface. Curb is necessary to directly contaminated runoff to proper location. Installation includes all materials, equipment, and labor to install this practice, The stabilized area will address the resource concerns soil erosion and water quality degradation.

**Before Situation:**

This practice applies to all land uses where frequently and/or intensively used areas requiring treatment to address soil erosion and water quality degradation.

**After Situation:**

Unstable area is surfaced with 2500 square feet of concrete with curbing. Curb is installed to direct contaminated runoff to proper location and to assist in the movement, handling and management of manure. Concrete slab is 5" thick with 6" of compacted dranifill underneath. Concrete curb is 24" tall and 8" wide with 3' wide footing, with reinforcing steel. Area is frequently and intensively used by people, animals or vehicles and will address soil erosion and water quality degradation. Associated practices are Access Road (560), Stream Crossing (578), Critical Area Planting (342). Provisions to store, utilize, and/or treat contaminated runoff shall be addressed under Sediment Basin (350), Waste Storage Facility (313), or Waste Treatment (629) as appropriate. To reduce the potential for air quality problems from particulate matter associated with heavy use areas, consider the use of Windbreak/Shelterbelt Establishment (380) or Herbaceous Wind Barriers (603).

**Feature Measure:** Area of Concrete Pad

**Scenario Unit::** Square Foot

**Scenario Typical Size:** 2,500.0

**Scenario Total Cost:** $27,117.67

**Scenario Cost/Unit:** $10.85

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 | $327.92 | 39 | $12,788.88 |
| Concrete, CIP, formed reinforced | 38 | Steel reinforced concrete formed and cast-in-placed in formed structures such as walls or suspended slabs by chute placement. Typical strength is 3000 to 4000 psi. Includes materials, labor and equipment to transport, place and finish. | Cubic Yard | $510.00 | 21 | $10,710.00 |
| 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 | $2.36 | 185 | $436.60 |
| Earthfill, Manually Compacted | 50 | Earthfill, manually compacted, includes equipment and labor | Cubic Yard | $5.87 | 46 | $270.02 |
| Tillage, Light | 945 | Includes light disking (tandem) or field cultivator. Includes equipment, power unit and labor costs. | Acre | $11.14 | 0.1 | $1.11 |
| Fertilizer, ground application, dry bulk | 950 | Dry bulk fertilizer application performed by ground equipment. Includes equipment, power unit and labor costs. | Acre | $6.62 | 0.1 | $0.66 |
| Lime application | 953 | Lime application performed by ground equipment. Includes equipment, power unit and labor costs. | Acre | $10.63 | 0.1 | $1.06 |
| 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 | $12.60 | 0.1 | $1.26 |
| Cultipacking | 1100 | Includes equipment, power unit and labor costs. | Acre | $7.70 | 0.1 | $0.77 |
| **Labor** | | | | | | |
| General Labor | 231 | Labor performed using basic tools such as power tool, shovels, and other tools that do not require extensive training. Ex. pipe layer, herder, concrete placement, materials spreader, flagger, etc. | Hour | $25.31 | 6 | $151.86 |
| General Labor | 231 | Labor performed using basic tools such as power tool, shovels, and other tools that do not require extensive training. Ex. pipe layer, herder, concrete placement, materials spreader, flagger, etc. | Hour | $25.31 | 2 | $50.62 |
| 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 | $45.69 | 4 | $182.76 |
| **Materials** | | | | | | |
| Aggregate, Sand, Graded, Washed | 45 | Sand, typical ASTM C33 gradation, includes materials, equipment and labor to transport and place | Cubic Yard | $34.29 | 46 | $1,577.34 |
| 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 | $0.49 | 5 | $2.45 |
| Phosphorus, P2O5 | 73 | Price per pound of P2O5 supplied by Superphosphate. Price is not per pound of total product applied, no conversion is needed. | Pound | $0.65 | 5 | $3.25 |

| | | | | | | |
|---|---|---|---|---|---|---|
| Potassium, K2O | 74 | K2O supplied by Muriate Of Potash. Price is not per pound of total product applied, no conversion is needed. | Pound | $0.36 | 5 | $1.80 |
| Lime, ENM | 75 | Fertilizer: Limestone Spread on field. | Ton | $93.23 | 0.2 | $18.65 |
| Straw | 1237 | Small grain straw (non organic and certified organic). Includes materials only. | Ton | $128.33 | 0.4 | $51.33 |
| Three Species Mix, Cool Season, Introduced Perennial Grass | 2315 | Cool season, introduced grass mix. Includes material and shipping only. | Acre | $45.35 | 0.1 | $4.54 |
| One Species, Warm Season, Native Perennial Grass | 2322 | Native, warm season perennial grass. Includes material and shipping only. | Acre | $69.06 | 0.1 | $6.91 |
| **Mobilization** | | | | | | |
| Mobilization, small equipment | 1138 | Equipment <70 HP but can't be transported by a pick-up truck or with typical weights between 3,500 to 14,000 pounds. | Each | $172.07 | 2 | $344.14 |
| Mobilization, medium equipment | 1139 | Equipment with 70-150 HP or typical weights between 14,000 and 30,000 pounds. | Each | $255.83 | 2 | $511.66 |

**Practice:** 561 - Heavy Use Area Protection

**Scenario** #7 - Concrete/Asphalt without Curb over 1000 SF

**Scenario Description:**

The stabilization of areas around facilities that are frequently and intensively used by people, animals or vehicles by surfacing with reinforced concrete on a sand or gravel foundation to provide a stable, non-eroding surface. Installation includes all materials, equipment, and labor to install this practice, The stabilized area will address the resource concerns soil erosion and water quality degradation.

**Before Situation:**

This practice applies to all land uses where frequently and/or intensively used areas requiring treatment to address soil erosion and water quality degradation.

**After Situation:**

Unstable area is surfaced with 2500 square feet of concrete, no curbing. Concrete slab is 5" thick with 6" of compacted dranifill underneath. Assume 0.1 acres of seeding. Area is frequently and intensively used by people, animals or vehicles and will address soil erosion and water quality degradation. Associated practices are Access Road (560), Stream Crossing (578), Critical Area Planting (342). Provisions to store, utilize, and/or treat contaminated runoff shall be addressed under Sediment Basin (350), Waste Storage Facility (313), or Waste Treatment (629) as appropriate. To reduce the potential for air quality problems from particulate matter associated with heavy use areas, consider the use of Windbreak/Shelterbelt Establishment (380) or Herbaceous Wind Barriers (603).

**Feature Measure:** Area of Concrete Pad

**Scenario Unit::** Square Foot

**Scenario Typical Size:** 2,500.0

**Scenario Total Cost:** $16,407.67

**Scenario Cost/Unit:** $6.56

Cost Details:

| Component Name | ID | Description | Unit | Cost | QTY | Total |
|---|---|---|---|---|---|---|
| **Equipment Installation** | | | | | | |
| Concrete, CIP, slab on grade, reinforced | 37 | Steel reinforced concrete formed and cast-in-placed as a slab on grade by chute placement. Typical strength is 3000 to 4000 psi. Includes materials, labor and equipment to transport, place and finish. | Cubic Yard | $327.92 | 39 | $12,788.88 |
| Excavation, Common Earth, side cast, small equipment | 48 | Bulk excavation and side casting of common earth with hydraulic excavator with less than 1 CY capacity. Includes equipment and labor. | Cubic Yard | $2.36 | 185 | $436.60 |
| Earthfill, Manually Compacted | 50 | Earthfill, manually compacted, includes equipment and labor | Cubic Yard | $5.87 | 46 | $270.02 |
| Tillage, Light | 945 | Includes light disking (tandem) or field cultivator. Includes equipment, power unit and labor costs. | Acre | $11.14 | 0.1 | $1.11 |
| Fertilizer, ground application, dry bulk | 950 | Dry bulk fertilizer application performed by ground equipment. Includes equipment, power unit and labor costs. | Acre | $6.62 | 0.1 | $0.66 |
| Lime application | 953 | Lime application performed by ground equipment. Includes equipment, power unit and labor costs. | Acre | $10.63 | 0.1 | $1.06 |
| 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 | $12.60 | 0.1 | $1.26 |
| Cultipacking | 1100 | Includes equipment, power unit and labor costs. | Acre | $7.70 | 0.1 | $0.77 |
| **Labor** | | | | | | |
| General Labor | 231 | Labor performed using basic tools such as power tool, shovels, and other tools that do not require extensive training. Ex. pipe layer, herder, concrete placement, materials spreader, flagger, etc. | Hour | $25.31 | 2 | $50.62 |
| General Labor | 231 | Labor performed using basic tools such as power tool, shovels, and other tools that do not require extensive training. Ex. pipe layer, herder, concrete placement, materials spreader, flagger, etc. | Hour | $25.31 | 6 | $151.86 |
| 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 | $45.69 | 4 | $182.76 |
| **Materials** | | | | | | |
| Aggregate, Sand, Graded, Washed | 45 | Sand, typical ASTM C33 gradation, includes materials, equipment and labor to transport and place | Cubic Yard | $34.29 | 46 | $1,577.34 |
| 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 | $0.49 | 5 | $2.45 |
| Phosphorus, P2O5 | 73 | Price per pound of P2O5 supplied by Superphosphate. Price is not per pound of total product applied, no conversion is needed. | Pound | $0.65 | 5 | $3.25 |
| Potassium, K2O | 74 | K2O supplied by Muriate Of Potash. Price is not per pound of total product applied, no conversion is needed. | Pound | $0.36 | 5 | $1.80 |
| Lime, ENM | 75 | Fertilizer: Limestone Spread on field. | Ton | $93.23 | 0.2 | $18.65 |

| | | | | | | |
|---|---|---|---|---|---|---|
| Straw | 1237 | Small grain straw (non organic and certified organic). Includes materials only. | Ton | $128.33 | 0.4 | $51.33 |
| Three Species Mix, Cool Season, Introduced Perennial Grass | 2315 | Cool season, introduced grass mix. Includes material and shipping only. | Acre | $45.35 | 0.1 | $4.54 |
| One Species, Warm Season, Native Perennial Grass | 2322 | Native, warm season perennial grass. Includes material and shipping only. | Acre | $69.06 | 0.1 | $6.91 |
| **Mobilization** | | | | | | |
| Mobilization, small equipment | 1138 | Equipment <70 HP but can't be transported by a pick-up truck or with typical weights between 3,500 to 14,000 pounds. | Each | $172.07 | 2 | $344.14 |
| Mobilization, medium equipment | 1139 | Equipment with 70-150 HP or typical weights between 14,000 and 30,000 pounds. | Each | $255.83 | 2 | $511.66 |

**Practice:** 561 - Heavy Use Area Protection

**Scenario** #15 - Bunk Silo Slab

**Scenario Description:**

The stabilization of areas under a bunk silo that is frequently and intensively used by heavy equipment by surfacing with reinforced concrete over a sand or gravel foundation to provide a stable, non-eroding surface. An addition 2" of asphalt is installed over the concrete to protect it from the acidic and caustic nature of silage leachate. Installation includes all materials, equipment, and labor to install this practice. The stabilized area will address the resource concerns soil erosion and water quality degradation.

**Before Situation:**

This practice applies to all bunk silos where frequently and/or intensively used areas requiring treatment to address soil erosion and water quality degradation.

**After Situation:**

Unstable area is surfaced with 2500 square feet of concrete, no curbing. Concrete slab is 5" thick with 6" of compacted dranifill underneath. An addition 2" of asphalt is installed over the concrete to protect it from the acidic and caustic nature of silage leachate. Assume 0.1 acres of seeding. Area is frequently and intensively used by heavy equipment used to load, compact silage and unload the silo. Practice will address soil erosion and water quality degradation. Associated practices are Access Road (560), Obstruction Removal (500), Critical Area Planting (342). Provisions to store, utilize, and/or treat silage leachate and contaminated runoff shall be addressed under Sediment Basin (350), Waste Storage Facility (313), Waste Treatment (629), or Vegetated Treatment Area (635) as appropriate. To reduce the potential for air quality problems from particulate matter associated with heavy use areas, consider the use of Windbreak/Shelterbelt Establishment (380) or Herbaceous Wind Barriers (603).

**Feature Measure:** Area of Slab

**Scenario Unit::** Square Foot

**Scenario Typical Size:** 2,500.0

**Scenario Total Cost:** $20,060.93

**Scenario Cost/Unit:** $8.02

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 | $327.92 | 40 | $13,116.80 |
| 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 | $2.36 | 95 | $224.20 |
| Earthfill, Roller Compacted | 49 | Earthfill, roller or machine compacted, includes equipment and labor | Cubic Yard | $4.45 | 50 | $222.50 |
| Dozer, 80 HP | 929 | Track mounted Dozer with horsepower range of 60 to 90. Equipment and power unit costs. Labor not included. | Hour | $66.13 | 4 | $264.52 |
| Tillage, Light | 945 | Includes light disking (tandem) or field cultivator. Includes equipment, power unit and labor costs. | Acre | $11.14 | 0.1 | $1.11 |
| Fertilizer, ground application, dry bulk | 950 | Dry bulk fertilizer application performed by ground equipment. Includes equipment, power unit and labor costs. | Acre | $6.62 | 0.1 | $0.66 |
| Lime application | 953 | Lime application performed by ground equipment. Includes equipment, power unit and labor costs. | Acre | $10.63 | 0.1 | $1.06 |
| 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 | $12.60 | 0.1 | $1.26 |
| Cultipacking | 1100 | Includes equipment, power unit and labor costs. | Acre | $7.70 | 0.1 | $0.77 |
| **Labor** | | | | | | |
| General Labor | 231 | Labor performed using basic tools such as power tool, shovels, and other tools that do not require extensive training. Ex. pipe layer, herder, concrete placement, materials spreader, flagger, etc. | Hour | $25.31 | 2 | $50.62 |
| General Labor | 231 | Labor performed using basic tools such as power tool, shovels, and other tools that do not require extensive training. Ex. pipe layer, herder, concrete placement, materials spreader, flagger, etc. | Hour | $25.31 | 6 | $151.86 |
| 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 | $45.69 | 4 | $182.76 |
| **Materials** | | | | | | |
| Nitrogen (N), Urea | 71 | Price per pound of N supplied by Urea. Price is not per pound of total product applied, no conversion is needed. | Pound | $0.49 | 5 | $2.45 |
| Phosphorus, P2O5 | 73 | Price per pound of P2O5 supplied by Superphosphate. Price is not per pound of total product applied, no conversion is needed. | Pound | $0.65 | 5 | $3.25 |
| Potassium, K2O | 74 | K2O supplied by Muriate Of Potash. Price is not per pound of total product applied, no conversion is needed. | Pound | $0.36 | 5 | $1.80 |

| | | | | | | |
|---|---|---|---|---|---|---|
| Lime, ENM | 75 | Fertilizer: Limestone Spread on field. | Ton | $93.23 | 0.2 | $18.65 |
| Aggregate, Gravel, Ungraded, Quarry Run | 1099 | Includes materials, equipment and labor | Cubic Yard | $23.96 | 50 | $1,198.00 |
| Straw | 1237 | Small grain straw (non organic and certified organic). Includes materials only. | Ton | $128.33 | 0.4 | $51.33 |
| Asphalt, pavement | 1867 | Bituminous Concrete,includes materials, equipment and labor for 4" layer, base not included. | Square Foot | $2.60 | 1250 | $3,250.00 |
| Three Species Mix, Cool Season, Introduced Perennial Grass | 2315 | Cool season, introduced grass mix. Includes material and shipping only. | Acre | $45.35 | 0.1 | $4.54 |
| One Species, Warm Season, Native Perennial Grass | 2322 | Native, warm season perennial grass. Includes material and shipping only. | Acre | $69.06 | 0.1 | $6.91 |
| **Mobilization** | | | | | | |
| Mobilization, very small equipment | 1137 | Equipment that is small enough to be transported by a pick-up truck with typical weights less than 3,500 pounds. Can be multiple pieces of equipment if all hauled simultaneously. | Each | $70.64 | 4 | $282.56 |
| Mobilization, medium equipment | 1139 | Equipment with 70-150 HP or typical weights between 14,000 and 30,000 pounds. | Each | $255.83 | 4 | $1,023.32 |

**Practice:** 570 - Stormwater Runoff Control

**Scenario** #1 - Combination, Most common Best Management Practices

**Scenario Description:**

This scenario involves installation of silt fence, straw wattles, and straw bales on the construction site as part of one conservation engineering system. The combined system shall include two or more components and will address the resource concerns related with concentrated flow erosion, excessive sediment in surface waters as well as protection of existing inlets and structures depending on the combination.

**Before Situation:**

The combination scenario is applicable in all construction sites and watersheds including those in the urban and suburban areas. Which component would apply in a particular situation would depend on the site condition, slope etc.

**After Situation:**

When properly installed, the combination structures slow down runoff flow velocity and reduce high velocity erosion, detain and filter the stormwater runoff and provide a controlled release to the downstream areas. In seeded areas, straw wattles also enable seeds to settle and germinate, aiding the revegetation process. By filtering overland runoff and holding sediment on the slope, Straw Wattles also help to protect lakes, ponds, rivers and streams from sediment pollution. By filtering overland runoff and holding sediment on the slope, straw bales can also help to protect water quality. Silt fence are installed along the downstream perimeter of a construction site to prevent sediment transport off construction areas. A typical silt fence consists of a synthetic filter fabric stretched between a series of fence stakes, with the stakes installed on the downstream side of the perimeter and the fabric trenched into the soil on the upstream side and backfilled. All erosion control blankets and straw mulches will be covered under 484-Mulching. If earthen basins are warranted for water quality improvement or retention/detention purposes, use Sediment Basin (350). If seeding is warranted for water quality and erosion control purposes, all temporary and permanent vegetation will use Critical Area Planting (342).

**Feature Measure:** Area of construction site

**Scenario Unit::** Acre

**Scenario Typical Size:** 1.0

**Scenario Total Cost:** $791.32

**Scenario Cost/Unit:** $791.32

Cost Details:

| Component Name | ID | Description | Unit | Cost | QTY | Total |
|---|---|---|---|---|---|---|
| **Equipment Installation** | | | | | | |
| Truck, Pickup | 939 | Equipment and power unit costs. Labor not included. | Hour | $21.79 | 1.5 | $32.69 |
| **Labor** | | | | | | |
| General Labor | 231 | Labor performed using basic tools such as power tool, shovels, and other tools that do not require extensive training. Ex. pipe layer, herder, concrete placement, materials spreader, flagger, etc. | Hour | $25.31 | 10 | $253.10 |
| 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 | $45.69 | 1.5 | $68.54 |
| **Materials** | | | | | | |
| Silt Fence | 43 | Silt Fence with support post. Includes materials, equipment and labor | Foot | $0.88 | 100 | $88.00 |
| Wattles, straw, 8-9"x25' | 1405 | Tubes of rice straw, approximately 8-9 inch in diameter, 25 feet long . Includes materials and shipping only (including stakes). | Foot | $0.99 | 100 | $99.00 |
| Straw bales | 2186 | Straw bales buried at defined intervals to halt rill and gulley formation. Materials and shipping only. | Each | $5.00 | 25 | $125.00 |
| **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 i | Dollar | $1.00 | 125 | $125.00 |

**Practice:** 570 - Stormwater Runoff Control

**Scenario** #2 - Silt Fence

**Scenario Description:**

This scenario involves installation and removal of silt fence. Typical scenario includes the installation of 200 feet of silt fence to minimize the volume of sediment leaving the construction site. Silt fence is typically 3' high and is anchored into the ground. Stakes are installed every 10'. Silt fence shall be removed when construction is completed and vegetation has been established.

**Before Situation:**

Large area of vegetation is disturbed to construct and install a conservation practice. Potential for sedimentation is very high.

**After Situation:**

Silt fence is installed along the downstream perimeter of a construction site to prevent sediment transport off construction areas. A typical silt fence consists of a synthetic filter fabric stretched between a series of fence stakes, with the stakes installed on the downstream side of the perimeter and the fabric trenched into the soil on the upstream side and backfilled. Associated practices shall be 342 - Critical Area Seeding and 484-Mulching.

**Feature Measure:** Linear Feet of Silt Fence Installed

**Scenario Unit::** Foot

**Scenario Typical Size:** 200.0

**Scenario Total Cost:** $344.72

**Scenario Cost/Unit:** $1.72

Cost Details:

| Component Name | ID | Description | Unit | Cost | QTY | Total |
|---|---|---|---|---|---|---|
| **Equipment Installation** | | | | | | |
| Truck, Pickup | 939 | Equipment and power unit costs. Labor not included. | Hour | $21.79 | 1 | $21.79 |
| **Labor** | | | | | | |
| General Labor | 231 | Labor performed using basic tools such as power tool, shovels, and other tools that do not require extensive training. Ex. pipe layer, herder, concrete placement, materials spreader, flagger, etc. | Hour | $25.31 | 4 | $101.24 |
| 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 | $45.69 | 1 | $45.69 |
| **Materials** | | | | | | |
| Silt Fence | 43 | Silt Fence with support post. Includes materials, equipment and labor | Foot | $0.88 | 200 | $176.00 |

**Practice:** 574 - Spring Development

**Scenario** #1 - Solid Well Tile & Pipe Development

**Scenario Description:**

Develop a water source from a natural spring or seep (i.e., spring development) to provide water for livestock, and/or wildlife needs. The collection system is commonly composed of a single or a network of perforated 4 inch diameter drainage pipe placed in an excavated collection trench that runs across the slope. This typical scenario includes excavating and exposing the water source at the spring/seep (typically on a hillside) and constructing a water collection structure by installing a 100 ft long, 4 inch diameter HDPE perforated pipe enclosed in a sand/gravel envelope overlaid by 2 ft wide filter fabric (50 ft long). Water is then directed (via 20 ft long, 4 inch PVC) to a spring box (36-48 inch diameter x 8 ft long concrete well tile) that is located below the collection trench, equipped with a watertight lid and two outlets. One outlet serves as overflow pipe to account for occasions where inflow exceeds outflow. The outflow pipe from the spring box can be directed to buried large storage (not included) and/or to a watering facility (not included) for use. Resource Concern: Livestock production limitation - Inadequate livestock water. Associated Practices: 516-Livestock Pipeline; 614-Watering Facility; 382-Fence; Critical Area Planting (342).

**Before Situation:**

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

**After Situation:**

Spring development system provides adequate water for the intended use. The system typically runs all year long in most zones.

**Feature Measure:** Number of Developments

**Scenario Unit::** Each

**Scenario Typical Size:** 1.0

**Scenario Total Cost:** $4,570.09

**Scenario Cost/Unit:** $4,570.09

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 | $510.00 | 1.5 | $765.00 |
| Geotextile, woven | 42 | Woven Geotextile Fabric. Includes materials, equipment and labor | Square Yard | $2.53 | 22 | $55.66 |
| Backhoe, 80 HP | 926 | Wheel mounted backhoe excavator with horsepower range of 60 to 90. Equipment and power unit costs. Labor not included. | Hour | $56.05 | 16 | $896.80 |
| **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 | $25.31 | 32 | $809.92 |
| Equipment Operators, Light | 232 | Includes: Skid Steer Loaders, Hydraulic Excavators <50 HP, Trenchers <12", Ag Equipment <150 HP, Pickup Trucks, Forklifts, Mulchers | Hour | $25.23 | 16 | $403.68 |
| **Materials** | | | | | | |
| Aggregate, Gravel, Graded | 46 | Gravel, includes materials, equipment and labor to transport and place. Includes washed and unwashed gravel. | Cubic Yard | $34.75 | 16 | $556.00 |
| Poly film, 6 mil. | 245 | 6 mil, polyethylene, black | Square Foot | $0.08 | 1000 | $80.00 |
| Pipe, PVC, 4", SCH 40 | 978 | Materials: - 4" - PVC - SCH 40 - ASTM D1785 | Foot | $3.47 | 20 | $69.40 |
| Pipe, HDPE, 4", PCPT, Single Wall | 1270 | Pipe, Corrugated Plastic Tubing, Single Wall, Perforated, 4" diameter - ASTM F405. Material cost only. | Foot | $0.46 | 100 | $46.00 |
| 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 | $175.40 | 1 | $175.40 |
| Well Casing, Concrete | 2173 | Concrete tile 3" diameter x 8' long. Materials only. | Foot | $57.05 | 8 | $456.40 |
| **Mobilization** | | | | | | |
| Mobilization, medium equipment | 1139 | Equipment with 70-150 HP or typical weights between 14,000 and 30,000 pounds. | Each | $255.83 | 1 | $255.83 |

**Practice:** 574 - Spring Development

**Scenario** #2 - Perforated Well Tile Development

**Scenario Description:**

Develop a water source from a natural spring, seep, or other wet area to provide water for livestock and/or wildlife needs. This typical scenario includes excavating and exposing the water source at the spring/seep and installing a 3'-4' dia x 8' deep perforated concrete well tile enveloped in crushed stone, with geotextile fabric placed along the stone soil interface. Water seeps through the fabric and stone into the collection well. The perforated concrete well tile is equipped with a watertight lid and two outlets. One outlet serves as overflow pipe to account for occasions where inflow exceeds outflow. The outflow pipe (not included) from the well can be directed to buried large storage (not included), and/or to a watering facility (not included) for use. Resource Concern: Livestock production limitation - Inadequate livestock water. Associated Practices: 516-Livestock Pipeline; 614-Watering Facility; 382-Fence; Critical Area Planting (342).

**Before Situation:**

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

**After Situation:**

Spring development system provides adequate water for the intended use. The system typically runs all year long in most zones.

**Feature Measure:** Number of Developments

**Scenario Unit::** Each

**Scenario Typical Size:** 1.0

**Scenario Total Cost:** $2,133.53

**Scenario Cost/Unit:** $2,133.53

Cost Details:

| Component Name | ID | Description | Unit | Cost | QTY | Total |
|---|---|---|---|---|---|---|
| **Equipment Installation** | | | | | | |
| Geotextile, woven | 42 | Woven Geotextile Fabric. Includes materials, equipment and labor | Square Yard | $2.53 | 56 | $141.68 |
| Backhoe, 80 HP | 926 | Wheel mounted backhoe excavator with horsepower range of 60 to 90. Equipment and power unit costs. Labor not included. | Hour | $56.05 | 4 | $224.20 |
| **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 | $25.31 | 16 | $404.96 |
| Equipment Operators, Light | 232 | Includes: Skid Steer Loaders, Hydraulic Excavators <50 HP, Trenchers <12", Ag Equipment <150 HP, Pickup Trucks, Forklifts, Mulchers | Hour | $25.23 | 6 | $151.38 |
| **Materials** | | | | | | |
| Aggregate, Gravel, Graded | 46 | Gravel, includes materials, equipment and labor to transport and place. Includes washed and unwashed gravel. | Cubic Yard | $34.75 | 8 | $278.00 |
| 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 | $175.40 | 1 | $175.40 |
| Well Casing, Concrete, perforated | 2174 | Perforated concrete tile 3" diameter x 8' long. Materials only. | Foot | $62.76 | 8 | $502.08 |
| **Mobilization** | | | | | | |
| Mobilization, medium equipment | 1139 | Equipment with 70-150 HP or typical weights between 14,000 and 30,000 pounds. | Each | $255.83 | 1 | $255.83 |

**Practice:** 575 - Trails and Walkways

**Scenario** #1 - Earth or Vegetated Trail

**Scenario Description:**

Layout and construct an earth or vegetated trail to facilitate the movement of animals, people, or off-road vehicles to provide or improve access to forage, water, working/handling facilities, and/or shelter, Improve grazing efficiency and distribution, and/or protect ecologically sensitive, erosive and/or potentially erosive sites, pedestrian or off-road vehicle access to agricultural, construction, or maintenance operations, provide trails for recreational activities or access to recreation sites and address the resource concerns of soil erosion and water quality degradation. Costs include excavation, shaping, grading, earth and or vegetated surfaces and all equipment, labor and incidental materials necessary to install the practice.

**Before Situation:**

This practice applies on all lands where management of animal or human movement is needed to address soil erosion and water quality resource concerns. This practice applies to a trails or walkways constructed for use by off-road vehicles, such as All-Terrain Vehicles or snowmobiles, which are not designed for use on public roads. It does not apply to roads constructed for movement of equipment or vehicles. Use NRCS Conservation Practice Standard Access Road (Code 560).

**After Situation:**

The typical trail will be a 8 foot wide 300 foot long, 2400 square foot lane of earth and vegetation. All excavation, grading and shaping necessary to provide a smooth permanent travel surface for livestock or people is included. Included is 15 CY. Assume 0.1 acre of seeding to stabilize disturbed areas on both sides. Consider the adequacy of natural surfacing. If the lane requires planting, the vegetation is provided. Where earth and or vegetation is not practical, adequate surface protection is provided under a different scenario. Stream Crossing, Code 578, will be used when the trail or lane crosses streams or shallow water areas. Consider the use of water bars to control and direct water flow in the trail. All culverts will be applied under Structure for Water Control (587). Use Access Road, Code 560 and Diversion (362) as appropriate. Fencing, Code 382, will be used when needed to control animal movement.

**Feature Measure:** Length of Walkway

**Scenario Unit::** Foot

**Scenario Typical Size:** 300.0

**Scenario Total Cost:** $1,590.97

**Scenario Cost/Unit:** $5.30

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 | $2.36 | 15 | $35.40 |
| Dozer, 80 HP | 929 | Track mounted Dozer with horsepower range of 60 to 90. Equipment and power unit costs. Labor not included. | Hour | $66.13 | 3 | $198.39 |
| Truck, Pickup | 939 | Equipment and power unit costs. Labor not included. | Hour | $21.79 | 3 | $65.37 |
| Tillage, Light | 945 | Includes light disking (tandem) or field cultivator. Includes equipment, power unit and labor costs. | Acre | $11.14 | 0.1 | $1.11 |
| Fertilizer, ground application, dry bulk | 950 | Dry bulk fertilizer application performed by ground equipment. Includes equipment, power unit and labor costs. | Acre | $6.62 | 0.1 | $0.66 |
| Lime application | 953 | Lime application performed by ground equipment. Includes equipment, power unit and labor costs. | Acre | $10.63 | 0.1 | $1.06 |
| 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 | $12.60 | 0.1 | $1.26 |
| Cultipacking | 1100 | Includes equipment, power unit and labor costs. | Acre | $7.70 | 0.1 | $0.77 |
| **Labor** | | | | | | |
| Skilled Labor | 230 | Labor requiring a high level skill set: Includes carpenters, welders, electricians, conservation professionals involved with data collection, monitoring, and or record keeping, etc. | Hour | $41.76 | 4 | $167.04 |
| 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 | $25.31 | 10 | $253.10 |
| 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 | $44.37 | 6 | $266.22 |
| **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 | $0.49 | 5 | $2.45 |
| Phosphorus, P2O5 | 73 | Price per pound of P2O5 supplied by Superphosphate. Price is not per pound of total product applied, no conversion is needed. | Pound | $0.65 | 5 | $3.25 |
| Potassium, K2O | 74 | K2O supplied by Muriate Of Potash. Price is not per pound of total product applied, no conversion is needed. | Pound | $0.36 | 5 | $1.80 |
| Lime, ENM | 75 | Fertilizer: Limestone Spread on field. | Ton | $93.23 | 0.2 | $18.65 |

| | | | | | | |
|---|---|---|---|---|---|---|
| Straw | 1237 | Small grain straw (non organic and certified organic). Includes materials only. | Ton | $128.33 | 0.4 | $51.33 |
| Three Species Mix, Cool Season, Introduced Perennial Grass | 2315 | Cool season, introduced grass mix. Includes material and shipping only. | Acre | $45.35 | 0.1 | $4.54 |
| One Species, Warm Season, Native Perennial Grass | 2322 | Native, warm season perennial grass. Includes material and shipping only. | Acre | $69.06 | 0.1 | $6.91 |
| **Mobilization** | | | | | | |
| Mobilization, medium equipment | 1139 | Equipment with 70-150 HP or typical weights between 14,000 and 30,000 pounds. | Each | $255.83 | 2 | $511.66 |

**Practice:** 575 - Trails and Walkways

**Scenario** #2 - Reinforced Concrete Walkway

**Scenario Description:**

Layout and construct an reinforced concrete walkway on a sand foundation to facilitate the movement of animals, people, or off-road vehicles to provide or improve access to forage, water, working/handling facilities, and/or shelter, Improve grazing efficiency and distribution, and/or protect ecologically sensitive, erosive and/or potentially erosive sites, pedestrian or off-road vehicle access to agricultural, construction, or maintenance operations, provide walkways for recreational activities or access to recreation sites and address the resource concerns of soil erosion and water quality degradation. Costs include excavation, shaping, grading, reinforced concrete surfacing, vegetation of disturbed areas, all equipment, labor and incidental materials necessary to install the practice.

**Before Situation:**

This practice applies on all lands where management of animal or human movement is needed to address soil erosion and water quality resource concerns. This practice applies to a trails or walkways constructed for use by off-road vehicles, such as All-Terrain Vehicles or snowmobiles, which are not designed for use on public roads. It does not apply to roads constructed for movement of equipment or vehicles. Use NRCS Conservation Practice Standard Access Road (Code 560).

**After Situation:**

The typical walkway will be a 8 foot wide 300 foot long, 2400 square foot of reinforced concrete. All excavation, grading and shaping necessary to provide a smooth permanent travel surface for livestock or people is included. Included is reinforced concrete of 2400 square foot for surfacing. Assume 0.1 acre of seeding to stabilize disturbed areas on both sides. The walkway consist of approximately 44.5 CY of excavation, 30 CY of reinforced concrete with a 30 CY sand foundation. Stream Crossing, Code 578, will be used when the walkway crosses streams or shallow water areas. All culverts will be applied under Structure for Water Control (587). Use Access Road, Code 560 and Diversion (362) as appropriate. Fencing, Code 382, will be used when needed to control animal movement.

**Feature Measure:** Length of Walkway

**Scenario Unit::** Foot

**Scenario Typical Size:** 300.0

**Scenario Total Cost:** $12,450.96

**Scenario Cost/Unit:** $41.50

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 | $327.92 | 30 | $9,837.60 |
| Excavation, Common Earth, side cast, small equipment | 48 | Bulk excavation and side casting of common earth with hydraulic excavator with less than 1 CY capacity. Includes equipment and labor. | Cubic Yard | $2.36 | 44.5 | $105.02 |
| Dozer, 80 HP | 929 | Track mounted Dozer with horsepower range of 60 to 90. Equipment and power unit costs. Labor not included. | Hour | $66.13 | 3 | $198.39 |
| Truck, Pickup | 939 | Equipment and power unit costs. Labor not included. | Hour | $21.79 | 3 | $65.37 |
| Tillage, Light | 945 | Includes light disking (tandem) or field cultivator. Includes equipment, power unit and labor costs. | Acre | $11.14 | 0.1 | $1.11 |
| Fertilizer, ground application, dry bulk | 950 | Dry bulk fertilizer application performed by ground equipment. Includes equipment, power unit and labor costs. | Acre | $6.62 | 0.1 | $0.66 |
| Lime application | 953 | Lime application performed by ground equipment. Includes equipment, power unit and labor costs. | Acre | $10.63 | 0.1 | $1.06 |
| 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 | $12.60 | 0.1 | $1.26 |
| Cultipacking | 1100 | Includes equipment, power unit and labor costs. | Acre | $7.70 | 0.1 | $0.77 |
| **Labor** | | | | | | |
| Skilled Labor | 230 | Labor requiring a high level skill set: Includes carpenters, welders, electricians, conservation professionals involved with data collection, monitoring, and or record keeping, etc. | Hour | $41.76 | 4 | $167.04 |
| 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 | $25.31 | 7 | $177.17 |
| 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 | $44.37 | 6 | $266.22 |
| **Materials** | | | | | | |
| Aggregate, Sand, Graded, Washed | 45 | Sand, typical ASTM C33 gradation, includes materials, equipment and labor to transport and place | Cubic Yard | $34.29 | 30 | $1,028.70 |
| 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 | $0.49 | 5 | $2.45 |

| | | | | | | |
|---|---|---|---|---|---|---|
| Phosphorus, P2O5 | 73 | Price per pound of P2O5 supplied by Superphosphate. Price is not per pound of total product applied, no conversion is needed. | Pound | $0.65 | 5 | $3.25 |
| Potassium, K2O | 74 | K2O supplied by Muriate Of Potash. Price is not per pound of total product applied, no conversion is needed. | Pound | $0.36 | 5 | $1.80 |
| Lime, ENM | 75 | Fertilizer: Limestone Spread on field. | Ton | $93.23 | 0.2 | $18.65 |
| Straw | 1237 | Small grain straw (non organic and certified organic). Includes materials only. | Ton | $128.33 | 0.4 | $51.33 |
| Three Species Mix, Cool Season, Introduced Perennial Grass | 2315 | Cool season, introduced grass mix. Includes material and shipping only. | Acre | $45.35 | 0.1 | $4.54 |
| One Species, Warm Season, Native Perennial Grass | 2322 | Native, warm season perennial grass. Includes material and shipping only. | Acre | $69.06 | 0.1 | $6.91 |
| **Mobilization** | | | | | | |
| Mobilization, medium equipment | 1139 | Equipment with 70-150 HP or typical weights between 14,000 and 30,000 pounds. | Each | $255.83 | 2 | $511.66 |

**Practice:** 575 - Trails and Walkways

**Scenario** #3 - Rock/Gravel on Geotextile, Walkway

**Scenario Description:**

Layout and construct a walkway with rock and or gravel on a geotextile fabric foundation surface treatment, to facilitate the movement of animals, people, or off-road vehicles to provide or improve access to forage, water, working/handling facilities, and/or shelter, Improve grazing efficiency and distribution, and/or protect ecologically sensitive, erosive and/or potentially erosive sites, pedestrian or off-road vehicle access to agricultural, construction, or maintenance operations, provide walkways for recreational activities or access to recreation sites and address the resource concerns of soil erosion and water quality degradation. Costs include excavation, shaping, grading, rock and or gravel, geotextile, vegetation of disturbed areas, all equipment, labor and incidental materials necessary to install the practice.

**Before Situation:**

This practice applies on all lands where management of animal or human movement is needed to address soil erosion and water quality resource concerns. This practice applies to a trails or walkways constructed for use by off-road vehicles, such as All-Terrain Vehicles or snowmobiles, which are not designed for use on public roads. It does not apply to roads constructed for movement of equipment or vehicles. Use NRCS Conservation Practice Standard Access Road (Code 560).

**After Situation:**

The typical walkway will be a 8 foot wide 300 foot long, 2400 square foot of rock and or gravel on a geotextile fabric foundation surface treatment. All excavation, grading and shaping necessary to provide a smooth permanent travel surface for livestock or people is included. Included is aggregate gravel of 2400 square foot for surfacing. Assume 0.1 acre of seeding to stabilize disturbed areas on both sides. The walkway consist of approximately 67 CY of excavation, 67 CY of aggregate gravel on a 267 SY of geotextile fabric foundation. Stream Crossing, Code 578, will be used when the walkway crosses streams or shallow water areas. All culverts will be applied under Structure for Water Control (587). Use Access Road, Code 560 and Diversion (362) as appropriate. Fencing, Code 382, will be used when needed to control animal movement.

**Feature Measure:** Length of Walkway

**Scenario Unit::** Foot

**Scenario Typical Size:** 300.0

**Scenario Total Cost:** $4,641.52

**Scenario Cost/Unit:** $15.47

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 | $2.53 | 267 | $675.51 |
| Excavation, Common Earth, side cast, small equipment | 48 | Bulk excavation and side casting of common earth with hydraulic excavator with less than 1 CY capacity. Includes equipment and labor. | Cubic Yard | $2.36 | 67 | $158.12 |
| Dozer, 80 HP | 929 | Track mounted Dozer with horsepower range of 60 to 90. Equipment and power unit costs. Labor not included. | Hour | $66.13 | 3 | $198.39 |
| Truck, Pickup | 939 | Equipment and power unit costs. Labor not included. | Hour | $21.79 | 3 | $65.37 |
| Tillage, Light | 945 | Includes light disking (tandem) or field cultivator. Includes equipment, power unit and labor costs. | Acre | $11.14 | 0.1 | $1.11 |
| Fertilizer, ground application, dry bulk | 950 | Dry bulk fertilizer application performed by ground equipment. Includes equipment, power unit and labor costs. | Acre | $6.62 | 0.1 | $0.66 |
| Lime application | 953 | Lime application performed by ground equipment. Includes equipment, power unit and labor costs. | Acre | $10.63 | 0.1 | $1.06 |
| 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 | $12.60 | 0.1 | $1.26 |
| Cultipacking | 1100 | Includes equipment, power unit and labor costs. | Acre | $7.70 | 0.1 | $0.77 |
| **Labor** | | | | | | |
| Skilled Labor | 230 | Labor requiring a high level skill set: Includes carpenters, welders, electricians, conservation professionals involved with data collection, monitoring, and or record keeping, etc. | Hour | $41.76 | 4 | $167.04 |
| 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 | $25.31 | 7 | $177.17 |
| 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 | $44.37 | 6 | $266.22 |
| **Materials** | | | | | | |
| Aggregate, Gravel, Graded | 46 | Gravel, includes materials, equipment and labor to transport and place. Includes washed and unwashed gravel. | Cubic Yard | $34.75 | 67 | $2,328.25 |
| Nitrogen (N), Urea | 71 | Price per pound of N supplied by Urea. Price is not per pound of total product applied, no conversion is needed. | Pound | $0.49 | 5 | $2.45 |
| Phosphorus, P2O5 | 73 | Price per pound of P2O5 supplied by Superphosphate. Price is not per pound of total product applied, no conversion is needed. | Pound | $0.65 | 5 | $3.25 |

| | | | | | | |
|---|---|---|---|---|---|---|
| Potassium, K2O | 74 | K2O supplied by Muriate Of Potash. Price is not per pound of total product applied, no conversion is needed. | Pound | $0.36 | 5 | $1.80 |
| Lime, ENM | 75 | Fertilizer: Limestone Spread on field. | Ton | $93.23 | 0.2 | $18.65 |
| Straw | 1237 | Small grain straw (non organic and certified organic). Includes materials only. | Ton | $128.33 | 0.4 | $51.33 |
| Three Species Mix, Cool Season, Introduced Perennial Grass | 2315 | Cool season, introduced grass mix. Includes material and shipping only. | Acre | $45.35 | 0.1 | $4.54 |
| One Species, Warm Season, Native Perennial Grass | 2322 | Native, warm season perennial grass. Includes material and shipping only. | Acre | $69.06 | 0.1 | $6.91 |
| **Mobilization** | | | | | | |
| Mobilization, medium equipment | 1139 | Equipment with 70-150 HP or typical weights between 14,000 and 30,000 pounds. | Each | $255.83 | 2 | $511.66 |

**Practice:** 575 - Trails and Walkways

**Scenario** #4 - Rock/Gravel in GeoCell on Geotextile, Walkway

**Scenario Description:**

Layout and construct a walkway with rock and or gravel in a cellular containment grid on a geotextile fabric foundation surface treatment, to facilitate the movement of animals, people, or off-road vehicles to provide or improve access to forage, water, working/handling facilities, and/or shelter, Improve grazing efficiency and distribution, and/or protect ecologically sensitive, erosive and/or potentially erosive sites, pedestrian or off-road vehicle access to agricultural, construction, or maintenance operations, provide walkways for recreational activities or access to recreation sites and address the resource concerns of soil erosion and water quality degradation. Costs include excavation, shaping, grading, rock and or gravel, containment grid, geotextile, vegetation of disturbed areas, all equipment, labor and incidental materials necessary to install the practice.

**Before Situation:**

This practice applies on all lands where management of animal or human movement is needed to address soil erosion and water quality resource concerns. This practice applies to a trails or walkways constructed for use by off-road vehicles, such as All-Terrain Vehicles or snowmobiles, which are not designed for use on public roads. It does not apply to roads constructed for movement of equipment or vehicles. Use NRCS Conservation Practice Standard Access Road (Code 560).

**After Situation:**

The typical walkway will be a 8 foot wide 300 foot long, 2400 square foot of rock and or gravel in a cellular containment grid on a geotextile fabric foundation surface treatment. All excavation, grading and shaping necessary to provide a smooth permanent travel surface for livestock or people is included. Included is aggregate gravel of 2400 square foot for surfacing. Assume 0.1 acre of seeding to stabilize disturbed areas on both sides. The walkway consist of approximately 67 CY of excavation, 67 CY of aggregate gravel in 267 SY of 4 inch geocell on a 267 SY of geotextile fabric foundation. Stream Crossing, Code 578, will be used when the walkway crosses streams or shallow water areas. All culverts will be applied under Structure for Water Control (587). Use Access Road, Code 560 and Diversion (362) as appropriate. Fencing, Code 382, will be used when needed to control animal movement.

**Feature Measure:** Length of Walkway

**Scenario Unit::** Foot

**Scenario Typical Size:** 300.0

**Scenario Total Cost:** $13,335.13

**Scenario Cost/Unit:** $44.45

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 | $2.53 | 267 | $675.51 |
| Excavation, Common Earth, side cast, small equipment | 48 | Bulk excavation and side casting of common earth with hydraulic excavator with less than 1 CY capacity. Includes equipment and labor. | Cubic Yard | $2.36 | 67 | $158.12 |
| Dozer, 80 HP | 929 | Track mounted Dozer with horsepower range of 60 to 90. Equipment and power unit costs. Labor not included. | Hour | $66.13 | 3 | $198.39 |
| Truck, Pickup | 939 | Equipment and power unit costs. Labor not included. | Hour | $21.79 | 3 | $65.37 |
| Tillage, Light | 945 | Includes light disking (tandem) or field cultivator. Includes equipment, power unit and labor costs. | Acre | $11.14 | 0.1 | $1.11 |
| Fertilizer, ground application, dry bulk | 950 | Dry bulk fertilizer application performed by ground equipment. Includes equipment, power unit and labor costs. | Acre | $6.62 | 0.1 | $0.66 |
| Lime application | 953 | Lime application performed by ground equipment. Includes equipment, power unit and labor costs. | Acre | $10.63 | 0.1 | $1.06 |
| 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 | $12.60 | 0.1 | $1.26 |
| Cultipacking | 1100 | Includes equipment, power unit and labor costs. | Acre | $7.70 | 0.1 | $0.77 |
| **Labor** | | | | | | |
| Skilled Labor | 230 | Labor requiring a high level skill set: Includes carpenters, welders, electricians, conservation professionals involved with data collection, monitoring, and or record keeping, etc. | Hour | $41.76 | 4 | $167.04 |
| 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 | $25.31 | 7 | $177.17 |
| 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 | $44.37 | 6 | $266.22 |
| **Materials** | | | | | | |
| Aggregate, Gravel, Graded | 46 | Gravel, includes materials, equipment and labor to transport and place. Includes washed and unwashed gravel. | Cubic Yard | $34.75 | 67 | $2,328.25 |
| Nitrogen (N), Urea | 71 | Price per pound of N supplied by Urea. Price is not per pound of total product applied, no conversion is needed. | Pound | $0.49 | 5 | $2.45 |

| | | | | | | |
|---|---|---|---|---|---|---|
| Phosphorus, P2O5 | 73 | Price per pound of P2O5 supplied by Superphosphate. Price is not per pound of total product applied, no conversion is needed. | Pound | $0.65 | 5 | $3.25 |
| Potassium, K2O | 74 | K2O supplied by Muriate Of Potash. Price is not per pound of total product applied, no conversion is needed. | Pound | $0.36 | 5 | $1.80 |
| Lime, ENM | 75 | Fertilizer: Limestone Spread on field. | Ton | $93.23 | 0.2 | $18.65 |
| 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 | $32.55 | 267 | $8,690.85 |
| Straw | 1237 | Small grain straw (non organic and certified organic). Includes materials only. | Ton | $128.33 | 0.4 | $51.33 |
| Three Species Mix, Cool Season, Introduced Perennial Grass | 2315 | Cool season, introduced grass mix. Includes material and shipping only. | Acre | $45.35 | 0.1 | $4.54 |
| One Species, Warm Season, Native Perennial Grass | 2322 | Native, warm season perennial grass. Includes material and shipping only. | Acre | $69.06 | 0.04 | $2.76 |
| One Species, Warm Season, Native Perennial Grass | 2322 | Native, warm season perennial grass. Includes material and shipping only. | Acre | $69.06 | 0.1 | $6.91 |
| **Mobilization** | | | | | | |
| Mobilization, medium equipment | 1139 | Equipment with 70-150 HP or typical weights between 14,000 and 30,000 pounds. | Each | $255.83 | 2 | $511.66 |

**Practice:** 575 - Trails and Walkways

**Scenario** #6 - Bituminous Concrete Pavement, Walkway

**Scenario Description:**

Layout and construct a bituminous concrete pavement surface treatment on aggregate gravel foundation walkway to facilitate the movement of animals, people, or off-road vehicles to provide or improve access to forage, water, working/handling facilities, and/or shelter, Improve grazing efficiency and distribution, and/or protect ecologically sensitive, erosive and/or potentially erosive sites, pedestrian or off-road vehicle access to agricultural, construction, or maintenance operations, provide walkways for recreational activities or access to recreation sites and address the resource concerns of soil erosion and water quality degradation. Costs include excavation, shaping, grading, bituminous concrete pavement surfacing, vegetation of disturbed areas, all equipment, labor and incidental materials necessary to install the practice.

**Before Situation:**

This practice applies on all lands where management of animal or human movement is needed to address soil erosion and water quality resource concerns. This practice applies to a trails or walkways constructed for use by off-road vehicles, such as All-Terrain Vehicles or snowmobiles, which are not designed for use on public roads. It does not apply to roads constructed for movement of equipment or vehicles. Use NRCS Conservation Practice Standard Access Road (Code 560).

**After Situation:**

The typical walkway will be a 8 foot wide 300 foot long, 2400 square foot of bituminous concrete pavement on aggregate gravel foundation. All excavation, grading and shaping necessary to provide a smooth permanent travel surface for livestock or people is included. Included is bituminous concrete pavement of 2400 square foot for surfacing. Assume 0.1 acre of seeding to stabilize disturbed areas on both sides. The walkway consist of approximately 45.5 CY of excavation, 2400 square feet bituminous concrete pavement, with a 30 CY gravel foundation. Stream Crossing, Code 578, will be used when the walkway crosses streams or shallow water areas. All culverts will be applied under Structure for Water Control (587). Use Access Road, Code 560 and Diversion (362) as appropriate. Fencing, Code 382, will be used when needed to control animal movement.

**Feature Measure:** Length of Walkway

**Scenario Unit::** Foot

**Scenario Typical Size:** 300.0

**Scenario Total Cost:** $9,042.80

**Scenario Cost/Unit:** $30.14

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 | $2.36 | 45.5 | $107.38 |
| Dozer, 140 HP | 927 | Track mounted Dozer with horsepower range of 125 to 160. Equipment and power unit costs. Labor not included. | Hour | $124.03 | 3 | $372.09 |
| Truck, Pickup | 939 | Equipment and power unit costs. Labor not included. | Hour | $21.79 | 3 | $65.37 |
| Tillage, Light | 945 | Includes light disking (tandem) or field cultivator. Includes equipment, power unit and labor costs. | Acre | $11.14 | 0.1 | $1.11 |
| Fertilizer, ground application, dry bulk | 950 | Dry bulk fertilizer application performed by ground equipment. Includes equipment, power unit and labor costs. | Acre | $6.62 | 0.1 | $0.66 |
| Lime application | 953 | Lime application performed by ground equipment. Includes equipment, power unit and labor costs. | Acre | $10.63 | 0.1 | $1.06 |
| 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 | $12.60 | 0.1 | $1.26 |
| Cultipacking | 1100 | Includes equipment, power unit and labor costs. | Acre | $7.70 | 0.1 | $0.77 |
| **Labor** | | | | | | |
| Skilled Labor | 230 | Labor requiring a high level skill set: Includes carpenters, welders, electricians, conservation professionals involved with data collection, monitoring, and or record keeping, etc. | Hour | $41.76 | 4 | $167.04 |
| 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 | $25.31 | 7 | $177.17 |
| 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 | $44.37 | 6 | $266.22 |
| **Materials** | | | | | | |
| Aggregate, Gravel, Graded | 46 | Gravel, includes materials, equipment and labor to transport and place. Includes washed and unwashed gravel. | Cubic Yard | $34.75 | 30 | $1,042.50 |
| 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 | $0.49 | 5 | $2.45 |
| Phosphorus, P2O5 | 73 | Price per pound of P2O5 supplied by Superphosphate. Price is not per pound of total product applied, no conversion is needed. | Pound | $0.65 | 0.1 | $0.07 |

| | | | | | | |
|---|---|---|---|---|---|---|
| Potassium, K2O | 74 | K2O supplied by Muriate Of Potash. Price is not per pound of total product applied, no conversion is needed. | Pound | $0.36 | 5 | $1.80 |
| Lime, ENM | 75 | Fertilizer: Limestone Spread on field. | Ton | $93.23 | 0.2 | $18.65 |
| Straw | 1237 | Small grain straw (non organic and certified organic). Includes materials only. | Ton | $128.33 | 0.4 | $51.33 |
| Asphalt, pavement | 1867 | Bituminous Concrete,includes materials, equipment and labor for 4" layer, base not included. | Square Foot | $2.60 | 2400 | $6,240.00 |
| Three Species Mix, Cool Season, Introduced Perennial Grass | 2315 | Cool season, introduced grass mix. Includes material and shipping only. | Acre | $45.35 | 0.1 | $4.54 |
| One Species, Warm Season, Native Perennial Grass | 2322 | Native, warm season perennial grass. Includes material and shipping only. | Acre | $69.06 | 0.1 | $6.91 |
| One Species, Warm Season, Native Perennial Grass | 2322 | Native, warm season perennial grass. Includes material and shipping only. | Acre | $69.06 | 0.04 | $2.76 |
| **Mobilization** | | | | | | |
| Mobilization, medium equipment | 1139 | Equipment with 70-150 HP or typical weights between 14,000 and 30,000 pounds. | Each | $255.83 | 2 | $511.66 |

**Practice:** 575 - Trails and Walkways

**Scenario** #7 - Wood Chips, Walkway

**Scenario Description:**

Layout and construct a wood chip surface treatment on a earthen foundation walkway to facilitate the movement of animals, people, or off-road vehicles to provide or improve access to forage, water, working/handling facilities, and/or shelter, Improve grazing efficiency and distribution, and/or protect ecologically sensitive, erosive and/or potentially erosive sites, pedestrian or off-road vehicle access to agricultural, construction, or maintenance operations, provide walkways for recreational activities or access to recreation sites and address the resource concerns of soil erosion and water quality degradation. Costs include excavation, shaping, grading, wood chip surfacing, vegetation of disturbed areas, all equipment, labor and incidental materials necessary to install the practice.

**Before Situation:**

This practice applies on all lands where management of animal or human movement is needed to address soil erosion and water quality resource concerns. This practice applies to a trails or walkways constructed for use by off-road vehicles, such as All-Terrain Vehicles or snowmobiles, which are not designed for use on public roads. It does not apply to roads constructed for movement of equipment or vehicles. Use NRCS Conservation Practice Standard Access Road (Code 560).

**After Situation:**

The typical walkway will be a 8 foot wide 300 foot long, 2400 square foot of wood chip surface treatment on earthen foundation. All excavation, grading and shaping necessary to provide a smooth permanent travel surface for livestock or people is included. Included is wood chips of 2400 square foot for surfacing. Assume 0.1 Acre of seeding to stabilize disturbed areas on both sides. The walkway consist of approximately 22 CY of excavation, 2400 square feet of wood chip surfacing. Stream Crossing, Code 578, will be used when the walkway crosses streams or shallow water areas. All culverts will be applied under Structure for Water Control (587). Use Access Road, Code 560 and Diversion (362) as appropriate. Fencing, Code 382, will be used when needed to control animal movement.

**Feature Measure:** Length of Walkway

**Scenario Unit::** Foot

**Scenario Typical Size:** 300.0

**Scenario Total Cost:** $1,904.17

**Scenario Cost/Unit:** $6.35

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 | $2.36 | 22 | $51.92 |
| Dozer, 80 HP | 929 | Track mounted Dozer with horsepower range of 60 to 90. Equipment and power unit costs. Labor not included. | Hour | $66.13 | 3 | $198.39 |
| Truck, Pickup | 939 | Equipment and power unit costs. Labor not included. | Hour | $21.79 | 3 | $65.37 |
| Tillage, Light | 945 | Includes light disking (tandem) or field cultivator. Includes equipment, power unit and labor costs. | Acre | $11.14 | 0.1 | $1.11 |
| Fertilizer, ground application, dry bulk | 950 | Dry bulk fertilizer application performed by ground equipment. Includes equipment, power unit and labor costs. | Acre | $6.62 | 0.1 | $0.66 |
| Lime application | 953 | Lime application performed by ground equipment. Includes equipment, power unit and labor costs. | Acre | $10.63 | 0.1 | $1.06 |
| 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 | $12.60 | 0.1 | $1.26 |
| Aggregate, Wood Chips | 1098 | Includes materials, equipment and labor | Cubic Yard | $22.66 | 30 | $679.80 |
| Cultipacking | 1100 | Includes equipment, power unit and labor costs. | Acre | $7.70 | 0.1 | $0.77 |
| **Labor** | | | | | | |
| General Labor | 231 | Labor performed using basic tools such as power tool, shovels, and other tools that do not require extensive training. Ex. pipe layer, herder, concrete placement, materials spreader, flagger, etc. | Hour | $25.31 | 6 | $151.86 |
| Equipment Operators, Light | 232 | Includes: Skid Steer Loaders, Hydraulic Excavators <50 HP, Trenchers <12", Ag Equipment <150 HP, Pickup Trucks, Forklifts, Mulchers | Hour | $25.23 | 6 | $151.38 |
| **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 | $0.49 | 5 | $2.45 |
| Phosphorus, P2O5 | 73 | Price per pound of P2O5 supplied by Superphosphate. Price is not per pound of total product applied, no conversion is needed. | Pound | $0.65 | 5 | $3.25 |
| Potassium, K2O | 74 | K2O supplied by Muriate Of Potash. Price is not per pound of total product applied, no conversion is needed. | Pound | $0.36 | 5 | $1.80 |
| Lime, ENM | 75 | Fertilizer: Limestone Spread on field. | Ton | $93.23 | 0.2 | $18.65 |
| Straw | 1237 | Small grain straw (non organic and certified organic). Includes materials only. | Ton | $128.33 | 0.4 | $51.33 |

| | | | | | | |
|---|---|---|---|---|---|---|
| Three Species Mix, Cool Season, Introduced Perennial Grass | 2315 | Cool season, introduced grass mix. Includes material and shipping only. | Acre | $45.35 | 0.1 | $4.54 |
| One Species, Warm Season, Native Perennial Grass | 2322 | Native, warm season perennial grass. Includes material and shipping only. | Acre | $69.06 | 0.1 | $6.91 |
| **Mobilization** | | | | | | |
| Mobilization, medium equipment | 1139 | Equipment with 70-150 HP or typical weights between 14,000 and 30,000 pounds. | Each | $255.83 | 2 | $511.66 |

**Practice:** 578 - Stream Crossing

**Scenario** #1 - Culvert Installation, >30 inch diameter

**Scenario Description:**

Install a new culvert greater than 30" in diameter. HDPE and CMP are acceptable materials under this scenario. For culverts less than 30" use Practice Standard 587 Structure for Water Control. Work includes dewatering, site preparation and removing any old crossing, acquiring and installing culvert pipe with gravel bedding and fill (compacted), and building headwalls. If a different travel surface is needed, refer to another appropriate standard for the surfacing. 36 inch Culvert installation with <75 cy of fill needed and < 2 yds rock riprap for headwalls. Pipe is 40 feet long. Use (396) Aquatic Organism Passage instead, when the primary intent is biological concerns, not hydrologic. Use (587) Structure for Water Control instead, for ditch cross culverts and other intermittent flows and culverts less than 30" in diameter.

**Before Situation:**

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

**After Situation:**

Access road and waterflow are able to cross each other in a stable manner. Stream flow is not impeded and a stable base exists for equipment, people and/or animals to cross. Associated practices could be (342) Critical Area Planting, (560) Access Road, (575) Animal Trails and Walkways, (566) Recreational Trails and Walkways, (500) Obstruction Removal, or (584) Channel Stabilization.

**Feature Measure:** Culvert

**Scenario Unit::** Inch-Foot

**Scenario Typical Size:** 1,440.0

**Scenario Total Cost:** $5,286.88

**Scenario Cost/Unit:** $3.67

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 | $5.87 | 3 | $17.61 |
| 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 | $113.75 | 10 | $1,137.50 |
| **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 | $44.37 | 10 | $443.70 |
| **Materials** | | | | | | |
| Rock Riprap, Placed with geotextile | 44 | Rock Riprap, placed with geotextile, includes materials, equipment and labor to transport and place | Cubic Yard | $79.57 | 2 | $159.14 |
| Aggregate, Gravel, Graded | 46 | Gravel, includes materials, equipment and labor to transport and place. Includes washed and unwashed gravel. | Cubic Yard | $34.75 | 50 | $1,737.50 |
| 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 | $38.39 | 40 | $1,535.60 |
| **Mobilization** | | | | | | |
| Mobilization, medium equipment | 1139 | Equipment with 70-150 HP or typical weights between 14,000 and 30,000 pounds. | Each | $255.83 | 1 | $255.83 |

**Practice:** 578 - Stream Crossing

**Scenario** #2 - Low Water Crossing, Riprap

**Scenario Description:**

Stabilize the bottom and slope of a stream channel using rock riprap or cast in place concrete. This 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. Typical stream has 30 foot bottom width and approaches. Width is 14 feet for a total area as 420sf. Use (396) Aquatic Organism Passage instead, when the primary intent is biological concerns, not hydrologic.

**Before Situation:**

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

**After Situation:**

Stream flow is not impeded and a stable base exists for equipment, people and/or animals to cross. Associated practices could be (342) Critical Area Planting, (560) Access Road, (575) Animal Trails and Walkways, (566) Recreational Trails and Walkways, (500) Obstruction Removal, or (584) Channel Stabilization.

**Feature Measure:** Cubic Yards of Riprap Installed (In P

**Scenario Unit::** Cubic Yard

**Scenario Typical Size:** 16.0

**Scenario Total Cost:** $1,799.33

**Scenario Cost/Unit:** $112.46

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 | $2.36 | 16 | $37.76 |
| **Materials** | | | | | | |
| Rock Riprap, Placed with geotextile | 44 | Rock Riprap, placed with geotextile, includes materials, equipment and labor to transport and place | Cubic Yard | $79.57 | 16 | $1,273.12 |
| **Mobilization** | | | | | | |
| Mobilization, large equipment | 1140 | Equipment >150HP or typical weights greater than 30,000 pounds or loads requiring over width or over length permits. | Each | $488.45 | 1 | $488.45 |

**Practice:** 578 - Stream Crossing

**Scenario** #3 - Low water crossing using prefabricated products

**Scenario Description:**

To install a stable crossing medium on channel bottom and approaches. Medium includes but not limited to precast concrete blocks, geocells, pavers, and gabions. If a different travel surface is needed, refer to another appropriate standard for the surfacing. Typical stream has 30 foot bottom width and approaches. Width is 14 feet for a total area as 420sf. Use (396) Aquatic Organism Passage instead, when the primary intent is biological concerns, not hydrologic.

**Before Situation:**

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

**After Situation:**

Access road and waterflow are able to cross each other in a stable manner. Stream flow is not impeded and a stable base exists for equipment, people and/or animals to cross. Associated practices could be (342) Critical Area Planting, (560) Access Road, (575) Animal Trails and Walkways, (566) Recreational Trails and Walkways, (500) Obstruction Removal, or (584) Channel Stabilization.

**Feature Measure:** low water crossing

**Scenario Unit::** Square Foot

**Scenario Typical Size:** 420.0

**Scenario Total Cost:** $5,118.81

**Scenario Cost/Unit:** $12.19

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 | $96.73 | 8 | $773.84 |
| 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 | $1.69 | 18 | $30.42 |
| **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 | $25.31 | 40 | $1,012.40 |
| 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 | $44.37 | 8 | $354.96 |
| **Materials** | | | | | | |
| Aggregate, Sand, Graded, Washed | 45 | Sand, typical ASTM C33 gradation, includes materials, equipment and labor to transport and place | Cubic Yard | $34.29 | 6 | $205.74 |
| Aggregate, Gravel, Graded | 46 | Gravel, includes materials, equipment and labor to transport and place. Includes washed and unwashed gravel. | Cubic Yard | $34.75 | 18 | $625.50 |
| 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 | $32.55 | 50 | $1,627.50 |
| **Mobilization** | | | | | | |
| Mobilization, large equipment | 1140 | Equipment >150HP or typical weights greater than 30,000 pounds or loads requiring over width or over length permits. | Each | $488.45 | 1 | $488.45 |

**Practice:** 578 - Stream Crossing

**Scenario** #4 - Low Water Crossing, Rock

**Scenario Description:**

Stabilize the bottom and slope of a stream channel using natural river rock to achieve a more natural low water crossing. This scenario includes site preparation, dewatering, acquiring and installing geotextile with river rock on channel bottom and approaches. Final travel surface shall be the river rocks. If a different travel surface is needed, refer to another appropriate standard for the surfacing. Typical stream has 30 foot bottom width and approaches. Width is 14 feet for a total area as 420sf. Use (396) Aquatic Organism Passage instead, when the primary intent is biological concerns, not hydrologic.

**Before Situation:**

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

**After Situation:**

Stream flow is not impeded and a stable base exists for equipment, people and/or animals to cross. Associated practices could be (342) Critical Area Planting, (560) Access Road, (575) Animal Trails and Walkways, (566) Recreational Trails and Walkways, (500) Obstruction Removal, or (584) Channel Stabilization.

**Feature Measure:** area of rock installed

**Scenario Unit::** Square Foot

**Scenario Typical Size:** 420.0

**Scenario Total Cost:** $1,828.64

**Scenario Cost/Unit:** $4.35

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 | $304.36 | 0.1 | $30.44 |
| Geotextile, woven | 42 | Woven Geotextile Fabric. Includes materials, equipment and labor | Square Yard | $2.53 | 47 | $118.91 |
| 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 | $113.75 | 4 | $455.00 |
| **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 | $44.37 | 4 | $177.48 |
| Supervisor or Manager | 234 | Labor involving supervision or management activities. Includes crew supervisors, foremen and farm/ranch managers time required for adopting new technology, etc. | Hour | $45.69 | 2 | $91.38 |
| **Materials** | | | | | | |
| Aggregate, river rock | 1834 | Well graded, rounded mineral substrates derived from local riverine settings. Includes materials and local delivery | Ton | $29.15 | 24 | $699.60 |
| **Mobilization** | | | | | | |
| Mobilization, medium equipment | 1139 | Equipment with 70-150 HP or typical weights between 14,000 and 30,000 pounds. | Each | $255.83 | 1 | $255.83 |

**Practice:** 578 - Stream Crossing

**Scenario** #5 - Bridge with a span of less than or equal to 14 feet

**Scenario Description:**

Install a bridge to allow stream flows to cross under access road or animal trail. Bridge opening determined by sizing for storm event dictated in standard. Scenario includes dewatering, abutments, girders, decking. Work consists of site preparation, dewatering, acquiring and installing abutments, girders, decking with necessary hardware, backfilling abutments, and armoring with geotextile and riprap. Riprap and geotextile are used to stabilize and protect abutments as needed. Scenario based on cast in place concrete abutments, steel girders, and timber deck. Travel surface shall be wooden deck surface. If a different travel surface is needed, refer to another appropriate standard for the surfacing. Span is 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:** 252.0

**Scenario Total Cost:** $18,826.77

**Scenario Cost/Unit:** $74.71

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 | $272.75 | 15 | $4,091.25 |
| Truck, dump, 12 CY | 1215 | Dump truck for moving bulk material. Typically capacity is 16 ton or 12 cubic yards. Includes equipment only. | Hour | $96.73 | 8 | $773.84 |
| 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 | $1.69 | 75 | $126.75 |
| **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 | $41.76 | 80 | $3,340.80 |
| 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 | $44.37 | 8 | $354.96 |
| **Materials** | | | | | | |
| Rock Riprap, Placed with geotextile | 44 | Rock Riprap, placed with geotextile, includes materials, equipment and labor to transport and place | Cubic Yard | $79.57 | 20 | $1,591.40 |
| Aggregate, Gravel, Graded | 46 | Gravel, includes materials, equipment and labor to transport and place. Includes washed and unwashed gravel. | Cubic Yard | $34.75 | 20 | $695.00 |
| Dimension Lumber, untreated | 1045 | Untreated dimension lumber with nominal thickness equal or less than 2". Includes lumber and fasteners. | Board Foot | $0.80 | 2000 | $1,600.00 |
| Block, pre-cast concrete, modular | 1496 | Pre-cast concrete blocks, typically 2ft x 2ft x 6ft , includes installation and delivery. | Cubic Yard | $99.83 | 18 | $1,796.94 |
| Steel, structural steel members | 1779 | Structural steel, includes materials and fabrication. | Pound | $1.00 | 4200 | $4,200.00 |
| **Mobilization** | | | | | | |
| Mobilization, medium equipment | 1139 | Equipment with 70-150 HP or typical weights between 14,000 and 30,000 pounds. | Each | $255.83 | 1 | $255.83 |

**Practice:** 578 - Stream Crossing

**Scenario** #6 - Bridge with cast in place abutments, span > 14 feet

**Scenario Description:**

Install a bridge to allow stream flows to cross under access road or animal trail. Bridge opening determined by sizing for storm event dictated in standard. Scenario includes dewatering, abutments, girders, decking. Work consists of site preparation, dewatering, acquiring and installing abutments, girders, decking with necessary hardware, backfilling abutments, and armoring with geotextile and riprap. Riprap and geotextile are used to stabilize and protect abutments as needed. Scenario based on cast in place concrete abutments, steel girders, and timber deck. Travel surface shall be wooden deck surface. If a different travel surface is needed, refer to another appropriate standard for the surfacing. Span is greater than 14 feet. Load is H-20. Width is 15 feet including curbs. Abutment height as needed from design. Use (396) Aquatic Organism Passage instead, when the primary intent is biological concerns, not hydrologic.

**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:** Linear feet of bridge deck

**Scenario Unit::** Foot

**Scenario Typical Size:** 30.0

**Scenario Total Cost:** $74,355.88

**Scenario Cost/Unit:** $2,478.53

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 | $510.00 | 32 | $16,320.00 |
| Backhoe, 80 HP | 926 | Wheel mounted backhoe excavator with horsepower range of 60 to 90. Equipment and power unit costs. Labor not included. | Hour | $56.05 | 40 | $2,242.00 |
| 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 | $164.46 | 60 | $9,867.60 |
| Skidsteer, 80 HP | 933 | Skidsteer loader with horsepower range of 60 to 90. Equipment and power unit costs. Labor not included. | Hour | $44.60 | 40 | $1,784.00 |
| Truck, Concrete Pump | 1211 | Concrete pump, normally truck mounted. Use this item in association with other concrete components when job requires placement by other than normal chutes. Include drive and setup time in quantity; therefore, do not include mobilization. Includes equi | Hour | $201.97 | 8 | $1,615.76 |
| Truck, dump, 18 CY | 1400 | Dump truck for moving bulk material. Typically capacity is 25 ton or 18 cubic yards. Includes equipment only. | Hour | $121.65 | 40 | $4,866.00 |
| **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 | $41.76 | 40 | $1,670.40 |
| 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 | $25.31 | 60 | $1,518.60 |
| 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 | $44.37 | 140 | $6,211.80 |
| Supervisor or Manager | 234 | Labor involving supervision or management activities. Includes crew supervisors, foremen and farm/ranch managers time required for adopting new technology, etc. | Hour | $45.69 | 40 | $1,827.60 |
| Specialist Labor | 235 | Labor requiring a specialized skill set: Includes Agronomists, Foresters, Biologists, etc. to provide additional technical information during the planning and implementation of the practice. Does not include NRCS or TSP services. | Hour | $110.71 | 120 | $13,285.20 |
| **Materials** | | | | | | |
| Rock Riprap, Placed with geotextile | 44 | Rock Riprap, placed with geotextile, includes materials, equipment and labor to transport and place | Cubic Yard | $79.57 | 40 | $3,182.80 |
| Dimension Lumber, Treated | 1044 | Treated dimension lumber with nominal thickness equal or less than 2". Includes lumber and fasteners | Board Foot | $0.90 | 2500 | $2,250.00 |

| | | | | | | |
|---|---|---|---|---|---|---|
| Epoxy anchor | 1599 | Galvanized bolts anchored into concrete or stone using epoxy adhesive. Includes materials and labor to drill and install. | Each | $19.49 | 12 | $233.88 |
| Steel, structural steel members | 1779 | Structural steel, includes materials and fabrication. | Pound | $1.00 | 5360 | $5,360.00 |
| Pipe, PE, 4", DR 9, perforated | 2140 | Materials: -4" - Perforated PE- 160 psi - ASTM D3035 DR 9 | Foot | $8.74 | 60 | $524.40 |
| Galvanized Bolts, large | 2166 | 5/8" x 12" galvanized timber bolts. Materials only. | Each | $4.47 | 24 | $107.28 |
| **Mobilization** | | | | | | |
| Mobilization, medium equipment | 1139 | Equipment with 70-150 HP or typical weights between 14,000 and 30,000 pounds. | Each | $255.83 | 2 | $511.66 |
| Mobilization, large equipment | 1140 | Equipment >150HP or typical weights greater than 30,000 pounds or loads requiring over width or over length permits. | Each | $488.45 | 2 | $976.90 |

**Practice:** 578 - Stream Crossing

**Scenario** #7 - Bridge with precast abutments, span > 14 feet

**Scenario Description:**

Install a bridge to allow stream flows to cross under access road or animal trail. Bridge opening determined by sizing for storm event dictated in standard. Scenario includes dewatering, abutments, girders, decking. Work consists of site preparation, dewatering, acquiring and installing abutments, girders, decking with necessary hardware, backfilling abutments, and armoring with geotextile and riprap. Riprap and geotextile are used to stabilize and protect abutments as needed. Scenario based on precast concrete abutments, steel girders, and timber deck. Travel surface shall be wooden deck surface. If a different travel surface is needed, refer to another appropriate standard for the surfacing. Span is greater than 14 feet. Load is H-20. Width is 15 feet including curbs. Abutment height as needed from design. Use (396) Aquatic Organism Passage instead, when the primary intent is biological concerns, not hydrologic.

**Before Situation:**

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

**After Situation:**

Access and 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:** Linear feet of bridge deck

**Scenario Unit::** Foot

**Scenario Typical Size:** 30.0

**Scenario Total Cost:** $58,640.52

**Scenario Cost/Unit:** $1,954.68

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 | $56.05 | 40 | $2,242.00 |
| 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 | $164.46 | 60 | $9,867.60 |
| Skidsteer, 80 HP | 933 | Skidsteer loader with horsepower range of 60 to 90. Equipment and power unit costs. Labor not included. | Hour | $44.60 | 40 | $1,784.00 |
| Truck, dump, 18 CY | 1400 | Dump truck for moving bulk material. Typically capacity is 25 ton or 18 cubic yards. Includes equipment only. | Hour | $121.65 | 40 | $4,866.00 |
| **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 | $41.76 | 40 | $1,670.40 |
| 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 | $25.31 | 60 | $1,518.60 |
| 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 | $44.37 | 140 | $6,211.80 |
| Supervisor or Manager | 234 | Labor involving supervision or management activities. Includes crew supervisors, foremen and farm/ranch managers time required for adopting new technology, etc. | Hour | $45.69 | 40 | $1,827.60 |
| Specialist Labor | 235 | Labor requiring a specialized skill set: Includes Agronomists, Foresters, Biologists, etc. to provide additional technical information during the planning and implementation of the practice. Does not include NRCS or TSP services. | Hour | $110.71 | 120 | $13,285.20 |
| **Materials** | | | | | | |
| Rock Riprap, Placed with geotextile | 44 | Rock Riprap, placed with geotextile, includes materials, equipment and labor to transport and place | Cubic Yard | $79.57 | 40 | $3,182.80 |
| Dimension Lumber, Treated | 1044 | Treated dimension lumber with nominal thickness equal or less than 2". Includes lumber and fasteners | Board Foot | $0.90 | 2500 | $2,250.00 |
| Epoxy anchor | 1599 | Galvanized bolts anchored into concrete or stone using epoxy adhesive. Includes materials and labor to drill and install. | Each | $19.49 | 12 | $233.88 |
| Steel, structural steel members | 1779 | Structural steel, includes materials and fabrication. | Pound | $1.00 | 5360 | $5,360.00 |
| Footing, concrete, precast | 1836 | Precast spread footing with stemwall, T-shaped, with channel built to accept arched culvert leg. Includes materials only. | Foot | $55.51 | 40 | $2,220.40 |
| Pipe, PE, 4", DR 9, perforated | 2140 | Materials: -4" - Perforated PE- 160 psi - ASTM D3035 DR 9 | Foot | $8.74 | 60 | $524.40 |

| | | | | | | |
|---|---|---|---|---|---|---|
| Galvanized Bolts, large | 2166 | 5/8" x 12" galvanized timber bolts. Materials only. | Each | $4.47 | 24 | $107.28 |
| **Mobilization** | | | | | | |
| Mobilization, medium equipment | 1139 | Equipment with 70-150 HP or typical weights between 14,000 and 30,000 pounds. | Each | $255.83 | 2 | $511.66 |
| Mobilization, large equipment | 1140 | Equipment >150HP or typical weights greater than 30,000 pounds or loads requiring over width or over length permits. | Each | $488.45 | 2 | $976.90 |

**Practice:** 578 - Stream Crossing

**Scenario** #8 - Bridge, prefabricated

**Scenario Description:**

Install a bridge to allow stream flows to cross under access road or animal trail. Bridge opening determined by sizing for storm event dictated in standard. Scenario includes dewatering, abutments, girders, decking installed as a prefabricated unit. Work consists of site preparation, dewatering, acquiring and installing the prefabricated unit with necessary hardware, backfilling abutments, and armoring with geotextile and riprap. Riprap and geotextile are used to stabilize and protect abutments as needed. Scenario based on prefabricated bridge structure. Travel surface shall be part of the prefabricated bridge structure. If a different travel surface is needed, refer to another appropriate standard for the surfacing. Load is H-20. Width is 15 feet including curbs. Abutment height as needed from design. Use (396) Aquatic Organism Passage instead, when the primary intent is biological concerns, not hydrologic.

**Before Situation:**

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

**After Situation:**

Access and 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:** Linear feet of bridge deck

**Scenario Unit::** Foot

**Scenario Typical Size:** 30.0

**Scenario Total Cost:** $75,376.22

**Scenario Cost/Unit:** $2,512.54

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 | $510.00 | 18 | $9,180.00 |
| Backhoe, 80 HP | 926 | Wheel mounted backhoe excavator with horsepower range of 60 to 90. Equipment and power unit costs. Labor not included. | Hour | $56.05 | 40 | $2,242.00 |
| 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 | $164.46 | 20 | $3,289.20 |
| Water management, Flooding & dewatering | 969 | Includes equipment and power unit. Labor not included. | Acre Foot | $272.75 | 50 | $13,637.50 |
| Truck, dump, 18 CY | 1400 | Dump truck for moving bulk material. Typically capacity is 25 ton or 18 cubic yards. Includes equipment only. | Hour | $121.65 | 10 | $1,216.50 |
| **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 | $41.76 | 34 | $1,419.84 |
| General Labor | 231 | Labor performed using basic tools such as power tool, shovels, and other tools that do not require extensive training. Ex. pipe layer, herder, concrete placement, materials spreader, flagger, etc. | Hour | $25.31 | 60 | $1,518.60 |
| 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 | $44.37 | 80 | $3,549.60 |
| 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 | $45.69 | 20 | $913.80 |
| 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 | $110.71 | 80 | $8,856.80 |
| **Materials** | | | | | | |
| Painting, steel surface, Impermeable | 2165 | Painting of steel surface with an impermeable coating. Includes materials and application | Square Foot | $0.86 | 1260 | $1,083.60 |
| Bridge, steel or concrete, pre-Manufactured Bridge | 2193 | A premanufactured steel or precast prestressed concrete bridge rated for an HS 25 highway loading. Typical width is 14', length is variable. Includes railing system. Includes materials and shipping only. | Square Foot | $61.61 | 450 | $27,724.50 |
| **Mobilization** | | | | | | |
| Mobilization, medium equipment | 1139 | Equipment with 70-150 HP or typical weights between 14,000 and 30,000 pounds. | Each | $255.83 | 1 | $255.83 |

| | | | | | | |
|---|---|---|---|---|---|---|
| Mobilization, large equipment | 1140 | Equipment >150HP or typical weights greater than 30,000 pounds or loads requiring over width or over length permits. | Each | $488.45 | 1 | $488.45 |

**Practice:** 578 - Stream Crossing

**Scenario** #9 - Stream Simulation Culvert, with Headwalls

**Scenario Description:**

Install a stream simulation culvert with a headwall where a particular culvert geometry is needed even though aquatic organism passage may not be the primary concern. For culverts less than 30" use Practice Standard 587 Structure for Water Control. Work includes dewatering, site preparation and removing any old crossing, acquiring and installing culvert pipe with gravel bedding and fill (compacted), and building headwalls. If a different travel surface is needed, refer to another appropriate standard for the surfacing. Pipe is 20 feet long and headwalls are included. Typical arch size may be 10' X 5'3" X 20' arch with 2'X3' precast footings Use (396) Aquatic Organism Passage instead, when the primary intent is biological concerns, not hydrologic. Use (587) Structure for Water Control instead, for ditch cross culverts and other intermittent flows and culverts less than 30" in diameter.

**Before Situation:**

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

**After Situation:**

Access road and 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:** Length of Multi-plate arch or box

**Scenario Unit::** Foot

**Scenario Typical Size:** 20.0

**Scenario Total Cost:** $49,993.43

**Scenario Cost/Unit:** $2,499.67

Cost Details:

| Component Name | ID | Description | Unit | Cost | QTY | Total |
|---|---|---|---|---|---|---|
| **Equipment Installation** | | | | | | |
| Geotextile, woven | 42 | Woven Geotextile Fabric. Includes materials, equipment and labor | Square Yard | $2.53 | 100 | $253.00 |
| 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 | $164.46 | 60 | $9,867.60 |
| Skidsteer, 80 HP | 933 | Skidsteer loader with horsepower range of 60 to 90. Equipment and power unit costs. Labor not included. | Hour | $44.60 | 40 | $1,784.00 |
| Water management, Flooding & dewatering | 969 | Includes equipment and power unit. Labor not included. | Acre Foot | $272.75 | 25 | $6,818.75 |
| Truck, dump, 18 CY | 1400 | Dump truck for moving bulk material. Typically capacity is 25 ton or 18 cubic yards. Includes equipment only. | Hour | $121.65 | 40 | $4,866.00 |
| **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 | $41.76 | 40 | $1,670.40 |
| 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 | $25.31 | 60 | $1,518.60 |
| 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 | $44.37 | 100 | $4,437.00 |
| 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 | $45.69 | 40 | $1,827.60 |
| **Materials** | | | | | | |
| Aggregate, river rock | 1834 | Well graded, rounded mineral substrates derived from local riverine settings. Includes materials and local delivery | Ton | $29.15 | 45 | $1,311.75 |
| Footing, concrete, precast | 1836 | Precast spread footing with stemwall, T-shaped, with channel built to accept arched culvert leg. Includes materials only. | Foot | $55.51 | 40 | $2,220.40 |
| Geocell, 6" | 1842 | 6-inch thick cellular confinement system, three-dimensional, expandable panels made from high-density polyethylene (HDPE), polyester or another polymer material. Includes materials, labor and equipment for the geocell only, does not include backfill. | Square Yard | $39.68 | 45 | $1,785.60 |
| Culvert, Multi-Plate arch | 1979 | Multi-plate arch culvert, typically 7 Gauge corrugated plate. Includes metal arch materials only, does not include footings. | Pound | $1.30 | 8000 | $10,400.00 |
| **Mobilization** | | | | | | |
| Mobilization, medium equipment | 1139 | Equipment with 70-150 HP or typical weights between 14,000 and 30,000 pounds. | Each | $255.83 | 1 | $255.83 |

| | | | | | | |
|---|---|---|---|---|---|---|
| Mobilization, large equipment | 1140 | Equipment >150HP or typical weights greater than 30,000 pounds or loads requiring over width or over length permits. | Each | $488.45 | 2 | $976.90 |

**Practice:** 578 - Stream Crossing

**Scenario** #10 - Stream Simulation Culvert, without Headwalls

**Scenario Description:**

Install a stream simulation culvert without a headwall where a particular culvert geometry is needed even though aquatic organism passage may not be the primary concern. For culverts less than 30" use Practice Standard 587 Structure for Water Control. Work includes dewatering, site preparation and removing any old crossing, acquiring and installing culvert pipe with gravel bedding and fill (compacted). If a different travel surface is needed, refer to another appropriate standard for the surfacing. Pipe is 40 feet long and therefore headwalls are not included. Typical arch size may be 10' X 5'3" X 40' arch with 2'X3' precast footings Use (396) Aquatic Organism Passage instead, when the primary intent is biological concerns, not hydrologic. Use (587) Structure for Water Control instead, for ditch cross culverts and other intermittent flows and culverts less than 30" in diameter.

**Before Situation:**

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

**After Situation:**

Access road and 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:** Length of Multi-plate arch or box

**Scenario Unit::** Foot

**Scenario Typical Size:** 40.0

**Scenario Total Cost:** $58,814.18

**Scenario Cost/Unit:** $1,470.35

Cost Details:

| Component Name | ID | Description | Unit | Cost | QTY | Total |
|---|---|---|---|---|---|---|
| **Equipment Installation** | | | | | | |
| Geotextile, woven | 42 | Woven Geotextile Fabric. Includes materials, equipment and labor | Square Yard | $2.53 | 200 | $506.00 |
| 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 | $164.46 | 60 | $9,867.60 |
| Skidsteer, 80 HP | 933 | Skidsteer loader with horsepower range of 60 to 90. Equipment and power unit costs. Labor not included. | Hour | $44.60 | 40 | $1,784.00 |
| Water management, Flooding & dewatering | 969 | Includes equipment and power unit. Labor not included. | Acre Foot | $272.75 | 25 | $6,818.75 |
| Truck, dump, 18 CY | 1400 | Dump truck for moving bulk material. Typically capacity is 25 ton or 18 cubic yards. Includes equipment only. | Hour | $121.65 | 40 | $4,866.00 |
| **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 | $41.76 | 40 | $1,670.40 |
| 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 | $25.31 | 60 | $1,518.60 |
| 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 | $44.37 | 100 | $4,437.00 |
| 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 | $45.69 | 40 | $1,827.60 |
| **Materials** | | | | | | |
| Aggregate, river rock | 1834 | Well graded, rounded mineral substrates derived from local riverine settings. Includes materials and local delivery | Ton | $29.15 | 90 | $2,623.50 |
| Footing, concrete, precast | 1836 | Precast spread footing with stemwall, T-shaped, with channel built to accept arched culvert leg. Includes materials only. | Foot | $55.51 | 80 | $4,440.80 |
| Geocell, 6" | 1842 | 6-inch thick cellular confinement system, three-dimensional, expandable panels made from high-density polyethylene (HDPE), polyester or another polymer material. Includes materials, labor and equipment for the geocell only, does not include backfill. | Square Yard | $39.68 | 90 | $3,571.20 |
| Culvert, Multi-Plate arch | 1979 | Multi-plate arch culvert, typically 7 Gauge corrugated plate. Includes metal arch materials only, does not include footings. | Pound | $1.30 | 10500 | $13,650.00 |
| **Mobilization** | | | | | | |
| Mobilization, medium equipment | 1139 | Equipment with 70-150 HP or typical weights between 14,000 and 30,000 pounds. | Each | $255.83 | 1 | $255.83 |

| | | | | | | |
|---|---|---|---|---|---|---|
| Mobilization, large equipment | 1140 | Equipment >150HP or typical weights greater than 30,000 pounds or loads requiring over width or over length permits. | Each | $488.45 | 2 | $976.90 |

**Practice:** 578 - Stream Crossing

**Scenario** #11 - Concrete Box Culvert

**Scenario Description:**

Install a concrete box culvert where a particular culvert geometry is needed even though aquatic organism passage may not be the primary concern. For culverts less than 30" use Practice Standard 587 Structure for Water Control. Work includes dewatering, site preparation and removing any old crossing, acquiring and installing concrete box culvert with gravel bedding and fill (compacted). If a different travel surface is needed, refer to another appropriate standard for the surfacing. Concrete box culvert is a 6' by 8' box and is 20 feet long. Headwalls are not included. Typical concrete box culvert size is 6' by 8' by 20'. Use (396) Aquatic Organism Passage instead, when the primary intent is biological concerns, not hydrologic. Use (587) Structure for Water Control instead, for ditch cross culverts and other intermittent flows and culverts less than 30" in diameter.

**Before Situation:**

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

**After Situation:**

Access road and 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:** Length of concrete box culvert

**Scenario Unit::** Foot

**Scenario Typical Size:** 20.0

**Scenario Total Cost:** $43,959.63

**Scenario Cost/Unit:** $2,197.98

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 | $2.53 | 100 | $253.00 |
| 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 | $164.46 | 60 | $9,867.60 |
| Skidsteer, 80 HP | 933 | Skidsteer loader with horsepower range of 60 to 90. Equipment and power unit costs. Labor not included. | Hour | $44.60 | 40 | $1,784.00 |
| Water management, Flooding & dewatering | 969 | Includes equipment and power unit. Labor not included. | Acre Foot | $272.75 | 25 | $6,818.75 |
| Truck, dump, 18 CY | 1400 | Dump truck for moving bulk material. Typically capacity is 25 ton or 18 cubic yards. Includes equipment only. | Hour | $121.65 | 40 | $4,866.00 |
| **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 | $41.76 | 40 | $1,670.40 |
| 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 | $25.31 | 60 | $1,518.60 |
| 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 | $44.37 | 100 | $4,437.00 |
| 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 | $45.69 | 40 | $1,827.60 |
| **Materials** | | | | | | |
| Aggregate, river rock | 1834 | Well graded, rounded mineral substrates derived from local riverine settings. Includes materials and local delivery | Ton | $29.15 | 45 | $1,311.75 |
| Geocell, 6" | 1842 | 6-inch thick cellular confinement system, three-dimensional, expandable panels made from high-density polyethylene (HDPE), polyester or another polymer material. Includes materials, labor and equipment for the geocell only, does not include backfill. | Square Yard | $39.68 | 45 | $1,785.60 |
| Culvert, box, 6' x 8' | 2175 | Precast concrete box culvert, 6'X8'. Typically in 4' sections. Materials only. | Foot | $329.33 | 20 | $6,586.60 |
| **Mobilization** | | | | | | |
| Mobilization, medium equipment | 1139 | Equipment with 70-150 HP or typical weights between 14,000 and 30,000 pounds. | Each | $255.83 | 1 | $255.83 |
| Mobilization, large equipment | 1140 | Equipment >150HP or typical weights greater than 30,000 pounds or loads requiring over width or over length permits. | Each | $488.45 | 2 | $976.90 |

**Practice:** 578 - Stream Crossing

**Scenario** #12 - Bridge, Light Weight Timber

**Scenario Description:**

Light Weight Timber bridge is constructed of 6" x 10" timbers side by side bolted together by ASTM A307 Bolts to provide a deck for animal traffic and light weight equipment such as ATV's. Deck is fabricated into 3 - 4'x20' panels which are moved into position by an excavator. Bridge is placed across a narrow incised stream where installing a ford or other type of crossing is not practical. Bridge deck is mounted on precast concrete blocks which are buried 1/2 to 3/4 into the ground. Approaches to both ends of the bridge are graded to meet the contour of the existing or proposed animal trail. Bridge opening determined by sizing for storm event dictated in standard. Streambanks and bed at crossing location are generally stable. Work consists of furnishing and installing four precast blocks to mount bridge, furnishing 24 - 6" x 10" timbers and assembling the bridge on site, necessary hardware, and lifting bridge panels into place by hydraulic excavator. Span is less than 14 feet. Bridge is intended for cattle passage and not for heavy weight equipment. Bridge width is 12 feet. Use (396) Aquatic Organism Passage instead, when the primary intent is biological concerns, not hydrologic.

**Before Situation:**

Access to pasture is not possible without causing excessive erosion and other water quality water concerns.

**After Situation:**

Access and waterflow are able to cross each other in a stable manner. Stream flow is not impeded and a stable base exists for light weight equipment, people and/or animals to cross. Associated practices could be (342) Critical Area Planting, (560) Access Road, (575) Animal Trails and Walkways, (566) Recreational Trails and Walkways, (500) Obstruction Removal, or (584) Channel Stabilization.

**Feature Measure:** Area of Bridge Deck in Square Feet

**Scenario Unit::** Square Foot

**Scenario Typical Size:** 240.0

**Scenario Total Cost:** $7,579.28

**Scenario Cost/Unit:** $31.58

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 | $113.75 | 8 | $910.00 |
| **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 | $25.31 | 16 | $404.96 |
| 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 | $44.37 | 8 | $354.96 |
| 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 | $45.69 | 2 | $91.38 |
| **Materials** | | | | | | |
| Block, pre-cast concrete, modular | 1496 | Pre-cast concrete blocks, typically 2ft x 2ft x 6ft , includes installation and delivery. | Cubic Yard | $99.83 | 3.6 | $359.39 |
| Lumber, planks, posts and timbers, untreated | 1623 | Untreated dimension lumber with nominal thickness greater than 2'. Includes lumber and fasteners. Does not include labor. | Board Foot | $1.33 | 2400 | $3,192.00 |
| Bolt, All Thread Rod, ASTM A307, 1" Dia. x 4' | 2528 | Hot Dipped Galvanized All Thread Rod, ASTM A307, 1" Dia. X 4' Long with two - nuts and flat washers. Includes materials and shipping only. | Each | $103.86 | 18 | $1,869.48 |
| **Mobilization** | | | | | | |
| Mobilization, very small equipment | 1137 | Equipment that is small enough to be transported by a pick-up truck with typical weights less than 3,500 pounds. Can be multiple pieces of equipment if all hauled simultaneously. | Each | $70.64 | 2 | $141.28 |
| Mobilization, medium equipment | 1139 | Equipment with 70-150 HP or typical weights between 14,000 and 30,000 pounds. | Each | $255.83 | 1 | $255.83 |

**Practice:** 580 - Streambank and Shoreline Protection

**Scenario** #1 - Riprap

**Scenario Description:**

Protection of streambanks using riprap to stabilize and protect banks of streams against scour and erosion. The purpose of this practice is to maintain, improve, or restore physical, chemical, and biological functions of a stream to provide diverse aquatic communities to improve habitat for desired aquatic species. Payment cost include shaping bank, geotextile, and furnishing and placing rock rip rap. Typical scenario is a 2.0 feet thick blanket of rock riprap, placed on a 1.5 to 1 slope, installed on an eroded streambank which is 200 feet long. Streambank is typically 6 feet high. Riprap toe is excavated 3 feet into stream bottom. The bank above the riprap will be graded to a stable slope and revegetated. Resource Concerns: Soil Erosion - Excessive Bank Erosion from Streams, Shoreline and Water Conveyance Channels; Water Quality Degradation - Excessive Sediment in Surface Waters; Water Quality Degradation - Elevated Water Temperature; Excess/Insufficient Water - Excessive Sediment in Surface Waters; Inadequate Habitat for Fish and Wildlife- Habitat Degradation. Associated Practices include: 560 - Access Road; 342 - Critical Area Planting; 382 - Fence; 391 - Riparian Forest Buffer; 390 - Riparian Herbaceous Cover; 395 - Stream Habitat Improvement and Management; 614 - Watering Facility; 484-Mulching; 570-Stromwater Runoff Control.

**Before Situation:**

A stream bisects the agricultural property and has had all of the woody vegetation removed due to overgrazing or human manipulation; the stream has severely degraded streambanks that are unstable and show signs of active erosion. Soil Erosion: The streambank is unstable. Water Quality Degradation: The sediment load has increased in the stream resulting in elevated water temperatures. Excess/Insufficient Water: The excessive sediment load has reduced the water conveyance capacity, storage capacity and flow within the stream. Inadequate Habitat for Fish and Wildlife: The deficiencies in the stream's habitat limit survival, growth, reproduction, and/or diversity of aquatic organisms within the stream.

**After Situation:**

The streambank is stable against further erosion and encourages natural sediment transport and deposition. Loss of riparian areas and sediment load is reduced in the stream. For Soil Erosion: The streambank is stable. For Water Quality Degradation: The sediment load has decreased in the stream resulting in improved aquatic habitat. For Excess/Insufficient Water: The water conveyance capacity, storage capacity and flow within the stream has been stabilized. For Inadequate Habitat for Fish and Wildlife: The reduction in the sediment load promotes survival, growth, reproduction, and/or diversity of aquatic organisms within the stream's habitat.

**Feature Measure:** Volume of Riprap

**Scenario Unit::** Cubic Yard

**Scenario Typical Size:** 240.0

**Scenario Total Cost:** $21,394.90

**Scenario Cost/Unit:** $89.15

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 | $113.75 | 10 | $1,137.50 |
| **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 | $44.37 | 10 | $443.70 |
| 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 | $45.69 | 5 | $228.45 |
| **Materials** | | | | | | |
| Rock Riprap, Placed with geotextile | 44 | Rock Riprap, placed with geotextile, includes materials, equipment and labor to transport and place | Cubic Yard | $79.57 | 240 | $19,096.80 |
| **Mobilization** | | | | | | |
| Mobilization, large equipment | 1140 | Equipment >150HP or typical weights greater than 30,000 pounds or loads requiring over width or over length permits. | Each | $488.45 | 1 | $488.45 |

**Practice:** 580 - Streambank and Shoreline Protection

**Scenario** #2 - Bioengineered

**Scenario Description:**

Bioengineering consist of non-structural measures such as fascines, wattles, woody cuttings, revetments and other non-structural measures to stabilize and protect the streambank against scour and erosion. Soil bioengineering is a system of living plant materials that are installed to provide immediate protection and reinforcement of the soil along the streambank. Bioengineering is generally installed on the streambank above structural measures or toe protection such as rock riprap. Vegetation in the form of trees, bushes, grass re-establishment is covered under 342 - Critical Area Planting. In addition, soil bioengineering systems create resistance to sliding or shear displacement in a streambank as they develop roots or fibrous inclusions. Environmental benefits derived from bioengineering materials include diverse and productive riparian habitats, shade, organic additions to the stream, cover for fish, and improvements in aesthetic value and water quality. Soil bioengineering installations work best in conjunction with structural measures such as rock riprap to provide more permanent protection and healthy function, enhance aesthetics, and create a more environmentally acceptable product. Soil bioengineering systems normally use unrooted plant parts in the form of cut branches and rooted plants. For streambanks, living systems include brushmattresses, live stakes, joint plantings, vegetated geogrids, branchpacking, and live fascines. Typical bioengineering scenario is a plot of land which is 200' long by 10' wide (2000 sf) installed on the upper part of the streambank. Resource Concerns: Soil Erosion - Excessive Bank Erosion from Streams, Shoreline and Water Conveyance Channels; Water Quality Degradation - Excessive Sediment in Surface Waters; Water Quality Degradation - Elevated Water Temperature; Excess/Insufficient Water - Excessive Sediment in Surface Waters; Inadequate Habitat for Fish and Wildlife- Habitat Degradation. Associated Practices include: 560 - Access Road; 342 - Critical Area Planting; 382 - Fence; 391 - Riparian Forest Buffer; 390 - Riparian Herbaceous Cover; 395 - Stream Habitat Improvement and Management; 614 - Watering Facility; 484-Mulching; 570-Stromwater Runoff Control.

**Before Situation:**

A stream bisects the agricultural property and has had all of the woody vegetation removed due to overgrazing or human manipulation; the upper part of the streambank is degraded, unstable and show signs of active erosion. Generally installed above more permanent structural measures such as rock riprap. Soil Erosion: The streambank is unstable. Water Quality Degradation: The sediment load has increased in the stream resulting in elevated water temperatures. Excess/Insufficient Water: The excessive sediment load has reduced the water conveyance capacity, storage capacity and flow within the stream. Inadequate Habitat for Fish and Wildlife: The deficiencies in the stream's habitat limit survival, growth, reproduction, and/or diversity of aquatic organisms within the stream.

**After Situation:**

The streambank is stable against further erosion and encourages natural sediment transport and deposition. Loss of riparian areas and sediment load is reduced in the stream. For Soil Erosion: The streambank is stable. For Water Quality Degradation: The sediment load has decreased in the stream resulting in improved aquatic habitat. For Excess/Insufficient Water: The water conveyance capacity, storage capacity and flow within the stream has been stabilized. For Inadequate Habitat for Fish and Wildlife: The reduction in the sediment load promotes survival, growth, reproduction, and/or diversity of aquatic organisms within the stream's habitat.

**Feature Measure:** Area of Bio-Engineering Applied

**Scenario Unit::** Square Foot

**Scenario Typical Size:** 2,000.0

**Scenario Total Cost:** $7,790.56

**Scenario Cost/Unit:** $3.90

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 | $56.05 | 10 | $560.50 |
| Tractor, agricultural, 120 HP | 962 | Agricultural tractor with horsepower range of 90 to 140. Equipment and power unit costs. Labor not included. | Hour | $57.70 | 10 | $577.00 |
| **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 | $25.31 | 20 | $506.20 |
| Equipment Operators, Light | 232 | Includes: Skid Steer Loaders, Hydraulic Excavators <50 HP, Trenchers <12", Ag Equipment <150 HP, Pickup Trucks, Forklifts, Mulchers | Hour | $25.23 | 10 | $252.30 |
| 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 | $45.69 | 10 | $456.90 |
| **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 | $0.48 | 200 | $96.00 |
| Wattles or facines, 4 to 5 inch diameter | 1903 | Facines, or wattles: bundles of live tree stems of species that sprout roots, bound together. 4"-5" diameter. Includes materials and shipping only. | Foot | $5.09 | 200 | $1,018.00 |
| Wattles or facines, 6 to 8 inch diameter | 1904 | Facines, or wattles: bundles of live tree stems of species that sprout roots, bound together. 6"-8" diameter. Includes materials and shipping only. | Foot | $7.06 | 200 | $1,412.00 |
| Wattles or facines, 9 to 12 inch diameter | 1905 | Facines, or wattles: bundles of live tree stems of species that sprout roots, bound together. 9"- 12" diameter. Includes materials and shipping only. | Foot | $12.00 | 200 | $2,400.00 |
| **Mobilization** | | | | | | |

| | | | | | | |
|---|---|---|---|---|---|---|
| Mobilization, medium equipment | 1139 | Equipment with 70-150 HP or typical weights between 14,000 and 30,000 pounds. | Each | $255.83 | 2 | $511.66 |

**Practice:** 582 - Open Channel

**Scenario** #1 - excavation, normal conditions

**Scenario Description:**

This scenario is the construction or improvement of a channel in which water flows with a free surface. Typical construction dimensions are 6' deep x 15' wide bottom x 100' length with a side slope of 2.5:1. The practice is used for the restoration of a natural or artificial channel to improve the process and ecological function in a degraded and eroding stream. Conditions are normal. Normal conditions include: a location easily accessible from a main road, soils without large rock or difficult clay to excavate, and/or other aspects that are average compared to excavation work in the area. This scenario assists in addressing the resource concerns: streambank erosion, sediment deposition, excessive flooding or ponding. Conservation practices that may be associated are: 356-Dike, 587-Structure For Water Control, 533-Pumping Plant, 580 Streambank and Shoreline Protection, 584 Channel Stabilization, 578 Stream Crossing.

**Before Situation:**

A stream or channel with active streambank erosion or headcuts and inadequate capacity to handle the flow needed for flood prevention, drainage or erosion prevention.

**After Situation:**

An earthen channel was excavated to allow unrestricted flow of water and to stabilize the bottom and side slopes. Flooding and erosion is no longer a resource concern.

**Feature Measure:** Volume of earth excavated in CY's

**Scenario Unit::** Cubic Yard

**Scenario Typical Size:** 500.0

**Scenario Total Cost:** $1,435.83

**Scenario Cost/Unit:** $2.87

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 | $2.36 | 500 | $1,180.00 |
| **Mobilization** | | | | | | |
| Mobilization, medium equipment | 1139 | Equipment with 70-150 HP or typical weights between 14,000 and 30,000 pounds. | Each | $255.83 | 1 | $255.83 |

**Practice:** 582 - Open Channel

**Scenario** #2 - excavation, difficult conditions

**Scenario Description:**

This scenario is the construction or improvement of a channel in which water flows with a free surface. Typical construction dimensions are 6' deep x 15' wide bottom x 100' length with a side slope of 2.5:1. The practice is used for the restoration of a natural or artificial channel to improve the process and ecological function in a degraded and eroding stream. Conditions are difficult. Difficult conditions include: a location that requires a significant drive off the main road, soils with large rock or difficult clay to excavate, and/or other aspects that create difficulty in excavation compared to similar work in the area. Construction may include vegetation and/or a lightly armored bank toe. This scenario assists in addressing the resource concerns: streambank erosion, sediment deposition, excessive flooding or ponding. Conservation practices that may be associated are: 356-Dike, 587-Structure For Water Control, 533-Pumping Plant, 580 Streambank and Shoreline Protection, 584 Channel Stabilization, 578 Stream Crossing.

**Before Situation:**

A stream or channel with active streambank erosion or headcuts and inadequate capacity to handle the flow needed for flood prevention, drainage or erosion prevention.

**After Situation:**

An earthen channel was excavated to allow unrestricted flow of water and to stabilize the bottom and side slopes. Flooding and erosion is no longer a resource concern.

**Feature Measure:** Volume of earth excavated in CY's

**Scenario Unit::** Cubic Yard

**Scenario Typical Size:** 500.0

**Scenario Total Cost:** $2,003.83

**Scenario Cost/Unit:** $4.01

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 | $2.36 | 500 | $1,180.00 |
| **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 | $25.31 | 8 | $202.48 |
| Supervisor or Manager | 234 | Labor involving supervision or management activities. Includes crew supervisors, foremen and farm/ranch managers time required for adopting new technology, etc. | Hour | $45.69 | 8 | $365.52 |
| **Mobilization** | | | | | | |
| Mobilization, medium equipment | 1139 | Equipment with 70-150 HP or typical weights between 14,000 and 30,000 pounds. | Each | $255.83 | 1 | $255.83 |

**Practice:** 582 - Open Channel

**Scenario** #3 - excavation and fill, normal conditions

**Scenario Description:**

This scenario is the construction or improvement of a channel in which water flows with a free surface. Typical construction dimensions are 6' deep x 15' wide bottom x 100' length with a side slope of 2.5:1. Excavation and earth fill is required. The practice is used for the restoration of a natural or artificial channel to improve the process and ecological function in a degraded and eroding stream. Conditions are normal. Normal conditions include: a location easily accessible from a main road, soils without large rock or difficult clay to excavate, and/or other aspects that are average compared to excavation work in the area. This scenario assists in addressing the resource concerns: streambank erosion, sediment deposition, excessive flooding or ponding. Conservation practices that may be associated are: 356-Dike, 587-Structure For Water Control, 533-Pumping Plant, 580 Streambank and Shoreline Protection, 584 Channel Stabilization, 578 Stream Crossing.

**Before Situation:**

A stream or channel with active streambank erosion or headcuts and inadequate capacity to handle the flow needed for flood prevention, drainage or erosion prevention.

**After Situation:**

An earthen channel was excavated to allow unrestricted flow of water and to stabilize the bottom and side slopes. Some fill was used to complete the channel shape. Flooding and erosion is no longer a resource concern.

**Feature Measure:** Volume of earth excavated in CY's

**Scenario Unit::** Cubic Yard

**Scenario Typical Size:** 500.0

**Scenario Total Cost:** $3,660.83

**Scenario Cost/Unit:** $7.32

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 | $2.36 | 500 | $1,180.00 |
| Earthfill, Roller Compacted | 49 | Earthfill, roller or machine compacted, includes equipment and labor | Cubic Yard | $4.45 | 500 | $2,225.00 |
| **Mobilization** | | | | | | |
| Mobilization, medium equipment | 1139 | Equipment with 70-150 HP or typical weights between 14,000 and 30,000 pounds. | Each | $255.83 | 1 | $255.83 |

**Practice:** 582 - Open Channel

**Scenario** #4 - excavation and fill, difficult conditions

**Scenario Description:**

This scenario is the construction or improvement of a channel in which water flows with a free surface. Typical construction dimensions are 6' deep x 15' wide bottom x 100' length with a side slope of 2.5:1. The practice is used for the restoration of a natural or artificial channel to improve the process and ecological function in a degraded and eroding stream. Excavation and earth fill is required. Conditions are difficult. Difficult conditions include: a location that requires a significant drive off the main road, soils with large rock or difficult clay to excavate, and/or other aspects that create difficulty in excavation compared to similar work in the area. Construction may include vegetation and/or a lightly armored bank toe. This scenario assists in addressing the resource concerns: streambank erosion, sediment deposition, excessive flooding or ponding. Conservation practices that may be associated are: 356-Dike, 587-Structure For Water Control, 533-Pumping Plant, 580 Streambank and Shoreline Protection, 584 Channel Stabilization, 578 Stream Crossing.

**Before Situation:**

A stream or channel with active streambank erosion or headcuts and inadequate capacity to handle the flow needed for flood prevention, drainage or erosion prevention.

**After Situation:**

An earthen channel was excavated to allow unrestricted flow of water and to stabilize the bottom and side slopes. Some fill was used to complete the channel shape. Flooding and erosion is no longer a resource concern.

**Feature Measure:** Volume of earth excavated in CY's

**Scenario Unit::** Cubic Yard

**Scenario Typical Size:** 500.0

**Scenario Total Cost:** $4,228.83

**Scenario Cost/Unit:** $8.46

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 | $2.36 | 500 | $1,180.00 |
| Earthfill, Roller Compacted | 49 | Earthfill, roller or machine compacted, includes equipment and labor | Cubic Yard | $4.45 | 500 | $2,225.00 |
| **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 | $25.31 | 8 | $202.48 |
| Supervisor or Manager | 234 | Labor involving supervision or management activities. Includes crew supervisors, foremen and farm/ranch managers time required for adopting new technology, etc. | Hour | $45.69 | 8 | $365.52 |
| **Mobilization** | | | | | | |
| Mobilization, medium equipment | 1139 | Equipment with 70-150 HP or typical weights between 14,000 and 30,000 pounds. | Each | $255.83 | 1 | $255.83 |

**Practice:** 582 - Open Channel

**Scenario** #5 - Cranberry By-Pass Channel

**Scenario Description:**

This scenario is the construction or improvement of a channel in which water flows with a free surface. Typical construction dimensions are 5' deep x 6' wide bottom x 750' length with a side slope of 2:1. Excavation and earth fill is required. The practice is used to create or improve channels to convey low frequency storm flows by-passing cranberry bogs during chemigation. Normal conditions include: a location easily accessible from a main road, soils without large rock or difficult clay to excavate, and/or other aspects that are average compared to excavation work in the area. This scenario assists in addressing the resource concerns: water pollution, streambank erosion, sediment deposition, excessive flooding or ponding. Conservation practices that may be associated are: 356-Dike, 587-Structure For Water Control, 533-Pumping Plant, 580 Streambank and Shoreline Protection, 584 Channel Stabilization, 578 Stream Crossing.

**Before Situation:**

No drainage channels exist to convey flows outside of chemigated bogs or a channel with inadequate capacity needs improvements to handle the flow needed for flood prevention, drainage or erosion prevention.

**After Situation:**

A cranberry by-pass earthen channel was excavated to allow unrestricted flow of water and to stabilize the bottom and side slopes. Some fill was used to complete the channel shape. Water pollution, flooding and erosion are no longer resource concerns.

**Feature Measure:** <Unknown>

**Scenario Unit::** Cubic Yard

**Scenario Typical Size:** 2,250.0

**Scenario Total Cost:** $15,834.16

**Scenario Cost/Unit:** $7.04

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 | $2.36 | 2250 | $5,310.00 |
| Earthfill, Roller Compacted | 49 | Earthfill, roller or machine compacted, includes equipment and labor | Cubic Yard | $4.45 | 2250 | $10,012.50 |
| **Mobilization** | | | | | | |
| Mobilization, medium equipment | 1139 | Equipment with 70-150 HP or typical weights between 14,000 and 30,000 pounds. | Each | $255.83 | 2 | $511.66 |

**Practice:** 582 - Open Channel

**Scenario** #6 - Cranberry By-Pass Channel with Rock

**Scenario Description:**

This scenario is the construction or improvement of a channel in which water flows with a free surface. Typical construction dimensions are 5' deep x 6' wide bottom x 750' length with a side slope of 2:1. Excavation and earth fill is required. The practice is used to create channels to convey low frequency storm flows by-passing cranberry bogs during chemigation. Normal conditions include: a location easily accessible from a main road, soils without large rock or difficult clay to excavate, and/or other aspects that are average compared to excavation work in the area. This scenario assists in addressing the resource concerns: water pollution, streambank erosion, sediment deposition, excessive flooding or ponding. Conservation practices that may be associated are: 356-Dike, 587-Structure For Water Control, 533-Pumping Plant, 580 Streambank and Shoreline Protection, 584 Channel Stabilization, 578 Stream Crossing.

**Before Situation:**

No drainage channel exist to convey flows outside of chemigated bogs or a channel with inadequate capacity needs improvements to handle the flow needed for flood prevention, drainage or erosion prevention.

**After Situation:**

A cranberry by-pass earthen channel was excavated to allow unrestricted flow of water and to stabilize the bottom and side slopes. Some fill was used to complete the channel shape and 0.5ft of rock was installed in the flow area to prevent damage from excessive velocities. Water pollution, flooding and erosion are no longer resource concerns.

**Feature Measure:** Volume of earth excavated in CY's

**Scenario Unit::** Cubic Yard

**Scenario Typical Size:** 2,400.0

**Scenario Total Cost:** $22,397.58

**Scenario Cost/Unit:** $9.33

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 | $2.36 | 2400 | $5,664.00 |
| Earthfill, Roller Compacted | 49 | Earthfill, roller or machine compacted, includes equipment and labor | Cubic Yard | $4.45 | 2400 | $10,680.00 |
| **Materials** | | | | | | |
| Rock Riprap, graded, angular, material and shipping | 1200 | Graded Rock Riprap for all gradation ranges. Includes materials and delivery only. | Ton | $36.46 | 152 | $5,541.92 |
| **Mobilization** | | | | | | |
| Mobilization, medium equipment | 1139 | Equipment with 70-150 HP or typical weights between 14,000 and 30,000 pounds. | Each | $255.83 | 2 | $511.66 |

**Practice:** 582 - Open Channel

**Scenario** #8 - Two Stage Ditch

**Scenario Description:**

This scenario is the improvement of a channel in which water flows with a free surface. The practice is used for the restoration of a natural or artificial channel to improve nutrient (phosphorus and nitrate) reduction and ecological function by creating a floodplain bench. Installation conditions are normal which means the location is easily accessible from a main road, soils are without large rock or difficult clay to excavate, and/or other aspects are average compared to excavation work in the area.

**Before Situation:**

A stream or channel with active streambank erosion and excess nutrient load from upstream or tile entry sources. This scenario assists in addressing the resource concerns: water quality, streambank erosion, sediment deposition.

**After Situation:**

An earthen floobplain bench is excavated above low channel flow to create floodplain flow area and to stabilize the bottom and side slopes. Nutrients are reduced in the water through bench saturation. Erosion is no longer a resource concern. Typical construction dimensions are similar to Fig. 10-9 in Stream Restoration Design handbook with 10 ft wide benches excavated on either side of 6 ft deep ditch. Total excavation = 5' x 10' X 2 sides = 100 cubic feet per foot. Cool season grasses are established on the bench and slope areas using 342 Critical Area Planting. Need for mulching (straw or erosion control blanket) would be accomplished through 484-Mulching as necessary. Associated practices: 356-Dike, 393-Filter Strip, 484-Mulching 587-Structure For Water Control, 533-Pumping Plant, 580 Streambank and Shoreline Protection, 584 Channel Stabilization, 578 Stream Crossing.

**Feature Measure:** Length of Ditch

**Scenario Unit::** Linear Foot

**Scenario Typical Size:** 1,000.0

**Scenario Total Cost:** $13,285.26

**Scenario Cost/Unit:** $13.29

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 | $2.36 | 3700 | $8,732.00 |
| Dozer, 140 HP | 927 | Track mounted Dozer with horsepower range of 125 to 160. Equipment and power unit costs. Labor not included. | Hour | $124.03 | 24 | $2,976.72 |
| **Labor** | | | | | | |
| Equipment Operators, Heavy | 233 | Includes: Cranes, Hydraulic Excavators >=50 HP, Dozers, Paving Machines, Rock Trenchers, Trenchers >=12", Dump Trucks, Ag Equipment >=150 HP, Scrapers, Water Wagons. | Hour | $44.37 | 24 | $1,064.88 |
| **Mobilization** | | | | | | |
| Mobilization, medium equipment | 1139 | Equipment with 70-150 HP or typical weights between 14,000 and 30,000 pounds. | Each | $255.83 | 2 | $511.66 |

**Practice:** 584 - Channel Bed Stabilization

**Scenario** #8 - Bio-engineering

**Scenario Description:**

Stabilize the bottom and slope of a stream channel using bioengineering methods. Bio-engineering methods include live stakes, fascines, plantings, bare root stock, willow waddles, and live stakes. Re-vegetation of exposed surfaces will be completed using 342 - Critical Area Planting. Typical stream has 50 foot bottom width and 6 foot banks. Length of area 100 feet. Planting entire area at a 2x2 grid with live stakes, potted plants, and bare root mix

**Before Situation:**

Bed of an existing or newly constructed alluvial or threshold channel is undergoing damaging aggradation or degradation. Stream cannot be feasibly controlled with clearing and snagging, vegetation, bank protection or upstream water control. Soil Erosion: The stream is unstable. Water Quality Degradation: The sediment load has increased in the stream resulting in elevated water temperatures. Excess/Insufficient Water: The excessive sediment load has reduced the water conveyance capacity, storage capacity and flow within the stream. Inadequate Habitat for Fish and Wildlife: The deficiencies in the stream's habitat limit survival, growth, reproduction, and/or diversity of aquatic organisms within the stream.

**After Situation:**

Stream channel is stable and vegetated. Other associated practices could be (326) Clearing and Snagging, (396 ) Aquatic Organism Passage, (395) Stream Habitat Improvement and Management, (580) Streambank and Shoreline Protection, or (587) Structure for Water Control. For Soil Erosion: The streambank is stable. For Water Quality Degradation: The sediment load has decreased in the stream resulting in improved aquatic habitat. For Excess/Insufficient Water: The water conveyance capacity, storage capacity and flow within the stream has been stabilized. For Inadequate Habitat for Fish and Wildlife: The reduction in the sediment load promotes survival, growth, reproduction, and/or diversity of aquatic organisms within the stream's habitat.

**Feature Measure:** Area of planting

**Scenario Unit::** Square Foot

**Scenario Typical Size:** 2,500.0

**Scenario Total Cost:** $10,928.33

**Scenario Cost/Unit:** $4.37

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 | $24.77 | 40 | $990.80 |
| Stripping and stockpiling, topsoil | 1199 | Stripping and stockpiling of topsoil adjacent to stripping area. Includes equipment and labor. | Cubic Yard | $0.89 | 200 | $178.00 |
| **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 | $25.31 | 123 | $3,113.13 |
| Equipment Operators, Light | 232 | Includes: Skid Steer Loaders, Hydraulic Excavators <50 HP, Trenchers <12", Ag Equipment <150 HP, Pickup Trucks, Forklifts, Mulchers | Hour | $25.23 | 40 | $1,009.20 |
| 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 | $45.69 | 40 | $1,827.60 |
| **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 | $1.30 | 800 | $1,040.00 |
| Tree, willow | 1426 | Willow tree for planting, 18" to 36" seedling. Includes materials and shipping only. | Each | $0.65 | 1500 | $975.00 |
| Wattles or facines, 6 to 8 inch diameter | 1904 | Facines, or wattles: bundles of live tree stems of species that sprout roots, bound together. 6"-8" diameter. Includes materials and shipping only. | Foot | $7.06 | 200 | $1,412.00 |
| One Species, Cool Season, Annual Grass or Legume | 2311 | Cool season annual grass or legume. Includes material and shipping only. | Acre | $38.26 | 10 | $382.60 |

**Practice:** 584 - Channel Bed Stabilization

**Scenario** #9 - Rock structures

**Scenario Description:**

Stabilize the bottom and slope of a stream channel using rock riprap or engineered products that consist primarily of rock or concrete. This includes but not limited to gabions, rock veins, rock weirs, concrete blocks, etc. Typical stream has 50 foot bottom width and 6 foot banks. Length of area 100 feet. Based on degrading channel that needs to be riprapped its entire wetted perimeter.

**Before Situation:**

Bed of an existing or newly constructed alluvial or threshold channel is undergoing damaging aggradation or degradation. Changes cannot be controlled feasibly with clearing and snagging, vegetation, bank protection or upstream water control. Soil Erosion: The stream is unstable. Water Quality Degradation: The sediment load has increased in the stream resulting in elevated water temperatures. Excess/Insufficient Water: The excessive sediment load has reduced the water conveyance capacity, storage capacity and flow within the stream. Inadequate Habitat for Fish and Wildlife: The deficiencies in the stream's habitat limit survival, growth, reproduction, and/or diversity of aquatic organisms within the stream.

**After Situation:**

Stream channel is stable. Re-vegetation of exposed surfaces will be completed using 342 - Critical Area Planting. Other associated practices could be (326) Clearing and Snagging, (396 ) Aquatic Organism Passage, (395) Stream Habitat Improvement and Management, (580) Streambank and Shoreline Protection, or (587) Structure for Water Control. For Soil Erosion: The streambank is stable. For Water Quality Degradation: The sediment load has decreased in the stream resulting in improved aquatic habitat. For Excess/Insufficient Water: The water conveyance capacity, storage capacity and flow within the stream has been stabilized. For Inadequate Habitat for Fish and Wildlife: The reduction in the sediment load promotes survival, growth, reproduction, and/or diversity of aquatic organisms within the stream's habitat.

**Feature Measure:** Area to be stabilized.

**Scenario Unit::** Cubic Yard

**Scenario Typical Size:** 575.0

**Scenario Total Cost:** $48,694.90

**Scenario Cost/Unit:** $84.69

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 | $304.36 | 0.2 | $60.87 |
| **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 | $25.31 | 20 | $506.20 |
| **Materials** | | | | | | |
| Rock Riprap, Placed with geotextile | 44 | Rock Riprap, placed with geotextile, includes materials, equipment and labor to transport and place | Cubic Yard | $79.57 | 600 | $47,742.00 |
| Tree, willow | 1426 | Willow tree for planting, 18" to 36" seedling. Includes materials and shipping only. | Each | $0.65 | 200 | $130.00 |
| **Mobilization** | | | | | | |
| Mobilization, medium equipment | 1139 | Equipment with 70-150 HP or typical weights between 14,000 and 30,000 pounds. | Each | $255.83 | 1 | $255.83 |

**Practice:** 584 - Channel Bed Stabilization

**Scenario** #10 - Wood structures

**Scenario Description:**

Stabilize the bottom and slope of a stream channel using engineered structures consisting primarily of wood. This includes but not limited to toe wood, log weirs, log vanes, root wads, log step pools, etc. Re-vegetation of exposed surfaces will be completed using 342 - Critical Area Planting. Typical stream has 50 foot bottom width and 6 foot banks. Length of area 100 feet. Structures spaced at 50 foot intervals.

**Before Situation:**

Bed of an existing or newly constructed alluvial or threshold channel is undergoing damaging aggradation or degradation. Changes cannot be controlled feasibly with clearing and snagging, vegetation, bank protection or upstream water control. Soil Erosion: The stream is unstable. Water Quality Degradation: The sediment load has increased in the stream resulting in elevated water temperatures. Excess/Insufficient Water: The excessive sediment load has reduced the water conveyance capacity, storage capacity and flow within the stream. Inadequate Habitat for Fish and Wildlife: The deficiencies in the stream's habitat limit survival, growth, reproduction, and/or diversity of aquatic organisms within the stream.

**After Situation:**

Stream channel is stable. Re-vegetation of exposed surfaces will be completed using 342 - Critical Area Planting. Other associated practices could be (326) Clearing and Snagging, (396 ) Aquatic Organism Passage, (395) Stream Habitat Improvement and Management, (580) Streambank and Shoreline Protection, or (587) Structure for Water Control. For Soil Erosion: The streambank is stable. For Water Quality Degradation: The sediment load has decreased in the stream resulting in improved aquatic habitat. For Excess/Insufficient Water: The water conveyance capacity, storage capacity and flow within the stream has been stabilized. For Inadequate Habitat for Fish and Wildlife: The reduction in the sediment load promotes survival, growth, reproduction, and/or diversity of aquatic organisms within the stream's habitat.

**Feature Measure:** Number of structures

**Scenario Unit::** Each

**Scenario Typical Size:** 3.0

**Scenario Total Cost:** $8,925.17

**Scenario Cost/Unit:** $2,975.06

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 | $2.36 | 40 | $94.40 |
| **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 | $25.31 | 42 | $1,063.02 |
| **Materials** | | | | | | |
| Rock Riprap, Placed with geotextile | 44 | Rock Riprap, placed with geotextile, includes materials, equipment and labor to transport and place | Cubic Yard | $79.57 | 75 | $5,967.75 |
| Wattles or facines, 9 to 12 inch diameter | 1905 | Facines, or wattles: bundles of live tree stems of species that sprout roots, bound together. 9"- 12" diameter. Includes materials and shipping only. | Foot | $12.00 | 150 | $1,800.00 |

**Practice:** 585 - Stripcropping

**Scenario** #1 - Stripcropping - wind and water erosion

**Scenario Description:**

This scenario describes the implementation of a strip cropping system that is designed specifically for the control of wind and water erosion or minimizing the transport of sediments or other water borne contaminants originating from runoff on cropland. The planned strip cropping system will meet the current 585 standard. Implementation will result in alternating strips of erosion susceptible crops with erosion resistant crops that are oriented as close to perpendicular to water flows as possible. The designed system will reduce erosion/sediment/contaminants to desired objectives. The scenario includes the costs of designing the system, installing the strips on the landscape appropriately, and integrating a crop rotation that includes water erosion resistant species.

**Before Situation:**

In this geographic area, excessive water erosion is caused by raising crops in a manner that allows sheet water flows to travel down the slope causing sheet and rill erosion or concentrated flow conditions, degradation of soil health through loss of topsoil and organic matter, along with offsite negative impacts to water quality and aquatic wildlife habitat.

**After Situation:**

A strip cropping system that includes at least two or more strips within the planning slope will be designed to include parallel strips of approximately equal widths of water erosion resistant crop species with non-water erosion resistant crop species. Widths will be determined using current water erosion prediction technology to meet objectives. The design and implementation of a stripcropping system will minimize wind, sheet and rill erosion, protect soil quality, reduce offsite sedimentation, and benefit offsite aquatic wildlife habitat. Erosion prediction before and after practice application will be recorded showing the design and benefits of the practice. Erosion resistant strips in rotation must be managed to maintain the planned vegetative cover and surface roughness.

**Feature Measure:** area of strips

**Scenario Unit::** Acre

**Scenario Typical Size:** 80.0

**Scenario Total Cost:** $141.30

**Scenario Cost/Unit:** $1.77

Cost Details:

| Component Name | ID | Description | Unit | Cost | QTY | Total |
|---|---|---|---|---|---|---|
| **Equipment Installation** | | | | | | |
| Truck, Pickup | 939 | Equipment and power unit costs. Labor not included. | Hour | $21.79 | 3 | $65.37 |
| **Labor** | | | | | | |
| General Labor | 231 | Labor performed using basic tools such as power tool, shovels, and other tools that do not require extensive training. Ex. pipe layer, herder, concrete placement, materials spreader, flagger, etc. | Hour | $25.31 | 3 | $75.93 |

**Practice:** 587 - Structure for Water Control

**Scenario** #1 - Inlet Flashboard Riser, Metal

**Scenario Description:**

A Flashboard Riser fabricated of metal and used in a water management system that maintains a desired water surface elevation, controls the direction or rate of flow, or conveys water to address the resource concerns: Inadequate Water - Inefficient use of Irrigation Water and Inadequate habitat for Fish and Wildlife. The water surface elevation is controlled by addition or removal of slats or "stoplogs". This scenario is applicable to variable crest weir structures where the elevation is controlled at the inlet (Half-Rounds). They are often fabricated from half pipes (i.e. half-rounds) or sheet steel in a box shape. Payment rate is based upon the Flashboard Weir Length in inches multiplied by the outlet length in feet (Inch-Foot). Cost estimate is based on a "Half-Round" flashboard riser shop fabricated using a longitudinal cut 36" smooth steel pipe, a 50' long - 30" outlet pipe passing through an embankment.

**Before Situation:**

The operator presently flood irrigates his field and has no means to accurately maintain a constant water level at varying elevations resulting in a lack of flexibility, and inefficient use of water and energy during pumping. The operator also desires to maintain a permanent pool for water fowl during the winter.

**After Situation:**

The operator has the capability to more efficiently control and maintain a range of water surface elevations thereby reducing the flow rate needed. Less water is wasted and both water and energy is conserved. The operator is now able to maintain adequate water during the winter as a benefit to waterfowl. Any needed re-vegetation of disturbed areas use Critical Area Planting (342). Other associated practices such as; Irrigation Water Management (449), Irrigation Land Leveling (464), Irrigation Canal or Lateral (320), Irrigation System, Tailwater Recovery (447), Dike (356), and Grade Stabilization Structure (410) will use the corresponding Standard(s) as appropriate.

**Feature Measure:** Flashboard Weir Length (in) x barre

**Scenario Unit::** Inch-Foot

**Scenario Typical Size:** 1,800.0

**Scenario Total Cost:** $6,611.74

**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 | $4.45 | 190 | $845.50 |
| Earthfill, Manually Compacted | 50 | Earthfill, manually compacted, includes equipment and labor | Cubic Yard | $5.87 | 10 | $58.70 |
| 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 | $62.74 | 2 | $125.48 |
| **Labor** | | | | | | |
| Skilled Labor | 230 | Labor requiring a high level skill set: Includes carpenters, welders, electricians, conservation professionals involved with data collection, monitoring, and or record keeping, etc. | Hour | $41.76 | 5 | $208.80 |
| 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 | $25.31 | 6 | $151.86 |
| 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 | $44.37 | 5 | $221.85 |
| **Materials** | | | | | | |
| Pipe, Steel, 30", Std Wt, USED | 1361 | Materials: - USED - 30" - Steel Std Wt | Foot | $77.96 | 50 | $3,898.00 |
| Pipe, Steel, 36", Std Wt, USED | 1362 | Materials: - USED - 36" - Steel Std Wt | Foot | $99.54 | 6 | $597.24 |
| 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 | $3.37 | 24 | $80.88 |
| Steel, Plate, 3/8" | 1375 | Flat steel plate, 3/8" thickness. Materials only. | Square Foot | $11.28 | 4 | $45.12 |
| 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 | $1.62 | 32 | $51.84 |
| **Mobilization** | | | | | | |
| Mobilization, very small equipment | 1137 | Equipment that is small enough to be transported by a pick-up truck with typical weights less than 3,500 pounds. Can be multiple pieces of equipment if all hauled simultaneously. | Each | $70.64 | 1 | $70.64 |
| Mobilization, medium equipment | 1139 | Equipment with 70-150 HP or typical weights between 14,000 and 30,000 pounds. | Each | $255.83 | 1 | $255.83 |

**Practice:** 587 - Structure for Water Control

**Scenario** #2 - Inline Flashboard Riser, Metal

**Scenario Description:**

A Flashboard Riser fabricated of metal and used in a water management system that maintains a desired water surface elevation, controls the direction or rate of flow, or conveys water to address the resource concerns: Inadequate Water - Inefficient use of Irrigation Water and Inadequate habitat for Fish and Wildlife. The water surface elevation is controlled by addition or removal of slats or "stoplogs". This scenario is applicable to variable crest weir structures where the elevation is controlled at the embankment. They are often fabricated from vertical pipes with the stoplogs are located in the middle (i.e. Full-Rounds) or sheet steel in a box shape. Payment rate is based upon the Flashboard Weir Length in inches multiplied by the outlet length in feet (Inch-Foot). Cost estimate is based on a "Half-Round" flashboard riser shop fabricated using a longitudinal cut 36" smooth steel pipe, a 50' long - 30" outlet pipe passing through an embankment.

**Before Situation:**

The operator presently flood irrigates his field and has no means to accurately maintain a constant water level at varying elevations resulting in a lack of flexibility, and inefficient use of water and energy during pumping. The operator also desires to maintain a permanent pool for water fowl during the winter.

**After Situation:**

The operator has the capability to more efficiently control and maintain a range of water surface elevations thereby reducing the flow rate needed. Less water is wasted and both water and energy is conserved. The operator is now able to maintain adequate water during the winter as a benefit to waterfowl. Any needed re-vegetation of disturbed areas use Critical Area Planting (342). Other associated practices such as; Irrigation Water Management (449), Irrigation Land Leveling (464), Irrigation Canal or Lateral (320), Irrigation System, Tailwater Recovery (447), Dike (356), and Grade Stabilization Structure (410) will use the corresponding Standard(s) as appropriate.

**Feature Measure:** Flashboard Weir Length (in) x Barre

**Scenario Unit::** Inch-Foot

**Scenario Typical Size:** 1,800.0

**Scenario Total Cost:** $6,929.28

**Scenario Cost/Unit:** $3.85

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 | $4.45 | 190 | $845.50 |
| Earthfill, Manually Compacted | 50 | Earthfill, manually compacted, includes equipment and labor | Cubic Yard | $5.87 | 15 | $88.05 |
| 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 | $62.74 | 4 | $250.96 |
| **Labor** | | | | | | |
| Skilled Labor | 230 | Labor requiring a high level skill set: Includes carpenters, welders, electricians, conservation professionals involved with data collection, monitoring, and or record keeping, etc. | Hour | $41.76 | 7 | $292.32 |
| 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 | $25.31 | 10 | $253.10 |
| 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 | $44.37 | 4 | $177.48 |
| **Materials** | | | | | | |
| Pipe, Steel, 30", Std Wt, USED | 1361 | Materials: - USED - 30" - Steel Std Wt | Foot | $77.96 | 50 | $3,898.00 |
| Pipe, Steel, 36", Std Wt, USED | 1362 | Materials: - USED - 36" - Steel Std Wt | Foot | $99.54 | 6 | $597.24 |
| 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 | $3.37 | 24 | $80.88 |
| Steel, Plate, 3/8" | 1375 | Flat steel plate, 3/8" thickness. Materials only. | Square Foot | $11.28 | 10 | $112.80 |
| 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 | $1.62 | 4 | $6.48 |
| **Mobilization** | | | | | | |
| Mobilization, very small equipment | 1137 | Equipment that is small enough to be transported by a pick-up truck with typical weights less than 3,500 pounds. Can be multiple pieces of equipment if all hauled simultaneously. | Each | $70.64 | 1 | $70.64 |
| Mobilization, medium equipment | 1139 | Equipment with 70-150 HP or typical weights between 14,000 and 30,000 pounds. | Each | $255.83 | 1 | $255.83 |

**Practice:** 587 - Structure for Water Control

**Scenario** #3 - Commercial Inline Flashboard Riser

**Scenario Description:**

An Inline Water Control Structure (WCS) composed of plastic that maintains a desired water surface elevation, controls the direction or rate of flow, or conveys water to address the resource concern: Inadequate habitat for Fish and Wildlife. The water surface elevation is controlled by addition or removal of slats or "stoplogs". This scenario is applicable to variable crest weir structures where the elevation is controlled at point along a pipe extending through an embankment, providing ease of access to the structure and provide better protection against beaver activity. There are commercially available models composed of plastic that are commonly used when the width of the is 24" or less. Payment rate is based upon the Flashboard Weir Length in inches multiplied by the outlet length in feet (Inch-Foot). Cost estimate is based on a using a such a commercial product. The typical scenario is an inline structure with a width of 20", height of six feet, The pipe is 50' of 15" SCH 40 PVC (inlet and outlet combined).

**Before Situation:**

The landowner wishes to provide for a way to control the water surface elevation in a wetland area. The landowner wishes to enhance and enlarge the area to provide habitat for fish and wildlife.

**After Situation:**

A WCS is installed in a flow line allowing shallow water impoundments. A wetland area is enhanced and water levels can be varied to better accommodate wildlife needs. Any needed re-vegetation of disturbed areas use Critical Area Planting (342). Other associated practices such as; Wetland Creation (658), Wetland Enhancement (659) Wetland Wildlife Habitat Management (644), Dike (356), and Grade Stabilization Structure (410) will use the corresponding Standard(s) as appropriate.

**Feature Measure:** Flashboard Weir Length (in) x Barre

**Scenario Unit::** Inch-Foot

**Scenario Typical Size:** 1,000.0

**Scenario Total Cost:** $5,906.16

**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 | $4.45 | 190 | $845.50 |
| Earthfill, Manually Compacted | 50 | Earthfill, manually compacted, includes equipment and labor | Cubic Yard | $5.87 | 15 | $88.05 |
| 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 | $62.74 | 2 | $125.48 |
| **Labor** | | | | | | |
| Skilled Labor | 230 | Labor requiring a high level skill set: Includes carpenters, welders, electricians, conservation professionals involved with data collection, monitoring, and or record keeping, etc. | Hour | $41.76 | 3 | $125.28 |
| 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 | $25.31 | 8 | $202.48 |
| 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 | $44.37 | 2 | $88.74 |
| **Materials** | | | | | | |
| Pipe, PVC, 16", SCH 80 | 1353 | Materials: - 16" - PVC - SCH 80 - ASTM D1785 | Foot | $46.84 | 50 | $2,342.00 |
| 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 | 120 | $1,449.60 |
| **Mobilization** | | | | | | |
| Mobilization, very small equipment | 1137 | Equipment that is small enough to be transported by a pick-up truck with typical weights less than 3,500 pounds. Can be multiple pieces of equipment if all hauled simultaneously. | Each | $70.64 | 1 | $70.64 |
| Mobilization, medium equipment | 1139 | Equipment with 70-150 HP or typical weights between 14,000 and 30,000 pounds. | Each | $255.83 | 1 | $255.83 |

**Practice:** 587 - Structure for Water Control

**Scenario** #4 - Culvert <30 inches HDPE

**Scenario Description:**

Install a new HDPE culvert under 30 inches in diameter to convey water under roads or other barriers. A typical scenario would be an 24 inch diameter pipe, 40 feet in length. Work includes site preparation, acquiring and installing culvert pipe with gravel bedding and fill (compacted), and riprap protection of side slopes. Use (396) Aquatic Organism Passage when the primary intent is biological concerns, not hydrologic. Use (578) Stream Crossing for culverts ≥ 30 inches or perennial flow.

**Before Situation:**

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

**After Situation:**

Water is conveyed in a controlled manner. Associated practices could be Access Road (560), Animal Trails and Walkways (575), Critical Area Planting (342), Drainage Water Management (554), Irrigation Canal or Lateral (320), Irrigation Pipeline (430), Irrigation Reservoir (436), Irrigation System, Surface and Subsurface (443), Irrigation System, Tailwater Recovery (447), Irrigation Water Management (449), Lined Waterway or Outlet (468), Obstruction Removal (500), Pond (378), Stormwater Runoff Control (570), Surface Drain, Field Ditch (607), Surface Drain, Main or Lateral (608), and Trails and Walkways (568).

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

**Scenario Unit::** Inch-Foot

**Scenario Typical Size:** 960.0

**Scenario Total Cost:** $2,299.20

**Scenario Cost/Unit:** $2.40

Cost Details:

| Component Name | ID | Description | Unit | Cost | QTY | Total |
|---|---|---|---|---|---|---|
| **Equipment Installation** | | | | | | |
| Excavation, Common Earth, side cast, small equipment | 48 | Bulk excavation and side casting of common earth with hydraulic excavator with less than 1 CY capacity. Includes equipment and labor. | Cubic Yard | $2.36 | 5 | $11.80 |
| Earthfill, Manually Compacted | 50 | Earthfill, manually compacted, includes equipment and labor | Cubic Yard | $5.87 | 45 | $264.15 |
| **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 | $25.31 | 10 | $253.10 |
| **Materials** | | | | | | |
| Rock Riprap, Placed with geotextile | 44 | Rock Riprap, placed with geotextile, includes materials, equipment and labor to transport and place | Cubic Yard | $79.57 | 2 | $159.14 |
| Aggregate, Gravel, Graded | 46 | Gravel, includes materials, equipment and labor to transport and place. Includes washed and unwashed gravel. | Cubic Yard | $34.75 | 5 | $173.75 |
| 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 | $23.14 | 40 | $925.60 |
| **Mobilization** | | | | | | |
| Mobilization, medium equipment | 1139 | Equipment with 70-150 HP or typical weights between 14,000 and 30,000 pounds. | Each | $255.83 | 2 | $511.66 |

**Practice:** 587 - Structure for Water Control

**Scenario** #5 - Culvert <30 inches CMP

**Scenario Description:**

Install a new Corrugated Metal Pipe (CMP) culvert under 30 inches in diameter to convey water under roads or other barriers. A typical scenario would be an 24 inch diameter pipe, 40 feet in length. Work includes site preparation, acquiring and installing culvert pipe with gravel bedding and fill (compacted), and riprap protection of side slopes. Use (396) Aquatic Organism Passage when the primary intent is biological concerns, not hydrologic. Use (578) Stream Crossing instead for culverts ≥ 30 inches or perennial flow.

**Before Situation:**

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

**After Situation:**

Water is conveyed in a controlled manner. Associated practices could be Access Road (560), Animal Trails and Walkways (575), Critical Area Planting (342), Drainage Water Management (554), Irrigation Canal or Lateral (320), Irrigation Pipeline (430), Irrigation Reservoir (436), Irrigation System, Surface and Subsurface (443), Irrigation System, Tailwater Recovery (447), Irrigation Water Management (449), Lined Waterway or Outlet (468), Obstruction Removal (500), Pond (378), Stormwater Runoff Control (570), Surface Drain, Field Ditch (607), Surface Drain, Main or Lateral (608), and Trails and Walkways (568).

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

**Scenario Unit::** Inch-Foot

**Scenario Typical Size:** 960.0

**Scenario Total Cost:** $2,502.40

**Scenario Cost/Unit:** $2.61

Cost Details:

| Component Name | ID | Description | Unit | Cost | QTY | Total |
|---|---|---|---|---|---|---|
| **Equipment Installation** | | | | | | |
| Excavation, Common Earth, side cast, small equipment | 48 | Bulk excavation and side casting of common earth with hydraulic excavator with less than 1 CY capacity. Includes equipment and labor. | Cubic Yard | $2.36 | 5 | $11.80 |
| Earthfill, Manually Compacted | 50 | Earthfill, manually compacted, includes equipment and labor | Cubic Yard | $5.87 | 45 | $264.15 |
| **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 | $25.31 | 10 | $253.10 |
| **Materials** | | | | | | |
| Rock Riprap, Placed with geotextile | 44 | Rock Riprap, placed with geotextile, includes materials, equipment and labor to transport and place | Cubic Yard | $79.57 | 2 | $159.14 |
| Aggregate, Gravel, Graded | 46 | Gravel, includes materials, equipment and labor to transport and place. Includes washed and unwashed gravel. | Cubic Yard | $34.75 | 5 | $173.75 |
| Pipe, CMP, 24", 12 Gauge | 1417 | 24" Corrugated Metal Pipe, Galvanized, Uncoated, 12 gage. Material cost only. | Foot | $28.22 | 40 | $1,128.80 |
| **Mobilization** | | | | | | |
| Mobilization, medium equipment | 1139 | Equipment with 70-150 HP or typical weights between 14,000 and 30,000 pounds. | Each | $255.83 | 2 | $511.66 |

**Practice:** 587 - Structure for Water Control

**Scenario** #6 - Slide Gate

**Scenario Description:**

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

**Before Situation:**

A channel, aquaculture pond, or pipeline is in need of a head gate to control the flow of water.

**After Situation:**

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

**Feature Measure:** diameter

**Scenario Unit::** Foot

**Scenario Typical Size:** 4.0

**Scenario Total Cost:** $8,319.59

**Scenario Cost/Unit:** $2,079.90

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 | $56.05 | 6 | $336.30 |
| **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 | $41.76 | 12 | $501.12 |
| General Labor | 231 | Labor performed using basic tools such as power tool, shovels, and other tools that do not require extensive training. Ex. pipe layer, herder, concrete placement, materials spreader, flagger, etc. | Hour | $25.31 | 12 | $303.72 |
| 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 | $44.37 | 6 | $266.22 |
| **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 | $255.83 | 1 | $255.83 |

**Practice:** 587 - Structure for Water Control

**Scenario** #7 - Flap Gate

**Scenario Description:**

This scenario is the installation of a permanent flap (tide) gate structure to control the direction of flow resulting from tides or high water or back-flow from flooding. The typical size is a 4' diameter opening. The gate may be installed on an open channel or pipeline. It is made of steel and operates automatically. This scenario assists in addressing the resource concerns: water management. Conservation practices that may be associated are:

**Before Situation:**

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

**After Situation:**

A flap gate 4' wide is installed.

**Feature Measure:** Feet Diameter (of Gate)

**Scenario Unit::** Foot

**Scenario Typical Size:** 4.0

**Scenario Total Cost:** $7,229.69

**Scenario Cost/Unit:** $1,807.42

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 | $56.05 | 6 | $336.30 |
| **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 | $41.76 | 12 | $501.12 |
| General Labor | 231 | Labor performed using basic tools such as power tool, shovels, and other tools that do not require extensive training. Ex. pipe layer, herder, concrete placement, materials spreader, flagger, etc. | Hour | $25.31 | 12 | $303.72 |
| 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 | $44.37 | 6 | $266.22 |
| **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 | $255.83 | 1 | $255.83 |

**Practice:** 587 - Structure for Water Control

**Scenario** #8 - Flap Gate w/ Concrete Wall

**Scenario Description:**

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

**Before Situation:**

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

**After Situation:**

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

**Feature Measure:** Cubic Yards of Concrete

**Scenario Unit::** Cubic Yard

**Scenario Typical Size:** 10.0

**Scenario Total Cost:** $12,727.94

**Scenario Cost/Unit:** $1,272.79

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 | $510.00 | 10 | $5,100.00 |
| 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 | $2.36 | 200 | $472.00 |
| Earthfill, Roller Compacted | 49 | Earthfill, roller or machine compacted, includes equipment and labor | Cubic Yard | $4.45 | 200 | $890.00 |
| **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 | $25.31 | 2 | $50.62 |
| **Materials** | | | | | | |
| Aggregate, Sand, Graded, Washed | 45 | Sand, typical ASTM C33 gradation, includes materials, equipment and labor to transport and place | Cubic Yard | $34.29 | 4 | $137.16 |
| 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 | $255.83 | 2 | $511.66 |

**Practice:** 587 - Structure for Water Control

**Scenario** #9 - 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:** 87.0

**Scenario Total Cost:** $5,905.48

**Scenario Cost/Unit:** $67.88

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 | $272.75 | 2 | $545.50 |
| 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 | $1.59 | 84 | $133.56 |
| **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 | $25.31 | 8 | $202.48 |
| **Materials** | | | | | | |
| Rock Riprap, Placed with geotextile | 44 | Rock Riprap, placed with geotextile, includes materials, equipment and labor to transport and place | Cubic Yard | $79.57 | 57 | $4,535.49 |
| **Mobilization** | | | | | | |
| Mobilization, large equipment | 1140 | Equipment >150HP or typical weights greater than 30,000 pounds or loads requiring over width or over length permits. | Each | $488.45 | 1 | $488.45 |

**Practice:** 587 - Structure for Water Control

**Scenario** #10 - In-Stream Structure for Water Surface Profile

**Scenario Description:**

Typical setting is in a stream that has become incised and is therefore disconnected from the floodplain. Typical installation consists of installing a "Vee" shaped concrete structure which points facing upstream for the purpose of raising the water surface profile. Cost estimate is for one cross vane with a effective length (Streambed width) of 36', and total length of 65', effective height of 3', max height of 6', and a 3' by 1.5' footer; containing 19 cubic yards of Concrete. Disturbed areas are protected with permanent vegetative cover. Addresses resource concerns such as water quality degradation and soil erosion-concentrated flow erosion.

**Before Situation:**

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

**After Situation:**

Banks are stabilized, and pools are created raising the water surface elevation and effectively reducing the slope. Riffle pool scheme is restored and banks are protected. Water quality is protected downstream due to erosion protection, and wetland features are restored in the floodplain. Any needed re-vegetation of disturbed areas use Critical Area Planting (342). Other associated practices such as; Streambank and Shoreline Protection (580) Channel Bed Stabilization (584), Stream Habitat Improvement and Management (395), and Wetland Wildlife Habitat Management (644) will use the corresponding Standard(s) as appropriate.

**Feature Measure:** Streambed Width

**Scenario Unit::** Foot

**Scenario Typical Size:** 36.0

**Scenario Total Cost:** $11,137.25

**Scenario Cost/Unit:** $309.37

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 | $510.00 | 19 | $9,690.00 |
| 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 | $2.36 | 18 | $42.48 |
| Water management, Flooding & dewatering | 969 | Includes equipment and power unit. Labor not included. | Acre Foot | $272.75 | 1 | $272.75 |
| **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 | $25.31 | 10 | $253.10 |
| 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 | $45.69 | 7 | $319.83 |
| **Mobilization** | | | | | | |
| Mobilization, very small equipment | 1137 | Equipment that is small enough to be transported by a pick-up truck with typical weights less than 3,500 pounds. Can be multiple pieces of equipment if all hauled simultaneously. | Each | $70.64 | 1 | $70.64 |
| Mobilization, large equipment | 1140 | Equipment >150HP or typical weights greater than 30,000 pounds or loads requiring over width or over length permits. | Each | $488.45 | 1 | $488.45 |

**Practice:** 587 - Structure for Water Control

**Scenario** #11 - 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:** 1.0

**Scenario Total Cost:** $797.28

**Scenario Cost/Unit:** $797.28

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 | $56.05 | 2 | $112.10 |
| **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 | $25.31 | 5 | $126.55 |
| Equipment Operators, Light | 232 | Includes: Skid Steer Loaders, Hydraulic Excavators <50 HP, Trenchers <12", Ag Equipment <150 HP, Pickup Trucks, Forklifts, Mulchers | Hour | $25.23 | 3 | $75.69 |
| **Materials** | | | | | | |
| Pipe, CMP, 12", 16 Gauge | 1269 | 12" Corrugated Metal Pipe, Galvanized, Uncoated, 16 gage. Material cost only. | Foot | $10.78 | 10 | $107.80 |
| 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 | $255.83 | 1 | $255.83 |

**Practice:** 587 - Structure for Water Control

**Scenario** #12 - Concrete Turnout Structure - Small

**Scenario Description:**

A reinforced concrete turnout structure equipped with slide boards or panels diverts irrigation water from a ditch or canal into a field, field ditch, or aquaculture facility. This scenario is for a four ft tall, two foot wide, and five foot long turnout structure.

**Before Situation:**

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

**After Situation:**

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

**Feature Measure:** Each

**Scenario Unit::** Each

**Scenario Typical Size:** 1.0

**Scenario Total Cost:** $1,382.34

**Scenario Cost/Unit:** $1,382.34

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 | $510.00 | 2 | $1,020.00 |
| Backhoe, 80 HP | 926 | Wheel mounted backhoe excavator with horsepower range of 60 to 90. Equipment and power unit costs. Labor not included. | Hour | $56.05 | 1 | $56.05 |
| **Labor** | | | | | | |
| Equipment Operators, Light | 232 | Includes: Skid Steer Loaders, Hydraulic Excavators <50 HP, Trenchers <12", Ag Equipment <150 HP, Pickup Trucks, Forklifts, Mulchers | Hour | $25.23 | 2 | $50.46 |
| **Mobilization** | | | | | | |
| Mobilization, medium equipment | 1139 | Equipment with 70-150 HP or typical weights between 14,000 and 30,000 pounds. | Each | $255.83 | 1 | $255.83 |

**Practice:** 587 - Structure for Water Control

**Scenario** #13 - Concrete Turnout Structure

**Scenario Description:**

A reinforced concrete turnout structure equipped with a 48 inch slide gate diverts irrigation water from a canal into a field, field ditch, or aquaculture pond. 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, field, or aquaculture pond does not exist. A water supply of sufficient quantity and quality is available.

**After Situation:**

Water is diverted from a canal to meet irrigation or aquaculture 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:** 1.0

**Scenario Total Cost:** $10,699.28

**Scenario Cost/Unit:** $10,699.28

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 | $510.00 | 5 | $2,550.00 |
| Backhoe, 80 HP | 926 | Wheel mounted backhoe excavator with horsepower range of 60 to 90. Equipment and power unit costs. Labor not included. | Hour | $56.05 | 4 | $224.20 |
| **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 | $25.31 | 10 | $253.10 |
| Equipment Operators, Light | 232 | Includes: Skid Steer Loaders, Hydraulic Excavators <50 HP, Trenchers <12", Ag Equipment <150 HP, Pickup Trucks, Forklifts, Mulchers | Hour | $25.23 | 5 | $126.15 |
| **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 | $13.20 | 48 | $633.60 |
| **Mobilization** | | | | | | |
| Mobilization, medium equipment | 1139 | Equipment with 70-150 HP or typical weights between 14,000 and 30,000 pounds. | Each | $255.83 | 1 | $255.83 |

**Practice:** 587 - Structure for Water Control

**Scenario** #14 - Flow Meter with Mechanical Index

**Scenario Description:**

Permanently installed water flow meter with mechanical, cumulative volume and rate index. Meters can be any flow measurement device that meets CPS 433, (i.e. meters: turbine, propeller, acoustic, magnetic, venturi, orifice, etc.) with or without straightening vanes. Resource Concerns: Insufficient Water - Inefficient use of irrigation water, and Degraded Plant Condition - Undesirable plant productivity and health, and Inefficient Energy Use - Equipment and facilities Associated Practices: 533-Pumping Plant, 449-Irrigation Water Management, 441-Irrigation System, Microirrigation, 443-Irrigation System Surface and Subsurface, 442-Irrigation System, Sprinkler, 328-Conservation Crop Rotation, 634-Waste Transfer, and 590-Nutrient Management.

**Before Situation:**

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

**After Situation:**

Producer is able to access instantaneous rate and cumulative flow volume data at the meter location. The information gained will enable the irrigator to improve irrigation water management, recognize system performance issues before they become critical, and reduce energy use.

**Feature Measure:** Nominal Diameter of Meter

**Scenario Unit::** Inch

**Scenario Typical Size:** 10.0

**Scenario Total Cost:** $1,995.16

**Scenario Cost/Unit:** $199.52

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 | $70.64 | 2 | $141.28 |

**Practice:** 587 - Structure for Water Control

**Scenario** #15 - Flow Meter with Electronic Index

**Scenario Description:**

Permanently installed water flow meter with an electronic index . Meters can be any flow measurement device that meets CPS 433, (i.e., meters: turbine, propeller, acoustic, magnetic, venturi, orifice, etc.) with or without straightening vanes or data logging capability. Meter nominal diameter for insert type turbine meters will be installation pipe size. Typical installation would include installation of a 10 inch turbine flow meter, with electronic index output. Resource Concerns: Insufficient Water - Inefficient use of irrigation water, and Degraded Plant Condition - Undesirable plant productivity and health, and Inefficient Energy Use - Equipment and facilities Associated Practices: 533-Pumping Plant, 449-Irrigation Water Management, 441-Irrigation System, Microirrigation, 443-Irrigation System Surface and Subsurface, 442-Irrigation System, Sprinkler, 328-Conservation Crop Rotation, 634-Waster Transfer, and 590-Nutrient Management.

**Before Situation:**

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

**After Situation:**

Producer is able to access instantaneous rate and cumulative flow volume data at the meter location. The information gained will enable the irrigator to improve irrigation water management, recognize system performance issues before they become critical, and reduce energy use.

**Feature Measure:** Nominal Diameter of Meter

**Scenario Unit::** Inch

**Scenario Typical Size:** 10.0

**Scenario Total Cost:** $3,793.38

**Scenario Cost/Unit:** $379.34

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 | $70.64 | 2 | $141.28 |

**Practice:** 587 - Structure for Water Control

**Scenario** #16 - Flow Meter with Electronic Index & Telemetry

**Scenario Description:**

Permanently installed water flow meter with an electronic flow rate and volume index and data telemetry transmission system. Meters can be any flow measurement device that meets CPS 433, (i.e. meters: turbine, propeller, acoustic, magnetic, venturi, orifice, etc.) with or without straightening vanes. Meter nominal diameter for insert type turbine meters will be installation pipe size. Typical installation would include installation of a 10 inch magnetic flow meter, with electronic index output and telemetry data transfer system for monitoring irrigation system flow rate. Resource Concerns: Insufficient Water - Inefficient use of irrigation water, and Degraded Plant Condition - Undesirable plant productivity and health, and Inefficient Energy Use - Equipment and facilities Associated Practices: 533-Pumping Plant, 449-Irrigation Water Management, 441-Irrigation System, Microirrigation, 443-Irrigation System Surface and Subsurface, 442-Irrigation System, Sprinkler, 328-Conservation Crop Rotation, 634-Waste Transfer, and 590-Nutrient Management.

**Before Situation:**

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

**After Situation:**

Producer is able to access instantaneous rate and cumulative flow volume data from a personal computer or cell phone at any time. The information gained will enable the irrigator to improve irrigation water management, recognize system performance issues before they become critical, and reduce energy use.

**Feature Measure:** Nominal Diameter of Meter

**Scenario Unit::** Inch

**Scenario Typical Size:** 10.0

**Scenario Total Cost:** $5,268.27

**Scenario Cost/Unit:** $526.83

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 | $5,126.99 | 1 | $5,126.99 |
| **Mobilization** | | | | | | |
| Mobilization, very small equipment | 1137 | Equipment that is small enough to be transported by a pick-up truck with typical weights less than 3,500 pounds. Can be multiple pieces of equipment if all hauled simultaneously. | Each | $70.64 | 2 | $141.28 |

**Practice:** 587 - Structure for Water Control

**Scenario** #17 - Fish Screens <= 400 gpm

**Scenario Description:**

An inline intake screens assembly is designed according to applicable Federal and State guidelines, to avoid entrainment or trapping of aquatic organisms. This practice can also be used at the inlet and/or outlet of an aquaculture facility to prevent the emigration of cultured organisms or the entrainment of native aquatic organisms into the influent water supply. Typical scenario is a screen assembly rated for 250gpm including the clamp, screen body, rings and adapters.

**Before Situation:**

The intake pipe of an irrigation system or aquaculture facility is not properly screened resulting in excessive velocities prejudicial to T&E fish species or other aquatic organisms, or the outlet of a fish culture facility is not properly screened resulting in the unintentional emigration of cultured species.

**After Situation:**

A fish screen is installed on a pipe inlet to prevent the entrainment or trapping of aquatic organisms, or a fish screen is installed on the outlet of an aquaculture facility to prevent the unintentional emigration of cultured species.

**Feature Measure:** Number of screens

**Scenario Unit::** Each

**Scenario Typical Size:** 1.0

**Scenario Total Cost:** $1,484.19

**Scenario Cost/Unit:** $1,484.19

Cost Details:

| Component Name | ID | Description | Unit | Cost | QTY | Total |
|---|---|---|---|---|---|---|
| **Labor** | | | | | | |
| General Labor | 231 | Labor performed using basic tools such as power tool, shovels, and other tools that do not require extensive training. Ex. pipe layer, herder, concrete placement, materials spreader, flagger, etc. | Hour | $25.31 | 4 | $101.24 |
| **Materials** | | | | | | |
| Pump intake screen, Linear, fixed cost portion | 2069 | Fixed cost portion of linear fish intake pump screen including all adapters, o-rings, mounting tabs, and other accessories. This is the base cost for the system. Includes materials and shipping only. | Each | $522.95 | 1 | $522.95 |
| Pump intake screen, Linear, variable cost portion | 2070 | Variable cost portion of linear fish intake pump screen including all adapters, o-rings, mounting tabs, and other accessories. Includes materials and shipping only. | Gallon per Minute | $3.44 | 250 | $860.00 |

**Practice:** 587 - Structure for Water Control

**Scenario** #18 - Fish Screen > 400gpm

**Scenario Description:**

An inline intake screens assembly is designed according to applicable Federal and State guidelines, to avoid entrainment or trapping of aquatic organisms. This practice can also be used at the inlet and/or outlet of an aquaculture facility to prevent the emigration of cultured organisms or the entrainment of native aquatic orcansithms into the influent water supply. Typical scenario is a screen assembly rated for 600gpm including the clamp, screen body, rings and adapters.

**Before Situation:**

The intake pipe of an irrigation system or an aquaculture facility is not properly screened resulting in excessive velocities detrimental to aquatic organisms, or the outlet of an fish culture facility is not properly screen resulting in the unintentional emigration of cultured species.

**After Situation:**

A fish screen is installed on a pipe inlet to prevent the entrainment or trapping of aquatic organisms, or a fish screen is installed on the outlet of an aquaculture facility to prevent the unintentional emigration of cultured species.

**Feature Measure:** Number of screens

**Scenario Unit::** Each

**Scenario Typical Size:** 1.0

**Scenario Total Cost:** $2,688.19

**Scenario Cost/Unit:** $2,688.19

Cost Details:

| Component Name | ID | Description | Unit | Cost | QTY | Total |
|---|---|---|---|---|---|---|
| **Labor** | | | | | | |
| General Labor | 231 | Labor performed using basic tools such as power tool, shovels, and other tools that do not require extensive training. Ex. pipe layer, herder, concrete placement, materials spreader, flagger, etc. | Hour | $25.31 | 4 | $101.24 |
| **Materials** | | | | | | |
| Pump intake screen, Linear, fixed cost portion | 2069 | Fixed cost portion of linear fish intake pump screen including all adapters, o-rings, mounting tabs, and other accessories. This is the base cost for the system. Includes materials and shipping only. | Each | $522.95 | 1 | $522.95 |
| Pump intake screen, Linear, variable cost portion | 2070 | Variable cost portion of linear fish intake pump screen including all adapters, o-rings, mounting tabs, and other accessories. Includes materials and shipping only. | Gallon per Minute | $3.44 | 600 | $2,064.00 |

**Practice:** 587 - Structure for Water Control

**Scenario** #19 - Catch Basin, 3 ft width

**Scenario Description:**

This scenario involves installation of a small catch basin to control surface water or overflow water and provide a safe outlet for the water. Catch basin is precast concrete with a typical size of 3 feet (square or round) and 6 feet deep. Catch basin is placed on firm bedding and is backfilled using aggregate and/or earthfill.

**Before Situation:**

Prior to installation of the practice surface runoff is causing erosion. No safe outlet exists for surface water.

**After Situation:**

Water is collected in a controlled manner and a safe outlet is provided significantly reducing or eliminating erosion in the area. Associated practices may include: Waste Storage Facility (313), Diversion (362), Grade Stabilization Structure (410), Livestock Pipeline (516), Underground Outlet (620), Waste Transfer (634), or others.

**Feature Measure:** Vertical Foot of Catch Basin

**Scenario Unit::** Vertical Foot

**Scenario Typical Size:** 6.0

**Scenario Total Cost:** $1,716.25

**Scenario Cost/Unit:** $286.04

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 | $2.53 | 2 | $5.06 |
| Earthfill, Manually Compacted | 50 | Earthfill, manually compacted, includes equipment and labor | Cubic Yard | $5.87 | 37.5 | $220.13 |
| 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 | $1.69 | 43 | $72.67 |
| **Materials** | | | | | | |
| Aggregate, Gravel, Graded | 46 | Gravel, includes materials, equipment and labor to transport and place. Includes washed and unwashed gravel. | Cubic Yard | $34.75 | 3.9 | $135.53 |
| 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 | $794.42 | 1 | $794.42 |
| **Mobilization** | | | | | | |
| Mobilization, large equipment | 1140 | Equipment >150HP or typical weights greater than 30,000 pounds or loads requiring over width or over length permits. | Each | $488.45 | 1 | $488.45 |

**Practice:** 587 - Structure for Water Control

**Scenario** #20 - Catch Basin, 5 ft diameter

**Scenario Description:**

This scenario involves installation of a large catch basin to control surface water or overflow water and provide a safe outlet for the water. Catch basin is precast concrete with a typical size of 60 inches in diameter and 6 feet deep. Catch basin is placed on firm bedding and is backfilled using aggregate and/or earthfill.

**Before Situation:**

Prior to installation of the practice surface runoff is causing erosion. No safe outlet exists for surface water.

**After Situation:**

Water is collected in a controlled manner and a safe outlet is provided significantly reducing or eliminating erosion in the area. Associated practices may include: Waste Storage Facility (313), Diversion (362), Grade Stabilization Structure (410), Livestock Pipeline (516), Underground Outlet (620), Waste Transfer (634), or others.

**Feature Measure:** Vertical Foot of Catch Basin

**Scenario Unit::** Vertical Foot

**Scenario Typical Size:** 6.0

**Scenario Total Cost:** $3,110.31

**Scenario Cost/Unit:** $518.39

Cost Details:

| Component Name | ID | Description | Unit | Cost | QTY | Total |
|---|---|---|---|---|---|---|
| **Equipment Installation** | | | | | | |
| Geotextile, woven | 42 | Woven Geotextile Fabric. Includes materials, equipment and labor | Square Yard | $2.53 | 5.5 | $13.92 |
| Earthfill, Manually Compacted | 50 | Earthfill, manually compacted, includes equipment and labor | Cubic Yard | $5.87 | 49.5 | $290.57 |
| 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 | $1.69 | 56.7 | $95.82 |
| **Materials** | | | | | | |
| Aggregate, Gravel, Graded | 46 | Gravel, includes materials, equipment and labor to transport and place. Includes washed and unwashed gravel. | Cubic Yard | $34.75 | 7.2 | $250.20 |
| Catch Basin, concrete, 60" dia. | 1754 | Precast 60-in diameter catch basin, 6' deep, with collar and grate cover. Materials only. | Each | $1,971.36 | 1 | $1,971.36 |
| **Mobilization** | | | | | | |
| Mobilization, large equipment | 1140 | Equipment >150HP or typical weights greater than 30,000 pounds or loads requiring over width or over length permits. | Each | $488.45 | 1 | $488.45 |

**Practice:** 590 - Nutrient Management

**Scenario** #2 - Basic NM with Manure Injection or Incorporation

**Scenario Description:**

This scenario describes the implementation of a basic nutrient management system on > = 40 acres of cropland or hayland where all applied nutrient sources (nitrogen, phosphorus, and potassium) are either incorporated using tillage at least 3-4 inches deep or injected into the soil at least 3-6 inches deep (Exceptions for incorporation or injection include: established close grown crops such as wheat or perennial crops such as hay or pasture). This scenario is applicable on non-organic and organic land for all nutrient sources (manure, compost, commercial fertilizers, and organic sources of nutrients). Micro-nutrients may be surface applied. The planned NM system will meet the current Nutrient Management (590) CPS. Implementation will result in the proper rate, source, method of placement (incorporation or injection), and timing of nutrient application. Payment for implementation is to defray the costs of soil testing, manure analysis, incorporation or injection of all nutrients, and the implementation of the nutrient management plan and recordkeeping. Records demonstrating implementation of the 4 R's of NM will be required. Scenario is designed to address the Nutrient Management (590) purposes for nitrogen losses via N2O emissions, nitrogen leaching, and nitrogen and phosphorus surface runoff. The basis for nutrient applications will be recommendations based on soil tests; and when applicable, plant tissue, manure, and compost analyses. Soil loss is controlled to the soil loss tolerance criteria or less for the significant soil map unit.

**Before Situation:**

In this geographic area, a fertility program is not properly managed to supply the proper rate, timing, method of application, and source to address air and water quality. Application of fertilizers, including manures, composts, and amendments, are surface applied and completed annually based upon tradition that does not specifically consider the detrimental effects of improper timing or rates of all nutrient sources, or excess nutrient buildup in the soil, emissions of N2O, surface runoff, or the leaching of nitrogen to ground or surface water via subsurface drainage. Fields are overwintered with little or no erosion protection often times resulting in sheet, rill, and ephemeral erosion by spring. Soil testing is not completed on a regular basis and applications of all nutrient sources are not based on land grant university recommendations or a nutrient budget. An environmental evaluation or risk assessment is not completed. Nutrients are transported to surface waters through runoff, drainage tile, soil erosion, or to ground water from leaching in quantities that degrade air and water quality. Soil quality may be degraded by excess or inadequate nutrients and erosion. Fields have little or no erosion protection during critical periods often times resulting in sheet, rill, and ephemeral erosion in excess of the planning criteria.

**After Situation:**

A nutrient management system is developed with the producer to meet the current Nutrient Management (590) CPS; and when applicable, the system will also meet NOP regulations. All nutrient sources will be incorporated with tillage at least 3-4 inches deep or injected at least 4-6 inches deep into the soil (Exceptions for incorporation or injection include: established close grown crops such as wheat or perennial crops such as hay or pasture). Implementation of the nutrient management plan (NMP) will benefit plant productivity while also reducing the potential for off-site degradation. A nutrient management budget will be developed for each field based on soil test analysis and land grant university recommendations or crop removal rates. On planning units typically 40 acres or larger, soil testing (and where applicable manure analyses, plant tissue analyses, etc.) is completed according to LGU recommendations. Applications of all phosphorus and nitrogen sources are based on risk assessments (PI - phosphorus index and leaching index). Records will be provided annually documenting current soil tests and other plant or manure analyses, date and rate of applications, form and placement of nutrients for each field, including post-harvest yields. Nutrient applications will be completed according to the NMP that minimizes nutrient runoff, nitrogen leaching, nitrogen emissions, or buildup of excess nutrient concentrations in the soil.

**Feature Measure:** <Unknown>

**Scenario Unit::** Acre

**Scenario Typical Size:** 40.0

**Scenario Total Cost:** $901.06

**Scenario Cost/Unit:** $22.53

Cost Details:

| Component Name | ID | Description | Unit | Cost | QTY | Total |
|---|---|---|---|---|---|---|
| **Equipment Installation** | | | | | | |
| Truck, Pickup | 939 | Equipment and power unit costs. Labor not included. | Hour | $21.79 | 1 | $21.79 |
| Tillage, Primary | 946 | Includes heavy disking (offset) or chisel plow. Includes equipment, power unit and labor costs. | Acre | $16.60 | 40 | $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 | $25.31 | 4 | $101.24 |
| **Materials** | | | | | | |
| Test, Soil Test, Standard | 299 | Includes materials, shiping, labor, and equipment costs. | Each | $10.04 | 2 | $20.08 |
| Test, Manure Analysis | 306 | Moisture, Total N, P, K. Includes materials and shipping only. | Each | $44.78 | 1 | $44.78 |
| Test, Compost Analysis | 307 | Moisture, Total N, P, K. Includes materials and shipping only. | Each | $49.17 | 1 | $49.17 |

**Practice:** 590 - Nutrient Management

**Scenario** #5 - NM Nitrification/Urease Inhibitors, variable rate, grid/zone soil sampling, soil nitrate/plant tissue test (Non-Organic/Organic)

**Scenario Description:**

This scenario takes a conventional cropping system where either no nutrient management or only a very basic level of nutrient management is being practiced and improves it to address air quality (reduce emissions for N fertilizer) and/or minimize agricultural nonpoint source pollution of surface and groundwater. The planned NM system will meet the current Nutrient Management (590) CPS general and additional criteria. Nutrient management system includes such items as split applications, variable rate applications, nitrification or urease inhibitors, additional nutrient tests including PSNT (pre-side dress nitrogen test), CSNT (corn stalk nitrate test), and PPSN (pre-plant soil nitrate test), chlorophyll meters, and/or spectral analysis may be used to further refine nutrient applications. Payment for implementation is to defray the costs of grid or zone soil testing, additional testing and analysis, nitrification or urease inhibitors, equipment, implementation of the NMP and recordkeeping. Typical treatment area is 40 acres.

**Before Situation:**

In this geographic area, conventional fertility programs involve very little or no soil or manure testing. Application of fertilizers, including manures and amendments, are completed annually based upon tradition that does not specifically consider the detrimental affects of improper timing or rates of nutrients, nitrous oxide emissions or excess nutrient build-up in the soil. Fields are overwintered with little or no erosion protection often times resulting in sheet, rill, and ephemeral erosion by spring. Runoff flows into adjacent streams, water courses, tile drains, field surface drains, or other water courses causing degradation to receiving waters or leaching of nutrients to shallow ground water sources. There is typically no environmental evaluation of the potential for off-site movement. Soil quality may also be detrimentally affected.

**After Situation:**

A nutrient management system will be developed to meet the current Nutrient Management (590) CPS general and additional criteria, when applicable system will also meet NOP regulations. Development and implementation of a Nutrient Management Plan (NMP) base on the 4Rs will benefit plant productivity while reducing potential of off-site movement of nutrients, including the use of nitrification or urease inhibitors to reduce nitrogen emissions. NMP may include practices such as use of split applications, slow release nutrients, nitrification inhibitors, urease inhibitors, proper timing of application, more appropriate formulations, banding, etc. Additional nutrient tests including PSNT (pre-side dress nitrogen test), CSNT (corn stalk nitrate test), and PPSN (pre-plant soil nitrate test), chlorophyll meters, spectral analysis, etc., may also be used to further refine nutrient applications. Use of a post-harvest soil test or tissue tests will help establish the adequacy of the plan in meeting crop needs while minimizing P application rate and residual N, thus reducing the potential for off-site impacts. Potential for offsite movement of nutrient may be further reduced by identifying variability across the field(s) by using soil survey maps or other simple techniques to establish management zones, along with grid or zone soil testing. Nutrients are applied at rates based on soil test zone analyses. Nitrogen and Phosphorus risk assessment tools are completed and results included in the nutrient management system specifications as required by current NRCS 590 CPS criteria and any mitigation measures are included in the conservation plan if determined needed by risk assessment results. Soil testing is completed according to LGU recommendations. Analysis are completed at least once every three years for N-P-K, and for N annually. A nutrient budget is developed for each field or management zone annually. Records will be provided annually of the current soil test, analysis, application rates, forms and rates of nutrients for each field, including crop yields.

**Feature Measure:** <Unknown>

**Scenario Unit::** Acre

**Scenario Typical Size:** 40.0

**Scenario Total Cost:** $1,286.39

**Scenario Cost/Unit:** $32.16

Cost Details:

| Component Name | ID | Description | Unit | Cost | QTY | Total |
|---|---|---|---|---|---|---|
| **Equipment Installation** | | | | | | |
| Truck, Pickup | 939 | Equipment and power unit costs. Labor not included. | Hour | $21.79 | 2 | $43.58 |
| All terrain vehicles, ATV | 965 | Includes equipment, power unit and labor costs. | Hour | $28.28 | 2 | $56.56 |
| Chlorophyll Reader | 1125 | Applicator and chlorophyll sensor includes labor.?? No materials | Acre | $11.01 | 40 | $440.40 |
| **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 | $25.31 | 4 | $101.24 |
| 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 | $110.71 | 1 | $110.71 |
| **Materials** | | | | | | |
| Nitrogen-Urease inhibitor | 260 | Nitrogen-Urease inhibitor | Acre | $8.55 | 40 | $342.00 |
| Test, Soil Test, Precision, Grid or Zone DELETION SCHEDULED for PS FY 2018 , USE CID 299 | 300 | Includes materials, shipping, labor, and equipment costs. DELETION SCHEDULED for PS FY 2018 , USE CID 299 | Each | $10.31 | 15 | $154.65 |
| Test, Plant Tissue Test | 301 | Tissue analysis for crops. Includes materials and shipping only. | Each | $24.61 | 1 | $24.61 |
| Test, Soil Nitrogen Testing | 311 | Pre-Side Dress/Deep Soil Testing. Includes materials and shipping only. | Each | $12.64 | 1 | $12.64 |

**Practice:** 590 - Nutrient Management

**Scenario** #6 - NM grid/zone soil sampling, variable rate, soil nitrate/plant tissue test (Non-Organic/Organic)

**Scenario Description:**

This scenario takes a conventional cropping system where either no nutrient management or only a very basic level of nutrient management is being practiced and improves it to minimize agricultural nonpoint source pollution of surface and groundwater. The planned NM system will meet the current Nutrient Management (590) CPS general and additional criteria. Nutrient management system includes such items as split applications, variable rate applications, additional nutrient tests including PSNT (pre-side dress nitrogen test), CSNT (corn stalk nitrate test), and PPSN (pre-plant soil nitrate test), chlorophyll meters, and/or spectral analysis may be used to further refine nutrient applications. Payment for implementation is to defray the costs of grid or zone soil testing, additional testing and analysis, equipment, implementation of the NMP and recordkeeping. Typical treatment area is 40 acres.

**Before Situation:**

In this geographic area, conventional fertility programs involve very little or no soil or manure testing. Application of fertilizers, including manures and amendments, are completed annually based upon tradition that does not specifically consider the detrimental affects of improper timing or rates of nutrients or excess nutrient build-up in the soil. Fields are overwintered with little or no erosion protection often times resulting in sheet, rill, and ephemeral erosion by spring. Runoff flows into adjacent streams, water courses, tile drains, field surface drains, or other water courses causing degradation to receiving waters or leaching of nutrients to shallow ground water sources. There is typically no environmental evaluation of the potential for off-site movement. Soil quality may also be detrimentally affected.

**After Situation:**

A nutrient management system will be developed to meet the current Nutrient Management (590) CPS general and additional criteria, when applicable system will also meet NOP regulations. Development and implementation of a Nutrient Management Plan (NMP) base on the 4Rs will benefit plant productivity while reducing potential of off-site movement of nutrients. NMP may include practices such as use of split applications, slow release nutrients, proper timing of application, more appropriate formulations, banding, etc. Additional nutrient tests including PSNT (pre-side dress nitrogen test), CSNT (corn stalk nitrate test), and PPSN (pre-plant soil nitrate test), chlorophyll meters, spectral analysis, etc., may also be used to further refine nutrient applications. Use of a post-harvest soil test or tissue tests will help establish the adequacy of the plan in meeting crop needs while minimizing P application rate and residual N, thus reducing the potential for off-site impacts. Potential for offsite movement of nutrient may be further reduced by identifying variability across the field(s) by using soil survey maps or other simple techniques to establish management zones, along with grid or zone soil testing. Nutrients are applied at rates based on soil test zone analyses. Nitrogen and Phosphorus risk assessment tools are completed and results included in the nutrient management system specifications as required by current NRCS 590 CPS criteria and any mitigation measures are included in the conservation plan if determined needed by risk assessment results. Soil testing is completed according to LGU recommendations. Analysis are completed at least once every three years for N-P-K, and for N annually. A nutrient budget is developed for each field or management zone annually. Records will be provided annually of the current soil test, analysis, application rates, forms and rates of nutrients for each field, including crop yields.

**Feature Measure:** <Unknown>

**Scenario Unit::** Acre

**Scenario Typical Size:** 40.0

**Scenario Total Cost:** $922.60

**Scenario Cost/Unit:** $23.07

Cost Details:

| Component Name | ID | Description | Unit | Cost | QTY | Total |
|---|---|---|---|---|---|---|
| **Equipment Installation** | | | | | | |
| Truck, Pickup | 939 | Equipment and power unit costs. Labor not included. | Hour | $21.79 | 1 | $21.79 |
| All terrain vehicles, ATV | 965 | Includes equipment, power unit and labor costs. | Hour | $28.28 | 2 | $56.56 |
| Chlorophyll Reader | 1125 | Applicator and chlorophyll sensor includes labor.?? No materials | Acre | $11.01 | 40 | $440.40 |
| **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 | $25.31 | 4 | $101.24 |
| 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 | $110.71 | 1 | $110.71 |
| **Materials** | | | | | | |
| Test, Soil Test, Precision, Grid or Zone DELETION SCHEDULED for PS FY 2018 , USE CID 299 | 300 | Includes materials, shipping, labor, and equipment costs. DELETION SCHEDULED for PS FY 2018 , USE CID 299 | Each | $10.31 | 15 | $154.65 |
| Test, Plant Tissue Test | 301 | Tissue analysis for crops. Includes materials and shipping only. | Each | $24.61 | 1 | $24.61 |
| Test, Soil Nitrogen Testing | 311 | Pre-Side Dress/Deep Soil Testing. Includes materials and shipping only. | Each | $12.64 | 1 | $12.64 |

**Practice:** 590 - Nutrient Management

**Scenario** #261 - Basic NM (Non-Organic/Organic)

**Scenario Description:**

This scenario describes the implementation of a basic nutrient management system on > = 40 acres of cropland or hayland where there is no manure application. Scenario is applicable on non-organic and organic land. The planned NM system will meet the current Nutrient Management (590) CPS. Implementation will result in the proper rate, source, method of placement, and timing of nutrient application. Payment for implementation is to defray the costs of soil testing, analysis, and implementation of the nutrient management plan and recordkeeping. Records demonstrating implementation of the 4 R's of NM will be required.

**Before Situation:**

In this geographic area, a fertility program is either nonexistent or does not meet the Nutrient Management (590) CPS. Soil testing is not completed on a regular basis and applications of fertilizers are not based on land grant university recommendations or a nutrient budget. An environmental evaluation or risk assessment is not completed. Nutrients are transported to surface waters through runoff, drainage tile, or soil erosion, or to ground water from leaching in quantities that degrade water quality and limit use of intended purposes. Soil quality may be degraded by excess or inadequate nutrients. Fields have little or no erosion protection during critical periods often times resulting in sheet, rill, and ephemeral erosion.

**After Situation:**

A nutrient management system will be developed to meet the current Nutrient Management (590) CPS, when applicable system will also meet NOP regulations. Development and implementation of a nutrient management plan (NMP) will benefit plant productivity while also reducing potential for off-site degradation. A nutrient management budget will be developed for each field(s) based on soil test analysis and land grant university recommendations or crop removal rates. On planning units typically 40 acres or larger, soil testing is completed according to LGU recommendations. Records will be provided annually of the current soil test, analysis, application rates, forms and rates of nutrients for each field, including crop yields. Nutrient applications will be completed according to the Nutrient Management Plan that minimizes nutrient runoff and leaching or buildup of excess nutrient concentrations.

**Feature Measure:** <Unknown>

**Scenario Unit::** Acre

**Scenario Typical Size:** 40.0

**Scenario Total Cost:** $82.45

**Scenario Cost/Unit:** $2.06

Cost Details:

| Component Name | ID | Description | Unit | Cost | QTY | Total |
|---|---|---|---|---|---|---|
| **Equipment Installation** | | | | | | |
| Truck, Pickup | 939 | Equipment and power unit costs. Labor not included. | Hour | $21.79 | 1 | $21.79 |
| **Labor** | | | | | | |
| General Labor | 231 | Labor performed using basic tools such as power tool, shovels, and other tools that do not require extensive training. Ex. pipe layer, herder, concrete placement, materials spreader, flagger, etc. | Hour | $25.31 | 2 | $50.62 |
| **Materials** | | | | | | |
| Test, Soil Test, Standard | 299 | Includes materials, shiping, labor, and equipment costs. | Each | $10.04 | 1 | $10.04 |

**Practice:** 590 - Nutrient Management

**Scenario** #263 - Small Farm NM (Non-Organic/Organic)

**Scenario Description:**

Scenario is applicable on non-organic and organic land. Scenario implementation of a basic nutrient management system on small, often diversified farm systems typically between 0.5-10 acres where manure and/or compost may be utilized either alone or in conjunction with commercial fertilizer. The planned NM system will meet the current Nutrient Management (590) CPS. Implementation will result in the proper rate, source, method of placement, and timing of nutrient application. Payment for implementation is to defray the costs of soil testing, manure and/or compost analysis, and implementation of the nutrient management plan and recordkeeping. Records demonstrating implementation of the 4 R's of NM will be required. Scenario is designed to encourage producers to effectively utilize commercial fertilizers, organic fertilizers, manure, and/or compost appropriately improving soil quality and minimizing runoff of nutrients from fields to surface waters. The basis for nutrient applications will be recommendations based on soil, manure, and compost analyses.

**Before Situation:**

In this geographic area, a fertility program is either nonexistent or does not meet the Nutrient Management (590). Soil testing is not completed on a regular basis and applications of fertilizers are not based on land grant university recommendations or a nutrient budget. An environmental evaluation or risk assessment is not completed. Nutrients are transported to surface waters through runoff, drainage tile, or soil erosion, or to ground water from leaching in quantities that degrade water quality and limit use of intended purposes. Soil quality may be degraded by excess or inadequate nutrients. Fields have little or no erosion protection during critical periods often times resulting in sheet, rill, and ephemeral erosion.

**After Situation:**

A nutrient management system will be developed to meet the current Nutrient Management (590), when applicable system will also meet NOP regulations. Development and implementation of a nutrient management plan (NMP) will benefit plant productivity while also reducing potential for off-site degradation. A nutrient management budget will be developed for each field, crop block, or crop rotation within a block/field based on soil test analysis and land grant university recommendations or crop removal rates. Application of nutrients will be completed at the proper rate, timing, and methods, and sources per the NMP. Records will be provided annually of current soil test, analysis, application timing, nutrient source, application method, application rate, and crop yields for each block. Nutrient applications will be completed according to the NMP that minimizes nutrient runoff and leaching or buildup of excess nutrient concentrations.

**Feature Measure:** <Unknown>

**Scenario Unit::** Each

**Scenario Typical Size:** 1.0

**Scenario Total Cost:** $164.65

**Scenario Cost/Unit:** $164.65

Cost Details:

| Component Name | ID | Description | Unit | Cost | QTY | Total |
|---|---|---|---|---|---|---|
| **Labor** | | | | | | |
| General Labor | 231 | Labor performed using basic tools such as power tool, shovels, and other tools that do not require extensive training. Ex. pipe layer, herder, concrete placement, materials spreader, flagger, etc. | Hour | $25.31 | 2 | $50.62 |
| **Materials** | | | | | | |
| Test, Soil Test, Standard | 299 | Includes materials, shiping, labor, and equipment costs. | Each | $10.04 | 2 | $20.08 |
| Test, Manure Analysis | 306 | Moisture, Total N, P, K. Includes materials and shipping only. | Each | $44.78 | 1 | $44.78 |
| Test, Compost Analysis | 307 | Moisture, Total N, P, K. Includes materials and shipping only. | Each | $49.17 | 1 | $49.17 |

**Practice:** 590 - Nutrient Management

**Scenario** #264 - Basic NM with Manure and/or Compost (Non-Organic/Organic)

**Scenario Description:**

This scenario describes the implementation of a basic nutrient management system on > = 40 acres of cropland or hayland where manure and/or compost is utilized either alone or in conjunction with commercial fertilizer. Scenario is applicable on non-organic and organic land. The planned NM system will meet the current Nutrient Management (590) CPS. Implementation will result in the proper rate, source, method of placement, and timing of nutrient application. Payment for implementation is to defray the costs of soil testing, manure and/or compost analysis, and implementation of the nutrient management plan and recordkeeping. Records demonstrating implementation of the 4 R's of NM will be required. Scenario is designed to encourage producers to effectively utilize commercial fertilizers, organic fertilizers, manure, and/or compost appropriately improving soil quality and minimizing runoff of nutrients from fields to surface waters. The basis for nutrient applications will be recommendations based on soil, manure, and compost analyses.

**Before Situation:**

In this geographic area, a fertility program is either nonexistent or at a basic level. Application of fertilizers, including manures, composts, and amendments, are completed annually based upon tradition that does not specifically consider the detrimental effects of improper timing or rates of nutrients, or excess nutrient buildup in the soil. Fields are overwintered with little or no erosion protection often times resulting in sheet, rill, and ephemeral erosion by spring. Soil testing is not completed on a regular basis and applications of fertilizers are not based on land grant university recommendations or a nutrient budget. An environmental evaluation or risk assessment is not completed. Nutrients are transported to surface waters through runoff, drainage tile, or soil erosion, or to ground water from leaching in quantities that degrade water quality and limit use of intended purposes. Soil quality may be degraded by excess or inadequate nutrients. Fields have little or no erosion protection during critical periods often times resulting in sheet, rill, and ephemeral erosion.

**After Situation:**

A nutrient management system will be developed to meet the current Nutrient Management (590) CPS, when applicable system will also meet NOP regulations. Development and implementation of a nutrient management plan (NMP) will benefit plant productivity while also reducing potential for off-site degradation. A nutrient management budget will be developed for each field(s) based on soil test analysis and land grant university recommendations or crop removal rates. On planning units typically 40 acres or larger, soil testing is completed according to LGU recommendations. Records will be provided annually of the current soil test, analysis, application rate, forms and rates of nutrients for each field, including crop yields. Nutrient applications will be completed according to the Nutrient Management Plan that minimizes nutrient runoff and leaching or buildup of excess nutrient concentrations.

**Feature Measure:** <Unknown>

**Scenario Unit::** Acre

**Scenario Typical Size:** 40.0

**Scenario Total Cost:** $127.23

**Scenario Cost/Unit:** $3.18

Cost Details:

| Component Name | ID | Description | Unit | Cost | QTY | Total |
|---|---|---|---|---|---|---|
| **Equipment Installation** | | | | | | |
| Truck, Pickup | 939 | Equipment and power unit costs. Labor not included. | Hour | $21.79 | 1 | $21.79 |
| **Labor** | | | | | | |
| General Labor | 231 | Labor performed using basic tools such as power tool, shovels, and other tools that do not require extensive training. Ex. pipe layer, herder, concrete placement, materials spreader, flagger, etc. | Hour | $25.31 | 2 | $50.62 |
| **Materials** | | | | | | |
| Test, Soil Test, Standard | 299 | Includes materials, shiping, labor, and equipment costs. | Each | $10.04 | 1 | $10.04 |
| Test, Manure Analysis | 306 | Moisture, Total N, P, K. Includes materials and shipping only. | Each | $44.78 | 1 | $44.78 |

**Practice:** 590 - Nutrient Management

**Scenario** #267 - Adaptive NM

**Scenario Description:**

The practice scenario is for the implementation of nutrient management on a small plot, as detailed in outlined in Agronomy Technical Note 7 - Adaptive Nutrient Management. Scenario includes implementing replicated strip trials on a field plot to evaluate, identify and implement various nutrient use efficiency improvement methods for timing, rate, method of application, or source of nutrients.

**Before Situation:**

The practice will be installed on cropland (small grain rotation or typical corn-soybean rotation) to address water quality degradation, air quality degradation and energy concerns. The scenario applies to non-organic and organic operations.

**After Situation:**

Installation of this scenario will result in adopting the four R's of nutrient management following the procedures outlined in Agronomy Technical Note 7 - Adaptive Nutrient Management. Implementation involves establishing the replicated plots to evaluate one or more of the 4 R's. The plot will consist of at least 4 replicated plots designed, laid out, managed and evaluated with the assistance of a consultant or extension professional knowledgeable in nutrient management and experimental design and data collection. Results are used to make nutrient application decisions to address water quality degradation issues and nutrient use efficiencies. Yields will be measured and statistically analyzed and summarized following the procedures in Agronomy Technical Note 7. The yields for each plot will be adjusted to the appropriate moisture content.

**Feature Measure:** <Unknown>

**Scenario Unit::** Each

**Scenario Typical Size:** 1.0

**Scenario Total Cost:** $2,053.81

**Scenario Cost/Unit:** $2,053.81

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 | $25.31 | 16 | $404.96 |
| Specialist Labor | 235 | Labor requiring a specialized skill set: Includes Agronomists, Foresters, Biologists, etc. to provide additional technical information during the planning and implementation of the practice. Does not include NRCS or TSP services. | Hour | $110.71 | 10 | $1,107.10 |
| **Materials** | | | | | | |
| Test, Soil Test, Standard | 299 | Includes materials, shiping, labor, and equipment costs. | Each | $10.04 | 2 | $20.08 |
| Test, Plant Tissue Test | 301 | Tissue analysis for crops. Includes materials and shipping only. | Each | $24.61 | 14 | $344.54 |
| Test, Soil Nitrogen Testing | 311 | Pre-Side Dress/Deep Soil Testing. Includes materials and shipping only. | Each | $12.64 | 14 | $176.96 |

**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 or 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 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).

**Feature Measure:** Acres of management applied

**Scenario Unit::** Acre

**Scenario Typical Size:** 40.0

**Scenario Total Cost:** $747.78

**Scenario Cost/Unit:** $18.69

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 | $41.76 | 2 | $83.52 |
| Specialist Labor | 235 | Labor requiring a specialized skill set: Includes Agronomists, Foresters, Biologists, etc. to provide additional technical information during the planning and implementation of the practice. Does not include NRCS or TSP services. | Hour | $110.71 | 6 | $664.26 |

**Practice:** 595 - Integrated Pest Management (IPM)

**Scenario** #2 - Basic IPM Field over 1RC

**Scenario Description:**

A basic IPM plan with LGU-approved pest monitoring techniques and pest thresholds (where available) is applied in Large Scale Field or 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 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).

**Feature Measure:** Acres of management applied

**Scenario Unit::** Acre

**Scenario Typical Size:** 40.0

**Scenario Total Cost:** $1,010.96

**Scenario Cost/Unit:** $25.27

Cost Details:

| Component Name | ID | Description | Unit | Cost | QTY | Total |
|---|---|---|---|---|---|---|
| **Labor** | | | | | | |
| Skilled Labor | 230 | Labor requiring a high level skill set: Includes carpenters, welders, electricians, conservation professionals involved with data collection, monitoring, and or record keeping, etc. | Hour | $41.76 | 3 | $125.28 |
| Specialist Labor | 235 | Labor requiring a specialized skill set: Includes Agronomists, Foresters, Biologists, etc. to provide additional technical information during the planning and implementation of the practice. Does not include NRCS or TSP services. | Hour | $110.71 | 8 | $885.68 |

**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 or 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 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:** Acres of management applied

**Scenario Unit::** Acre

**Scenario Typical Size:** 40.0

**Scenario Total Cost:** $1,495.56

**Scenario Cost/Unit:** $37.39

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 | $41.76 | 4 | $167.04 |
| Specialist Labor | 235 | Labor requiring a specialized skill set: Includes Agronomists, Foresters, Biologists, etc. to provide additional technical information during the planning and implementation of the practice. Does not include NRCS or TSP services. | Hour | $110.71 | 12 | $1,328.52 |

**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 or 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 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).

**Feature Measure:** Acres of management applied

**Scenario Unit::** Acre

**Scenario Typical Size:** 10.0

**Scenario Total Cost:** $1,052.72

**Scenario Cost/Unit:** $105.27

Cost Details:

| Component Name | ID | Description | Unit | Cost | QTY | Total |
|---|---|---|---|---|---|---|
| **Labor** | | | | | | |
| Skilled Labor | 230 | Labor requiring a high level skill set: Includes carpenters, welders, electricians, conservation professionals involved with data collection, monitoring, and or record keeping, etc. | Hour | $41.76 | 4 | $167.04 |
| Specialist Labor | 235 | Labor requiring a specialized skill set: Includes Agronomists, Foresters, Biologists, etc. to provide additional technical information during the planning and implementation of the practice. Does not include NRCS or TSP services. | Hour | $110.71 | 8 | $885.68 |

**Practice:** 595 - Integrated Pest Management (IPM)

**Scenario** #5 - Basic IPM Fruit Veg over 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 or 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).

**Feature Measure:** Acres of management applied

**Scenario Unit::** Acre

**Scenario Typical Size:** 10.0

**Scenario Total Cost:** $1,357.66

**Scenario Cost/Unit:** $135.77

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 | $41.76 | 6 | $250.56 |
| Specialist Labor | 235 | Labor requiring a specialized skill set: Includes Agronomists, Foresters, Biologists, etc. to provide additional technical information during the planning and implementation of the practice. Does not include NRCS or TSP services. | Hour | $110.71 | 10 | $1,107.10 |

**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 or 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).

**Feature Measure:** Acres of management applied

**Scenario Unit::** Acre

**Scenario Typical Size:** 10.0

**Scenario Total Cost:** $2,078.25

**Scenario Cost/Unit:** $207.83

Cost Details:

| Component Name | ID | Description | Unit | Cost | QTY | Total |
|---|---|---|---|---|---|---|
| **Labor** | | | | | | |
| Skilled Labor | 230 | Labor requiring a high level skill set: Includes carpenters, welders, electricians, conservation professionals involved with data collection, monitoring, and or record keeping, etc. | Hour | $41.76 | 10 | $417.60 |
| Specialist Labor | 235 | Labor requiring a specialized skill set: Includes Agronomists, Foresters, Biologists, etc. to provide additional technical information during the planning and implementation of the practice. Does not include NRCS or TSP services. | Hour | $110.71 | 15 | $1,660.65 |

**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 or 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).

**Feature Measure:** Acres of management applied

**Scenario Unit::** Acre

**Scenario Typical Size:** 10.0

**Scenario Total Cost:** $1,357.66

**Scenario Cost/Unit:** $135.77

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 | $41.76 | 6 | $250.56 |
| Specialist Labor | 235 | Labor requiring a specialized skill set: Includes Agronomists, Foresters, Biologists, etc. to provide additional technical information during the planning and implementation of the practice. Does not include NRCS or TSP services. | Hour | $110.71 | 10 | $1,107.10 |

**Practice:** 595 - Integrated Pest Management (IPM)

**Scenario** #8 - Basic IPM Orchard over 1RC

**Scenario Description:**

A basic IPM plan with LGU-approved pest monitoring techniques and pest thresholds (where available) is applied in Large Scale Orchard or 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).

**Feature Measure:** Acres of management applied

**Scenario Unit::** Acre

**Scenario Typical Size:** 10.0

**Scenario Total Cost:** $2,078.25

**Scenario Cost/Unit:** $207.83

Cost Details:

| Component Name | ID | Description | Unit | Cost | QTY | Total |
|---|---|---|---|---|---|---|
| **Labor** | | | | | | |
| Skilled Labor | 230 | Labor requiring a high level skill set: Includes carpenters, welders, electricians, conservation professionals involved with data collection, monitoring, and or record keeping, etc. | Hour | $41.76 | 10 | $417.60 |
| Specialist Labor | 235 | Labor requiring a specialized skill set: Includes Agronomists, Foresters, Biologists, etc. to provide additional technical information during the planning and implementation of the practice. Does not include NRCS or TSP services. | Hour | $110.71 | 15 | $1,660.65 |

**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).

**Feature Measure:** Acres of management applied

**Scenario Unit::** Acre

**Scenario Typical Size:** 10.0

**Scenario Total Cost:** $3,258.20

**Scenario Cost/Unit:** $325.82

Cost Details:

| Component Name | ID | Description | Unit | Cost | QTY | Total |
|---|---|---|---|---|---|---|
| **Labor** | | | | | | |
| Skilled Labor | 230 | Labor requiring a high level skill set: Includes carpenters, welders, electricians, conservation professionals involved with data collection, monitoring, and or record keeping, etc. | Hour | $41.76 | 25 | $1,044.00 |
| 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 | $110.71 | 20 | $2,214.20 |

**Practice:** 595 - Integrated Pest Management (IPM)

**Scenario** #10 - IPM Sm Farm 1RC

**Scenario Description:**

A basic IPM plan with LGU-approved pest monitoring techniques and pest thresholds (where available) is applied in Small Farm or 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).

**Feature Measure:** Acres of management applied

**Scenario Unit::** Each

**Scenario Typical Size:** 1.0

**Scenario Total Cost:** $637.07

**Scenario Cost/Unit:** $637.07

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 | $41.76 | 2 | $83.52 |
| Specialist Labor | 235 | Labor requiring a specialized skill set: Includes Agronomists, Foresters, Biologists, etc. to provide additional technical information during the planning and implementation of the practice. Does not include NRCS or TSP services. | Hour | $110.71 | 5 | $553.55 |

**Practice:** 595 - Integrated Pest Management (IPM)

**Scenario** #11 - IPM Sm Farm over 1RC

**Scenario Description:**

A basic IPM plan with LGU-approved pest monitoring techniques and pest thresholds (where available) is applied in Small Farm or 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).

**Feature Measure:** Acres of management applied

**Scenario Unit::** Each

**Scenario Typical Size:** 1.0

**Scenario Total Cost:** $831.30

**Scenario Cost/Unit:** $831.30

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 | $41.76 | 4 | $167.04 |
| Specialist Labor | 235 | Labor requiring a specialized skill set: Includes Agronomists, Foresters, Biologists, etc. to provide additional technical information during the planning and implementation of the practice. Does not include NRCS or TSP services. | Hour | $110.71 | 6 | $664.26 |

**Practice:** 595 - Integrated Pest Management (IPM)

**Scenario** #12 - Advanced IPM Sm 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 or 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:** Acres of management applied

**Scenario Unit::** Each

**Scenario Typical Size:** 1.0

**Scenario Total Cost:** $1,246.95

**Scenario Cost/Unit:** $1,246.95

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 | $41.76 | 6 | $250.56 |
| Specialist Labor | 235 | Labor requiring a specialized skill set: Includes Agronomists, Foresters, Biologists, etc. to provide additional technical information during the planning and implementation of the practice. Does not include NRCS or TSP services. | Hour | $110.71 | 9 | $996.39 |

**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:** Acres of management applied

**Scenario Unit::** Acre

**Scenario Typical Size:** 10.0

**Scenario Total Cost:** $1,733.50

**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 | $41.76 | 15 | $626.40 |
| 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 | $110.71 | 10 | $1,107.10 |

**Practice:** 600 - Terrace

**Scenario** #1 - Broad-based

**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 broad-based terrace having 5:1 upstream and 5:1 downstream slopes measuring 1,000 feet in a field with slopes from 2% to 8% constructed in loam soils or similar in regards to workability. Channel and berm are farmed. A stable outlet is provided in the form of a Grassed Waterway or Underground Outlet. Costs include all equipment and forces necessary to excavate, shape, and compact terrace. This practice addresses Concentrated Flow Erosion and Excessive Sediment in surface waters.

**Before Situation:**

Long slope lengths contribute to excessive sedimentation and soil erosion in cropped fields as a result of gully, rill, and sheet erosion. The excessive erosion may lead to deterioration of receiving waters due to excessive sedimentation and nutrient transport.

**After Situation:**

A system of broad-based terraces measuring 1,000 feet in length, 2.5 height, and 5:1 front and back slopes is installed with spacing designed to intercept flow of water and shorten slope length to reduce erosion to acceptable levels. Work is done with dozer, scraper, or road grader. The installed terrace is typically farmed. Associated practices are Critical Area Planting (342), Grassed Waterway (412), and Underground Outlet (620).

**Feature Measure:** Length of Terrace

**Scenario Unit::** Foot

**Scenario Typical Size:** 1,000.0

**Scenario Total Cost:** $4,571.57

**Scenario Cost/Unit:** $4.57

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 | $124.03 | 24 | $2,976.72 |
| **Labor** | | | | | | |
| Equipment Operators, Heavy | 233 | Includes: Cranes, Hydraulic Excavators >=50 HP, Dozers, Paving Machines, Rock Trenchers, Trenchers >=12", Dump Trucks, Ag Equipment >=150 HP, Scrapers, Water Wagons. | Hour | $44.37 | 24 | $1,064.88 |
| 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 | $45.69 | 6 | $274.14 |
| **Mobilization** | | | | | | |
| Mobilization, medium equipment | 1139 | Equipment with 70-150 HP or typical weights between 14,000 and 30,000 pounds. | Each | $255.83 | 1 | $255.83 |

**Practice:** 606 - Subsurface Drain

**Scenario** #1 - Corrugated Plastic Pipe (CPP), Single-Wall, less than or equal to 6 inch

**Scenario Description:**

Description: Below ground installation of perforated HDPE (Corrugated Plastic Pipe) pipeline, using a backhoe. HDPE (CPP) Single-Wall is manufactured in sizes (nominal diameter) from 3-inch to 24-inch; typical practice sizes range from 3-inch to 12-inch; and typical scenario size is 6-inch. Construct 1,000 feet of 6-inch, Single-Wall, perforated HDPE Corrugated Plastic Pipe (CPP), installed below ground to a minimum depth 5 feet. The unit is in length of pipe. The typical number of mainline connections for 1,000 feet of subsurface drainline is ~ 2 each. Resource Concerns: Excess Water (Seasonal High Water Table); Degraded Plant Condition; Water Quality Degradation (Nutrients). Associated Practices: 608 - Surface Drain, Main or Lateral; 587 - Structure for Water Control, 533 - Pumping Plant; 606- Underground Outlet, and 554 - Drainage Water Management.

**Before Situation:**

Before installation soil conditions are excessively wet in the spring due to poor internal soil drainage. Excess soil water is causing crop stress and delay of field operations (seed bed preparation, planting, etc.).

**After Situation:**

The drainage modifications result in reduced plant stress due to excessive wetness caused by a seasonal high water table, or improved drainage water quality due to system retrofit enabling drainage water management.

**Feature Measure:** Length of pipe

**Scenario Unit::** Foot

**Scenario Typical Size:** 1,000.0

**Scenario Total Cost:** $4,025.61

**Scenario Cost/Unit:** $4.03

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 | $2.36 | 703 | $1,659.08 |
| 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 | $2.16 | 333 | $719.28 |
| **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 | $25.31 | 8 | $202.48 |
| **Materials** | | | | | | |
| Pipe, HDPE, 6", CPT, Single Wall | 1242 | Pipe, Corrugated Plastic Tubing, Single Wall, 6" diameter - ASTM F405. Material cost only. | Foot | $1.13 | 1000 | $1,130.00 |
| Drainage Lateral Connection | 1458 | Connect 3"-6" drainage lateral to main drain, includes excavation to 6' depth, install tee on main line, connect lateral, and backfill. Includes material cost for tee. | Each | $29.47 | 2 | $58.94 |
| **Mobilization** | | | | | | |
| Mobilization, medium equipment | 1139 | Equipment with 70-150 HP or typical weights between 14,000 and 30,000 pounds. | Each | $255.83 | 1 | $255.83 |

**Practice:** 606 - Subsurface Drain

**Scenario** #2 - Enveloped Corrugated Plastic Pipe (CPP), Single-Wall, less than or equal to 6 inch

**Scenario Description:**

Description: Below ground installation of perforated HDPE (Corrugated Plastic Pipe) pipeline with Sand-Gravel envelope, using a or backhoe. HDPE (CPP) Single-Wall is manufactured in sizes (nominal diameter) from 3-inch to 24-inch; typical practice sizes range from 3-inch to 12-inch; and typical scenario size is 6-inch. Construct 1,000 feet of 6-inch, Single-Wall, perforated HDPE Corrugated Plastic Pipe (CPP), installed below ground to a minimum depth of 5 feet, and surrounded with a sand-gravel envelope lined with geotextile. The unit is in length of pipe. The typical volume sand-gravel for 1,000 feet of 2'wide x 12" high envelope is 74 cubic yards. The typical number of mainline connections for 1,000 feet of subsurface drainline is a total of 2 each. Resource Concerns: Excess Water (seasonal High Water Table); Degraded Plant Condition; Water Quality Degradation (Nutrients). Associated Practices: 608 - Surface Drain, Main or Lateral; 587 - Structure for Water Control, 533 - Pumping Plant; 606-Underground Outlet, and 554 - Drainage Water Management.

**Before Situation:**

Before installation soil conditions are excessively wet in the spring due to poor internal soil drainage. Excess soil water is causing crop stress and delay of field operations (seed bed preparation, planting, etc.).

**After Situation:**

The drainage modifications result in reduced plant stress due to excessive wetness caused by a seasonal high water table, or improved drainage water quality due to system retrofit enabling drainage water management.

**Feature Measure:** length of pipe

**Scenario Unit::** Foot

**Scenario Typical Size:** 1,000.0

**Scenario Total Cost:** $9,563.35

**Scenario Cost/Unit:** $9.56

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 | $2.36 | 666 | $1,571.76 |
| 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 | $2.16 | 296 | $639.36 |
| **Labor** | | | | | | |
| General Labor | 231 | Labor performed using basic tools such as power tool, shovels, and other tools that do not require extensive training. Ex. pipe layer, herder, concrete placement, materials spreader, flagger, etc. | Hour | $25.31 | 8 | $202.48 |
| **Materials** | | | | | | |
| Aggregate, Gravel, Graded | 46 | Gravel, includes materials, equipment and labor to transport and place. Includes washed and unwashed gravel. | Cubic Yard | $34.75 | 74 | $2,571.50 |
| Geotextile, non-woven, heavy weight | 1210 | Non-woven greater than 8 ounce/square yard geotextile with staple anchoring. Materials and shipping only. | Square Yard | $4.34 | 722 | $3,133.48 |
| Pipe, HDPE, 6", CPT, Single Wall | 1242 | Pipe, Corrugated Plastic Tubing, Single Wall, 6" diameter - ASTM F405. Material cost only. | Foot | $1.13 | 1000 | $1,130.00 |
| Drainage Lateral Connection | 1458 | Connect 3"-6" drainage lateral to main drain, includes excavation to 6' depth, install tee on main line, connect lateral, and backfill. Includes material cost for tee. | Each | $29.47 | 2 | $58.94 |
| **Mobilization** | | | | | | |
| Mobilization, medium equipment | 1139 | Equipment with 70-150 HP or typical weights between 14,000 and 30,000 pounds. | Each | $255.83 | 1 | $255.83 |

**Practice:** 606 - Subsurface Drain

**Scenario** #3 - Env Corrugated Plastic Pipe (CPP), Single-Wall, less than or equal to 6 inch, 10 feet deep

**Scenario Description:**

Description: Below ground installation of perforated HDPE (Corrugated Plastic Pipe) pipeline with Sand-Gravel envelope, using a backhoe. HDPE (CPP) Single-Wall is manufactured in sizes (nominal diameter) from 3-inch to 24-inch; typical practice sizes range from 3-inch to 12-inch; and typical scenario size is 6-inch. Construct 1,000 feet of 6-inch, Single-Wall, perforated HDPE Corrugated Plastic Pipe (CPP), installed below ground to a depth of 10 feet, and surrounded with a sand-gravel envelope. The unit is in length of pipe. The typical volume sand-gravel for 1,000 feet of 2'wide x 12" high envelope is 74 cubic yards. The typical number of mainline connections for 1,000 feet of subsurface drainline is a total of 2 each. Resource Concerns: Excess Water (seasonal High Water Table); Degraded Plant Condition; Water Quality Degradation (Nutrients). Associated Practices: 608 - Surface Drain, Main or Lateral; 587 - Structure for Water Control, 533 - Pumping Plant; 606-Underground Outlet, and 554 - Drainage Water Management.

**Before Situation:**

Before installation soil conditions are excessively wet in the spring due to poor internal soil drainage. Excess soil water is causing crop stress and delay of field operations (seed bed preparation, planting, etc.).

**After Situation:**

The drainage modifications result in reduced plant stress due to excessive wetness caused by a seasonal high water table, or improved drainage water quality due to system retrofit enabling drainage water management.

**Feature Measure:** length of pipe

**Scenario Unit::** Foot

**Scenario Typical Size:** 1,000.0

**Scenario Total Cost:** $14,595.43

**Scenario Cost/Unit:** $14.60

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 | $2.36 | 2111 | $4,981.96 |
| 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 | $2.16 | 1000 | $2,160.00 |
| **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 | $25.31 | 12 | $303.72 |
| **Materials** | | | | | | |
| Aggregate, Gravel, Graded | 46 | Gravel, includes materials, equipment and labor to transport and place. Includes washed and unwashed gravel. | Cubic Yard | $34.75 | 74 | $2,571.50 |
| Geotextile, non-woven, heavy weight | 1210 | Non-woven greater than 8 ounce/square yard geotextile with staple anchoring. Materials and shipping only. | Square Yard | $4.34 | 722 | $3,133.48 |
| Pipe, HDPE, 6", CPT, Single Wall | 1242 | Pipe, Corrugated Plastic Tubing, Single Wall, 6" diameter - ASTM F405. Material cost only. | Foot | $1.13 | 1000 | $1,130.00 |
| Drainage Lateral Connection | 1458 | Connect 3"-6" drainage lateral to main drain, includes excavation to 6' depth, install tee on main line, connect lateral, and backfill. Includes material cost for tee. | Each | $29.47 | 2 | $58.94 |
| **Mobilization** | | | | | | |
| Mobilization, medium equipment | 1139 | Equipment with 70-150 HP or typical weights between 14,000 and 30,000 pounds. | Each | $255.83 | 1 | $255.83 |

**Practice:** 606 - Subsurface Drain

**Scenario** #4 - Corrugated Plastic Pipe (CPP), Single-Wall, greater or equal to 8 inch

**Scenario Description:**

Description: Below ground installation of HDPE (Corrugated Plastic Pipe) pipeline, using a backhoe. HDPE (CPP) Single-Wall is manufactured in sizes (nominal diameter) from 3-inch to 24-inch; typical practice sizes range from 3-inch to 12-inch; and typical scenario size is 10-inch. Construct 1,000 feet of 10-inch, Single-Wall, HDPE Corrugated Plastic Pipe (CPP), installed below ground to a minimum depth 5 feet. The unit is in length of pipe of pipe in feet. Resource Concerns: Excess Water (Seasonal High Water Table); Degraded Plant Condition; Water Quality Degradation (Nutrients). Associated Practices: 607 - Surface Drain, Field Ditch; 608 - Surface Drain, Main or Lateral; 587 - Structure for Water Control, 533 - Pumping Plant; and 554 - Drainage Water Management.

**Before Situation:**

Before installation soil conditions are excessively wet in the spring due to poor internal soil drainage. Excess soil water is causing crop stress and delay of field operations (seed bed preparation, planting, etc.).

**After Situation:**

The drainage modifications result in reduced plant stress due to excessive wetness caused by a seasonal high water table, or improved drainage water quality due to system retrofit enabling drainage water management.

**Feature Measure:** Weight of Pipe

**Scenario Unit::** Foot

**Scenario Typical Size:** 1,000.0

**Scenario Total Cost:** $13,163.94

**Scenario Cost/Unit:** $13.16

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 | $2.36 | 740 | $1,746.40 |
| Compaction, earthfill, vibratory plate | 1260 | Compaction of earthfill with a walk behind vibratory plate compactor in typical 6-8 inch thick lifts, 2 passes. Includes equipment and labor. | Cubic Yard | $2.16 | 278 | $600.48 |
| **Labor** | | | | | | |
| General Labor | 231 | Labor performed using basic tools such as power tool, shovels, and other tools that do not require extensive training. Ex. pipe layer, herder, concrete placement, materials spreader, flagger, etc. | Hour | $25.31 | 8 | $202.48 |
| **Materials** | | | | | | |
| Aggregate, Gravel, Graded | 46 | Gravel, includes materials, equipment and labor to transport and place. Includes washed and unwashed gravel. | Cubic Yard | $34.75 | 185 | $6,428.75 |
| Pipe, HDPE, 10", PCPT, Single Wall | 1273 | Pipe, Corrugated Plastic Tubing, Single Wall, Perforated, 10" diameter - ASTM F667. Material cost only. | Foot | $3.93 | 1000 | $3,930.00 |
| **Mobilization** | | | | | | |
| Mobilization, medium equipment | 1139 | Equipment with 70-150 HP or typical weights between 14,000 and 30,000 pounds. | Each | $255.83 | 1 | $255.83 |

**Practice:** 606 - Subsurface Drain

**Scenario** #5 - Corrugated Plastic Pipe (CPP), Twin-Wall, greater or equal to 8 inch

**Scenario Description:**

Description: Below ground installation of HDPE (Corrugated Plastic Pipe) pipeline, using a backhoe. HDPE (CPP) Twin-Wall is manufactured in sizes (nominal diameter) from 4-inch to 60-inch; typical practice sizes range from 8-inch to 15-inch; and typical scenario size is 12-inch. Construct 1,000 feet of 12-inch, Twin-Wall, HDPE Corrugated Plastic Pipe (CPP), installed below ground to a minimum depth 5 feet. The unit is in length of pipe in feet. Resource Concerns: Excess Water (Seasonal High Water Table); Degraded Plant Condition; Water Quality Degradation (Nutrients). Associated Practices: 607 - Surface Drain, Field Ditch; 608 - Surface Drain, Main or Lateral; 587 - Structure for Water Control, 533 - Pumping Plant; and 554 - Drainage Water Management.

**Before Situation:**

Before installation soil conditions are excessively wet in the spring due to poor internal soil drainage. Excess soil water is causing crop stress and delay of field operations (seed bed preparation, planting, etc.).

**After Situation:**

The drainage modifications result in reduced plant stress due to excessive wetness caused by a seasonal high water table, or improved drainage water quality due to system retrofit enabling drainage water management.

**Feature Measure:** length of pipe

**Scenario Unit::** Foot

**Scenario Typical Size:** 1,000.0

**Scenario Total Cost:** $18,827.77

**Scenario Cost/Unit:** $18.83

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 | $2.36 | 888 | $2,095.68 |
| 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 | $2.16 | 333 | $719.28 |
| **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 | $25.31 | 8 | $202.48 |
| **Materials** | | | | | | |
| Aggregate, Gravel, Graded | 46 | Gravel, includes materials, equipment and labor to transport and place. Includes washed and unwashed gravel. | Cubic Yard | $34.75 | 222 | $7,714.50 |
| Pipe, HDPE, corrugated double wall, LTE-12", soil tight, weight priced | 1587 | High Density Polyethylene (HDPE) compound manufactured into double wall corrugated pipe LTE-12" diameter. Materials only. | Pound | $2.45 | 3200 | $7,840.00 |
| **Mobilization** | | | | | | |
| Mobilization, medium equipment | 1139 | Equipment with 70-150 HP or typical weights between 14,000 and 30,000 pounds. | Each | $255.83 | 1 | $255.83 |

**Practice:** 606 - Subsurface Drain

**Scenario** #6 - 4 inch PVC Footing Drain w/ geotextile fabric

**Scenario Description:**

Description: Below ground installation of 4" Perf PVC to improve soil drainage. Installed where greater strength is needed under high traffic areas; in locations where replacement may be difficult; or in conjunction with other structural conservation practices to remove excess water and ensure proper function of that practice. Pipe usually installed in a crushed stone envelope, w/ geotextile around base of structure. Resource Concerns: Excess Water (Seasonal High Water Table); Water Quality Degradation (Nutrients). Per practice it supports. Associated Practices: 607 - Surface Drain, Field Ditch; 608 - Surface Drain, Main or Lateral; 587 - Structure for Water Control, 533 - Pumping Plant; 606 Underground Outlet, 313 Waste Storage Facility, and 554 - Drainage Water Management.

**Before Situation:**

Before installation soil conditions are excessively wet due to poor internal soil drainage. Excess soil water threatens stability/functionality of proposed conservation practice.

**After Situation:**

The drainage modifications result in improved drainage of groundwater to ensure function and longevity of supporting practice.

**Feature Measure:** length of pipe

**Scenario Unit::** Foot

**Scenario Typical Size:** 100.0

**Scenario Total Cost:** $742.40

**Scenario Cost/Unit:** $7.42

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 | $25.31 | 4 | $101.24 |
| **Materials** | | | | | | |
| Aggregate, Gravel, Graded | 46 | Gravel, includes materials, equipment and labor to transport and place. Includes washed and unwashed gravel. | Cubic Yard | $34.75 | 8 | $278.00 |
| Pipe, PVC, 4", SDR 26 | 989 | Materials: - 4" - PVC - SDR 26 160 psi - ASTM D2241 | Foot | $2.68 | 100 | $268.00 |
| Geotextile, non-woven, light weight | 1209 | Non-woven less than 8 ounce/square yard geotextile with staple anchoring. Materials and shipping only. | Square Yard | $1.22 | 78 | $95.16 |

**Practice:** 606 - Subsurface Drain

**Scenario** #7 - 6 inch Corrugated Plastic Pipe Footing Drain

**Scenario Description:**

Description: Below ground installation of 6" Perf corrugated plastic pipe to improve soil drainage. Installed along structures footings; or in conjunction with other structural conservation practices to remove excess water and ensure proper function of that practice. Pipe usually installed in a crushed stone envelope around base of structure. All excavation is included in other associated practice(s). Resource Concerns: Excess Water (Seasonal High Water Table); Water Quality Degradation (Nutrients). Per practice it supports. Associated Practices: 607 - Surface Drain, Field Ditch; 608 - Surface Drain, Main or Lateral; 587 - Structure for Water Control, 533 - Pumping Plant; 606 Underground Outlet, 313 Waste Storage Facility, and 554 - Drainage Water Management.

**Before Situation:**

Before installation soil conditions are excessively wet due to poor internal soil drainage. Excess soil water threatens stability/functionality of proposed conservation practice.

**After Situation:**

The drainage modifications result in improved drainage of groundwater to ensure function and longevity of supporting practice.

**Feature Measure:** length of pipe

**Scenario Unit::** Foot

**Scenario Typical Size:** 100.0

**Scenario Total Cost:** $492.24

**Scenario Cost/Unit:** $4.92

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 | $25.31 | 4 | $101.24 |
| **Materials** | | | | | | |
| Aggregate, Gravel, Graded | 46 | Gravel, includes materials, equipment and labor to transport and place. Includes washed and unwashed gravel. | Cubic Yard | $34.75 | 8 | $278.00 |
| Pipe, HDPE, 6", CPT, Single Wall | 1242 | Pipe, Corrugated Plastic Tubing, Single Wall, 6" diameter - ASTM F405. Material cost only. | Foot | $1.13 | 100 | $113.00 |

**Practice:** 606 - Subsurface Drain

**Scenario** #8 - 6 inch Footing Drain w/ Geotextile Fabric

**Scenario Description:**

Description: Below ground installation of 4" Perf PVC or 6" Perf corrugated plastic pipe to improve soil drainage. PVC installed where greater strength is needed under high traffic areas; in locations where replacement may be difficult; both installed in conjunction with other structural conservation practices to remove excess water and ensure proper function of that practice. Pipe usually installed in a crushed stone envelope, w/ geotextile around base of structure. All excavation is included in other associated practice(s). Resource Concerns: Excess Water (Seasonal High Water Table); Water Quality Degradation (Nutrients). Per practice it supports. Associated Practices: 607 - Surface Drain, Field Ditch; 608 - Surface Drain, Main or Lateral; 587 - Structure for Water Control, 533 - Pumping Plant; 606 Underground Outlet, 313 Waste Storage Facility, and 554 - Drainage Water Management.

**Before Situation:**

Before installation soil conditions are excessively wet due to poor internal soil drainage. Excess soil water threatens stability/functionality of proposed conservation practice.

**After Situation:**

The drainage modifications result in improved drainage of groundwater to ensure function and longevity of supporting practice.

**Feature Measure:** length of pipe

**Scenario Unit::** Foot

**Scenario Typical Size:** 100.0

**Scenario Total Cost:** $830.65

**Scenario Cost/Unit:** $8.31

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 | $25.31 | 4 | $101.24 |
| **Materials** | | | | | | |
| Aggregate, Gravel, Graded | 46 | Gravel, includes materials, equipment and labor to transport and place. Includes washed and unwashed gravel. | Cubic Yard | $34.75 | 15 | $521.25 |
| Geotextile, non-woven, light weight | 1209 | Non-woven less than 8 ounce/square yard geotextile with staple anchoring. Materials and shipping only. | Square Yard | $1.22 | 78 | $95.16 |
| Pipe, HDPE, 6", CPT, Single Wall | 1242 | Pipe, Corrugated Plastic Tubing, Single Wall, 6" diameter - ASTM F405. Material cost only. | Foot | $1.13 | 100 | $113.00 |

**Practice:** 612 - Tree/Shrub Establishment

**Scenario** #1 - Hardwood Hand Planting-bare root-protected

**Scenario Description:**

Improving the hardwood forest setting by hand planting hardwood tree seedlings. Seedlings are protected from deer browsing. The number of trees to plant is lower than establishing a new forest. Resource concerns are degraded plant condition - undesirable 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 landowner objectives of growing high quality trees. Wildlife habitat is poor due to the above described conditions. Resource concerns are degrade plant condition - undesirable productivity and health, and Inadequate structure and composition; inadequate habitat for fish and wildlife - habitat degradation. Prior to planting any needed vegetation control will be conducted first.

**After Situation:**

The area of treatment is 10 acres. Bare root hardwood seedlings are planted by hand in the best locations for seedling survival. Solid tree tubes are installed to protect seedlings from animal browsing damage. Post planting vegetation control is planned to ensure seedling survival.

**Feature Measure:** Area of Treatment

**Scenario Unit::** Acre

**Scenario Typical Size:** 10.0

**Scenario Total Cost:** $5,903.62

**Scenario Cost/Unit:** $590.36

Cost Details:

| Component Name | ID | Description | Unit | Cost | QTY | Total |
|---|---|---|---|---|---|---|
| **Equipment Installation** | | | | | | |
| Truck, Pickup | 939 | Equipment and power unit costs. Labor not included. | Hour | $21.79 | 25 | $544.75 |
| All terrain vehicles, ATV | 965 | Includes equipment, power unit and labor costs. | Hour | $28.28 | 25 | $707.00 |
| Trailer, flatbed, small | 1505 | Small flatbed trailer (typically less than 30' in length) pulled by a pickup to transport materials and equipment. Truck not included. | Hour | $15.90 | 25 | $397.50 |
| Hand tools, tree planting | 1590 | Various hand tools for digging holes and planting trees such as augers, dibble bars, planting shovel, hoe-dad. Equipment only. Labor not included. | Hour | $12.04 | 50 | $602.00 |
| 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 | $2.42 | 25 | $60.50 |
| **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 | $25.31 | 50 | $1,265.50 |
| Supervisor 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 | $45.69 | 4 | $182.76 |
| **Materials** | | | | | | |
| Shrub, seedling or transplant, bare root, 36-60" | 1508 | Bare root shrubs 3 to 5 foot tall. Includes materials and shipping only. | Each | $1.68 | 300 | $504.00 |
| Tree shelter, solid tube type, 4" x 48" | 1566 | 4" x 48" tree tube for protection from animal damage. Materials only. | Each | $4.14 | 300 | $1,242.00 |
| Planting gel, polymer | 1576 | Polymer planting gel that retains water around seedling roots. Materials only. | Pound | $9.54 | 1 | $9.54 |
| Stakes, wood, 3/4" x 3/4" x 36" | 1581 | 3/4" x 3/4" x 36" wood stakes to fasten items in place. Includes materials only. | Each | $0.72 | 300 | $216.00 |
| **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 | $172.07 | 1 | $172.07 |

**Practice:** 612 - Tree/Shrub Establishment

**Scenario** #2 - Hardwood Planting 1 gal pots

**Scenario Description:**

Hardwood seedlings (potted) to be planted to reestablish 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 - undesirable 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 occurring.

**After Situation:**

The area of treatment is 2 acres. Potted/containerized hardwood seedlings are planted by hand. Post vegetation control should be evaluated and conducted it necessary.

**Feature Measure:** Area of Treatment

**Scenario Unit::** Acre

**Scenario Typical Size:** 2.0

**Scenario Total Cost:** $11,377.71

**Scenario Cost/Unit:** $5,688.86

Cost Details:

| Component Name | ID | Description | Unit | Cost | QTY | Total |
|---|---|---|---|---|---|---|
| **Equipment Installation** | | | | | | |
| Truck, Pickup | 939 | Equipment and power unit costs. Labor not included. | Hour | $21.79 | 50 | $1,089.50 |
| All terrain vehicles, ATV | 965 | Includes equipment, power unit and labor costs. | Hour | $28.28 | 50 | $1,414.00 |
| Trailer, flatbed, small | 1505 | Small flatbed trailer (typically less than 30' in length) pulled by a pickup to transport materials and equipment. Truck not included. | Hour | $15.90 | 50 | $795.00 |
| Hand tools, tree planting | 1590 | Various hand tools for digging holes and planting trees such as augers, dibble bars, planting shovel, hoe-dad. Equipment only. Labor not included. | Hour | $12.04 | 100 | $1,204.00 |
| **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 | $25.31 | 100 | $2,531.00 |
| 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 | $45.69 | 6 | $274.14 |
| **Materials** | | | | | | |
| Tree, hardwood, seedling or transplant, potted, 1/2 to 1 gal. | 1531 | Potted hardwood tree, 1/2 to 1 gal. Includes materials and shipping only. | Each | $4.54 | 600 | $2,724.00 |
| Tree shelter, solid tube type, 3-1/4" x 30" | 1560 | 3-1/4" x 30" tree tube for protection from animal damage. Materials only. | Each | $1.79 | 600 | $1,074.00 |
| **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 i | Dollar | $1.00 | 100 | $100.00 |
| Mobilization, small equipment | 1138 | Equipment <70 HP but can't be transported by a pick-up truck or with typical weights between 3,500 to 14,000 pounds. | Each | $172.07 | 1 | $172.07 |

**Practice:** 612 - Tree/Shrub Establishment

**Scenario** #3 - Hardwood Est.-Direct Seeding

**Scenario Description:**

Native seed (acorns, nuts, etc.) from native tree species are directly planted in the soil. Site preparation is completed (disking to eliminate competing vegetation). The native seed are collected/purchased locally so as to get trees known to be adapted to local conditions. Resource concerns are degraded plant condition, inadequate habitat for fish and wildlife.

**Before Situation:**

The hardwood forest is degrading. High value species, lumber and wildlife habitat, are not regenerating due to changes in the natural disturbance regime or past harvesting. Unwanted shade tolerant tree species have regenerated and are in the overstory competing with desirable species as well as in the mid and understory where they will eventually out-compete with desirable species.

**After Situation:**

Seed from native species are collected or purchased and planted at prescribed rates. Site preparation is done prior to direct seeding. Degraded plant condition is on an upward trend and habitat for wildlife will improve.

**Feature Measure:** Area of Treatment

**Scenario Unit::** Acre

**Scenario Typical Size:** 2.0

**Scenario Total Cost:** $1,658.18

**Scenario Cost/Unit:** $829.09

Cost Details:

| Component Name | ID | Description | Unit | Cost | QTY | Total |
|---|---|---|---|---|---|---|
| **Equipment Installation** | | | | | | |
| Truck, Pickup | 939 | Equipment and power unit costs. Labor not included. | Hour | $21.79 | 12 | $261.48 |
| All terrain vehicles, ATV | 965 | Includes equipment, power unit and labor costs. | Hour | $28.28 | 12 | $339.36 |
| 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 | $15.90 | 12 | $190.80 |
| Hand tools, tree planting | 1590 | Various hand tools for digging holes and planting trees such as augers, dibble bars, planting shovel, hoe-dad. Equipment only. Labor not included. | Hour | $12.04 | 12 | $144.48 |
| **Labor** | | | | | | |
| General Labor | 231 | Labor performed using basic tools such as power tool, shovels, and other tools that do not require extensive training. Ex. pipe layer, herder, concrete placement, materials spreader, flagger, etc. | Hour | $25.31 | 12 | $303.72 |
| 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 | $45.69 | 3 | $137.07 |
| **Materials** | | | | | | |
| Trees and shrubs, seed | 1871 | Tree or shrub seed, e.g., acorns, to establish trees. Includes materials and shipping only. | Pound | $4.55 | 24 | $109.20 |
| **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 | $172.07 | 1 | $172.07 |

**Practice:** 612 - Tree/Shrub Establishment

**Scenario** #4 - Plant Small Areas/Quantities

**Scenario Description:**

Trees and shrubs are planted to improve habitat and the successional process. Trees and shrubs are planted in an upland or wetland setting. The resource concerns are insufficient cover/shelter and insufficient food for wildlife. Small quantities of trees and shrubs are needed to plant portions of fields to meet habitat and food needs.

**Before Situation:**

Old fields or other open areas lack sufficient cover/shelter and food for species of concern. There is a lack of native woody cover and the open areas are dominated by forbs and grass.

**After Situation:**

A 5 acre field will have portions planted to trees and shrubs in a scattered pattern equaling about an acre of planting. Small quantities of trees and shrubs, 200 stems, will need to be ordered. Larger trees and shrubs will be planted to compete better with idle area forbs and tall grasses.

**Feature Measure:** Area of Treatment

**Scenario Unit::** Acre

**Scenario Typical Size:** 1.0

**Scenario Total Cost:** $2,372.21

**Scenario Cost/Unit:** $2,372.21

Cost Details:

| Component Name | ID | Description | Unit | Cost | QTY | Total |
|---|---|---|---|---|---|---|
| **Equipment Installation** | | | | | | |
| Truck, Pickup | 939 | Equipment and power unit costs. Labor not included. | Hour | $21.79 | 12 | $261.48 |
| All terrain vehicles, ATV | 965 | Includes equipment, power unit and labor costs. | Hour | $28.28 | 12 | $339.36 |
| 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 | $15.90 | 12 | $190.80 |
| Hand tools, tree planting | 1590 | Various hand tools for digging holes and planting trees such as augers, dibble bars, planting shovel, hoe-dad. Equipment only. Labor not included. | Hour | $12.04 | 12 | $144.48 |
| **Labor** | | | | | | |
| General Labor | 231 | Labor performed using basic tools such as power tool, shovels, and other tools that do not require extensive training. Ex. pipe layer, herder, concrete placement, materials spreader, flagger, etc. | Hour | $25.31 | 12 | $303.72 |
| 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 | $45.69 | 4 | $182.76 |
| **Materials** | | | | | | |
| Shrub, seedling or transplant, bare root, 36-60" | 1508 | Bare root shrubs 3 to 5 foot tall. Includes materials and shipping only. | Each | $1.68 | 200 | $336.00 |
| Tree, hardwood, seedling or transplant, bare root, 36-60" | 1511 | Bare root hardwood trees 3 to 5 foot tall. Includes materials and shipping only. | Each | $1.66 | 200 | $332.00 |
| Planting gel, polymer | 1576 | Polymer planting gel that retains water around seedling roots. Materials only. | Pound | $9.54 | 1 | $9.54 |
| **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 i | Dollar | $1.00 | 100 | $100.00 |
| Mobilization, small equipment | 1138 | Equipment <70 HP but can't be transported by a pick-up truck or with typical weights between 3,500 to 14,000 pounds. | Each | $172.07 | 1 | $172.07 |

**Practice:** 612 - Tree/Shrub Establishment

**Scenario** #5 - Shrub Planting

**Scenario Description:**

Shrubs are planted to provide a more diverse habitat and to enhance cover, food (fruit, nectar, pollen, nesting sites) for specific wildlife needs on small and urban farms for shrub dependent wildlife. Shrub planting density is variable depending on the objective (e.g., protective cover, food (e.g., fruit, nectar, pollen). Resource concerns are Inadequate structure and composition; inadequate habitat for fish and wildlife - habitat degradation, inadequate habitat for fish and wildlife - cover, inadequate habitat for fish and wildlife - food.

**Before Situation:**

In existing small or urban farm, there is insufficient food, cover and nesting opportunity for species that use shrublands for all or a significant portion of their life cycle. Existing conditions do not meet landowner objectives of creating cover, food, or nesting sites for desired shrubland wildlife. Resource concerns are Inadequate structure and composition; inadequate habitat for fish and wildlife - habitat degradation, inadequate habitat for fish and wildlife - cover, inadequate habitat for fish and wildlife - food

**After Situation:**

In existing small or urban farm, there is now sufficient food, cover and nesting opportunity for species that use shrubs for all or a significant portion of their life cycle. Existing conditions now meet the landowner's objectives of creating cover, food, or nesting sites for desired shrubland wildlife. Resource concerns are now addressed for Inadequate structure and composition; inadequate habitat for fish and wildlife - habitat degradation, inadequate habitat for fish and wildlife - cover, inadequate habitat for fish and wildlife - food

**Feature Measure:** Area of Treatment

**Scenario Unit::** Each

**Scenario Typical Size:** 200.0

**Scenario Total Cost:** $3,854.22

**Scenario Cost/Unit:** $19.27

Cost Details:

| Component Name | ID | Description | Unit | Cost | QTY | Total |
|---|---|---|---|---|---|---|
| **Equipment Installation** | | | | | | |
| Truck, Pickup | 939 | Equipment and power unit costs. Labor not included. | Hour | $21.79 | 17 | $370.43 |
| All terrain vehicles, ATV | 965 | Includes equipment, power unit and labor costs. | Hour | $28.28 | 17 | $480.76 |
| 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 | $15.90 | 17 | $270.30 |
| 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 | 34 | $409.36 |
| **Labor** | | | | | | |
| General Labor | 231 | Labor performed using basic tools such as power tool, shovels, and other tools that do not require extensive training. Ex. pipe layer, herder, concrete placement, materials spreader, flagger, etc. | Hour | $25.31 | 34 | $860.54 |
| Supervisor 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 | $45.69 | 4 | $182.76 |
| **Materials** | | | | | | |
| Shrub, seedling or transplant, potted, 1/2 to 1 gal. | 1526 | Potted shrub, 1/2 to 1 gal. Includes materials and shipping only. | Each | $4.52 | 200 | $904.00 |
| Tree shelter, mesh tree tube, 24" | 1555 | 24" tall vexar or other open weave tubular tree shelter to protect from animal damage. Materials only. | Each | $0.52 | 200 | $104.00 |
| **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 i | Dollar | $1.00 | 100 | $100.00 |
| Mobilization, small equipment | 1138 | Equipment <70 HP but can't be transported by a pick-up truck or with typical weights between 3,500 to 14,000 pounds. | Each | $172.07 | 1 | $172.07 |

**Practice:** 612 - Tree/Shrub Establishment

**Scenario** #6 - Shrub Bare Root Hand Planting In Sod Grasses

**Scenario Description:**

This scenario is to enhance cover, food (fruit, nectar, pollen, nesting sites) for specific wildlife needs on land converted to agriculture and currently in grass sod for shrub dependent wildlife. Shrub planting density is variable depending on the objective (e.g., protective cover, food (e.g., fruit, nectar, pollen). Resource concerns are Inadequate structure and composition; inadequate habitat for fish and wildlife - habitat degradation, inadequate habitat for fish and wildlife - cover, inadequate habitat for fish and wildlife - food. This scenario is only to be used for hand planting in sod where sod will choke out bare root seedlings; this scenario is not to be used for dibble- or mechanical-planting of shrubs in grassland, or woodland or existing cropland where grass groundcover is not a problem.

**Before Situation:**

In existing open grassland, there is insufficient food, cover and nesting opportunity for species that use shrublands for all or a significant portion of their life cycle. Existing conditions do not meet landowner objectives of creating cover, food, or nesting sites for desired shrubland wildlife. Resource concerns are Inadequate structure and composition; inadequate habitat for fish and wildlife - habitat degradation, inadequate habitat for fish and wildlife - cover, inadequate habitat for fish and wildlife - food.

**After Situation:**

The area of treatment is 1 acre. Bare root hardwood shrub seedlings are planted by hand on a 6 x 6 spacing in a sod grass field by hand. Will require removal of sod in a 2-foot circle prior to planting bareroot seedlings to achieve adequate survival. Installation of post-planting practice mulching or other vegetation control is needed to enhance seedling survival.

**Feature Measure:** <Unknown>

**Scenario Unit::** Each

**Scenario Typical Size:** 1,200.0

**Scenario Total Cost:** $8,267.63

**Scenario Cost/Unit:** $6.89

Cost Details:

| Component Name | ID | Description | Unit | Cost | QTY | Total |
|---|---|---|---|---|---|---|
| **Equipment Installation** | | | | | | |
| Truck, Pickup | 939 | Equipment and power unit costs. Labor not included. | Hour | $21.79 | 40 | $871.60 |
| All terrain vehicles, ATV | 965 | Includes equipment, power unit and labor costs. | Hour | $28.28 | 40 | $1,131.20 |
| 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 | $15.90 | 40 | $636.00 |
| Hand tools, tree planting | 1590 | Various hand tools for digging holes and planting trees such as augers, dibble bars, planting shovel, hoe-dad. Equipment only. Labor not included. | Hour | $12.04 | 120 | $1,444.80 |
| **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 | $25.31 | 120 | $3,037.20 |
| 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 | $45.69 | 8 | $365.52 |
| **Materials** | | | | | | |
| Shrub, seedling or transplant, bare root, 6-18" | 1506 | Bare root hardwood trees 6-18" tall. Includes materials and shipping only. | Each | $0.46 | 1200 | $552.00 |
| Planting gel, polymer | 1576 | Polymer planting gel that retains water around seedling roots. Materials only. | Pound | $9.54 | 6 | $57.24 |
| **Mobilization** | | | | | | |
| Mobilization, small equipment | 1138 | Equipment <70 HP but can't be transported by a pick-up truck or with typical weights between 3,500 to 14,000 pounds. | Each | $172.07 | 1 | $172.07 |

**Practice:** 612 - Tree/Shrub Establishment

**Scenario** #7 - Shrub Planting

**Scenario Description:**

Shrubs are planted to provide a more diverse habitat. Plantings are in either uplands or bottomlands. The site lacks ground level habitat structure and diversity for wildlife. Resource concern is inadequate habitat for fish and wildlife - habitat fragmentation.

**Before Situation:**

No shrubbery vegetation, or very little, is present under the forest overstory. Wildlife species that need shrub cover are not present. An adequate stand of overstory trees is present, but it is a single level, not multi-level.

**After Situation:**

A 10 acre area is planted with suitable shrubs based upon shade tolerance requirements. Shrubs are not planted over the entire 10 acres. They are planted in groups or motts. The motts, more or less circular in shape, are 50 feet in diameter, with 50 shrubs planted within each mott. 4 motts are planted per acre for a total of 200 shrubs per acre. Motts are randomly established to take advantage of site conditions and shrub species being planted.

**Feature Measure:** Area of Treatment

**Scenario Unit::** Acre

**Scenario Typical Size:** 10.0

**Scenario Total Cost:** $3,861.89

**Scenario Cost/Unit:** $386.19

Cost Details:

| Component Name | ID | Description | Unit | Cost | QTY | Total |
|---|---|---|---|---|---|---|
| **Equipment Installation** | | | | | | |
| Truck, Pickup | 939 | Equipment and power unit costs. Labor not included. | Hour | $21.79 | 6 | $130.74 |
| All terrain vehicles, ATV | 965 | Includes equipment, power unit and labor costs. | Hour | $28.28 | 6 | $169.68 |
| Trailer, flatbed, small | 1505 | Small flatbed trailer (typically less than 30' in length) pulled by a pickup to transport materials and equipment. Truck not included. | Hour | $15.90 | 6 | $95.40 |
| Hand tools, tree planting | 1590 | Various hand tools for digging holes and planting trees such as augers, dibble bars, planting shovel, hoe-dad. Equipment only. Labor not included. | Hour | $12.04 | 12 | $144.48 |
| **Labor** | | | | | | |
| General Labor | 231 | Labor performed using basic tools such as power tool, shovels, and other tools that do not require extensive training. Ex. pipe layer, herder, concrete placement, materials spreader, flagger, etc. | Hour | $25.31 | 12 | $303.72 |
| 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 | $45.69 | 6 | $274.14 |
| **Materials** | | | | | | |
| Shrub, seedling or transplant, bare root, 6-18" | 1506 | Bare root hardwood trees 6-18" tall. Includes materials and shipping only. | Each | $0.46 | 2000 | $920.00 |
| Tree shelter, mesh tree tube, 24" | 1555 | 24" tall vexar or other open weave tubular tree shelter to protect from animal damage. Materials only. | Each | $0.52 | 2000 | $1,040.00 |
| **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 i | Dollar | $1.00 | 100 | $100.00 |
| Mobilization, small equipment | 1138 | Equipment <70 HP but can't be transported by a pick-up truck or with typical weights between 3,500 to 14,000 pounds. | Each | $172.07 | 1 | $172.07 |
| Mobilization, medium equipment | 1139 | Equipment with 70-150 HP or typical weights between 14,000 and 30,000 pounds. | Each | $255.83 | 2 | $511.66 |

**Practice:** 612 - Tree/Shrub Establishment

**Scenario** #8 - Mostly Hardwood Hand Planting-bare root-protected

**Scenario Description:**

Improving a highly degraded site by hand planting tree seedlings, appropriate to the site. Seedlings are protected from deer browsing. The number of trees to plant is a minimum of 200 plants/ac. Resource concerns are degraded plant condition - undesirable productivity and health, and Inadequate structure and composition; inadequate habitat for fish and wildlife - habitat degradation.

**Before Situation:**

In an existing upland forest the present overstory trees are poor quality, at low stocking levels, or are undesirable species. Dense invasive species in the understory have prevented natural regeneration of native tree and shrub species. Existing conditions do not meet landowner objectives of growing high quality trees for the future. Wildlife habitat is poor due to the above described conditions. Resource concerns are degrade plant condition - undesirable productivity and health, and Inadequate structure and composition; inadequate habitat for fish and wildlife - habitat degradation. Prior to planting any needed vegetation control will be conducted first.

**After Situation:**

The area of treatment is 10 acres. First, the invasive species are adequately controlled under a different conservation practice. The existing overstory canopy is also treated per the forester's recommendation in order to create the optimal light conditions for the new tree seedlings. Bare root hardwood and/or softwood seedlings are planted by hand at a minimum of 200 plants/ac. The species and planting rate are recommended by a forester in the forest management plan. Solid tree tubes are installed to protect seedlings from animal browsing damage. Post planting vegetation control is planned to ensure seedling survival.

**Feature Measure:** Area of Treatment

**Scenario Unit::** Acre

**Scenario Typical Size:** 10.0

**Scenario Total Cost:** $17,649.41

**Scenario Cost/Unit:** $1,764.94

Cost Details:

| Component Name | ID | Description | Unit | Cost | QTY | Total |
|---|---|---|---|---|---|---|
| **Equipment Installation** | | | | | | |
| Truck, Pickup | 939 | Equipment and power unit costs. Labor not included. | Hour | $21.79 | 20 | $435.80 |
| All terrain vehicles, ATV | 965 | Includes equipment, power unit and labor costs. | Hour | $28.28 | 5 | $141.40 |
| 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 | $15.90 | 20 | $318.00 |
| Hand tools, tree planting | 1590 | Various hand tools for digging holes and planting trees such as augers, dibble bars, planting shovel, hoe-dad. Equipment only. Labor not included. | Hour | $12.04 | 80 | $963.20 |
| **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 | $25.31 | 80 | $2,024.80 |
| Supervisor or Manager | 234 | Labor involving supervision or management activities. Includes crew supervisors, foremen and farm/ranch managers time required for adopting new technology, etc. | Hour | $45.69 | 10 | $456.90 |
| **Materials** | | | | | | |
| Shrub, seedling or transplant, bare root, 36-60" | 1508 | Bare root shrubs 3 to 5 foot tall. Includes materials and shipping only. | Each | $1.68 | 2000 | $3,360.00 |
| Tree shelter, solid tube type, 4" x 48" | 1566 | 4" x 48" tree tube for protection from animal damage. Materials only. | Each | $4.14 | 2000 | $8,280.00 |
| Planting gel, polymer | 1576 | Polymer planting gel that retains water around seedling roots. Materials only. | Pound | $9.54 | 6 | $57.24 |
| Stakes, wood, 3/4" x 3/4" x 36" | 1581 | 3/4" x 3/4" x 36" wood stakes to fasten items in place. Includes materials only. | Each | $0.72 | 2000 | $1,440.00 |
| **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 | $172.07 | 1 | $172.07 |

**Practice:** 614 - Watering Facility

**Scenario** #1 - Permanent Drinking and/or Storage upto 500 Gallons

**Scenario Description:**

A permanent watering facility as a means for providing controlled access to drinking water for livestock or wildlife constructed of approved materials with less than 500 gallons of capacity that stores adequate quantity and quality of water for storage or direct drinking access. The watering facility will be constructed from approved durable materials that have a life expectancy that meets or exceeds the planned useful life of the installation. The watering facility will address the resource concerns of inadequate supply of water for livestock or wildlife, habitat degradation, water quality, and undesirable plant productivity and health.

**Before Situation:**

This practice applies to all land uses where there is a need for a watering facility for livestock or wildlife, where there is a source of water that is adequate in quantity and quality for the purpose, and where soils and topography are suitable for a facility to provide controlled access to drinking water for livestock or wildlife to provide daily water requirements, improve animal distribution to better utilize grazing resources, provide a water source that is an alternative to a sensitive resource.

**After Situation:**

A permanent watering facility as a means for providing controlled access to drinking water for livestock or wildlife constructed of approved materials with less than 500 gallons of capacity, installed with all tank materials, tank plumbing and float valve, that stores adequate quantity and quality of water for storage or direct drinking access. The watering facility will be constructed from approved durable materials that have a life expectancy that meets or exceeds the planned useful life of the installation. The watering facility will address the resource concerns of inadequate supply of water for livestock or wildlife, habitat degradation, water quality, and undesirable plant productivity and health. The watering facility is placed on a properly prepared foundation with all required materials, plumbing and vegetation for stabilizing disturbed areas. All needed pipelines are installed using Livestock Pipeline (516). All collectors or catchments for collecting precipitation will be addressed by using Water Harvesting Catchment (636). Any needed water source installation will use Water Well (642), Pumping Plant (533), Spring Development (574), or Livestock Pipeline (516) as appropriate. Areas around watering facilities where animal concentrations or overflow from the watering facility will cause resource concerns will be protected by using Heavy Use Area Protection (561) as appropriate. All fencing will use Fence (382).

**Feature Measure:** Capacity in Gallons

**Scenario Unit::** Gallon

**Scenario Typical Size:** 250.0

**Scenario Total Cost:** $988.57

**Scenario Cost/Unit:** $3.95

Cost Details:

| Component Name | ID | Description | Unit | Cost | QTY | Total |
|---|---|---|---|---|---|---|
| **Equipment Installation** | | | | | | |
| Excavation, Common Earth, side cast, small equipment | 48 | Bulk excavation and side casting of common earth with hydraulic excavator with less than 1 CY capacity. Includes equipment and labor. | Cubic Yard | $2.36 | 4 | $9.44 |
| Backhoe, 80 HP | 926 | Wheel mounted backhoe excavator with horsepower range of 60 to 90. Equipment and power unit costs. Labor not included. | Hour | $56.05 | 2 | $112.10 |
| Truck, Pickup | 939 | Equipment and power unit costs. Labor not included. | Hour | $21.79 | 2 | $43.58 |
| **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 | $25.31 | 3 | $75.93 |
| Equipment Operators, Light | 232 | Includes: Skid Steer Loaders, Hydraulic Excavators <50 HP, Trenchers <12", Ag Equipment <150 HP, Pickup Trucks, Forklifts, Mulchers | Hour | $25.23 | 2 | $50.46 |
| **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 | $23.96 | 4 | $95.84 |
| One Species, Warm Season, Native Perennial Grass | 2322 | Native, warm season perennial grass. Includes material and shipping only. | Acre | $69.06 | 0.01 | $0.69 |
| **Mobilization** | | | | | | |
| Mobilization, medium equipment | 1139 | Equipment with 70-150 HP or typical weights between 14,000 and 30,000 pounds. | Each | $255.83 | 1 | $255.83 |

**Practice:** 614 - Watering Facility

**Scenario** #2 - Permanent Drinking and/or Storage 500 to 1000 Gallons

**Scenario Description:**

A permanent watering facility for livestock and or wildlife with a capacity of 500 to 1,000 gallons that stores adequate quantity and quality of water for storage and or direct drinking access. All watering facilities will be constructed from approved durable materials that have a life expectancy that meets or exceeds the planned useful life of the installation. This watering facility will address the resource concerns of inadequate supply of water for livestock and or wildlife, habitat degradation, water quality, and undesirable plant productivity and health.

**Before Situation:**

This practice applies to all land uses where there is a need for a watering facility for livestock or wildlife, where there is a source of water that is adequate in quantity and quality for the purpose, and where soils and topography are suitable for a facility to provide controlled access to drinking water for livestock or wildlife to provide daily water requirements, improve animal distribution to better utilize grazing resources, provide a water source that is an alternative to a sensitive resource.

**After Situation:**

A permanent watering facility as a means for providing controlled access to drinking water for livestock or wildlife constructed of approved materials with a capacity of 500 to 1,000 gallons of capacity, installed with all tank materials, tank plumbing and float valve, that stores adequate quantity and quality of water for storage or direct drinking access. The watering facility will be constructed from approved durable materials that have a life expectancy that meets or exceeds the planned useful life of the installation. The watering facility will address the resource concerns of inadequate supply of water for livestock or wildlife, habitat degradation, water quality, and undesirable plant productivity and health. The watering facility is placed on a properly prepared foundation with all required materials, plumbing and vegetation for stabilizing disturbed areas. All needed pipelines are installed using Livestock Pipeline (516). All collectors or catchments for collecting precipitation will be addressed by using Water Harvesting Catchment (636). Any needed water source installation will use Water Well (642), Pumping Plant (533), Spring Development (574), or Livestock Pipeline (516) as appropriate. Areas around watering facilities where animal concentrations or overflow from the watering facility will cause resource concerns will be protected by using Heavy Use Area Protection (561) as appropriate. All fencing will use Fence (382).

**Feature Measure:** Capacity in Gallons

**Scenario Unit::** Gallon

**Scenario Typical Size:** 750.0

**Scenario Total Cost:** $1,746.82

**Scenario Cost/Unit:** $2.33

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 | $2.36 | 4 | $9.44 |
| Backhoe, 80 HP | 926 | Wheel mounted backhoe excavator with horsepower range of 60 to 90. Equipment and power unit costs. Labor not included. | Hour | $56.05 | 6 | $336.30 |
| Truck, Pickup | 939 | Equipment and power unit costs. Labor not included. | Hour | $21.79 | 6 | $130.74 |
| **Labor** | | | | | | |
| Skilled Labor | 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 | $41.76 | 6 | $250.56 |
| 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 | $25.31 | 7 | $177.17 |
| Equipment Operators, Light | 232 | Includes: Skid Steer Loaders, Hydraulic Excavators <50 HP, Trenchers <12", Ag Equipment <150 HP, Pickup Trucks, Forklifts, Mulchers | Hour | $25.23 | 6 | $151.38 |
| **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 | $23.96 | 4 | $95.84 |
| One Species, Warm Season, Native Perennial Grass | 2322 | Native, warm season perennial grass. Includes material and shipping only. | Acre | $69.06 | 0.01 | $0.69 |

**Practice:** 614 - Watering Facility

**Scenario** #3 - Permanent Drinking and/or Storage 1000 to 5000 Gallons

**Scenario Description:**

A permanent watering facility as a means for providing controlled access to drinking water for livestock or wildlife constructed of approved materials with greater than 1,000 to 5,000 gallons of capacity that stores adequate quantity and quality of water for storage or direct drinking access. The watering facility will be constructed from approved durable materials that have a life expectancy that meets or exceeds the planned useful life of the installation. The watering facility will address the resource concerns of inadequate supply of water for livestock or wildlife, habitat degradation, water quality, and undesirable plant productivity and health.

**Before Situation:**

This practice applies to all land uses where there is a need for a watering facility for livestock or wildlife, where there is a source of water that is adequate in quantity and quality for the purpose, and where soils and topography are suitable for a facility to provide controlled access to drinking water for livestock or wildlife to provide daily water requirements, improve animal distribution to better utilize grazing resources, provide a water source that is an alternative to a sensitive resource.

**After Situation:**

A permanent watering facility as a means for providing controlled access to drinking water for livestock or wildlife constructed of approved materials with a capacity of greater than 1,000 to 5,000 gallons of capacity, installed with all tank materials, tank plumbing and float valve, that stores adequate quantity and quality of water for storage or direct drinking access. The watering facility will be constructed from approved durable materials that have a life expectancy that meets or exceeds the planned useful life of the installation. The watering facility will address the resource concerns of inadequate supply of water for livestock or wildlife, habitat degradation, water quality, and undesirable plant productivity and health. The watering facility is placed on a properly prepared foundation with all required materials, plumbing and vegetation for stabilizing disturbed areas. All needed pipelines are installed using Livestock Pipeline (516). All collectors or catchments for collecting precipitation will be addressed by using Water Harvesting Catchment (636). Any needed water source installation will use Water Well (642), Pumping Plant (533), Spring Development (574), or Livestock Pipeline (516) as appropriate. Areas around watering facilities where animal concentrations or overflow from the watering facility will cause resource concerns will be protected by using Heavy Use Area Protection (561) as appropriate. All fencing will use Fence (382).

**Feature Measure:** Capacity in Gallons

**Scenario Unit::** Gallon

**Scenario Typical Size:** 2,000.0

**Scenario Total Cost:** $3,540.05

**Scenario Cost/Unit:** $1.77

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 | $327.92 | 4 | $1,311.68 |
| Excavation, Common Earth, side cast, small equipment | 48 | Bulk excavation and side casting of common earth with hydraulic excavator with less than 1 CY capacity. Includes equipment and labor. | Cubic Yard | $2.36 | 7 | $16.52 |
| Backhoe, 80 HP | 926 | Wheel mounted backhoe excavator with horsepower range of 60 to 90. Equipment and power unit costs. Labor not included. | Hour | $56.05 | 8 | $448.40 |
| Truck, Pickup | 939 | Equipment and power unit costs. Labor not included. | Hour | $21.79 | 8 | $174.32 |
| **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 | $41.76 | 8 | $334.08 |
| 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 | $25.31 | 9 | $227.79 |
| Equipment Operators, Light | 232 | Includes: Skid Steer Loaders, Hydraulic Excavators <50 HP, Trenchers <12", Ag Equipment <150 HP, Pickup Trucks, Forklifts, Mulchers | Hour | $25.23 | 8 | $201.84 |
| **Materials** | | | | | | |
| Aggregate, Sand, Graded, Washed | 45 | Sand, typical ASTM C33 gradation, includes materials, equipment and labor to transport and place | Cubic Yard | $34.29 | 7 | $240.03 |
| 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 |
| One Species, Warm Season, Native Perennial Grass | 2322 | Native, warm season perennial grass. Includes material and shipping only. | Acre | $69.06 | 0.01 | $0.69 |

**Practice:** 614 - Watering Facility

**Scenario** #4 - Permanent Drinking and/or Storage over 5000 Gallons

**Scenario Description:**

A permanent watering facility as a means for providing controlled access to drinking water for livestock or wildlife constructed of approved materials with greater than 5,000 gallons of capacity that stores adequate quantity and quality of water for storage or direct drinking access. The watering facility will be constructed from approved durable materials that have a life expectancy that meets or exceeds the planned useful life of the installation. The watering facility will address the resource concerns of inadequate supply of water for livestock or wildlife, habitat degradation, water quality, and undesirable plant productivity and health.

**Before Situation:**

This practice applies to all land uses where there is a need for a watering facility for livestock or wildlife, where there is a source of water that is adequate in quantity and quality for the purpose, and where soils and topography are suitable for a facility to provide controlled access to drinking water for livestock or wildlife to provide daily water requirements, improve animal distribution to better utilize grazing resources, provide a water source that is an alternative to a sensitive resource.

**After Situation:**

A permanent watering facility as a means for providing controlled access to drinking water for livestock or wildlife constructed of approved materials with a capacity of greater than 5,000 gallons of capacity, installed with all tank materials, tank plumbing and float valve, that stores adequate quantity and quality of water for storage or direct drinking access. The watering facility will be constructed from approved durable materials that have a life expectancy that meets or exceeds the planned useful life of the installation. The watering facility will address the resource concerns of inadequate supply of water for livestock or wildlife, habitat degradation, water quality, and undesirable plant productivity and health. The watering facility is placed on a properly prepared foundation with all required materials, plumbing and vegetation for stabilizing disturbed areas. All needed pipelines are installed using Livestock Pipeline (516). All collectors or catchments for collecting precipitation will be addressed by using Water Harvesting Catchment (636). Any needed water source installation will use Water Well (642), Pumping Plant (533), Spring Development (574), or Livestock Pipeline (516) as appropriate. Areas around watering facilities where animal concentrations or overflow from the watering facility will cause resource concerns will be protected by using Heavy Use Area Protection (561) as appropriate. All fencing will use Fence (382).

**Feature Measure:** Capacity in Gallons

**Scenario Unit::** Gallon

**Scenario Typical Size:** 10,000.0

**Scenario Total Cost:** $7,312.55

**Scenario Cost/Unit:** $0.73

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 | $327.92 | 7 | $2,295.44 |
| Excavation, Common Earth, side cast, small equipment | 48 | Bulk excavation and side casting of common earth with hydraulic excavator with less than 1 CY capacity. Includes equipment and labor. | Cubic Yard | $2.36 | 13 | $30.68 |
| Backhoe, 80 HP | 926 | Wheel mounted backhoe excavator with horsepower range of 60 to 90. Equipment and power unit costs. Labor not included. | Hour | $56.05 | 12 | $672.60 |
| Truck, Pickup | 939 | Equipment and power unit costs. Labor not included. | Hour | $21.79 | 12 | $261.48 |
| **Labor** | | | | | | |
| Skilled Labor | 230 | Labor requiring a high level skill set: Includes carpenters, welders, electricians, conservation professionals involved with data collection, monitoring, and or record keeping, etc. | Hour | $41.76 | 12 | $501.12 |
| General Labor | 231 | Labor performed using basic tools such as power tool, shovels, and other tools that do not require extensive training. Ex. pipe layer, herder, concrete placement, materials spreader, flagger, etc. | Hour | $25.31 | 13 | $329.03 |
| Equipment Operators, Light | 232 | Includes: Skid Steer Loaders, Hydraulic Excavators <50 HP, Trenchers <12", Ag Equipment <150 HP, Pickup Trucks, Forklifts, Mulchers | Hour | $25.23 | 12 | $302.76 |
| 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 | $45.69 | 12 | $548.28 |
| **Materials** | | | | | | |
| Aggregate, Sand, Graded, Washed | 45 | Sand, typical ASTM C33 gradation, includes materials, equipment and labor to transport and place | Cubic Yard | $34.29 | 13 | $445.77 |
| 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 |
| One Species, Warm Season, Native Perennial Grass | 2322 | Native, warm season perennial grass. Includes material and shipping only. | Acre | $69.06 | 0.01 | $0.69 |

**Practice:** 614 - Watering Facility

**Scenario** #5 - Portable Drinking and/or Storage upto 100 Gallons

**Scenario Description:**

A portable watering facility as a means for providing controlled access to drinking water for livestock or wildlife constructed of approved materials with less than 100 gallons of capacity. Watering facilities are used in rotational grazing systems and are moved from paddock to paddock to provide an adequate source of water for livestock. All watering facilities will be constructed from approved durable materials that have a life expectancy that meets or exceeds the planned useful life of the installation. This watering facility will address the resource concerns of inadequate supply of water for livestock and or wildlife, habitat degradation, water quality, and undesirable plant productivity and health.

**Before Situation:**

This practice applies to all land uses where there is a need for a watering facility for livestock or wildlife, where there is a source of water that is adequate in quantity and quality for the purpose, and where soils and topography are suitable for a facility to provide controlled access to drinking water for livestock or wildlife to provide daily water requirements, improve animal distribution to better utilize grazing resources, provide a water source that is an alternative to a sensitive resource.

**After Situation:**

A portable watering facility as a means for providing controlled access to drinking water for livestock or wildlife constructed of approved materials with less than 100 gallons of capacity, installed with all tank materials, tank plumbing and float valve, that stores adequate quantity and quality of water for storage or direct drinking access. The watering facility will be constructed from approved durable materials that have a life expectancy that meets or exceeds the planned useful life of the installation. The watering facility will address the resource concerns of inadequate supply of water for livestock or wildlife, habitat degradation, water quality, and undesirable plant productivity and health. The watering facility is placed on a properly prepared foundation with all required materials, plumbing and vegetation for stabilizing disturbed areas. All needed pipelines are installed using Livestock Pipeline (516). All collectors or catchments for collecting precipitation will be addressed by using Water Harvesting Catchment (636). Any needed water source installation will use Water Well (642), Pumping Plant (533), Spring Development (574), or Livestock Pipeline (516) as appropriate. Areas around watering facilities where animal concentrations or overflow from the watering facility will cause resource concerns will be protected by using Heavy Use Area Protection (561) as appropriate. All fencing will use Fence (382).

**Feature Measure:** Trough Capacity in Gallons

**Scenario Unit::** Gallon

**Scenario Typical Size:** 100.0

**Scenario Total Cost:** $132.25

**Scenario Cost/Unit:** $1.32

Cost Details:

| Component Name | ID | Description | Unit | Cost | QTY | Total |
|---|---|---|---|---|---|---|
| **Equipment Installation** | | | | | | |
| Truck, Pickup | 939 | Equipment and power unit costs. Labor not included. | Hour | $21.79 | 0.25 | $5.45 |
| **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 | $25.31 | 0.25 | $6.33 |
| **Materials** | | | | | | |
| Tank, Polyethylene, 100 gallon | 290 | Portable heavy duty rubber stock tank. | Each | $96.31 | 1 | $96.31 |
| Tank, Float Valve Assembly | 1077 | Float Valve, Stem, Swivel, Float Ball | Each | $24.16 | 1 | $24.16 |

**Practice:** 614 - Watering Facility

**Scenario** #6 - Frost Free Trough

**Scenario Description:**

A permanent watering facility as a means for providing controlled access to drinking water for livestock or wildlife during all weather conditions, including sub-freezing temperatures. Facility will provide an adequate quantity and quality of water for storage or direct drinking access. The watering facility will be constructed from approved durable materials that have a life expectancy that meets or exceeds the planned useful life of the installation. The watering facility will address the resource concerns of inadequate supply of water for livestock or wildlife, habitat degradation, water quality, and undesirable plant productivity and health.

**Before Situation:**

This practice applies to all land uses where there is a need for a watering facility for livestock or wildlife, where there is a source of water that is adequate in quantity and quality for the purpose, and where soils and topography are suitable for a facility to provide controlled access to drinking water for livestock or wildlife to provide daily water requirements, improve animal distribution to better utilize grazing resources, provide a water source that is an alternative to a sensitive resource.

**After Situation:**

A permanent watering facility as a means for providing controlled access to drinking water for livestock or wildlife constructed for all weather conditions, including sub-freezing conditions. Costs include all tank materials, tank plumbing and float valve, that stores adequate quantity and quality of water for storage or direct drinking access. The watering facility will be constructed from approved durable materials that have a life expectancy that meets or exceeds the planned useful life of the installation. The watering facility will address the resource concerns of inadequate supply of water for livestock or wildlife, habitat degradation, water quality, and undesirable plant productivity and health. The watering facility is placed on a properly prepared foundation with all required materials, plumbing and vegetation for stabilizing disturbed areas. All needed pipelines are installed using Livestock Pipeline (516). All collectors or catchments for collecting precipitation will be addressed by using Water Harvesting Catchment (636). Any needed water source installation will use Water Well (642), Pumping Plant (533), Spring Development (574), or Livestock Pipeline (516) as appropriate. Areas around watering facilities where animal concentrations or overflow from the watering facility will cause resource concerns will be protected by using Heavy Use Area Protection (561) as appropriate. All fencing will use Fence (382).

**Feature Measure:** Number of Frost Free Watering Tro

**Scenario Unit::** Each

**Scenario Typical Size:** 1.0

**Scenario Total Cost:** $900.90

**Scenario Cost/Unit:** $900.90

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 | $56.05 | 1 | $56.05 |
| Truck, Pickup | 939 | Equipment and power unit costs. Labor not included. | Hour | $21.79 | 2 | $43.58 |
| **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 | $25.31 | 3 | $75.93 |
| Equipment Operators, Light | 232 | Includes: Skid Steer Loaders, Hydraulic Excavators <50 HP, Trenchers <12", Ag Equipment <150 HP, Pickup Trucks, Forklifts, Mulchers | Hour | $25.23 | 1 | $25.23 |
| **Materials** | | | | | | |
| Tank, Freeze Proof, 2 hole | 280 | Tank, Freeze Proof with 2 drinking holes. Includes materials and shipping. | Each | $699.42 | 1 | $699.42 |
| One Species, Warm Season, Native Perennial Grass | 2322 | Native, warm season perennial grass. Includes material and shipping only. | Acre | $69.06 | 0.01 | $0.69 |

**Practice:** 614 - Watering Facility

**Scenario** #7 - Permanent Storage Tank

**Scenario Description:**

A permanent storage tank as a means of supplying water which will assist to provide controlled access to drinking water for livestock or wildlife. Tank will be less than 1500 gallons of capacity that stores adequate quantity and quality of water for direct drinking access. The storage tank will be constructed from approved durable materials that have a life expectancy that meets or exceeds the planned useful life of the installation. The storage tank will be installed in conjunction with watering facility(s) that will address the resource concerns of inadequate supply of water for livestock or wildlife, habitat degradation, water quality, and undesirable plant productivity and health.

**Before Situation:**

This practice applies to all land uses where there is a need for a watering facility for livestock or wildlife. However, the existing source of water does not provide adequate quantity of water for grazing livestock during certain times of the year, making the grazing system unfeasible. Livestock gather at unprotected wetlands and streams to gain access to water which causing resource degradation. Impacts to water quality are apparent, plant condition is impacted and soil erosion is occurring. Adequate water is available if it can be stored and delivered to the livestock when they need it.

**After Situation:**

A permanent 1500 gallon polyethylene storage tank will provide adequate water supply for watering facilities as a means for providing controlled access to drinking water for livestock or wildlife. Cost include furnishing and installing all tank materials, tank plumbing, float valve, etc. that stores adequate quantity and quality of water. Tank will be constructed from approved durable materials that have a life expectancy that meets or exceeds the planned useful life of the installation. The storage tank in conjunction with a watering facility will address the resource concerns of inadequate supply of water for livestock or wildlife, habitat degradation, water quality, and undesirable plant productivity and health. The tank will be placed on a properly prepared foundation with all required materials, plumbing and vegetation for stabilizing disturbed areas. All needed pipelines are installed using Livestock Pipeline (516). All collectors or catchments for collecting precipitation will be addressed by using Water Harvesting Catchment (636). Any needed water source installation will use Water Well (642), Pumping Plant (533), Spring Development (574), or Livestock Pipeline (516) as appropriate. Areas around watering facilities where animal concentrations or overflow from the watering facility will cause resource concerns will be protected by using Heavy Use Area Protection (561) as appropriate. All fencing will use Fence (382).

**Feature Measure:** Capacity in Gallons

**Scenario Unit::** Gallon

**Scenario Typical Size:** 1,500.0

**Scenario Total Cost:** $1,773.60

**Scenario Cost/Unit:** $1.18

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 | $56.05 | 2 | $112.10 |
| Truck, Pickup | 939 | Equipment and power unit costs. Labor not included. | Hour | $21.79 | 2 | $43.58 |
| **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 | $25.31 | 3 | $75.93 |
| Equipment Operators, Light | 232 | Includes: Skid Steer Loaders, Hydraulic Excavators <50 HP, Trenchers <12", Ag Equipment <150 HP, Pickup Trucks, Forklifts, Mulchers | Hour | $25.23 | 2 | $50.46 |
| **Materials** | | | | | | |
| Tank, Poly Enclosed Storage, >1,000 | 1075 | Water storage tanks. Includes materials and shipping only. | Gallon | $0.93 | 1500 | $1,395.00 |
| Aggregate, Gravel, Ungraded, Quarry Run | 1099 | Includes materials, equipment and labor | Cubic Yard | $23.96 | 4 | $95.84 |
| One Species, Warm Season, Native Perennial Grass | 2322 | Native, warm season perennial grass. Includes material and shipping only. | Acre | $69.06 | 0.01 | $0.69 |

**Practice:** 620 - Underground Outlet

**Scenario** #1 - 4 inch Corrugated Plastic Pipe (CPP) only

**Scenario Description:**

Install 150 feet of 4" approved plastic pipe to convey stormwater from one location to a suitable and stable outlet. Trench is excavated 52" deep and 24" wide by hydraulic track excavator. Costs include 4" CPT or PVC pipe, trench excavation, pipe bedding, trench backfill, rodent guard and laid up stone headwall at outlet. This practice is often installed in conjunction with roof runoff practices.

**Before Situation:**

Roof runoff or surface runoff that becomes contaminated with agricultural wastes that significantly contributes to the amount of runoff that has to be stored or treated.

**After Situation:**

"Clean" storm water runoff is diverted away from an agricultural waste management system to minimize the volume of runoff that is contaminated by agricultural waste. Associated practices are Critical Area Planting (342) and Roof Runoff Structure (558).

**Feature Measure:** Length of Conduit

**Scenario Unit::** Foot

**Scenario Typical Size:** 150.0

**Scenario Total Cost:** $1,012.34

**Scenario Cost/Unit:** $6.75

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 | $2.36 | 88 | $207.68 |
| 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 | $2.16 | 40 | $86.40 |
| **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 | $25.31 | 3 | $75.93 |
| **Materials** | | | | | | |
| Rock Riprap, Placed with geotextile | 44 | Rock Riprap, placed with geotextile, includes materials, equipment and labor to transport and place | Cubic Yard | $79.57 | 0.25 | $19.89 |
| Aggregate, Sand, Graded, Washed | 45 | Sand, typical ASTM C33 gradation, includes materials, equipment and labor to transport and place | Cubic Yard | $34.29 | 8 | $274.32 |
| Pipe, PVC, 4", SDR 35 | 992 | Materials: - 4" - PVC - SDR 35 - ASTM D3034 | Foot | $2.01 | 10 | $20.10 |
| Pipe, HDPE, 4", PCPT, Single Wall | 1270 | Pipe, Corrugated Plastic Tubing, Single Wall, Perforated, 4" diameter - ASTM F405. Material cost only. | Foot | $0.46 | 140 | $64.40 |
| Rat Guard, 6" diameter | 2529 | Mild steel prong type rodent guard, 6 inch diameter. Attaches to the top of outlet pipe. Includes materials and shipping only. | Each | $7.79 | 1 | $7.79 |
| **Mobilization** | | | | | | |
| Mobilization, medium equipment | 1139 | Equipment with 70-150 HP or typical weights between 14,000 and 30,000 pounds. | Each | $255.83 | 1 | $255.83 |

## USDA - Natural Resources Conservation Service

**Massachusetts**

**Practice:** 620 - Underground Outlet

**Scenario** #2 - 6 inch Corrugated Plastic Pipe (CPP) only

**Scenario Description:**

Install 150 feet of 6" approved plastic pipe to convey stormwater from one location to a suitable and stable outlet. Trench is excavated approximately 54"deep and 24" wide by excavator. Costs include 6" HDPE corrugated single wall plastic tubing, trench excavation, trench backfill and compaction, rodent guard and laid up stone headwall at outlet. This practice is often installed in conjunction with terraces, diversions, sediment control basins, waterways or similar practices.

**Before Situation:**

Excessive sedimentation and soil erosion as a result of gully, rill or sheet erosion which exceeds "T" from farm fields and other locations. Also, roof runoff or surface runoff that becomes contaminated with agricultural wastes that significantly contributes to the amount of runoff that has to be stored or treated.

**After Situation:**

Field system meets "T" or "clean" storm water runoff is diverted away from an agricultural waste management system to minimize the volume of runoff that is contaminated by agricultural waste. Associated practices are Critical Area Planting (342), Grassed Waterway ( 412), Terrace (600), Diversion (342), Water and Sediment Control Basin (638), and Subsurface Drainage (606)

**Feature Measure:** Length of Conduit

**Scenario Unit::** Foot

**Scenario Typical Size:** 150.0

**Scenario Total Cost:** $1,655.13

**Scenario Cost/Unit:** $11.03

Cost Details:

| Component Name | ID | Description | Unit | Cost | QTY | Total |
|---|---|---|---|---|---|---|
| **Equipment Installation** | | | | | | |
| Excavation, common earth, side cast, large equipment | 1227 | Bulk excavation and side casting of common earth with hydraulic excavator with less greater than 1 CY capacity. Includes equipment and labor. | Cubic Yard | $1.69 | 89 | $150.41 |
| Compaction, earthfill, vibratory plate | 1260 | Compaction of earthfill with a walk behind vibratory plate compactor in typical 6-8 inch thick lifts, 2 passes. Includes equipment and labor. | Cubic Yard | $2.16 | 39 | $84.24 |
| **Labor** | | | | | | |
| General Labor | 231 | Labor performed using basic tools such as power tool, shovels, and other tools that do not require extensive training. Ex. pipe layer, herder, concrete placement, materials spreader, flagger, etc. | Hour | $25.31 | 2 | $50.62 |
| 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 | $45.69 | 2 | $91.38 |
| **Materials** | | | | | | |
| Rock Riprap, Placed with geotextile | 44 | Rock Riprap, placed with geotextile, includes materials, equipment and labor to transport and place | Cubic Yard | $79.57 | 1 | $79.57 |
| Aggregate, Sand, Graded, Washed | 45 | Sand, typical ASTM C33 gradation, includes materials, equipment and labor to transport and place | Cubic Yard | $34.29 | 11 | $377.19 |
| Pipe, PVC, 6", SDR 35 | 993 | Materials: - 6" - PVC - SDR 35 - ASTM D3034 | Foot | $4.51 | 10 | $45.10 |
| Pipe, HDPE, 6", CPT, Single Wall | 1242 | Pipe, Corrugated Plastic Tubing, Single Wall, 6" diameter - ASTM F405. Material cost only. | Foot | $1.13 | 140 | $158.20 |
| Headwall, stone or concrete bag | 1418 | Laid up stone or concrete bag headwall for a pipe inlet. Square Foot unit is a vertical area measurement of the headwall cross-section. Includes materials, equipment and labor. | Square Foot | $35.48 | 10 | $354.80 |
| Rat Guard, 6" diameter | 2529 | Mild steel prong type rodent guard, 6 inch diameter. Attaches to the top of outlet pipe. Includes materials and shipping only. | Each | $7.79 | 1 | $7.79 |
| **Mobilization** | | | | | | |
| Mobilization, medium equipment | 1139 | Equipment with 70-150 HP or typical weights between 14,000 and 30,000 pounds. | Each | $255.83 | 1 | $255.83 |

## USDA - Natural Resources Conservation Service

**Massachusetts**

**Practice:** 620 - Underground Outlet

**Scenario** #3 - 8 inch Corrugated Plastic Pipe (CPP) only

**Scenario Description:**

Install 150 feet of 8" approved plastic pipe to convey stormwater from one location to a suitable and stable outlet. Trench is excavated approximately 54"deep and 24" wide by excavator. Costs include 8" HDPE corrugated single wall plastic tubing, trench excavation, trench backfill and compaction, rodent guard and laid up stone headwall at outlet. This practice is often installed in conjunction with terraces, diversions, sediment control basins, waterways or similar practices.

**Before Situation:**

Excessive sedimentation and soil erosion as a result of gully, rill or sheet erosion which exceeds "T" from farm fields and other locations. Also, roof runoff or surface runoff that becomes contaminated with agricultural wastes that significantly contributes to the amount of runoff that has to be stored or treated.

**After Situation:**

Field system meets "T" or "clean" storm water runoff is diverted away from an agricultural waste management system to minimize the volume of runoff that is contaminated by agricultural waste. Associated practices are Critical Area Planting (342), Grassed Waterway ( 412), Terrace (600), Diversion (342), Water and Sediment Control Basin (638), and Subsurface Drainage (606)

**Feature Measure:** Length of Conduit

**Scenario Unit::** Foot

**Scenario Typical Size:** 150.0

**Scenario Total Cost:** $2,046.63

**Scenario Cost/Unit:** $13.64

Cost Details:

| Component Name | ID | Description | Unit | Cost | QTY | Total |
|---|---|---|---|---|---|---|
| **Equipment Installation** | | | | | | |
| Excavation, common earth, side cast, large equipment | 1227 | Bulk excavation and side casting of common earth with hydraulic excavator with less greater than 1 CY capacity. Includes equipment and labor. | Cubic Yard | $1.69 | 83 | $140.27 |
| 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 | $2.16 | 33 | $71.28 |
| **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 | $25.31 | 4 | $101.24 |
| 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 | $45.69 | 2 | $91.38 |
| **Materials** | | | | | | |
| Rock Riprap, Placed with geotextile | 44 | Rock Riprap, placed with geotextile, includes materials, equipment and labor to transport and place | Cubic Yard | $79.57 | 1 | $79.57 |
| Aggregate, Sand, Graded, Washed | 45 | Sand, typical ASTM C33 gradation, includes materials, equipment and labor to transport and place | Cubic Yard | $34.29 | 17 | $582.93 |
| Pipe, PVC, 8", SDR 35 | 994 | Materials: - 8" - PVC - SDR 35 - ASTM D3034 | Foot | $8.10 | 10 | $81.00 |
| Pipe, HDPE, 8", PCPT, Single Wall | 1272 | Pipe, Corrugated Plastic Tubing, Single Wall, Perforated, 8" diameter - ASTM F667. Material cost only. | Foot | $1.99 | 140 | $278.60 |
| Headwall, stone or concrete bag | 1418 | Laid up stone or concrete bag headwall for a pipe inlet. Square Foot unit is a vertical area measurement of the headwall cross-section. Includes materials, equipment and labor. | Square Foot | $35.48 | 10 | $354.80 |
| Rat Guard, 8" diameter | 2530 | Mild steel prong type rodent guard, 8 inch diameter. Attaches to the top of outlet pipe. Includes materials and shipping only. | Each | $9.73 | 1 | $9.73 |
| **Mobilization** | | | | | | |
| Mobilization, medium equipment | 1139 | Equipment with 70-150 HP or typical weights between 14,000 and 30,000 pounds. | Each | $255.83 | 1 | $255.83 |

**Practice:** 620 - Underground Outlet

**Scenario** #4 - 10 inch High Density Polyethylene (HDPE) Pipe only

**Scenario Description:**

Install 150 feet of 10" approved plastic pipe to convey stormwater from one location to a suitable and stable outlet. Trench Excavation is 58" deep and 28" wide. Costs include 10" HDPE pipe, trench excavation, trench backfill, rodent guard and laid up stone headwall at outlet. This practice is often installed in conjunction with terraces, diversions, sediment control basins, waterways or similar practices.

**Before Situation:**

Excessive sedimentation and soil erosion as a result of gully, rill or sheet erosion which exceeds "T" from farm fields and other locations. Also, roof runoff or surface runoff that becomes contaminated with agricultural wastes that significantly contributes to the amount of runoff that has to be stored or treated.

**After Situation:**

Field system meets "T" or "clean" storm water runoff is diverted away from an agricultural waste management system to minimize the volume of runoff that is contaminated by agricultural waste. Associated practices are Critical Area Planting (342), Grassed Waterway ( 412), Terrace (600), Diversion (342), Water and Sediment Control Basin (638), and Subsurface Drainage (606)

**Feature Measure:** Length of Conduit

**Scenario Unit::** Foot

**Scenario Typical Size:** 150.0

**Scenario Total Cost:** $2,795.79

**Scenario Cost/Unit:** $18.64

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 | $2.36 | 78 | $184.08 |
| 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 | $2.16 | 28 | $60.48 |
| **Labor** | | | | | | |
| General Labor | 231 | Labor performed using basic tools such as power tool, shovels, and other tools that do not require extensive training. Ex. pipe layer, herder, concrete placement, materials spreader, flagger, etc. | Hour | $25.31 | 4 | $101.24 |
| 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 | $45.69 | 2 | $91.38 |
| **Materials** | | | | | | |
| Rock Riprap, Placed with geotextile | 44 | Rock Riprap, placed with geotextile, includes materials, equipment and labor to transport and place | Cubic Yard | $79.57 | 1 | $79.57 |
| Aggregate, Sand, Graded, Washed | 45 | Sand, typical ASTM C33 gradation, includes materials, equipment and labor to transport and place | Cubic Yard | $34.29 | 22 | $754.38 |
| 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 | $6.00 | 150 | $900.00 |
| Headwall, stone or concrete bag | 1418 | Laid up stone or concrete bag headwall for a pipe inlet. Square Foot unit is a vertical area measurement of the headwall cross-section. Includes materials, equipment and labor. | Square Foot | $35.48 | 10 | $354.80 |
| Rat Guard, 10" diameter | 2531 | Mild steel prong type rodend guard, 10 inch diameter. Attaches to the top of outlet pipe. Includes materials and shipping only. | Each | $14.03 | 1 | $14.03 |
| **Mobilization** | | | | | | |
| Mobilization, medium equipment | 1139 | Equipment with 70-150 HP or typical weights between 14,000 and 30,000 pounds. | Each | $255.83 | 1 | $255.83 |

## USDA - Natural Resources Conservation Service

**Massachusetts**

**Practice:** 620 - Underground Outlet

**Scenario** #5 - 4 to 6 inch Corrugated Plastic Pipe (CPP) with Riser

**Scenario Description:**

Install 150 feet of 6" approved plastic pipe to convey stormwater from one location to a suitable and stable outlet. Trench is excavated approximately 54"deep and 24" wide by excavator. Costs include 6" HDPE corrugated single wall plastic tubing, 8" Perforated PVC Riser Inlet, trench excavation, trench backfill, rodent guard and laid up stone headwall at outlet. This practice is often installed in conjunction with terraces, diversions, sediment control basins, waterways or similar practices.

**Before Situation:**

Excessive sedimentation and soil erosion as a result of gully, rill or sheet erosion which exceeds "T" from farm fields and other locations. Also, roof runoff or surface runoff that becomes contaminated with agricultural wastes that significantly contributes to the amount of runoff that has to be stored or treated.

**After Situation:**

Field system meets "T" or "clean" storm water runoff is diverted away from an agricultural waste management system to minimize the volume of runoff that is contaminated by agricultural waste. Associated practices are Critical Area Planting (342), Grassed Waterway ( 412), Terrace (600), Diversion (342), Water and Sediment Control Basin (638), and Subsurface Drainage (606)

**Feature Measure:** Length of Conduit

**Scenario Unit::** Foot

**Scenario Typical Size:** 150.0

**Scenario Total Cost:** $1,870.02

**Scenario Cost/Unit:** $12.47

Cost Details:

| Component Name | ID | Description | Unit | Cost | QTY | Total |
|---|---|---|---|---|---|---|
| **Equipment Installation** | | | | | | |
| Excavation, common earth, side cast, large equipment | 1227 | Bulk excavation and side casting of common earth with hydraulic excavator with less greater than 1 CY capacity. Includes equipment and labor. | Cubic Yard | $1.69 | 88 | $148.72 |
| 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 | $2.16 | 38 | $82.08 |
| **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 | $25.31 | 2 | $50.62 |
| 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 | $45.69 | 2 | $91.38 |
| **Materials** | | | | | | |
| Rock Riprap, Placed with geotextile | 44 | Rock Riprap, placed with geotextile, includes materials, equipment and labor to transport and place | Cubic Yard | $79.57 | 1 | $79.57 |
| Aggregate, Sand, Graded, Washed | 45 | Sand, typical ASTM C33 gradation, includes materials, equipment and labor to transport and place | Cubic Yard | $34.29 | 11 | $377.19 |
| Pipe, PVC, 6", SDR 35 | 993 | Materials: - 6" - PVC - SDR 35 - ASTM D3034 | Foot | $4.51 | 10 | $45.10 |
| Pipe, HDPE, 6", CPT, Single Wall | 1242 | Pipe, Corrugated Plastic Tubing, Single Wall, 6" diameter - ASTM F405. Material cost only. | Foot | $1.13 | 140 | $158.20 |
| 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 |
| Headwall, stone or concrete bag | 1418 | Laid up stone or concrete bag headwall for a pipe inlet. Square Foot unit is a vertical area measurement of the headwall cross-section. Includes materials, equipment and labor. | Square Foot | $35.48 | 10 | $354.80 |
| Rat Guard, 6" diameter | 2529 | Mild steel prong type rodent guard, 6 inch diameter. Attaches to the top of outlet pipe. Includes materials and shipping only. | Each | $7.79 | 1 | $7.79 |
| **Mobilization** | | | | | | |
| Mobilization, medium equipment | 1139 | Equipment with 70-150 HP or typical weights between 14,000 and 30,000 pounds. | Each | $255.83 | 1 | $255.83 |

**Practice:** 620 - Underground Outlet

**Scenario** #6 - 4 to 6 inch Polyvinyl Chloride (PVC) Pipe with Catch Basin upto 50 feet in length

**Scenario Description:**

Install 50 feet of 6" approved plastic pipe to convey stormwater from one location to a suitable and stable outlet. Trench is excavated 52" deep and 24" wide by hydraulic track excavator. Costs include 6" SDR-35 pipe, Precast concrete drop inlet with steel grate, trench excavation, trench backfill, rodent guard and laid up stone headwall at outlet. This practice is often installed in conjunction with terraces, diversions, sediment control basins, waterways, roof runoff structures, or similar practices.

**Before Situation:**

Excessive sedimentation and soil erosion as a result of gully, rill or sheet erosion which exceeds "T" from farm fields and other locations. Also, roof runoff or surface runoff that becomes contaminated with agricultural wastes significantly contributes to the amount of runoff that has to be stored or treated.

**After Situation:**

Field system meets "T" or "clean" storm water runoff is diverted away from an agricultural waste management system to minimize the volume of runoff that is contaminated by agricultural waste. Associated practices are Critical Area Planting (342), Grassed Waterway (412), Terrace (600), Diversion (342), Water and Sediment Control Basin (638), Roof Runoff Structure (558), and Subsurface Drainage (606)

**Feature Measure:** Length of Conduit

**Scenario Unit::** Foot

**Scenario Typical Size:** 50.0

**Scenario Total Cost:** $1,961.14

**Scenario Cost/Unit:** $39.22

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 | $5.87 | 6 | $35.22 |
| 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 | $1.69 | 25 | $42.25 |
| Compaction, earthfill, vibratory plate | 1260 | Compaction of earthfill with a walk behind vibratory plate compactor in typical 6-8 inch thick lifts, 2 passes. Includes equipment and labor. | Cubic Yard | $2.16 | 11 | $23.76 |
| **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 | $25.31 | 2 | $50.62 |
| 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 | $45.69 | 2 | $91.38 |
| **Materials** | | | | | | |
| Rock Riprap, Placed with geotextile | 44 | Rock Riprap, placed with geotextile, includes materials, equipment and labor to transport and place | Cubic Yard | $79.57 | 1 | $79.57 |
| Pipe, PVC, 6", SDR 35 | 993 | Materials: - 6" - PVC - SDR 35 - ASTM D3034 | Foot | $4.51 | 50 | $225.50 |
| 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 | $794.42 | 1 | $794.42 |
| Headwall, stone or concrete bag | 1418 | Laid up stone or concrete bag headwall for a pipe inlet. Square Foot unit is a vertical area measurement of the headwall cross-section. Includes materials, equipment and labor. | Square Foot | $35.48 | 10 | $354.80 |
| Rat Guard, 6" diameter | 2529 | Mild steel prong type rodent guard, 6 inch diameter. Attaches to the top of outlet pipe. Includes materials and shipping only. | Each | $7.79 | 1 | $7.79 |
| **Mobilization** | | | | | | |
| Mobilization, medium equipment | 1139 | Equipment with 70-150 HP or typical weights between 14,000 and 30,000 pounds. | Each | $255.83 | 1 | $255.83 |

## USDA - Natural Resources Conservation Service

**Massachusetts**

**Practice:** 620 - Underground Outlet

**Scenario** #7 - 4 to 6 inch Polyvinyl Chloride (PVC)Pipe with Catch Basin over 50 feet in length

**Scenario Description:**

Install 150 feet of 6" approved plastic pipe to convey stormwater from one location to a suitable and stable outlet. Trench is excavated 52" deep and 24" wide by hydraulic track excavator. Costs include 6" SDR-35 pipe, Precast concrete drop inlet with steel grate, trench excavation, trench backfill, rodent guard and laid up stone headwall at outlet. This practice is often installed in conjunction with terraces, diversions, sediment control basins, waterways, roof runoff structures, or similar practices.

**Before Situation:**

Excessive sedimentation and soil erosion as a result of gully, rill or sheet erosion which exceeds "T" from farm fields and other locations. Also, roof runoff or surface runoff that becomes contaminated with agricultural wastes significantly contributes to the amount of runoff that has to be stored or treated.

**After Situation:**

Field system meets "T" or "clean" storm water runoff is diverted away from an agricultural waste management system to minimize the volume of runoff that is contaminated by agricultural waste. Associated practices are Critical Area Planting (342), Grassed Waterway (412), Terrace (600), Diversion (342), Water and Sediment Control Basin (638), Roof Runoff Structure (558), and Subsurface Drainage (606)

**Feature Measure:** Length of Conduit

**Scenario Unit::** Foot

**Scenario Typical Size:** 150.0

**Scenario Total Cost:** $2,560.61

**Scenario Cost/Unit:** $17.07

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 | $5.87 | 16 | $93.92 |
| Excavation, common earth, side cast, large equipment | 1227 | Bulk excavation and side casting of common earth with hydraulic excavator with less greater than 1 CY capacity. Includes equipment and labor. | Cubic Yard | $1.69 | 50 | $84.50 |
| Compaction, earthfill, vibratory plate | 1260 | Compaction of earthfill with a walk behind vibratory plate compactor in typical 6-8 inch thick lifts, 2 passes. Includes equipment and labor. | Cubic Yard | $2.16 | 33 | $71.28 |
| **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 | $25.31 | 2 | $50.62 |
| 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 | $45.69 | 2 | $91.38 |
| **Materials** | | | | | | |
| Rock Riprap, Placed with geotextile | 44 | Rock Riprap, placed with geotextile, includes materials, equipment and labor to transport and place | Cubic Yard | $79.57 | 1 | $79.57 |
| Pipe, PVC, 6", SDR 35 | 993 | Materials: - 6" - PVC - SDR 35 - ASTM D3034 | Foot | $4.51 | 150 | $676.50 |
| 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 | $794.42 | 1 | $794.42 |
| Headwall, stone or concrete bag | 1418 | Laid up stone or concrete bag headwall for a pipe inlet. Square Foot unit is a vertical area measurement of the headwall cross-section. Includes materials, equipment and labor. | Square Foot | $35.48 | 10 | $354.80 |
| Rat Guard, 6" diameter | 2529 | Mild steel prong type rodent guard, 6 inch diameter. Attaches to the top of outlet pipe. Includes materials and shipping only. | Each | $7.79 | 1 | $7.79 |
| **Mobilization** | | | | | | |
| Mobilization, medium equipment | 1139 | Equipment with 70-150 HP or typical weights between 14,000 and 30,000 pounds. | Each | $255.83 | 1 | $255.83 |

**Practice:** 620 - Underground Outlet

**Scenario** #8 - 8 to 12 inch High Density Polyethylene (HDPE) Pipe with Riser

**Scenario Description:**

Install 150 feet of 10" approved plastic pipe to convey stormwater from one location to a suitable and stable outlet. Trench Excavation is 58" deep and 28" wide. Costs include 10" HDPE pipe, 12" Perforated PVC Riser Inlet, trench excavation, trench backfill, rodent guard and laid up stone headwall at outlet. This practice is often installed in conjunction with terraces, diversions, sediment control basins, waterways or similar practices.

**Before Situation:**

Excessive sedimentation and soil erosion as a result of gully, rill or sheet erosion which exceeds "T" from farm fields and other locations. Also, roof runoff or surface runoff that becomes contaminated with agricultural wastes that significantly contributes to the amount of runoff that has to be stored or treated.

**After Situation:**

Field system meets "T" or "clean" storm water runoff is diverted away from an agricultural waste management system to minimize the volume of runoff that is contaminated by agricultural waste. Associated practices are Critical Area Planting (342), Grassed Waterway ( 412), Terrace (600), Diversion (342), Water and Sediment Control Basin (638), and Subsurface Drainage (606)

**Feature Measure:** Length of Conduit

**Scenario Unit::** Foot

**Scenario Typical Size:** 150.0

**Scenario Total Cost:** $3,092.41

**Scenario Cost/Unit:** $20.62

Cost Details:

| Component Name | ID | Description | Unit | Cost | QTY | Total |
|---|---|---|---|---|---|---|
| **Equipment Installation** | | | | | | |
| Excavation, Common Earth, side cast, small equipment | 48 | Bulk excavation and side casting of common earth with hydraulic excavator with less than 1 CY capacity. Includes equipment and labor. | Cubic Yard | $2.36 | 78 | $184.08 |
| 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 | $2.16 | 28 | $60.48 |
| **Labor** | | | | | | |
| General Labor | 231 | Labor performed using basic tools such as power tool, shovels, and other tools that do not require extensive training. Ex. pipe layer, herder, concrete placement, materials spreader, flagger, etc. | Hour | $25.31 | 4 | $101.24 |
| 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 | $45.69 | 2 | $91.38 |
| **Materials** | | | | | | |
| Rock Riprap, Placed with geotextile | 44 | Rock Riprap, placed with geotextile, includes materials, equipment and labor to transport and place | Cubic Yard | $79.57 | 1 | $79.57 |
| Aggregate, Sand, Graded, Washed | 45 | Sand, typical ASTM C33 gradation, includes materials, equipment and labor to transport and place | Cubic Yard | $34.29 | 22 | $754.38 |
| 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 | $6.00 | 150 | $900.00 |
| 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 |
| Headwall, stone or concrete bag | 1418 | Laid up stone or concrete bag headwall for a pipe inlet. Square Foot unit is a vertical area measurement of the headwall cross-section. Includes materials, equipment and labor. | Square Foot | $35.48 | 10 | $354.80 |
| Rat Guard, 10" diameter | 2531 | Mild steel prong type rodend guard, 10 inch diameter. Attaches to the top of outlet pipe. Includes materials and shipping only. | Each | $14.03 | 1 | $14.03 |
| **Mobilization** | | | | | | |
| Mobilization, medium equipment | 1139 | Equipment with 70-150 HP or typical weights between 14,000 and 30,000 pounds. | Each | $255.83 | 1 | $255.83 |

**Practice:** 620 - Underground Outlet

**Scenario** #9 - 8 to 12 inch High Density Polyethylene (HDPE) Pipe with Catch Basin upto 50 feet in length

**Scenario Description:**

Install 50 feet of 10" approved plastic pipe to convey stormwater from one location to a suitable and stable outlet. Trench Excavation is 58" deep and 28" wide. Costs include 10" HDPE pipe, Precast concrete drop inlet with steel grate, trench excavation, trench backfill, rodent guard and laid up stone headwall at outlet. This practice is often installed in conjunction with terraces, diversions, sediment control basins, waterways or similar practices.

**Before Situation:**

Excessive sedimentation and soil erosion as a result of gully, rill or sheet erosion which exceeds "T" from farm fields and other locations. Also, roof runoff or surface runoff that becomes contaminated with agricultural wastes that significantly contributes to the amount of runoff that has to be stored or treated.

**After Situation:**

Field system meets "T" or "clean" storm water runoff is diverted away from an agricultural waste management system to minimize the volume of runoff that is contaminated by agricultural waste. Associated practices are Critical Area Planting (342), Grassed Waterway ( 412), Terrace (600), Diversion (342), Water and Sediment Control Basin (638), and Subsurface Drainage (606)

**Feature Measure:** Length of Conduit

**Scenario Unit::** Foot

**Scenario Typical Size:** 50.0

**Scenario Total Cost:** $2,350.70

**Scenario Cost/Unit:** $47.01

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 | $2.36 | 32 | $75.52 |
| 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 | $2.16 | 12 | $25.92 |
| **Labor** | | | | | | |
| General Labor | 231 | Labor performed using basic tools such as power tool, shovels, and other tools that do not require extensive training. Ex. pipe layer, herder, concrete placement, materials spreader, flagger, etc. | Hour | $25.31 | 2 | $50.62 |
| 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 | $45.69 | 2 | $91.38 |
| **Materials** | | | | | | |
| Rock Riprap, Placed with geotextile | 44 | Rock Riprap, placed with geotextile, includes materials, equipment and labor to transport and place | Cubic Yard | $79.57 | 1 | $79.57 |
| Aggregate, Sand, Graded, Washed | 45 | Sand, typical ASTM C33 gradation, includes materials, equipment and labor to transport and place | Cubic Yard | $34.29 | 9 | $308.61 |
| 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 | $6.00 | 50 | $300.00 |
| 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 | $794.42 | 1 | $794.42 |
| Headwall, stone or concrete bag | 1418 | Laid up stone or concrete bag headwall for a pipe inlet. Square Foot unit is a vertical area measurement of the headwall cross-section. Includes materials, equipment and labor. | Square Foot | $35.48 | 10 | $354.80 |
| Rat Guard, 10" diameter | 2531 | Mild steel prong type rodend guard, 10 inch diameter. Attaches to the top of outlet pipe. Includes materials and shipping only. | Each | $14.03 | 1 | $14.03 |
| **Mobilization** | | | | | | |
| Mobilization, medium equipment | 1139 | Equipment with 70-150 HP or typical weights between 14,000 and 30,000 pounds. | Each | $255.83 | 1 | $255.83 |

**Practice:** 620 - Underground Outlet

**Scenario** #10 - 8 to 12 inch High Density Polyethylene (HDPE) Pipe with Catch Basin over 50 feet in length

**Scenario Description:**

Install 150 feet of 10" approved plastic pipe to convey stormwater from one location to a suitable and stable outlet. Trench Excavation is 58" deep and 28" wide. Costs include 10" HDPE pipe, Precast concrete drop inlet with steel grate, trench excavation, trench backfill, rodent guard and laid up stone headwall at outlet. This practice is often installed in conjunction with terraces, diversions, sediment control basins, waterways or similar practices.

**Before Situation:**

Excessive sedimentation and soil erosion as a result of gully, rill or sheet erosion which exceeds "T" from farm fields and other locations. Also, roof runoff or surface runoff that becomes contaminated with agricultural wastes that significantly contributes to the amount of runoff that has to be stored or treated.

**After Situation:**

Field system meets "T" or "clean" storm water runoff is diverted away from an agricultural waste management system to minimize the volume of runoff that is contaminated by agricultural waste. Associated practices are Critical Area Planting (342), Grassed Waterway ( 412), Terrace (600), Diversion (342), Water and Sediment Control Basin (638), and Subsurface Drainage (606)

**Feature Measure:** Length of Conduit

**Scenario Unit::** Foot

**Scenario Typical Size:** 150.0

**Scenario Total Cost:** $3,789.49

**Scenario Cost/Unit:** $25.26

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 | $2.36 | 97 | $228.92 |
| Compaction, earthfill, vibratory plate | 1260 | Compaction of earthfill with a walk behind vibratory plate compactor in typical 6-8 inch thick lifts, 2 passes. Includes equipment and labor. | Cubic Yard | $2.16 | 36 | $77.76 |
| **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 | $25.31 | 4 | $101.24 |
| 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 | $45.69 | 2 | $91.38 |
| **Materials** | | | | | | |
| Rock Riprap, Placed with geotextile | 44 | Rock Riprap, placed with geotextile, includes materials, equipment and labor to transport and place | Cubic Yard | $79.57 | 1 | $79.57 |
| Aggregate, Sand, Graded, Washed | 45 | Sand, typical ASTM C33 gradation, includes materials, equipment and labor to transport and place | Cubic Yard | $34.29 | 26 | $891.54 |
| 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 | $6.00 | 150 | $900.00 |
| 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 | $794.42 | 1 | $794.42 |
| Headwall, stone or concrete bag | 1418 | Laid up stone or concrete bag headwall for a pipe inlet. Square Foot unit is a vertical area measurement of the headwall cross-section. Includes materials, equipment and labor. | Square Foot | $35.48 | 10 | $354.80 |
| Rat Guard, 10" diameter | 2531 | Mild steel prong type rodend guard, 10 inch diameter. Attaches to the top of outlet pipe. Includes materials and shipping only. | Each | $14.03 | 1 | $14.03 |
| **Mobilization** | | | | | | |
| Mobilization, medium equipment | 1139 | Equipment with 70-150 HP or typical weights between 14,000 and 30,000 pounds. | Each | $255.83 | 1 | $255.83 |

## USDA - Natural Resources Conservation Service

**Massachusetts**

**Practice:** 620 - Underground Outlet

**Scenario** #11 - 14 to 18 inch High Density Polyethylene (HDPE) Pipe with Catch Basin

**Scenario Description:**

Install 150 feet of 18" approved plastic pipe to convey stormwater from one location to a suitable and stable outlet. Trench excavation is 66" deep x 39" wide. Costs include 18" HDPE pipe, Precast concrete drop inlet with steel grate, trench excavation, bedding material, trench backfill, rodent guard and laid up stone headwall at outlet. This practice is often is installed in conjunction with terraces, diversions, sediment control basins, waterways or similar practices.

**Before Situation:**

Excessive sedimentation and soil erosion as a result of gully, rill or sheet erosion which exceeds "T" from farm fields and other locations. Also, roof runoff or surface runoff that becomes contaminated with agricultural wastes that significantly contributes to the amount of runoff that has to be stored or treated.

**After Situation:**

Field system meets "T" or "clean" storm water runoff is diverted away from an agricultural waste management system to minimize the volume of runoff that is contaminated by agricultural waste. Associated practices are Critical Area Planting (342), Grassed Waterway ( 412), Terrace (600), Diversion (342), Water and Sediment Control Basin (638), and Subsurface Drainage (606)

**Feature Measure:** Length of Conduit

**Scenario Unit::** Foot

**Scenario Typical Size:** 150.0

**Scenario Total Cost:** $5,243.63

**Scenario Cost/Unit:** $34.96

Cost Details:

| Component Name | ID | Description | Unit | Cost | QTY | Total |
|---|---|---|---|---|---|---|
| **Equipment Installation** | | | | | | |
| Excavation, common earth, side cast, large equipment | 1227 | Bulk excavation and side casting of common earth with hydraulic excavator with less greater than 1 CY capacity. Includes equipment and labor. | Cubic Yard | $1.69 | 171 | $288.99 |
| Compaction, earthfill, vibratory plate | 1260 | Compaction of earthfill with a walk behind vibratory plate compactor in typical 6-8 inch thick lifts, 2 passes. Includes equipment and labor. | Cubic Yard | $2.16 | 72 | $155.52 |
| **Labor** | | | | | | |
| General Labor | 231 | Labor performed using basic tools such as power tool, shovels, and other tools that do not require extensive training. Ex. pipe layer, herder, concrete placement, materials spreader, flagger, etc. | Hour | $25.31 | 4 | $101.24 |
| 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 | $45.69 | 2 | $91.38 |
| **Materials** | | | | | | |
| Rock Riprap, Placed with geotextile | 44 | Rock Riprap, placed with geotextile, includes materials, equipment and labor to transport and place | Cubic Yard | $79.57 | 1 | $79.57 |
| Aggregate, Gravel, Graded | 46 | Gravel, includes materials, equipment and labor to transport and place. Includes washed and unwashed gravel. | Cubic Yard | $34.75 | 26 | $903.50 |
| 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 | $12.76 | 150 | $1,914.00 |
| 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 | $794.42 | 1 | $794.42 |
| Headwall, stone or concrete bag | 1418 | Laid up stone or concrete bag headwall for a pipe inlet. Square Foot unit is a vertical area measurement of the headwall cross-section. Includes materials, equipment and labor. | Square Foot | $35.48 | 10 | $354.80 |
| Rat Guard, 18" diameter | 2534 | Mild steel prong type rodent guard, 18 inch diameter. Attaches to the top of outlet pipe. Includes materials and shipping only. | Each | $71.76 | 1 | $71.76 |
| **Mobilization** | | | | | | |
| Mobilization, large equipment | 1140 | Equipment >150HP or typical weights greater than 30,000 pounds or loads requiring over width or over length permits. | Each | $488.45 | 1 | $488.45 |

**Practice:** 620 - Underground Outlet

**Scenario** #12 - 20 to 24 inch High Density Polyethylene (HDPE) Pipe with Catch Basin

**Scenario Description:**

Install 150 feet of 24" approved plastic pipe to convey stormwater from one location to a suitable and stable outlet. Trench excavation is 72" x 48" wide. Costs include 24" HDPE pipe, Precast concrete drop inlet with steel grate, 24" HDPE pipe, trench excavation, bedding material, trench backfill, rodent guard and laid up stone headwall at outlet. Practice is often installed in conjunction with terraces, diversions, sediment control basins, waterways or similar practices.

**Before Situation:**

Excessive sedimentation and soil erosion as a result of gully, rill or sheet erosion which exceeds "T" from farm fields and other locations. Also, roof runoff or surface runoff that becomes contaminated with agricultural wastes that significantly contributes to the amount of runoff that has to be stored or treated.

**After Situation:**

Field system meets "T" or "clean" storm water runoff is diverted away from an agricultural waste management system to minimize the volume of runoff that is contaminated by agricultural waste. Associated practices are Critical Area Planting (342), Grassed Waterway ( 412), Terrace (600), Diversion (342), Water and Sediment Control Basin (638), and Subsurface Drainage (606)

**Feature Measure:** Length of Conduit

**Scenario Unit::** Foot

**Scenario Typical Size:** 150.0

**Scenario Total Cost:** $7,721.76

**Scenario Cost/Unit:** $51.48

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 | $2.50 | 89 | $222.50 |
| Excavation, common earth, side cast, large equipment | 1227 | Bulk excavation and side casting of common earth with hydraulic excavator with less greater than 1 CY capacity. Includes equipment and labor. | Cubic Yard | $1.69 | 134 | $226.46 |
| Compaction, earthfill, vibratory plate | 1260 | Compaction of earthfill with a walk behind vibratory plate compactor in typical 6-8 inch thick lifts, 2 passes. Includes equipment and labor. | Cubic Yard | $2.16 | 89 | $192.24 |
| **Labor** | | | | | | |
| General Labor | 231 | Labor performed using basic tools such as power tool, shovels, and other tools that do not require extensive training. Ex. pipe layer, herder, concrete placement, materials spreader, flagger, etc. | Hour | $25.31 | 4 | $101.24 |
| 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 | $45.69 | 2.5 | $114.23 |
| **Materials** | | | | | | |
| Rock Riprap, Placed with geotextile | 44 | Rock Riprap, placed with geotextile, includes materials, equipment and labor to transport and place | Cubic Yard | $79.57 | 1 | $79.57 |
| Aggregate, Gravel, Graded | 46 | Gravel, includes materials, equipment and labor to transport and place. Includes washed and unwashed gravel. | Cubic Yard | $34.75 | 38 | $1,320.50 |
| 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 | $23.14 | 150 | $3,471.00 |
| 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 | $794.42 | 1 | $794.42 |
| Headwall, stone or concrete bag | 1418 | Laid up stone or concrete bag headwall for a pipe inlet. Square Foot unit is a vertical area measurement of the headwall cross-section. Includes materials, equipment and labor. | Square Foot | $35.48 | 10 | $354.80 |
| Rat Guard, 24" diameter | 2536 | Mild steel prong type rodent guard, 24 inch diameter. Attaches to the top of outlet pipe. Includes materials and shipping only. | Each | $100.52 | 1 | $100.52 |
| **Mobilization** | | | | | | |
| Mobilization, medium equipment | 1139 | Equipment with 70-150 HP or typical weights between 14,000 and 30,000 pounds. | Each | $255.83 | 1 | $255.83 |
| Mobilization, large equipment | 1140 | Equipment >150HP or typical weights greater than 30,000 pounds or loads requiring over width or over length permits. | Each | $488.45 | 1 | $488.45 |

**Practice:** 620 - Underground Outlet

**Scenario** #13 - 26 to 30 inch High Density Polyethylene (HDPE) Pipe with Catch Basin

**Scenario Description:**

Install 200 feet of 30" approved plastic pipe to convey stormwater from one location to a suitable and stable outlet. Trench excavation is 78" deep x 56" wide. Costs include 30" HDPE pipe, Precast concrete drop inlet with steel grate, trench excavation, bedding material, trench backfill, rodent guard and laid up stone headwall at outlet. This practices is often installed in conjunction with terraces, diversions, sediment control basins, waterways or similar practices.

**Before Situation:**

Excessive sedimentation and soil erosion as a result of gully, rill or sheet erosion which exceeds "T" from farm fields and other locations. Also, roof runoff or surface runoff that becomes contaminated with agricultural wastes that significantly contributes to the amount of runoff that has to be stored or treated.

**After Situation:**

Field system meets "T" or "clean" storm water runoff is diverted away from an agricultural waste management system to minimize the volume of runoff that is contaminated by agricultural waste. Associated practices are Critical Area Planting (342), Grassed Waterway ( 412), Terrace (600), Diversion (342), Water and Sediment Control Basin (638), and Subsurface Drainage (606)

**Feature Measure:** Length of Conduit

**Scenario Unit::** Foot

**Scenario Typical Size:** 200.0

**Scenario Total Cost:** $12,644.87

**Scenario Cost/Unit:** $63.22

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 | $2.50 | 122 | $305.00 |
| 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 | $1.69 | 226 | $381.94 |
| 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 | $2.16 | 122 | $263.52 |
| **Labor** | | | | | | |
| General Labor | 231 | Labor performed using basic tools such as power tool, shovels, and other tools that do not require extensive training. Ex. pipe layer, herder, concrete placement, materials spreader, flagger, etc. | Hour | $25.31 | 5 | $126.55 |
| Supervisor 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 | $45.69 | 3 | $137.07 |
| **Materials** | | | | | | |
| Rock Riprap, Placed with geotextile | 44 | Rock Riprap, placed with geotextile, includes materials, equipment and labor to transport and place | Cubic Yard | $79.57 | 3 | $238.71 |
| Aggregate, Gravel, Graded | 46 | Gravel, includes materials, equipment and labor to transport and place. Includes washed and unwashed gravel. | Cubic Yard | $34.75 | 67 | $2,328.25 |
| Manhole, 4' x 4' | 1053 | Precast Manhole with base and top delivered. 4' diameter x 4' depth. Materials only. | Each | $1,670.90 | 1 | $1,670.90 |
| 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 | $29.86 | 200 | $5,972.00 |
| Headwall, stone or concrete bag | 1418 | Laid up stone or concrete bag headwall for a pipe inlet. Square Foot unit is a vertical area measurement of the headwall cross-section. Includes materials, equipment and labor. | Square Foot | $35.48 | 10 | $354.80 |
| Rat Guard, 30" diameter | 2537 | Mild steel prong type rodent guard, 30 inch diameter. Attaches to the top of outlet pipe. Includes materials and shipping only. | Each | $121.85 | 1 | $121.85 |
| **Mobilization** | | | | | | |
| Mobilization, medium equipment | 1139 | Equipment with 70-150 HP or typical weights between 14,000 and 30,000 pounds. | Each | $255.83 | 1 | $255.83 |
| Mobilization, large equipment | 1140 | Equipment >150HP or typical weights greater than 30,000 pounds or loads requiring over width or over length permits. | Each | $488.45 | 1 | $488.45 |

**Practice:** 620 - Underground Outlet

**Scenario** #14 - Over 30 inch High Density Polyethylene (HDPE) Pipe with Catch Basin

**Scenario Description:**

Install 200 feet of 36" approved plastic pipe to convey stormwater from one location to a suitable and stable outlet. Trench excavation is 84" deep x 64" wide. Costs include 36" HDPE pipe, Precast concrete drop inlet with steel grate, trench excavation, bedding material, trench backfill, rodent guard and laid up stone headwall at outlet. This practice is often installed in conjunction with terraces, diversions, sediment control basins, waterways or similar practices.

**Before Situation:**

Excessive sedimentation and soil erosion as a result of gully, rill or sheet erosion which exceeds "T" from farm fields and other locations. Also, roof runoff or surface runoff that becomes contaminated with agricultural wastes that significantly contributes to the amount of runoff that has to be stored or treated.

**After Situation:**

Field system meets "T" or "clean" storm water runoff is diverted away from an agricultural waste management system to minimize the volume of runoff that is contaminated by agricultural waste. Associated practices are Critical Area Planting (342), Grassed Waterway ( 412), Terrace (600), Diversion (342), Water and Sediment Control Basin (638), and Subsurface Drainage (606)

**Feature Measure:** Length of Conduit

**Scenario Unit::** Foot

**Scenario Typical Size:** 200.0

**Scenario Total Cost:** $17,111.41

**Scenario Cost/Unit:** $85.56

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 | $2.50 | 157 | $392.50 |
| Excavation, common earth, side cast, large equipment | 1227 | Bulk excavation and side casting of common earth with hydraulic excavator with less greater than 1 CY capacity. Includes equipment and labor. | Cubic Yard | $1.69 | 275 | $464.75 |
| Compaction, earthfill, vibratory plate | 1260 | Compaction of earthfill with a walk behind vibratory plate compactor in typical 6-8 inch thick lifts, 2 passes. Includes equipment and labor. | Cubic Yard | $2.16 | 157 | $339.12 |
| **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 | $25.31 | 5 | $126.55 |
| Supervisor 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 | $45.69 | 4 | $182.76 |
| **Materials** | | | | | | |
| Rock Riprap, Placed with geotextile | 44 | Rock Riprap, placed with geotextile, includes materials, equipment and labor to transport and place | Cubic Yard | $79.57 | 4 | $318.28 |
| Aggregate, Gravel, Graded | 46 | Gravel, includes materials, equipment and labor to transport and place. Includes washed and unwashed gravel. | Cubic Yard | $34.75 | 135 | $4,691.25 |
| Manhole, 4' x 4' | 1053 | Precast Manhole with base and top delivered. 4' diameter x 4' depth. Materials only. | Each | $1,670.90 | 1 | $1,670.90 |
| 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 | $38.39 | 200 | $7,678.00 |
| Headwall, stone or concrete bag | 1418 | Laid up stone or concrete bag headwall for a pipe inlet. Square Foot unit is a vertical area measurement of the headwall cross-section. Includes materials, equipment and labor. | Square Foot | $35.48 | 10 | $354.80 |
| Rat Guard, 36" diameter | 2538 | Mild steel prong type rodent guard, 36 inch diameter. Attaches to the top of outlet pipe. Includes materials and shipping only. | Each | $148.22 | 1 | $148.22 |
| **Mobilization** | | | | | | |
| Mobilization, medium equipment | 1139 | Equipment with 70-150 HP or typical weights between 14,000 and 30,000 pounds. | Each | $255.83 | 1 | $255.83 |
| Mobilization, large equipment | 1140 | Equipment >150HP or typical weights greater than 30,000 pounds or loads requiring over width or over length permits. | Each | $488.45 | 1 | $488.45 |

**Practice:** 620 - Underground Outlet

**Scenario** #15 - 4 to 6 inch Polyvinyl Chloride (PVC) Pipe with Catch Basin w/ Horizontal Boring

**Scenario Description:**

Install 150 feet of 6" approved plastic pipe to convey stormwater from one location to a suitable and stable outlet. Trench is excavated 52" deep and 24" wide by hydraulic track excavator. 50' of pipe installed under road with horizontal boring equipment. Costs include 6" SDR-35 pipe, Precast concrete drop inlet with steel grate, trench excavation, trench backfill, hor. boring equipment, rodent guard and laid up stone headwall at outlet. This practice is often installed in conjunction with terraces, diversions, sediment control basins, waterways, roof runoff structures, or similar practices.

**Before Situation:**

Excessive sedimentation and soil erosion as a result of gully, rill or sheet erosion which exceeds "T" from farm fields and other locations. Also, roof runoff or surface runoff that becomes contaminated with agricultural wastes significantly contributes to the amount of runoff that has to be stored or treated.

**After Situation:**

Field system meets "T" or "clean" storm water runoff is diverted away from an agricultural waste management system to minimize the volume of runoff that is contaminated by agricultural waste. Associated practices are Critical Area Planting (342), Grassed Waterway (412), Terrace (600), Diversion (342), Water and Sediment Control Basin (638), Roof Runoff Structure (558), and Subsurface Drainage (606)

**Feature Measure:** Length of Conduit

**Scenario Unit::** Foot

**Scenario Typical Size:** 150.0

**Scenario Total Cost:** $7,970.81

**Scenario Cost/Unit:** $53.14

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 | $5.87 | 11 | $64.57 |
| 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 | $113.75 | 4 | $455.00 |
| Horizontal Boring, Greater Than 3" diameter | 1132 | Includes equipment, labor and setup. | Foot | $85.82 | 50 | $4,291.00 |
| 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 | $1.69 | 50 | $84.50 |
| Compaction, earthfill, vibratory plate | 1260 | Compaction of earthfill with a walk behind vibratory plate compactor in typical 6-8 inch thick lifts, 2 passes. Includes equipment and labor. | Cubic Yard | $2.16 | 22 | $47.52 |
| **Labor** | | | | | | |
| General Labor | 231 | Labor performed using basic tools such as power tool, shovels, and other tools that do not require extensive training. Ex. pipe layer, herder, concrete placement, materials spreader, flagger, etc. | Hour | $25.31 | 6 | $151.86 |
| 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 | $44.37 | 4 | $177.48 |
| Supervisor or Manager | 234 | Labor involving supervision or management activities. Includes crew supervisors, foremen and farm/ranch managers time required for adopting new technology, etc. | Hour | $45.69 | 6 | $274.14 |
| **Materials** | | | | | | |
| Rock Riprap, Placed with geotextile | 44 | Rock Riprap, placed with geotextile, includes materials, equipment and labor to transport and place | Cubic Yard | $79.57 | 1 | $79.57 |
| Pipe, PVC, 6", SDR 35 | 993 | Materials: - 6" - PVC - SDR 35 - ASTM D3034 | Foot | $4.51 | 150 | $676.50 |
| 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 | $794.42 | 1 | $794.42 |
| Headwall, stone or concrete bag | 1418 | Laid up stone or concrete bag headwall for a pipe inlet. Square Foot unit is a vertical area measurement of the headwall cross-section. Includes materials, equipment and labor. | Square Foot | $35.48 | 10 | $354.80 |
| Rat Guard, 6" diameter | 2529 | Mild steel prong type rodent guard, 6 inch diameter. Attaches to the top of outlet pipe. Includes materials and shipping only. | Each | $7.79 | 1 | $7.79 |
| **Mobilization** | | | | | | |
| Mobilization, medium equipment | 1139 | Equipment with 70-150 HP or typical weights between 14,000 and 30,000 pounds. | Each | $255.83 | 2 | $511.66 |

**Practice:** 620 - Underground Outlet

**Scenario** #16 - 8 to 12 inch High Density Polyethylene (HDPE) Pipe with Catch Basin w/ Horizontal Boring

**Scenario Description:**

Install 150 feet of 10" approved plastic pipe to convey stormwater from one location to a suitable and stable outlet. Trench Excavation is 58" deep and 28" wide. 50' of pipe installed under road with horizontal boring equipment. Costs include 10" HDPE pipe, Precast concrete drop inlet with steel grate, trench excavation, trench backfill, hor. boring equipment, rodent guard and laid up stone headwall at outlet. This practice is often installed in conjunction with terraces, diversions, sediment control basins, waterways, roof runoff structures, or similar practices.

**Before Situation:**

Excessive sedimentation and soil erosion as a result of gully, rill or sheet erosion which exceeds "T" from farm fields and other locations. Also, roof runoff or surface runoff that becomes contaminated with agricultural wastes that significantly contributes to the amount of runoff that has to be stored or treated.

**After Situation:**

Field system meets "T" or "clean" storm water runoff is diverted away from an agricultural waste management system to minimize the volume of runoff that is contaminated by agricultural waste. Associated practices are Critical Area Planting (342), Grassed Waterway ( 412), Terrace (600), Diversion (342), Water and Sediment Control Basin (638), and Subsurface Drainage (606)

**Feature Measure:** Length of Conduit

**Scenario Unit::** Foot

**Scenario Typical Size:** 150.0

**Scenario Total Cost:** $8,763.59

**Scenario Cost/Unit:** $58.42

Cost Details:

| Component Name | ID | Description | Unit | Cost | QTY | Total |
|---|---|---|---|---|---|---|
| **Equipment Installation** | | | | | | |
| Excavation, Common Earth, side cast, small equipment | 48 | Bulk excavation and side casting of common earth with hydraulic excavator with less than 1 CY capacity. Includes equipment and labor. | Cubic Yard | $2.36 | 97 | $228.92 |
| 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 | $113.75 | 4 | $455.00 |
| Horizontal Boring, Greater Than 3" diameter | 1132 | Includes equipment, labor and setup. | Foot | $85.82 | 50 | $4,291.00 |
| 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 | $2.16 | 36 | $77.76 |
| **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 | $25.31 | 6 | $151.86 |
| 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 | $44.37 | 4 | $177.48 |
| Supervisor or Manager | 234 | Labor involving supervision or management activities. Includes crew supervisors, foremen and farm/ranch managers time required for adopting new technology, etc. | Hour | $45.69 | 2 | $91.38 |
| **Materials** | | | | | | |
| Rock Riprap, Placed with geotextile | 44 | Rock Riprap, placed with geotextile, includes materials, equipment and labor to transport and place | Cubic Yard | $79.57 | 1 | $79.57 |
| Aggregate, Sand, Graded, Washed | 45 | Sand, typical ASTM C33 gradation, includes materials, equipment and labor to transport and place | Cubic Yard | $34.29 | 26 | $891.54 |
| 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 | $6.00 | 150 | $900.00 |
| 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 | $794.42 | 1 | $794.42 |
| Headwall, stone or concrete bag | 1418 | Laid up stone or concrete bag headwall for a pipe inlet. Square Foot unit is a vertical area measurement of the headwall cross-section. Includes materials, equipment and labor. | Square Foot | $35.48 | 10 | $354.80 |
| Rat Guard, 10" diameter | 2531 | Mild steel prong type rodend guard, 10 inch diameter. Attaches to the top of outlet pipe. Includes materials and shipping only. | Each | $14.03 | 1 | $14.03 |
| **Mobilization** | | | | | | |
| Mobilization, medium equipment | 1139 | Equipment with 70-150 HP or typical weights between 14,000 and 30,000 pounds. | Each | $255.83 | 1 | $255.83 |

**Practice:** 629 - Waste Treatment

**Scenario** #1 - Litter Windrow Pasteurization

**Scenario Description:**

This practice scenario includes the in house windrowing of poultry litter to promote pasteurization between flocks. The purpose of the practice is to address resource concerns related to water quality degradation due to (excess nutrient and pathogens) and air quality impacts (PM & PM precursors, and objectionable odors). Associated practices: Amendments for Treatment of Agricultural Waste (591), Waste Storage Facility (313), & Nutrient Management (590)

**Before Situation:**

A poultry operation typically removes part of the litter and bedding between flocks, called a cakeout. A full cleanout of litter and bedding is typically done once every 1-3 years depending on the operation. Over time, the accumulation of poultry waste in the litter contributes to an increase in odors and high ammonia emissions in the house contribute to impacts on bird health.

**After Situation:**

This scenario assumes 4 flocks per year in an operation with 2 - 42 x 500 square foot houses. Three (3) in-house pasteurization events will be performed annually. There will be a full cleanout after the 4th flock. Formula to calculate the total number of pasteurization events per year on a 1000 SF basis: (Square Feet of house) / 1000 SF X (Number of houses) X (Number of pasteurization events) = Number of 1000SF. 21,000 SF / 1000 SF X 2 houses X 3 events = 126 units of 1000SF In house pasteurization of poultry litter is achieved by windrowing the litter in the house. The process takes approximately one week. This process successfully addresses the air quality impacts (ammonia emissions, PM and PM precursors) and bird health resource concerns. This process also improves the quality of poultry litter that must be spread on farmland. Bird health is improved and bird mortality is reduced.

**Feature Measure:** Surface Area of housing floor windr

**Scenario Unit::** 1,000 Square Foot

**Scenario Typical Size:** 126.0

**Scenario Total Cost:** $5,769.18

**Scenario Cost/Unit:** $45.79

Cost Details:

| Component Name | ID | Description | Unit | Cost | QTY | Total |
|---|---|---|---|---|---|---|
| **Equipment Installation** | | | | | | |
| Tractor, agricultural, 120 HP | 962 | Agricultural tractor with horsepower range of 90 to 140. Equipment and power unit costs. Labor not included. | Hour | $57.70 | 66 | $3,808.20 |
| Aerator Attachment, 8", PTO | 1707 | Aerator attachment for mounting to tractor and PTO, 8" diameter. Equipment cost only with out tractor. Brown Bear R24C-8" or equivalent | Hour | $9.86 | 30 | $295.80 |
| **Labor** | | | | | | |
| Equipment Operators, Light | 232 | Includes: Skid Steer Loaders, Hydraulic Excavators <50 HP, Trenchers <12", Ag Equipment <150 HP, Pickup Trucks, Forklifts, Mulchers | Hour | $25.23 | 66 | $1,665.18 |

**Practice:** 629 - Waste Treatment

**Scenario** #2 - Milking Parlor Waste Treatment System with Dosing System and Bark Beds

**Scenario Description:**

This practice scenario includes a dosed treatment system with bark bed for milking parlor wastewater. Bark beds may be used where the following minimum separations can be achieved to the bottom of the treatment area after grading: two feet to seasonal groundwater and three feet to bedrock. Bark beds rely on the soil profile to reduce BOD5 levels in the wastewater. Bark materials provide some aeration of the soil surface and insulate the infiltration area in the winter and allows for evaporation in the summer. The purpose of the practice is to address resource concerns related to water quality degradation due to (excess nutrient, salts and pathogens). Associated practices: Nutrient Management (590), Pumping Plant (533), Fence (382), Waste Storage Facility (313), Diversion (362), Critical Area Seeding (342), Waste Transfer (634)

**Before Situation:**

Milkhouse waste water currently outlets in an untreated manner which presents potential soil, water and air quality concerns.

**After Situation:**

This scenario assumes that the treatment system is designed for 500 gal/day of wastewater from the milking parlor. It assumes pre-treatment in two tanks. The pumping tank is under PS 634-Waste Transfer and the 2" solid handling sewage pump is under PS 533-Pumping Plant. The grease trap acts as the primary settling basin. The settling tanks are equipped with effluent filters. The wastewater is pressure dosed from the pumping tank to the treatment bed (bark bed or leaching gallery). This treatment method relies primarily on the soil profile to reduce BOD5 levels. This scenario assumes that the treatment bed is dosed at 0.16 gal/square ft (3125 sq ft). To maintain bark bed performance, bark needs to be replaced or added every 3 to 5 years as an O&M task. This practice scenario reduces nutrient content, organic strength, or pathogen levels of agricultural waste; improve air quality by reducing odors and gaseous emissions (methane or ammonia).

**Feature Measure:** Bark Bed Treatment Area (SF)

**Scenario Unit::** Square Foot

**Scenario Typical Size:** 3,125.0

**Scenario Total Cost:** $28,489.10

**Scenario Cost/Unit:** $9.12

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 | $5.87 | 250 | $1,467.50 |
| Trenching, Earth, 12" x 48" | 53 | Trenching, earth, 12" wide x 48" depth, includes equipment and labor for trenching and backfilling | Foot | $1.38 | 460 | $634.80 |
| Aggregate, Wood Chips | 1098 | Includes materials, equipment and labor | Cubic Yard | $22.66 | 350 | $7,931.00 |
| Stripping and stockpiling, topsoil | 1199 | Stripping and stockpiling of topsoil adjacent to stripping area. Includes equipment and labor. | Cubic Yard | $0.89 | 116 | $103.24 |
| 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 | $3.77 | 402 | $1,515.54 |
| **Labor** | | | | | | |
| Skilled Labor | 230 | Labor requiring a high level skill set: Includes carpenters, welders, electricians, conservation professionals involved with data collection, monitoring, and or record keeping, etc. | Hour | $41.76 | 80 | $3,340.80 |
| **Materials** | | | | | | |
| Pipe, PVC, 2", SCH 40 | 976 | Materials: - 2" - PVC - SCH 40 - ASTM D1785 | Foot | $1.34 | 290 | $388.60 |
| Pipe, PVC, 4", SCH 40 | 978 | Materials: - 4" - PVC - SCH 40 - ASTM D1785 | Foot | $3.47 | 260 | $902.20 |
| Pipe, PVC, 6", SCH 40 | 980 | Materials: - 6" - PVC - SCH 40 - ASTM D1785 | Foot | $6.14 | 200 | $1,228.00 |
| Aggregate, Gravel, Ungraded, Quarry Run | 1099 | Includes materials, equipment and labor | Cubic Yard | $23.96 | 130 | $3,114.80 |
| Geotextile, non-woven, light weight | 1209 | Non-woven less than 8 ounce/square yard geotextile with staple anchoring. Materials and shipping only. | Square Yard | $1.22 | 400 | $488.00 |
| Prefabricated concrete septic tank, 1500 gal | 1738 | Precast concrete septic tank, 1,500 gal. Materials only. | Each | $1,581.26 | 2 | $3,162.52 |
| Filter, effluent, municipal grade | 2063 | Effluent filter rated 8,000 to 10,000 gallons per day with 1/16" to 1/32" filtration. Includes materials and shipping only. | Each | $370.83 | 2 | $741.66 |
| Riser, Septic Tank | 2067 | 24" HDPE riser with cover. Materials only. | Each | $171.77 | 4 | $687.08 |
| **Mobilization** | | | | | | |
| Mobilization, very small equipment | 1137 | Equipment that is small enough to be transported by a pick-up truck with typical weights less than 3,500 pounds. Can be multiple pieces of equipment if all hauled simultaneously. | Each | $70.64 | 2 | $141.28 |
| 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 | $172.07 | 4 | $688.28 |

| | | | | | | |
|---|---|---|---|---|---|---|
| Mobilization, large equipment | 1140 | Equipment >150HP or typical weights greater than 30,000 pounds or loads requiring over width or over length permits. | Each | $488.45 | 4 | $1,953.80 |

**Practice:** 629 - Waste Treatment

**Scenario** #3 - Milkhouse Wastewater Treatment with Dosing System and Bark Mounds

**Scenario Description:**

This practice scenario includes a dosed treatment system with bark mounds for milking parlor wastewater. The unit refers to the square footage of the organic filter mound foot print. Bark mounds may be used on level area requiring no grading where the following minimum separations can be achieved to the bottom of the mound: two feet to seasonal groundwater and three feet to bedrock. This treatment method relies primarily on the bark media to reduce BOD5 levels. Treatment takes place primarily in the above-ground mounds and at the mound/soil interface. The purpose of the practice is to address resource concerns related to water quality degradation due to (excess nutrient, salts and pathogens). Associated practices: Nutrient Management (590), Pumping Plant (533), Fence (382), Waste Storage Facility (313), Diversion (362), Critical Area Seeding (342), Waste Transfer (634)

**Before Situation:**

Milkhouse waste water currently outlets in an untreated manner which presents potential soil, water and air quality concerns.

**After Situation:**

This scenario assumes that the treatment system is designed for 500 gal/day of wastewater from the milking parlor. It assumes pre-treatment in two tanks. The pumping tank is under PS 634-Waste Transfer and the 2" solid handling sewage pump is under PS 533-Pumping Plant. The grease trap acts as the primary settling basin. The settling tanks are equipped with effluent filters. The wastewater is then pressure dosed from the pumping tank to the treatment filter. Effluent is directed to separate bark mound(s) with a sequencing valve and manifold. The bark filter mounds are typically trapezoidal in shape with a 23ft base, 5ft depth and 8ft top width, 50ft long. The wastewater distribution pipe is placed in the mound on top of 3ft of compacted shredded bark. A spray chamber is placed over the distribution pipe to promote effluent distribution across the bark mound and enhance aeration for treatment. The spray chambers are then covered with 1ft of shredded bark to minimize odors and provide insulation during cold weather operation. This scenario for a 500gpd system assumes that the treatment area is dosed at 0.16 gal/square ft (3125 sq ft). To maintain bark mound performance, bark needs o be replaced or added every 3 to 5 years as an O&M task. This practice scenario reduces nutrient content, organic strength, or pathogen levels of agricultural waste; improve air quality by reducing odors and gaseous emissions (methane or ammonia).

**Feature Measure:** Bark Bed Treatment Area (SF)

**Scenario Unit::** Square Foot

**Scenario Typical Size:** 3,125.0

**Scenario Total Cost:** $29,352.43

**Scenario Cost/Unit:** $9.39

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 | $5.87 | 250 | $1,467.50 |
| Trenching, Earth, 12" x 48" | 53 | Trenching, earth, 12" wide x 48" depth, includes equipment and labor for trenching and backfilling | Foot | $1.38 | 450 | $621.00 |
| Skidsteer, 80 HP | 933 | Skidsteer loader with horsepower range of 60 to 90. Equipment and power unit costs. Labor not included. | Hour | $44.60 | 10 | $446.00 |
| Aggregate, Wood Chips | 1098 | Includes materials, equipment and labor | Cubic Yard | $22.66 | 550 | $12,463.00 |
| Excavation, common earth, large equipment, 150 ft | 1223 | Bulk excavation of common earth including sand and gravel with dozer >100 HP with average push distance of 150 feet. Includes equipment and labor. | Cubic Yard | $3.77 | 316 | $1,191.32 |
| **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 | $41.76 | 48 | $2,004.48 |
| **Materials** | | | | | | |
| Pipe, PVC, 1", SCH 40 | 973 | Materials: - 1" - PVC - SCH 40 - ASTM D1785 | Foot | $0.73 | 640 | $467.20 |
| Pipe, PVC, 2", SCH 40 | 976 | Materials: - 2" - PVC - SCH 40 - ASTM D1785 | Foot | $1.34 | 100 | $134.00 |
| Pipe, PVC, 4", SCH 40 | 978 | Materials: - 4" - PVC - SCH 40 - ASTM D1785 | Foot | $3.47 | 250 | $867.50 |
| Pipe, PE, 2", DR 9 | 1000 | Materials: - 2" - PE - 160 psi - ASTM D3035 DR 9 | Foot | $1.70 | 250 | $425.00 |
| Aggregate, Gravel, Ungraded, Quarry Run | 1099 | Includes materials, equipment and labor | Cubic Yard | $23.96 | 12 | $287.52 |
| 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 | $38.31 | 17 | $651.27 |
| Prefabricated concrete septic tank, 1500 gal | 1738 | Precast concrete septic tank, 1,500 gal. Materials only. | Each | $1,581.26 | 2 | $3,162.52 |
| Filter, effluent, municipal grade | 2063 | Effluent filter rated 8,000 to 10,000 gallons per day with 1/16" to 1/32" filtration. Includes materials and shipping only. | Each | $370.83 | 2 | $741.66 |
| Valve, distribution | 2064 | Sequencing valve, 4 or 6 way, for pressure dosing wastewater. Includes materials and shipping only. | Each | $152.96 | 1 | $152.96 |

| | | | | | | |
|---|---|---|---|---|---|---|
| Arch septic leaching chamber, HDPE | 2066 | HDPE leaching galley, 2.5' to 3' wide x 6' to 8' long. Materials only. | Foot | $5.86 | 270 | $1,582.20 |
| Riser, Septic Tank | 2067 | 24" HDPE riser with cover. Materials only. | Each | $171.77 | 4 | $687.08 |
| **Mobilization** | | | | | | |
| Mobilization, medium equipment | 1139 | Equipment with 70-150 HP or typical weights between 14,000 and 30,000 pounds. | Each | $255.83 | 4 | $1,023.32 |
| Mobilization, large equipment | 1140 | Equipment >150HP or typical weights greater than 30,000 pounds or loads requiring over width or over length permits. | Each | $488.45 | 2 | $976.90 |

**Practice:** 629 - Waste Treatment

**Scenario** #5 - Aerator less than or equal to 5 hp

**Scenario Description:**

This practice scenario includes installation of an aerator into a liquid storage pond or tank that has a surface area less than 1 acre. The purpose of the practice is to address resource concerns related to water quality degradation due to (excess nutrient and pathogens) and air quality impacts (PM & PM precursors, and objectionable odors). Associated practices: Nutrient Management (590) and Waste Storage Facility (313)

**Before Situation:**

A dairy, swine, or other agricultural operation in which the waste goes into a storage pond. The pond is not managed as an anaerobic lagoon and the nutrients stratify over time and odors are objectionable. It is difficult to properly estimate the nutrient content being pumped onto the land because of the stratification. There is also not enough aerobic microbial activity in the pond to prevent objectionable odors.

**After Situation:**

This scenario assumes that the producer would like to increase oxygen content in the storage pond and mix the waste for even nutrient distribution. Under aerobic conditions microorganisms can convert nutrients and odors will be reduced. Nutrient content of the liquid waste is more uniform which is better for uniform agronomic application rates improving nutrient management and to protect air and water quality resources.

**Feature Measure:** Horse Power of aerator

**Scenario Unit::** Horsepower

**Scenario Typical Size:** 1.0

**Scenario Total Cost:** $1,299.29

**Scenario Cost/Unit:** $1,299.29

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 | $41.76 | 2 | $83.52 |
| **Materials** | | | | | | |
| Aerator, pond, 1 hp | 1708 | 1 hp Aerator for pond or tank with less than 10 acres of surface area. Materials only. | Each | $1,215.77 | 1 | $1,215.77 |

**Practice:** 629 - Waste Treatment

**Scenario** #6 - Aerator greater than 5 hp

**Scenario Description:**

This practice scenario includes installation of an aerator into a liquid storage pond or tank with a surface area larger than 1 acre. The purpose of the practice is to address resource concerns related to water quality degradation due to (excess nutrient and pathogens) and air quality impacts (PM & PM precursors, and objectionable odors). Associated practices: Nutrient Management (590) and Waste Storage Facility (313)

**Before Situation:**

A dairy, swine, or other agricultural operation in which the waste goes into a storage pond. The pond is not managed as an anaerobic lagoon and the nutrients stratify over time and odors are objectionable. It is difficult to properly estimate the nutrient content being pumped onto the land because of the stratification. There is also not enough aerobic microbial activity in the pond to prevent objectionable odors.

**After Situation:**

This scenario assumes that the producer would like to increase oxygen content in the storage pond and mix the waste for even nutrient distribution. Under aerobic conditions microorganisms can convert nutrients and odors will be reduced. Nutrient content of the liquid waste is more uniform which is better for uniform agronomic applications rates improving nutrient management and to protect air and water quality resources.

**Feature Measure:** Each aerator

**Scenario Unit::** Each

**Scenario Typical Size:** 1.0

**Scenario Total Cost:** $9,784.61

**Scenario Cost/Unit:** $9,784.61

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 | $41.76 | 3 | $125.28 |
| **Materials** | | | | | | |
| Aerator or Circulator, Pond, Large | 1709 | Aerator or Circulator for pond or tank, 10 or more HP and/or 10 or more acres of surface area. Materials only | Each | $9,659.33 | 1 | $9,659.33 |

**Practice:** 629 - Waste Treatment

**Scenario** #7 - Straw Pond Cover

**Scenario Description:**

This practice scenario is a permeable organic cover applied to the liquid surface of a waste storage facility that has a surface area less than or equal to 2 acres. Straw cover applications can remain on top of the pond for between 2 and 6 months. The cover will 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:**

This practice is applicable on a dairy or swine operation in which the waste goes into a liquid storage pond or tank and the bio-treatment of emissions will improve air quality. The maximum recommended surface area is 2 acres.

**After Situation:**

Permeable organic cover applied to the liquid surface of a waste storage or treatment facility. Organic materials often used as covers include straws, cornstalks and peat moss. Typical application is an 8" straw application on a 120' diameter storage tank every 3 months. The scenario unit calculation is (Surface Area of Pond)*(Number of applications per year). For this scenario, the calculation is: (120/2)^2*pi *4 = 45,239sf Organic covers can reduce odors up to 90 percent if the straw cover is 12" deep.

**Feature Measure:** Surface Area of Pond or Tank per a

**Scenario Unit::** Square Foot

**Scenario Typical Size:** 45,239.0

**Scenario Total Cost:** $34,711.96

**Scenario Cost/Unit:** $0.77

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 | $21.25 | 40 | $850.00 |
| Tractor, agricultural, 120 HP | 962 | Agricultural tractor with horsepower range of 90 to 140. Equipment and power unit costs. Labor not included. | Hour | $57.70 | 16 | $923.20 |
| **Labor** | | | | | | |
| Equipment Operators, Light | 232 | Includes: Skid Steer Loaders, Hydraulic Excavators <50 HP, Trenchers <12", Ag Equipment <150 HP, Pickup Trucks, Forklifts, Mulchers | Hour | $25.23 | 16 | $403.68 |
| **Materials** | | | | | | |
| Straw | 1237 | Small grain straw (non organic and certified organic). Includes materials only. | Ton | $128.33 | 242.8 | $31,158.52 |
| **Mobilization** | | | | | | |
| Mobilization, small equipment | 1138 | Equipment <70 HP but can't be transported by a pick-up truck or with typical weights between 3,500 to 14,000 pounds. | Each | $172.07 | 8 | $1,376.56 |

**Practice:** 629 - Waste Treatment

**Scenario** #9 - Dairy - MHMP STS Leaching Galleries

**Scenario Description:**

This practice scenario consists of a subsurface treatment system using leaching galleries to treat wastewater from a small milk house and milking parlor. This system would apply to small dairy farms (up to 25 cows). This system assumes manure is scraped and removed. Raw milk also should not be allowed into this treatment system. Scraped manure and raw milk should be handled using other practices such as 313 Waste Storage Facility. Leaching galleries may be used where the following minimum separations can be achieved to the bottom of the gallery: two feet to seasonal high groundwater and four feet to bedrock. Possible associated practices include but are not limited to 533 Pumping Plant, 342 Critical Area Planting, 634 Waste Transfer. 313 Waste Storage Facility, or 362 Diversion.

**Before Situation:**

Milkhouse waste water currently outlets in an untreated manner which presents potential soil, water and air quality concerns..

**After Situation:**

This scenario assumes that the treatment system has a design flow of 200 gal/day of wastewater from the milkhouse and milking parlor. Using typical soil conditions and typical waste characteristics this equates to approximately 750 sf of leaching area necessary. It assumes pre-treatment in two tanks. The grease trap acts as the primary settling basin. The secondary settling tank is equipped with an effluent filter. The wastewater then goes to a distribution box that apportions the wastewater to the subsurface treatment system consisting of leaching galleries with 1 foot of 1"stone either side. The combination of leaching gallery and stone treats 8.8 sf of leaching area per linear foot. This practice scenario reduces nutrient content, organic strength, or pathogen levels of agricultural waste; improves air quality by reducing odors and gaseous emissions (methane or ammonia).

**Feature Measure:** Design Flow in Gallons per Day

**Scenario Unit::** Gallon per Day

**Scenario Typical Size:** 200.0

**Scenario Total Cost:** $17,812.43

**Scenario Cost/Unit:** $89.06

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 | $510.00 | 0.2 | $102.00 |
| Earthfill, Manually Compacted | 50 | Earthfill, manually compacted, includes equipment and labor | Cubic Yard | $5.87 | 130 | $763.10 |
| Trenching, Earth, 12" x 48" | 53 | Trenching, earth, 12" wide x 48" depth, includes equipment and labor for trenching and backfilling | Foot | $1.38 | 150 | $207.00 |
| Stripping and stockpiling, topsoil | 1199 | Stripping and stockpiling of topsoil adjacent to stripping area. Includes equipment and labor. | Cubic Yard | $0.89 | 48 | $42.72 |
| Excavation, common earth, large equipment, 150 ft | 1223 | Bulk excavation of common earth including sand and gravel with dozer >100 HP with average push distance of 150 feet. Includes equipment and labor. | Cubic Yard | $3.77 | 200 | $754.00 |
| **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 | $41.76 | 64 | $2,672.64 |
| **Materials** | | | | | | |
| Aggregate, Sand, Graded, Washed | 45 | Sand, typical ASTM C33 gradation, includes materials, equipment and labor to transport and place | Cubic Yard | $34.29 | 16 | $548.64 |
| Aggregate, Gravel, Graded | 46 | Gravel, includes materials, equipment and labor to transport and place. Includes washed and unwashed gravel. | Cubic Yard | $34.75 | 5 | $173.75 |
| Pipe, PVC, 4", SCH 40 | 978 | Materials: - 4" - PVC - SCH 40 - ASTM D1785 | Foot | $3.47 | 150 | $520.50 |
| Aggregate, Gravel, Ungraded, Quarry Run | 1099 | Includes materials, equipment and labor | Cubic Yard | $23.96 | 8 | $191.68 |
| Geotextile, non-woven, light weight | 1209 | Non-woven less than 8 ounce/square yard geotextile with staple anchoring. Materials and shipping only. | Square Yard | $1.22 | 60 | $73.20 |
| Prefabricated concrete septic tank, 1500 gal | 1738 | Precast concrete septic tank, 1,500 gal. Materials only. | Each | $1,581.26 | 2 | $3,162.52 |
| Filter, effluent, municipal grade | 2063 | Effluent filter rated 8,000 to 10,000 gallons per day with 1/16" to 1/32" filtration. Includes materials and shipping only. | Each | $370.83 | 1 | $370.83 |
| Riser, Septic Tank | 2067 | 24" HDPE riser with cover. Materials only. | Each | $171.77 | 5 | $858.85 |
| Leaching Galley, 4' X 4' X 3' | 2575 | Leaching galley, precast concrete 4' x 4' x 3', Materials only. | Each | $241.57 | 22 | $5,314.54 |
| **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 i | Dollar | $1.00 | 250 | $250.00 |
| Mobilization, very small equipment | 1137 | Equipment that is small enough to be transported by a pick-up truck with typical weights less than 3,500 pounds. Can be multiple pieces of equipment if all hauled simultaneously. | Each | $70.64 | 2 | $141.28 |
| 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 | $172.07 | 4 | $688.28 |
| Mobilization, large equipment | 1140 | Equipment >150HP or typical weights greater than 30,000 pounds or loads requiring over width or over length permits. | Each | $488.45 | 2 | $976.90 |

**Practice:** 629 - Waste Treatment

**Scenario** #18 - Milking Parlor Waste Treatment System with Dosing System

**Scenario Description:**

This practice scenario includes a dosed treatment system for milking parlor wastewater that will outlet to a constructed wetland and/or vegetated treatment area and/or other acceptable treatment. The purpose of the practice is to address resource concerns related to water quality degradation due to (excess nutrient, salts and pathogens). Associated practices: Constructed Wetland (656), Vegetated Treatment Area (635), Waste Transfer (634), Nutrient Management (590), Pumping Plant (533), Fence (382), & Waste Storage Facility (313)

**Before Situation:**

Milkhouse waste water currently outlets in an untreated manner which presents potential soil, water and air quality concerns.

**After Situation:**

This scenario assumes that the treatment system is designed for 500 gal/day of wastewater from the milking parlor. It assumes a two tank scenario. The grease trap acts as the primary settling basin. The wastewater overflows into the septic tank, which is then dosed to a treatment area (constructed wetland and/or vegetated treatment area and/or other acceptable treatment). This practice scenario reduces nutrient content, organic strength, or pathogen levels of agricultural waste; improve air quality by reducing odors and gaseous emissions (methane or ammonia).

**Feature Measure:** Design Flow

**Scenario Unit::** Gallon per Day

**Scenario Typical Size:** 500.0

**Scenario Total Cost:** $10,595.47

**Scenario Cost/Unit:** $21.19

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 | $63.92 | 1 | $63.92 |
| **Equipment Installation** | | | | | | |
| Earthfill, Manually Compacted | 50 | Earthfill, manually compacted, includes equipment and labor | Cubic Yard | $5.87 | 118 | $692.66 |
| Trenching, Earth, 12" x 48" | 53 | Trenching, earth, 12" wide x 48" depth, includes equipment and labor for trenching and backfilling | Foot | $1.38 | 450 | $621.00 |
| Excavation, common earth, large equipment, 150 ft | 1223 | Bulk excavation of common earth including sand and gravel with dozer >100 HP with average push distance of 150 feet. Includes equipment and labor. | Cubic Yard | $3.77 | 138 | $520.26 |
| **Labor** | | | | | | |
| Skilled Labor | 230 | Labor requiring a high level skill set: Includes carpenters, welders, electricians, conservation professionals involved with data collection, monitoring, and or record keeping, etc. | Hour | $41.76 | 18 | $751.68 |
| **Materials** | | | | | | |
| Pipe, PVC, 6", SCH 40 | 980 | Materials: - 6" - PVC - SCH 40 - ASTM D1785 | Foot | $6.14 | 200 | $1,228.00 |
| Pipe, PE, 2", DR 9 | 1000 | Materials: - 2" - PE - 160 psi - ASTM D3035 DR 9 | Foot | $1.70 | 250 | $425.00 |
| Aggregate, Gravel, Ungraded, Quarry Run | 1099 | Includes materials, equipment and labor | Cubic Yard | $23.96 | 3 | $71.88 |
| Prefabricated concrete septic tank, 1500 gal | 1738 | Precast concrete septic tank, 1,500 gal. Materials only. | Each | $1,581.26 | 2 | $3,162.52 |
| Dosing System, siphon | 1763 | Dosing system siphon with typical 3" diameter and 12" drawdown. Includes materials and shipping only. | Each | $275.19 | 1 | $275.19 |
| **Mobilization** | | | | | | |
| Mobilization, very small equipment | 1137 | Equipment that is small enough to be transported by a pick-up truck with typical weights less than 3,500 pounds. Can be multiple pieces of equipment if all hauled simultaneously. | Each | $70.64 | 2 | $141.28 |
| 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 | $172.07 | 4 | $688.28 |
| Mobilization, large equipment | 1140 | Equipment >150HP or typical weights greater than 30,000 pounds or loads requiring over width or over length permits. | Each | $488.45 | 4 | $1,953.80 |

**Practice:** 630 - Vertical Drain

**Scenario** #5 - Infiltration basin

**Scenario Description:**

An vertical drywell, or lateral infiltration trench, installed underground to collect and infiltrate clean roof water, surface runoff, or subsurface drainage where a suitable gravity outlet is not possible. Costs include excavating the well or trench, installing geotextile along trench perimeter, perforated well casing, and perimeter stone. Typical application is for a 3' dia x 8' deep perforated dry well. Site conditions may require alternative configurations such as: 2- 4' deep drywalls in parallel/series or a subsurface lateral trench constructed with a rectangular drywell, large perforated pipe, large rocks, or other suitable means. Associated practices include: 558- Roof Runoff, 606- Subsurface Drain, 620- Underground Outlet, and 362 Diversion.

**Before Situation:**

Surface water not managed creates water problems around the farmstead, can freeze causing disruption of structures, or travels across barnyards or roads causing a ice hazard in winter months.

**After Situation:**

Clean water is directed away from problem area to a basin where it can be infiltrated into the ground.

**Feature Measure:** vertical or horizontal length of basi

**Scenario Unit::** Foot

**Scenario Typical Size:** 8.0

**Scenario Total Cost:** $1,046.61

**Scenario Cost/Unit:** $130.83

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 | $2.36 | 7 | $16.52 |
| 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 | $62.74 | 2 | $125.48 |
| **Materials** | | | | | | |
| Aggregate, Gravel, Graded | 46 | Gravel, includes materials, equipment and labor to transport and place. Includes washed and unwashed gravel. | Cubic Yard | $34.75 | 6 | $208.50 |
| Geotextile, non-woven, light weight | 1209 | Non-woven less than 8 ounce/square yard geotextile with staple anchoring. Materials and shipping only. | Square Yard | $1.22 | 18 | $21.96 |
| Well Casing, Concrete, perforated | 2174 | Perforated concrete tile 3" diameter x 8' long. Materials only. | Foot | $62.76 | 8 | $502.08 |
| **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 | $172.07 | 1 | $172.07 |

**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, 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:** 1.0

**Scenario Total Cost:** $48,813.08

**Scenario Cost/Unit:** $48,813.08

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 | $327.92 | 10 | $3,279.20 |
| **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 | $41.76 | 16 | $668.16 |
| 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 | $25.31 | 32 | $809.92 |
| **Materials** | | | | | | |
| Screw or Roller Press - Small | 1950 | Screw or Roller Press with a capacity of < 100 GPM. Includes materials and equipment. | Each | $43,200.00 | 1 | $43,200.00 |
| **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 | $172.07 | 2 | $344.14 |
| Mobilization, medium equipment | 1139 | Equipment with 70-150 HP or typical weights between 14,000 and 30,000 pounds. | Each | $255.83 | 2 | $511.66 |

**Practice:** 632 - Waste Separation Facility

**Scenario** #2 - Earthen Settling Structure

**Scenario Description:**

An earthen structure, such as a basin or a terrace or dike like structure, used to capture and separate a portion of the solids from a liquid stream from a feedlot or confinement facility. A concrete pad should be installed on the bottom of the basin and around outlet structures to facilitate cleanout. Removes as portion of the solids to facilitate waste handling and to address water quality concerns. Associated practices include Nutrient Management (590), Composting Facility (317), Anaerobic Digester (366), Waste Storage Facility (313), Waste Recycling (633), Waste Transfer (634), Vegetated Treatment Area (635), Pond Lining or Sealing (521A-D), and Waste Treatment (629).

**Before Situation:**

Applicable to situations where partitioning solids, liquids, and nutrients will facilitate the management of an animal waste management system, improve air quality (reduce odors), and address water quality concerns.

**After Situation:**

Earthen settling basin structure is 60 ft wide by 200 ft long average with 2:1 inside slopes. Basin is 3 ft deep, total with three screening outlet structures) constructed around or at a livestock feeding operation. Removes a portion of the solids that otherwise would leave with the runoff from an animal feeding operation. Part of an animal waste management system. Strike Full Volume includes freeboard, normal precipitation, solids build up, etc.

**Feature Measure:** "Strike Full" Volume

**Scenario Unit::** Cubic Foot

**Scenario Typical Size:** 36,000.0

**Scenario Total Cost:** $16,350.14

**Scenario Cost/Unit:** $0.45

Cost Details:

| Component Name | ID | Description | Unit | Cost | QTY | Total |
|---|---|---|---|---|---|---|
| **Equipment Installation** | | | | | | |
| Concrete, CIP, formed reinforced | 38 | Steel reinforced concrete formed and cast-in-placed in formed structures such as walls or suspended slabs by chute placement. Typical strength is 3000 to 4000 psi. Includes materials, labor and equipment to transport, place and finish. | Cubic Yard | $510.00 | 12 | $6,120.00 |
| 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 | $2.36 | 1000 | $2,360.00 |
| Earthfill, Roller Compacted | 49 | Earthfill, roller or machine compacted, includes equipment and labor | Cubic Yard | $4.45 | 1000 | $4,450.00 |
| **Labor** | | | | | | |
| General Labor | 231 | Labor performed using basic tools such as power tool, shovels, and other tools that do not require extensive training. Ex. pipe layer, herder, concrete placement, materials spreader, flagger, etc. | Hour | $25.31 | 8 | $202.48 |
| **Materials** | | | | | | |
| Aggregate, Gravel, Graded | 46 | Gravel, includes materials, equipment and labor to transport and place. Includes washed and unwashed gravel. | Cubic Yard | $34.75 | 15 | $521.25 |
| Weeping Wall | 1765 | Weeping wall or picket screen structure for solid settling basin. Materials only. | Foot | $51.00 | 24 | $1,224.00 |
| **Mobilization** | | | | | | |
| Mobilization, very small equipment | 1137 | Equipment that is small enough to be transported by a pick-up truck with typical weights less than 3,500 pounds. Can be multiple pieces of equipment if all hauled simultaneously. | Each | $70.64 | 3 | $211.92 |
| 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 | $172.07 | 3 | $516.21 |
| Mobilization, medium equipment | 1139 | Equipment with 70-150 HP or typical weights between 14,000 and 30,000 pounds. | Each | $255.83 | 1 | $255.83 |
| Mobilization, large equipment | 1140 | Equipment >150HP or typical weights greater than 30,000 pounds or loads requiring over width or over length permits. | Each | $488.45 | 1 | $488.45 |

**Practice:** 632 - Waste Separation Facility

**Scenario** #3 - Concrete Basin

**Scenario Description:**

A concrete structure, such as a basin with concrete walls and floor, used to capture and separate a portion of the solids from a liquid stream from a feedlot or confinement facility. Removes a portion of the solids to facilitate waste handling and to address water quality concerns. Typical scenario consist of a concrete basin which is 20' wide x 30' long with 3' high concrete walls. A weeping/picket wall is located along one end to retain solids and to allow the liquid to pass through to another practice. Associated practices include Nutrient Management (590), Composting Facility (317), Anaerobic Digester (366), Waste Storage Facility (313), Waste Recycling (633), Waste Transfer (634), Pumping Plant (533), Vegetated Treatment Area (635), Pond Lining or Sealing (521A-D), and Waste Treatment (629).

**Before Situation:**

Applicable to situations where partitioning solids, liquids, and nutrients will facilitate the management of an animal waste management system, improve air quality (reduce odors), and address water quality concerns.

**After Situation:**

Practice helps to alleviate the wastewater from leaving the farm and improve surface and subsurface water resources. Also, the removal of liquid from the solid portion of the waste stream will alleviate air quality concerns.

**Feature Measure:** "Strike" Full Volume

**Scenario Unit::** Cubic Foot

**Scenario Typical Size:** 1,800.0

**Scenario Total Cost:** $13,191.24

**Scenario Cost/Unit:** $7.33

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 | $327.92 | 9 | $2,951.28 |
| Concrete, CIP, formed reinforced | 38 | Steel reinforced concrete formed and cast-in-placed in formed structures such as walls or suspended slabs by chute placement. Typical strength is 3000 to 4000 psi. Includes materials, labor and equipment to transport, place and finish. | Cubic Yard | $510.00 | 13 | $6,630.00 |
| 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 | $1.59 | 290 | $461.10 |
| 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 | $2.16 | 70 | $151.20 |
| **Materials** | | | | | | |
| Aggregate, Gravel, Graded | 46 | Gravel, includes materials, equipment and labor to transport and place. Includes washed and unwashed gravel. | Cubic Yard | $34.75 | 28 | $973.00 |
| Weeping Wall | 1765 | Weeping wall or picket screen structure for solid settling basin. Materials only. | Foot | $51.00 | 20 | $1,020.00 |
| **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 | $172.07 | 3 | $516.21 |
| Mobilization, large equipment | 1140 | Equipment >150HP or typical weights greater than 30,000 pounds or loads requiring over width or over length permits. | Each | $488.45 | 1 | $488.45 |

**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:** 5,000.0

**Scenario Total Cost:** $44,521.40

**Scenario Cost/Unit:** $8.90

Cost Details:

| Component Name | ID | Description | Unit | Cost | QTY | Total |
|---|---|---|---|---|---|---|
| **Equipment Installation** | | | | | | |
| Concrete, CIP, slab on grade, reinforced | 37 | Steel reinforced concrete formed and cast-in-placed as a slab on grade by chute placement. Typical strength is 3000 to 4000 psi. Includes materials, labor and equipment to transport, place and finish. | Cubic Yard | $327.92 | 90 | $29,512.80 |
| Concrete, CIP, formed reinforced | 38 | Steel reinforced concrete formed and cast-in-placed in formed structures such as walls or suspended slabs by chute placement. Typical strength is 3000 to 4000 psi. Includes materials, labor and equipment to transport, place and finish. | Cubic Yard | $510.00 | 20 | $10,200.00 |
| 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 | $2.36 | 180 | $424.80 |
| Earthfill, Roller Compacted | 49 | Earthfill, roller or machine compacted, includes equipment and labor | Cubic Yard | $4.45 | 90 | $400.50 |
| **Materials** | | | | | | |
| Aggregate, Gravel, Graded | 46 | Gravel, includes materials, equipment and labor to transport and place. Includes washed and unwashed gravel. | Cubic Yard | $34.75 | 90 | $3,127.50 |
| **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 | $172.07 | 2 | $344.14 |
| Mobilization, medium equipment | 1139 | Equipment with 70-150 HP or typical weights between 14,000 and 30,000 pounds. | Each | $255.83 | 2 | $511.66 |

**Practice:** 634 - Waste Transfer

**Scenario** #1 - Agitator-small used for mixing a basin or pit no more than 10 ft. deep.

**Scenario Description:**

This scenario is for a manure and wastewater agitator associated with an agricultural production operation to transfer agricultural waste product from the production source to a storage facility for proper utilization. This agitator is typically no more than 15 HP and is used for smaller waste storage facilities that are less than 10 feet deep. This scenario does not include a pump. Associated practices may include: PS 313 Waste Storage Facility for storage structures; PS 533, Pumping Plant; PS 430, Irrigation Pipeline; PS 632, Solid/Liquid Waste Separation Facility; PS 468, Lined Waterway or Outlet; PS 590 Nutrient Management for waste application; PS 633, Waste Recycling The waste transfer equipment is installed to address water quality concerns by facilitating timely land application of waste at agronomic rates according to the nutrient management plan. This scenario addresses the potential for surface water and groundwater quality degradation.

**Before Situation:**

In this typical setting, the operator has a small waste storage structure from a confined animal feeding operation without an effective waste handling and transfer system to manage the waste stream departing from the facility.

**After Situation:**

The typical installation would be for a small manure 10 HP agitator to put settled manure solids into suspension for removal from an animal waste storage structure and transfer to the next step of waste treatment, utilization or storage. Part of an animal waste management system to address water quality concerns. If required a wastewater reception pit, concrete channel or transfer conduit scenario may need to be contracted to support the operation of this waste transfer system equipment.

**Feature Measure:** Agitator for wastewater, installed

**Scenario Unit::** Each

**Scenario Typical Size:** 1.0

**Scenario Total Cost:** $11,914.93

**Scenario Cost/Unit:** $11,914.93

Cost Details:

| Component Name | ID | Description | Unit | Cost | QTY | Total |
|---|---|---|---|---|---|---|
| **Labor** | | | | | | |
| Skilled Labor | 230 | Labor requiring a high level skill set: Includes carpenters, welders, electricians, conservation professionals involved with data collection, monitoring, and or record keeping, etc. | Hour | $41.76 | 11 | $459.36 |
| **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 | $70.64 | 2 | $141.28 |

**Practice:** 634 - Waste Transfer

**Scenario** #4 - Stacker (Manure Elevator)

**Scenario Description:**

Install 60' elevator to transfer solid or semi-solid manure from the barn to a waste storage facility. Cost include elevator chute, drive unit, electric motor, chain w/ paddles, support system, freight, and labor to install the system.

**Before Situation:**

An area of waste production is separated from the waste storage facility and current operations may cause water quality concerns as it is not efficient in transporting the waste to the storage. Manure is heavily bedded and transferring manure via pump or gravity flow is not a viable option.

**After Situation:**

Install a 60 foot long elevator to transfer solid or semi-solid manure from the barn to a waste storage facility. This scenario includes the elevator chute, drive unit, electric motor, chains w/ paddles, support system, freight, and labor to assemble and install.

**Feature Measure:** Feet of Stacker Elevator

**Scenario Unit::** Foot

**Scenario Typical Size:** 60.0

**Scenario Total Cost:** $16,890.20

**Scenario Cost/Unit:** $281.50

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 | $41.76 | 8 | $334.08 |
| 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 | $25.31 | 20 | $506.20 |
| 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 | $45.69 | 8 | $365.52 |
| **Materials** | | | | | | |
| Manure Transfer, Elevator stacker | 1774 | 60' manure elevator - Cost includes elevator chute, drive unit, electric motor, chain w/ paddles, and support system. Includes shipping. | Each | $15,428.57 | 1 | $15,428.57 |
| **Mobilization** | | | | | | |
| Mobilization, medium equipment | 1139 | Equipment with 70-150 HP or typical weights between 14,000 and 30,000 pounds. | Each | $255.83 | 1 | $255.83 |

**Practice:** 634 - Waste Transfer

**Scenario** #5 - Wastewater Collection Tank

**Scenario Description:**

Installation for a wastewater collection system that includes materials and structures to collect liquids of a design volume less than 1500 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 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. 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:** Volume of Collection Tank

**Scenario Unit::** Gallon

**Scenario Typical Size:** 1,000.0

**Scenario Total Cost:** $3,508.52

**Scenario Cost/Unit:** $3.51

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 | $2.36 | 116 | $273.76 |
| Earthfill, Manually Compacted | 50 | Earthfill, manually compacted, includes equipment and labor | Cubic Yard | $5.87 | 57 | $334.59 |
| Earthfill, Dumped and Spread | 51 | Earthfill, dumped and spread without compaction effort, includes equipment and labor | Cubic Yard | $3.65 | 9 | $32.85 |
| 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 | $2.50 | 107 | $267.50 |
| **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 | $25.31 | 2 | $50.62 |
| 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 | $45.69 | 1 | $45.69 |
| **Materials** | | | | | | |
| Aggregate, Gravel, Graded | 46 | Gravel, includes materials, equipment and labor to transport and place. Includes washed and unwashed gravel. | Cubic Yard | $34.75 | 3 | $104.25 |
| Catch Basin, concrete, 60" dia. | 1754 | Precast 60-in diameter catch basin, 6' deep, with collar and grate cover. Materials only. | Each | $1,971.36 | 1 | $1,971.36 |
| **Mobilization** | | | | | | |
| Mobilization, small equipment | 1138 | Equipment <70 HP but can't be transported by a pick-up truck or with typical weights between 3,500 to 14,000 pounds. | Each | $172.07 | 1 | $172.07 |
| Mobilization, medium equipment | 1139 | Equipment with 70-150 HP or typical weights between 14,000 and 30,000 pounds. | Each | $255.83 | 1 | $255.83 |

**Practice:** 634 - Waste Transfer

**Scenario** #6 - 6 inch PVC Gravity Pipe without Hopper

**Scenario Description:**

6" Gravity flow conduit is typically a large diameter water tight HDPE or PVC sanitary sewer pipe used to transfer manure by gravity from one location to another. The pipe conveys the slurry waste liquid or wastewater between the waste collection point and a waste storage facility or waste treatment area. Adequate head on the pipe must be available for the gravity system to function. This practice includes 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 for storage structures; PS 533, Pumping Plant; PS 430, Irrigation Pipeline; PS 632, Solid/Liquid Waste Separation Facility; PS 468, Lined Waterway or Outlet; PS 590 Nutrient Management for waste application; PS 633, Waste Recycling.

**Before Situation:**

An area of waste production is separated from the waste storage facility and current operations may cause water quality concerns as it is not efficient in transporting the waste to the storage. The site has a change in elevation between production area and treatment or storage structure that is adequate to provide sufficient head for a gravity flow conduit to transport the slurry waste liquid stream.

**After Situation:**

Install a 100 foot long gravity transfer pipe with a precast collection hopper. Pipe shall be 6" diameter PVC with a smooth interior and water tight joints. 6"diameter PVC sanitary sewer grade pipe that will flow to an outlet at the site of manure treatment or storage. This scenario includes the 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 6" PVC Pipe

**Scenario Unit::** Foot

**Scenario Typical Size:** 100.0

**Scenario Total Cost:** $1,643.35

**Scenario Cost/Unit:** $16.43

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 | $62.74 | 6 | $376.44 |
| **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 | $25.31 | 8 | $202.48 |
| 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 | $44.37 | 6 | $266.22 |
| Supervisor or Manager | 234 | Labor involving supervision or management activities. Includes crew supervisors, foremen and farm/ranch managers time required for adopting new technology, etc. | Hour | $45.69 | 2 | $91.38 |
| **Materials** | | | | | | |
| Pipe, PVC, 6", SDR 35 | 993 | Materials: - 6" - PVC - SDR 35 - ASTM D3034 | Foot | $4.51 | 100 | $451.00 |
| **Mobilization** | | | | | | |
| Mobilization, medium equipment | 1139 | Equipment with 70-150 HP or typical weights between 14,000 and 30,000 pounds. | Each | $255.83 | 1 | $255.83 |

**Practice:** 634 - Waste Transfer

**Scenario** #7 - 6 inch PVC Gravity Pipe with Hopper

**Scenario Description:**

6" Gravity flow conduit is typically a large diameter water tight HDPE or PVC sanitary sewer pipe used to transfer manure by gravity from one location to another. The pipe conveys the slurry waste liquid or wastewater between the waste collection point and a waste storage facility or waste treatment area. Adequate head on the pipe must be available for the gravity system to function. This practice includes 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 for storage structures; PS 533, Pumping Plant; PS 430, Irrigation Pipeline; PS 632, Solid/Liquid Waste Separation Facility; PS 468, Lined Waterway or Outlet; PS 590 Nutrient Management for waste application; PS 633, Waste Recycling.

**Before Situation:**

An area of waste production is separated from the waste storage facility and current operations may cause water quality concerns as it is not efficient in transporting the waste to the storage. The site has a change in elevation between production area and treatment or storage structure that is adequate to provide sufficient head for a gravity flow conduit to transport the slurry waste liquid stream.

**After Situation:**

Install a 100 foot long gravity transfer pipe with a precast collection hopper. Pipe shall be 6" diameter PVC with a smooth interior and water tight joints. 6"diameter PVC sanitary sewer grade pipe that will flow to an outlet at the site of manure treatment or storage. This scenario includes the 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 6" PVC Pipe

**Scenario Unit::** Foot

**Scenario Typical Size:** 100.0

**Scenario Total Cost:** $3,683.34

**Scenario Cost/Unit:** $36.83

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 | $62.74 | 8 | $501.92 |
| **Labor** | | | | | | |
| General Labor | 231 | Labor performed using basic tools such as power tool, shovels, and other tools that do not require extensive training. Ex. pipe layer, herder, concrete placement, materials spreader, flagger, etc. | Hour | $25.31 | 10 | $253.10 |
| 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 | $44.37 | 8 | $354.96 |
| 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 | $45.69 | 2 | $91.38 |
| **Materials** | | | | | | |
| Aggregate, Gravel, Graded | 46 | Gravel, includes materials, equipment and labor to transport and place. Includes washed and unwashed gravel. | Cubic Yard | $34.75 | 3 | $104.25 |
| Pipe, PVC, 6", SDR 35 | 993 | Materials: - 6" - PVC - SDR 35 - ASTM D3034 | Foot | $4.51 | 100 | $451.00 |
| Manhole, 4' x 4' | 1053 | Precast Manhole with base and top delivered. 4' diameter x 4' depth. Materials only. | Each | $1,670.90 | 1 | $1,670.90 |
| **Mobilization** | | | | | | |
| Mobilization, medium equipment | 1139 | Equipment with 70-150 HP or typical weights between 14,000 and 30,000 pounds. | Each | $255.83 | 1 | $255.83 |

**Practice:** 634 - Waste Transfer

**Scenario** #8 - 12 inch HDPE Gravity Pipe with Hopper

**Scenario Description:**

12" 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 a pre-cast concrete 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 waste storage facility or waste treatment area. Adequate head on the pipe must be available for the gravity system to function. This practice includes the inlet structure, transfer pipe plus all other fittings, trench excavation and backfill, labor and equipment for installation. This practices also includes a 10'x10' concrete frost wall foundation to support a small building to prevent freezing in the winter. This conduit is part of a manure transfer system for a planned waste management or comprehensive nutrient management plan. This scenario addresses the transport of liquid waste to a waste storage or treatment facility to prevent a water quality resource concern of excessive nutrients/organics and harmful levels of pathogens in surface water and/or excessive nutrients/organics in ground water. Associated practices may include: PS 313 Waste Storage Facility for storage structures; PS 367, Roofs and Covers; PS 533, Pumping Plant; PS 430, Irrigation Pipeline; PS 632, Solid/Liquid Waste Separation Facility; PS 468, Lined Waterway or Outlet; PS 590 Nutrient Management for waste application; PS 633, Waste Recycling.

**Before Situation:**

An area of waste production is separated from the waste storage facility and current operations may cause water quality concerns as it is not efficient in transporting the waste to the storage. The site has a change in elevation between production area and treatment or storage structure that is adequate to provide sufficient head for a gravity flow conduit to transport the slurry waste liquid stream.

**After Situation:**

Install a 100 foot long gravity transfer pipe with a precast collection hopper. Pipe shall be 12" diameter (ID) HDPE with a smooth interior and water tight joints. 12" 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. This scenario also includes a concrete frost wall to support building to protect the hopper from cold weather. 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 12" HDPE Pipe

**Scenario Unit::** Foot

**Scenario Typical Size:** 100.0

**Scenario Total Cost:** $8,379.31

**Scenario Cost/Unit:** $83.79

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 | $510.00 | 8 | $4,080.00 |
| 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 | $62.74 | 10 | $627.40 |
| **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 | $25.31 | 12 | $303.72 |
| 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 | $44.37 | 10 | $443.70 |
| 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 | $45.69 | 4 | $182.76 |
| **Materials** | | | | | | |
| Aggregate, Gravel, Graded | 46 | Gravel, includes materials, equipment and labor to transport and place. Includes washed and unwashed gravel. | Cubic Yard | $34.75 | 4 | $139.00 |
| Manhole, 4' x 4' | 1053 | Precast Manhole with base and top delivered. 4' diameter x 4' depth. Materials only. | Each | $1,670.90 | 1 | $1,670.90 |
| 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 | $6.76 | 100 | $676.00 |
| **Mobilization** | | | | | | |
| Mobilization, medium equipment | 1139 | Equipment with 70-150 HP or typical weights between 14,000 and 30,000 pounds. | Each | $255.83 | 1 | $255.83 |

**Practice:** 634 - Waste Transfer

**Scenario** #9 - 18 inch HDPE Gravity Pipe with Hopper

**Scenario Description:**

18" 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 a pre-cast concrete 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 waste storage facility or waste treatment area. Adequate head on the pipe must be available for the gravity system to function. This practice includes the inlet structure, transfer pipe plus all other fittings, trench excavation and backfill, labor and equipment for installation. This practices also includes a 10'x10' concrete frost wall foundation to support a small building to prevent freezing in the winter. This conduit is part of a manure transfer system for a planned waste management or comprehensive nutrient management plan. This scenario addresses the transport of liquid waste to a waste storage or treatment facility to prevent a water quality resource concern of excessive nutrients/organics and harmful levels of pathogens in surface water and/or excessive nutrients/organics in ground water. Associated practices may include: PS 313 Waste Storage Facility for storage structures; PS 367, Roofs and Covers; PS 533, Pumping Plant; PS 430, Irrigation Pipeline; PS 632, Solid/Liquid Waste Separation Facility; PS 468, Lined Waterway or Outlet; PS 590 Nutrient Management for waste application; PS 633, Waste Recycling.

**Before Situation:**

An area of waste production is separated from the waste storage facility and current operations may cause water quality concerns as it is not efficient in transporting the waste to the storage. The site has a change in elevation between production area and treatment or storage structure that is adequate to provide sufficient head for a gravity flow conduit to transport the slurry waste liquid stream.

**After Situation:**

Install a 100 foot long gravity transfer pipe with a precast collection hopper. Pipe shall be 18" diameter (ID) HDPE with a smooth interior and water tight joints. 18" 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. This scenario also includes a concrete frost wall to support building to protect the hopper from cold weather. 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 18" HDPE Pipe

**Scenario Unit::** Foot

**Scenario Typical Size:** 100.0

**Scenario Total Cost:** $10,490.07

**Scenario Cost/Unit:** $104.90

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 | $510.00 | 8 | $4,080.00 |
| 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 | $113.75 | 12 | $1,365.00 |
| **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 | $25.31 | 15 | $379.65 |
| 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 | $44.37 | 12 | $532.44 |
| 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 | $45.69 | 7 | $319.83 |
| **Materials** | | | | | | |
| Aggregate, Gravel, Graded | 46 | Gravel, includes materials, equipment and labor to transport and place. Includes washed and unwashed gravel. | Cubic Yard | $34.75 | 7 | $243.25 |
| Manhole, 4' x 8' | 2106 | Precast Manhole with base and top delivered. 4' diameter x 8' depth. Includes materials, equipment and labor. | Each | $1,898.07 | 1 | $1,898.07 |
| Pipe, HDPE, CPT, Double Wall, Water Tight, 18" | 2207 | Pipe, Corrugated HDPE Double Wall 18" diameter with water tight joints meeting ASTM F477. Material cost only. | Foot | $14.16 | 100 | $1,416.00 |
| **Mobilization** | | | | | | |
| Mobilization, medium equipment | 1139 | Equipment with 70-150 HP or typical weights between 14,000 and 30,000 pounds. | Each | $255.83 | 1 | $255.83 |

**Practice:** 634 - Waste Transfer

**Scenario** #10 - 24 inch HDPE Gravity Pipe with Hopper

**Scenario Description:**

24" 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 a pre-cast concrete 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 waste storage facility or waste treatment area. Adequate head on the pipe must be available for the gravity system to function. This practice includes the inlet structure, transfer pipe plus all other fittings, trench excavation and backfill, labor and equipment for installation. This practices also includes a 10'x10' concrete frost wall foundation to support a small building to prevent freezing in the winter. This conduit is part of a manure transfer system for a planned waste management or comprehensive nutrient management plan. This scenario addresses the transport of liquid waste to a waste storage or treatment facility to prevent a water quality resource concern of excessive nutrients/organics and harmful levels of pathogens in surface water and/or excessive nutrients/organics in ground water. Associated practices may include: PS 313 Waste Storage Facility for storage structures; PS 367, Roofs and Covers; PS 533, Pumping Plant; PS 430, Irrigation Pipeline; PS 632, Solid/Liquid Waste Separation Facility; PS 468, Lined Waterway or Outlet; PS 590 Nutrient Management for waste application; PS 633, Waste Recycling.

**Before Situation:**

An area of waste production is separated from the waste storage facility and current operations may cause water quality concerns as it is not efficient in transporting the waste to the storage. The site has a change in elevation between production area and treatment or storage structure that is adequate to provide sufficient head for a gravity flow conduit to transport the slurry waste liquid stream.

**After Situation:**

Install a 100 foot long gravity transfer pipe with a precast collection hopper. Pipe shall be 24" diameter (ID) HDPE with a smooth interior and water tight joints. 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. This scenario also includes a concrete frost wall to support building to protect the hopper from cold weather. 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 24" HDPE Pipe

**Scenario Unit::** Foot

**Scenario Typical Size:** 100.0

**Scenario Total Cost:** $14,267.33

**Scenario Cost/Unit:** $142.67

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 | $510.00 | 8 | $4,080.00 |
| 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 | $113.75 | 16 | $1,820.00 |
| **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 | $25.31 | 20 | $506.20 |
| 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 | $44.37 | 16 | $709.92 |
| 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 | $45.69 | 8 | $365.52 |
| **Materials** | | | | | | |
| Aggregate, Gravel, Graded | 46 | Gravel, includes materials, equipment and labor to transport and place. Includes washed and unwashed gravel. | Cubic Yard | $34.75 | 10 | $347.50 |
| 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 | $23.14 | 100 | $2,314.00 |
| Catch Basin, concrete, 60" dia. | 1754 | Precast 60-in diameter catch basin, 6' deep, with collar and grate cover. Materials only. | Each | $1,971.36 | 1 | $1,971.36 |
| Pipe, HDPE, CPT, Double Wall, Water Tight, 24" | 2208 | Pipe, Corrugated HDPE Double Wall 24" diameter with water tight joints meeting ASTM F477. Material cost only. | Foot | $18.97 | 100 | $1,897.00 |
| **Mobilization** | | | | | | |
| Mobilization, medium equipment | 1139 | Equipment with 70-150 HP or typical weights between 14,000 and 30,000 pounds. | Each | $255.83 | 1 | $255.83 |

**Practice:** 634 - Waste Transfer

**Scenario** #11 - 30 inch HDPE Gravity Pipe with Hopper

**Scenario Description:**

30" 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 a pre-cast concrete 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 waste storage facility or waste treatment area. Adequate head on the pipe must be available for the gravity system to function. This practice includes the inlet structure, transfer pipe plus all other fittings, trench excavation and backfill, labor and equipment for installation. This practices also includes a 10'x10' concrete frost wall foundation to support a small building to prevent freezing in the winter. This conduit is part of a manure transfer system for a planned waste management or comprehensive nutrient management plan. This scenario addresses the transport of liquid waste to a waste storage or treatment facility to prevent a water quality resource concern of excessive nutrients/organics and harmful levels of pathogens in surface water and/or excessive nutrients/organics in ground water. Associated practices may include: PS 313 Waste Storage Facility for storage structures; PS 367, Roofs and Covers; PS 533, Pumping Plant; PS 430, Irrigation Pipeline; PS 632, Solid/Liquid Waste Separation Facility; PS 468, Lined Waterway or Outlet; PS 590 Nutrient Management for waste application; PS 633, Waste Recycling.

**Before Situation:**

An area of waste production is separated from the waste storage facility and current operations may cause water quality concerns as it is not efficient in transporting the waste to the storage. The site has a change in elevation between production area and treatment or storage structure that is adequate to provide sufficient head for a gravity flow conduit to transport the slurry waste liquid stream.

**After Situation:**

Install a 100 foot long gravity transfer pipe with a precast collection hopper. Pipe shall be 30" diameter (ID) HDPE with a smooth interior and water tight joints. 30"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. This scenario also includes a concrete frost wall to support building to protect the hopper from cold weather. 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 30" HPDE Pipe

**Scenario Unit::** Foot

**Scenario Typical Size:** 100.0

**Scenario Total Cost:** $13,434.50

**Scenario Cost/Unit:** $134.35

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 | $510.00 | 8 | $4,080.00 |
| 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 | $113.75 | 18 | $2,047.50 |
| **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 | $25.31 | 23 | $582.13 |
| 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 | $44.37 | 18 | $798.66 |
| Supervisor or Manager | 234 | Labor involving supervision or management activities. Includes crew supervisors, foremen and farm/ranch managers time required for adopting new technology, etc. | Hour | $45.69 | 8 | $365.52 |
| **Materials** | | | | | | |
| Aggregate, Gravel, Graded | 46 | Gravel, includes materials, equipment and labor to transport and place. Includes washed and unwashed gravel. | Cubic Yard | $34.75 | 10 | $347.50 |
| 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 | $29.86 | 100 | $2,986.00 |
| Catch Basin, concrete, 60" dia. | 1754 | Precast 60-in diameter catch basin, 6' deep, with collar and grate cover. Materials only. | Each | $1,971.36 | 1 | $1,971.36 |
| **Mobilization** | | | | | | |
| Mobilization, medium equipment | 1139 | Equipment with 70-150 HP or typical weights between 14,000 and 30,000 pounds. | Each | $255.83 | 1 | $255.83 |

**Practice:** 634 - Waste Transfer

**Scenario** #12 - 3 inch PVC Pressure Pipe

**Scenario Description:**

3" PVC pipe conduit is typically a pressure rated water tight PVC pipe used to transfer manure from one location to another. Costs include pipe materials and assembly, trench excavation, pipe installation, bedding, and proper backfill. Pipe is typically installed 4 feet below grade. The pipe conveys the slurry waste liquid and wastewater between the waste collection point and a waste storage facility or waste treatment area. Transfer pump is covered under PS 533 - Pumping Plant. This conduit is part of a manure transfer system for a planned waste management or comprehensive nutrient management plan. This scenario addresses the transport of liquid waste to a waste storage or treatment facility to prevent a water quality resource concern of excessive nutrients/organics and harmful levels of pathogens in surface water and/or excessive nutrients/organics in ground water. Associated practices may include: PS 313 Waste Storage Facility for storage structures; PS 533, Pumping Plant; PS 430, Irrigation Pipeline; PS 632, Solid/Liquid Waste Separation Facility; PS 468, Lined Waterway or Outlet; PS 590 Nutrient Management for waste application; PS 633, Waste Recycling.

**Before Situation:**

An area of waste production is separated from the waste storage facility and current operations may cause water quality concerns as it is not efficient in transporting the waste to the storage. The site DOES NOT have sufficient change in elevation or head pressure between production area and treatment or storage structure that is adequate to transfer wastes via gravity flow conduit.

**After Situation:**

Install a 100 foot long pressure rated water tight PVC pipe. Pipe shall be 3" diameter pressure rated PVC pipe with water tight joints. 3" diameter PVC pipe will direct flow of manure and wastewater to manure treatment or storage facility. This scenario includes the pipe, couplers and all other fittings, trench excavation, pipe bedding and backfill. The transfer conduit will provide collection and containment of the manure slurry, thereby protecting water quality resources.

**Feature Measure:** Length of 3" PVC Pipe

**Scenario Unit::** Foot

**Scenario Typical Size:** 100.0

**Scenario Total Cost:** $1,395.35

**Scenario Cost/Unit:** $13.95

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 | $62.74 | 6 | $376.44 |
| **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 | $25.31 | 8 | $202.48 |
| 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 | $44.37 | 6 | $266.22 |
| Supervisor or Manager | 234 | Labor involving supervision or management activities. Includes crew supervisors, foremen and farm/ranch managers time required for adopting new technology, etc. | Hour | $45.69 | 2 | $91.38 |
| **Materials** | | | | | | |
| Pipe, PVC, 3", SDR 21 | 1721 | Materials: - 3" - PVC - SDR 21 - ASTM D2241 | Foot | $2.03 | 100 | $203.00 |
| **Mobilization** | | | | | | |
| Mobilization, medium equipment | 1139 | Equipment with 70-150 HP or typical weights between 14,000 and 30,000 pounds. | Each | $255.83 | 1 | $255.83 |

**Practice:** 634 - Waste Transfer

**Scenario** #13 - 4 inch PVC Pressure Pipe

**Scenario Description:**

4" PVC pipe conduit is typically a pressure rated water tight PVC pipe used to transfer manure from one location to another. Costs include pipe materials and assembly, trench excavation, pipe installation, bedding, and proper backfill. Pipe is typically installed 4 feet below grade. The pipe conveys the slurry waste liquid and wastewater between the waste collection point and a waste storage facility or waste treatment area. Transfer pump is covered under PS 533 - Pumping Plant. This conduit is part of a manure transfer system for a planned waste management or comprehensive nutrient management plan. This scenario addresses the transport of liquid waste to a waste storage or treatment facility to prevent a water quality resource concern of excessive nutrients/organics and harmful levels of pathogens in surface water and/or excessive nutrients/organics in ground water. Associated practices may include: PS 313 Waste Storage Facility for storage structures; PS 533, Pumping Plant; PS 430, Irrigation Pipeline; PS 632, Solid/Liquid Waste Separation Facility; PS 468, Lined Waterway or Outlet; PS 590 Nutrient Management for waste application; PS 633, Waste Recycling.

**Before Situation:**

An area of waste production is separated from the waste storage facility and current operations may cause water quality concerns as it is not efficient in transporting the waste to the storage. The site DOES NOT have sufficient change in elevation or head pressure between production area and treatment or storage structure that is adequate to transfer wastes via gravity flow conduit.

**After Situation:**

Install a 100 foot long pressure rated water tight PVC pipe. Pipe shall be 4" diameter pressure rated PVC pipe with water tight joints. 4" diameter PVC pipe will direct flow of manure and wastewater to manure treatment or storage facility. This scenario includes the pipe, couplers and all other fittings, trench excavation, pipe bedding and backfill. The transfer conduit will provide collection and containment of the manure slurry, thereby protecting water quality resources.

**Feature Measure:** Length of 4" PVC Pipe

**Scenario Unit::** Foot

**Scenario Typical Size:** 100.0

**Scenario Total Cost:** $1,556.35

**Scenario Cost/Unit:** $15.56

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 | $62.74 | 6 | $376.44 |
| **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 | $25.31 | 8 | $202.48 |
| 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 | $44.37 | 6 | $266.22 |
| Supervisor or Manager | 234 | Labor involving supervision or management activities. Includes crew supervisors, foremen and farm/ranch managers time required for adopting new technology, etc. | Hour | $45.69 | 2 | $91.38 |
| **Materials** | | | | | | |
| Pipe, PVC, 4", SDR 21 | 986 | Materials: - 4" - PVC - SDR 21 200 psi - ASTM D2241 | Foot | $3.64 | 100 | $364.00 |
| **Mobilization** | | | | | | |
| Mobilization, medium equipment | 1139 | Equipment with 70-150 HP or typical weights between 14,000 and 30,000 pounds. | Each | $255.83 | 1 | $255.83 |

**Practice:** 634 - Waste Transfer

**Scenario** #14 - 6 inch PVC Pressure Pipe

**Scenario Description:**

6" PVC pipe conduit is typically a pressure rated water tight PVC pipe used to transfer manure from one location to another. Costs include pipe materials and assembly, trench excavation, pipe installation, bedding, and proper backfill. Pipe is typically installed 4 feet below grade. The pipe conveys the slurry waste liquid and wastewater between the waste collection point and a waste storage facility or waste treatment area. Transfer pump is covered under PS 533 - Pumping Plant. This conduit is part of a manure transfer system for a planned waste management or comprehensive nutrient management plan. This scenario addresses the transport of liquid waste to a waste storage or treatment facility to prevent a water quality resource concern of excessive nutrients/organics and harmful levels of pathogens in surface water and/or excessive nutrients/organics in ground water. Associated practices may include: PS 313 Waste Storage Facility for storage structures; PS 533, Pumping Plant; PS 430, Irrigation Pipeline; PS 632, Solid/Liquid Waste Separation Facility; PS 468, Lined Waterway or Outlet; PS 590 Nutrient Management for waste application; PS 633, Waste Recycling.

**Before Situation:**

An area of waste production is separated from the waste storage facility and current operations may cause water quality concerns as it is not efficient in transporting the waste to the storage. The site DOES NOT have sufficient change in elevation or head pressure between production area and treatment or storage structure that is adequate to transfer wastes via gravity flow conduit.

**After Situation:**

Install a 100 foot long pressure rated water tight PVC pipe. Pipe shall be 6" diameter pressure rated PVC pipe with water tight joints. 6" diameter PVC pipe will direct flow of manure and wastewater to manure treatment or storage facility. This scenario includes the pipe, couplers and all other fittings, trench excavation, pipe bedding and backfill. The transfer conduit will provide collection and containment of the manure slurry, thereby protecting water quality resources.

**Feature Measure:** Length of 6" PVC Pipe

**Scenario Unit::** Foot

**Scenario Typical Size:** 100.0

**Scenario Total Cost:** $1,975.35

**Scenario Cost/Unit:** $19.75

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 | $62.74 | 6 | $376.44 |
| **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 | $25.31 | 8 | $202.48 |
| 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 | $44.37 | 6 | $266.22 |
| Supervisor or Manager | 234 | Labor involving supervision or management activities. Includes crew supervisors, foremen and farm/ranch managers time required for adopting new technology, etc. | Hour | $45.69 | 2 | $91.38 |
| **Materials** | | | | | | |
| Pipe, PVC, 6", SDR 21 | 987 | Materials: - 6" - PVC - SDR 21 200 psi - ASTM D2241 | Foot | $7.83 | 100 | $783.00 |
| **Mobilization** | | | | | | |
| Mobilization, medium equipment | 1139 | Equipment with 70-150 HP or typical weights between 14,000 and 30,000 pounds. | Each | $255.83 | 1 | $255.83 |

**Practice:** 634 - Waste Transfer

**Scenario** #15 - 8 inch PVC Pressure Pipe

**Scenario Description:**

8" PVC pipe conduit is typically a pressure rated water tight PVC pipe used to transfer manure from one location to another. Costs include pipe materials and assembly, trench excavation, pipe installation, bedding, and proper backfill. Pipe is typically installed 4 feet below grade. The pipe conveys the slurry waste liquid and wastewater between the waste collection point and a waste storage facility or waste treatment area. Transfer pump is covered under PS 533 - Pumping Plant. This conduit is part of a manure transfer system for a planned waste management or comprehensive nutrient management plan. This scenario addresses the transport of liquid waste to a waste storage or treatment facility to prevent a water quality resource concern of excessive nutrients/organics and harmful levels of pathogens in surface water and/or excessive nutrients/organics in ground water. Associated practices may include: PS 313 Waste Storage Facility for storage structures; PS 533, Pumping Plant; PS 430, Irrigation Pipeline; PS 632, Solid/Liquid Waste Separation Facility; PS 468, Lined Waterway or Outlet; PS 590 Nutrient Management for waste application; PS 633, Waste Recycling.

**Before Situation:**

An area of waste production is separated from the waste storage facility and current operations may cause water quality concerns as it is not efficient in transporting the waste to the storage. The site DOES NOT have sufficient change in elevation or head pressure between production area and treatment or storage structure that is adequate to transfer wastes via gravity flow conduit.

**After Situation:**

Install a 100 foot long pressure rated water tight PVC pipe. Pipe shall be 8" diameter pressure rated PVC pipe with water tight joints. 8" diameter PVC pipe will direct flow of manure and wastewater to manure treatment or storage facility. This scenario includes the pipe, couplers and all other fittings, trench excavation, pipe bedding and backfill. The transfer conduit will provide collection and containment of the manure slurry, thereby protecting water quality resources.

**Feature Measure:** Length of 8" PVC Pipe

**Scenario Unit::** Foot

**Scenario Typical Size:** 100.0

**Scenario Total Cost:** $2,820.88

**Scenario Cost/Unit:** $28.21

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 | $62.74 | 8 | $501.92 |
| **Labor** | | | | | | |
| General Labor | 231 | Labor performed using basic tools such as power tool, shovels, and other tools that do not require extensive training. Ex. pipe layer, herder, concrete placement, materials spreader, flagger, etc. | Hour | $25.31 | 10 | $253.10 |
| 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 | $44.37 | 8 | $354.96 |
| 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 | $45.69 | 3 | $137.07 |
| **Materials** | | | | | | |
| Pipe, PVC, 8", SDR 21 | 988 | Materials: - 8" - PVC - SDR 21 200 psi - ASTM D2241 | Foot | $13.18 | 100 | $1,318.00 |
| **Mobilization** | | | | | | |
| Mobilization, medium equipment | 1139 | Equipment with 70-150 HP or typical weights between 14,000 and 30,000 pounds. | Each | $255.83 | 1 | $255.83 |

**Practice:** 634 - Waste Transfer

**Scenario** #16 - 12 inch PVC Pressure Pipe

**Scenario Description:**

12" PVC pipe conduit is typically a pressure rated water tight PVC pipe used to transfer manure from one location to another. Costs include pipe materials and assembly, trench excavation, pipe installation, bedding, and proper backfill. Pipe is typically installed 4 feet below grade. The pipe conveys the slurry waste liquid and wastewater between the waste collection point and a waste storage facility or waste treatment area. Transfer pump is covered under PS 533 - Pumping Plant. This conduit is part of a manure transfer system for a planned waste management or comprehensive nutrient management plan. This scenario addresses the transport of liquid waste to a waste storage or treatment facility to prevent a water quality resource concern of excessive nutrients/organics and harmful levels of pathogens in surface water and/or excessive nutrients/organics in ground water. Associated practices may include: PS 313 Waste Storage Facility for storage structures; PS 533, Pumping Plant; PS 430, Irrigation Pipeline; PS 632, Solid/Liquid Waste Separation Facility; PS 468, Lined Waterway or Outlet; PS 590 Nutrient Management for waste application; PS 633, Waste Recycling.

**Before Situation:**

An area of waste production is separated from the waste storage facility and current operations may cause water quality concerns as it is not efficient in transporting the waste to the storage. The site DOES NOT have sufficient change in elevation or head pressure between production area and treatment or storage structure that is adequate to transfer wastes via gravity flow conduit.

**After Situation:**

Install a 100 foot long pressure rated water tight PVC pipe. Pipe shall be 12" diameter pressure rated PVC pipe with water tight joints. 12" diameter PVC pipe will direct flow of manure and wastewater to manure treatment or storage facility. This scenario includes the pipe, couplers and all other fittings, trench excavation, pipe bedding and backfill. The transfer conduit will provide collection and containment of the manure slurry, thereby protecting water quality resources.

**Feature Measure:** Length of 12" PVC Pipe

**Scenario Unit::** Foot

**Scenario Typical Size:** 100.0

**Scenario Total Cost:** $3,719.57

**Scenario Cost/Unit:** $37.20

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 | $62.74 | 8 | $501.92 |
| **Labor** | | | | | | |
| General Labor | 231 | Labor performed using basic tools such as power tool, shovels, and other tools that do not require extensive training. Ex. pipe layer, herder, concrete placement, materials spreader, flagger, etc. | Hour | $25.31 | 10 | $253.10 |
| 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 | $44.37 | 8 | $354.96 |
| 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 | $45.69 | 4 | $182.76 |
| **Materials** | | | | | | |
| Pipe, PVC, 12", ASTM-2241, SDR 26 | 1943 | Materials: - 12" - PVC - ASTM 2241, SDR 26 | Foot | $21.71 | 100 | $2,171.00 |
| **Mobilization** | | | | | | |
| Mobilization, medium equipment | 1139 | Equipment with 70-150 HP or typical weights between 14,000 and 30,000 pounds. | Each | $255.83 | 1 | $255.83 |

**Practice:** 634 - Waste Transfer

**Scenario** #17 - 15 inch PVC Pressure Pipe

**Scenario Description:**

15" PVC pipe conduit is typically a pressure rated water tight PVC pipe used to transfer manure from one location to another. Costs include pipe materials and assembly, trench excavation, pipe installation, bedding, and proper backfill. Pipe is typically installed 4 feet below grade. The pipe conveys the slurry waste liquid and wastewater between the waste collection point and a waste storage facility or waste treatment area. Transfer pump is covered under PS 533 - Pumping Plant. This conduit is part of a manure transfer system for a planned waste management or comprehensive nutrient management plan. This scenario addresses the transport of liquid waste to a waste storage or treatment facility to prevent a water quality resource concern of excessive nutrients/organics and harmful levels of pathogens in surface water and/or excessive nutrients/organics in ground water. Associated practices may include: PS 313 Waste Storage Facility for storage structures; PS 533, Pumping Plant; PS 430, Irrigation Pipeline; PS 632, Solid/Liquid Waste Separation Facility; PS 468, Lined Waterway or Outlet; PS 590 Nutrient Management for waste application; PS 633, Waste Recycling.

**Before Situation:**

An area of waste production is separated from the waste storage facility and current operations may cause water quality concerns as it is not efficient in transporting the waste to the storage. The site DOES NOT have sufficient change in elevation or head pressure between production area and treatment or storage structure that is adequate to transfer wastes via gravity flow conduit.

**After Situation:**

Install a 100 foot long pressure rated water tight PVC pipe. Pipe shall be 15" diameter pressure rated PVC pipe with water tight joints. 15" diameter PVC pipe will direct flow of manure and wastewater to manure treatment or storage facility. This scenario includes the pipe, couplers and all other fittings, trench excavation, pipe bedding and backfill. The transfer conduit will provide collection and containment of the manure slurry, thereby protecting water quality resources.

**Feature Measure:** Length of 15" PVC Pipe

**Scenario Unit::** Foot

**Scenario Typical Size:** 100.0

**Scenario Total Cost:** $4,253.62

**Scenario Cost/Unit:** $42.54

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 | $62.74 | 10 | $627.40 |
| **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 | $25.31 | 13 | $329.03 |
| 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 | $44.37 | 10 | $443.70 |
| 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 | $45.69 | 7 | $319.83 |
| **Materials** | | | | | | |
| Pipe, PVC, 15", SDR 41, PIP | 1718 | Materials: - 15" - PVC - SDR 41 100 psi - gasketed PIP ASTM D2241 | Foot | $20.22 | 100 | $2,022.00 |
| **Mobilization** | | | | | | |
| Mobilization, medium equipment | 1139 | Equipment with 70-150 HP or typical weights between 14,000 and 30,000 pounds. | Each | $255.83 | 2 | $511.66 |

**Practice:** 634 - Waste Transfer

**Scenario** #18 - Push-Off Ramp w/ Safety Gate

**Scenario Description:**

Installation of a three-sided vertical concrete push off ramp in an earthen WSF. Ramp is designed to be installed on the side slope of an earthen WSF so manure and wastewater can be pushed directly into the WSF via skid steer load or other type of scraping equipment. Scenario consist of a three-sided 10' vertical wall that is approximately 20' long by 15' wide (VT Drawing # VT031212SD). Scenario also includes a safety gate at the end of the ramp to prevent scraping equipment from accidentally falling into the WSF. Push off ramps are particularly effective with manure laden with sand or heavy straw/hay bedding. Associated practices may include: PS 313 Waste Storage Facility for storage structures; PS 533, Pumping Plant; PS 430, Irrigation Pipeline; PS 632, Solid/Liquid Waste Separation Facility; PS 468, Lined Waterway or Outlet; PS 590 Nutrient Management for waste application; PS 633, Waste Recycling.

**Before Situation:**

Current facility operations are allowing liquid waste to flow uncontrolled during periods of precipitation events or cleaning operations such that water resources can be contaminated.

**After Situation:**

Water quality concerns will be addressed by preventing liquid waste from entering surface waters, and to facilitate timely land application of manure and wastewater at agronomic rates according to the CNMP. This scenario addresses the potential for surface water and groundwater quality degradation.

**Feature Measure:** Number of Push-Off Ramps

**Scenario Unit::** Each

**Scenario Typical Size:** 1.0

**Scenario Total Cost:** $24,799.54

**Scenario Cost/Unit:** $24,799.54

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 | $327.92 | 6 | $1,967.52 |
| 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 | $510.00 | 25 | $12,750.00 |
| Earthfill, Manually Compacted | 50 | Earthfill, manually compacted, includes equipment and labor | Cubic Yard | $5.87 | 100 | $587.00 |
| 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 | $113.75 | 16 | $1,820.00 |
| Truck, Concrete Pump | 1211 | Concrete pump, normally truck mounted. Use this item in association with other concrete components when job requires placement by other than normal chutes. Include drive and setup time in quantity; therefore, do not include mobilization. Includes equi | Hour | $201.97 | 8 | $1,615.76 |
| **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 | $25.31 | 10 | $253.10 |
| 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 | $44.37 | 16 | $709.92 |
| 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 | $45.69 | 10 | $456.90 |
| **Materials** | | | | | | |
| Aggregate, Gravel, Graded | 46 | Gravel, includes materials, equipment and labor to transport and place. Includes washed and unwashed gravel. | Cubic Yard | $34.75 | 7 | $243.25 |
| Safety Guard, pipe fence and tractor guard | 1953 | Pipe fence and tractor guard 4' tall with working loads expected from equipment and livestock. Materials and shipping only. | Foot | $275.55 | 14 | $3,857.70 |
| **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 | $70.64 | 4 | $282.56 |
| Mobilization, medium equipment | 1139 | Equipment with 70-150 HP or typical weights between 14,000 and 30,000 pounds. | Each | $255.83 | 1 | $255.83 |

**Practice:** 634 - Waste Transfer

**Scenario** #19 - Concrete Channel

**Scenario Description:**

Installation of a concrete channel to convey silage leachate, barnyard runoff and other wastewater from the source to a waste storage and/or treatment facility. Typical scenario includes the installation of a parabolic concrete channel which is 6' wide by 100' long. Concrete is 5" thick and reinforced with rebar. Concrete is underlain by 6" of clean drainfill material. Livestock are generally excluded. Concrete channel is used in areas where the topography or geology does not allow the installation of an underground pipe system. Concrete channel allows for easy and frequent maintenance and cleanout. Concrete channel shall NOT be used to convey manure. Associated practices may include: PS 313 Waste Storage Facility for storage structures; PS 533, Pumping Plant; PS 430, Irrigation Pipeline; PS 632, Solid/Liquid Waste Separation Facility; PS 468, Lined Waterway or Outlet; PS 590 Nutrient Management for waste application; PS 633, Waste Recycling.

**Before Situation:**

Current facility operations are allowing liquid waste to flow uncontrolled during periods of precipitation events or cleaning operations such that water resources can be contaminated.

**After Situation:**

Water quality concerns will be addressed by preventing liquid waste from entering surface waters, and to facilitate timely land application of manure and wastewater at agronomic rates according to the CNMP. This scenario addresses the potential for surface water and groundwater quality degradation.

**Feature Measure:** Surface Area of Concrete Channel

**Scenario Unit::** Square Foot

**Scenario Typical Size:** 600.0

**Scenario Total Cost:** $4,498.44

**Scenario Cost/Unit:** $7.50

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 | $327.92 | 9 | $2,951.28 |
| Excavation, Common Earth, side cast, small equipment | 48 | Bulk excavation and side casting of common earth with hydraulic excavator with less than 1 CY capacity. Includes equipment and labor. | Cubic Yard | $2.36 | 22 | $51.92 |
| Earthfill, Manually Compacted | 50 | Earthfill, manually compacted, includes equipment and labor | Cubic Yard | $5.87 | 11 | $64.57 |
| **Labor** | | | | | | |
| General Labor | 231 | Labor performed using basic tools such as power tool, shovels, and other tools that do not require extensive training. Ex. pipe layer, herder, concrete placement, materials spreader, flagger, etc. | Hour | $25.31 | 4 | $101.24 |
| 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 | $45.69 | 2 | $91.38 |
| **Materials** | | | | | | |
| Aggregate, Gravel, Graded | 46 | Gravel, includes materials, equipment and labor to transport and place. Includes washed and unwashed gravel. | Cubic Yard | $34.75 | 11 | $382.25 |
| **Mobilization** | | | | | | |
| Mobilization, small equipment | 1138 | Equipment <70 HP but can't be transported by a pick-up truck or with typical weights between 3,500 to 14,000 pounds. | Each | $172.07 | 2 | $344.14 |
| Mobilization, medium equipment | 1139 | Equipment with 70-150 HP or typical weights between 14,000 and 30,000 pounds. | Each | $255.83 | 2 | $511.66 |

**Practice:** 634 - Waste Transfer

**Scenario** #20 - Concrete Scrape Alley

**Scenario Description:**

Installation of a concrete scrape alley which is 10' wide to collect, contain and transfer manure and/or wastewater from the barn or barnyard to a waste storage facility or waste transfer system. Manure will be conveyed by a skid steer loader or other type of scraping equipment. Typical scenario includes a 6" concrete slab which is 10' wide by 100' long with 24" tall curbs on both sides. Concrete slab is reinforced with rebar and underlain by 6" of clean drainfill material. Associated practices may include: PS 313 Waste Storage Facility for storage structures; PS 533, Pumping Plant; PS 430, Irrigation Pipeline; PS 632, Solid/Liquid Waste Separation Facility; PS 468, Lined Waterway or Outlet; PS 590 Nutrient Management for waste application; PS 633, Waste Recycling.

**Before Situation:**

Current facility operations are allowing liquid waste to flow uncontrolled during periods of precipitation events or cleaning operations such that water resources can be contaminated.

**After Situation:**

Water quality concerns will be addressed by preventing liquid waste from entering surface waters, and to facilitate timely land application of manure and wastewater at agronomic rates according to the CNMP. This scenario addresses the potential for surface water and groundwater quality degradation.

**Feature Measure:** Surface Area of Scrape Alley

**Scenario Unit::** Square Foot

**Scenario Typical Size:** 1,000.0

**Scenario Total Cost:** $13,329.38

**Scenario Cost/Unit:** $13.33

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 | $327.92 | 19 | $6,230.48 |
| Concrete, CIP, formed reinforced | 38 | Steel reinforced concrete formed and cast-in-placed in formed structures such as walls or suspended slabs by chute placement. Typical strength is 3000 to 4000 psi. Includes materials, labor and equipment to transport, place and finish. | Cubic Yard | $510.00 | 10 | $5,100.00 |
| 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 | $2.36 | 37 | $87.32 |
| Earthfill, Manually Compacted | 50 | Earthfill, manually compacted, includes equipment and labor | Cubic Yard | $5.87 | 19 | $111.53 |
| **Labor** | | | | | | |
| General Labor | 231 | Labor performed using basic tools such as power tool, shovels, and other tools that do not require extensive training. Ex. pipe layer, herder, concrete placement, materials spreader, flagger, etc. | Hour | $25.31 | 4 | $101.24 |
| 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 | $45.69 | 4 | $182.76 |
| **Materials** | | | | | | |
| Aggregate, Gravel, Graded | 46 | Gravel, includes materials, equipment and labor to transport and place. Includes washed and unwashed gravel. | Cubic Yard | $34.75 | 19 | $660.25 |
| **Mobilization** | | | | | | |
| Mobilization, small equipment | 1138 | Equipment <70 HP but can't be transported by a pick-up truck or with typical weights between 3,500 to 14,000 pounds. | Each | $172.07 | 2 | $344.14 |
| Mobilization, medium equipment | 1139 | Equipment with 70-150 HP or typical weights between 14,000 and 30,000 pounds. | Each | $255.83 | 2 | $511.66 |

**Practice:** 634 - Waste Transfer

**Scenario** #21 - Horizontal Boring

**Scenario Description:**

Install pressure or gravity pipe waste transfer system under a road using directional drilling or horizontal boring equipment. Scenario generally pertains to smaller diameter pipes less than 12" in diameter. Boring is done approximately 50" below the road surface. Road is approximately 30' wide and length of boring is 50'. This scenario shall only be used if there is no other option or location is available. Scenario only pertains to horizontal boring through overburden material, not rock. Costs include oversized sleeve, 6" PVC pipe, horizontal boring equipment, excavator and misc. labor. This practice is often installed in conjunction with 533 - Pumping Plant, 313 - Waste Storage Facility, 632 - Waste Separation Facility, 590 - Nutrient Management, etc.

**Before Situation:**

An area of waste production is separated from the waste storage facility and current operations may cause water quality concerns as it is not efficient in transporting the waste to the storage. Existing road or highway is in the way that impedes the installation of pipe and pipe has to be installed under the road. Local rules and regulations require the pipe be installed under the road by horizontal boring methods. Pipe can be gravity flow or pump pipe.

**After Situation:**

Installation of a gravity or pump transfer conduit will provide the collection and containment of manure and wastewater, thereby protecting surface and ground water resources.

**Feature Measure:** Each Road Crossing

**Scenario Unit::** Each

**Scenario Typical Size:** 1.0

**Scenario Total Cost:** $7,028.46

**Scenario Cost/Unit:** $7,028.46

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 | $113.75 | 10 | $1,137.50 |
| Horizontal Boring, Greater Than 3" diameter | 1132 | Includes equipment, labor and setup. | Foot | $85.82 | 50 | $4,291.00 |
| **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 | $25.31 | 10 | $253.10 |
| 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 | $44.37 | 10 | $443.70 |
| **Materials** | | | | | | |
| Pipe, PVC, 6", SDR 21 | 987 | Materials: - 6" - PVC - SDR 21 200 psi - ASTM D2241 | Foot | $7.83 | 50 | $391.50 |
| **Mobilization** | | | | | | |
| Mobilization, medium equipment | 1139 | Equipment with 70-150 HP or typical weights between 14,000 and 30,000 pounds. | Each | $255.83 | 2 | $511.66 |

**Practice:** 635 - Vegetated Treatment Area

**Scenario** #1 - VTA-surface application-gravity flow

**Scenario Description:**

This is a permanent herbaceous vegetative area or channel installed down slope from a livestock production area. Wastewater (runoff or milking parlor wastewater) is properly collected and released with a controlled gravity outflow into the VTA. The VTA vegetation is harvested to removed nutrients on a regular basis. This practice addresses water quality degradation due to uncontrolled nutrient rich wastewater that can flow into surface waters or leach into ground water. Associated practices: Waste Storage Facility (313), Fence (382), Solid/Liquid Waste Separation Facility (632), Manure Transfer (634), Roof runoff Management (558), Pumping Plant (533), Subsurface Drain (606), Critical Area Planting (342), Terrace (600), Nutrient Management (590), Diversion (362), Pipeline (516), Land Smoothing (466), Precision Land Forming (462), Waste Treatment (629), Heavy Use Area (561)

**Before Situation:**

Nutrient rich wastewater is running off from an animal operation that has the potential to pollute surface waters or ponding and leaching into groundwater.

**After Situation:**

Typical VTA is 75'x150' (11250 SF) in size, includes a perforated pipe manifold at the top of the VTA for distribution flow (sheet flow). Typically requires grading and shaping, gravel spreader trenches at top of VTA below manifold pipe, at 50ft spacing along the VTA, and at the bottom of the VTA. A settling basin for wastewater collection is contracted using Solid/Liquid Waste Separation Facility (632). For milkhouse waste, Waste Treatment (629) could be contracted to provide pre-treatment prior to being released into the VTA. Seeding is contracted under Critical Area Planting (342). The VTA practice will provide a controlled release of nutrient rich wastewater into a designed vegetative area for nutrient uptake. This system will improve water quality by treating nutrient rich wastewater and prevent contamination of surface and ground water resources.

**Feature Measure:** Amount of VTA installed

**Scenario Unit::** Square Foot

**Scenario Typical Size:** 11,250.0

**Scenario Total Cost:** $8,051.29

**Scenario Cost/Unit:** $0.72

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 | $2.53 | 270 | $683.10 |
| 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 | $2.36 | 45 | $106.20 |
| Earthfill, Dumped and Spread | 51 | Earthfill, dumped and spread without compaction effort, includes equipment and labor | Cubic Yard | $3.65 | 417 | $1,522.05 |
| Trenching, Earth, 12" x 48" | 53 | Trenching, earth, 12" wide x 48" depth, includes equipment and labor for trenching and backfilling | Foot | $1.38 | 200 | $276.00 |
| Dozer, 80 HP | 929 | Track mounted Dozer with horsepower range of 60 to 90. Equipment and power unit costs. Labor not included. | Hour | $66.13 | 8 | $529.04 |
| Stripping and stockpiling, topsoil | 1199 | Stripping and stockpiling of topsoil adjacent to stripping area. Includes equipment and labor. | Cubic Yard | $0.89 | 417 | $371.13 |
| **Labor** | | | | | | |
| General Labor | 231 | Labor performed using basic tools such as power tool, shovels, and other tools that do not require extensive training. Ex. pipe layer, herder, concrete placement, materials spreader, flagger, etc. | Hour | $25.31 | 16 | $404.96 |
| 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 | $44.37 | 8 | $354.96 |
| **Materials** | | | | | | |
| Aggregate, Gravel, Graded | 46 | Gravel, includes materials, equipment and labor to transport and place. Includes washed and unwashed gravel. | Cubic Yard | $34.75 | 45 | $1,563.75 |
| Pipe, PVC, 6", SCH 40 | 980 | Materials: - 6" - PVC - SCH 40 - ASTM D1785 | Foot | $6.14 | 270 | $1,657.80 |
| **Mobilization** | | | | | | |
| Mobilization, very small equipment | 1137 | Equipment that is small enough to be transported by a pick-up truck with typical weights less than 3,500 pounds. Can be multiple pieces of equipment if all hauled simultaneously. | Each | $70.64 | 1 | $70.64 |
| Mobilization, medium equipment | 1139 | Equipment with 70-150 HP or typical weights between 14,000 and 30,000 pounds. | Each | $255.83 | 2 | $511.66 |

**Practice:** 635 - Vegetated Treatment Area

**Scenario** #2 - VTA Direct Flow - Surface Apply

**Scenario Description:**

This is a permanent herbaceous vegetative area or channel installed down slope from a compost pad. Wastewater is conveyed in sheet flow onto the VTA. The VTA vegetation is harvested to removed nutrients on a regular basis. This practice addresses water quality degradation due to uncontrolled nutrient rich wastewater that can flow into surface waters or leach into ground water. Associated practices: Waste Storage Facility (313), Fence (382), Solid/Liquid Waste Separation Facility (632), Manure Transfer (634), Roof runoff Management (558), Pumping Plant (533), Subsurface Drain (606), Critical Area Planting (342), Terrace (600), Nutrient Management (590), Diversion (362), Pipeline (516), Land Smoothing (466), Precision Land Forming (462), Waste Treatment (629), Heavy Use Area (561), Composting Facility (317)

**Before Situation:**

Nutrient rich wastewater is running off from an animal operation that has the potential to pollute surface waters or ponding and leaching into groundwater.

**After Situation:**

Typical VTA is 75'x150' (11250 SF) in size. Typically requires grading and shaping, gravel spreader trenches at top of VTA, at 50ft spacing along the VTA, and at the bottom of the VTA. If needed, a settling basin for wastewater collection may be contracted using Solid/Liquid Waste Separation Facility (632). Seeding is contracted under Critical Area Planting (342). The VTA practice will provide a controlled release of nutrient rich wastewater into a designed vegetative area for nutrient uptake. This system will improve water quality by treating nutrient rich wastewater and prevent contamination of surface and ground water resources.

**Feature Measure:** Amount of VTA installed

**Scenario Unit::** Square Foot

**Scenario Typical Size:** 11,250.0

**Scenario Total Cost:** $5,844.37

**Scenario Cost/Unit:** $0.52

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 | $2.53 | 270 | $683.10 |
| 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 | $2.36 | 45 | $106.20 |
| Earthfill, Dumped and Spread | 51 | Earthfill, dumped and spread without compaction effort, includes equipment and labor | Cubic Yard | $3.65 | 417 | $1,522.05 |
| Dozer, 80 HP | 929 | Track mounted Dozer with horsepower range of 60 to 90. Equipment and power unit costs. Labor not included. | Hour | $66.13 | 8 | $529.04 |
| Stripping and stockpiling, topsoil | 1199 | Stripping and stockpiling of topsoil adjacent to stripping area. Includes equipment and labor. | Cubic Yard | $0.89 | 417 | $371.13 |
| **Labor** | | | | | | |
| General Labor | 231 | Labor performed using basic tools such as power tool, shovels, and other tools that do not require extensive training. Ex. pipe layer, herder, concrete placement, materials spreader, flagger, etc. | Hour | $25.31 | 8 | $202.48 |
| 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 | $44.37 | 8 | $354.96 |
| **Materials** | | | | | | |
| Aggregate, Gravel, Graded | 46 | Gravel, includes materials, equipment and labor to transport and place. Includes washed and unwashed gravel. | Cubic Yard | $34.75 | 45 | $1,563.75 |
| **Mobilization** | | | | | | |
| Mobilization, medium equipment | 1139 | Equipment with 70-150 HP or typical weights between 14,000 and 30,000 pounds. | Each | $255.83 | 2 | $511.66 |

**Practice:** 635 - Vegetated Treatment Area

**Scenario** #3 - VTA New with Spreader Curb

**Scenario Description:**

This is a permanent herbaceous vegetative area or channel installed down slope from a livestock production area. Nutrient rich runoff is treated with overland flow through the VTA. A flow distribution component is installed to achieve sheet flow at the start of the VTA. Clean runoff is diverted where possible. The VTA vegetation is harvested to removed nutrients on a regular basis. This practice addresses water quality degradation due to uncontrolled nutrient rich runoff that can flow into surface waters or leach into ground water. Associated practices: Waste Storage Facility (313), Fence (382), Solid/Liquid Waste Separation Facility (632), Manure Transfer (634), Irrigation System, Sprinkler (442), Roof runoff Management (558), Pumping Plant (533), Subsurface Drain (606), Critical Area Planting (342), Terrace (600), Nutrient Management (590), Diversion (362), Pipeline (516), Land Smoothing (466), Precision Land Forming (462), Waste Treatment Area (629)

**Before Situation:**

Nutrient rich wastewater is running off from an animal operation that has the potential to pollute surface waters or ponding and leaching into groundwater.

**After Situation:**

Typical VTA is 75'x150' (11250 SF) in size, includes grading, distribution pipes from the collection area, a concrete curb, and gravel trenches to establish sheet flow onto and along the VTA where an existing permanent herbaceous vegetated area meets the requirements for a VTA. Seeding is contracted under Critical Area Planting (342). The VTA practice will provide a controlled release of nutrient rich runoff into an existing vegetative area for nutrient uptake. This system will improve water quality by treating nutrient rich runoff and prevent contamination of surface and ground water resources.

**Feature Measure:** Amount of VTA treating wastewate

**Scenario Unit::** Square Foot

**Scenario Typical Size:** 11,250.0

**Scenario Total Cost:** $9,668.69

**Scenario Cost/Unit:** $0.86

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 | $510.00 | 5 | $2,550.00 |
| Geotextile, woven | 42 | Woven Geotextile Fabric. Includes materials, equipment and labor | Square Yard | $2.53 | 270 | $683.10 |
| 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 | $2.36 | 45 | $106.20 |
| Earthfill, Dumped and Spread | 51 | Earthfill, dumped and spread without compaction effort, includes equipment and labor | Cubic Yard | $3.65 | 417 | $1,522.05 |
| Dozer, 80 HP | 929 | Track mounted Dozer with horsepower range of 60 to 90. Equipment and power unit costs. Labor not included. | Hour | $66.13 | 8 | $529.04 |
| Stripping and stockpiling, topsoil | 1199 | Stripping and stockpiling of topsoil adjacent to stripping area. Includes equipment and labor. | Cubic Yard | $0.89 | 417 | $371.13 |
| **Labor** | | | | | | |
| General Labor | 231 | Labor performed using basic tools such as power tool, shovels, and other tools that do not require extensive training. Ex. pipe layer, herder, concrete placement, materials spreader, flagger, etc. | Hour | $25.31 | 8 | $202.48 |
| **Materials** | | | | | | |
| Aggregate, Gravel, Graded | 46 | Gravel, includes materials, equipment and labor to transport and place. Includes washed and unwashed gravel. | Cubic Yard | $34.75 | 45 | $1,563.75 |
| Pipe, PVC, 2", SCH 40 | 976 | Materials: - 2" - PVC - SCH 40 - ASTM D1785 | Foot | $1.34 | 30 | $40.20 |
| Coupling, PVC, endcap, 2", SCH 20 | 1727 | 2" - PVC- SCH 40- ASTM D1785 pipe endcaps. Materials only. | Each | $1.82 | 15 | $27.30 |
| Pipe, PE, 6", DR 9, perforated | 1728 | Materials: -6" - Perforated PE- 160 psi - ASTM D3035 DR 9 | Foot | $18.94 | 75 | $1,420.50 |
| **Mobilization** | | | | | | |
| Mobilization, very small equipment | 1137 | Equipment that is small enough to be transported by a pick-up truck with typical weights less than 3,500 pounds. Can be multiple pieces of equipment if all hauled simultaneously. | Each | $70.64 | 2 | $141.28 |
| Mobilization, medium equipment | 1139 | Equipment with 70-150 HP or typical weights between 14,000 and 30,000 pounds. | Each | $255.83 | 2 | $511.66 |

**Practice:** 635 - Vegetated Treatment Area

**Scenario** #4 - VTA Existing with Spreader Curb

**Scenario Description:**

An existing permanent herbaceous vegetated area that meets the requirements for a VTA and is used as an overland flow area for nutrient rich runoff treatment. A flow distribution component is installed to achieve sheet flow at the start of the VTA. Clean runoff is diverted where possible. The VTA vegetation is harvested to removed nutrients on a regular basis. This practice addresses water quality degradation due to uncontrolled nutrient rich runoff that can flow into surface waters or leach into ground water. Associated practices: Waste Storage Facility (313), Fence (382), Solid/Liquid Waste Separation Facility (632), Manure Transfer (634), Irrigation System, Sprinkler (442), Roof runoff Management (558), Pumping Plant (533), Subsurface Drain (606), Critical Area Planting (342), Terrace (600), Nutrient Management (590), Diversion (362), Pipeline (516), Land Smoothing (466), Precision Land Forming (462), Waste Treatment Area (629)

**Before Situation:**

Nutrient rich wastewater is running off from an animal operation that has the potential to pollute surface waters or ponding and leaching into groundwater.

**After Situation:**

Typical VTA is 75'x150' (11250 SF) in size, includes distribution pipes from the collection area, a concrete curb, and gravel trenches to establish sheet flow onto and along the VTA where an existing permanent herbaceous vegetated area meets the requirements for a VTA. Does not include any grading or seeding. The VTA practice will provide a controlled release of nutrient rich runoff into an existing vegetative area for nutrient uptake. This system will improve water quality by treating nutrient rich runoff and prevent contamination of surface and ground water resources.

**Feature Measure:** Amount of VTA treating wastewate

**Scenario Unit::** Square Foot

**Scenario Typical Size:** 11,250.0

**Scenario Total Cost:** $6,990.64

**Scenario Cost/Unit:** $0.62

Cost Details:

| Component Name | ID | Description | Unit | Cost | QTY | Total |
|---|---|---|---|---|---|---|
| **Equipment Installation** | | | | | | |
| Concrete, CIP, formed reinforced | 38 | Steel reinforced concrete formed and cast-in-placed in formed structures such as walls or suspended slabs by chute placement. Typical strength is 3000 to 4000 psi. Includes materials, labor and equipment to transport, place and finish. | Cubic Yard | $510.00 | 5 | $2,550.00 |
| Geotextile, woven | 42 | Woven Geotextile Fabric. Includes materials, equipment and labor | Square Yard | $2.53 | 270 | $683.10 |
| 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 | $2.36 | 45 | $106.20 |
| **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 | $25.31 | 8 | $202.48 |
| **Materials** | | | | | | |
| Aggregate, Gravel, Graded | 46 | Gravel, includes materials, equipment and labor to transport and place. Includes washed and unwashed gravel. | Cubic Yard | $34.75 | 45 | $1,563.75 |
| Pipe, PVC, 2", SCH 40 | 976 | Materials: - 2" - PVC - SCH 40 - ASTM D1785 | Foot | $1.34 | 30 | $40.20 |
| Coupling, PVC, endcap, 2", SCH 20 | 1727 | 2" - PVC- SCH 40- ASTM D1785 pipe endcaps. Materials only. | Each | $1.82 | 15 | $27.30 |
| Pipe, PE, 6", DR 9, perforated | 1728 | Materials: -6" - Perforated PE- 160 psi - ASTM D3035 DR 9 | Foot | $18.94 | 75 | $1,420.50 |
| **Mobilization** | | | | | | |
| Mobilization, very small equipment | 1137 | Equipment that is small enough to be transported by a pick-up truck with typical weights less than 3,500 pounds. Can be multiple pieces of equipment if all hauled simultaneously. | Each | $70.64 | 2 | $141.28 |
| Mobilization, medium equipment | 1139 | Equipment with 70-150 HP or typical weights between 14,000 and 30,000 pounds. | Each | $255.83 | 1 | $255.83 |

**Practice:** 635 - Vegetated Treatment Area

**Scenario** #5 - Graded Area, Pumped Into A Basin, Gravity Flow Surface Application

**Scenario Description:**

This is a permanent herbaceous vegetative area or channel located upslope from the livestock production area. The topography of the site requires wastewater to be pumped uphill to the VTA designed system. Wastewater (runoff or milking parlor wastewater) is properly collected at the production area and pumped uphill to a shallow tank or basin where it has a controlled gravity outflow into the VTA. The VTA vegetation is harvested to removed nutrients on a regular basis. This practice addresses water quality degradation due to uncontrolled nutrient rich wastewater that can flow into surface waters or leach into ground water. Associated practices: Waste Storage Facility (313), Fence (382), Solid/Liquid Waste Separation Facility (632), Manure Transfer (634), Irrigation System, Sprinkler (442), Roof runoff Management (558), Pumping Plant (533), Subsurface Drain (606), Critical Area Planting (342), Terrace (600), Nutrient Management (590), Diversion (362), Pipeline (516), Land Smoothing (466), Precision Land Forming (462), Waste Treatment (629).

**Before Situation:**

Nutrient rich wastewater is running off from an animal operation that has the potential to pollute surface waters or ponding and leaching into groundwater.

**After Situation:**

Typical VTA is 1 ac (43560 SF) in size, includes the installation site to be upslope from the production area with a shallow tank or basin that provides a controlled gravity outflow into the VTA. Typically requires grading and shaping, gravel spreader trenches and perforated pipe to maintain sheet flow throughout the VTA. A settling basin for wastewater collection is contracted using Solid/Liquid Waste Separation Facility (632) and Pumping Plant (533) to get the wastewater upslope to the VTA distribution point. For milkhouse waste, Waste Treatment (629) could be contracted to provide pretreatment prior to being released into the VTA. Seeding is contracted under Critical Area Planting (342). The VTA practice will provide a controlled release of nutrient rich wastewater into a designed vegetative area for nutrient uptake. This system will improve water quality by treating nutrient rich wastewater and prevent contamination of surface and ground water resources.

**Feature Measure:** Amount of VTA installed

**Scenario Unit::** Square Foot

**Scenario Typical Size:** 43,560.0

**Scenario Total Cost:** $14,571.54

**Scenario Cost/Unit:** $0.33

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 | $327.92 | 2 | $655.84 |
| 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 | $510.00 | 12 | $6,120.00 |
| Geotextile, woven | 42 | Woven Geotextile Fabric. Includes materials, equipment and labor | Square Yard | $2.53 | 400 | $1,012.00 |
| 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 | $2.36 | 100 | $236.00 |
| **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 | $25.31 | 40 | $1,012.40 |
| **Materials** | | | | | | |
| Aggregate, Sand, Graded, Washed | 45 | Sand, typical ASTM C33 gradation, includes materials, equipment and labor to transport and place | Cubic Yard | $34.29 | 6 | $205.74 |
| Aggregate, Gravel, Graded | 46 | Gravel, includes materials, equipment and labor to transport and place. Includes washed and unwashed gravel. | Cubic Yard | $34.75 | 70 | $2,432.50 |
| Pipe, PVC, 2", SCH 40 | 976 | Materials: - 2" - PVC - SCH 40 - ASTM D1785 | Foot | $1.34 | 45 | $60.30 |
| Ball Valve, 4" | 1726 | 4" ball valve, metal body. Materials only. | Each | $320.66 | 2 | $641.32 |
| Coupling, PVC, endcap, 2", SCH 20 | 1727 | 2" - PVC- SCH 40- ASTM D1785 pipe endcaps. Materials only. | Each | $1.82 | 15 | $27.30 |
| Pipe, PE, 6", DR 9, perforated | 1728 | Materials: -6" - Perforated PE- 160 psi - ASTM D3035 DR 9 | Foot | $18.94 | 80 | $1,515.20 |
| **Mobilization** | | | | | | |
| Mobilization, very small equipment | 1137 | Equipment that is small enough to be transported by a pick-up truck with typical weights less than 3,500 pounds. Can be multiple pieces of equipment if all hauled simultaneously. | Each | $70.64 | 2 | $141.28 |
| Mobilization, medium equipment | 1139 | Equipment with 70-150 HP or typical weights between 14,000 and 30,000 pounds. | Each | $255.83 | 2 | $511.66 |

**Practice:** 635 - Vegetated Treatment Area

**Scenario** #6 - Graded Area, Mechanical Distribution

**Scenario Description:**

This is a permanent herbaceous vegetative area located adjacent to a livestock production area. Wastewater (runoff or milking parlor wastewater) is properly collected at the production area and pumped to mechanically distribute wastewater onto the VTA. The VTA vegetation is harvested to removed nutrients on a regular basis. This practice addresses water quality degradation due to uncontrolled nutrient rich wastewater that can flow into surface waters or leach into ground water. Associated practices: Waste Storage Facility (313), Fence (382), Solid/Liquid Waste Separation Facility (632), Manure Transfer (634), Irrigation System, Sprinkler (442), Roof runoff Management (558), Pumping Plant (533), Subsurface Drain (606), Critical Area Planting (342), Terrace (600), Nutrient Management (590), Diversion (362), Pipeline (516), Land Smoothing (466), Precision Land Forming (462), Waste Treatment (629)

**Before Situation:**

Nutrient rich wastewater is running off from an animal operation that has the potential to pollute surface waters or ponding and leaching into groundwater.

**After Situation:**

Typical VTA is 1.0 ac in size, includes the sizing, grading and shaping of the VTA area. Typically requires grading and shaping to maintain sheet flow onto the VTA. A settling basin for wastewater collection is contracted using Solid/Liquid Waste Separation Facility (632) and Pumping Plant (533) to get the wastewater to the VTA mechanical distribution component that is contracted using Irrigation System, Sprinkler (442). For milkhouse waste, Waste Treatment (629) could be contracted to provide pretreatment prior to being pumped and distributed onto the VTA. Seeding is contracted under Critical Area Planting (342). The VTA practice will provide a controlled release of nutrient rich wastewater into a designed vegetative area for nutrient uptake. This system will improve water quality by treating nutrient rich wastewater and prevent contamination of surface and ground water resources.

**Feature Measure:** Amount of VTA installed

**Scenario Unit::** Acre

**Scenario Typical Size:** 1.0

**Scenario Total Cost:** $2,428.79

**Scenario Cost/Unit:** $2,428.79

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 | $66.13 | 16 | $1,058.08 |
| **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 | $25.31 | 16 | $404.96 |
| 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 | $44.37 | 16 | $709.92 |
| **Mobilization** | | | | | | |
| Mobilization, medium equipment | 1139 | Equipment with 70-150 HP or typical weights between 14,000 and 30,000 pounds. | Each | $255.83 | 1 | $255.83 |

**Practice:** 638 - Water and Sediment Control Basin

**Scenario** #1 - WASCOB less than 350 CY

**Scenario Description:**

Typical scenario is for excavating 100 CY to create an earthen WASCOB. The excavated material is used to build up an earthen embankment or combination ridge and channel generally constructed across the slope and minor watercourses to form a sediment trap and water detention basin. Outlet is typically an underground outlet. Work is done with excavator and/ or dozer. Costs include all equipment necessary to excavate, shape, grade and compact the Water and Sediment Control Basin and mobilization of equipment. This practice is utilized to reduce watercourse and gully erosion, trap sediment, reduce and manage onsite and downstream runoff. Sheet and rill erosion will be controlled by other conservation practices.

**Before Situation:**

Farming fields with excessive slope length has resulted in multiple rills and/or ephemeral gullies that will continue to worsen over time. The excessive erosion may lead to deterioration of receiving waters due to excessive sedimentation and nutrient transport. Resource concern addressed includes soil erosion and water quality by trapping sediment and/or reduce erosion in a field to protect riparian areas and water bodies from sediment deposition. Surface water causes erosion and the sediment (and potentially pesticides) to be transported into the riparian areas and water bodies downstream.

**After Situation:**

Water and Sediment Control Basin is constructed with 100 CY of excavation/earthfill with dozer, scraper and/or road grader. Rill and/or gully erosion is reduced. If riser and underground outlet are needed, then include Underground Outlet (620). Include Critical Area Planting (342) where necessary to prevent erosion following construction activities.

**Feature Measure:** Cubic Yard of WASCOB excavation

**Scenario Unit::** Cubic Yard

**Scenario Typical Size:** 100.0

**Scenario Total Cost:** $875.83

**Scenario Cost/Unit:** $8.76

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 | $2.36 | 100 | $236.00 |
| 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 | $2.50 | 100 | $250.00 |
| **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 | $45.69 | 1 | $45.69 |
| **Mobilization** | | | | | | |
| Mobilization, small equipment | 1138 | Equipment <70 HP but can't be transported by a pick-up truck or with typical weights between 3,500 to 14,000 pounds. | Each | $172.07 | 2 | $344.14 |

**Practice:** 638 - Water and Sediment Control Basin

**Scenario** #2 - WASCOB less than 350 CY-Topsoil

**Scenario Description:**

Typical scenarios is for excavating 100 CY to create an earthen WASCOB. Prior to building the embankment, 6 inches of topsoil is removed and stockpiled. The excavated material is used to build up an earthen embankment or combination ridge and channel generally constructed across the slope and minor watercourses to form a sediment trap and water detention basin. Topsoil is replaced following construction of the embankment. Outlet is typically an underground outlet. Costs include all equipment necessary to strip and stock pile topsoil, excavate, shape, grade and compact the Water and Sediment Control Basin, spread and replace topsoil after construction and mobilization of equipment. Seeding not included. This practice is utilized to reduce watercourse and gully erosion, trap sediment, reduce and manage onsite and downstream runoff. Sheet and rill erosion will be controlled by other conservation practices. Work is done with dozer, scraper, or road grader.

**Before Situation:**

Site has shallow topsoil which if removed by earthwork for construction of embankment will significantly impact yields. Farming fields with excessive slope length has resulted in multiple rills and/or ephemeral gullies that will continue to worsen over time. The excessive erosion may lead to deterioration of receiving waters due to excessive sedimentation and nutrient transport. Resource concern addressed includes soil erosion and water quality by trapping sediment and/or reduce erosion in a field to protect riparian areas and water bodies from sediment deposition. Surface water causes erosion and the sediment (and potentially pesticides) is being transported into the riparian areas and water bodies downstream.

**After Situation:**

Water and Sediment Control Basis is constructed with 100 CY of excavation/earthfill with dozer, scraper and/or road grader. Rill and/or gully erosion is reduced. If riser and underground outlet are needed, then include Underground Outlet (620). Include Critical Area Planting (342) where necessary to prevent erosion following construction activities.

**Feature Measure:** Cubic Yard of WASCOB Excavation

**Scenario Unit::** Cubic Yard

**Scenario Typical Size:** 100.0

**Scenario Total Cost:** $999.25

**Scenario Cost/Unit:** $9.99

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 | $2.36 | 70 | $165.20 |
| Stripping and stockpiling, topsoil | 1199 | Stripping and stockpiling of topsoil adjacent to stripping area. Includes equipment and labor. | Cubic Yard | $0.89 | 30 | $26.70 |
| 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 | $2.50 | 100 | $250.00 |
| **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 | $45.69 | 1 | $45.69 |
| **Mobilization** | | | | | | |
| Mobilization, medium equipment | 1139 | Equipment with 70-150 HP or typical weights between 14,000 and 30,000 pounds. | Each | $255.83 | 2 | $511.66 |

**Practice:** 638 - Water and Sediment Control Basin

**Scenario** #3 - WASCOB greater than or equal to 350 CY

**Scenario Description:**

Typical scenario is for excavating 700 CY to create an earthen WASCOB. Outlet is typically an underground outlet. The excavated material is used to build up an earthen embankment or combination ridge and channel generally constructed across the slope and minor watercourses to form a sediment trap and water detention basin. Work is done with excavator and/or dozer. Costs include all equipment necessary to excavate, shape, grade and compact the Water and Sediment Control Basin and mobilization of equipment. This practice is utilized to reduce watercourse and gully erosion, trap sediment, reduce and manage onsite and downstream runoff. Sheet and rill erosion will be controlled by other conservation practices.

**Before Situation:**

Farming fields with excessive slope length has resulted in multiple rills and/or ephemeral gullies that will continue to worsen over time. The excessive erosion may lead to deterioration of receiving waters due to excessive sedimentation and nutrient transport. Resource concern addressed includes soil erosion and water quality by trapping sediment and/or reduce erosion in a field to protect riparian areas and water bodies from sediment deposition. Surface water causes erosion and the sediment (and potentially pesticides) to be transported into the riparian areas and water bodies downstream.

**After Situation:**

Water and Sediment Control Basin is constructed with 700 CY of excavation/earthfill with dozer, scraper and/or road grader. Rill and/or gully erosion is reduced. If riser and underground outlet are needed, then include Underground Outlet (620). Include Critical Area Planting (342) where necessary to prevent erosion following construction activities.

**Feature Measure:** Cubic Yard of WASCOB Excavation

**Scenario Unit::** Cubic Yard

**Scenario Typical Size:** 700.0

**Scenario Total Cost:** $4,005.04

**Scenario Cost/Unit:** $5.72

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 | $2.36 | 700 | $1,652.00 |
| 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 | $2.50 | 700 | $1,750.00 |
| **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 | $45.69 | 2 | $91.38 |
| **Mobilization** | | | | | | |
| Mobilization, medium equipment | 1139 | Equipment with 70-150 HP or typical weights between 14,000 and 30,000 pounds. | Each | $255.83 | 2 | $511.66 |

**Practice:** 642 - Water Well

**Scenario** #1 - Dug Well

**Scenario Description:**

Typical construction is for the excavation of a shallow dug well. The purpose of the practice is to provide water for livestock. A typical dug well is 4 foot in diameter and 12 feet in depth. The well is excavated using a backhoe. Excavate to a depth where the water recharge is greater than the equipment can remove. Washed gravel is placed in the base of the dug opening. Concrete manhole risers are installed to hold the water. Pea gravel is placed above the washed gravel to transition to the earth backfill. The hole is backfilled and sloped to direct surface water away from entering the manhole cover.

**Before Situation:**

Livestock have insufficient water or are fenced from their water source. There is insufficient water for use in micro-irrigation.

**After Situation:**

Sufficient water is available for livestock or micro-irrigation. Utilize Pumping Plant (533), Pipeline (516), Irrigation Pipeline (430) as associated practices. Use Critical Area Seeding (342) where necessary to prevent erosion following construction activities.

**Feature Measure:** No.

**Scenario Unit::** Each

**Scenario Typical Size:** 1.0

**Scenario Total Cost:** $11,025.19

**Scenario Cost/Unit:** $11,025.19

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 | $56.05 | 6 | $336.30 |
| **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 | $25.31 | 8 | $202.48 |
| 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 | $44.37 | 6 | $266.22 |
| **Materials** | | | | | | |
| Aggregate, Gravel, Graded | 46 | Gravel, includes materials, equipment and labor to transport and place. Includes washed and unwashed gravel. | Cubic Yard | $34.75 | 3 | $104.25 |
| Test, Standard Water Test, Well Water | 309 | Well Water Suitability test. Includes materials and shipping only. | Each | $44.00 | 1 | $44.00 |
| Manhole, 4' x 4' | 1053 | Precast Manhole with base and top delivered. 4' diameter x 4' depth. Materials only. | Each | $1,670.90 | 3 | $5,012.70 |
| 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 | $38.31 | 1 | $38.31 |
| 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 | $950.26 | 5 | $4,751.30 |
| Chlorine | 1335 | Liquid chlorine bleach. Includes materials only. | Gallon | $2.76 | 5 | $13.80 |
| **Mobilization** | | | | | | |
| Mobilization, medium equipment | 1139 | Equipment with 70-150 HP or typical weights between 14,000 and 30,000 pounds. | Each | $255.83 | 1 | $255.83 |

**Practice:** 642 - Water Well

**Scenario** #2 - Shallow Well

**Scenario Description:**

Typical construction is for the installation of a well, in areas where sufficient water is known to occur within 100 feet of the ground surface. The well shall be drilled, dug, driven, bored, jetted or otherwise constructed to an aquifer for water supply. The purpose of the practice is to provide water for livestock or irrigation. An average well depth is 50 feet. Well casings is 4" in diameter. Steel casing is installed to a depth of 30 feet.

**Before Situation:**

Livestock have insufficient water or are fenced from their water source. There is insufficient water for use in micro-irrigation.

**After Situation:**

Sufficient water is available for livestock or irrigation. Utilize Pumping Plant (533), Irrigation Pipeline (430), Pipeline (516) as associated practices. Use Critical Area Seeding (342) where necessary to prevent erosion following construction activities.

**Feature Measure:** No.

**Scenario Unit::** Each

**Scenario Typical Size:** 1.0

**Scenario Total Cost:** $3,925.18

**Scenario Cost/Unit:** $3,925.18

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 | $161.60 | 0.16 | $25.86 |
| Rotary Drill Rig | 1595 | Rotary drill rig including equipment and power unit costs. Labor not included. | Hour | $339.46 | 4 | $1,357.84 |
| **Materials** | | | | | | |
| Test, Standard Water Test, Well Water | 309 | Well Water Suitability test. Includes materials and shipping only. | Each | $44.00 | 1 | $44.00 |
| 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 | $950.26 | 2 | $1,900.52 |
| Chlorine | 1335 | Liquid chlorine bleach. Includes materials only. | Gallon | $2.76 | 1 | $2.76 |
| Well Cap, 4" | 1785 | Well cap, 4". Materials only. | Each | $25.67 | 1 | $25.67 |
| Well Casing, Metal, 4" | 1809 | Steel well casing, 4". Materials only. | Foot | $8.14 | 30 | $244.20 |
| Well Screen, plastic, 4" | 1998 | 4" PVC well screen. Materials only. | Foot | $6.85 | 10 | $68.50 |
| **Mobilization** | | | | | | |
| Mobilization, medium equipment | 1139 | Equipment with 70-150 HP or typical weights between 14,000 and 30,000 pounds. | Each | $255.83 | 1 | $255.83 |

**Practice:** 642 - Water Well

**Scenario** #3 - Typical Well

**Scenario Description:**

Typical construction is for the installation of a well, in areas where sufficient water is known to occur 100 - 600 feet of the ground surface. The well shall be drilled, driven, bored, jetted or otherwise constructed to an aquifer for water supply. The purpose of the practice is to provide water for livestock or micro-irrigation. An average well depth is 400 feet. Well casings are 4-6" in diameter. Steel casing is installed to a depth of 100 feet.

**Before Situation:**

Livestock have insufficient water or are fenced from their water source. There is insufficient water for use in micro-irrigation.

**After Situation:**

Sufficient water is available for livestock or micro-irrigation. Utilize Pumping Plant (533), Irrigation Pipeline (430), and Pipeline (516) as associated practices. Use Critical Area Seeding (342) where necessary to prevent erosion following construction activities.

**Feature Measure:** No.

**Scenario Unit::** Each

**Scenario Typical Size:** 1.0

**Scenario Total Cost:** $7,010.21

**Scenario Cost/Unit:** $7,010.21

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 | $161.60 | 0.2 | $32.32 |
| Rotary Drill Rig | 1595 | Rotary drill rig including equipment and power unit costs. Labor not included. | Hour | $339.46 | 8 | $2,715.68 |
| **Materials** | | | | | | |
| Test, Standard Water Test, Well Water | 309 | Well Water Suitability test. Includes materials and shipping only. | Each | $44.00 | 1 | $44.00 |
| 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 | $950.26 | 2 | $1,900.52 |
| Chlorine | 1335 | Liquid chlorine bleach. Includes materials only. | Gallon | $2.76 | 1 | $2.76 |
| 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 | 100 | $1,414.00 |
| Well Screen, stainless steel, 6" | 1995 | 6" Stainless steel well screen. Materials only. | Foot | $61.15 | 10 | $611.50 |
| **Mobilization** | | | | | | |
| Mobilization, medium equipment | 1139 | Equipment with 70-150 HP or typical weights between 14,000 and 30,000 pounds. | Each | $255.83 | 1 | $255.83 |

**Practice:** 642 - Water Well

**Scenario** #4 - Deep Well

**Scenario Description:**

Typical construction is for the installation of a well, in areas where sufficient water is known to occur > 600 feet of the ground surface. The well shall be drilled, driven, bored, jetted or otherwise constructed to an aquifer for water supply. The purpose of the practice is to provide water for livestock or micro-irrigation. An average well depth is 800 feet. Well casings are 4-6" in diameter. Steel casing is installed to a depth of 100 feet.

**Before Situation:**

Livestock have insufficient water or are fenced from their water source. There is insufficient water for use in micro-irrigation.

**After Situation:**

Sufficient water is available for livestock or micro-irrigation. Utilize Pumping Plant (533), Irrigation Pipeline (430), and Pipeline (516) as associated practices. Use Critical Area Seeding (342) where necessary to prevent erosion following construction activities.

**Feature Measure:** No.

**Scenario Unit::** Each

**Scenario Typical Size:** 1.0

**Scenario Total Cost:** $14,890.33

**Scenario Cost/Unit:** $14,890.33

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 | $161.60 | 0.2 | $32.32 |
| Rotary Drill Rig | 1595 | Rotary drill rig including equipment and power unit costs. Labor not included. | Hour | $339.46 | 24 | $8,147.04 |
| **Materials** | | | | | | |
| Test, Standard Water Test, Well Water | 309 | Well Water Suitability test. Includes materials and shipping only. | Each | $44.00 | 1 | $44.00 |
| 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 | $950.26 | 2 | $1,900.52 |
| Chlorine | 1335 | Liquid chlorine bleach. Includes materials only. | Gallon | $2.76 | 2 | $5.52 |
| 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 | 100 | $1,414.00 |
| Well Screen, stainless steel, 6" | 1995 | 6" Stainless steel well screen. Materials only. | Foot | $61.15 | 50 | $3,057.50 |
| **Mobilization** | | | | | | |
| Mobilization, medium equipment | 1139 | Equipment with 70-150 HP or typical weights between 14,000 and 30,000 pounds. | Each | $255.83 | 1 | $255.83 |

**Practice:** 642 - Water Well

**Scenario** #5 - High Volume Shallow Well

**Scenario Description:**

Typical construction is for the installation of a well, in areas where sufficient water is known to occur within 100 feet of the ground surface. The well shall be drilled, dug, driven, bored, jetted or otherwise constructed to an aquifer for water supply. The purpose of the practice is to provide water for overhead irrigation. An average well depth is 75 feet. Well casings are ≥ 8" in diameter. Steel casing is installed to a depth of 30 feet.

**Before Situation:**

There is insufficient water for use in irrigation.

**After Situation:**

Sufficient water is available for irrigation. Utilize Pumping Plant (533) and Irrigation Pipeline (430) as associated practices. Use Critical Area Seeding (342) where necessary to prevent erosion following construction activities.

**Feature Measure:** No.

**Scenario Unit::** Each

**Scenario Typical Size:** 1.0

**Scenario Total Cost:** $6,640.48

**Scenario Cost/Unit:** $6,640.48

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 | $161.60 | 0.2 | $32.32 |
| Rotary Drill Rig | 1595 | Rotary drill rig including equipment and power unit costs. Labor not included. | Hour | $339.46 | 8 | $2,715.68 |
| **Materials** | | | | | | |
| Test, Standard Water Test, Well Water | 309 | Well Water Suitability test. Includes materials and shipping only. | Each | $44.00 | 1 | $44.00 |
| 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 | $950.26 | 2 | $1,900.52 |
| Chlorine | 1335 | Liquid chlorine bleach. Includes materials only. | Gallon | $2.76 | 1 | $2.76 |
| Well Cap, 8" | 1787 | Well cap, 8". Materials only. | Each | $50.37 | 1 | $50.37 |
| Well Casing, Metal, 8" | 1811 | Steel well casing, 8". Materials only. | Foot | $22.75 | 30 | $682.50 |
| Well Screen, stainless steel, 8" | 1819 | 8" Stainless steel well screen. Materials only. | Foot | $95.65 | 10 | $956.50 |
| **Mobilization** | | | | | | |
| Mobilization, medium equipment | 1139 | Equipment with 70-150 HP or typical weights between 14,000 and 30,000 pounds. | Each | $255.83 | 1 | $255.83 |

**Practice:** 642 - Water Well

**Scenario** #6 - High Volume Typical Well

**Scenario Description:**

Typical construction is for the installation of a well, in areas where sufficient water is known to occur 100 - 600 feet of the ground surface. The well shall be drilled, driven, bored, jetted or otherwise constructed to an aquifer for water supply. The purpose of the practice is to provide water for livestock or micro-irrigation. An average well depth is 400 feet. Well casings are ≥ 8" in diameter. Steel casing is installed to a depth of 100 feet.

**Before Situation:**

There is insufficient water for use in irrigation.

**After Situation:**

Sufficient water is available for irrigation. Utilize Pumping Plant (533) and Irrigation Pipeline (430) as associated practices. Use Critical Area Seeding (342) where necessary to prevent erosion following construction activities.

**Feature Measure:** No.

**Scenario Unit::** Each

**Scenario Typical Size:** 1.0

**Scenario Total Cost:** $10,948.66

**Scenario Cost/Unit:** $10,948.66

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 | $161.60 | 0.2 | $32.32 |
| Rotary Drill Rig | 1595 | Rotary drill rig including equipment and power unit costs. Labor not included. | Hour | $339.46 | 16 | $5,431.36 |
| **Materials** | | | | | | |
| Test, Standard Water Test, Well Water | 309 | Well Water Suitability test. Includes materials and shipping only. | Each | $44.00 | 1 | $44.00 |
| 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 | $950.26 | 2 | $1,900.52 |
| Chlorine | 1335 | Liquid chlorine bleach. Includes materials only. | Gallon | $2.76 | 1 | $2.76 |
| Well Cap, 8" | 1787 | Well cap, 8". Materials only. | Each | $50.37 | 1 | $50.37 |
| Well Casing, Metal, 8" | 1811 | Steel well casing, 8". Materials only. | Foot | $22.75 | 100 | $2,275.00 |
| Well Screen, stainless steel, 8" | 1819 | 8" Stainless steel well screen. Materials only. | Foot | $95.65 | 10 | $956.50 |
| **Mobilization** | | | | | | |
| Mobilization, medium equipment | 1139 | Equipment with 70-150 HP or typical weights between 14,000 and 30,000 pounds. | Each | $255.83 | 1 | $255.83 |

**Practice:** 642 - Water Well

**Scenario** #7 - High Volume Deep Well

**Scenario Description:**

Typical construction is for the installation of a well, in areas where sufficient water is known to occur > 600 feet of the ground surface. The well shall be drilled, driven, bored, jetted or otherwise constructed to an aquifer for water supply. The purpose of the practice is to provide water for livestock or micro-irrigation. An average well depth is 800 feet. Well casings are ≥ 8" in diameter. Steel casing is installed to a depth of 100 feet.

**Before Situation:**

There is insufficient water for use in irrigation.

**After Situation:**

Sufficient water is available for irrigation. Utilize Pumping Plant (533) and Irrigation Pipeline (430) as associated practices. Use Critical Area Seeding (342) where necessary to prevent erosion following construction activities.

**Feature Measure:** No.

**Scenario Unit::** Each

**Scenario Typical Size:** 1.0

**Scenario Total Cost:** $22,921.70

**Scenario Cost/Unit:** $22,921.70

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 | $161.60 | 0.2 | $32.32 |
| Rotary Drill Rig | 1595 | Rotary drill rig including equipment and power unit costs. Labor not included. | Hour | $339.46 | 40 | $13,578.40 |
| **Materials** | | | | | | |
| Test, Standard Water Test, Well Water | 309 | Well Water Suitability test. Includes materials and shipping only. | Each | $44.00 | 1 | $44.00 |
| 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 | $950.26 | 2 | $1,900.52 |
| Chlorine | 1335 | Liquid chlorine bleach. Includes materials only. | Gallon | $2.76 | 1 | $2.76 |
| Well Cap, 8" | 1787 | Well cap, 8". Materials only. | Each | $50.37 | 1 | $50.37 |
| Well Casing, Metal, 8" | 1811 | Steel well casing, 8". Materials only. | Foot | $22.75 | 100 | $2,275.00 |
| Well Screen, stainless steel, 8" | 1819 | 8" Stainless steel well screen. Materials only. | Foot | $95.65 | 50 | $4,782.50 |
| **Mobilization** | | | | | | |
| Mobilization, medium equipment | 1139 | Equipment with 70-150 HP or typical weights between 14,000 and 30,000 pounds. | Each | $255.83 | 1 | $255.83 |

**Practice:** 642 - Water Well

**Scenario** #64 - 4" cased

**Scenario Description:**

Typical construction is for the installation of a well, in areas where sufficient water is known to occur within 100 feet of the ground surface. The well shall be drilled, dug, driven, bored, jetted or otherwise constructed to an aquifer for water supply. The purpose of the practice is to provide water for livestock or irrigation. An average well depth is 250 feet. Well casings are 4" in diameter. Steel casing is installed to a depth of 110 feet.

**Before Situation:**

Livestock have insufficient water or are fenced from their water source. There is insufficient water for use in micro-irrigation.

**After Situation:**

Install a 250' deep well with 110' of 4" casing. Casing grouted to seal out surface water. Sufficient water is available for livestock or irrigation. Utilize Pumping Plant (533) and Pipeline (516) as associated practices. Use Critical Area Seeding (342) where necessary to prevent erosion following construction activities.

**Feature Measure:** Total depth of well

**Scenario Unit::** Linear Foot

**Scenario Typical Size:** 250.0

**Scenario Total Cost:** $6,111.20

**Scenario Cost/Unit:** $24.44

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 | $339.46 | 6 | $2,036.76 |
| **Materials** | | | | | | |
| Test, Standard Water Test, Well Water | 309 | Well Water Suitability test. Includes materials and shipping only. | Each | $44.00 | 1 | $44.00 |
| 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 | $950.26 | 3 | $2,850.78 |
| Chlorine | 1335 | Liquid chlorine bleach. Includes materials only. | Gallon | $2.76 | 1 | $2.76 |
| Well Cap, 4" | 1785 | Well cap, 4". Materials only. | Each | $25.67 | 1 | $25.67 |
| Well Casing, Metal, 4" | 1809 | Steel well casing, 4". Materials only. | Foot | $8.14 | 110 | $895.40 |
| **Mobilization** | | | | | | |
| Mobilization, medium equipment | 1139 | Equipment with 70-150 HP or typical weights between 14,000 and 30,000 pounds. | Each | $255.83 | 1 | $255.83 |

**Practice:** 642 - Water Well

**Scenario** #65 - Typical Well, 6"

**Scenario Description:**

Typical construction is for the installation of a well, in areas where sufficient water is known to occur 100 - 600 feet of the ground surface. The well shall be drilled, dug, driven, bored, jetted or otherwise constructed to an aquifer for water supply. The purpose of the practice is to provide water for livestock or micro- irrigation. An average well depth is 400 feet. Well casings are 4-6" in diameter. Steel casing is installed to a depth of 150 feet.

**Before Situation:**

Livestock have insufficient water or are fenced from their water source. There is insufficient water for use in micro-irrigation.

**After Situation:**

Install a 400' deep well with 150' of 6" casing. Casing grouted to seal out surface water. Sufficient water is available for livestock or micro-irrigation. Utilize Pumping Plant (533) and Pipeline (516) as associated practices. Use Critical Area Seeding (342) where necessary to prevent erosion following construction activities

**Feature Measure:** Total depth of well

**Scenario Unit::** Linear Foot

**Scenario Typical Size:** 400.0

**Scenario Total Cost:** $9,985.32

**Scenario Cost/Unit:** $24.96

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 | $339.46 | 8 | $2,715.68 |
| **Materials** | | | | | | |
| Test, Standard Water Test, Well Water | 309 | Well Water Suitability test. Includes materials and shipping only. | Each | $44.00 | 1 | $44.00 |
| 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 | $950.26 | 5 | $4,751.30 |
| Chlorine | 1335 | Liquid chlorine bleach. Includes materials only. | Gallon | $2.76 | 1 | $2.76 |
| 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 | 150 | $2,121.00 |
| Well Screen, stainless steel, 6" | 1995 | 6" Stainless steel well screen. Materials only. | Foot | $61.15 | 1 | $61.15 |
| **Mobilization** | | | | | | |
| Mobilization, medium equipment | 1139 | Equipment with 70-150 HP or typical weights between 14,000 and 30,000 pounds. | Each | $255.83 | 1 | $255.83 |

**Practice:** 642 - Water Well

**Scenario** #67 - High Volume Typical Well, 8" or greater

**Scenario Description:**

Typical construction is for the installation of a well, in areas where sufficient water is known to occur 100 - 600 feet of the ground surface. The well shall be drilled, dug, driven, bored, jetted or otherwise constructed to an aquifer for water supply. The purpose of the practice is to provide water for livestock or micro- irrigation.

**Before Situation:**

There is insufficient water for use in irrigation.

**After Situation:**

A well is drilled with 150' feet of 8" casing and a total depth of 500'. Sufficient water is available for livestock or micro-irrigation. Utilize Pumping Plant (533) and Pipeline (516) as associated practices. Use Critical Area Seeding (342) where necessary to prevent erosion following construction activities.

**Feature Measure:** Total depth of well

**Scenario Unit::** Linear Foot

**Scenario Typical Size:** 500.0

**Scenario Total Cost:** $21,280.00

**Scenario Cost/Unit:** $42.56

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 | $339.46 | 32 | $10,862.72 |
| **Materials** | | | | | | |
| Test, Standard Water Test, Well Water | 309 | Well Water Suitability test. Includes materials and shipping only. | Each | $44.00 | 1 | $44.00 |
| 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 | $950.26 | 7 | $6,651.82 |
| Chlorine | 1335 | Liquid chlorine bleach. Includes materials only. | Gallon | $2.76 | 1 | $2.76 |
| Well Cap, 8" | 1787 | Well cap, 8". Materials only. | Each | $50.37 | 1 | $50.37 |
| Well Casing, Metal, 8" | 1811 | Steel well casing, 8". Materials only. | Foot | $22.75 | 150 | $3,412.50 |
| **Mobilization** | | | | | | |
| Mobilization, medium equipment | 1139 | Equipment with 70-150 HP or typical weights between 14,000 and 30,000 pounds. | Each | $255.83 | 1 | $255.83 |

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

**Scenario** #1 - Rare or Declining Habitat Monitoring and Management, Oyster Reef Habitat Monitoring Medium

**Scenario Description:**

This scenario is for monitoring the progress of native oyster reef restoration to make recommendations on adaptive management to improved the restored habitat. Monitoring will include temperature, salinity, dissolved oxygen, substrate type, submerged vegetation, oyster survival rates and other data listed in Conservation Practice Job Sheet -Oyster Monitoring. Reef habitats will be monitored twice per season. A boat will be required to gain access to the site and diving may be required to collect the required data. All information will be documented on the data collection sheets provided.

**Before Situation:**

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

**After Situation:**

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

**Feature Measure:** Monitoring efforts and adaptive m

**Scenario Unit::** Each

**Scenario Typical Size:** 1.0

**Scenario Total Cost:** $2,244.92

**Scenario Cost/Unit:** $2,244.92

Cost Details:

| Component Name | ID | Description | Unit | Cost | QTY | Total |
|---|---|---|---|---|---|---|
| **Equipment Installation** | | | | | | |
| Boat, 150 HP | 2407 | 22 foot boat with 150hp motor used to place cultch to create reef habitat. | Hour | $172.77 | 4 | $691.08 |
| **Labor** | | | | | | |
| Skilled Labor | 230 | Labor requiring a high level skill set: Includes carpenters, welders, electricians, conservation professionals involved with data collection, monitoring, and or record keeping, etc. | Hour | $41.76 | 16 | $668.16 |
| 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 | $110.71 | 8 | $885.68 |

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

**Scenario** #2 - Habitat Monitoring and Management, High Intensity and Complexity-Year 1

**Scenario Description:**

This scenario is for monitoring the progress of native oyster reef restoration to make recommendations on adaptive management to improved the restored habitat. This is for Year 1 after 0.025 acres is restored. Monitoring will include temperature, salinity, dissolved oxygen, substrate type, submerged vegetation, oyster survival rates and other data listed in Conservation Practice Job Sheet -Oyster Monitoring. Additional disease monitoring will be completed annually to determine if specific diseases are impacting the reef organisms .Reef habitats will be monitored twice per season (Disease monitoring only once). A boat will be required to gain access to the site and diving may be required to collect the required data. All information will be documented on the data collection sheets provided.

**Before Situation:**

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

**After Situation:**

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

**Feature Measure:** Monitoring efforts and adaptive m

**Scenario Unit::** Each

**Scenario Typical Size:** 1.0

**Scenario Total Cost:** $5,371.62

**Scenario Cost/Unit:** $5,371.62

Cost Details:

| Component Name | ID | Description | Unit | Cost | QTY | Total |
|---|---|---|---|---|---|---|
| **Equipment Installation** | | | | | | |
| Boat, 150 HP | 2407 | 22 foot boat with 150hp motor used to place cultch to create reef habitat. | Hour | $172.77 | 8 | $1,382.16 |
| **Labor** | | | | | | |
| Skilled Labor | 230 | Labor requiring a high level skill set: Includes carpenters, welders, electricians, conservation professionals involved with data collection, monitoring, and or record keeping, etc. | Hour | $41.76 | 16 | $668.16 |
| 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 | $110.71 | 30 | $3,321.30 |

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

**Scenario** #3 - Development of Shallow Micro-Topographic Features with Normal Farming Equipment.

**Scenario Description:**

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

**Before Situation:**

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

**After Situation:**

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

**Feature Measure:** hours of tractor use

**Scenario Unit::** Acre

**Scenario Typical Size:** 20.0

**Scenario Total Cost:** $829.58

**Scenario Cost/Unit:** $41.48

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 | $16.60 | 20 | $332.00 |
| Tractor, agricultural, 120 HP | 962 | Agricultural tractor with horsepower range of 90 to 140. Equipment and power unit costs. Labor not included. | Hour | $57.70 | 6 | $346.20 |
| **Labor** | | | | | | |
| Equipment Operators, Light | 232 | Includes: Skid Steer Loaders, Hydraulic Excavators <50 HP, Trenchers <12", Ag Equipment <150 HP, Pickup Trucks, Forklifts, Mulchers | Hour | $25.23 | 6 | $151.38 |

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

**Scenario** #4 - Development of Deep Micro-Topographic Features with Heavy Equipment.

**Scenario Description:**

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

**Before Situation:**

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

**After Situation:**

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

**Feature Measure:** Hours

**Scenario Unit::** Acre

**Scenario Typical Size:** 20.0

**Scenario Total Cost:** $2,340.31

**Scenario Cost/Unit:** $117.02

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 | $194.15 | 6 | $1,164.90 |
| Tillage, Primary | 946 | Includes heavy disking (offset) or chisel plow. Includes equipment, power unit and labor costs. | Acre | $16.60 | 20 | $332.00 |
| **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 | $44.37 | 8 | $354.96 |
| **Mobilization** | | | | | | |
| Mobilization, large equipment | 1140 | Equipment >150HP or typical weights greater than 30,000 pounds or loads requiring over width or over length permits. | Each | $488.45 | 1 | $488.45 |

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

**Scenario** #5 - Vernal Pool Creation

**Scenario Description:**

Creation of vernal pools to provide breeding habitats for amphibian species that are in decline. Vernal pools are usually located in forested landscapes. Vernal pools are usually 0.1-0.5 acres in size. Woody debris may be added to the vernal pools to improve the habitat. Resource concerns include Inadequate Cover/Shelter. Practice 643 is being used in lieu of Wetland Creation because a vernal pool may not support permanent wetland vegetation. Associated practices include: 390 Riparian Herbaceous Cove, 460 Land Clearing.

**Before Situation:**

Forested landscape has limited number of vernal pools. Surrounding lands have been developed resulting in a decrease number of sites for amphibian breeding. Lack of breeding has caused a decrease in amphibian populations.

**After Situation:**

A vernal pool is create which provides additional cover/shelter for breeding amphibians. The amphibian population increase in the area of the vernal pool.

**Feature Measure:** <Unknown>

**Scenario Unit::** Acre

**Scenario Typical Size:** 0.0

**Scenario Total Cost:** $2,709.78

**Scenario Cost/Unit:** #Div/0!

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 | $124.03 | 9 | $1,116.27 |
| Chainsaw | 937 | Equipment and power unit costs. Labor not included. | Hour | $4.37 | 5 | $21.85 |
| **Labor** | | | | | | |
| Skilled Labor | 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 | $41.76 | 12 | $501.12 |
| 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 | $44.37 | 9 | $399.33 |
| Supervisor 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 | $45.69 | 4 | $182.76 |
| **Mobilization** | | | | | | |
| Mobilization, large equipment | 1140 | Equipment >150HP or typical weights greater than 30,000 pounds or loads requiring over width or over length permits. | Each | $488.45 | 1 | $488.45 |

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

**Scenario** #6 - Flash Grazing for Bog Turtle Habitat Restoration

**Scenario Description:**

Landowners with habitat for Bog Turtles complete flash grazing to promote restoration and management of these habitats. This is usually carried out annually. Livestock are temporarily allowed to graze the habitat area. Stocking is 0.75 AU/Acre. A Biologist is required to locate all existing bog turtles and relocate during the flash grazing. Livestock are transported to the site for the grazing. Normally use cattle, sheep or goats depending on the availability of the livestock for grazing and the type of vegetation being grazed. Associated practices include: 472 Access Control. Resource Concerns include inadequate fish and wildlife habitat.

**Before Situation:**

Bog Turtle habitat is degraded due to an overgrowth of woody vegetation. The areas do not provide the necessary habitat to fully support the Bog Turtle.

**After Situation:**

After flash grazing the habitat regenerate to vegetation and a structure that is beneficial to the Bog Turtle.

**Feature Measure:** <Unknown>

**Scenario Unit::** Acre

**Scenario Typical Size:** 2.0

**Scenario Total Cost:** $1,580.28

**Scenario Cost/Unit:** $790.14

Cost Details:

| Component Name | ID | Description | Unit | Cost | QTY | Total |
|---|---|---|---|---|---|---|
| **Equipment Installation** | | | | | | |
| Truck, Pickup | 939 | Equipment and power unit costs. Labor not included. | Hour | $21.79 | 4 | $87.16 |
| **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 | $25.31 | 24 | $607.44 |
| Specialist Labor | 235 | Labor requiring a specialized skill set: Includes Agronomists, Foresters, Biologists, etc. to provide additional technical information during the planning and implementation of the practice. Does not include NRCS or TSP services. | Hour | $110.71 | 8 | $885.68 |

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

**Scenario** #7 - Reef Creation-Live Oysters and Cultch

**Scenario Description:**

Spat on Shell: 1 million oyster larvae are grown in an aquaculture facility on shell which are then placed on top of shell to improve the amount of living animals in order to improve regeneration of the developed or restored reef. Each setting will require 45 fish totes (0.11 cubic yards per tote). Shell will be placed in bags and transported to the aquaculture facility. Approximately 1 million larvae are added to the tank and they set on the shells. The oysters are set in the tanks for 7-10 days. The bags are then place in the coastal ponds or estuaries until oysters grow to greater than or equal to 1 ".. The oysters are placed on beds created from clean shell (45 totes 5 yards of clean shell average of 2"). The following process is used: 1. Collect shell for bagging-2 people for 2 days, 300 bags. (16 hours) 2. Spat on Shell includes setting, and transportation. ARC sets oysters goal is to plant ½ million at 1 inch or greater. In tank for 7-10 days. 3. Go back and pick up oysters. 1 day trucking 2 persons. Then bring out to area to grow out. 4 hours boat time plus 3 workers. 4. Oysters are grown out over June-October, normally 8 hours per week, 2 people. Boat time would be approximately 4 hours per week. 5. Place cultch on bottom. 5 yards or 3.5 tons of cultch (45 totes). 9 totes in a yard. 8 hours with boat, 4 laborers(32 hours) ( 3.5 tons of cultch are used to build the reef base prior to deployment of live oysters. 6. Oysters placed on cultch. 8 hours with boat, 4 laborers(32 hours) 7. Additional gear to grow out. Additional grow out bags 500-600. $5.50 per bag, each cage holds 5-6 bags, $12,000. 3 years is $4,000 per year. 8. Oyster shell, $1,500 per 300 bags. Scenario id based on 90 fish totes.

**Before Situation:**

Coastal estuaries and coastal ponds are lacking beneficial oyster beds. The oyster beds have been degraded or eliminated due to poor water quality, weather events, or disease. Beds have limited population of oysters or lack any oysters. This limits the natural regeneration of the beds. The lack of or decrease in oyster beds limits wildlife food and cover. Water quality is decrease due to a lack of filtering by the oysters.

**After Situation:**

The biological and structural components of the oyster beds are restored. These populated oysters can continue to re-seed the bed, as well as, surrounding beds. Native wildlife habitat is increased. There is an increase in both food and cover for native wildlife. Oysters that set on the beds provide increased water quality by additional filtering of the water.

**Feature Measure:** Totes

**Scenario Unit::** Each

**Scenario Typical Size:** 90.0

**Scenario Total Cost:** $31,907.26

**Scenario Cost/Unit:** $354.53

Cost Details:

| Component Name | ID | Description | Unit | Cost | QTY | Total |
|---|---|---|---|---|---|---|
| **Equipment Installation** | | | | | | |
| Truck, Pickup | 939 | Equipment and power unit costs. Labor not included. | Hour | $21.79 | 8 | $174.32 |
| Boat, 150 HP | 2407 | 22 foot boat with 150hp motor used to place cultch to create reef habitat. | Hour | $172.77 | 96 | $16,585.92 |
| **Labor** | | | | | | |
| General Labor | 231 | Labor performed using basic tools such as power tool, shovels, and other tools that do not require extensive training. Ex. pipe layer, herder, concrete placement, materials spreader, flagger, etc. | Hour | $25.31 | 220 | $5,568.20 |
| 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 | $110.71 | 48 | $5,314.08 |
| **Materials** | | | | | | |
| Cultch | 2409 | Cultch material (used and/or slightly crushed, cleaned, medium to large sized shells). Includes materials only. | Ton | $67.82 | 7 | $474.74 |
| Hatchery Seed Oysters | 2635 | Hatchery produced oyster seed with spat grown to 1" to 2" for Oyster Reef Restoration. Component unit "Each" refers to 1,000 count. Includes materials and shipping from hatchery to dockside. | Each | $3.79 | 1000 | $3,790.00 |

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

**Scenario** #8 - Creation of Oyster Reef Coastal Pond

**Scenario Description:**

Oyster reef are restored in shallow coastal pond or bays. These areas have limited access. Oyster reefs are created using clean cultch that is purchased from local shellfish processing plants. The typical unit size is 1100 square feet. Clean shell is placed in totes and loaded on boats to be taken to the reef restoration location. Shell is place using manual labor on pre-selected sites. Volume of shell is usually 40 yards per 1/10 acre or 10 yards per 1100 square feet. Shell is place in linear or concentric piles.

**Before Situation:**

Coastal estuaries and coastal ponds are lacking beneficial oyster beds. The oyster beds have been degraded or eliminated due to poor water quality, weather events, or disease. Beds have limited population of oysters or lack any oysters. This limits the natural regeneration of the beds. The lack of or decrease in oyster beds limits wildlife food and cover. Water quality is decrease due to a lack of filtering by the oysters.

**After Situation:**

The biological and structural components of the oyster beds are restored. These populated oysters can continue to re-seed the bed, as well as, surrounding beds. Native wildlife habitat is increased. There is an increase in both food and cover for native wildlife. Oysters that set on the beds provide increased water quality by additional filtering of the water.

**Feature Measure:** Totes

**Scenario Unit::** Each

**Scenario Typical Size:** 90.0

**Scenario Total Cost:** $6,423.56

**Scenario Cost/Unit:** $71.37

Cost Details:

| Component Name | ID | Description | Unit | Cost | QTY | Total |
|---|---|---|---|---|---|---|
| **Equipment Installation** | | | | | | |
| Truck, Pickup | 939 | Equipment and power unit costs. Labor not included. | Hour | $21.79 | 4.5 | $98.06 |
| Boat, 150 HP | 2407 | 22 foot boat with 150hp motor used to place cultch to create reef habitat. | Hour | $172.77 | 12 | $2,073.24 |
| **Labor** | | | | | | |
| Skilled Labor | 230 | Labor requiring a high level skill set: Includes carpenters, welders, electricians, conservation professionals involved with data collection, monitoring, and or record keeping, etc. | Hour | $41.76 | 4 | $167.04 |
| 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 | $25.31 | 56 | $1,417.36 |
| Supervisor or Manager | 234 | Labor involving supervision or management activities. Includes crew supervisors, foremen and farm/ranch managers time required for adopting new technology, etc. | Hour | $45.69 | 48 | $2,193.12 |
| **Materials** | | | | | | |
| Cultch | 2409 | Cultch material (used and/or slightly crushed, cleaned, medium to large sized shells). Includes materials only. | Ton | $67.82 | 7 | $474.74 |

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

**Scenario** #9 - Oyster Reef Barge Crane

**Scenario Description:**

Restoration of native oyster beds by placing oyster shells to form beds in coastal estuaries or coastal ponds. Typically requires 100 tons of shells placed on the bottom of the coastal estuary. The shell is transported to the site via a barge. The transportation and placement of the shell usually takes three days. Normally 100 tons of oyster or clam shell is dried over winter to remove disease and placed on the bottom in strategic locations based on bathymetric positions in the estuary. The shell creates habitat for both the oysters and other native wildlife.

**Before Situation:**

Coastal estuaries and coastal ponds are lacking beneficial oyster beds. The oyster beds have been degraded or eliminated due to poor water quality, weather events, or disease. The lack of or decrease in oyster beds limits wildlife food and cover. Water quality is decrease due to a lack of filtering by the oysters

**After Situation:**

The structural components of the oyster beds are restored. These beds can be seeded by native oyster population. Native wildlife habitat is increased. There is an increase in both food and cover for native wildlife. Oysters that set on the beds provide increased water quality by additional filtering of the water.

**Feature Measure:** <Unknown>

**Scenario Unit::** Acre

**Scenario Typical Size:** 1.0

**Scenario Total Cost:** $20,164.57

**Scenario Cost/Unit:** $20,164.57

Cost Details:

| Component Name | ID | Description | Unit | Cost | QTY | Total |
|---|---|---|---|---|---|---|
| **Equipment Installation** | | | | | | |
| Track Loader, 95HP | 935 | Equipment and power unit costs. Labor not included. | Hour | $88.16 | 8 | $705.28 |
| Barge with crane and operator | 2408 | Barge to transport and place 1 ton bags of cultch to form oyster reef habitat. | Hour | $391.03 | 27 | $10,557.81 |
| **Labor** | | | | | | |
| General Labor | 231 | Labor performed using basic tools such as power tool, shovels, and other tools that do not require extensive training. Ex. pipe layer, herder, concrete placement, materials spreader, flagger, etc. | Hour | $25.31 | 35 | $885.85 |
| Supervisor or Manager | 234 | Labor involving supervision or management activities. Includes crew supervisors, foremen and farm/ranch managers time required for adopting new technology, etc. | Hour | $45.69 | 27 | $1,233.63 |
| **Materials** | | | | | | |
| Cultch | 2409 | Cultch material (used and/or slightly crushed, cleaned, medium to large sized shells). Includes materials only. | Ton | $67.82 | 100 | $6,782.00 |

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

**Scenario** #18 - Oyster Reef Monitoring Year 1

**Scenario Description:**

This scenario is for monitoring the progress of native oyster reef restoration after year 1. This will assists to make recommendations on adaptive management to improved the restored habitat. This will be used after 1100 square feet of reef is restored. This will require collecting 20 quadrats of data on the reef. Monitoring will include temperature, salinity, dissolved oxygen, substrate type, submerged vegetation, oyster survival rates and other data listed in Conservation Practice Job Sheet -Oyster Monitoring. Reef habitats will be monitored twice per season. A boat will be required to gain access to the site and diving may be required to collect the required data. All information will be documented on the data collection sheets provided.

**Before Situation:**

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

**After Situation:**

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

**Feature Measure:** Monitoring efforts and adaptive m

**Scenario Unit::** Each

**Scenario Typical Size:** 1.0

**Scenario Total Cost:** $2,936.00

**Scenario Cost/Unit:** $2,936.00

Cost Details:

| Component Name | ID | Description | Unit | Cost | QTY | Total |
|---|---|---|---|---|---|---|
| **Equipment Installation** | | | | | | |
| Boat, 150 HP | 2407 | 22 foot boat with 150hp motor used to place cultch to create reef habitat. | Hour | $172.77 | 8 | $1,382.16 |
| **Labor** | | | | | | |
| Skilled Labor | 230 | Labor requiring a high level skill set: Includes carpenters, welders, electricians, conservation professionals involved with data collection, monitoring, and or record keeping, etc. | Hour | $41.76 | 16 | $668.16 |
| 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 | $110.71 | 8 | $885.68 |

**Practice:** 644 - Wetland Wildlife Habitat Management

**Scenario** #2 - Creation of Turtle Nesting Habitat

**Scenario Description:**

The creation of turtle nesting habitat through a combination of the following activities: clearing vegetation, stripping loam, and scarifying the soil.. Usually in Upland areas (suitable for turtle nesting habitat) that are adjacent to wetlands, rivers, lakes and streams. This provides benefits for Fish and Wildlife: Inadequate Space.

**Before Situation:**

Areas adjacent to wetland, rivers, lakes and streams do not have adequate turtle nesting habitat. Turtles have to travel excessive distances to find nesting sites. This situation can increase the mortality of the local population and impact the repopulation of the species.

**After Situation:**

Turtle nesting habits is created adjacent to wetland, rivers, lakes and streams. Turtles are less likely to be killed crossing roads and by predation. The typical sixe of the installed practice is 1.0 acres.

**Feature Measure:** <Unknown>

**Scenario Unit::** Acre

**Scenario Typical Size:** 0.0

**Scenario Total Cost:** $2,396.61

**Scenario Cost/Unit:** #Div/0!

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 | $194.15 | 8 | $1,553.20 |
| **Labor** | | | | | | |
| Equipment Operators, Heavy | 233 | Includes: Cranes, Hydraulic Excavators >=50 HP, Dozers, Paving Machines, Rock Trenchers, Trenchers >=12", Dump Trucks, Ag Equipment >=150 HP, Scrapers, Water Wagons. | Hour | $44.37 | 8 | $354.96 |
| **Mobilization** | | | | | | |
| Mobilization, large equipment | 1140 | Equipment >150HP or typical weights greater than 30,000 pounds or loads requiring over width or over length permits. | Each | $488.45 | 1 | $488.45 |

**Practice:** 645 - Upland Wildlife Habitat Management

**Scenario** #1 - Mast/Apple Tree Release

**Scenario Description:**

Releasing individual Hardwood/Apple trees for mast, by reducing stocking and cutting undesirable competing species.

**Before Situation:**

Apple trees are being overtopped by other trees and plant productivity, health and vigor are negatively effected which limits flowering and fruit production. Food resources on the property are not meeting client's objectives for wildlife habitat. Healthy but suppressed trees will be retained while competing trees (with competing canopies) will be removed giving free growing space and full sunlight to the apple trees. There is limited herbaceous and woody seedlings/saplings regenerating under the apple trees further limiting food and cover.

**After Situation:**

Typical approach is to release individual trees from competition on 1 acre of land. Tools include chainsaw, brush saws, and bow saws. Trees competing with apple trees have been cut down so that there is sunlight on the apple tree for most of the day. The increase in sunlight will increase productivity, health and vigor of the apple tree stimulating future flowering and fruiting potential. Where larger trees are removed, there is also a flush of understory and forb/grass growth in the opening providing food and cover.

**Feature Measure:** Number of Trees Released

**Scenario Unit::** Each

**Scenario Typical Size:** 20.0

**Scenario Total Cost:** $423.35

**Scenario Cost/Unit:** $21.17

Cost Details:

| Component Name | ID | Description | Unit | Cost | QTY | Total |
|---|---|---|---|---|---|---|
| **Equipment Installation** | | | | | | |
| Chainsaw | 937 | Equipment and power unit costs. Labor not included. | Hour | $4.37 | 10 | $43.70 |
| **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 | $25.31 | 15 | $379.65 |

**Practice:** 645 - Upland Wildlife Habitat Management

**Scenario** #2 - Snags

**Scenario Description:**

Create 8 snags by double girdling selected trees. Poor quality or deformed trees, such as those with broken tops or large branches, will be chosen for snags when available.

**Before Situation:**

Forest stands do not have a mix of dead wood among the growing trees. Cavity nesting birds and other wildlife species that use standing dead trees for shelter are declining in the vicinity due to insufficient cover.

**After Situation:**

8 snags per acre are created by double-girdling the selected trees in the stand. Snags provide habitat to innumerable organisms including fungi, insects and other invertebrates, and land animals such as amphibians, reptiles, birds, and mammals. Resource concerns for Wildlife-Insufficient nesting habitat is addressed.

**Feature Measure:** Number of snags

**Scenario Unit::** Each

**Scenario Typical Size:** 8.0

**Scenario Total Cost:** $84.67

**Scenario Cost/Unit:** $10.58

Cost Details:

| Component Name | ID | Description | Unit | Cost | QTY | Total |
|---|---|---|---|---|---|---|
| **Equipment Installation** | | | | | | |
| Chainsaw | 937 | Equipment and power unit costs. Labor not included. | Hour | $4.37 | 2 | $8.74 |
| **Labor** | | | | | | |
| General Labor | 231 | Labor performed using basic tools such as power tool, shovels, and other tools that do not require extensive training. Ex. pipe layer, herder, concrete placement, materials spreader, flagger, etc. | Hour | $25.31 | 3 | $75.93 |

**Practice:** 645 - Upland Wildlife Habitat Management

**Scenario** #4 - Grassland Bird Management

**Scenario Description:**

This scenario involves the monitoring and adaptive management related to a change in the mowing regime on productive hayland by ensuring an early hay cut in mid to late May followed by a delay in the second cut of 65 days. Transects are walked to observe ground nesting birds. Three transects will be run per 20 acres. Monitoring efforts (n=3) are conducted two weeks apart. Observation of nesting are documented on a job-sheet. Haying is delayed until no nest are observed during the monitoring efforts. A third cut is allowed. Research has shown that implementing this management on intensely managed hayfields will provide nearly the same productivity for grassland songbirds as a hayfield not mowed until August 1st. Facilitating practice include 315 Herbaceous Weed Control and 511 Forage Harvest Management. Resource concerns include Wildlife: food and cover.

**Before Situation:**

Typical setting for this practice is agricultural dominated landscapes with large fields. These agricultural landscapes, and other large grass areas such as airports or preserves, are often the most desirable areas for grassland birds in the Northeast. Breeding success for grassland songbirds on intensively managed hayfields (3-4 cuts per summer) is nearly non-existent as the time period between mowings is too short for successful nesting. Through mowing the nests are destroyed or cover is removed making them vulnerable to predation by crows, ring-billed gulls and other predators. The reduction in nesting sites and nest success reduces the population of grassland nesting birds.

**After Situation:**

Providing this 65 day period without cutting the field provides grassland birds with good nesting habitat to breed and successfully fledge young.

**Feature Measure:** <Unknown>

**Scenario Unit::** Acre

**Scenario Typical Size:** 20.0

**Scenario Total Cost:** $1,846.79

**Scenario Cost/Unit:** $92.34

Cost Details:

| Component Name | ID | Description | Unit | Cost | QTY | Total |
|---|---|---|---|---|---|---|
| **Foregone Income** | | | | | | |
| FI, Hay, General Grass | 2122 | General Grass Hay is Primary Land Use | Ton | $42.52 | 20 | $850.40 |
| **Labor** | | | | | | |
| Specialist Labor | 235 | Labor requiring a specialized skill set: Includes Agronomists, Foresters, Biologists, etc. to provide additional technical information during the planning and implementation of the practice. Does not include NRCS or TSP services. | Hour | $110.71 | 9 | $996.39 |

**Practice:** 647 - Early Successional Habitat Development/Management

**Scenario** #1 - Mowing

**Scenario Description:**

This scenario address inadequate habitat for fish and wildlife where setting back succession by mowing incoming woody species will improve habitat for the target species. Mowing can be used to increase structural diversity by creating areas of shorter vegetation preferred by some species or certain life stages of species. The typical setting for this scenario is woodlands and shrublands at the edge of crop fields, in pastures, hayland, at the edge of woodlands or brushy areas, and in odd areas such as pivot corners. Where chemical control of weeds, including invasives, is required to reduce competition for the desired plant community conservation practice 315 herbaceous weed control should be used. Where the seedbank is inadequate for natural regeneration and seeding is required use conservation practice 327 Conservation Cover.

**Before Situation:**

The site is static or trending to later successional plant community. The disturbance regime to maintain an earlier successional plant community is lacking. Pastures are often monotypic, lacking in diversity. Competition for sunlight from dense grass stands prevents seedling establishment. Stands are often dense and inhibit the movements of young wildlife such as game bird chicks. Area lacks diversity in the height of vegetation.

**After Situation:**

Early successional habitat maintained. Mowing has provided more sun light for forb establishment. The heterogeneity of the habitat structure has been increased.

**Feature Measure:** width and length of treated area

**Scenario Unit::** Acre

**Scenario Typical Size:** 5.0

**Scenario Total Cost:** $557.77

**Scenario Cost/Unit:** $111.55

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 | $51.91 | 5 | $259.55 |
| **Labor** | | | | | | |
| Equipment Operators, Light | 232 | Includes: Skid Steer Loaders, Hydraulic Excavators <50 HP, Trenchers <12", Ag Equipment <150 HP, Pickup Trucks, Forklifts, Mulchers | Hour | $25.23 | 5 | $126.15 |
| **Mobilization** | | | | | | |
| Mobilization, small equipment | 1138 | Equipment <70 HP but can't be transported by a pick-up truck or with typical weights between 3,500 to 14,000 pounds. | Each | $172.07 | 1 | $172.07 |

**Practice:** 647 - Early Successional Habitat Development/Management

**Scenario** #2 - Light Brush hogging

**Scenario Description:**

This scenario address inadequate habitat for wildlife where setting back succession by mowing incoming woody species will improve habitat for the target species. Brush hogging can be used to increase structural diversity by creating areas of shorter vegetation while maintaining brushy beneficial areas preferred by some species or certain life stages of species. The typical setting for this scenario is old fields.

**Before Situation:**

Describe the setting where the practice will be installed. The site is lacking vertical and horizontal diversity and trending to later successional plant community. The disturbance regime to maintain an earlier successional plant community is lacking or is being implemented improperly or during the prime nesting period.

**After Situation:**

The field has been improved through better timed and implemented management to create a vertically and horizontally diverse habitat for species of concern providing necessary cover and nesting/rearing habitat.

**Feature Measure:** Acre

**Scenario Unit::** Acre

**Scenario Typical Size:** 5.0

**Scenario Total Cost:** $750.62

**Scenario Cost/Unit:** $150.12

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 | $51.91 | 7.5 | $389.33 |
| **Labor** | | | | | | |
| Equipment Operators, Light | 232 | Includes: Skid Steer Loaders, Hydraulic Excavators <50 HP, Trenchers <12", Ag Equipment <150 HP, Pickup Trucks, Forklifts, Mulchers | Hour | $25.23 | 7.5 | $189.23 |
| **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 | $172.07 | 1 | $172.07 |

**Practice:** 647 - Early Successional Habitat Development/Management

**Scenario** #3 - Hand Cutting with Chainsaw

**Scenario Description:**

Using a brush saw and/or chainsaw to clear woody vegetation on pasture or wildlife openings that is 1 to 3" or less in diameter on ground with poor access and/or that is too steep or rocky for rotary mowing. Typical rate 1 acre per day.

**Before Situation:**

The site is static or trending to later successional plant community. The disturbance regime to maintain an earlier successional plant community is lacking. Area lacks diversity in the height of vegetation. Early successional wildlife are leaving the area.

**After Situation:**

Early successional habitat maintained. Clearing has provided more light for early successional vegetation reestablishment. The heterogeneity of the habitat structure has been increased. The early successional wildlife are returning.

**Feature Measure:** width and length of treated area

**Scenario Unit::** Acre

**Scenario Typical Size:** 2.0

**Scenario Total Cost:** $2,020.71

**Scenario Cost/Unit:** $1,010.36

Cost Details:

| Component Name | ID | Description | Unit | Cost | QTY | Total |
|---|---|---|---|---|---|---|
| **Equipment Installation** | | | | | | |
| Chainsaw | 937 | Equipment and power unit costs. Labor not included. | Hour | $4.37 | 32 | $139.84 |
| Brush Chipper, 6" capacity | 938 | Brush Chipper, 6" capacity, typically 35 HP. Includes chipper and power unit. Labor not included. | Hour | $21.25 | 8 | $170.00 |
| **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 | $41.76 | 32 | $1,336.32 |
| 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 | $25.31 | 8 | $202.48 |
| **Mobilization** | | | | | | |
| Mobilization, small equipment | 1138 | Equipment <70 HP but can't be transported by a pick-up truck or with typical weights between 3,500 to 14,000 pounds. | Each | $172.07 | 1 | $172.07 |

**Practice:** 647 - Early Successional Habitat Development/Management

**Scenario** #4 - Mowing with foregone income

**Scenario Description:**

This scenario address inadequate habitat for fish and wildlife where harvesting a crop by delayed mowing/grazing will improve habitat for the target species. Delay in the mowing allows grass nesting species time to raise their young. Mowing is generally not permitted from April 15 to August 1. The typical setting for this scenario is in quality hay fields and pastures.

**Before Situation:**

The site is a productive hay field or pasture. Grassland birds attempt to nest in the crop but are disturbed by mowing/grazing before the young are old enough to leave the nest. Mortality is high and affects the population of birds in the area.

**After Situation:**

Mowing of the hay field/pasture is delayed until the young are grown and able to escape (August 1). Careful mowing allows all animals to escape to the field edges.

**Feature Measure:** acres delayed

**Scenario Unit::** Acre

**Scenario Typical Size:** 5.0

**Scenario Total Cost:** $974.02

**Scenario Cost/Unit:** $194.80

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 | $51.91 | 5 | $259.55 |
| **Foregone Income** | | | | | | |
| FI, Grazing AUMs | 2079 | Grazing is the Primary Land Use | Animal Unit Month | $16.65 | 25 | $416.25 |
| **Labor** | | | | | | |
| Equipment Operators, Light | 232 | Includes: Skid Steer Loaders, Hydraulic Excavators <50 HP, Trenchers <12", Ag Equipment <150 HP, Pickup Trucks, Forklifts, Mulchers | Hour | $25.23 | 5 | $126.15 |
| **Mobilization** | | | | | | |
| Mobilization, small equipment | 1138 | Equipment <70 HP but can't be transported by a pick-up truck or with typical weights between 3,500 to 14,000 pounds. | Each | $172.07 | 1 | $172.07 |

**Practice:** 647 - Early Successional Habitat Development/Management

**Scenario** #5 - Light Mechanical

**Scenario Description:**

Practice to be used in old fields and forests where size class is 2 inches DBH or less. Control is achieved with a brontosaurus, Davco mower, gyrotrac or other mechanical means.

**Before Situation:**

Area is reverting to forest from early successional. Mechanical treatment is needed to control woody vegetation. Wildlife needing early successional habitat is leaving the area.

**After Situation:**

Appropriate habitat is restored and wildlife needing early successional habitat is able to return.

**Feature Measure:** acre

**Scenario Unit::** Acre

**Scenario Typical Size:** 20.0

**Scenario Total Cost:** $8,213.45

**Scenario Cost/Unit:** $410.67

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 | 60 | $5,062.80 |
| **Labor** | | | | | | |
| Equipment Operators, Heavy | 233 | Includes: Cranes, Hydraulic Excavators >=50 HP, Dozers, Paving Machines, Rock Trenchers, Trenchers >=12", Dump Trucks, Ag Equipment >=150 HP, Scrapers, Water Wagons. | Hour | $44.37 | 60 | $2,662.20 |
| **Mobilization** | | | | | | |
| Mobilization, large equipment | 1140 | Equipment >150HP or typical weights greater than 30,000 pounds or loads requiring over width or over length permits. | Each | $488.45 | 1 | $488.45 |

**Practice:** 647 - Early Successional Habitat Development/Management

**Scenario** #6 - Medium Mechanical

**Scenario Description:**

Practice to be used in old fields and forests where size class is between 2 inches and 4 inches DBH. Control is achieved with a brontosaurus, Davco mower, gyrotrac or other mechanical means and takes more time per acre.

**Before Situation:**

Area is reverting to pole sized forest from early successional. Mechanical treatment is needed to control woody vegetation. Wildlife needing early successional habitat is leaving the area.

**After Situation:**

Appropriate habitat is restored and wildlife needing early successional habitat is able to return. For New England Cottontail projects - Sufficient amounts of course and fine woody debris will be left behind as protection for wildlife and regeneration.

**Feature Measure:** acre of treatment

**Scenario Unit::** Acre

**Scenario Typical Size:** 10.0

**Scenario Total Cost:** $7,391.55

**Scenario Cost/Unit:** $739.16

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 | $21.25 | 10 | $212.50 |
| Mechanical cutter, chopper | 943 | Forestry mulcher, flail shredder, hydro axe, brush cutter, etc. Equipment and power unit costs. Labor not included. | Hour | $84.38 | 50 | $4,219.00 |
| **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 | $25.31 | 10 | $253.10 |
| 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 | $44.37 | 50 | $2,218.50 |
| **Mobilization** | | | | | | |
| Mobilization, large equipment | 1140 | Equipment >150HP or typical weights greater than 30,000 pounds or loads requiring over width or over length permits. | Each | $488.45 | 1 | $488.45 |

**Practice:** 647 - Early Successional Habitat Development/Management

**Scenario** #7 - Heavy Mechanical low intensity cut (Lg Patch Cut)

**Scenario Description:**

The implementation of early successional habitat in a moderately to heavily forested area consisting of trees with an average stand DBH of less than 6 inches. The size and density of vegetation to be removed requires mechanized forestry equipment such as a log skidder, feller buncher, forwarder, etc. Multiple pieces of equipment may be needed to complete the practice. The boundary of the cut, as well as any trees to be retained within the project area are to be marked in the field. Implementation is done in accordance with a site specific cutting plan developed by a licensed forester. The existing standing timber typically has adequate acceptable growing stock, as identified in the site specific management plan. Stand and site conditions allow for typical operation of equipment.

**Before Situation:**

Area is completely forested. Mechanical treatment is needed to control woody vegetation. Wildlife needing early successional habitat has left the area.

**After Situation:**

Appropriate habitat is restored and wildlife needing early successional habitat is able to return. For New England Cottontail projects - Sufficient amounts of course and fine woody debris will be left behind as protection for wildlife and regeneration.

**Feature Measure:** area treated

**Scenario Unit::** Acre

**Scenario Typical Size:** 10.0

**Scenario Total Cost:** $11,579.10

**Scenario Cost/Unit:** $1,157.91

Cost Details:

| Component Name | ID | Description | Unit | Cost | QTY | Total |
|---|---|---|---|---|---|---|
| **Equipment Installation** | | | | | | |
| Chainsaw | 937 | Equipment and power unit costs. Labor not included. | Hour | $4.37 | 20 | $87.40 |
| Feller buncher | 941 | Equipment and power unit costs. Labor not included. | Hour | $117.36 | 30 | $3,520.80 |
| Log skidder | 942 | Equipment and power unit costs. Labor not included. | Hour | $127.52 | 30 | $3,825.60 |
| **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 | $25.31 | 20 | $506.20 |
| 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 | $44.37 | 60 | $2,662.20 |
| **Mobilization** | | | | | | |
| Mobilization, large equipment | 1140 | Equipment >150HP or typical weights greater than 30,000 pounds or loads requiring over width or over length permits. | Each | $488.45 | 2 | $976.90 |

**Practice:** 647 - Early Successional Habitat Development/Management

**Scenario** #8 - Heavy Mechanical High intensity cut

**Scenario Description:**

The implementation of early successional habitat in a moderately to heavily forested area consisting of trees with an average stand DBH of 6 inches or greater. The size and density of vegetation to be removed requires mechanized forestry equipment such as a log skidder, feller buncher, forwarder, etc. Multiple pieces of equipment may be needed to complete the practice. The boundary of the cut, as well as any trees to be retained in the cut are to be marked in the field. Implementation is done in accordance with a site specific cutting plan developed by a licensed forester. The existing forest stands typically have minimal acceptable growing stock, as identified in the site specific management plan. Stand or site conditions will reduce operating efficiency resulting in increased cost

**Before Situation:**

Area is completely forested. Mechanical treatment is needed to control woody vegetation. Wildlife needing early successional habitat has left the area.

**After Situation:**

Appropriate habitat is restored and wildlife needing early successional habitat is able to return. For New England Cottontail projects - Sufficient amounts of course and fine woody debris will be left behind as protection for wildlife and regeneration.

**Feature Measure:** area treated

**Scenario Unit::** Acre

**Scenario Typical Size:** 10.0

**Scenario Total Cost:** $20,348.36

**Scenario Cost/Unit:** $2,034.84

Cost Details:

| Component Name | ID | Description | Unit | Cost | QTY | Total |
|---|---|---|---|---|---|---|
| **Equipment Installation** | | | | | | |
| Chainsaw | 937 | Equipment and power unit costs. Labor not included. | Hour | $4.37 | 30 | $131.10 |
| Feller buncher | 941 | Equipment and power unit costs. Labor not included. | Hour | $117.36 | 60 | $7,041.60 |
| Log skidder | 942 | Equipment and power unit costs. Labor not included. | Hour | $127.52 | 50 | $6,376.00 |
| **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 | $25.31 | 30 | $759.30 |
| 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 | $44.37 | 110 | $4,880.70 |
| 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 | $45.69 | 4 | $182.76 |
| **Mobilization** | | | | | | |
| Mobilization, large equipment | 1140 | Equipment >150HP or typical weights greater than 30,000 pounds or loads requiring over width or over length permits. | Each | $488.45 | 2 | $976.90 |

**Practice:** 649 - Structures for Wildlife

**Scenario** #1 - Nesting Box, Small no pole

**Scenario Description:**

A structure is provided to support the nesting and rearing of smaller targeted species, such as bees and small birds, and is directly mounted to a tree, building or other structure. Addresses resource concern for wildlife of inadequate cover/shelter

**Before Situation:**

The area lacks sufficient nesting habitat sites (natural cavities). A suitable location to mount the box is available.

**After Situation:**

The installation of nesting and rearing boxes support the life-cycle needs of targeted species, such as small birds. These structures/features enhance habitat, cover, and improve species survivability.

**Feature Measure:** Number of structures

**Scenario Unit::** Each

**Scenario Typical Size:** 1.0

**Scenario Total Cost:** $43.43

**Scenario Cost/Unit:** $43.43

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 | $25.31 | 0.5 | $12.66 |
| **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 small nest box and mounting on a pole. A structure is provided to support the nesting and rearing of targeted species, such as blue birds. Trees, buildings or other structures are not available. These structures are designed to meet targeted species biology and life history needs. Addresses Resource Concern: Inadequate Cover/Shelter.

**Before Situation:**

This area lacked sufficient nesting sites to support viable populations of targeted species. Location and conditions suggest that predator guards are not needed.

**After Situation:**

The installation nesting and rearing boxes support the life-cycle needs of targeted species, such as blue birds. Location and conditions suggest that predator guards are not needed. These structures/features enhance habitat, cover, and improve species survivability.

**Feature Measure:** Number of structures with poles.

**Scenario Unit::** Number

**Scenario Typical Size:** 1.0

**Scenario Total Cost:** $64.85

**Scenario Cost/Unit:** $64.85

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 | $25.31 | 0.75 | $18.98 |
| **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 or owls. The box is directly mounted to a tree, building or other structure. These structures are designed to meet targeted species biology and life history needs. Addresses Resource Concern: Inadequate Cover/Shelter.

**Before Situation:**

The area lacks sufficient overall habitat conditions to support viable populations of targeted species. A suitable location to mount the box is available. Predator guards not needed.

**After Situation:**

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

**Feature Measure:** Number of structures.

**Scenario Unit::** Each

**Scenario Typical Size:** 1.0

**Scenario Total Cost:** $84.88

**Scenario Cost/Unit:** $84.88

Cost Details:

| Component Name | ID | Description | Unit | Cost | QTY | Total |
|---|---|---|---|---|---|---|
| **Labor** | | | | | | |
| General Labor | 231 | Labor performed using basic tools such as power tool, shovels, and other tools that do not require extensive training. Ex. pipe layer, herder, concrete placement, materials spreader, flagger, etc. | Hour | $25.31 | 0.5 | $12.66 |
| **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 wood ducks, bats, barn owls or to provide needed perches or nesting structures for raptures. Addresses Resource Concern: Inadequate Cover/Shelter.

**Before Situation:**

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

**After Situation:**

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

**Feature Measure:** Number of structures

**Scenario Unit::** Each

**Scenario Typical Size:** 1.0

**Scenario Total Cost:** $254.05

**Scenario Cost/Unit:** $254.05

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 | $161.60 | 0.1 | $16.16 |
| All terrain vehicles, ATV | 965 | Includes equipment, power unit and labor costs. | Hour | $28.28 | 0.5 | $14.14 |
| **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 | $25.31 | 1.5 | $37.97 |
| **Materials** | | | | | | |
| Pipe, steel, galvanized, threaded, 1 1/4", schedule 40 | 256 | Spec. A-53, includes coupling and clevis hanger assembly sized for covering, 10' OC | Foot | $7.43 | 10 | $74.30 |
| 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 | $39.26 | 1 | $39.26 |

**Practice:** 649 - Structures for Wildlife

**Scenario** #5 - Brush Pile - Large

**Scenario Description:**

Downed tree structures are created to provide shrubby/woody escape cover for wildlife. Existing sod will be killed prior to placement of tree structures. Felling of select trees and placement in selected locations to provide wildlife cover. Typical scenario of 30' x 50' area for structure covered by interlocking limbs of trees at least 12" in diameter.

**Before Situation:**

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

**After Situation:**

Large brush piles provide needed escape, ground nesting and safe loafing cover for targeted wildlife species.

**Feature Measure:** brush piles

**Scenario Unit::** Each

**Scenario Typical Size:** 1.0

**Scenario Total Cost:** $150.13

**Scenario Cost/Unit:** $150.13

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 | $44.60 | 1 | $44.60 |
| Chainsaw | 937 | Equipment and power unit costs. Labor not included. | Hour | $4.37 | 1 | $4.37 |
| **Labor** | | | | | | |
| General Labor | 231 | Labor performed using basic tools such as power tool, shovels, and other tools that do not require extensive training. Ex. pipe layer, herder, concrete placement, materials spreader, flagger, etc. | Hour | $25.31 | 3 | $75.93 |
| Equipment Operators, Light | 232 | Includes: Skid Steer Loaders, Hydraulic Excavators <50 HP, Trenchers <12", Ag Equipment <150 HP, Pickup Trucks, Forklifts, Mulchers | Hour | $25.23 | 1 | $25.23 |

**Practice:** 649 - Structures for Wildlife

**Scenario** #6 - Bat House - Large, Single Chamber

**Scenario Description:**

A single chamber large bat hourse (preferably built to Bat Conservation International's design standards) to support the roosting and rearing of approximately 50 colonial roosting bats and is directly mounted to a tree, building or other structure. Typically boxes are placed 12 to 15 feet from the ground with a south or southeast aspect and within 1/4 mile of water. Addresses resource concern for wildlife of inadequate cover/shelter.

**Before Situation:**

The area lacks sufficient summer roosting habitat (smags, cavity trees, trees with cracks or exfoliating bark) for bats, and a suitable location to mount the box is available.

**After Situation:**

The installation of such structures supports the life-cycle needs of many bat species. These structures/features enhance habitat, cover, and improve species survivability.

**Feature Measure:** Number of structures

**Scenario Unit::** Each

**Scenario Typical Size:** 1.0

**Scenario Total Cost:** $144.13

**Scenario Cost/Unit:** $144.13

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 | $25.31 | 2.5 | $63.28 |
| **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, Bat | 246 | BAT-1 Bat House Single. Includes materials and shipping. | Each | $53.87 | 1 | $53.87 |

**Practice:** 649 - Structures for Wildlife

**Scenario** #7 - 3-Chamber Bat House

**Scenario Description:**

A 3-chamber bat hourse (preferably built to Bat Conservation International's design standards) to support the roosting and rearing of approximately 200 colonial roosting bats and is directly mounted to a tree, building or other structure. Typically boxes are placed 12 to 15 feet from the ground with a south or southeast aspect and within 1/4 mile of water. Addresses resource concern for wildlife of inadequate cover/shelter.

**Before Situation:**

The area lacks sufficient summer roosting habitat (smags, cavity trees, trees with cracks or exfoliating bark) for bats, and a suitable location to mount the box is available.

**After Situation:**

The installation of such structures supports the life-cycle needs of many bat species. These structures/features enhance habitat, cover, and improve species survivability.

**Feature Measure:** Number of Structures

**Scenario Unit::** Each

**Scenario Typical Size:** 1.0

**Scenario Total Cost:** $189.46

**Scenario Cost/Unit:** $189.46

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 | $25.31 | 2.5 | $63.28 |
| **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 | 2 | $53.96 |
| 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** #8 - Osprey/Eagle Nesting Platform

**Scenario Description:**

A structure is provided to support the nesting and rearing of targeted species such as Ospreys found nesting in coastal areas. These structures are designed to meet targeted species biology and life history needs.

**Before Situation:**

These structures are targeted for areas that lack sufficient nesting sites to support viable populations of targeted species that nest along coastal estuaries and large water bodies or utilize nesting site such as poles that support high voltage lines that can be a hazard to these birds.

**After Situation:**

The installation of pole and nesting platform supports the life-cycle needs of targeted species, such as Ospreys and other types of raptors that nest along coastal estuaries and large water bodies. These structures/features enhance habitat, cover, and reduce predation. .

**Feature Measure:** <Unknown>

**Scenario Unit::** Each

**Scenario Typical Size:** 1.0

**Scenario Total Cost:** $1,063.80

**Scenario Cost/Unit:** $1,063.80

Cost Details:

| Component Name | ID | Description | Unit | Cost | QTY | Total |
|---|---|---|---|---|---|---|
| **Materials** | | | | | | |
| Pole, Utility, Nesting Platform | 2048 | Fabrication and installation of avian nesting platform. Includes all equipment, labor and material needed to install utility pole with a nesting platform. | Foot | $35.46 | 30 | $1,063.80 |

**Practice:** 655 - Forest Trails and Landings

**Scenario** #1 - Re-Route Sections

**Scenario Description:**

Problem sections of existing forest trails will be re-routed to avoid sensitive areas or to avoid continued use of problem steep sections with erosion. This scenario may also address fixing existing road sections that are severely eroding but that don't require the extensive work and gravel existing in other scenarios. This will primarily consist of earthwork. The resource concerns include but are not limited to soil erosion, water quality - sedimentation, and in some cases insufficient cover/shelter (when sensitive areas are avoided).

**Before Situation:**

Existing skid trails sections are located at low topographic areas running through wetlands, riparian areas or vernal pools damaging habitat for species of concern. Or, trail sections are located such that slopes are excessive and erosion is difficult to address with minor earthwork.

**After Situation:**

Problem sections of existing forest trails will be relocated to minimize negative impacts and to reduce or eliminate soil erosion and sedimentation. New sections will avoid problem areas and tie in with existing skid trails through the forest. In some cases extra earthwork and equipment time will address erosion problems and not require re-routing the skid trail section. Typical length of application is 300 feet.

**Feature Measure:** Foot

**Scenario Unit::** Foot

**Scenario Typical Size:** 300.0

**Scenario Total Cost:** $4,206.96

**Scenario Cost/Unit:** $14.02

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 | $113.75 | 10 | $1,137.50 |
| Chainsaw | 937 | Equipment and power unit costs. Labor not included. | Hour | $4.37 | 4 | $17.48 |
| Truck, Pickup | 939 | Equipment and power unit costs. Labor not included. | Hour | $21.79 | 2 | $43.58 |
| 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 | $3.18 | 300 | $954.00 |
| **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 | $41.76 | 4 | $167.04 |
| 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 | $25.31 | 4 | $101.24 |
| 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 | $44.37 | 10 | $443.70 |
| 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 | $45.69 | 8 | $365.52 |
| **Mobilization** | | | | | | |
| Mobilization, large equipment | 1140 | Equipment >150HP or typical weights greater than 30,000 pounds or loads requiring over width or over length permits. | Each | $488.45 | 2 | $976.90 |

**Practice:** 655 - Forest Trails and Landings

**Scenario** #2 - Trail and Landing Installation

**Scenario Description:**

Construction of forest trails and landings for the purpose of providing access to a gently sloping forested tract, Access will allow the application of other conservation practices, monitoring and the removal of forest products. It is not, however, to be used if the installation is done as part of a commercial operation such as timber harvesting. In such a case, the Scenario 1 should be used. Installation will include removal of trees and brush as needed, a minimum amount of blading and soil disturbance, and the installing of water control measures such as water bars, broad-based dips, wing ditches, etc. It will not include measures more common to access roads such as gravelling or ditching. Installation will be supervised by a consultant forester, land manager, or other resource professional. Resource concerns include Excessive sediment in surface waters, Sheet & rill erosion, and Concentrated flow erosion

**Before Situation:**

Access to the tract is not available for occasional travel by the landowner or manager for the purposes of monitoring, installing conservation practices and/or the removal of forest products. Improperly installed trails and landings will cause soil erosion and water quality problems.

**After Situation:**

A trail system is installed that provides access to the forested tract and does not cause excessive erosion or water quality concerns.

**Feature Measure:** Length of trail treated

**Scenario Unit::** Foot

**Scenario Typical Size:** 2,000.0

**Scenario Total Cost:** $4,704.24

**Scenario Cost/Unit:** $2.35

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 | $66.13 | 10 | $661.30 |
| Skidsteer, 80 HP | 933 | Skidsteer loader with horsepower range of 60 to 90. Equipment and power unit costs. Labor not included. | Hour | $44.60 | 24 | $1,070.40 |
| Chainsaw | 937 | Equipment and power unit costs. Labor not included. | Hour | $4.37 | 8 | $34.96 |
| Truck, Pickup | 939 | Equipment and power unit costs. Labor not included. | Hour | $21.79 | 16 | $348.64 |
| 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 | $3.18 | 225 | $715.50 |
| **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 | $25.31 | 16 | $404.96 |
| Equipment Operators, Light | 232 | Includes: Skid Steer Loaders, Hydraulic Excavators <50 HP, Trenchers <12", Ag Equipment <150 HP, Pickup Trucks, Forklifts, Mulchers | Hour | $25.23 | 34 | $857.82 |
| Supervisor 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 | $45.69 | 4 | $182.76 |
| **Mobilization** | | | | | | |
| Mobilization, small equipment | 1138 | Equipment <70 HP but can't be transported by a pick-up truck or with typical weights between 3,500 to 14,000 pounds. | Each | $172.07 | 1 | $172.07 |
| Mobilization, medium equipment | 1139 | Equipment with 70-150 HP or typical weights between 14,000 and 30,000 pounds. | Each | $255.83 | 1 | $255.83 |

**Practice:** 655 - Forest Trails and Landings

**Scenario** #3 - Trail Erosion Control w/o Vegetation, Slopes < 35%

**Scenario Description:**

Rehabilitation of existing forest access trail segments on a 20% slope and a 4% grade by addressing legacy resource issues for long-term use. Typically the trail is a single lane (18-foot wide, including cut and fill), seasonal prism requiring sustained erosion control measures installed by using heavy equipment such as dozers, graders, backhoes, and/or excavators. The purpose is to hydrologically disconnect the existing trail/landing system from streams and natural drainages. This scenario includes designing and installing measures such as cross drains, rock drains, relief drains, out sloping (or changing surface drainage), rolling dips and water bars and ditch outs as needed, and applies to only those segments of the trail system that have resource concerns requiring rehabilitation. Some hand work (chainsaw) will be needed to allow the use of the equipment. Installation will be supervised. Other practices such as Stream Crossing, and Critical Area Planting, Access Road, and Structure for Water Control can be adjacent/appurtenant but not part of this practice scenario. Treatments are for long-term reduction of sediment, restoration of fish habitat, creation of fire access, and the removal of routes off unstable slopes. Resource concerns include: Excessive sedimentation in surface waters, Concentrated flow erosion, Sheet and rill erosion, and Degradation of wildlife species.

**Before Situation:**

Trails are delivering sediment to waterways, impacting riparian areas and wetlands and possibly affecting T&E species. The system's usefulness for access is also being compromised by inadequate erosion and drainage control systems. However rehabilitation over abandonment is an acceptable course of action.

**After Situation:**

Trails and landings provide access and do not adversely affect the resources concerns.

**Feature Measure:** Length of trail treated

**Scenario Unit::** Foot

**Scenario Typical Size:** 2,000.0

**Scenario Total Cost:** $7,859.71

**Scenario Cost/Unit:** $3.93

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 | $66.13 | 18 | $1,190.34 |
| 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 | $113.75 | 18 | $2,047.50 |
| Chainsaw | 937 | Equipment and power unit costs. Labor not included. | Hour | $4.37 | 9 | $39.33 |
| Truck, Pickup | 939 | Equipment and power unit costs. Labor not included. | Hour | $21.79 | 18 | $392.22 |
| 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 | $3.18 | 250 | $795.00 |
| **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 | $25.31 | 18 | $455.58 |
| 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 | $44.37 | 36 | $1,597.32 |
| 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 | $45.69 | 8 | $365.52 |
| **Mobilization** | | | | | | |
| Mobilization, large equipment | 1140 | Equipment >150HP or typical weights greater than 30,000 pounds or loads requiring over width or over length permits. | Each | $488.45 | 2 | $976.90 |

**Practice:** 655 - Forest Trails and Landings

**Scenario** #5 - Grading and Shaping with Vegetative Establishment

**Scenario Description:**

Rehabilitation of existing forest access trails and landings on a medium slope by addressing rutting, erosion, and sedimentation. Typically the trail is a single, existing 18-foot wide (including cut and fill) seasonal road prism on gently sloping terrain requiring sustained erosion control measures applied with heavy equipment such as dozers, graders, backhoes, and/or excavators. The purpose is to hydrologically disconnect the existing trail/landing system from streams and natural drainages and to establish a vegetative cover. This scenario includes designing and installation measures such as cross drains, rock drains, relief drainage, out sloping (or changing surface drainage), rolling dips and water bars and ditch outs as needed, and applies to only those segments of the trail system that have resource concerns requiring rehabilitation. It also includes seedbed preparation, seeding and soil amendments determined to be needed. Some hand work (chainsaw) will be needed to allow the use of the equipment. The work will be supervised. Other practices such as Stream Crossing, and Critical Area Planting. Access Road and Structure for Water Control can be adjacent/appurtenant but not part of the practice scenario. Treatments are for long-term reduction of sediment, restore fish habitat, create fire access and to move routes off unstable slopes. Resource concerns include: Excessive sediment in surface waters, Concentrated and Sheet & rill flow erosion, Soil compaction, and Habitat degradation.

**Before Situation:**

Trail/landings are delivering sediment to waterways, impacting riparian/wetlands and/or possibly affecting fish/T&E species. The usefulness of the trail/landing system is being adversely affected by erosion.

**After Situation:**

A trail system is installed that provides access to the forested tract and does not cause excessive erosion or water quality concerns.

**Feature Measure:** Length of trail treated

**Scenario Unit::** Foot

**Scenario Typical Size:** 2,000.0

**Scenario Total Cost:** $7,841.89

**Scenario Cost/Unit:** $3.92

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 | $56.05 | 16 | $896.80 |
| Skidsteer, 80 HP | 933 | Skidsteer loader with horsepower range of 60 to 90. Equipment and power unit costs. Labor not included. | Hour | $44.60 | 16 | $713.60 |
| Chainsaw | 937 | Equipment and power unit costs. Labor not included. | Hour | $4.37 | 8 | $34.96 |
| Tillage, Light | 945 | Includes light disking (tandem) or field cultivator. Includes equipment, power unit and labor costs. | Acre | $11.14 | 1 | $11.14 |
| Fertilizer, ground application, dry bulk | 950 | Dry bulk fertilizer application performed by ground equipment. Includes equipment, power unit and labor costs. | Acre | $6.62 | 1 | $6.62 |
| Lime application | 953 | Lime application performed by ground equipment. Includes equipment, power unit and labor costs. | Acre | $10.63 | 1 | $10.63 |
| 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 | $12.60 | 1 | $12.60 |
| All terrain vehicles, ATV | 965 | Includes equipment, power unit and labor costs. | Hour | $28.28 | 10 | $282.80 |
| Truck, water | 1448 | Water tanker truck. Equipment only. Labor not included. | Hour | $163.53 | 6 | $981.18 |
| Water Bars | 1500 | Installation of graded trail water controlling structures such as water bars, broad based dips for erosion control. Typical cross section is 1.5 feet high with 4:1 side slopes yielding about 0.33 CY/ft of length. | Foot | $3.18 | 300 | $954.00 |
| Motor Grader, 200 HP | 1782 | Motor Grader or Maintainer, 200 hp. Typical of equipment with HP in range of 170-225. Equipment cost, does not include labor. | Hour | $164.36 | 10 | $1,643.60 |
| **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 | $25.31 | 16 | $404.96 |
| Equipment Operators, Light | 232 | Includes: Skid Steer Loaders, Hydraulic Excavators <50 HP, Trenchers <12", Ag Equipment <150 HP, Pickup Trucks, Forklifts, Mulchers | Hour | $25.23 | 40 | $1,009.20 |
| 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 | $45.69 | 4 | $182.76 |
| **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 | $0.60 | 70 | $42.00 |

| | | | | | | |
|---|---|---|---|---|---|---|
| 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 | $0.65 | 55 | $35.75 |
| Potassium, K2O | 74 | K2O supplied by Muriate Of Potash. Price is not per pound of total product applied, no conversion is needed. | Pound | $0.36 | 40 | $14.40 |
| Lime, ENM | 75 | Fertilizer: Limestone Spread on field. | Ton | $93.23 | 1 | $93.23 |
| **Mobilization** | | | | | | |
| Mobilization, medium equipment | 1139 | Equipment with 70-150 HP or typical weights between 14,000 and 30,000 pounds. | Each | $255.83 | 2 | $511.66 |

**Practice:** 655 - Forest Trails and Landings

**Scenario** #6 - Temporary Stream Crossing

**Scenario Description:**

The design and installation of a temporary stream crossing that will meet the immediate forest management/conservation needs. Afterwards the crossing will be restored and stabilized. Improperly designed and/or installed stream crossings will, in the long term, adversely affect water quality and aquatic life. Approaches will also be stabilized for the use of the crossing and stabilized afterwards as necessary. Installation will be supervised. Permanent and/or high-traffic crossings will be designed and installed according to the Stream Crossing (578) Standard. Resource concerns include: Excessive sediment in surface waters and Habitat degradation.

**Before Situation:**

Access to a forested tract is not available for the installation of conservation practices or removal of forest products due to the lack of a suitable stream crossing(s).

**After Situation:**

Access was available to address other resource concerns/management needs and the stream is restored to its previous or better condition.

**Feature Measure:** Number of crossings

**Scenario Unit::** Each

**Scenario Typical Size:** 1.0

**Scenario Total Cost:** $1,035.20

**Scenario Cost/Unit:** $1,035.20

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 | $113.75 | 2 | $227.50 |
| Skidsteer, 80 HP | 933 | Skidsteer loader with horsepower range of 60 to 90. Equipment and power unit costs. Labor not included. | Hour | $44.60 | 2 | $89.20 |
| Truck, Pickup | 939 | Equipment and power unit costs. Labor not included. | Hour | $21.79 | 1 | $21.79 |
| **Labor** | | | | | | |
| General Labor | 231 | Labor performed using basic tools such as power tool, shovels, and other tools that do not require extensive training. Ex. pipe layer, herder, concrete placement, materials spreader, flagger, etc. | Hour | $25.31 | 2 | $50.62 |
| 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 | $44.37 | 2 | $88.74 |
| Supervisor or Manager | 234 | Labor involving supervision or management activities. Includes crew supervisors, foremen and farm/ranch managers time required for adopting new technology, etc. | Hour | $45.69 | 1 | $45.69 |
| **Mobilization** | | | | | | |
| Mobilization, medium equipment | 1139 | Equipment with 70-150 HP or typical weights between 14,000 and 30,000 pounds. | Each | $255.83 | 2 | $511.66 |

**Practice:** 655 - Forest Trails and Landings

**Scenario** #54 - Trail Layout

**Scenario Description:**

The use of professional assistance in trail design or redesign, location and layout. Installation costs are not included. Resource concerns include Concentrated flow erosion, and Excessive sediment in surface waters.

**Before Situation:**

Access to a forested tract is not available for the occasional travel by the landowner or manager for the purposes of monitoring or for the removal of forest products. Improperly designed and installed trails will cause soil erosion and water quality (sedimentation) problems. The trail will be installed as part a management operation such as timber harvesting and will not include extensive water control measures more common to access roads such as gravelling or ditching.

**After Situation:**

A trail system is designed and laid out that provides access to the forested tract and does not cause excessive erosion or water quality concerns.

**Feature Measure:** Length of trail designed

**Scenario Unit::** Foot

**Scenario Typical Size:** 5,280.0

**Scenario Total Cost:** $885.68

**Scenario Cost/Unit:** $0.17

Cost Details:

| Component Name | ID | Description | Unit | Cost | QTY | Total |
|---|---|---|---|---|---|---|
| **Labor** | | | | | | |
| Specialist Labor | 235 | Labor requiring a specialized skill set: Includes Agronomists, Foresters, Biologists, etc. to provide additional technical information during the planning and implementation of the practice. Does not include NRCS or TSP services. | Hour | $110.71 | 8 | $885.68 |

**Practice:** 657 - Wetland Restoration

**Scenario** #1 - Mineral or Organic Flat

**Scenario Description:**

A Mineral Flat wetland is to be restored. The tract size is 160 Acres consists of surface saturated soils interspersed with shallow depressions that are not depressional class HGM wetlands. The wetland size is also 160 acres. Resource Concerns are: 4-SOIL QUALITY DEGRADATION - Organic matter depletion, 11- WATER QUALITY DEGRADATION - Excess nutrients in surface and ground waters, 12 - WATER QUALITY DEGRADATION - Pesticides transported to surface and ground waters, 16 - WATER QUALITY DEGRADATION - Excessive sediment in surface waters, 18 - DEGRADED PLANT CONDITION - Undesirable plant productivity and health, 19 - DEGRADED PLANT CONDITION, Inadequate structure 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:** 160.0

**Scenario Total Cost:** $2,367.11

**Scenario Cost/Unit:** $14.79

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 | $62.74 | 24 | $1,505.76 |
| **Labor** | | | | | | |
| Equipment Operators, Light | 232 | Includes: Skid Steer Loaders, Hydraulic Excavators <50 HP, Trenchers <12", Ag Equipment <150 HP, Pickup Trucks, Forklifts, Mulchers | Hour | $25.23 | 24 | $605.52 |
| **Mobilization** | | | | | | |
| Mobilization, medium equipment | 1139 | Equipment with 70-150 HP or typical weights between 14,000 and 30,000 pounds. | Each | $255.83 | 1 | $255.83 |

**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 structure 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:** 100.0

**Scenario Total Cost:** $40,452.55

**Scenario Cost/Unit:** $404.53

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 | $2.36 | 16520 | $38,987.20 |
| **Mobilization** | | | | | | |
| Mobilization, large equipment | 1140 | Equipment >150HP or typical weights greater than 30,000 pounds or loads requiring over width or over length permits. | Each | $488.45 | 3 | $1,465.35 |

**Practice:** 657 - Wetland Restoration

**Scenario** #3 - Depression Sediment Removal and Ditch Plug

**Scenario Description:**

A Depressional HGM class wetland is to be restored. The tract size is 15 acres, and the actual wetland size is 10 acres. The site is a recharge depression, fed only from surface runoff. Resource Concerns are: 4-SOIL QUALITY DEGRADATION - Organic matter depletion, 11- WATER QUALITY DEGRADATION - Excess nutrients in surface and ground waters, 12 - WATER QUALITY DEGRADATION - Pesticides transported to surface and ground waters, 16 - WATER QUALITY DEGRADATION - Excessive sediment in surface waters, 18 - DEGRADED PLANT CONDITION - Undesirable plant productivity and health, 19 - DEGRADED PLANT CONDITION, Inadequate structure and composition, 22- INADEQUATE HABITAT FOR FISH AND WILDLIFE - Habitat degradation.

**Before Situation:**

The wetland has been converted to agricultural production, and the tract drained with a surface ditch. The ditch is 4' average depth, and 12 feet average width. The wetland receives surface runoff from an adjacent upland watershed, and ponds water on a shallow perched layer. The watershed has been converted from native to agricultural landuse, and the resultant soil erosion has deposited 6" of sediment in the bottom of the depression.

**After Situation:**

The ditch has been plugged by the installation of a 50' long section of compacted clay fill, and the deposition has been removed down to the original topsoil layer. A herbaceous plant community has been seeded. Facilitative practices include Conservation Cover. Restoration of hydrology and plant community functions will improve the WATER QUALITY and DEGRADED PLANT CONDITION concerns listed above. The hydrologic and vegetative practices will address the SOIL QUALITY DEGRADATION and INADEQUATE HABITAT FOR FISH AND WILDLIFE concerns.

**Feature Measure:** Acres of Tract

**Scenario Unit::** Acre

**Scenario Typical Size:** 15.0

**Scenario Total Cost:** $20,807.12

**Scenario Cost/Unit:** $1,387.14

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 | $2.36 | 8067 | $19,038.12 |
| Earthfill, Roller Compacted | 49 | Earthfill, roller or machine compacted, includes equipment and labor | Cubic Yard | $4.45 | 178 | $792.10 |
| **Mobilization** | | | | | | |
| Mobilization, large equipment | 1140 | Equipment >150HP or typical weights greater than 30,000 pounds or loads requiring over width or over length permits. | Each | $488.45 | 2 | $976.90 |

**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 structure 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:** 120.0

**Scenario Total Cost:** $2,135.59

**Scenario Cost/Unit:** $17.80

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 | $2.36 | 284 | $670.24 |
| **Mobilization** | | | | | | |
| Mobilization, large equipment | 1140 | Equipment >150HP or typical weights greater than 30,000 pounds or loads requiring over width or over length permits. | Each | $488.45 | 3 | $1,465.35 |

**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 structure 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 conversion 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:** 15.0

**Scenario Total Cost:** $8,115.90

**Scenario Cost/Unit:** $541.06

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 | $2.36 | 3025 | $7,139.00 |
| **Mobilization** | | | | | | |
| Mobilization, large equipment | 1140 | Equipment >150HP or typical weights greater than 30,000 pounds or loads requiring over width or over length permits. | Each | $488.45 | 2 | $976.90 |

**Practice:** 657 - Wetland Restoration

**Scenario** #6 - Tidal Marsh Phragmites Removal

**Scenario Description:**

In coastal and estuarine wetland areas where tidal flow has been restored and invasive plants such as Phragmites has been eliminated there is a need to remove accumulated invasive plant rhizomes to facilitate natural restoration of native plant communities such as Spartina alternaflora, Spartina patens, and Iva frutescens and Distichilis spicatta. Normally excavating 0.5 to 1.0 ffot of the material will remove the accumulated rhizimes. The resulting mud flats are then able to naturally be naturally revegetated. There may be situations when planting is required. Coastal wetland ranch in size from 1 acre to 500 area. The marsh surface is excavated using low pressure excavation equipment. Coastal permitting agencies require the excavated materials to be removed from the wetland. Many projects requires installation of new culverts to allow flow through dikes and roads. Resource concerns include: Inadequate Habitat for Fish and Wildlife, Degrade plant condition. Facilitating practices include: 587 Structure for Water control, 657 Wetland Restoration, 390 Riparian Herbaceous Cover.

**Before Situation:**

Coastal and estuarine wetlands are degraded due to growth of invasive plants such as Phragmites. The Phragmites has been eliminated using a variety of techniques including restoration of tidal flow, invasive plant removal, and tidal channel restoration. Large areas of dead rhizomes, usually 0.5 to 1.0 feet in thickness prevent native vegetation from re-establishing.

**After Situation:**

The acres with dense mats of rhizomes are removes. Mud flats can be colonizes by native plants such as: Spartina alternaflora, Spartina patens, and Iva frutescens and Distichilis spicatta. The restored area provides habitat for coastal wildlife.

**Feature Measure:** <Unknown>

**Scenario Unit::** Acre

**Scenario Typical Size:** 1.0

**Scenario Total Cost:** $23,618.61

**Scenario Cost/Unit:** $23,618.61

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 | $66.13 | 80 | $5,290.40 |
| Skidsteer, 80 HP | 933 | Skidsteer loader with horsepower range of 60 to 90. Equipment and power unit costs. Labor not included. | Hour | $44.60 | 200 | $8,920.00 |
| **Labor** | | | | | | |
| Equipment Operators, Light | 232 | Includes: Skid Steer Loaders, Hydraulic Excavators <50 HP, Trenchers <12", Ag Equipment <150 HP, Pickup Trucks, Forklifts, Mulchers | Hour | $25.23 | 280 | $7,064.40 |
| 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 | $45.69 | 40 | $1,827.60 |
| **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 | $172.07 | 3 | $516.21 |

**Practice:** 657 - Wetland Restoration

**Scenario** #7 - Wetland Restoration Sediment Removal

**Scenario Description:**

A wetland complex has been altered due accumulation of sediments from adjacent landuse changes. The sediment accumulation has altered the plant composition, structure and hydrology of the wetland. Accumulated sediments will be removed to recreate the prior topography of the wetland so that native plants can become re-established. Removing the sediments will restore the wetland hydrology. Wetland range in size fro 0.5 acres to 50 acres. Resource concerns include: Habitat Fragmentation, Inadequate Cover/Shelter, Inadequate Food, Inadequate Space. Associated practice include: 390 Riparian Herbaceous Cover, 659 Wetland Enhancement, 342 Critical Area Planting.

**Before Situation:**

In wetland areas associated with forestland, and cropland. Portions of the wetland has been altered due to deposition and accumulation of sediments

**After Situation:**

Define the size and extent of the practice that will be installed. Describe how the practice is typically installed to solve the resource problem.

**Feature Measure:** <Unknown>

**Scenario Unit::** Acre

**Scenario Typical Size:** 1.0

**Scenario Total Cost:** $27,895.70

**Scenario Cost/Unit:** $27,895.70

Cost Details:

| Component Name | ID | Description | Unit | Cost | QTY | Total |
|---|---|---|---|---|---|---|
| **Equipment Installation** | | | | | | |
| Hydraulic Excavator, 1 CY | 931 | Track mounted hydraulic excavator with bucket capacity range of 0.8 to 1.5 CY. Equipment and power unit costs. Labor not included. | Hour | $113.75 | 100 | $11,375.00 |
| Truck, dump, 8 CY | 1401 | Dump truck for moving bulk material. Typically capacity is 12 ton or 8 cubic yards. Includes equipment only. | Hour | $57.56 | 100 | $5,756.00 |
| **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 | $44.37 | 200 | $8,874.00 |
| 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 | $45.69 | 20 | $913.80 |
| **Mobilization** | | | | | | |
| Mobilization, large equipment | 1140 | Equipment >150HP or typical weights greater than 30,000 pounds or loads requiring over width or over length permits. | Each | $488.45 | 2 | $976.90 |

**Practice:** 657 - Wetland Restoration

**Scenario** #8 - Wetland Hydrologic Barrier Removal

**Scenario Description:**

A wetland complex has been altered due road or trail crossings impairs hydrologic connectivity, function, and can result in altered plant communities. Water typically higher on one side of the road and lower due to the road berm. The crossing alters the wetland hydrology which in turn can alter historic plant communities. Roads will be retired and road/trial berms removed or berms breached with low water crossings in several locations to restore hydrology. Wetland range in size fro 0.5 acres to 50 acres. Resource concerns are: 18 - DEGRADED PLANT CONDITION - Undesirable plant productivity and health, 19 - DEGRADED PLANT CONDITION, Inadequate structure and composition, 22- INADEQUATE HABITAT FOR FISH AND WILDLIFE - Habitat degradation.

**Before Situation:**

A road or trail system used to access or manage land is bisecting and altering any wetland type. The road/trail berm and associated borrow ditch has altered hydrologic connectivity, water flow and altered the historic plant community. Alteration of wetlands by trails or access roads can occur on any land use.

**After Situation:**

Road/trail fill material and culverts are removed by heavy equipment and fill placed back in the borrow ditch from which it was taken. Excess fill will be trucked offsite. Where complete road/trail removal is not a viable alternative, the road or trail will be breached in as many locations as feasible and the bottom stabilized with gravel and compacted to allow infrequent crossing by equipment.

**Feature Measure:** footprint of trail removed

**Scenario Unit::** Acre

**Scenario Typical Size:** 0.0

**Scenario Total Cost:** $5,158.82

**Scenario Cost/Unit:** #Div/0!

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 | $113.75 | 16 | $1,820.00 |
| Excavation, common earth, wet, side cast, large equipment | 1228 | Bulk excavation and side casting of wet common earth with hydraulic excavator or dragline with greater than 1 CY capacity. Includes equipment and labor. | Cubic Yard | $4.32 | 0 | $0.00 |
| Truck, dump, 8 CY | 1401 | Dump truck for moving bulk material. Typically capacity is 12 ton or 8 cubic yards. Includes equipment only. | Hour | $57.56 | 16 | $920.96 |
| **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 | $44.37 | 16 | $709.92 |
| 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 | $45.69 | 16 | $731.04 |
| **Mobilization** | | | | | | |
| Mobilization, large equipment | 1140 | Equipment >150HP or typical weights greater than 30,000 pounds or loads requiring over width or over length permits. | Each | $488.45 | 2 | $976.90 |

**Practice:** 659 - Wetland Enhancement

**Scenario** #1 - Tidal Channel Restoration/Establishment

**Scenario Description:**

In coastal and estuarine wetland areas existing tidal channels are restored or new tidal cannels are installed to improve tidal flow and increase salinity levels in these wetlands The facilitated drainage increases in salinity and improves the overall health of the coastal wetland system. The increased salinity is capable of reducing or eliminating the invasive plant Phragmites. Coastal wetland ranch in size from 1 acre to 500 area. The channels are installed using low pressure excavation equipment. Coastal permitting agencies usually require the excavated materials to be removed from the wetland. Many projected requires installation of new culverts to allow flow through dikes and roads. Resource concerns include: Inadequate Habitat for Fish and Wildlife, Degrade plant condition. Facilitating practices include: 587 Structure for Water control, 657 Wetland Restoration, 390 Riparian Herbaceous Cover.

**Before Situation:**

Coastal and estuarine wetlands are degraded due to inadequate flow of salt water. The marsh vegetation is dying off and being replaced by invasive plants such as Phragmites. Areas of the marsh are devoid of vegetation.

**After Situation:**

Tidal flow is restored and salinity is increased by restoring existing channels or installing new channels. The increased salinity allows native coastal plants such as Spartina alternaflora, Spartina patens, and Iva frutescens and Distichilis spicatta to flourish and repopulate the marsh. The increased salinity

**Feature Measure:** <Unknown>

**Scenario Unit::** Acre

**Scenario Typical Size:** 0.0

**Scenario Total Cost:** $24,153.64

**Scenario Cost/Unit:** #Div/0!

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 | $62.74 | 110 | $6,901.40 |
| Truck, dump, 8 CY | 1401 | Dump truck for moving bulk material. Typically capacity is 12 ton or 8 cubic yards. Includes equipment only. | Hour | $57.56 | 110 | $6,331.60 |
| **Labor** | | | | | | |
| Equipment Operators, Light | 232 | Includes: Skid Steer Loaders, Hydraulic Excavators <50 HP, Trenchers <12", Ag Equipment <150 HP, Pickup Trucks, Forklifts, Mulchers | Hour | $25.23 | 220 | $5,550.60 |
| 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 | $45.69 | 110 | $5,025.90 |
| **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 | $172.07 | 2 | $344.14 |

**Practice:** 659 - Wetland Enhancement

**Scenario** #2 - Tidal Marsh Excavation

**Scenario Description:**

In coastal and estuarine wetland areas where tidal flow has been restored and invasive plants such as Phragmites has been eliminated there is a need to remove accumulated invasive plant rhizomes to facilitate natural restoration of native plant communities such as Spartina alternaflora, Spartina patens, Iva frutescens and Distichilis spicatta. Normally excavating 0.5 to 1.0 f0ot of the material will remove the accumulated rhizomes and associated organic material. The resulting mud flats are then able to be naturally revegetated. There may be situations when planting is required. Coastal wetland range in size from 1 acre to 500 acres. The marsh surface is excavated using low pressure excavation equipment. Coastal permitting agencies require the excavated materials to be removed from the wetland. Many projects require installation of new culverts to allow flow through dikes and roads. Resource concerns include: Inadequate Habitat for Fish and Wildlife, Degrade plant condition. Facilitating practices include: 587 Structure for Water control, 657 Wetland Restoration, 390 Riparian Herbaceous Cover, 396 Aquatic Organism Passage..

**Before Situation:**

Coastal and estuarine wetlands are degraded due to growth of invasive plants such as Phragmites. The Phragmites has been eliminated using a variety of techniques including restoration of tidal flow, invasive plant removal, and tidal channel restoration. Large areas of dead rhizomes, usually 0.5 to 1.0 feet in thickness prevent native vegetation from re-establishing.

**After Situation:**

The acres with dense mats of rhizomes are removes. Mud flats can be colonizes by native plants such as: Spartina alternaflora, Spartina patens, and Iva frutescens and Distichilis spicatta. The restored area provides habitat for coastal wildlife.

**Feature Measure:** <Unknown>

**Scenario Unit::** Acre

**Scenario Typical Size:** 1.0

**Scenario Total Cost:** $23,618.61

**Scenario Cost/Unit:** $23,618.61

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 | $66.13 | 80 | $5,290.40 |
| Skidsteer, 80 HP | 933 | Skidsteer loader with horsepower range of 60 to 90. Equipment and power unit costs. Labor not included. | Hour | $44.60 | 200 | $8,920.00 |
| **Labor** | | | | | | |
| Equipment Operators, Light | 232 | Includes: Skid Steer Loaders, Hydraulic Excavators <50 HP, Trenchers <12", Ag Equipment <150 HP, Pickup Trucks, Forklifts, Mulchers | Hour | $25.23 | 280 | $7,064.40 |
| 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 | $45.69 | 40 | $1,827.60 |
| **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 | $172.07 | 3 | $516.21 |

**Practice:** 659 - Wetland Enhancement

**Scenario** #3 - Tidal Barrier Removal

**Scenario Description:**

Removal of a barrier to tidal flow in a coastal wetland complex. Typically undersized culverts that had been previously installed do not provide adequate flow into a coastal marsh system. The limited tidal flow has significant impacts on the salinity levels, native vegetation, and native species. The typical scenario included removal of a 24 inch culvert that is approximately 20 feet long. Material will be hauled away from the site and disposed of outside of the wetland/marsh area. This scenario only includes removal of the culvert and fill material that has been placed in the channel. Facilitating practices include: 342 Critical Area Planting, 580 Streambank and Shoreline Protection, 584 Channel Stabilization, 315 Herbaceous Weed Control, 657 Wetland Restoration, 644 Wetland Wildlife Habitat Management.

**Before Situation:**

The practice will be completed typically in a coastal marsh that has been impacted by reduced tidal flow. Culverts have been installed across walking paths or small roads. The installed culverts have caused a reduction in the normal tidal flow. The decrease tidal flow has impacted the marsh and decrease native wildlife habitat, increased the presence of Phragmites and decreases the presence of native plants such as Spartina alternaflora and Spartina patens. The dense Phragmites vegetation has limited the use of the marsh by native wildlife. Water quality has been impacted by the decreased tidal flow.

**After Situation:**

The culvert has been removed and the natural tidal flow has been restored. The invasive plant Phragmites is eventually eradicated. Native coastal marsh plants become re-established. Native wildlife using the marsh become more abundant. Wildlife food and cover is increased. Water quality has improved because of improved tidal flow.

**Feature Measure:** <Unknown>

**Scenario Unit::** Each

**Scenario Typical Size:** 1.0

**Scenario Total Cost:** $7,254.88

**Scenario Cost/Unit:** $7,254.88

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 | $164.46 | 16 | $2,631.36 |
| Truck, dump, 12 CY | 1215 | Dump truck for moving bulk material. Typically capacity is 16 ton or 12 cubic yards. Includes equipment only. | Hour | $96.73 | 16 | $1,547.68 |
| **Labor** | | | | | | |
| General Labor | 231 | Labor performed using basic tools such as power tool, shovels, and other tools that do not require extensive training. Ex. pipe layer, herder, concrete placement, materials spreader, flagger, etc. | Hour | $25.31 | 16 | $404.96 |
| 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 | $44.37 | 32 | $1,419.84 |
| 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 | $45.69 | 6 | $274.14 |
| **Mobilization** | | | | | | |
| Mobilization, large equipment | 1140 | Equipment >150HP or typical weights greater than 30,000 pounds or loads requiring over width or over length permits. | Each | $488.45 | 2 | $976.90 |

**Practice:** 659 - Wetland Enhancement

**Scenario** #4 - Macro-Micro Topography Creation-On Site Disposal

**Scenario Description:**

The restoration of micro/macrotopography in a palustrine wetland area that was historically a forested wetland, wet meadow, or abandoned crop field. Alteration of the historic wetland has change the topography so that wetland values have been diminished. The wetland will be rehabilitated to enhance conditions primarily for waterfowl, amphibians and reptiles. The nearly level topography does not support a wide variety of native wetland plants. The hydrology has been significantly altered so that ponded water is not available for the establishment of wetland plants or for having adequate water for wildlife. Resource concerns include: Inadequate food and Cover, Inadequate water and Inadequate space. The micro/macro topography will be created using an excavator. Spoils materials will used or disposed of onsite. Micro/macro topography may range in depth from less than 1 to more than 3 feet. Facilitating practices include: 327 Conservation Cover, 342 Critical Area Planting, 644 Wetland Wildlife Habitat Management.

**Before Situation:**

A palustrine wetland complex has been altered due to changes in landuse or farming operations. There has been a significant change in the micro/macrotopography of the site. Typical native wetland plants are not present and there is a lack wetland hydrology. Plant communities are usually monotypic. Water is not available to facilitate wetland plant growth or to provide water for native wildlife. Wetland features and values are diminished or non-existent.

**After Situation:**

The micro/macrotopography has been restored. A variety of native wetland plants have colonized the wetland area providing both food and cover for native wildlife. Island nesting, breeding and foraging habitats have been enhances for resident wildlife. Wetland hydrology and communities have been restored. Water is available for native and migratory wildlife.

**Feature Measure:** <Unknown>

**Scenario Unit::** Acre

**Scenario Typical Size:** 1.0

**Scenario Total Cost:** $10,588.28

**Scenario Cost/Unit:** $10,588.28

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 | $164.46 | 32 | $5,262.72 |
| Tractor, agricultural, 120 HP | 962 | Agricultural tractor with horsepower range of 90 to 140. Equipment and power unit costs. Labor not included. | Hour | $57.70 | 4 | $230.80 |
| Dozer, 105 HP | 1320 | Track mounted Dozer with horsepower range of 90 to 125. Equipment and power unit costs. Labor not included. | Hour | $84.39 | 8 | $675.12 |
| **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 | $25.31 | 32 | $809.92 |
| Equipment Operators, Light | 232 | Includes: Skid Steer Loaders, Hydraulic Excavators <50 HP, Trenchers <12", Ag Equipment <150 HP, Pickup Trucks, Forklifts, Mulchers | Hour | $25.23 | 4 | $100.92 |
| 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 | $44.37 | 41 | $1,819.17 |
| Supervisor or Manager | 234 | Labor involving supervision or management activities. Includes crew supervisors, foremen and farm/ranch managers time required for adopting new technology, etc. | Hour | $45.69 | 10 | $456.90 |
| **Mobilization** | | | | | | |
| Mobilization, medium equipment | 1139 | Equipment with 70-150 HP or typical weights between 14,000 and 30,000 pounds. | Each | $255.83 | 1 | $255.83 |
| Mobilization, large equipment | 1140 | Equipment >150HP or typical weights greater than 30,000 pounds or loads requiring over width or over length permits. | Each | $488.45 | 2 | $976.90 |

**Practice:** 659 - Wetland Enhancement

**Scenario** #5 - Creation of Micro/Macrotopography Haul Away Spoils

**Scenario Description:**

The restoration of micro/macrotopography in a palustrine wetland area that was historically a forested wetland, wet meadow, or abandoned crop field. Alteration of the historic wetland has change the topography so that wetland values have been diminished. The wetland will be rehabilitated to enhance conditions primarily for waterfowl, amphibians and reptiles. The nearly level topography does not support a wide variety of native wetland plants. The hydrology has been significantly altered so that ponded water is not available for the establishment of wetland plants or for having adequate water for wildlife. Resource concerns include: Inadequate food and Cover, Inadequate water and Inadequate space. The micro/macro topography will be created using an excavator. Spoils materials will be hauled off site. Micro/macro topography may range in depth from less than 1 to more than 3 feet. Facilitating practices include: 327 Conservation Cover, 342 Critical Area Planting, 644 Wetland Wildlife Habitat Management.

**Before Situation:**

A palustrine wetland complex has been altered due to changes in landuse or farming operations. There has been a significant change in the micro/macrotopography of the site. Typical native wetland plants are not present and there is a lack wetland hydrology. Plant communities are usually monotypic. Water is not available to facilitate wetland plant growth or to provide water for native wildlife. Wetland features and values are diminished or non-existent.

**After Situation:**

The micro/macrotopography has been restored. A variety of native wetland plants have colonized the wetland area providing both food and cover for native wildlife. Nesting, breeding and foraging habitats have been enhances for resident wildlife. Wetland hydrology and communities have been restored. Water is available for native and migratory wildlife.

**Feature Measure:** <Unknown>

**Scenario Unit::** Acre

**Scenario Typical Size:** 1.0

**Scenario Total Cost:** $22,857.70

**Scenario Cost/Unit:** $22,857.70

Cost Details:

| Component Name | ID | Description | Unit | Cost | QTY | Total |
|---|---|---|---|---|---|---|
| **Equipment Installation** | | | | | | |
| Hydraulic Excavator, 1 CY | 931 | Track mounted hydraulic excavator with bucket capacity range of 0.8 to 1.5 CY. Equipment and power unit costs. Labor not included. | Hour | $113.75 | 60 | $6,825.00 |
| Truck, dump, 18 CY | 1400 | Dump truck for moving bulk material. Typically capacity is 25 ton or 18 cubic yards. Includes equipment only. | Hour | $121.65 | 60 | $7,299.00 |
| **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 | $25.31 | 60 | $1,518.60 |
| 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 | $44.37 | 120 | $5,324.40 |
| 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 | $45.69 | 20 | $913.80 |
| **Mobilization** | | | | | | |
| Mobilization, large equipment | 1140 | Equipment >150HP or typical weights greater than 30,000 pounds or loads requiring over width or over length permits. | Each | $488.45 | 2 | $976.90 |

**Practice:** 660 - Tree/Shrub Pruning

**Scenario** #1 - Pruning-Fire Hazard

**Scenario Description:**

Pruning trees of branches in a forest stand where wildfires are considered a high and very high hazard. Hand tools and power tools are used to cut branches from trees. Resource concerns include Degraded plant condition-wildfire hazard and Undesirable plant productivity and health.

**Before Situation:**

The forest stand is well to over-stocked, generally with 200 to 300+ trees per acre. Branches are touching understory vegetation or are in close proximity to forest floor where a ground fire can ignite the lower branches and move into the upper canopy. Wildfire hazard is very high.

**After Situation:**

The typical forest pruning treatment is 20 acres. Trees are pruned to the desirable height (generally 8-10') based on desired separation space between ground vegetation and tree crown. Pruned branches are treated if they are a hazard, see Woody Residue Treatment standard.

**Feature Measure:** area of treatment

**Scenario Unit::** Acre

**Scenario Typical Size:** 20.0

**Scenario Total Cost:** $4,714.88

**Scenario Cost/Unit:** $235.74

Cost Details:

| Component Name | ID | Description | Unit | Cost | QTY | Total |
|---|---|---|---|---|---|---|
| **Equipment Installation** | | | | | | |
| Chainsaw | 937 | Equipment and power unit costs. Labor not included. | Hour | $4.37 | 120 | $524.40 |
| Pruning tools, hand tools | 1318 | Pruning tools, hand tools, shears, loppers, pole saw, handsaw. Material costs only. Labor not included. | Hour | $4.94 | 20 | $98.80 |
| **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 | $25.31 | 140 | $3,543.40 |
| 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 | $45.69 | 12 | $548.28 |

**Practice:** 660 - Tree/Shrub Pruning

**Scenario** #2 - Pruning-Low Height

**Scenario Description:**

Pruning is done by hand with chain saws, tree loppers, hand shears, or hand saws. Trees are identified for pruning. To improve the quality of the stem wood, branches are pruned from the trees. Trees are growing at a fast pace, with leader growth on trees anywhere from 1.5 feet to 4 feet in length.

**Before Situation:**

Trees are retaining lower limbs along the entire tree bole, reducing wood quality. Pruning height will be based on overall stand diameter and height. Stand has been thinned and crop trees are identified for pruning. Degrade plant condition- undesirable plant productivity and health is the resource concern.

**After Situation:**

The typical forest pruning treatment is 20 acres. Trees are pruned to the desirable height of 8-10 feet. Pruned branches are treated if they are a hazard, see Woody Residue Treatment standard.

**Feature Measure:** area of treatment

**Scenario Unit::** Acre

**Scenario Typical Size:** 20.0

**Scenario Total Cost:** $3,803.95

**Scenario Cost/Unit:** $190.20

Cost Details:

| Component Name | ID | Description | Unit | Cost | QTY | Total |
|---|---|---|---|---|---|---|
| **Equipment Installation** | | | | | | |
| Chainsaw | 937 | Equipment and power unit costs. Labor not included. | Hour | $4.37 | 80 | $349.60 |
| Pruning tools, hand tools | 1318 | Pruning tools, hand tools, shears, loppers, pole saw, handsaw. Material costs only. Labor not included. | Hour | $4.94 | 20 | $98.80 |
| **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 | $25.31 | 100 | $2,531.00 |
| 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 | $45.69 | 15 | $685.35 |
| **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 | $6.96 | 20 | $139.20 |

**Practice:** 660 - Tree/Shrub Pruning

**Scenario** #3 - Pruning- High Height

**Scenario Description:**

Pruning is done by hand with pole saws or with gas pole saw. Crop trees are identified for pruning. The forest is on highly productive soils. Trees are growing at a fast pace, with leader growth on trees anywhere from 1.5 feet to 4 feet in length. To improve the quality of the stem wood, branches are pruned from the trees.

**Before Situation:**

Trees are retaining limbs mostly along the mid to upper section of the tree bole, reducing quality. Lower branches (0-8 feet) may have already been pruned, have naturally self pruned to differing heights. Pruning height is at least to eighteen (18) feet above the ground. Degrade plant condition- undesirable plant productivity and health is the resource concern.

**After Situation:**

The typical forest pruning treatment is 20 acres. Trees are pruned to the height of 18 feet or more. Pruned branches are treated so they do not become a fire or health hazard.

**Feature Measure:** area of treatment

**Scenario Unit::** Acre

**Scenario Typical Size:** 20.0

**Scenario Total Cost:** $5,912.15

**Scenario Cost/Unit:** $295.61

Cost Details:

| Component Name | ID | Description | Unit | Cost | QTY | Total |
|---|---|---|---|---|---|---|
| **Equipment Installation** | | | | | | |
| Chainsaw | 937 | Equipment and power unit costs. Labor not included. | Hour | $4.37 | 40 | $174.80 |
| 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 | 80 | $665.60 |
| **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 | $25.31 | 160 | $4,049.60 |
| 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 | $45.69 | 15 | $685.35 |
| **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 | $6.96 | 20 | $139.20 |

**Practice:** 660 - Tree/Shrub Pruning

**Scenario** #4 - Pruning-Wildlife

**Scenario Description:**

Pruning of hard/soft mast trees and shrubs to stimulate increased fruit/nut production for wildlife food. Primarily done around old agricultural fields, in old orchards, in forested areas. Is usually done with a chainsaw or handsaw to open the canopy and remove dead branches to increase airflow and sunlight penetration. Resource concerns are inadequate habitat for fish and wildlife - habitat degradation and plant condition- undesirable plant productivity and health

**Before Situation:**

Trees have reduced mast production due to tree reaching maturity or heavy shade. Pruning is needed to remove older branches, dead material and increase sunlight into the canopy. New branching will be stimulated, increasing mast production.

**After Situation:**

Selected trees (10 per acre) are re-invigorated with new branching and an increase in mast production.

**Feature Measure:** area of treatment

**Scenario Unit::** Acre

**Scenario Typical Size:** 2.0

**Scenario Total Cost:** $592.81

**Scenario Cost/Unit:** $296.41

Cost Details:

| Component Name | ID | Description | Unit | Cost | QTY | Total |
|---|---|---|---|---|---|---|
| **Equipment Installation** | | | | | | |
| Chainsaw | 937 | Equipment and power unit costs. Labor not included. | Hour | $4.37 | 5 | $21.85 |
| Pruning tools, hand tools | 1318 | Pruning tools, hand tools, shears, loppers, pole saw, handsaw. Material costs only. Labor not included. | Hour | $4.94 | 5 | $24.70 |
| Pruning tool, pole saw | 1319 | Gasoline powered pole chainsaw. Labor not included. | Hour | $8.32 | 6 | $49.92 |
| **Labor** | | | | | | |
| General Labor | 231 | Labor performed using basic tools such as power tool, shovels, and other tools that do not require extensive training. Ex. pipe layer, herder, concrete placement, materials spreader, flagger, etc. | Hour | $25.31 | 16 | $404.96 |
| 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 | $45.69 | 2 | $91.38 |

**Practice:** 660 - Tree/Shrub Pruning

**Scenario** #5 - Pruning-Multistory Cropping Understory

**Scenario Description:**

Pruning trees and/or shrubs is accomplished to extend the life span of trees and or shrubs. Pruning reduces the time periods of replacement by 2/3rds, exposing less bare soil. Pruning is accomplished by hand with hand tools and/or chainsaw. Trees and or shrubs are growing where the average rainfall is very high, with cooler temperatures and deep steep soils. Resource concerns are degraded plant condition-undesirable plant productivity and health, soil erosion-sheet and rill.

**Before Situation:**

Trees and/or shrubs are showing signs of reduced health (thinning crowns/less branching) and fruit production. Loss of trees or shrubs will occur within a few years. Severe soil erosion and sedimentation is a great concern if trees or shrubs are removed.

**After Situation:**

Tree/shrub pruning is completed on trees and/or shrubs. Cut vegetative material is left on the ground providing cover, and increasing organic matter. Alternative row pruning, treating every other row (or one-half the plants), in the same field, is completed 2 times. Renovation pruning is conducted one time for the entire field.

**Feature Measure:** individual tree/shrub pruned

**Scenario Unit::** Each

**Scenario Typical Size:** 800.0

**Scenario Total Cost:** $773.46

**Scenario Cost/Unit:** $0.97

Cost Details:

| Component Name | ID | Description | Unit | Cost | QTY | Total |
|---|---|---|---|---|---|---|
| **Equipment Installation** | | | | | | |
| Chainsaw | 937 | Equipment and power unit costs. Labor not included. | Hour | $4.37 | 10 | $43.70 |
| Pruning tools, hand tools | 1318 | Pruning tools, hand tools, shears, loppers, pole saw, handsaw. Material costs only. Labor not included. | Hour | $4.94 | 4 | $19.76 |
| **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 | $25.31 | 10 | $253.10 |
| 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 | $45.69 | 10 | $456.90 |

**Practice:** 660 - Tree/Shrub Pruning

**Scenario** #6 - Pruning-MultiStory Cropping-Overstory

**Scenario Description:**

Overstory tree crowns are pruned to increase sunlight to understory shrubs and low growing trees that have been purposely established to grow on the same acre of ground. Resource concern is degraded plant condition - undesirable plant productivity and health.

**Before Situation:**

The overstory trees are expanding their crowns, providing to much shade on the understory plants. The shade is affecting the growth and production of the understory plants. Pruning of branches, leaves, frawns, etc. are needed to maintain the desired amount of sunlight reaching the understory.

**After Situation:**

Pruning of the overstory tree crowns is completed, allowing the proper amount of sunlight to reach the understory vegetation, maintaining their growth, health and vigor, and wildlife benefits.

**Feature Measure:** Overstory Trees Pruned

**Scenario Unit::** Each

**Scenario Typical Size:** 120.0

**Scenario Total Cost:** $1,015.88

**Scenario Cost/Unit:** $8.47

Cost Details:

| Component Name | ID | Description | Unit | Cost | QTY | Total |
|---|---|---|---|---|---|---|
| **Equipment Installation** | | | | | | |
| Chainsaw | 937 | Equipment and power unit costs. Labor not included. | Hour | $4.37 | 0 | $0.00 |
| Pruning tools, hand tools | 1318 | Pruning tools, hand tools, shears, loppers, pole saw, handsaw. Material costs only. Labor not included. | Hour | $4.94 | 12 | $59.28 |
| Pruning tool, pole saw | 1319 | Gasoline powered pole chainsaw. Labor not included. | Hour | $8.32 | 20 | $166.40 |
| **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 | $25.31 | 24 | $607.44 |
| 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 | $45.69 | 4 | $182.76 |

**Practice:** 660 - Tree/Shrub Pruning

**Scenario** #8 - Sanitation

**Scenario Description:**

Pruning trees where Insects, and/or diseases create the potential for reducing growth, causing tree deformities and/or death. Hand tools and power tools are used to cut branches from trees. Resource concerns include degraded plant vigor, growth, and condition causing undesirable plant productivity and health.

**Before Situation:**

The forest stand has been identified as infested and/or infected with insects and/or disease. Typical setting is forestland or wildlife lands where the infestations and infections are established and are negatively affecting wildlife food and cover and tree productivity and health. Skilled labor will be consultant time for forester and General labor for landowner or other workers pruning and or moving brush.

**After Situation:**

The typical forest pruning treatment is 5 acres. Trees are pruned to the remove the infested and or infected branches. Pruned branches are treated as prescribed by the consultant Forester. After treatment, infestations and infections have been controlled to a level that meets client objectives to improve wildlife habitat, tree productivity, health, and vigor. Pruned branches are treated if they are considered a hazard, see Woody Residue Treatment standard.

**Feature Measure:** individual tree pruned

**Scenario Unit::** Acre

**Scenario Typical Size:** 5.0

**Scenario Total Cost:** $1,517.25

**Scenario Cost/Unit:** $303.45

Cost Details:

| Component Name | ID | Description | Unit | Cost | QTY | Total |
|---|---|---|---|---|---|---|
| **Equipment Installation** | | | | | | |
| Chainsaw | 937 | Equipment and power unit costs. Labor not included. | Hour | $4.37 | 10 | $43.70 |
| Pruning tools, hand tools | 1318 | Pruning tools, hand tools, shears, loppers, pole saw, handsaw. Material costs only. Labor not included. | Hour | $4.94 | 5 | $24.70 |
| Pruning tool, pole saw | 1319 | Gasoline powered pole chainsaw. Labor not included. | Hour | $8.32 | 25 | $208.00 |
| **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 | $25.31 | 40 | $1,012.40 |
| 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 | $45.69 | 5 | $228.45 |

**Practice:** 666 - Forest Stand Improvement

**Scenario** #3 - Pre-commercial Thinning - Hand tools

**Scenario Description:**

Adjusting the stocking of a young, non-merchantable stand of trees. The operation is supervised by a consultant forester and is carried out using hand tools such as chainsaws. Resource concerns include Undesirable plant productivity and health; Wildlife habitat degradation; Wildfire hazard; and Inadequate structure and composition.

**Before Situation:**

The stocking of a stand of trees that are too small to make a commercial thinning exceeds the recommended fully stocked level for the species and site. The effect is much slower growth than is reasonable or expected for the site, increased susceptibility to insects and disease, and an unacceptable devastating wildfire risk.

**After Situation:**

After adjusting the stocking to an acceptable level, stand growth, condition, and overall quality is improved. In addition, wildlife habitat is improved with the resulting increase of sunlight reaching the forest floor.

**Feature Measure:** Area treated

**Scenario Unit::** Acre

**Scenario Typical Size:** 10.0

**Scenario Total Cost:** $13,688.80

**Scenario Cost/Unit:** $1,368.88

Cost Details:

| Component Name | ID | Description | Unit | Cost | QTY | Total |
|---|---|---|---|---|---|---|
| **Equipment Installation** | | | | | | |
| Chainsaw | 937 | Equipment and power unit costs. Labor not included. | Hour | $4.37 | 200 | $874.00 |
| Truck, Pickup | 939 | Equipment and power unit costs. Labor not included. | Hour | $21.79 | 100 | $2,179.00 |
| **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 | $41.76 | 200 | $8,352.00 |
| 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 | $110.71 | 20 | $2,214.20 |
| **Materials** | | | | | | |
| Tree Marking Paint | 313 | Trees to be cut through tree marking are physically identified through the application of paint on the tree. Typically one quart of paint is used to mark one acre of trees. Includes materials and shipping only. | Acre | $6.96 | 10 | $69.60 |

**Practice:** 666 - Forest Stand Improvement

**Scenario** #5 - Timber Stand Improvement - Chemical, Ground

**Scenario Description:**

Using ground applied chemicals to release young desirable trees from competing and/or overtopping vegetation. Resource concerns include: Undesirable plant productivity and health, and Wildlife habitat degradation.

**Before Situation:**

An adequately stocked stand of desirable species and trees is not growing to its potential for the site due to severe competition from undesirable trees and brush. Releasing the desirable trees from the competition will be achieved through the application of appropriate herbicides according to label directions. Application will be by ground equipment as an over-the-top spray.

**After Situation:**

The released stand of trees contains the composition and quality needed to meet the landowner's objectives and address the resource concerns.

**Feature Measure:** Acres treated

**Scenario Unit::** Acre

**Scenario Typical Size:** 40.0

**Scenario Total Cost:** $10,505.00

**Scenario Cost/Unit:** $262.63

Cost Details:

| Component Name | ID | Description | Unit | Cost | QTY | Total |
|---|---|---|---|---|---|---|
| **Equipment Installation** | | | | | | |
| Truck, Pickup | 939 | Equipment and power unit costs. Labor not included. | Hour | $21.79 | 40 | $871.60 |
| Chemical, ground application | 948 | Chemical application performed by ground equipment. Includes equipment, power unit and labor costs. | Acre | $6.13 | 40 | $245.20 |
| **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 | $41.76 | 80 | $3,340.80 |
| Equipment Operators, Light | 232 | Includes: Skid Steer Loaders, Hydraulic Excavators <50 HP, Trenchers <12", Ag Equipment <150 HP, Pickup Trucks, Forklifts, Mulchers | Hour | $25.23 | 80 | $2,018.40 |
| 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 | $110.71 | 20 | $2,214.20 |
| **Materials** | | | | | | |
| Tree Marking Paint | 313 | Trees to be cut through tree marking are physically identified through the application of paint on the tree. Typically one quart of paint is used to mark one acre of trees. Includes materials and shipping only. | Acre | $6.96 | 40 | $278.40 |
| 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 | $37.13 | 40 | $1,485.20 |
| 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 shi | Acre | $1.28 | 40 | $51.20 |

**Practice:** 666 - Forest Stand Improvement

**Scenario** #7 - Thinning for Wildlife and Forest Health

**Scenario Description:**

Area-wide thinning is used to adjust the stocking of an overstocked stand to a recommended level -- generally equivalent to a "B-Line" stocking -- by lowing the overall basal area of the stand. A combination of hand and chemical treatments are used to improve residual tree spacing that enhances the forest's ability to increase diameter growth and live crown expansion. Resource concerns include: Inadequate structure and composition, Undesirable plant productivity and health, and Habitat degradation.

**Before Situation:**

The stand of pole-sized to overly mature trees is overstocked resulting in over competition, thus inhibiting growth potential and forest health. This condition is causing a lack of tree structure and composition as well as species diversity that is needed to meet the landowner's objective. Under the supervision of a consultant forester, the stand will be marked for thinning and timber stand improvement.

**After Situation:**

The stand will have adequate stocking that improves the overall residual tree growth and vigor. This is accomplished by removing defected and malformed, undesirable trees leaving only the best-formed and highest quality trees in the stand. The result will be a more resilient and fully stocked stand to mature into a healthy and viable forest.

**Feature Measure:** Acres treated

**Scenario Unit::** Acre

**Scenario Typical Size:** 10.0

**Scenario Total Cost:** $7,986.30

**Scenario Cost/Unit:** $798.63

Cost Details:

| Component Name | ID | Description | Unit | Cost | QTY | Total |
|---|---|---|---|---|---|---|
| **Equipment Installation** | | | | | | |
| Chainsaw | 937 | Equipment and power unit costs. Labor not included. | Hour | $4.37 | 100 | $437.00 |
| Truck, Pickup | 939 | Equipment and power unit costs. Labor not included. | Hour | $21.79 | 50 | $1,089.50 |
| **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 | $41.76 | 100 | $4,176.00 |
| 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 | $110.71 | 20 | $2,214.20 |
| **Materials** | | | | | | |
| Tree Marking Paint | 313 | Trees to be cut through tree marking are physically identified through the application of paint on the tree. Typically one quart of paint is used to mark one acre of trees. Includes materials and shipping only. | Acre | $6.96 | 10 | $69.60 |

**Practice:** 666 - Forest Stand Improvement

**Scenario** #8 - Creating Small Patch Clearcuts

**Scenario Description:**

Creating 2 acre patches in over-mature and/or degraded stands using hand tools such as chainsaws. Resource concerns include: Undesirable plant productivity and health, Inadequate structure and composition, and habitat degradation.

**Before Situation:**

The existing stand is overly mature and/or has been degraded in value by past harvesting practices. The level of acceptable growing stock is too low to justify managing this stand in its present condition. The present form, species composition and structure cannot meet the resource concerns and landowner objectives. Creating small openings by cutting all trees greater than 2" in diameter will foster the regeneration of high-value shade intolerant species. The work will be done with chainsaws.

**After Situation:**

A new, young stand of desirable species is established In addition, early successional wildlife habitat as well as forest type diversity are created.

**Feature Measure:** Area treated

**Scenario Unit::** Acre

**Scenario Typical Size:** 2.0

**Scenario Total Cost:** $1,361.92

**Scenario Cost/Unit:** $680.96

Cost Details:

| Component Name | ID | Description | Unit | Cost | QTY | Total |
|---|---|---|---|---|---|---|
| **Equipment Installation** | | | | | | |
| Chainsaw | 937 | Equipment and power unit costs. Labor not included. | Hour | $4.37 | 20 | $87.40 |
| Truck, Pickup | 939 | Equipment and power unit costs. Labor not included. | Hour | $21.79 | 10 | $217.90 |
| **Labor** | | | | | | |
| Skilled Labor | 230 | Labor requiring a high level skill set: Includes carpenters, welders, electricians, conservation professionals involved with data collection, monitoring, and or record keeping, etc. | Hour | $41.76 | 20 | $835.20 |
| 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 | $110.71 | 2 | $221.42 |

**Practice:** 666 - Forest Stand Improvement

**Scenario** #10 - Tree Marking

**Scenario Description:**

The marking of a forest stand by a professional forester, in accordance with recommendations in an approved Forest Management or Conservation Plan, to improve the health, productivity and vigor of the stand, and improve wildlife habitat. The cost for this scenario is based on the labor for a professional forester or wildlife biologist to provide timber marking to ensure that the treatment is silviculturally sound and damage to the residual stand is minimized. There is no cost of the wood removal since a commercial logger will be doing the work.

**Before Situation:**

An overstocked stand of mixed aged species that are growing slowly, and prone to forest health problems do to high stand density. Wildlife habitat is degraded, due to the species composition and competition which is reducing mast production and reducing the understory plant population.

**After Situation:**

The stand is treated to favor diversity of important commercial and wildlife species. The canopy is opened to the extent necessary to promote herbaceous growth and the work is performed without excessive damage to the residual trees and site.

**Feature Measure:** <Unknown>

**Scenario Unit::** Acre

**Scenario Typical Size:** 10.0

**Scenario Total Cost:** $955.28

**Scenario Cost/Unit:** $95.53

Cost Details:

| Component Name | ID | Description | Unit | Cost | QTY | Total |
|---|---|---|---|---|---|---|
| **Labor** | | | | | | |
| Specialist Labor | 235 | Labor requiring a specialized skill set: Includes Agronomists, Foresters, Biologists, etc. to provide additional technical information during the planning and implementation of the practice. Does not include NRCS or TSP services. | Hour | $110.71 | 8 | $885.68 |
| **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 | $6.96 | 10 | $69.60 |

**Practice:** 666 - Forest Stand Improvement

**Scenario** #12 - Girdling

**Scenario Description:**

The removal of less desirable trees of any species in a stand of saplings or larger trees primarily to improve composition, quality and wildlife. Resource concerns include Undesirable plant productivity and health; Wildlife habitat degradation; and Inadequate structure and composition.

**Before Situation:**

The stocking of a stand of trees that are too small to make a commercial thinning exceeds the recommended fully stocked level for the species and site. The effect is much slower growth than is reasonable or expected for the site, increased susceptibility to insects and disease, and an unacceptable devastating wildfire risk.

**After Situation:**

After adjusting the stocking to an acceptable level, stand growth, condition, and overall quality is improved. In addition, wildlife habitat is improved with the resulting increase of sunlight reaching the forest floor.

**Feature Measure:** Area treated

**Scenario Unit::** Acre

**Scenario Typical Size:** 10.0

**Scenario Total Cost:** $2,992.88

**Scenario Cost/Unit:** $299.29

Cost Details:

| Component Name | ID | Description | Unit | Cost | QTY | Total |
|---|---|---|---|---|---|---|
| **Equipment Installation** | | | | | | |
| Chainsaw | 937 | Equipment and power unit costs. Labor not included. | Hour | $4.37 | 30 | $131.10 |
| Truck, Pickup | 939 | Equipment and power unit costs. Labor not included. | Hour | $21.79 | 30 | $653.70 |
| **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 | $41.76 | 30 | $1,252.80 |
| 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 | $110.71 | 8 | $885.68 |
| **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 | $6.96 | 10 | $69.60 |

**Practice:** 672 - Building Envelope Improvement

**Scenario** #1 - Wall Insulation

**Scenario Description:**

Enclose both sidewalls and endwalls from ceiling to floor in one of two manners: 1) metal exterior, 3.5" fiberglass batts (R-11), vapor barrier, & interior plywood or OSB sheathing, or 2) closed-cell polyurethane foam application (minimum 1" thickness (R-7) of 2.5 lbs/cu.ft. or higher density, (3.0 or higher density preferred) with a form of physical protective barrier on lower 2' (may be 6 lbs/cu.ft. or higher density 1/8" thick foam, or treated lumber). Based on a 40' x 400' agricultural structure. NOTE: NOT USED FOR GREENHOUSES.

**Before Situation:**

An agricultural facility with an inefficient building envelope with limited wall insulation.

**After Situation:**

A more effective and efficient building envelope can be created through addition of, or increased, insulation. Associated practices/activities: may include 122-AgEMP - HQ, 374-Farmstead Energy Improvement, and other activities within 672-Building Envelope Improvement. The resource concern is inefficient use of energy in the farm operation which increases dependence on non-renewable energy sources and can be addressed through improved energy efficiency. Any improvements are based on a Type 2 energy audit meeting the requirements of ASABE S612.

**Feature Measure:** Square Feet of Wall Insulated

**Scenario Unit::** Square Foot

**Scenario Typical Size:** 12,000.0

**Scenario Total Cost:** $29,220.00

**Scenario Cost/Unit:** $2.44

Cost Details:

| Component Name | ID | Description | Unit | Cost | QTY | Total |
|---|---|---|---|---|---|---|
| **Materials** | | | | | | |
| Insulation, Panel, R-11 with sheathing | 1197 | Insulated wall panel typically 3.5" fiberglass batts (R-11), vapor barrier and OSB sheathing, or equal, includes materials, equipment and labor to install. | Square Foot | $2.26 | 6000 | $13,560.00 |
| 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 | $2.61 | 6000 | $15,660.00 |

**Practice:** 672 - Building Envelope Improvement

**Scenario** #2 - Sealant

**Scenario Description:**

A typical scenario is sealing the gaps between walls, gables, ceiling, etc. in a poultry house or greenhouse. Sealing is performed by a professional contractor, not merely use of spray foam from a can. The unit basis of payment in this scenario is each house based on 60' x 500' poultry house with an assumed need of sealant to seal 2400 linear feet of gap.

**Before Situation:**

An agricultural facility with an inefficient building envelope with gaps between walls, ceiling, etc. for a total of 2400 linear feet.

**After Situation:**

A more effective and efficient building envelope can be created through interior sealing of the exterior walls at the footer plate, eaves, ridge cap, and gable ends. The sealant reduces seasonal heat loss and heat gain due to infiltration which reduces the respective need for heating and cooling equipment to operate. Associated practices/activities: may include 122-AgEMP - HQ, 374-Farmstead Energy Improvement, and other activities within 672-Building Envelope Improvement . The resource concern is inefficient use of energy in the farm operation which increases dependence on non-renewable energy sources and can be addressed through improved energy efficiency. Any improvements are based on a Type 2 energy audit meeting the requirements of ASABE S612.

**Feature Measure:** Perimeter of heated structure

**Scenario Unit::** Foot

**Scenario Typical Size:** 2,400.0

**Scenario Total Cost:** $4,704.00

**Scenario Cost/Unit:** $1.96

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 | $1.96 | 2400 | $4,704.00 |

**Practice:** 672 - Building Envelope Improvement

**Scenario** #3 - Slab/floor insulation in cold storage.

**Scenario Description:**

Thermal insulation installed below floor and/or concrete slab in cold storage spaces to reduce cooling load.

**Before Situation:**

Operation of cold storage systems (e.g. Walk-in coolers) depend on maintaining an inside temperature against a thermal gradient compared to ambient and ground temperatures. Wall insulation (above grade) is generally well addressed via purchase of a modular panel walk-in cooler box or via farm-built framed construction. Slab insulation, however, is not always addressed, despite the fact that the ground temperature presents a higher reference temperature (stronger gradient) during most of the typical New England storage season.

**After Situation:**

Moisture tolerant, below grade, extruded polystyrene insulation @ R4 per inch, referred to as blueboard. 2' x 8' sheets 2" thick. Installing insulation under the slab will improve overall system energy efficiency by providing a thermal break between the cooled space (generally 38 F for coolers and 0 F for freezers) and the ground (average 50 F). It may also support the adoption of concrete slabs in general in cooled spaces which has food safety benefit (condensate management and clean ability).

**Feature Measure:** Square feet of conditioned space.

**Scenario Unit::** Square Foot

**Scenario Typical Size:** 300.0

**Scenario Total Cost:** $393.00

**Scenario Cost/Unit:** $1.31

Cost Details:

| Component Name | ID | Description | Unit | Cost | QTY | Total |
|---|---|---|---|---|---|---|
| **Materials** | | | | | | |
| Insulation, Foam board, expanded, 2 in. thick | 2475 | Foam board insulation, expanded, 2 in. thick | Square Foot | $1.31 | 300 | $393.00 |

**Practice:** 672 - Building Envelope Improvement

**Scenario** #4 - Greenhouse Bubble Insulation

**Scenario Description:**

Place aluminum foil faced double bubble insulation on greenhouse sidewalls to bench height (3') and/or cover the endwalls of a greenhouse with insulation from ceiling to floor. NOTE: FOR GREENHOUSES ONLY.

**Before Situation:**

A greenhouse with standard glazing, plastic or polycarbonate walls has an inefficient building envelope constructed with limited wall insulation. Heating of existing greenhouse is inefficient due to excessive heat loss.

**After Situation:**

Aluminum foil faced double bubble insulation is placed between the inner layer of plastic and the frame of greenhouse sidewalls to bench height (3') and/or covers the endwalls of a greenhouse with insulation from ceiling to floor. A more effective and efficient building envelope created through addition of insulation. The increased insulation reduces seasonal heat loss which reduces the respective need for heating equipment to operate. Associated practices/activities: may include 122-AgEMP - HQ, 374-Farmstead Energy Improvement, and other activities within 672-Building Envelope Improvement. The resource concern is inefficient use of energy in the farm operation which increases dependence on non-renewable energy sources and can be addressed through improved energy efficiency. Any improvements are based on a Type 2 energy audit meeting the requirements of ASABE S612.

**Feature Measure:** Square Feet of Wall Insulated

**Scenario Unit::** Square Foot

**Scenario Typical Size:** 600.0

**Scenario Total Cost:** $347.04

**Scenario Cost/Unit:** $0.58

Cost Details:

| Component Name | ID | Description | Unit | Cost | QTY | Total |
|---|---|---|---|---|---|---|
| **Labor** | | | | | | |
| Skilled Labor | 230 | Labor requiring a high level skill set: Includes carpenters, welders, electricians, conservation professionals involved with data collection, monitoring, and or record keeping, etc. | Hour | $41.76 | 4 | $167.04 |
| **Materials** | | | | | | |
| Insulation, Greenhouse, Reflective Bubble | 2410 | Double bubble reflective insulation with aluminum foil on both sides. Includes materials and shipping only. | Square Foot | $0.30 | 600 | $180.00 |

**Practice:** 672 - Building Envelope Improvement

**Scenario** #5 - Greenhouse Solid Insulation

**Scenario Description:**

Cover the endwalls 3ft to floor and/or the foundation (24 inches below ground) of a greenhouse with 1 inch of solid polystyrene or polyurethane insulation. NOTE: FOR GREENHOUSES ONLY.

**Before Situation:**

A greenhouse with an inefficient building envelope covered with limited end wall or foundation insulation.

**After Situation:**

Endwalls of greenhouse are covered 3ft to floor and/or the foundation is covered to 24 inches below ground with 1 inch of solid polystyrene or polyurethane insulation. A more effective and efficient building envelope created through addition of insulation. Associated practices/activities: may include 122-AgEMP - HQ, 374-Farmstead Energy Improvement, and other activities within 672-Building Envelope Improvement. The resource concern is inefficient use of energy in the farm operation which increases dependence on non-renewable energy sources and can be addressed through improved energy efficiency. Any improvements are based on a Type 2 energy audit meeting the requirements of ASABE S612.

**Feature Measure:** Square Feet Insulated

**Scenario Unit::** Square Foot

**Scenario Typical Size:** 500.0

**Scenario Total Cost:** $622.04

**Scenario Cost/Unit:** $1.24

Cost Details:

| Component Name | ID | Description | Unit | Cost | QTY | Total |
|---|---|---|---|---|---|---|
| **Labor** | | | | | | |
| Skilled Labor | 230 | Labor requiring a high level skill set: Includes carpenters, welders, electricians, conservation professionals involved with data collection, monitoring, and or record keeping, etc. | Hour | $41.76 | 4 | $167.04 |
| **Materials** | | | | | | |
| Insulation, Greenhouse, Solid | 2411 | Solid insulation board with aluminum foil on both sides. 1" X 4' X 8' or 32 sq.ft. Includes materials and shipping only. | Square Foot | $0.91 | 500 | $455.00 |

**Practice:** 672 - Building Envelope Improvement

**Scenario** #6 - Greenhouse Screens <= 10,000 sq. ft.

**Scenario Description:**

The mechanical energy screen system consists of a drive motor, support cables, controls, and shade material, which may be woven, knitted, or non-woven strips of aluminum fiber, polyethylene, nylon or other synthetic material. The screen provides a means to better control solar heat gain and heat transfer during night or cold weather conditions to reduce energy use. Screens and similar devices may also be used to divide internal areas and allow for differentiated heating, ventilation, or cooling system operation to reduce energy use. This scenario includes screens that are <= 10,000 square foot.

**Before Situation:**

Heating and cooling of an existing greenhouse, or similar structure with conditioned spaces, is inefficient due to poorly regulated heat transfer. A need to regulate an entire space for uniform conditions when some portions have differing, intermittent requirements can also reduce efficiency.

**After Situation:**

The greenhouse is fitted with a mechanically controlled energy screen installed truss-to-truss or gutter-to-gutter, with side screens as necessary, reducing heat loss in the greenhouse. Associated practices/activities: may include 122-AgEMP - HQ, 374-Farmstead Energy Improvement, and other activities within 672-Building Envelope Improvement. The resource concern is inefficient use of energy in the farm operation which increases dependence on non-renewable energy sources and can be addressed through improved energy efficiency. Any improvements are based on a Type 2 energy audit meeting the requirements of ASABE S612.

**Feature Measure:** Area of Screen

**Scenario Unit::** Square Foot

**Scenario Typical Size:** 8,000.0

**Scenario Total Cost:** $18,668.16

**Scenario Cost/Unit:** $2.33

Cost Details:

| Component Name | ID | Description | Unit | Cost | QTY | Total |
|---|---|---|---|---|---|---|
| **Labor** | | | | | | |
| Skilled Labor | 230 | Labor requiring a high level skill set: Includes carpenters, welders, electricians, conservation professionals involved with data collection, monitoring, and or record keeping, etc. | Hour | $41.76 | 16 | $668.16 |
| **Materials** | | | | | | |
| Thermal blanket, <= 10,000 square foot | 1147 | Thermal blanket greenhouse screens: mechanical energy screen system consists of a drive motor, support cables, controls, and shade material, which may be woven, knitted, or non-woven. Size range is less than 10,000 square feet. Materials only. | Square Foot | $2.25 | 8000 | $18,000.00 |

**Practice:** 672 - Building Envelope Improvement

**Scenario** #7 - Greenhouse Screens > 10,000 sq.ft.

**Scenario Description:**

The mechanical energy screen system consists of a drive motor, support cables, controls, and shade material, which may be woven, knitted, or non-woven strips of aluminum fiber, polyethylene, nylon or other synthetic material. The screen provides a means to better control solar heat gain and heat transfer during night or cold weather conditions to reduce energy use. Screens and similar devices may also be used to divide internal areas and allow for differentiated heating, ventilation, or cooling system operation to reduce energy use. This scenario includes screens that are > 10,000 square foot

**Before Situation:**

Heating and cooling of an existing greenhouse, or similar structure with conditioned spaces, is inefficient due to poorly regulated heat transfer. A need to regulate an entire space for uniform conditions when some portions have differing, intermittent requirements can also reduce efficiency.

**After Situation:**

The greenhouse is fitted with a mechanically controlled energy screen installed truss-to-truss or gutter-to-gutter, with side screens as necessary, reducing heat loss in the greenhouse. Associated practices/activities: may include 122-AgEMP - HQ, 374-Farmstead Energy Improvement, and other activities within 672-Building Envelope Improvement. The resource concern is inefficient use of energy in the farm operation which increases dependence on non-renewable energy sources and can be addressed through improved energy efficiency. Any improvements are based on a Type 2 energy audit meeting the requirements of ASABE S612.

**Feature Measure:** Area of Screen

**Scenario Unit::** Square Foot

**Scenario Typical Size:** 15,000.0

**Scenario Total Cost:** $30,900.00

**Scenario Cost/Unit:** $2.06

Cost Details:

| Component Name | ID | Description | Unit | Cost | QTY | Total |
|---|---|---|---|---|---|---|
| **Materials** | | | | | | |
| Thermal blanket 10,001 - 50,000 square foot | 1148 | Thermal blanket greenhouse screens: mechanical energy screen system consists of a drive motor, support cables, controls, and shade material, which may be woven, knitted, or non-woven. Size Range is 10,001 to 50,000 square feet. Materials only. | Square Foot | $2.06 | 15000 | $30,900.00 |

**Practice:** 672 - Building Envelope Improvement

**Scenario** #71 - Building Envelope - Attic Insulation

**Scenario Description:**

Install a minimum R-7 insulation in addition to existing attic or ceiling to reduce heat transfer. Increased insulation reduces seasonal heat loss and heat gain which reduces the respective need for heating and cooling equipment to operate.

**Before Situation:**

A poultry house with an inefficient building envelope with limited attic insulation.

**After Situation:**

A more effective and efficient building envelope can be created through addition of, or increased, attic insulation. Associated practices/activities: 122-AgEMP - HQ and 374-Farmstead Energy Improvement. The resource concern is inefficient use of energy in the farm operation which increases dependence on non-renewable energy sources and can be addressed through improved energy efficiency. Any improvements are based on a Type 2 energy audit meeting the requirements of ASABE S612.

**Feature Measure:** Area of Attic Insulated

**Scenario Unit::** Square Foot

**Scenario Typical Size:** 20,000.0

**Scenario Total Cost:** $18,600.00

**Scenario Cost/Unit:** $0.93

Cost Details:

| Component Name | ID | Description | Unit | Cost | QTY | Total |
|---|---|---|---|---|---|---|
| **Materials** | | | | | | |
| Insulation, Fiberglass or cellulose, R-15 | 1196 | Fiberglass or cellulose insulation R-15, includes materials, equipment and labor to install. | Square Foot | $0.93 | 20000 | $18,600.00 |

**Practice:** B000BFF1 - Buffer Bundle#1

**Scenario** #1 - Buffer Bundle#1

**Scenario Description:**
Addresses water quality degradation, degraded plant condition, fish/wildlife inadequate habitat, and/or air quality impacts.

**Before Situation:**
Resources are protected at the minimum level of the conservation practice standard(s) applied as part of the enhancement.

**After Situation:**
The adoption of this enhancement will provide resource protection above the minimum level of the conservation practice standard(s) applied

**Feature Measure:** Acre

**Scenario Unit::** Acre

**Scenario Typical Size:** 3.0

**Scenario Total Cost:** $2,719.14

**Scenario Cost/Unit:** $906.38

Cost Details:

| Component Name | ID | Description | Unit | Cost | QTY | Total |
|---|---|---|---|---|---|---|
| **Equipment Installation** | | | | | | |
| Truck, Pickup | 939 | Equipment and power unit costs. Labor not included. | Hour | $21.79 | 2 | $43.58 |
| Tillage, Light | 945 | Includes light disking (tandem) or field cultivator. Includes equipment, power unit and labor costs. | Acre | $11.14 | 1 | $11.14 |
| Chemical, ground application | 948 | Chemical application performed by ground equipment. Includes equipment, power unit and labor costs. | Acre | $6.13 | 1 | $6.13 |
| Chemical, ground application | 948 | Chemical application performed by ground equipment. Includes equipment, power unit and labor costs. | Acre | $6.13 | 1 | $6.13 |
| Seeding Operation, No Till/Grass Drill | 960 | No Till drill or grass drill for seeding. Includes equipment, power unit and labor costs. | Acre | $21.36 | 1 | $21.36 |
| Cultipacking | 1100 | Includes equipment, power unit and labor costs. | Acre | $7.70 | 1 | $7.70 |
| 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 |
| **Foregone Income** | | | | | | |
| FI, Corn Dryland | 1959 | Dryland Corn is Primary Crop | Acre | $376.15 | 0.41 | $154.22 |
| FI, Corn Dryland | 1959 | Dryland Corn is Primary Crop | Acre | $376.15 | 0.41 | $154.22 |
| FI, Soybeans Dryland | 1961 | Dryland Soybeans is Primary Crop | Acre | $361.97 | 0.36 | $130.31 |
| FI, Soybeans Dryland | 1961 | Dryland Soybeans is Primary Crop | Acre | $361.97 | 0.36 | $130.31 |
| FI, Wheat Dryland | 1963 | Dryland Wheat is Primary Crop | Acre | $269.62 | 0.23 | $62.01 |
| FI, Wheat Dryland | 1963 | Dryland Wheat is Primary Crop | Acre | $269.62 | 0.23 | $62.01 |
| **Labor** | | | | | | |
| Skilled Labor | 230 | Labor requiring a high level skill set: Includes carpenters, welders, electricians, conservation professionals involved with data collection, monitoring, and or record keeping, etc. | Hour | $41.76 | 2 | $83.52 |
| General Labor | 231 | Labor performed using basic tools such as power tool, shovels, and other tools that do not require extensive training. Ex. pipe layer, herder, concrete placement, materials spreader, flagger, etc. | Hour | $25.31 | 10 | $253.10 |
| Specialist Labor | 235 | Labor requiring a specialized skill set: Includes Agronomists, Foresters, Biologists, etc. to provide additional technical information during the planning and implementation of the practice. Does not include NRCS or TSP services. | Hour | $110.71 | 2 | $221.42 |
| **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 | $17.48 | 1 | $17.48 |
| 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 | $25.63 | 1 | $25.63 |

| | | | | | | |
|---|---|---|---|---|---|---|
| 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 shi | Acre | $1.28 | 1 | $1.28 |
| Shrub, seedling or transplant, bare root, 18"-36" | 1507 | Bare root hardwood trees 18-36" tall. Includes materials and shipping only. | Each | $0.57 | 341 | $194.37 |
| Tree, hardwood, seedling or transplant, bare root, 16-36" | 1510 | Bare root hardwood trees 18-36" tall. Includes materials and shipping only. | Each | $0.80 | 340 | $272.00 |
| Five Species Mix, Cool Season, Annual Grasses and Legumes | 2320 | Cool season, introduced grass and legume mix. Includes material and shipping only. | Acre | $58.50 | 1 | $58.50 |
| 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 | $254.41 | 1 | $254.41 |
| **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 | $172.07 | 1 | $172.07 |
| Mobilization, medium equipment | 1139 | Equipment with 70-150 HP or typical weights between 14,000 and 30,000 pounds. | Each | $255.83 | 1 | $255.83 |

**Practice:** B000BFF2 - Buffer Bundle#2

**Scenario** #1 - Buffer Bundle#2

**Scenario Description:**
Addresses water quality degradation, degraded plant condition, fish/wildlife inadequate habitat, and/or air quality impacts.

**Before Situation:**
Resources are protected at the minimum level of the conservation practice standard(s) applied as part of the enhancement.

**After Situation:**
The adoption of this enhancement will provide resource protection above the minimum level of the conservation practice standard(s) applied

**Feature Measure:** Acre

**Scenario Unit::** Acre

**Scenario Typical Size:** 3.0

**Scenario Total Cost:** $2,719.14

**Scenario Cost/Unit:** $906.38

Cost Details:

| Component Name | ID | Description | Unit | Cost | QTY | Total |
|---|---|---|---|---|---|---|
| **Equipment Installation** | | | | | | |
| Truck, Pickup | 939 | Equipment and power unit costs. Labor not included. | Hour | $21.79 | 2 | $43.58 |
| Tillage, Light | 945 | Includes light disking (tandem) or field cultivator. Includes equipment, power unit and labor costs. | Acre | $11.14 | 1 | $11.14 |
| Chemical, ground application | 948 | Chemical application performed by ground equipment. Includes equipment, power unit and labor costs. | Acre | $6.13 | 1 | $6.13 |
| Chemical, ground application | 948 | Chemical application performed by ground equipment. Includes equipment, power unit and labor costs. | Acre | $6.13 | 1 | $6.13 |
| Seeding Operation, No Till/Grass Drill | 960 | No Till drill or grass drill for seeding. Includes equipment, power unit and labor costs. | Acre | $21.36 | 1 | $21.36 |
| Cultipacking | 1100 | Includes equipment, power unit and labor costs. | Acre | $7.70 | 1 | $7.70 |
| 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 |
| **Foregone Income** | | | | | | |
| FI, Corn Dryland | 1959 | Dryland Corn is Primary Crop | Acre | $376.15 | 0.41 | $154.22 |
| FI, Corn Dryland | 1959 | Dryland Corn is Primary Crop | Acre | $376.15 | 0.41 | $154.22 |
| FI, Soybeans Dryland | 1961 | Dryland Soybeans is Primary Crop | Acre | $361.97 | 0.36 | $130.31 |
| FI, Soybeans Dryland | 1961 | Dryland Soybeans is Primary Crop | Acre | $361.97 | 0.36 | $130.31 |
| FI, Wheat Dryland | 1963 | Dryland Wheat is Primary Crop | Acre | $269.62 | 0.23 | $62.01 |
| FI, Wheat Dryland | 1963 | Dryland Wheat is Primary Crop | Acre | $269.62 | 0.23 | $62.01 |
| **Labor** | | | | | | |
| Skilled Labor | 230 | Labor requiring a high level skill set: Includes carpenters, welders, electricians, conservation professionals involved with data collection, monitoring, and or record keeping, etc. | Hour | $41.76 | 2 | $83.52 |
| General Labor | 231 | Labor performed using basic tools such as power tool, shovels, and other tools that do not require extensive training. Ex. pipe layer, herder, concrete placement, materials spreader, flagger, etc. | Hour | $25.31 | 10 | $253.10 |
| Specialist Labor | 235 | Labor requiring a specialized skill set: Includes Agronomists, Foresters, Biologists, etc. to provide additional technical information during the planning and implementation of the practice. Does not include NRCS or TSP services. | Hour | $110.71 | 2 | $221.42 |
| **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 | $17.48 | 1 | $17.48 |
| 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 | $25.63 | 1 | $25.63 |

| | | | | | | |
|---|---|---|---|---|---|---|
| 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 shi | Acre | $1.28 | 1 | $1.28 |
| Shrub, seedling or transplant, bare root, 18"-36" | 1507 | Bare root hardwood trees 18-36" tall. Includes materials and shipping only. | Each | $0.57 | 341 | $194.37 |
| Tree, hardwood, seedling or transplant, bare root, 16-36" | 1510 | Bare root hardwood trees 18-36" tall. Includes materials and shipping only. | Each | $0.80 | 340 | $272.00 |
| Five Species Mix, Cool Season, Annual Grasses and Legumes | 2320 | Cool season, introduced grass and legume mix. Includes material and shipping only. | Acre | $58.50 | 1 | $58.50 |
| 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 | $254.41 | 1 | $254.41 |
| **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 | $172.07 | 1 | $172.07 |
| Mobilization, medium equipment | 1139 | Equipment with 70-150 HP or typical weights between 14,000 and 30,000 pounds. | Each | $255.83 | 1 | $255.83 |

**Practice:** B000CPL1 - Crop Bundle#1 - Precision Ag, No till

**Scenario** #1 - Crop Bundle#1 - Precision Ag, No till

**Scenario Description:**
Addresses water quality degradation, air quality, and fish/wildlife inadequate habitat plus an option on soil erosion or soil quality degradation

**Before Situation:**
Resources are protected at the minimum level of the conservation practice standard(s) applied as part of the enhancement.

**After Situation:**
The adoption of this enhancement will provide resource protection above the minimum level of the conservation practice standard(s) applied

**Feature Measure:** Acre

**Scenario Unit::** Acre

**Scenario Typical Size:** 100.0

**Scenario Total Cost:** $3,674.03

**Scenario Cost/Unit:** $36.74

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 | $9.85 | 100 | $985.00 |
| Fertilizer, precision application | 952 | Fertilizer application performed by light bar/GPS navigation system. Includes equipment, power unit and labor costs. | Acre | $10.67 | 100 | $1,067.00 |
| **Foregone Income** | | | | | | |
| FI, Corn Dryland | 1959 | Dryland Corn is Primary Crop | Acre | $376.15 | 0.51 | $191.84 |
| FI, Soybeans Dryland | 1961 | Dryland Soybeans is Primary Crop | Acre | $361.97 | 0.45 | $162.89 |
| FI, Wheat Dryland | 1963 | Dryland Wheat is Primary Crop | Acre | $269.62 | 0.29 | $78.19 |
| **Labor** | | | | | | |
| Supervisor or Manager | 234 | Labor involving supervision or management activities. Includes crew supervisors, foremen and farm/ranch managers time required for adopting new technology, etc. | Hour | $45.69 | 1 | $45.69 |
| Specialist Labor | 235 | Labor requiring a specialized skill set: Includes 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 | $110.71 | 8 | $885.68 |
| **Materials** | | | | | | |
| Test, Soil Test, Precision, Grid or Zone DELETION SCHEDULED for PS FY 2018 , USE CID 299 | 300 | Includes materials, shipping, labor, and equipment costs. DELETION SCHEDULED for PS FY 2018 , USE CID 299 | Each | $10.31 | 25 | $257.75 |

## USDA - Natural Resources Conservation Service

**Massachusetts**

**Practice:** B000CPL2 - Crop Bundle#2 - Precision Ag, Reduced till

**Scenario** #1 - Crop Bundle#2 - Precision Ag, RT

**Scenario Description:**
Addresses water quality degradation, air quality, and fish/wildlife inadequate habitat plus an option on soil erosion or soil quality degradation

**Before Situation:**
Resources are protected at the minimum level of the conservation practice standard(s) applied as part of the enhancement.

**After Situation:**
The adoption of this enhancement will provide resource protection above the minimum level of the conservation practice standard(s) applied

**Feature Measure:** Acre

**Scenario Unit::** Acre

**Scenario Typical Size:** 100.0

**Scenario Total Cost:** $3,674.03

**Scenario Cost/Unit:** $36.74

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 | $9.85 | 100 | $985.00 |
| Fertilizer, precision application | 952 | Fertilizer application performed by light bar/GPS navigation system. Includes equipment, power unit and labor costs. | Acre | $10.67 | 100 | $1,067.00 |
| **Foregone Income** | | | | | | |
| FI, Corn Dryland | 1959 | Dryland Corn is Primary Crop | Acre | $376.15 | 0.51 | $191.84 |
| FI, Soybeans Dryland | 1961 | Dryland Soybeans is Primary Crop | Acre | $361.97 | 0.45 | $162.89 |
| FI, Wheat Dryland | 1963 | Dryland Wheat is Primary Crop | Acre | $269.62 | 0.29 | $78.19 |
| **Labor** | | | | | | |
| Supervisor or Manager | 234 | Labor involving supervision or management activities. Includes crew supervisors, foremen and farm/ranch managers time required for adopting new technology, etc. | Hour | $45.69 | 1 | $45.69 |
| Specialist Labor | 235 | Labor requiring a specialized skill set: Includes 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 | $110.71 | 8 | $885.68 |
| **Materials** | | | | | | |
| Test, Soil Test, Precision, Grid or Zone DELETION SCHEDULED for PS FY 2018 , USE CID 299 | 300 | Includes materials, shipping, labor, and equipment costs. DELETION SCHEDULED for PS FY 2018 , USE CID 299 | Each | $10.31 | 25 | $257.75 |

**Practice:** B000CPL3 - Crop Bundle#3 - Soil health rotation, No till

**Scenario** #1 - Crop Bundle#3 - Soil health rotation, NT

**Scenario Description:**
Addresses soil quality degradation, insufficient water, water quality degradation, and fish/wildlife inadequate habitat

**Before Situation:**
Resources are protected at the minimum level of the conservation practice standard(s) applied as part of the enhancement.

**After Situation:**
The adoption of this enhancement will provide resource protection above the minimum level of the conservation practice standard(s) applied

**Feature Measure:** Acre

**Scenario Unit::** Acre

**Scenario Typical Size:** 100.0

**Scenario Total Cost:** $4,086.91

**Scenario Cost/Unit:** $40.87

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 | $9.85 | 100 | $985.00 |
| Fertilizer, precision application | 952 | Fertilizer application performed by light bar/GPS navigation system. Includes equipment, power unit and labor costs. | Acre | $10.67 | 100 | $1,067.00 |
| **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 | $41.76 | 2 | $83.52 |
| Specialist Labor | 235 | Labor requiring a specialized skill set: Includes Agronomists, Foresters, Biologists, etc. to provide additional technical information during the planning and implementation of the practice. Does not include NRCS or TSP services. | Hour | $110.71 | 13 | $1,439.23 |
| **Materials** | | | | | | |
| Test, Soil Test, Precision, Grid or Zone DELETION SCHEDULED for PS FY 2018 , USE CID 299 | 300 | Includes materials, shipping, labor, and equipment costs. DELETION SCHEDULED for PS FY 2018 , USE CID 299 | Each | $10.31 | 25 | $257.75 |
| 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 | $254.41 | 1 | $254.41 |

**Practice:** B000CPL4 - Crop Bundle#4 - Soil health rotation, Reduced till

**Scenario** #1 - Crop Bundle#4 - SH rotation, RT

**Scenario Description:**
Addresses soil quality degradation, insufficient water, water quality degradation, and fish/wildlife inadequate habitat

**Before Situation:**
Resources are protected at the minimum level of the conservation practice standard(s) applied as part of the enhancement.

**After Situation:**
The adoption of this enhancement will provide resource protection above the minimum level of the conservation practice standard(s) applied

**Feature Measure:** Acre

**Scenario Unit::** Acre

**Scenario Typical Size:** 100.0

**Scenario Total Cost:** $4,086.91

**Scenario Cost/Unit:** $40.87

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 | $9.85 | 100 | $985.00 |
| Fertilizer, precision application | 952 | Fertilizer application performed by light bar/GPS navigation system. Includes equipment, power unit and labor costs. | Acre | $10.67 | 100 | $1,067.00 |
| **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 | $41.76 | 2 | $83.52 |
| Specialist Labor | 235 | Labor requiring a specialized skill set: Includes Agronomists, Foresters, Biologists, etc. to provide additional technical information during the planning and implementation of the practice. Does not include NRCS or TSP services. | Hour | $110.71 | 13 | $1,439.23 |
| **Materials** | | | | | | |
| Test, Soil Test, Precision, Grid or Zone DELETION SCHEDULED for PS FY 2018 , USE CID 299 | 300 | Includes materials, shipping, labor, and equipment costs. DELETION SCHEDULED for PS FY 2018 , USE CID 299 | Each | $10.31 | 25 | $257.75 |
| 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 | $254.41 | 1 | $254.41 |

**Practice:** B000CPL5 - Crop Bundle#5 - Soil Health Assessment, No till

**Scenario** #1 - Crop Bundle#5 - SH Assessment, NT

**Scenario Description:**
Addresses soil quality degradation, insufficient water, water quality degradation, and fish/wildlife inadequate habitat

**Before Situation:**
Resources are protected at the minimum level of the conservation practice standard(s) applied as part of the enhancement.

**After Situation:**
The adoption of this enhancement will provide resource protection above the minimum level of the conservation practice standard(s) applied

**Feature Measure:** Acre

**Scenario Unit::** Acre

**Scenario Typical Size:** 100.0

**Scenario Total Cost:** $4,569.64

**Scenario Cost/Unit:** $45.70

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 | $9.85 | 100 | $985.00 |
| Fertilizer, precision application | 952 | Fertilizer application performed by light bar/GPS navigation system. Includes equipment, power unit and labor costs. | Acre | $10.67 | 100 | $1,067.00 |
| **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 | $41.76 | 2 | $83.52 |
| Specialist Labor | 235 | Labor requiring a specialized skill set: Includes Agronomists, Foresters, Biologists, etc. to provide additional technical information during the planning and implementation of the practice. Does not include NRCS or TSP services. | Hour | $110.71 | 16 | $1,771.36 |
| **Materials** | | | | | | |
| Test, Soil Test, Standard | 299 | Includes materials, shiping, labor, and equipment costs. | Each | $10.04 | 15 | $150.60 |
| Test, Soil Test, Precision, Grid or Zone DELETION SCHEDULED for PS FY 2018 , USE CID 299 | 300 | Includes materials, shipping, labor, and equipment costs. DELETION SCHEDULED for PS FY 2018 , USE CID 299 | Each | $10.31 | 25 | $257.75 |
| 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 | $254.41 | 1 | $254.41 |

**Practice:** B000CPL6 - Crop Bundle#6 - Soil Health Assessment, Reduced till

**Scenario** #1 - Crop Bundle#6 - SH Assessment, RT

**Scenario Description:**
Addresses soil quality degradation, insufficient water, water quality degradation, and fish/wildlife inadequate habitat

**Before Situation:**
Resources are protected at the minimum level of the conservation practice standard(s) applied as part of the enhancement.

**After Situation:**
The adoption of this enhancement will provide resource protection above the minimum level of the conservation practice standard(s) applied

**Feature Measure:** Acre

**Scenario Unit::** Acre

**Scenario Typical Size:** 100.0

**Scenario Total Cost:** $4,569.64

**Scenario Cost/Unit:** $45.70

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 | $9.85 | 100 | $985.00 |
| Fertilizer, precision application | 952 | Fertilizer application performed by light bar/GPS navigation system. Includes equipment, power unit and labor costs. | Acre | $10.67 | 100 | $1,067.00 |
| **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 | $41.76 | 2 | $83.52 |
| Specialist Labor | 235 | Labor requiring a specialized skill set: Includes Agronomists, Foresters, Biologists, etc. to provide additional technical information during the planning and implementation of the practice. Does not include NRCS or TSP services. | Hour | $110.71 | 16 | $1,771.36 |
| **Materials** | | | | | | |
| Test, Soil Test, Standard | 299 | Includes materials, shiping, labor, and equipment costs. | Each | $10.04 | 15 | $150.60 |
| Test, Soil Test, Precision, Grid or Zone DELETION SCHEDULED for PS FY 2018 , USE CID 299 | 300 | Includes materials, shipping, labor, and equipment costs. DELETION SCHEDULED for PS FY 2018 , USE CID 299 | Each | $10.31 | 25 | $257.75 |
| 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 | $254.41 | 1 | $254.41 |

**Practice:** B000FST1 - Forest Bundle#1

**Scenario** #1 - Forest Bundle#1

**Scenario Description:**
Addresses forest management on sites that are not adapted to natural fire disturbances. Addresses resource concerns air quality impacts, degraded plant condition and fish/wildlife inadequate habitat.

**Before Situation:**
Resources are protected at the minimum level of the conservation practice standard(s) applied as part of the enhancement.

**After Situation:**
The adoption of this enhancement will provide resource protection above the minimum level of the conservation practice standard(s) applied

**Feature Measure:** Acre

**Scenario Unit::** Acre

**Scenario Typical Size:** 111.0

**Scenario Total Cost:** $8,983.11

**Scenario Cost/Unit:** $80.93

Cost Details:

| Component Name | ID | Description | Unit | Cost | QTY | Total |
|---|---|---|---|---|---|---|
| **Equipment Installation** | | | | | | |
| Chainsaw | 937 | Equipment and power unit costs. Labor not included. | Hour | $4.37 | 45 | $196.65 |
| Truck, Pickup | 939 | Equipment and power unit costs. Labor not included. | Hour | $21.79 | 15 | $326.85 |
| Chemical, ground application | 948 | Chemical application performed by ground equipment. Includes equipment, power unit and labor costs. | Acre | $6.13 | 1 | $6.13 |
| 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 | $64.90 | 41 | $2,660.90 |
| 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 | 11 | $132.44 |
| **Foregone Income** | | | | | | |
| FI, Corn Dryland | 1959 | Dryland Corn is Primary Crop | Acre | $376.15 | 0.41 | $154.22 |
| FI, Soybeans Dryland | 1961 | Dryland Soybeans is Primary Crop | Acre | $361.97 | 0.36 | $130.31 |
| FI, Wheat Dryland | 1963 | Dryland Wheat is Primary Crop | Acre | $269.62 | 0.23 | $62.01 |
| **Labor** | | | | | | |
| Skilled Labor | 230 | Labor requiring a high level skill set: Includes carpenters, welders, electricians, conservation professionals involved with data collection, monitoring, and or record keeping, etc. | Hour | $41.76 | 7 | $292.32 |
| 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 | $25.31 | 49 | $1,240.19 |
| Specialist Labor | 235 | Labor requiring a specialized skill set: Includes Agronomists, Foresters, Biologists, etc. to provide additional technical information during the planning and implementation of the practice. Does not include NRCS or TSP services. | Hour | $110.71 | 12 | $1,328.52 |
| 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 t | Hour | $71.89 | 17 | $1,222.13 |
| **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 | $6.96 | 20 | $139.20 |
| 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 | $17.48 | 1 | $17.48 |
| Herbicide, Picloram | 337 | Refer to WIN-PST for product names and active ingredients. Includes materials and shipping only. | Acre | $16.93 | 21 | $355.53 |

| | | | | | | |
|---|---|---|---|---|---|---|
| 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 | $25.63 | 1 | $25.63 |
| 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 shi | Acre | $1.28 | 1 | $1.28 |
| Shrub, seedling or transplant, bare root, 18"-36" | 1507 | Bare root hardwood trees 18-36" tall. Includes materials and shipping only. | Each | $0.57 | 605 | $344.85 |
| Tree, hardwood, seedling or transplant, bare root, 16-36" | 1510 | Bare root hardwood trees 18-36" tall. Includes materials and shipping only. | Each | $0.80 | 218 | $174.40 |
| **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 | $172.07 | 1 | $172.07 |

**Practice:** B000LLP1 - Longleaf Pine Bundle#1

**Scenario** #1 - Longleaf Pine Bundle#1

**Scenario Description:**
Improves conifer forest health through prescribed burning and grazing management. Addresses water quality degradation, degraded plant condition, and fish/wildlife inadequate habitat.

**Before Situation:**
Resources are protected at the minimum level of the conservation practice standard(s) applied as part of the enhancement.

**After Situation:**
The adoption of this enhancement will provide resource protection above the minimum level of the conservation practice standard(s) applied

**Feature Measure:** Acre

**Scenario Unit::** Acre

**Scenario Typical Size:** 110.0

**Scenario Total Cost:** $11,115.01

**Scenario Cost/Unit:** $101.05

Cost Details:

| Component Name | ID | Description | Unit | Cost | QTY | Total |
|---|---|---|---|---|---|---|
| **Acquisition of Technical Knowledge** | | | | | | |
| Training, Workshops | 294 | Educational seminar or series of meetings emphasizing interaction and exchange of information among a usually small number of participants. | Each | $63.92 | 1 | $63.92 |
| **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 | $7.31 | 5 | $36.55 |
| Chainsaw | 937 | Equipment and power unit costs. Labor not included. | Hour | $4.37 | 7 | $30.59 |
| Truck, Pickup | 939 | Equipment and power unit costs. Labor not included. | Hour | $21.79 | 5 | $108.95 |
| Truck, Pickup | 939 | Equipment and power unit costs. Labor not included. | Hour | $21.79 | 16 | $348.64 |
| Truck, Pickup | 939 | Equipment and power unit costs. Labor not included. | Hour | $21.79 | 2 | $43.58 |
| Truck, Pickup | 939 | Equipment and power unit costs. Labor not included. | Hour | $21.79 | 1 | $21.79 |
| Mower, Bush Hog | 940 | Equipment and power unit costs. Labor not included. | Hour | $51.91 | 2 | $103.82 |
| Chemical, ground application | 948 | Chemical application performed by ground equipment. Includes equipment, power unit and labor costs. | Acre | $6.13 | 1 | $6.13 |
| Chemical, ground application | 948 | Chemical application performed by ground equipment. Includes equipment, power unit and labor costs. | Acre | $6.13 | 1 | $6.13 |
| Tractor, agricultural, 60 HP | 963 | Agricultural tractor with horsepower range of 50 to 90. Equipment and power unit costs. Labor not included. | Hour | $24.77 | 5 | $123.85 |
| Tractor, agricultural, 60 HP | 963 | Agricultural tractor with horsepower range of 50 to 90. Equipment and power unit costs. Labor not included. | Hour | $24.77 | 4 | $99.08 |
| 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 | $64.90 | 3 | $194.70 |
| All terrain vehicles, ATV | 965 | Includes equipment, power unit and labor costs. | Hour | $28.28 | 2 | $56.56 |
| 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 |
| 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 | $2.42 | 2 | $4.84 |
| **Foregone Income** | | | | | | |
| FI, Corn Dryland | 1959 | Dryland Corn is Primary Crop | Acre | $376.15 | 0.82 | $308.44 |
| FI, Soybeans Dryland | 1961 | Dryland Soybeans is Primary Crop | Acre | $361.97 | 0.72 | $260.62 |
| FI, Wheat Dryland | 1963 | Dryland Wheat is Primary Crop | Acre | $269.62 | 0.46 | $124.03 |
| FI, Grazing AUMs | 2079 | Grazing is the Primary Land Use | Animal Unit Month | $16.65 | 12 | $199.80 |
| **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 | $41.76 | 7 | $292.32 |
| Skilled Labor | 230 | Labor requiring a high level skill set: Includes carpenters, welders, electricians, conservation professionals involved with data collection, monitoring, and or record keeping, etc. | Hour | $41.76 | 16 | $668.16 |
| Skilled Labor | 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 | $41.76 | 32 | $1,336.32 |
| 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 | $25.31 | 2 | $50.62 |
| General Labor | 231 | Labor performed using basic tools such as power tool, shovels, and other tools that do not require extensive training. Ex. pipe layer, herder, concrete placement, materials spreader, flagger, etc. | Hour | $25.31 | 16 | $404.96 |
| 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 | $25.31 | 33 | $835.23 |
| General Labor | 231 | Labor performed using basic tools such as power tool, shovels, and other tools that do not require extensive training. Ex. pipe layer, herder, concrete placement, materials spreader, flagger, etc. | Hour | $25.31 | 2 | $50.62 |
| Equipment Operators, Light | 232 | Includes: Skid Steer Loaders, Hydraulic Excavators <50 HP, Trenchers <12", Ag Equipment <150 HP, Pickup Trucks, Forklifts, Mulchers | Hour | $25.23 | 5 | $126.15 |
| Equipment Operators, Light | 232 | Includes: Skid Steer Loaders, Hydraulic Excavators <50 HP, Trenchers <12", Ag Equipment <150 HP, Pickup Trucks, Forklifts, Mulchers | Hour | $25.23 | 4 | $100.92 |
| 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 | $45.69 | 2 | $91.38 |
| Supervisor 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 | $45.69 | 8 | $365.52 |
| Supervisor or Manager | 234 | Labor involving supervision or management activities. Includes crew supervisors, foremen and farm/ranch managers time required for adopting new technology, etc. | Hour | $45.69 | 4 | $182.76 |
| 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 | $110.71 | 3 | $332.13 |
| **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 |
| 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 | 20 | $125.20 |
| 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, Steel T, 1.33 lbs, 6' | 15 | Steel Post, Studded 6' - 1.33 lb. Includes materials and shipping only. | Each | $6.68 | 90 | $601.20 |
| Fence, Wire Assembly, Barbed Wire | 30 | Brace pins, battens, clips, staples. Includes materials and shipping only. | Foot | $0.17 | 1320 | $224.40 |
| 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 | $17.48 | 1 | $17.48 |
| Herbicide, Picloram | 337 | Refer to WIN-PST for product names and active ingredients. Includes materials and shipping only. | Acre | $16.93 | 1 | $16.93 |
| 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 | $25.63 | 1 | $25.63 |
| Gate, Pipe, 12' | 1057 | 6 rail tube gate, 16 gauge. Includes materials and shipping only. | Each | $166.29 | 2 | $332.58 |
| 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 shi | Acre | $1.28 | 1 | $1.28 |
| Tree, hardwood, seedling or transplant, bare root, 16-36" | 1510 | Bare root hardwood trees 18-36" tall. Includes materials and shipping only. | Each | $0.80 | 872 | $697.60 |
| Tree shelter, solid tube type, 4" x 48" | 1566 | 4" x 48" tree tube for protection from animal damage. Materials only. | Each | $4.14 | 100 | $414.00 |
| Stakes, wood, 1" x 1" x 48" | 1578 | 1" x 1" x 48" wood stakes to fasten items in place. Includes materials only. | Each | $2.04 | 100 | $204.00 |

| | | | | | | |
|---|---|---|---|---|---|---|
| Fuel, ignition fuel mixture | 1596 | Mixture of gasoline and diesel for ignition of prescribed burns. Materials only. | Gallon | $4.32 | 5 | $21.60 |
| **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 | $172.07 | 1 | $172.07 |
| 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 | $172.07 | 1 | $172.07 |
| Mobilization, medium equipment | 1139 | Equipment with 70-150 HP or typical weights between 14,000 and 30,000 pounds. | Each | $255.83 | 2 | $511.66 |

**Practice:** B000LLP2 - Longleaf Pine Bundle#2

**Scenario** #1 - Longleaf Pine Bundle#2

**Scenario Description:**

Improves conifer forest health through prescribed burning and forest stand management. Addresses air quality impacts, degraded plant condition, and fish/wildlife inadequate habitat.

**Before Situation:**

Resources are protected at the minimum level of the conservation practice standard(s) applied as part of the enhancement.

**After Situation:**

The adoption of this enhancement will provide resource protection above the minimum level of the conservation practice standard(s) applied

**Feature Measure:** Acre

**Scenario Unit::** Acre

**Scenario Typical Size:** 125.0

**Scenario Total Cost:** $11,997.07

**Scenario Cost/Unit:** $95.98

Cost Details:

| Component Name | ID | Description | Unit | Cost | QTY | Total |
|---|---|---|---|---|---|---|
| **Equipment Installation** | | | | | | |
| Chainsaw | 937 | Equipment and power unit costs. Labor not included. | Hour | $4.37 | 150 | $655.50 |
| Chainsaw | 937 | Equipment and power unit costs. Labor not included. | Hour | $4.37 | 7 | $30.59 |
| Truck, Pickup | 939 | Equipment and power unit costs. Labor not included. | Hour | $21.79 | 1 | $21.79 |
| Truck, Pickup | 939 | Equipment and power unit costs. Labor not included. | Hour | $21.79 | 2 | $43.58 |
| Truck, Pickup | 939 | Equipment and power unit costs. Labor not included. | Hour | $21.79 | 15 | $326.85 |
| 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 | $64.90 | 3 | $194.70 |
| All terrain vehicles, ATV | 965 | Includes equipment, power unit and labor costs. | Hour | $28.28 | 2 | $56.56 |
| 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 | $2.42 | 2 | $4.84 |
| **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 | $41.76 | 7 | $292.32 |
| Skilled Labor | 230 | Labor requiring a high level skill set: Includes carpenters, welders, electricians, conservation professionals involved with data collection, monitoring, and or record keeping, etc. | Hour | $41.76 | 2 | $83.52 |
| Skilled Labor | 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 | $41.76 | 16 | $668.16 |
| 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 | $25.31 | 150 | $3,796.50 |
| General Labor | 231 | Labor performed using basic tools such as power tool, shovels, and other tools that do not require extensive training. Ex. pipe layer, herder, concrete placement, materials spreader, flagger, etc. | Hour | $25.31 | 2 | $50.62 |
| 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 | $45.69 | 2 | $91.38 |
| Specialist Labor | 235 | Labor requiring a specialized skill set: Includes Agronomists, Foresters, Biologists, etc. to provide additional technical information during the planning and implementation of the practice. Does not include NRCS or TSP services. | Hour | $110.71 | 30 | $3,321.30 |
| 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 | $110.71 | 3 | $332.13 |

| | | | | | | |
|---|---|---|---|---|---|---|
| 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 t | Hour | $71.89 | 17 | $1,222.13 |
| **Materials** | | | | | | |
| Herbicide, Picloram | 337 | Refer to WIN-PST for product names and active ingredients. Includes materials and shipping only. | Acre | $16.93 | 1 | $16.93 |
| Fuel, ignition fuel mixture | 1596 | Mixture of gasoline and diesel for ignition of prescribed burns. Materials only. | Gallon | $4.32 | 5 | $21.60 |
| 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 | $254.41 | 1 | $254.41 |
| **Mobilization** | | | | | | |
| Mobilization, medium equipment | 1139 | Equipment with 70-150 HP or typical weights between 14,000 and 30,000 pounds. | Each | $255.83 | 2 | $511.66 |

**Practice:** B000LLP3 - Longleaf Pine Bundle#3

**Scenario** #1 - Longleaf Pine Bundle#3

**Scenario Description:**

Improves forest health and wildlife habitat through forest stand management. Addresses air quality impacts, degraded plant condition, and fish/wildlife inadequate habitat.

**Before Situation:**

Resources are protected at the minimum level of the conservation practice standard(s) applied as part of the enhancement.

**After Situation:**

The adoption of this enhancement will provide resource protection above the minimum level of the conservation practice standard(s) applied

**Feature Measure:** Acre

**Scenario Unit::** Acre

**Scenario Typical Size:** 125.0

**Scenario Total Cost:** $15,127.61

**Scenario Cost/Unit:** $121.02

Cost Details:

| Component Name | ID | Description | Unit | Cost | QTY | Total |
|---|---|---|---|---|---|---|
| **Equipment Installation** | | | | | | |
| Chainsaw | 937 | Equipment and power unit costs. Labor not included. | Hour | $4.37 | 7 | $30.59 |
| Chainsaw | 937 | Equipment and power unit costs. Labor not included. | Hour | $4.37 | 150 | $655.50 |
| Truck, Pickup | 939 | Equipment and power unit costs. Labor not included. | Hour | $21.79 | 2 | $43.58 |
| Truck, Pickup | 939 | Equipment and power unit costs. Labor not included. | Hour | $21.79 | 1 | $21.79 |
| Truck, Pickup | 939 | Equipment and power unit costs. Labor not included. | Hour | $21.79 | 72 | $1,568.88 |
| Truck, Pickup | 939 | Equipment and power unit costs. Labor not included. | Hour | $21.79 | 15 | $326.85 |
| 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 | $64.90 | 3 | $194.70 |
| All terrain vehicles, ATV | 965 | Includes equipment, power unit and labor costs. | Hour | $28.28 | 2 | $56.56 |
| Trailer, enclosed, small | 1503 | Small enclosed trailer (typically less than 30' in length) pulled by a pickup to transport materials and equipment. Truck not included. | Hour | $7.12 | 72 | $512.64 |
| 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 | $2.42 | 2 | $4.84 |
| **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 | $41.76 | 7 | $292.32 |
| Skilled Labor | 230 | Labor requiring a high level skill set: Includes carpenters, welders, electricians, conservation professionals involved with data collection, monitoring, and or record keeping, etc. | Hour | $41.76 | 16 | $668.16 |
| 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 | $25.31 | 150 | $3,796.50 |
| General Labor | 231 | Labor performed using basic tools such as power tool, shovels, and other tools that do not require extensive training. Ex. pipe layer, herder, concrete placement, materials spreader, flagger, etc. | Hour | $25.31 | 2 | $50.62 |
| General Labor | 231 | Labor performed using basic tools such as power tool, shovels, and other tools that do not require extensive training. Ex. pipe layer, herder, concrete placement, materials spreader, flagger, etc. | Hour | $25.31 | 48 | $1,214.88 |
| 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 | $45.69 | 2 | $91.38 |
| Specialist Labor | 235 | Labor requiring a specialized skill set: Includes Agronomists, Foresters, Biologists, etc. to provide additional technical information during the planning and implementation of the practice. Does not include NRCS or TSP services. | Hour | $110.71 | 30 | $3,321.30 |

| | | | | | | |
|---|---|---|---|---|---|---|
| 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 | $110.71 | 3 | $332.13 |
| 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 t | Hour | $71.89 | 17 | $1,222.13 |
| **Materials** | | | | | | |
| Herbicide, Picloram | 337 | Refer to WIN-PST for product names and active ingredients. Includes materials and shipping only. | Acre | $16.93 | 1 | $16.93 |
| Fuel, ignition fuel mixture | 1596 | Mixture of gasoline and diesel for ignition of prescribed burns. Materials only. | Gallon | $4.32 | 5 | $21.60 |
| **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 | $172.07 | 1 | $172.07 |
| Mobilization, medium equipment | 1139 | Equipment with 70-150 HP or typical weights between 14,000 and 30,000 pounds. | Each | $255.83 | 2 | $511.66 |

**Practice:** B000MRB1 - MRBI Bundle#1 - Irrigated Cropland

**Scenario** #1 - MRBI Bundle#1 - Irrigated Cropland

**Scenario Description:**
Addresses soil erosion, insufficient water, and water quality degradation

**Before Situation:**
Resources are protected at the minimum level of the conservation practice standard(s) applied as part of the enhancement.

**After Situation:**
The adoption of this enhancement will provide resource protection above the minimum level of the conservation practice standard(s) applied

**Feature Measure:** Acre

**Scenario Unit::** Acre

**Scenario Typical Size:** 100.0

**Scenario Total Cost:** $6,051.42

**Scenario Cost/Unit:** $60.51

Cost Details:

| Component Name | ID | Description | Unit | Cost | QTY | Total |
|---|---|---|---|---|---|---|
| **Labor** | | | | | | |
| Skilled Labor | 230 | Labor requiring a high level skill set: Includes carpenters, welders, electricians, conservation professionals involved with data collection, monitoring, and or record keeping, etc. | Hour | $41.76 | 1 | $41.76 |
| General Labor | 231 | Labor performed using basic tools such as power tool, shovels, and other tools that do not require extensive training. Ex. pipe layer, herder, concrete placement, materials spreader, flagger, etc. | Hour | $25.31 | 20 | $506.20 |
| 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 | $110.71 | 4 | $442.84 |
| **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 incl | Each | $460.51 | 1 | $460.51 |
| 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 | $655.75 | 1 | $655.75 |
| 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 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 | 2 | $73.48 |
| One Species, Cool Season, Annual Grass or Legume | 2311 | Cool season annual grass or legume. Includes material and shipping only. | Acre | $38.26 | 20 | $765.20 |
| Weather Station, Advanced | 2550 | Advance Weather Station which collects and records recording rainfall, humidity, barometric pressure, wind speed, temperature, and solar radiation from a solar powered self-standing tripod to an advance weather recording console. Used for both 449 advance | Each | $1,070.10 | 1 | $1,070.10 |
| **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 | $70.64 | 1 | $70.64 |

**Practice:** B000MRB2 - MRBI Bundle#2 - Non-Irrigated Cropland #1

**Scenario** #1 - MRBI Bundle#2 - Non-Irrigated Crop#1

**Scenario Description:**
Addresses soil erosion, soil quality degradation, and water quality degradation

**Before Situation:**
Resources are protected at the minimum level of the conservation practice standard(s) applied as part of the enhancement.

**After Situation:**
The adoption of this enhancement will provide resource protection above the minimum level of the conservation practice standard(s) applied

**Feature Measure:** Acre

**Scenario Unit::** Acre

**Scenario Typical Size:** 100.0

**Scenario Total Cost:** $974.00

**Scenario Cost/Unit:** $9.74

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 | $41.76 | 5 | $208.80 |
| **Materials** | | | | | | |
| One Species, Cool Season, Annual Grass or Legume | 2311 | Cool season annual grass or legume. Includes material and shipping only. | Acre | $38.26 | 20 | $765.20 |

**Practice:** B000MRB3 - MRBI Bundle#3 - Non-Irrigated Cropland #2

**Scenario** #1 - MRBI Bundle#3 - Non-Irrigated Crop#2

**Scenario Description:**
Addresses soil erosion, soil quality degradation, and water quality degradation

**Before Situation:**
Resources are protected at the minimum level of the conservation practice standard(s) applied as part of the enhancement.

**After Situation:**
The adoption of this enhancement will provide resource protection above the minimum level of the conservation practice standard(s) applied

**Feature Measure:** Acre

**Scenario Unit::** Acre

**Scenario Typical Size:** 100.0

**Scenario Total Cost:** $1,360.51

**Scenario Cost/Unit:** $13.61

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 | $41.76 | 1 | $41.76 |
| 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 | $110.71 | 5 | $553.55 |
| **Materials** | | | | | | |
| One Species, Cool Season, Annual Grass or Legume | 2311 | Cool season annual grass or legume. Includes material and shipping only. | Acre | $38.26 | 20 | $765.20 |

## USDA - Natural Resources Conservation Service

**Massachusetts**

**Practice:** B000MRB4 - MRBI Bundle#4 - Cropland with Water Bodies, No till

**Scenario** #1 - MRBI Bundle#4 - Crop w/ Water Bodies, NT

**Scenario Description:**
Addresses soil erosion, soil quality degradation, and water quality degradation

**Before Situation:**
Resources are protected at the minimum level of the conservation practice standard(s) applied as part of the enhancement.

**After Situation:**
The adoption of this enhancement will provide resource protection above the minimum level of the conservation practice standard(s) applied

**Feature Measure:** Acre

**Scenario Unit::** Acre

**Scenario Typical Size:** 100.0

**Scenario Total Cost:** $3,139.15

**Scenario Cost/Unit:** $31.39

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 | $41.76 | 10 | $417.60 |
| Skilled Labor | 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 | $41.76 | 1 | $41.76 |
| 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 | $110.71 | 3 | $332.13 |
| Specialist Labor | 235 | Labor requiring a specialized skill set: Includes 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 | $110.71 | 6 | $664.26 |
| **Materials** | | | | | | |
| Nitrogen-Urease inhibitor | 260 | Nitrogen-Urease inhibitor | Acre | $8.55 | 100 | $855.00 |
| Test, Soil Nitrogen Testing | 311 | Pre-Side Dress/Deep Soil Testing. Includes materials and shipping only. | Each | $12.64 | 5 | $63.20 |
| One Species, Cool Season, Annual Grass or Legume | 2311 | Cool season annual grass or legume. Includes material and shipping only. | Acre | $38.26 | 20 | $765.20 |

**Practice:** B000MRB5 - MRBI Bundle#5 - Cropland with Water Bodies, Reduced till

**Scenario** #1 - MRBI Bundle#5 - Crop w/ Water Bodies, RT

**Scenario Description:**
Addresses soil erosion, soil quality degradation, and water quality degradation

**Before Situation:**
Resources are protected at the minimum level of the conservation practice standard(s) applied as part of the enhancement.

**After Situation:**
The adoption of this enhancement will provide resource protection above the minimum level of the conservation practice standard(s) applied

**Feature Measure:** Acre

**Scenario Unit::** Acre

**Scenario Typical Size:** 100.0

**Scenario Total Cost:** $2,863.35

**Scenario Cost/Unit:** $28.63

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 | $41.76 | 10 | $417.60 |
| Skilled Labor | 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 | $41.76 | 5 | $208.80 |
| 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 | $110.71 | 2 | $221.42 |
| 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 | $110.71 | 3 | $332.13 |
| **Materials** | | | | | | |
| Nitrogen-Urease inhibitor | 260 | Nitrogen-Urease inhibitor | Acre | $8.55 | 100 | $855.00 |
| Test, Soil Nitrogen Testing | 311 | Pre-Side Dress/Deep Soil Testing. Includes materials and shipping only. | Each | $12.64 | 5 | $63.20 |
| One Species, Cool Season, Annual Grass or Legume | 2311 | Cool season annual grass or legume. Includes material and shipping only. | Acre | $38.26 | 20 | $765.20 |

**Practice:** B000MRB6 - MRBI Bundle#6 - Pastureland

**Scenario** #1 - MRBI Bundle#6 - Pastureland

**Scenario Description:**
Addresses soil quality degradation, water quality degradation, and fish/wildlife inadequate habitat plus an option on soil erosion

**Before Situation:**
Resources are protected at the minimum level of the conservation practice standard(s) applied as part of the enhancement.

**After Situation:**
The adoption of this enhancement will provide resource protection above the minimum level of the conservation practice standard(s) applied

**Feature Measure:** Acre

**Scenario Unit::** Acre

**Scenario Typical Size:** 101.0

**Scenario Total Cost:** $4,566.17

**Scenario Cost/Unit:** $45.21

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 | $7.31 | 5 | $36.55 |
| Truck, Pickup | 939 | Equipment and power unit costs. Labor not included. | Hour | $21.79 | 5 | $108.95 |
| Tractor, agricultural, 60 HP | 963 | Agricultural tractor with horsepower range of 50 to 90. Equipment and power unit costs. Labor not included. | Hour | $24.77 | 5 | $123.85 |
| **Foregone Income** | | | | | | |
| FI, Grazing AUMs | 2079 | Grazing is the Primary Land Use | Animal Unit Month | $16.65 | 25 | $416.25 |
| **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 | $25.31 | 33 | $835.23 |
| Equipment Operators, Light | 232 | Includes: Skid Steer Loaders, Hydraulic Excavators <50 HP, Trenchers <12", Ag Equipment <150 HP, Pickup Trucks, Forklifts, Mulchers | Hour | $25.23 | 5 | $126.15 |
| Supervisor or Manager | 234 | Labor involving supervision or management activities. Includes crew supervisors, foremen and farm/ranch managers time required for adopting new technology, etc. | Hour | $45.69 | 2 | $91.38 |
| **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 |
| 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 | 20 | $125.20 |
| 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, Steel T, 1.33 lbs, 6' | 15 | Steel Post, Studded 6' - 1.33 lb. Includes materials and shipping only. | Each | $6.68 | 90 | $601.20 |
| Fence, Wire Assembly, Barbed Wire | 30 | Brace pins, battens, clips, staples. Includes materials and shipping only. | Foot | $0.17 | 1320 | $224.40 |
| Gate, Pipe, 12' | 1057 | 6 rail tube gate, 16 gauge. Includes materials and shipping only. | Each | $166.29 | 2 | $332.58 |
| Four Species Mix, Cool Season, Introduced Perennial (2 grasses, 2 legumes) | 2317 | Cool season grass and legume mix. Includes material and shipping only. | Acre | $48.34 | 20 | $966.80 |
| **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 | $172.07 | 1 | $172.07 |

## USDA - Natural Resources Conservation Service

**Massachusetts**

**Practice:** B000MRB7 - MRBI Bundle#7 - Rangeland

**Scenario** #1 - MRBI Bundle#7 - Rangeland

**Scenario Description:**
Addresses soil erosion, water quality degradation, and fish/wildlife inadequate habitat

**Before Situation:**
Resources are protected at the minimum level of the conservation practice standard(s) applied as part of the enhancement.

**After Situation:**
The adoption of this enhancement will provide resource protection above the minimum level of the conservation practice standard(s) applied

**Feature Measure:** Acre

**Scenario Unit::** Acre

**Scenario Typical Size:** 1,001.0

**Scenario Total Cost:** $5,327.79

**Scenario Cost/Unit:** $5.32

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 | $63.92 | 1 | $63.92 |
| **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 | $7.31 | 5 | $36.55 |
| Truck, Pickup | 939 | Equipment and power unit costs. Labor not included. | Hour | $21.79 | 4 | $87.16 |
| Truck, Pickup | 939 | Equipment and power unit costs. Labor not included. | Hour | $21.79 | 5 | $108.95 |
| Tractor, agricultural, 60 HP | 963 | Agricultural tractor with horsepower range of 50 to 90. Equipment and power unit costs. Labor not included. | Hour | $24.77 | 5 | $123.85 |
| All terrain vehicles, ATV | 965 | Includes equipment, power unit and labor costs. | Hour | $28.28 | 12 | $339.36 |
| **Foregone Income** | | | | | | |
| FI, Grazing AUMs | 2079 | Grazing is the Primary Land Use | Animal Unit Month | $16.65 | 36 | $599.40 |
| **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 | $25.31 | 17 | $430.27 |
| General Labor | 231 | Labor performed using basic tools such as power tool, shovels, and other tools that do not require extensive training. Ex. pipe layer, herder, concrete placement, materials spreader, flagger, etc. | Hour | $25.31 | 33 | $835.23 |
| Equipment Operators, Light | 232 | Includes: Skid Steer Loaders, Hydraulic Excavators <50 HP, Trenchers <12", Ag Equipment <150 HP, Pickup Trucks, Forklifts, Mulchers | Hour | $25.23 | 5 | $126.15 |
| Supervisor or Manager | 234 | Labor involving supervision or management activities. Includes crew supervisors, foremen and farm/ranch managers time required for adopting new technology, etc. | Hour | $45.69 | 2 | $91.38 |
| **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, Polywire | 8 | Wire, Polywire for electric fence - 1,300 roll. Includes materials and shipping only. | Each | $47.61 | 1 | $47.61 |
| 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 | 20 | $125.20 |
| 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, Steel T, 1.33 lbs, 6' | 15 | Steel Post, Studded 6' - 1.33 lb. Includes materials and shipping only. | Each | $6.68 | 90 | $601.20 |
| Electric, Energizer, Solar | 27 | Electric, Energizer, Solar for electric fence. Includes materials and shipping only. | Each | $319.43 | 1 | $319.43 |
| Fence, Wire Assembly, Barbed Wire | 30 | Brace pins, battens, clips, staples. Includes materials and shipping only. | Foot | $0.17 | 1320 | $224.40 |
| Tank, Polyethylene, 300 gallon | 291 | Portable heavy duty rubber stock tank. | Each | $257.52 | 1 | $257.52 |

| | | | | | | |
|---|---|---|---|---|---|---|
| Gate, Pipe, 12' | 1057 | 6 rail tube gate, 16 gauge. Includes materials and shipping only. | Each | $166.29 | 2 | $332.58 |
| **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 | $172.07 | 1 | $172.07 |

**Practice:** B000OGL1 - Ogallala Bundle#1

**Scenario** #1 - Ogalalla Bundle#1

**Scenario Description:**
Addresses insufficient water, water quality degradation, and inefficient energy use plus an option on soil quality degradation

**Before Situation:**
Resources are protected at the minimum level of the conservation practice standard(s) applied as part of the enhancement.

**After Situation:**
The adoption of this enhancement will provide resource protection above the minimum level of the conservation practice standard(s) applied

**Feature Measure:** Acre

**Scenario Unit::** Acre

**Scenario Typical Size:** 100.0

**Scenario Total Cost:** $9,073.28

**Scenario Cost/Unit:** $90.73

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 | $25.31 | 20 | $506.20 |
| 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 | $110.71 | 3 | $332.13 |
| Specialist Labor | 235 | Labor requiring a specialized skill set: Includes 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 | $110.71 | 4 | $442.84 |
| 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 prod | Hour | $88.79 | 35 | $3,107.65 |
| 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 | $31.84 | 10 | $318.40 |
| **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 incl | Each | $460.51 | 1 | $460.51 |
| 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 | $655.75 | 1 | $655.75 |
| 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 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 | 2 | $73.48 |
| Weather Station, Advanced | 2550 | Advance Weather Station which collects and records recording rainfall, humidity, barometric pressure, wind speed, temperature, and solar radiation from a solar powered self-standing tripod to an advance weather recording console. Used for both 449 advance | Each | $1,070.10 | 1 | $1,070.10 |
| **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 | $70.64 | 1 | $70.64 |
| Mobilization, very small equipment | 1137 | Equipment that is small enough to be transported by a pick-up truck with typical weights less than 3,500 pounds. Can be multiple pieces of equipment if all hauled simultaneously. | Each | $70.64 | 1 | $70.64 |

**Practice:** B000OGL2 - Ogallala Bundle#2

**Scenario** #1 - Ogalalla Bundle#2

**Scenario Description:**
Addresses insufficient water, water quality degradation, and inefficient energy use plus an option on soil quality degradation

**Before Situation:**
Resources are protected at the minimum level of the conservation practice standard(s) applied as part of the enhancement.

**After Situation:**
The adoption of this enhancement will provide resource protection above the minimum level of the conservation practice standard(s) applied

**Feature Measure:** Acre

**Scenario Unit::** Acre

**Scenario Typical Size:** 80.0

**Scenario Total Cost:** $9,073.28

**Scenario Cost/Unit:** $113.42

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 | $25.31 | 20 | $506.20 |
| 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 | $110.71 | 3 | $332.13 |
| Specialist Labor | 235 | Labor requiring a specialized skill set: Includes 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 | $110.71 | 4 | $442.84 |
| 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 prod | Hour | $88.79 | 35 | $3,107.65 |
| 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 | $31.84 | 10 | $318.40 |
| **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 incl | Each | $460.51 | 1 | $460.51 |
| 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 | $655.75 | 1 | $655.75 |
| 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 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 | 2 | $73.48 |
| Weather Station, Advanced | 2550 | Advance Weather Station which collects and records recording rainfall, humidity, barometric pressure, wind speed, temperature, and solar radiation from a solar powered self-standing tripod to an advance weather recording console. Used for both 449 advance | Each | $1,070.10 | 1 | $1,070.10 |
| **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 | $70.64 | 1 | $70.64 |
| Mobilization, very small equipment | 1137 | Equipment that is small enough to be transported by a pick-up truck with typical weights less than 3,500 pounds. Can be multiple pieces of equipment if all hauled simultaneously. | Each | $70.64 | 1 | $70.64 |

**Practice:** B000PST1 - Pasture Bundle#1 - Organic

**Scenario** #1 - Pasture Bundle#1 - Organic

**Scenario Description:**
Addresses water quality degradation, degraded plant condition, and fish/wildlife inadequate habitat

**Before Situation:**
Resources are protected at the minimum level of the conservation practice standard(s) applied as part of the enhancement.

**After Situation:**
The adoption of this enhancement will provide resource protection above the minimum level of the conservation practice standard(s) applied

**Feature Measure:** Acre

**Scenario Unit::** Acre

**Scenario Typical Size:** 111.0

**Scenario Total Cost:** $9,869.43

**Scenario Cost/Unit:** $88.91

Cost Details:

| Component Name | ID | Description | Unit | Cost | QTY | Total |
|---|---|---|---|---|---|---|
| **Equipment Installation** | | | | | | |
| Auger, Post driver attachment | 934 | Auger or post driver attachment to a tractor or skidsteer. Does not include power unit. Labor not included. | Hour | $7.31 | 5 | $36.55 |
| Truck, Pickup | 939 | Equipment and power unit costs. Labor not included. | Hour | $21.79 | 5 | $108.95 |
| Tractor, agricultural, 60 HP | 963 | Agricultural tractor with horsepower range of 50 to 90. Equipment and power unit costs. Labor not included. | Hour | $24.77 | 5 | $123.85 |
| **Foregone Income** | | | | | | |
| FI, Grazing AUMs | 2079 | Grazing is the Primary Land Use | Animal Unit Month | $16.65 | 30 | $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 | $25.31 | 33 | $835.23 |
| Equipment Operators, Light | 232 | Includes: Skid Steer Loaders, Hydraulic Excavators <50 HP, Trenchers <12", Ag Equipment <150 HP, Pickup Trucks, Forklifts, Mulchers | Hour | $25.23 | 5 | $126.15 |
| Specialist Labor | 235 | Labor requiring a specialized skill set: Includes 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 | $110.71 | 1 | $110.71 |
| Specialist Labor | 235 | Labor requiring a specialized skill set: Includes 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 | $110.71 | 4 | $442.84 |
| **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 |
| 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 | 20 | $125.20 |
| 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, Steel T, 1.33 lbs, 6' | 15 | Steel Post, Studded 6' - 1.33 lb. Includes materials and shipping only. | Each | $6.68 | 90 | $601.20 |
| Fence, Wire Assembly, Barbed Wire | 30 | Brace pins, battens, clips, staples. Includes materials and shipping only. | Foot | $0.17 | 1320 | $224.40 |
| Test, Soil Test, Standard | 299 | Includes materials, shiping, labor, and equipment costs. | Each | $10.04 | 1 | $10.04 |
| Gate, Pipe, 12' | 1057 | 6 rail tube gate, 16 gauge. Includes materials and shipping only. | Each | $166.29 | 2 | $332.58 |
| Three Species Mix, Native Forb | 2333 | Native forb mix. Includes material and shipping only. | Acre | $571.46 | 10 | $5,714.60 |
| **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 | $172.07 | 1 | $172.07 |

## USDA - Natural Resources Conservation Service

**Massachusetts**

**Practice:** B000PST2 - Pasture Bundle#2

**Scenario** #1 - Pasture Bundle#2

**Scenario Description:**
Addresses soil quality degradation, water quality degradation, and degraded plant condition plus an option on fish/wildlife inadequate habitat

**Before Situation:**
Resources are protected at the minimum level of the conservation practice standard(s) applied as part of the enhancement.

**After Situation:**
The adoption of this enhancement will provide resource protection above the minimum level of the conservation practice standard(s) applied

**Feature Measure:** Acre

**Scenario Unit::** Acre

**Scenario Typical Size:** 210.0

**Scenario Total Cost:** $3,560.20

**Scenario Cost/Unit:** $16.95

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 | $63.92 | 1 | $63.92 |
| **Equipment Installation** | | | | | | |
| Truck, Pickup | 939 | Equipment and power unit costs. Labor not included. | Hour | $21.79 | 2 | $43.58 |
| 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 | $64.90 | 2 | $129.80 |
| All terrain vehicles, ATV | 965 | Includes equipment, power unit and labor costs. | Hour | $28.28 | 6 | $169.68 |
| **Foregone Income** | | | | | | |
| FI, Grazing AUMs | 2079 | Grazing is the Primary Land Use | Animal Unit Month | $16.65 | 0 | $0.00 |
| FI, Grazing AUMs | 2079 | Grazing is the Primary Land Use | Animal Unit Month | $16.65 | 10 | $166.50 |
| **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 | $25.31 | 8 | $202.48 |
| Supervisor or Manager | 234 | Labor involving supervision or management activities. Includes crew supervisors, foremen and farm/ranch managers time required for adopting new technology, etc. | Hour | $45.69 | 2 | $91.38 |
| Supervisor 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 | $45.69 | 2 | $91.38 |
| **Materials** | | | | | | |
| Wire, Polywire | 8 | Wire, Polywire for electric fence - 1,300 roll. Includes materials and shipping only. | Each | $47.61 | 1 | $47.61 |
| Electric, Energizer, Solar | 27 | Electric, Energizer, Solar for electric fence. Includes materials and shipping only. | Each | $319.43 | 1 | $319.43 |
| 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 | $0.49 | 2000 | $980.00 |
| Tank, Polyethylene, 300 gallon | 291 | Portable heavy duty rubber stock tank. | Each | $257.52 | 1 | $257.52 |
| Test, Soil Test, Standard | 299 | Includes materials, shiping, labor, and equipment costs. | Each | $10.04 | 3 | $30.12 |
| Four Species Mix, Cool Season, Introduced Perennial (2 grasses, 2 legumes) | 2317 | Cool season grass and legume mix. Includes material and shipping only. | Acre | $48.34 | 20 | $966.80 |

**Practice:** B000PST3 - Pasture Bundle#3 -- Soil Health

**Scenario** #1 - Pasture Bundle#3 -- Soil Health

**Scenario Description:**
Addresses soil quality degradation, water quality degradation, and degraded plant condition

**Before Situation:**
Resources are protected at the minimum level of the conservation practice standard(s) applied as part of the enhancement.

**After Situation:**
The adoption of this enhancement will provide resource protection above the minimum level of the conservation practice standard(s) applied

**Feature Measure:** Acre

**Scenario Unit::** Acre

**Scenario Typical Size:** 100.0

**Scenario Total Cost:** $3,240.19

**Scenario Cost/Unit:** $32.40

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 | $63.92 | 1 | $63.92 |
| **Foregone Income** | | | | | | |
| FI, Grazing AUMs | 2079 | Grazing is the Primary Land Use | Animal Unit Month | $16.65 | 0 | $0.00 |
| FI, Grazing AUMs | 2079 | Grazing is the Primary Land Use | Animal Unit Month | $16.65 | 25 | $416.25 |
| **Labor** | | | | | | |
| Skilled Labor | 230 | Labor requiring a high level skill set: Includes carpenters, welders, electricians, conservation professionals involved with data collection, monitoring, and or record keeping, etc. | Hour | $41.76 | 32 | $1,336.32 |
| 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 | $45.69 | 2 | $91.38 |
| Supervisor 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 | $45.69 | 8 | $365.52 |
| **Materials** | | | | | | |
| Four Species Mix, Cool Season, Introduced Perennial (2 grasses, 2 legumes) | 2317 | Cool season grass and legume mix. Includes material and shipping only. | Acre | $48.34 | 20 | $966.80 |

## USDA - Natural Resources Conservation Service

**Massachusetts**

**Practice:** B000PST4 - Pasture Bundle#4 - Monarch butterfly

**Scenario** #1 - Pasture Bundle#4 - Monarch butterfly

**Scenario Description:**
Addresses soil erosion, soil quality degradation, and fish/wildlife inadequate habitat

**Before Situation:**
Resources are protected at the minimum level of the conservation practice standard(s) applied as part of the enhancement.

**After Situation:**
The adoption of this enhancement will provide resource protection above the minimum level of the conservation practice standard(s) applied

**Feature Measure:** Acre

**Scenario Unit::** Acre

**Scenario Typical Size:** 200.0

**Scenario Total Cost:** $9,370.69

**Scenario Cost/Unit:** $46.85

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 | $63.92 | 1 | $63.92 |
| **Foregone Income** | | | | | | |
| FI, Grazing AUMs | 2079 | Grazing is the Primary Land Use | Animal Unit Month | $16.65 | 0 | $0.00 |
| FI, Grazing AUMs | 2079 | Grazing is the Primary Land Use | Animal Unit Month | $16.65 | 25 | $416.25 |
| **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 | $25.31 | 10 | $253.10 |
| 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 | $45.69 | 2 | $91.38 |
| Supervisor 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 | $45.69 | 2 | $91.38 |
| Specialist Labor | 235 | Labor requiring a specialized skill set: Includes Agronomists, Foresters, Biologists, etc. to provide additional technical information during the planning and implementation of the practice. Does not include NRCS or TSP services. | Hour | $110.71 | 2 | $221.42 |
| **Materials** | | | | | | |
| Wire, Polywire | 8 | Wire, Polywire for electric fence - 1,300 roll. Includes materials and shipping only. | Each | $47.61 | 1 | $47.61 |
| Electric, Energizer, Solar | 27 | Electric, Energizer, Solar for electric fence. Includes materials and shipping only. | Each | $319.43 | 1 | $319.43 |
| Three plus Species Mix, Warm Season, Native Perennial | 2327 | Native, warm season perennial grass. Includes material and shipping only. | Acre | $215.16 | 10 | $2,151.60 |
| Three Species Mix, Native Forb | 2333 | Native forb mix. Includes material and shipping only. | Acre | $571.46 | 10 | $5,714.60 |

**Practice:** B000RNG1 - Range Bundle#1 - Organic

**Scenario** #1 - Range Bundle#1 - Organic

**Scenario Description:**
Addresses degraded plant condition, fish/wildlife inadequate habitat and livestock production limitation

**Before Situation:**
Resources are protected at the minimum level of the conservation practice standard(s) applied as part of the enhancement.

**After Situation:**
The adoption of this enhancement will provide resource protection above the minimum level of the conservation practice standard(s) applied

**Feature Measure:** Acre

**Scenario Unit::** Acre

**Scenario Typical Size:** 1,000.0

**Scenario Total Cost:** $982.11

**Scenario Cost/Unit:** $0.98

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 | $63.92 | 1 | $63.92 |
| **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 | $124.03 | 4 | $496.12 |
| All terrain vehicles, ATV | 965 | Includes equipment, power unit and labor costs. | Hour | $28.28 | 1 | $28.28 |
| **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 | $25.31 | 2 | $50.62 |
| 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 | $44.37 | 4 | $177.48 |
| Supervisor or Manager | 234 | Labor involving supervision or management activities. Includes crew supervisors, foremen and farm/ranch managers time required for adopting new technology, etc. | Hour | $45.69 | 1 | $45.69 |
| **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 | 2000 | $120.00 |

**Practice:** B000RNG2 - Range Bundle#2

**Scenario** #1 - Range Bundle#2

**Scenario Description:**
Addresses soil erosion, degraded plant condition, fish/wildlife inadequate habitat and livestock production limitation

**Before Situation:**
Resources are protected at the minimum level of the conservation practice standard(s) applied as part of the enhancement.

**After Situation:**
The adoption of this enhancement will provide resource protection above the minimum level of the conservation practice standard(s) applied

**Feature Measure:** Acre

**Scenario Unit::** Acre

**Scenario Typical Size:** 1,100.0

**Scenario Total Cost:** $4,792.42

**Scenario Cost/Unit:** $4.36

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 | $63.92 | 1 | $63.92 |
| Training, Workshops | 294 | Educational seminar or series of meetings emphasizing interaction and exchange of information among a usually small number of participants. | Each | $63.92 | 1 | $63.92 |
| **Equipment Installation** | | | | | | |
| Truck, Pickup | 939 | Equipment and power unit costs. Labor not included. | Hour | $21.79 | 4 | $87.16 |
| All terrain vehicles, ATV | 965 | Includes equipment, power unit and labor costs. | Hour | $28.28 | 12 | $339.36 |
| All terrain vehicles, ATV | 965 | Includes equipment, power unit and labor costs. | Hour | $28.28 | 1 | $28.28 |
| **Foregone Income** | | | | | | |
| FI, Grazing AUMs | 2079 | Grazing is the Primary Land Use | Animal Unit Month | $16.65 | 54 | $899.10 |
| FI, Grazing AUMs | 2079 | Grazing is the Primary Land Use | Animal Unit Month | $16.65 | 12 | $199.80 |
| **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 | $41.76 | 32 | $1,336.32 |
| 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 | $25.31 | 17 | $430.27 |
| Supervisor 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 | $45.69 | 8 | $365.52 |
| Supervisor or Manager | 234 | Labor involving supervision or management activities. Includes crew supervisors, foremen and farm/ranch managers time required for adopting new technology, etc. | Hour | $45.69 | 2 | $91.38 |
| **Materials** | | | | | | |
| Wire, Polywire | 8 | Wire, Polywire for electric fence - 1,300 roll. Includes materials and shipping only. | Each | $47.61 | 4 | $190.44 |
| Electric, Energizer, Solar | 27 | Electric, Energizer, Solar for electric fence. Includes materials and shipping only. | Each | $319.43 | 1 | $319.43 |
| 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 | 2000 | $120.00 |
| Tank, Polyethylene, 300 gallon | 291 | Portable heavy duty rubber stock tank. | Each | $257.52 | 1 | $257.52 |

**Practice:** B000RNG3 - Range Bundle#3 - Soil Health

**Scenario** #1 - Range Bundle#3 - Soil Health

**Scenario Description:**
Addresses soil quality degradation, degraded plant condition, and livestock production limitation plus an option on fish/wildlife inadequate habitat

**Before Situation:**
Resources are protected at the minimum level of the conservation practice standard(s) applied as part of the enhancement.

**After Situation:**
The adoption of this enhancement will provide resource protection above the minimum level of the conservation practice standard(s) applied

**Feature Measure:** Acre

**Scenario Unit::** Acre

**Scenario Typical Size:** 1,000.0

**Scenario Total Cost:** $2,054.54

**Scenario Cost/Unit:** $2.05

Cost Details:

| Component Name | ID | Description | Unit | Cost | QTY | Total |
|---|---|---|---|---|---|---|
| **Acquisition of Technical Knowledge** | | | | | | |
| Training, Workshops | 294 | Educational seminar or series of meetings emphasizing interaction and exchange of information among a usually small number of participants. | Each | $63.92 | 1 | $63.92 |
| **Equipment Installation** | | | | | | |
| All terrain vehicles, ATV | 965 | Includes equipment, power unit and labor costs. | Hour | $28.28 | 8 | $226.24 |
| **Labor** | | | | | | |
| General Labor | 231 | Labor performed using basic tools such as power tool, shovels, and other tools that do not require extensive training. Ex. pipe layer, herder, concrete placement, materials spreader, flagger, etc. | Hour | $25.31 | 10 | $253.10 |
| 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 | $45.69 | 4 | $182.76 |
| 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 | $110.71 | 12 | $1,328.52 |

**Practice:** B000WLW - Working Lands for Wildlife Bundle

**Scenario** #1 - Working Lands for Wildlife Bundle

**Scenario Description:**
Addresses degraded plant condition, fish/wildlife inadequate habitat, and livestock production limitation plus an option on soil quality degradation and water quality degradation.

**Before Situation:**
Resources are protected at the minimum level of the conservation practice standard(s) applied as part of the enhancement.

**After Situation:**
The adoption of this enhancement will provide resource protection above the minimum level of the conservation practice standard(s) applied

**Feature Measure:** Acre

**Scenario Unit::** Acre

**Scenario Typical Size:** 1,000.0

**Scenario Total Cost:** $2,941.22

**Scenario Cost/Unit:** $2.94

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 | $28.28 | 1 | $28.28 |
| **Foregone Income** | | | | | | |
| FI, Grazing AUMs | 2079 | Grazing is the Primary Land Use | Animal Unit Month | $16.65 | 15 | $249.75 |
| FI, Grazing AUMs | 2079 | Grazing is the Primary Land Use | Animal Unit Month | $16.65 | 150 | $2,497.50 |
| **Labor** | | | | | | |
| Supervisor or Manager | 234 | Labor involving supervision or management activities. Includes crew supervisors, foremen and farm/ranch managers time required for adopting new technology, etc. | Hour | $45.69 | 1 | $45.69 |
| **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 | 2000 | $120.00 |

**Practice:** E314133Z - Brush management for improved structure and composition

**Scenario** #1 - Brush mgmt, improved structure and comp

**Scenario Description:**

Brush management is employed to create a desired plant community, consistent with the related ecological site steady state, which will maintain or enhance the wildlife habitat desired for the identified wildlife species. It will be designed to provide plant structure, density and diversity needed to meet those habitat objectives. This enhancement does not apply to removal of woody vegetation by prescribed fire or removal of woody vegetation to facilitate a land use change.

**Before Situation:**

Resources are protected at the minimum level of the Conservation Practice Standard (CPS) 314 - Brush Management

**After Situation:**

The adoption of this enhancement will provide resource protection above the minimum level as described in Conservation Practice Standard (CPS) 314 - Brush Management

**Feature Measure:** Acre

**Scenario Unit::** Acre

**Scenario Typical Size:** 100.0

**Scenario Total Cost:** $1,965.56

**Scenario Cost/Unit:** $19.66

Cost Details:

| Component Name | ID | Description | Unit | Cost | QTY | Total |
|---|---|---|---|---|---|---|
| **Acquisition of Technical Knowledge** | | | | | | |
| Training, Workshops | 294 | Educational seminar or series of meetings emphasizing interaction and exchange of information among a usually small number of participants. | Each | $63.92 | 1 | $63.92 |
| **Foregone Income** | | | | | | |
| FI, Grazing AUMs | 2079 | Grazing is the Primary Land Use | Animal Unit Month | $16.65 | 12 | $199.80 |
| **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 | $41.76 | 32 | $1,336.32 |
| 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 | $45.69 | 8 | $365.52 |

**Practice:** E314134Z - Brush management that maintains or enhances wildlife or fish habitat

**Scenario** #1 - Brush mgmt, enhance habitat

**Scenario Description:**

Brush management is employed to create a desired plant community, consistent with the related ecological site steady state, which will maintain or enhance the wildlife habitat desired for the identified wildlife species. It will be designed to provide plant structure, density and diversity needed to meet those habitat objectives. This enhancement does not apply to removal of woody vegetation by prescribed fire or removal of woody vegetation to facilitate a land use change.

**Before Situation:**

Resources are protected at the minimum level of the Conservation Practice Standard (CPS) 314 - Brush Management

**After Situation:**

The adoption of this enhancement will provide resource protection above the minimum level as described in Conservation Practice Standard (CPS) 314 - Brush Management

**Feature Measure:** Acre

**Scenario Unit::** Acre

**Scenario Typical Size:** 100.0

**Scenario Total Cost:** $1,965.56

**Scenario Cost/Unit:** $19.66

Cost Details:

| Component Name | ID | Description | Unit | Cost | QTY | Total |
|---|---|---|---|---|---|---|
| **Acquisition of Technical Knowledge** | | | | | | |
| Training, Workshops | 294 | Educational seminar or series of meetings emphasizing interaction and exchange of information among a usually small number of participants. | Each | $63.92 | 1 | $63.92 |
| **Foregone Income** | | | | | | |
| FI, Grazing AUMs | 2079 | Grazing is the Primary Land Use | Animal Unit Month | $16.65 | 12 | $199.80 |
| **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 | $41.76 | 32 | $1,336.32 |
| 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 | $45.69 | 8 | $365.52 |

**Practice:** E315132Z - Herbaceous weed control for desired plant communities/habitats consistent with the ecological site

**Scenario** #1 - Herbaceous weed control-habitats

**Scenario Description:**

Mechanical, chemical, or biological, herbaceous weed control will be employed to control targeted, herbaceous weeds so as to create, release, or restore desired plant communities that are consistent with achievable, ecological site, steady state descriptions.

**Before Situation:**

Resources are protected at the minimum level of the Conservation Practice Standard (CPS) 315 - Herbaceous Weed Control

**After Situation:**

The adoption of this enhancement will provide resource protection above the minimum level as described in Conservation Practice Standard (CPS) 315 - Herbaceous Weed Control

**Feature Measure:** Acre

**Scenario Unit::** Acre

**Scenario Typical Size:** 10.0

**Scenario Total Cost:** $129.80

**Scenario Cost/Unit:** $12.98

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 | $64.90 | 2 | $129.80 |

**Practice:** E315133Z - Herbaceous weed control (inadequate structure and comp) for desired plant communities/habitats

**Scenario** #1 - Herbaceous weed control-communities

**Scenario Description:**

Mechanical, chemical, or biological, herbaceous weed control will be employed to control targeted, herbaceous weeds so as to create, release, or restore desired plant communities that are consistent with achievable, ecological site, steady state descriptions.

**Before Situation:**

Resources are protected at the minimum level of the Conservation Practice Standard (CPS) 315 - Herbaceous Weed Control

**After Situation:**

The adoption of this enhancement will provide resource protection above the minimum level as described in Conservation Practice Standard (CPS) 315 - Herbaceous Weed Control

**Feature Measure:** Acre

**Scenario Unit::** Acre

**Scenario Typical Size:** 10.0

**Scenario Total Cost:** $129.80

**Scenario Cost/Unit:** $12.98

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 | $64.90 | 2 | $129.80 |

**Practice:** E315134Z - Herbaceous weed control (plant pest pressures) for desired plant communities/habitats

**Scenario** #1 - Herbaceous weed control-pest pressures

**Scenario Description:**

Mechanical, chemical, or biological, herbaceous weed control will be employed to control targeted, herbaceous weeds so as to create, release, or restore desired plant communities that are consistent with achievable, ecological site, steady state descriptions.

**Before Situation:**

Resources are protected at the minimum level of the Conservation Practice Standard (CPS) 315 - Herbaceous Weed Control

**After Situation:**

The adoption of this enhancement will provide resource protection above the minimum level as described in Conservation Practice Standard (CPS) 315 - Herbaceous Weed Control

**Feature Measure:** Acre

**Scenario Unit::** Acre

**Scenario Typical Size:** 10.0

**Scenario Total Cost:** $129.80

**Scenario Cost/Unit:** $12.98

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 | $64.90 | 2 | $129.80 |

**Practice:** E327136Z1 - Conservation cover to provide food habitat for pollinators and beneficial insects

**Scenario** #1 - Conservation cover-pollinator food

**Scenario Description:**

Seed or plug nectar and pollen producing plants in non-cropped areas such as field borders, vegetative barriers, contour buffer strips, grassed waterways, shelterbelts, hedgerows, windbreaks, conservation cover, and riparian forest and herbaceous buffers.

**Before Situation:**

Resources are protected at the minimum level of the Conservation Practice Standard (CPS) 327 - Conservation Cover

**After Situation:**

The adoption of this enhancement will provide resource protection above the minimum level as described in Conservation Practice Standard (CPS) 327 - Conservation Cover

**Feature Measure:** Acre

**Scenario Unit::** Acre

**Scenario Typical Size:** 1.0

**Scenario Total Cost:** $337.93

**Scenario Cost/Unit:** $337.93

Cost Details:

| Component Name | ID | Description | Unit | Cost | QTY | Total |
|---|---|---|---|---|---|---|
| **Labor** | | | | | | |
| Skilled Labor | 230 | Labor requiring a high level skill set: Includes carpenters, welders, electricians, conservation professionals involved with data collection, monitoring, and or record keeping, etc. | Hour | $41.76 | 2 | $83.52 |
| **Materials** | | | | | | |
| 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 | $254.41 | 1 | $254.41 |

**Practice:** E327136Z2 - Establish Monarch butterfly habitat

**Scenario** #1 - Establish monarch butterfly habitat

**Scenario Description:**

Seed or plug milkweed (Asclepias spp.), the Monarch butterfly larval hostplant, and high-value monarch butterfly nectar plants in non-cropped areas such as field borders, contour buffer strips, and associated grasslands.

**Before Situation:**

Resources are protected at the minimum level of the Conservation Practice Standard (CPS) 327 - Conservation Cover

**After Situation:**

The adoption of this enhancement will provide resource protection above the minimum level as described in Conservation Practice Standard (CPS) 327 - Conservation Cover

**Feature Measure:** Acre

**Scenario Unit::** Acre

**Scenario Typical Size:** 1.0

**Scenario Total Cost:** $2,390.86

**Scenario Cost/Unit:** $2,390.86

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 | $51.91 | 1 | $51.91 |
| 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 | $64.90 | 2 | $129.80 |
| Cultipacking | 1100 | Includes equipment, power unit and labor costs. | Acre | $7.70 | 1 | $7.70 |
| **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 | $45.69 | 2 | $91.38 |
| Specialist Labor | 235 | Labor requiring a specialized skill set: Includes Agronomists, Foresters, Biologists, etc. to provide additional technical information during the planning and implementation of the practice. Does not include NRCS or TSP services. | Hour | $110.71 | 1 | $110.71 |
| **Materials** | | | | | | |
| Highly Specialized native grass and forb mix | 2618 | A mix of native grass and forbs to be used for restoration of Monarch butterfly foraging and larva development habitat. Includes material and shipping only. | Acre | $1,999.36 | 1 | $1,999.36 |

**Practice:** E327137Z - Conservation cover to provide cover and shelter habitat for pollinators and beneficial insects

**Scenario** #1 - Conservation cover-pollinator shelter

**Scenario Description:**

Seed or plug nectar and pollen producing plants in non-cropped areas such as field borders, vegetative barriers, contour buffer strips, grassed waterways, shelterbelts, hedgerows, windbreaks, conservation cover, and riparian forest and herbaceous buffers.

**Before Situation:**

Resources are protected at the minimum level of the Conservation Practice Standard (CPS) 327 - Conservation Cover

**After Situation:**

The adoption of this enhancement will provide resource protection above the minimum level as described in Conservation Practice Standard (CPS) 327 - Conservation Cover

**Feature Measure:** Acre

**Scenario Unit::** Acre

**Scenario Typical Size:** 1.0

**Scenario Total Cost:** $337.93

**Scenario Cost/Unit:** $337.93

Cost Details:

| Component Name | ID | Description | Unit | Cost | QTY | Total |
|---|---|---|---|---|---|---|
| **Labor** | | | | | | |
| Skilled Labor | 230 | Labor requiring a high level skill set: Includes carpenters, welders, electricians, conservation professionals involved with data collection, monitoring, and or record keeping, etc. | Hour | $41.76 | 2 | $83.52 |
| **Materials** | | | | | | |
| 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 | $254.41 | 1 | $254.41 |

**Practice:** E327139Z - Conservation cover to provide habitat continuity for pollinators and beneficial insects

**Scenario** #1 - Conservation cover-habitat continuity

**Scenario Description:**

Seed or plug nectar and pollen producing plants in non-cropped areas such as field borders, vegetative barriers, contour buffer strips, grassed waterways, shelterbelts, hedgerows, windbreaks, conservation cover, and riparian forest and herbaceous buffers.

**Before Situation:**

Resources are protected at the minimum level of the Conservation Practice Standard (CPS) 327 - Conservation Cover

**After Situation:**

The adoption of this enhancement will provide resource protection above the minimum level as described in Conservation Practice Standard (CPS) 327 - Conservation Cover

**Feature Measure:** Acre

**Scenario Unit::** Acre

**Scenario Typical Size:** 1.0

**Scenario Total Cost:** $337.93

**Scenario Cost/Unit:** $337.93

Cost Details:

| Component Name | ID | Description | Unit | Cost | QTY | Total |
|---|---|---|---|---|---|---|
| **Labor** | | | | | | |
| Skilled Labor | 230 | Labor requiring a high level skill set: Includes carpenters, welders, electricians, conservation professionals involved with data collection, monitoring, and or record keeping, etc. | Hour | $41.76 | 2 | $83.52 |
| **Materials** | | | | | | |
| 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 | $254.41 | 1 | $254.41 |

**Practice:** E328101I - Improved resource conserving crop rotation to reduce water erosion

**Scenario** #1 - IRCCR water erosion

**Scenario Description:**

Improve an existing Resource Conserving Crop Rotation. The crop rotation will reduce soil erosion (water and wind), improve soil health, improve soil moisture efficiency, and reduce plan pest pressures.

**Before Situation:**

Resources are protected at the minimum level of the Conservation Practice Standard (CPS) 328 - Conservation Crop Rotation

**After Situation:**

The adoption of this enhancement will provide resource protection above the minimum level as described in Conservation Practice Standard (CPS) 328 - Conservation Crop Rotation

**Feature Measure:** Acre

**Scenario Unit::** Acre

**Scenario Typical Size:** 100.0

**Scenario Total Cost:** $553.55

**Scenario Cost/Unit:** $5.54

Cost Details:

| Component Name | ID | Description | Unit | Cost | QTY | Total |
|---|---|---|---|---|---|---|
| **Labor** | | | | | | |
| Specialist Labor | 235 | Labor requiring a specialized skill set: Includes Agronomists, Foresters, Biologists, etc. to provide additional technical information during the planning and implementation of the practice. Does not include NRCS or TSP services. | Hour | $110.71 | 5 | $553.55 |

**Practice:** E328101R - Resource conserving crop rotation to reduce water erosion

**Scenario** #1 - RCCR water erosion

**Scenario Description:**

Establish a Resource Conserving Crop Rotation. Rotation must include AT LEAST one resource conserving crop as determined by the State Conservationist in a minimum three year crop rotation. The crop rotation will reduce soil erosion (water and wind), improve soil health, improve soil moisture efficiency, and reduce plan pest pressures.

**Before Situation:**

Resources are protected at the minimum level of the Conservation Practice Standard (CPS) 328 - Conservation Crop Rotation

**After Situation:**

The adoption of this enhancement will provide resource protection above the minimum level as described in Conservation Practice Standard (CPS) 328 - Conservation Crop Rotation

**Feature Measure:** Acre

**Scenario Unit::** Acre

**Scenario Typical Size:** 100.0

**Scenario Total Cost:** $1,549.94

**Scenario Cost/Unit:** $15.50

Cost Details:

| Component Name | ID | Description | Unit | Cost | QTY | Total |
|---|---|---|---|---|---|---|
| **Labor** | | | | | | |
| Specialist Labor | 235 | Labor requiring a specialized skill set: Includes Agronomists, Foresters, Biologists, etc. to provide additional technical information during the planning and implementation of the practice. Does not include NRCS or TSP services. | Hour | $110.71 | 14 | $1,549.94 |

**Practice:** E328101Z - Conservation crop rotation on recently converted CRP grass/legume cover for water erosion

**Scenario** #1 - CRP trans crop rotation-water erosion

**Scenario Description:**

Implement a crop rotation management system on crop land acres that have recently converted from CRP grass/legume conservation cover to annual planted crops. Crop rotation minimizes disturbance resulting in a Soil Tillage Intensity Rating (STIR) less than10 and reduces soil erosion from water to below soil tolerance (T) level. RUSLE2 must be used to document the rotation, soil erosion estimate, and STIR calculations. *This enhancement is limited to acres where the conversion event took place not more than 2 years prior. Enhancement not applicable on hayland.

**Before Situation:**

Resources are protected at the minimum level of the Conservation Practice Standard (CPS) 328 - Conservation Crop Rotation

**After Situation:**

The adoption of this enhancement will provide resource protection above the minimum level as described in Conservation Practice Standard (CPS) 328 - Conservation Crop Rotation

**Feature Measure:** Acre

**Scenario Unit::** Acre

**Scenario Typical Size:** 100.0

**Scenario Total Cost:** $332.13

**Scenario Cost/Unit:** $3.32

Cost Details:

| Component Name | ID | Description | Unit | Cost | QTY | Total |
|---|---|---|---|---|---|---|
| **Labor** | | | | | | |
| Specialist Labor | 235 | Labor requiring a specialized skill set: Includes Agronomists, Foresters, Biologists, etc. to provide additional technical information during the planning and implementation of the practice. Does not include NRCS or TSP services. | Hour | $110.71 | 3 | $332.13 |

**Practice:** E328102I - Improved resource conserving crop rotation to reduce wind erosion

**Scenario** #1 - IRCCR wind erosion

**Scenario Description:**

Improve an existing Resource Conserving Crop Rotation. The crop rotation will reduce soil erosion (water and wind), improve soil health, improve soil moisture efficiency, and reduce plan pest pressures.

**Before Situation:**

Resources are protected at the minimum level of the Conservation Practice Standard (CPS) 328 - Conservation Crop Rotation

**After Situation:**

The adoption of this enhancement will provide resource protection above the minimum level as described in Conservation Practice Standard (CPS) 328 - Conservation Crop Rotation

**Feature Measure:** Acre

**Scenario Unit::** Acre

**Scenario Typical Size:** 100.0

**Scenario Total Cost:** $553.55

**Scenario Cost/Unit:** $5.54

Cost Details:

| Component Name | ID | Description | Unit | Cost | QTY | Total |
|---|---|---|---|---|---|---|
| **Labor** | | | | | | |
| Specialist Labor | 235 | Labor requiring a specialized skill set: Includes Agronomists, Foresters, Biologists, etc. to provide additional technical information during the planning and implementation of the practice. Does not include NRCS or TSP services. | Hour | $110.71 | 5 | $553.55 |

**Practice:** E328102R - Resource conserving crop rotation to reduce wind erosion

**Scenario** #1 - RCCR wind erosion

**Scenario Description:**

Establish a Resource Conserving Crop Rotation. Rotation must include AT LEAST one resource conserving crop as determined by the State Conservationist in a minimum three year crop rotation. The crop rotation will reduce soil erosion (water and wind), improve soil health, improve soil moisture efficiency, and reduce plan pest pressures.

**Before Situation:**

Resources are protected at the minimum level of the Conservation Practice Standard (CPS) 328 - Conservation Crop Rotation

**After Situation:**

The adoption of this enhancement will provide resource protection above the minimum level as described in Conservation Practice Standard (CPS) 328 - Conservation Crop Rotation

**Feature Measure:** Acre

**Scenario Unit::** Acre

**Scenario Typical Size:** 100.0

**Scenario Total Cost:** $1,549.94

**Scenario Cost/Unit:** $15.50

Cost Details:

| Component Name | ID | Description | Unit | Cost | QTY | Total |
|---|---|---|---|---|---|---|
| **Labor** | | | | | | |
| Specialist Labor | 235 | Labor requiring a specialized skill set: Includes Agronomists, Foresters, Biologists, etc. to provide additional technical information during the planning and implementation of the practice. Does not include NRCS or TSP services. | Hour | $110.71 | 14 | $1,549.94 |

**Practice:** E328102Z - Conservation crop rotation on recently converted CRP grass/legume cover for wind erosion

**Scenario** #1 - CRP trans crop rotation-wind erosion

**Scenario Description:**

Implement a crop rotation management system on crop land acres that have recently converted from CRP grass/legume conservation cover to annual planted crops. Crop rotation minimizes disturbance resulting in a Soil Tillage Intensity Rating (STIR) less than10 and reduces soil erosion from wind to below soil tolerance (T) level. WEPS must be used to document the rotation, soil erosion estimate, and STIR calculations. *This enhancement is limited to acres where the conversion event took place not more than 2 years prior. Enhancement not applicable on hayland.

**Before Situation:**

Resources are protected at the minimum level of the Conservation Practice Standard (CPS) 328 - Conservation Crop Rotation

**After Situation:**

The adoption of this enhancement will provide resource protection above the minimum level as described in Conservation Practice Standard (CPS) 328 - Conservation Crop Rotation

**Feature Measure:** Acre

**Scenario Unit::** Acre

**Scenario Typical Size:** 100.0

**Scenario Total Cost:** $332.13

**Scenario Cost/Unit:** $3.32

Cost Details:

| Component Name | ID | Description | Unit | Cost | QTY | Total |
|---|---|---|---|---|---|---|
| **Labor** | | | | | | |
| Specialist Labor | 235 | Labor requiring a specialized skill set: Includes Agronomists, Foresters, Biologists, etc. to provide additional technical information during the planning and implementation of the practice. Does not include NRCS or TSP services. | Hour | $110.71 | 3 | $332.13 |

**Practice:** E328106I - Improved resource conserving crop rotation for soil organic matter improvement

**Scenario** #1 - IRCCR for SOM improvement

**Scenario Description:**

Improve an existing Resource Conserving Crop Rotation. The crop rotation will reduce soil erosion (water and wind), improve soil health, improve soil moisture efficiency, and reduce plan pest pressures.

**Before Situation:**

Resources are protected at the minimum level of the Conservation Practice Standard (CPS) 328 - Conservation Crop Rotation

**After Situation:**

The adoption of this enhancement will provide resource protection above the minimum level as described in Conservation Practice Standard (CPS) 328 - Conservation Crop Rotation

**Feature Measure:** Acre

**Scenario Unit::** Acre

**Scenario Typical Size:** 100.0

**Scenario Total Cost:** $553.55

**Scenario Cost/Unit:** $5.54

Cost Details:

| Component Name | ID | Description | Unit | Cost | QTY | Total |
|---|---|---|---|---|---|---|
| **Labor** | | | | | | |
| Specialist Labor | 235 | Labor requiring a specialized skill set: Includes Agronomists, Foresters, Biologists, etc. to provide additional technical information during the planning and implementation of the practice. Does not include NRCS or TSP services. | Hour | $110.71 | 5 | $553.55 |

**Practice:** E328106R - Resource conserving crop rotation for soil organic matter improvement

**Scenario** #1 - RCCR for SOM improvement

**Scenario Description:**

Establish a Resource Conserving Crop Rotation. Rotation must include AT LEAST one resource conserving crop as determined by the State Conservationist in a minimum three year crop rotation. The crop rotation will reduce soil erosion (water and wind), improve soil health, improve soil moisture efficiency, and reduce plan pest pressures.

**Before Situation:**

Resources are protected at the minimum level of the Conservation Practice Standard (CPS) 328 - Conservation Crop Rotation

**After Situation:**

The adoption of this enhancement will provide resource protection above the minimum level as described in Conservation Practice Standard (CPS) 328 - Conservation Crop Rotation

**Feature Measure:** Acre

**Scenario Unit::** Acre

**Scenario Typical Size:** 100.0

**Scenario Total Cost:** $1,549.94

**Scenario Cost/Unit:** $15.50

Cost Details:

| Component Name | ID | Description | Unit | Cost | QTY | Total |
|---|---|---|---|---|---|---|
| **Labor** | | | | | | |
| Specialist Labor | 235 | Labor requiring a specialized skill set: Includes Agronomists, Foresters, Biologists, etc. to provide additional technical information during the planning and implementation of the practice. Does not include NRCS or TSP services. | Hour | $110.71 | 14 | $1,549.94 |

**Practice:** E328106Z1 - Soil health crop rotation

**Scenario** #1 - Soil health crop rotation

**Scenario Description:**

Implement a crop rotation which addresses all four principle components of soil health: increases diversity of the cropping system; maintains residue throughout the year; keeps a living root; and minimizes soil chemical, physical and biological disturbance. The rotation will include at least 4 different crop and/or cover crop types (crop types include cool season grass, warm season grass, cool season broadleaf, warm season broadleaf) grown in a sequence that will produce a positive trend in the Organic Matter (OM) subfactor value over the life of the rotation, as determined by the Soil Conditioning Index (SCI). RUSLE2 or WEPS must be used to document the rotation and SCI calculations.

**Before Situation:**

Resources are protected at the minimum level of the Conservation Practice Standard (CPS) 328 - Conservation Crop Rotation

**After Situation:**

The adoption of this enhancement will provide resource protection above the minimum level as described in Conservation Practice Standard (CPS) 328 - Conservation Crop Rotation

**Feature Measure:** Acre

**Scenario Unit::** Acre

**Scenario Typical Size:** 100.0

**Scenario Total Cost:** $553.55

**Scenario Cost/Unit:** $5.54

Cost Details:

| Component Name | ID | Description | Unit | Cost | QTY | Total |
|---|---|---|---|---|---|---|
| **Labor** | | | | | | |
| Specialist Labor | 235 | Labor requiring a specialized skill set: Includes Agronomists, Foresters, Biologists, etc. to provide additional technical information during the planning and implementation of the practice. Does not include NRCS or TSP services. | Hour | $110.71 | 5 | $553.55 |

**Practice:** E328106Z2 - Modifications to improve soil health and increase soil organic matter

**Scenario** #1 - Mod to improve SH and SOM

**Scenario Description:**

Use of soil health assessment to evaluate impact of current conservation crop rotation in addressing soil organic matter depletion (primary assessment made in Year 1). Modifications to the crop rotation and/or crop management will be made as a result of the assessment results (adding a new crop and/or cover crop to the rotation; making changes to planting and/or tillage system, harvest timing of crops, or termination timing of cover crops). During Year 3 a follow up assessment will be completed to allow time for the modifications to show increased soil organic matter. Modified system must produce a positive trend in the Organic Matter (OM) subfactor value over the life of the rotation, as determined by the Soil Conditioning Index (SCI). RUSLE2 or WEPS must be used to document the rotation and SCI calculations.

**Before Situation:**

Resources are protected at the minimum level of the Conservation Practice Standard (CPS) 328 - Conservation Crop Rotation

**After Situation:**

The adoption of this enhancement will provide resource protection above the minimum level as described in Conservation Practice Standard (CPS) 328 - Conservation Crop Rotation

**Feature Measure:** Acre

**Scenario Unit::** Acre

**Scenario Typical Size:** 100.0

**Scenario Total Cost:** $1,036.28

**Scenario Cost/Unit:** $10.36

Cost Details:

| Component Name | ID | Description | Unit | Cost | QTY | Total |
|---|---|---|---|---|---|---|
| **Labor** | | | | | | |
| Specialist Labor | 235 | Labor requiring a specialized skill set: Includes Agronomists, Foresters, Biologists, etc. to provide additional technical information during the planning and implementation of the practice. Does not include NRCS or TSP services. | Hour | $110.71 | 8 | $885.68 |
| **Materials** | | | | | | |
| Test, Soil Test, Standard | 299 | Includes materials, shiping, labor, and equipment costs. | Each | $10.04 | 15 | $150.60 |

**Practice:** E328106Z3 - Conservation crop rotation on recently converted CRP grass/legume cover for SOM improvement

**Scenario** #1 - CRP trans crop rotation-SOM

**Scenario Description:**

Implement a crop rotation management system on crop land acres that have recently converted from CRP grass/legume conservation cover to annual planted crops. The crop rotation adds diversity to the system; keeps a living root growing; and is managed to minimize soil chemical, physical and biological disturbance and maintain residue cover on the surface. The rotation includes crops and/or cover crops representing 3 of the 4 crop types during the planned crop sequence: warm season grass (WSG), warm season broadleaf (WSB), cool season grass (CSG), or cool season broadleaf (CSB). The crop rotation will produce a positive trend in the Organic Matter (OM) subfactor value over the life of the rotation, as determined by the SCI. Crop rotation minimizes disturbance resulting in a Soil Tillage Intensity Rating (STIR) less than10 and reduces soil erosion from wind to below soil tolerance (T) level. RUSLE2 or WEPS must be used to document the rotation, STIR and SCI calculations. *This enhancement is limited to acres where the conversion event took place not more than 2 years prior. Enhancement not applicable on hayland.

**Before Situation:**

Resources are protected at the minimum level of the Conservation Practice Standard (CPS) 328 - Conservation Crop Rotation

**After Situation:**

The adoption of this enhancement will provide resource protection above the minimum level as described in Conservation Practice Standard (CPS) 328 - Conservation Crop Rotation

**Feature Measure:** Acre

**Scenario Unit::** Acre

**Scenario Typical Size:** 100.0

**Scenario Total Cost:** $553.55

**Scenario Cost/Unit:** $5.54

Cost Details:

| Component Name | ID | Description | Unit | Cost | QTY | Total |
|---|---|---|---|---|---|---|
| **Labor** | | | | | | |
| Specialist Labor | 235 | Labor requiring a specialized skill set: Includes Agronomists, Foresters, Biologists, etc. to provide additional technical information during the planning and implementation of the practice. Does not include NRCS or TSP services. | Hour | $110.71 | 5 | $553.55 |

**Practice:** E328107I - Improved resource conserving crop rotation to improve soil compaction

**Scenario** #1 - IRCCR to improve soil compaction

**Scenario Description:**

Improve an existing Resource Conserving Crop Rotation. The crop rotation will reduce soil erosion (water and wind), improve soil health, improve soil moisture efficiency, and reduce plan pest pressures.

**Before Situation:**

Resources are protected at the minimum level of the Conservation Practice Standard (CPS) 328 - Conservation Crop Rotation

**After Situation:**

The adoption of this enhancement will provide resource protection above the minimum level as described in Conservation Practice Standard (CPS) 328 - Conservation Crop Rotation

**Feature Measure:** Acre

**Scenario Unit::** Acre

**Scenario Typical Size:** 100.0

**Scenario Total Cost:** $553.55

**Scenario Cost/Unit:** $5.54

Cost Details:

| Component Name | ID | Description | Unit | Cost | QTY | Total |
|---|---|---|---|---|---|---|
| **Labor** | | | | | | |
| Specialist Labor | 235 | Labor requiring a specialized skill set: Includes Agronomists, Foresters, Biologists, etc. to provide additional technical information during the planning and implementation of the practice. Does not include NRCS or TSP services. | Hour | $110.71 | 5 | $553.55 |

**Practice:** E328107R - Resource conserving crop rotation to improve soil compaction

**Scenario** #1 - RCCR to improve soil compaction

**Scenario Description:**

Establish a Resource Conserving Crop Rotation. Rotation must include AT LEAST one resource conserving crop as determined by the State Conservationist in a minimum three year crop rotation. The crop rotation will reduce soil erosion (water and wind), improve soil health, improve soil moisture efficiency, and reduce plan pest pressures.

**Before Situation:**

Resources are protected at the minimum level of the Conservation Practice Standard (CPS) 328 - Conservation Crop Rotation

**After Situation:**

The adoption of this enhancement will provide resource protection above the minimum level as described in Conservation Practice Standard (CPS) 328 - Conservation Crop Rotation

**Feature Measure:** Acre

**Scenario Unit::** Acre

**Scenario Typical Size:** 100.0

**Scenario Total Cost:** $1,549.94

**Scenario Cost/Unit:** $15.50

Cost Details:

| Component Name | ID | Description | Unit | Cost | QTY | Total |
|---|---|---|---|---|---|---|
| **Labor** | | | | | | |
| Specialist Labor | 235 | Labor requiring a specialized skill set: Includes Agronomists, Foresters, Biologists, etc. to provide additional technical information during the planning and implementation of the practice. Does not include NRCS or TSP services. | Hour | $110.71 | 14 | $1,549.94 |

**Practice:** E328109Z - Conservation crop rotation to reduce the concentration of salts

**Scenario** #1 - Rotate to reduce salt concentration

**Scenario Description:**

Implement a crop rotation to reduce the concentration of salts and other chemicals from saline seeps. The rotation should include at least 3 crops and/or cover crops grown in a sequence in the recharge areas of saline seeps that have rooting depths and water requirements adequate to fully utilize all available soil water. Do not use summer fallow. Use an approved water balance procedure to determine crop selection and sequence. Select crops with a tolerance to salinity levels that match the salinity of the discharge area. <see state lists>

**Before Situation:**

Resources are protected at the minimum level of the Conservation Practice Standard (CPS) 328 - Conservation Crop Rotation

**After Situation:**

The adoption of this enhancement will provide resource protection above the minimum level as described in Conservation Practice Standard (CPS) 328 - Conservation Crop Rotation

**Feature Measure:** Acre

**Scenario Unit::** Acre

**Scenario Typical Size:** 100.0

**Scenario Total Cost:** $442.84

**Scenario Cost/Unit:** $4.43

Cost Details:

| Component Name | ID | Description | Unit | Cost | QTY | Total |
|---|---|---|---|---|---|---|
| **Labor** | | | | | | |
| Specialist Labor | 235 | Labor requiring a specialized skill set: Includes Agronomists, Foresters, Biologists, etc. to provide additional technical information during the planning and implementation of the practice. Does not include NRCS or TSP services. | Hour | $110.71 | 4 | $442.84 |

**Practice:** E328134I - Improved resource conserving crop rotation to relieve plant pest pressure

**Scenario** #1 - IRCCR to relieve plant pest pressure

**Scenario Description:**

Improve an existing Resource Conserving Crop Rotation. The crop rotation will reduce soil erosion (water and wind), improve soil health, improve soil moisture efficiency, and reduce plan pest pressures.

**Before Situation:**

Resources are protected at the minimum level of the Conservation Practice Standard (CPS) 328 - Conservation Crop Rotation

**After Situation:**

The adoption of this enhancement will provide resource protection above the minimum level as described in Conservation Practice Standard (CPS) 328 - Conservation Crop Rotation

**Feature Measure:** Acre

**Scenario Unit::** Acre

**Scenario Typical Size:** 100.0

**Scenario Total Cost:** $553.55

**Scenario Cost/Unit:** $5.54

Cost Details:

| Component Name | ID | Description | Unit | Cost | QTY | Total |
|---|---|---|---|---|---|---|
| **Labor** | | | | | | |
| Specialist Labor | 235 | Labor requiring a specialized skill set: Includes Agronomists, Foresters, Biologists, etc. to provide additional technical information during the planning and implementation of the practice. Does not include NRCS or TSP services. | Hour | $110.71 | 5 | $553.55 |

**Practice:** E328134R - Resource conserving crop rotation to relieve plant pest pressure

**Scenario** #1 - RCCR to relieve plant pest pressure

**Scenario Description:**

Establish a Resource Conserving Crop Rotation. Rotation must include AT LEAST one resource conserving crop as determined by the State Conservationist in a minimum three year crop rotation. The crop rotation will reduce soil erosion (water and wind), improve soil health, improve soil moisture efficiency, and reduce plan pest pressures.

**Before Situation:**

Resources are protected at the minimum level of the Conservation Practice Standard (CPS) 328 - Conservation Crop Rotation

**After Situation:**

The adoption of this enhancement will provide resource protection above the minimum level as described in Conservation Practice Standard (CPS) 328 - Conservation Crop Rotation

**Feature Measure:** Acre

**Scenario Unit::** Acre

**Scenario Typical Size:** 100.0

**Scenario Total Cost:** $1,549.94

**Scenario Cost/Unit:** $15.50

Cost Details:

| Component Name | ID | Description | Unit | Cost | QTY | Total |
|---|---|---|---|---|---|---|
| **Labor** | | | | | | |
| Specialist Labor | 235 | Labor requiring a specialized skill set: Includes Agronomists, Foresters, Biologists, etc. to provide additional technical information during the planning and implementation of the practice. Does not include NRCS or TSP services. | Hour | $110.71 | 14 | $1,549.94 |

**Practice:** E328136Z - Leave standing grain crops unharvested to benefit wildlife food sources

**Scenario** #1 - Leave standing grain crops for food

**Scenario Description:**
Implement a crop rotation which allows a portion of grain crops to be left in fields un-harvested to provide food and cover for wildlife during winter months.

**Before Situation:**
Resources are protected at the minimum level of the Conservation Practice Standard (CPS) 328 - Conservation Crop Rotation

**After Situation:**
The adoption of this enhancement will provide resource protection above the minimum level as described in Conservation Practice Standard (CPS) 328 - Conservation Crop Rotation

**Feature Measure:** Acre

**Scenario Unit::** Acre

**Scenario Typical Size:** 100.0

**Scenario Total Cost:** $478.60

**Scenario Cost/Unit:** $4.79

Cost Details:

| Component Name | ID | Description | Unit | Cost | QTY | Total |
|---|---|---|---|---|---|---|
| **Foregone Income** | | | | | | |
| FI, Corn Dryland | 1959 | Dryland Corn is Primary Crop | Acre | $376.15 | 0.51 | $191.84 |
| FI, Soybeans Dryland | 1961 | Dryland Soybeans is Primary Crop | Acre | $361.97 | 0.45 | $162.89 |
| FI, Wheat Dryland | 1963 | Dryland Wheat is Primary Crop | Acre | $269.62 | 0.29 | $78.19 |
| **Labor** | | | | | | |
| Supervisor or Manager | 234 | Labor involving supervision or management activities. Includes crew supervisors, foremen and farm/ranch managers time required for adopting new technology, etc. | Hour | $45.69 | 1 | $45.69 |

**Practice:** E328137Z - Leave standing grain crops unharvested to benefit wildlife cover and shelter

**Scenario** #1 - Leave standing grain crops for shelter

**Scenario Description:**
Implement a crop rotation which allows a portion of grain crops to be left in fields un-harvested to provide food and cover for wildlife during winter months.

**Before Situation:**
Resources are protected at the minimum level of the Conservation Practice Standard (CPS) 328 - Conservation Crop Rotation

**After Situation:**
The adoption of this enhancement will provide resource protection above the minimum level as described in Conservation Practice Standard (CPS) 328 - Conservation Crop Rotation

**Feature Measure:** Acre

**Scenario Unit::** Acre

**Scenario Typical Size:** 100.0

**Scenario Total Cost:** $478.60

**Scenario Cost/Unit:** $4.79

Cost Details:

| Component Name | ID | Description | Unit | Cost | QTY | Total |
|---|---|---|---|---|---|---|
| **Foregone Income** | | | | | | |
| FI, Corn Dryland | 1959 | Dryland Corn is Primary Crop | Acre | $376.15 | 0.51 | $191.84 |
| FI, Soybeans Dryland | 1961 | Dryland Soybeans is Primary Crop | Acre | $361.97 | 0.45 | $162.89 |
| FI, Wheat Dryland | 1963 | Dryland Wheat is Primary Crop | Acre | $269.62 | 0.29 | $78.19 |
| **Labor** | | | | | | |
| Supervisor or Manager | 234 | Labor involving supervision or management activities. Includes crew supervisors, foremen and farm/ranch managers time required for adopting new technology, etc. | Hour | $45.69 | 1 | $45.69 |

**Practice:** E329101Z - No till to reduce water erosion

**Scenario** #1 - No till to reduce water erosion

**Scenario Description:**

Establish no till system to reduce sheet and rill erosion soil loss. Field(s) must have a soil loss at or below the soil tolerance (T) level for water erosion for the crop rotation and a Soil Tillage Intensity Rating (STIR) of no greater than 10 for each crop in the planned rotation. RUSLE2 must be used to calculate soil loss and STIR.

**Before Situation:**

Resources are protected at the minimum level of the Conservation Practice Standard (CPS) 329 - Residue and Tillage Management - No-Till/ Strip Till/ Direct Seed

**After Situation:**

The adoption of this enhancement will provide resource protection above the minimum level as described in Conservation Practice Standard (CPS) 329 - Residue and Tillage Management - No-Till/ Strip Till/ Direct Seed

**Feature Measure:** Acre

**Scenario Unit::** Acre

**Scenario Typical Size:** 100.0

**Scenario Total Cost:** $332.13

**Scenario Cost/Unit:** $3.32

Cost Details:

| Component Name | ID | Description | Unit | Cost | QTY | Total |
|---|---|---|---|---|---|---|
| **Labor** | | | | | | |
| Specialist Labor | 235 | Labor requiring a specialized skill set: Includes Agronomists, Foresters, Biologists, etc. to provide additional technical information during the planning and implementation of the practice. Does not include NRCS or TSP services. | Hour | $110.71 | 3 | $332.13 |

**Practice:** E329102Z - No till system to reduce wind erosion

**Scenario** #1 - No till system to reduce wind erosion

**Scenario Description:**

Establish no till system to reduce wind erosion soil loss. Field(s) must have a soil loss at or below the soil tolerance (T) level for wind erosion for the crop rotation and a Soil Tillage Intensity Rating (STIR) of no greater than 10 for each crop in the planned rotation. WEPS must be used to calculate soil loss and STIR.

**Before Situation:**

Resources are protected at the minimum level of the Conservation Practice Standard (CPS) 329 - Residue and Tillage Management - No-Till/ Strip Till/ Direct Seed

**After Situation:**

The adoption of this enhancement will provide resource protection above the minimum level as described in Conservation Practice Standard (CPS) 329 - Residue and Tillage Management - No-Till/ Strip Till/ Direct Seed

**Feature Measure:** Acre

**Scenario Unit::** Acre

**Scenario Typical Size:** 100.0

**Scenario Total Cost:** $332.13

**Scenario Cost/Unit:** $3.32

Cost Details:

| Component Name | ID | Description | Unit | Cost | QTY | Total |
|---|---|---|---|---|---|---|
| **Labor** | | | | | | |
| Specialist Labor | 235 | Labor requiring a specialized skill set: Includes Agronomists, Foresters, Biologists, etc. to provide additional technical information during the planning and implementation of the practice. Does not include NRCS or TSP services. | Hour | $110.71 | 3 | $332.13 |

**Practice:** E329106Z - No till system to increase soil health and soil organic matter content

**Scenario** #1 - No till system to increase SH and SOM

**Scenario Description:**

Establish a reduced till system to increase soil health and soil organic matter content. Each crop in the crop rotation shall have a Soil Tillage Intensity Rating (STIR) of no greater than 20. The crop rotation must achieve a soil conditioning index (SCI) of zero or higher and produce a positive trend in the Organic Matter (OM) subfactor over the life of the crop rotation. RUSLE2 or WEPS must be used to document STIR and SCI calculations. Residue shall not be burned, grazed, or harvested.

**Before Situation:**

Resources are protected at the minimum level of the Conservation Practice Standard (CPS) 329 - Residue and Tillage Management - No-Till/ Strip Till/ Direct Seed

**After Situation:**

The adoption of this enhancement will provide resource protection above the minimum level as described in Conservation Practice Standard (CPS) 329 - Residue and Tillage Management - No-Till/ Strip Till/ Direct Seed

**Feature Measure:** Acre

**Scenario Unit::** Acre

**Scenario Typical Size:** 100.0

**Scenario Total Cost:** $442.84

**Scenario Cost/Unit:** $4.43

Cost Details:

| Component Name | ID | Description | Unit | Cost | QTY | Total |
|---|---|---|---|---|---|---|
| **Labor** | | | | | | |
| Specialist Labor | 235 | Labor requiring a specialized skill set: Includes Agronomists, Foresters, Biologists, etc. to provide additional technical information during the planning and implementation of the practice. Does not include NRCS or TSP services. | Hour | $110.71 | 4 | $442.84 |

**Practice:** E329114Z - No till to increase plant-available moisture: irrigation water

**Scenario** #1 - No till for IWM

**Scenario Description:**

Establish a no till system to increase plant-available moisture. Each crop in the crop rotation shall have a Soil Tillage Intensity Rating (STIR) of no greater than 20. RUSLE2 or WEPS must be used to document STIR calculations. Maintain a minimum 60 percent surface residue cover throughout the year to reduce evaporation from the soil surface.

**Before Situation:**

Resources are protected at the minimum level of the Conservation Practice Standard (CPS) 329 - Residue and Tillage Management - No-Till/ Strip Till/ Direct Seed

**After Situation:**

The adoption of this enhancement will provide resource protection above the minimum level as described in Conservation Practice Standard (CPS) 329 - Residue and Tillage Management - No-Till/ Strip Till/ Direct Seed

**Feature Measure:** Acre

**Scenario Unit::** Acre

**Scenario Typical Size:** 100.0

**Scenario Total Cost:** $332.13

**Scenario Cost/Unit:** $3.32

Cost Details:

| Component Name | ID | Description | Unit | Cost | QTY | Total |
|---|---|---|---|---|---|---|
| **Labor** | | | | | | |
| Specialist Labor | 235 | Labor requiring a specialized skill set: Includes Agronomists, Foresters, Biologists, etc. to provide additional technical information during the planning and implementation of the practice. Does not include NRCS or TSP services. | Hour | $110.71 | 3 | $332.13 |

**Practice:** E329115Z - No till to increase plant-available moisture: moisture management

**Scenario** #1 - No till for moisture mgmt

**Scenario Description:**

Establish a no till system to increase plant-available moisture. Each crop in the crop rotation shall have a Soil Tillage Intensity Rating (STIR) of no greater than 20. RUSLE2 or WEPS must be used to document STIR calculations. Maintain a minimum 60 percent surface residue cover throughout the year to reduce evaporation from the soil surface.

**Before Situation:**

Resources are protected at the minimum level of the Conservation Practice Standard (CPS) 329 - Residue and Tillage Management - No-Till/ Strip Till/ Direct Seed

**After Situation:**

The adoption of this enhancement will provide resource protection above the minimum level as described in Conservation Practice Standard (CPS) 329 - Residue and Tillage Management - No-Till/ Strip Till/ Direct Seed

**Feature Measure:** Acre

**Scenario Unit::** Acre

**Scenario Typical Size:** 100.0

**Scenario Total Cost:** $332.13

**Scenario Cost/Unit:** $3.32

Cost Details:

| Component Name | ID | Description | Unit | Cost | QTY | Total |
|---|---|---|---|---|---|---|
| **Labor** | | | | | | |
| Specialist Labor | 235 | Labor requiring a specialized skill set: Includes Agronomists, Foresters, Biologists, etc. to provide additional technical information during the planning and implementation of the practice. Does not include NRCS or TSP services. | Hour | $110.71 | 3 | $332.13 |

**Practice:** E329128Z - No till to reduce tillage induced particulate matter

**Scenario** #1 - No till to reduce PM

**Scenario Description:**

Establish no till system to reduce tillage induced particulate matter. Field(s) must have a soil loss at or below the soil tolerance (T) level for the crop rotation and a Soil Tillage Intensity Rating (STIR) of no greater than 10 for each crop in the planned rotation. RUSLE2 or WEPS must be used to document soil loss and STIR calculations.

**Before Situation:**

Resources are protected at the minimum level of the Conservation Practice Standard (CPS) 329 - Residue and Tillage Management - No-Till/ Strip Till/ Direct Seed

**After Situation:**

The adoption of this enhancement will provide resource protection above the minimum level as described in Conservation Practice Standard (CPS) 329 - Residue and Tillage Management - No-Till/ Strip Till/ Direct Seed

**Feature Measure:** Acre

**Scenario Unit::** Acre

**Scenario Typical Size:** 100.0

**Scenario Total Cost:** $332.13

**Scenario Cost/Unit:** $3.32

Cost Details:

| Component Name | ID | Description | Unit | Cost | QTY | Total |
|---|---|---|---|---|---|---|
| **Labor** | | | | | | |
| Specialist Labor | 235 | Labor requiring a specialized skill set: Includes Agronomists, Foresters, Biologists, etc. to provide additional technical information during the planning and implementation of the practice. Does not include NRCS or TSP services. | Hour | $110.71 | 3 | $332.13 |

**Practice:** E329144Z - No till to reduce energy

**Scenario** #1 - No till to reduce energy

**Scenario Description:**

Establish a no till system which reduces total energy consumption associated with field operations by at least 25% compared to current tillage system (benchmark). Each crop in the crop rotation shall have a Soil Tillage Intensity Rating (STIR) of no greater than 20. The current NRCS wind and water erosion prediction technologies must be used to document STIR calculations and energy consumption.

**Before Situation:**

Resources are protected at the minimum level of the Conservation Practice Standard (CPS) 329 - Residue and Tillage Management - No-Till/ Strip Till/ Direct Seed

**After Situation:**

The adoption of this enhancement will provide resource protection above the minimum level as described in Conservation Practice Standard (CPS) 329 - Residue and Tillage Management - No-Till/ Strip Till/ Direct Seed

**Feature Measure:** Acre

**Scenario Unit::** Acre

**Scenario Typical Size:** 100.0

**Scenario Total Cost:** $442.84

**Scenario Cost/Unit:** $4.43

Cost Details:

| Component Name | ID | Description | Unit | Cost | QTY | Total |
|---|---|---|---|---|---|---|
| **Labor** | | | | | | |
| Specialist Labor | 235 | Labor requiring a specialized skill set: Includes Agronomists, Foresters, Biologists, etc. to provide additional technical information during the planning and implementation of the practice. Does not include NRCS or TSP services. | Hour | $110.71 | 4 | $442.84 |

**Practice:** E333118Z - Apply gypsum products to improve surface WQ quality by reducing dissolved P conc in surface runoff

**Scenario** #1 - Apply gypsum to control P in runoff

**Scenario Description:**

Apply approved gypsum products to improve surface water quality by reducing dissolved phosphorus concentrations in surface runoff.

**Before Situation:**

Resources are protected at the minimum level of the Conservation Practice Standard (CPS) 333 - Amending Soil Properties with Gypsiferous Products

**After Situation:**

The adoption of this enhancement will provide resource protection above the minimum level as described in Conservation Practice Standard (CPS) 333 - Amending Soil Properties with Gypsiferous Products

**Feature Measure:** Acre

**Scenario Unit::** Acre

**Scenario Typical Size:** 100.0

**Scenario Total Cost:** $417.60

**Scenario Cost/Unit:** $4.18

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 | $41.76 | 10 | $417.60 |

**Practice:** E333119Z - Apply gypsum products to improve surface WQ by reducing dissolved P conc in subsurface drainage

**Scenario** #1 - Apply gypsum to control P in drainage

**Scenario Description:**

Apply approved gypsum products to improve surface water quality by reducing dissolved phosphorus concentrations in subsurface drainage.

**Before Situation:**

Resources are protected at the minimum level of the Conservation Practice Standard (CPS) 333 - Amending Soil Properties with Gypsiferous Products

**After Situation:**

The adoption of this enhancement will provide resource protection above the minimum level as described in Conservation Practice Standard (CPS) 333 - Amending Soil Properties with Gypsiferous Products

**Feature Measure:** Acre

**Scenario Unit::** Acre

**Scenario Typical Size:** 100.0

**Scenario Total Cost:** $417.60

**Scenario Cost/Unit:** $4.18

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 | $41.76 | 10 | $417.60 |

**Practice:** E333122Z - Apply gypsum to improve WQ, contaminants transported from manure/biosolid application-surface water

**Scenario** #1 - Gypsum to control pathogens in runoff

**Scenario Description:**

Apply approved gypsum products to improve water quality by reducing the potential for pathogens and other contaminants transport from areas of manure and biosolids application.

**Before Situation:**

Resources are protected at the minimum level of the Conservation Practice Standard (CPS) 333 - Amending Soil Properties with Gypsiferous Products

**After Situation:**

The adoption of this enhancement will provide resource protection above the minimum level as described in Conservation Practice Standard (CPS) 333 - Amending Soil Properties with Gypsiferous Products

**Feature Measure:** Acre

**Scenario Unit::** Acre

**Scenario Typical Size:** 100.0

**Scenario Total Cost:** $417.60

**Scenario Cost/Unit:** $4.18

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 | $41.76 | 10 | $417.60 |

**Practice:** E333123Z - Apply gypsum to improve WQ, contaminants transported from manure/biosolid application-ground water

**Scenario** #1 - Gypsum to control pathogens in drainage

**Scenario Description:**

Apply approved gypsum products to improve water quality by reducing the potential for pathogens and other contaminants transport from areas of manure and biosolids application.

**Before Situation:**

Resources are protected at the minimum level of the Conservation Practice Standard (CPS) 333 - Amending Soil Properties with Gypsiferous Products

**After Situation:**

The adoption of this enhancement will provide resource protection above the minimum level as described in Conservation Practice Standard (CPS) 333 - Amending Soil Properties with Gypsiferous Products

**Feature Measure:** Acre

**Scenario Unit::** Acre

**Scenario Typical Size:** 100.0

**Scenario Total Cost:** $417.60

**Scenario Cost/Unit:** $4.18

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 | $41.76 | 10 | $417.60 |

**Practice:** E334107Z - Controlled traffic farming to reduce compaction

**Scenario** #1 - Controlled traffic for compaction

**Scenario Description:**

Establish a controlled traffic system where no more than 25% of the surface is tracked with heavy axel loads to minimize soil compaction. For row crops (e.g. corn in 30-inch rows) no tire should run on a row except for flotation tires on combines and/or fertilizer and lime spreading trucks. If wide flotation tires are used, they must be big enough that the inflation pressure will be below 18 psi to minimize compaction on trafficked rows.

**Before Situation:**

Resources are protected at the minimum level of the Conservation Practice Standard (CPS) 334 - Controlled Traffic Farming

**After Situation:**

The adoption of this enhancement will provide resource protection above the minimum level as described in Conservation Practice Standard (CPS) 334 - Controlled Traffic Farming

**Feature Measure:** Acre

**Scenario Unit::** Acre

**Scenario Typical Size:** 100.0

**Scenario Total Cost:** $806.65

**Scenario Cost/Unit:** $8.07

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 | $25.31 | 10 | $253.10 |
| Specialist Labor | 235 | Labor requiring a specialized skill set: Includes Agronomists, Foresters, Biologists, etc. to provide additional technical information during the planning and implementation of the practice. Does not include NRCS or TSP services. | Hour | $110.71 | 5 | $553.55 |

**Practice:** E338134Z - Strategic patch burning for grazing distribution/wildlife habitat (undesirable plant pressure)

**Scenario** #1 - Patch burning-plant pest pressure

**Scenario Description:**

Patch burn grazing is the application of prescribed fires on portions of an identified grazing unit at different times of the year. Patch burn grazing allows grazing animals to select where they want to graze creating a mosaic of vegetation structures and diversity that will maintain or enhance the wildlife habitat desired for the identified wildlife species and maintain livestock production.

**Before Situation:**

Resources are protected at the minimum level of the Conservation Practice Standard (CPS) 338 - Prescribed Burning

**After Situation:**

The adoption of this enhancement will provide resource protection above the minimum level as described in Conservation Practice Standard (CPS) 338 - Prescribed Burning

**Feature Measure:** Acre

**Scenario Unit::** Acre

**Scenario Typical Size:** 100.0

**Scenario Total Cost:** $833.83

**Scenario Cost/Unit:** $8.34

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 | $63.92 | 1 | $63.92 |
| **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 | $124.03 | 4 | $496.12 |
| **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 | $25.31 | 2 | $50.62 |
| 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 | $44.37 | 4 | $177.48 |
| Supervisor or Manager | 234 | Labor involving supervision or management activities. Includes crew supervisors, foremen and farm/ranch managers time required for adopting new technology, etc. | Hour | $45.69 | 1 | $45.69 |

**Practice:** E338135Z - Strategically planned, patch burning for grazing distribution and wildlife habitat (fuel loading)

**Scenario** #1 - Patch burning-fuel loading

**Scenario Description:**

Patch burn grazing is the application of prescribed fires on portions of an identified grazing unit at different times of the year. Patch burn grazing allows grazing animals to select where they want to graze creating a mosaic of vegetation structures and diversity that will maintain or enhance the wildlife habitat desired for the identified wildlife species and maintain livestock production.

**Before Situation:**

Resources are protected at the minimum level of the Conservation Practice Standard (CPS) 338 - Prescribed Burning

**After Situation:**

The adoption of this enhancement will provide resource protection above the minimum level as described in Conservation Practice Standard (CPS) 338 - Prescribed Burning

**Feature Measure:** Acre

**Scenario Unit::** Acre

**Scenario Typical Size:** 100.0

**Scenario Total Cost:** $833.83

**Scenario Cost/Unit:** $8.34

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 | $63.92 | 1 | $63.92 |
| **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 | $124.03 | 4 | $496.12 |
| **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 | $25.31 | 2 | $50.62 |
| 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 | $44.37 | 4 | $177.48 |
| Supervisor or Manager | 234 | Labor involving supervision or management activities. Includes crew supervisors, foremen and farm/ranch managers time required for adopting new technology, etc. | Hour | $45.69 | 1 | $45.69 |

**Practice:** E338137Z1 - Sequential patch burning

**Scenario** #1 - Sequential patch burning

**Scenario Description:**

Prescribed burning to promote and enhance conifer forests and maintain a healthy understory. This enhancement is to conduct prescribed burns in a conifer forest, burning only a portion of the area each year to create a mosaic of vegetation in several stages of development, to provide a more diverse wildlife habitat.

**Before Situation:**

Resources are protected at the minimum level of the Conservation Practice Standard (CPS) 338 - Prescribed Burning

**After Situation:**

The adoption of this enhancement will provide resource protection above the minimum level as described in Conservation Practice Standard (CPS) 338 - Prescribed Burning

**Feature Measure:** Acre

**Scenario Unit::** Acre

**Scenario Typical Size:** 10.0

**Scenario Total Cost:** $1,780.53

**Scenario Cost/Unit:** $178.05

Cost Details:

| Component Name | ID | Description | Unit | Cost | QTY | Total |
|---|---|---|---|---|---|---|
| **Equipment Installation** | | | | | | |
| Truck, Pickup | 939 | Equipment and power unit costs. Labor not included. | Hour | $21.79 | 2 | $43.58 |
| All terrain vehicles, ATV | 965 | Includes equipment, power unit and labor costs. | Hour | $28.28 | 2 | $56.56 |
| 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 | $2.42 | 2 | $4.84 |
| **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 | $41.76 | 16 | $668.16 |
| 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 | $25.31 | 2 | $50.62 |
| 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 | $45.69 | 2 | $91.38 |
| Specialist Labor | 235 | Labor requiring a specialized skill set: Includes Agronomists, Foresters, Biologists, etc. to provide additional technical information during the planning and implementation of the practice. Does not include NRCS or TSP services. | Hour | $110.71 | 3 | $332.13 |
| **Materials** | | | | | | |
| Fuel, ignition fuel mixture | 1596 | Mixture of gasoline and diesel for ignition of prescribed burns. Materials only. | Gallon | $4.32 | 5 | $21.60 |
| **Mobilization** | | | | | | |
| Mobilization, medium equipment | 1139 | Equipment with 70-150 HP or typical weights between 14,000 and 30,000 pounds. | Each | $255.83 | 2 | $511.66 |

**Practice:** E338137Z2 - Short-interval burn

**Scenario** #1 - Short-interval burn

**Scenario Description:**

This enhancement is the controlled use of fire in a forest to restore native forest conditions with a focus on improving the condition of fire-adapted plants and wildlife habitat and reducing the risk of damage from intense, severe wildfires.

**Before Situation:**

Resources are protected at the minimum level of the Conservation Practice Standard (CPS) 338 - Prescribed Burning

**After Situation:**

The adoption of this enhancement will provide resource protection above the minimum level as described in Conservation Practice Standard (CPS) 338 - Prescribed Burning

**Feature Measure:** Acre

**Scenario Unit::** Acre

**Scenario Typical Size:** 50.0

**Scenario Total Cost:** $2,769.12

**Scenario Cost/Unit:** $55.38

Cost Details:

| Component Name | ID | Description | Unit | Cost | QTY | Total |
|---|---|---|---|---|---|---|
| **Equipment Installation** | | | | | | |
| Truck, Pickup | 939 | Equipment and power unit costs. Labor not included. | Hour | $21.79 | 8 | $174.32 |
| All terrain vehicles, ATV | 965 | Includes equipment, power unit and labor costs. | Hour | $28.28 | 8 | $226.24 |
| 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 | $2.42 | 8 | $19.36 |
| **Labor** | | | | | | |
| Skilled Labor | 230 | Labor requiring a high level skill set: Includes carpenters, welders, electricians, conservation professionals involved with data collection, monitoring, and or record keeping, etc. | Hour | $41.76 | 48 | $2,004.48 |
| Supervisor or Manager | 234 | Labor involving supervision or management activities. Includes crew supervisors, foremen and farm/ranch managers time required for adopting new technology, etc. | Hour | $45.69 | 1 | $45.69 |
| **Materials** | | | | | | |
| Fuel, ignition fuel mixture | 1596 | Mixture of gasoline and diesel for ignition of prescribed burns. Materials only. | Gallon | $4.32 | 10 | $43.20 |
| **Mobilization** | | | | | | |
| Mobilization, medium equipment | 1139 | Equipment with 70-150 HP or typical weights between 14,000 and 30,000 pounds. | Each | $255.83 | 1 | $255.83 |

**Practice:** E338140Z - Short-interval prescribed burning to promote a healthy herbaceous plant community

**Scenario** #1 - Short-interval prescribed burning

**Scenario Description:**

???Increase the frequency of prescribed burning to help restore ecological conditions in forests and woodlands, with a focus on improving the condition of fire-adapted plants and forage while improving wildlife habitat and reducing the risk of damage from intense, severe wildfires. Short return-interval burns can also be effective in regenerating desirable native tree and herbaceous vegetation, and limiting the encroachment of competing vegetation including non-native species.

**Before Situation:**

Resources are protected at the minimum level of the Conservation Practice Standard (CPS) 338 - Prescribed Burning

**After Situation:**

The adoption of this enhancement will provide resource protection above the minimum level as described in Conservation Practice Standard (CPS) 338 - Prescribed Burning

**Feature Measure:** Acre

**Scenario Unit::** Acre

**Scenario Typical Size:** 40.0

**Scenario Total Cost:** $3,708.59

**Scenario Cost/Unit:** $92.71

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 | $66.13 | 8 | $529.04 |
| Truck, water | 1448 | Water tanker truck. Equipment only. Labor not included. | Hour | $163.53 | 8 | $1,308.24 |
| **Labor** | | | | | | |
| General Labor | 231 | Labor performed using basic tools such as power tool, shovels, and other tools that do not require extensive training. Ex. pipe layer, herder, concrete placement, materials spreader, flagger, etc. | Hour | $25.31 | 24 | $607.44 |
| 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 | $44.37 | 8 | $354.96 |
| 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 | $45.69 | 8 | $365.52 |
| 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 t | Hour | $71.89 | 4 | $287.56 |
| **Mobilization** | | | | | | |
| Mobilization, medium equipment | 1139 | Equipment with 70-150 HP or typical weights between 14,000 and 30,000 pounds. | Each | $255.83 | 1 | $255.83 |

**Practice:** E340101Z - Cover crop to reduce water erosion

**Scenario** #1 - Cover crop to reduce water erosion

**Scenario Description:**

Cover crop added to current crop rotation to reduce soil erosion from water to below soil tolerance (T) level. Cover crops grown during critical erosion period(s). Species are selected that will have physical characteristics to provide adequate erosion protection.

**Before Situation:**

Resources are protected at the minimum level of the Conservation Practice Standard (CPS) 340 - Cover Crop

**After Situation:**

The adoption of this enhancement will provide resource protection above the minimum level as described in Conservation Practice Standard (CPS) 340 - Cover Crop

**Feature Measure:** Acre

**Scenario Unit::** Acre

**Scenario Typical Size:** 100.0

**Scenario Total Cost:** $806.96

**Scenario Cost/Unit:** $8.07

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 | $41.76 | 1 | $41.76 |
| **Materials** | | | | | | |
| One Species, Cool Season, Annual Grass or Legume | 2311 | Cool season annual grass or legume. Includes material and shipping only. | Acre | $38.26 | 20 | $765.20 |

**Practice:** E340102Z - Cover crop to reduce wind erosion

**Scenario** #1 - Cover crop to reduce wind erosion

**Scenario Description:**

Cover crop added to current crop rotation to reduce soil erosion from wind to below the soil tolerance (T) level. Cover crops grown during critical erosion period(s). Species are selected that will have physical characteristics to provide adequate erosion protection.

**Before Situation:**

Resources are protected at the minimum level of the Conservation Practice Standard (CPS) 340 - Cover Crop

**After Situation:**

The adoption of this enhancement will provide resource protection above the minimum level as described in Conservation Practice Standard (CPS) 340 - Cover Crop

**Feature Measure:** Acre

**Scenario Unit::** Acre

**Scenario Typical Size:** 100.0

**Scenario Total Cost:** $806.96

**Scenario Cost/Unit:** $8.07

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 | $41.76 | 1 | $41.76 |
| **Materials** | | | | | | |
| One Species, Cool Season, Annual Grass or Legume | 2311 | Cool season annual grass or legume. Includes material and shipping only. | Acre | $38.26 | 20 | $765.20 |

**Practice:** E340106Z1 - Intensive cover cropping to increase soil health and soil organic matter content

**Scenario** #1 - Cover cropping for SH and SOM

**Scenario Description:**

Use of cover crops in a cropping system to add diversity, keep the soil covered, and maintain a living root as long as possible. Cover crop will be used during ALL non-crop production periods in an annual crop rotation. Cover crop may be a single species or multi-species mix. Cover crop shall not be harvested or burned. Planned crop rotation including cover crops and associated management activities must achieve a soil conditioning index (SCI) of zero or higher and produce a positive trend in the Organic Matter (OM) subfactor over the life of the crop rotation. RUSLE2 or WEPS must be used to document SCI calculations. Cover crops may be grazed following a prescribed grazing plan that removes no more than 40% of the biomass produced.

**Before Situation:**

Resources are protected at the minimum level of the Conservation Practice Standard (CPS) 340 - Cover Crop

**After Situation:**

The adoption of this enhancement will provide resource protection above the minimum level as described in Conservation Practice Standard (CPS) 340 - Cover Crop

**Feature Measure:** Acre

**Scenario Unit::** Acre

**Scenario Typical Size:** 100.0

**Scenario Total Cost:** $1,275.02

**Scenario Cost/Unit:** $12.75

Cost Details:

| Component Name | ID | Description | Unit | Cost | QTY | Total |
|---|---|---|---|---|---|---|
| **Labor** | | | | | | |
| Specialist Labor | 235 | Labor requiring a specialized skill set: Includes Agronomists, Foresters, Biologists, etc. to provide additional technical information during the planning and implementation of the practice. Does not include NRCS or TSP services. | Hour | $110.71 | 2 | $221.42 |
| **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 | $52.68 | 20 | $1,053.60 |

**Practice:** E340106Z2 - Use of multi-species cover crops to improve soil health and increase soil organic matter

**Scenario** #1 - Multi-species cover crops

**Scenario Description:**

Implement a multi-species cover crop to add diversity and increase biomass production to improve soil health and increased soil organic matter. Cover crop mix must include a minimum of 4 different species. The cover crop mix will increase diversity of the crop rotation by including crop types currently missing, e.g. Cool Season Grass (CSG), Cool Season Broadleaves (CSB), Warm Season Grasses (WSG), Warm Season Broadleaves (WSB).

**Before Situation:**

Resources are protected at the minimum level of the Conservation Practice Standard (CPS) 340 - Cover Crop

**After Situation:**

The adoption of this enhancement will provide resource protection above the minimum level as described in Conservation Practice Standard (CPS) 340 - Cover Crop

**Feature Measure:** Acre

**Scenario Unit::** Acre

**Scenario Typical Size:** 100.0

**Scenario Total Cost:** $1,253.52

**Scenario Cost/Unit:** $12.54

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 | $41.76 | 2 | $83.52 |
| **Materials** | | | | | | |
| Five Species Mix, Cool Season, Annual Grasses and Legumes | 2320 | Cool season, introduced grass and legume mix. Includes material and shipping only. | Acre | $58.50 | 20 | $1,170.00 |

**Practice:** E340106Z3 - Intensive cover cropping (orchard/vineyard floor) to increase soil health and SOM content

**Scenario** #1 - Cover cropping for orchards/vineyards

**Scenario Description:**

Implementation of cover crops to provide orchard or vineyard floor coverage throughout the year. Cover crop shall not be harvested, grazed, or burned. Planned cover crop management activities must achieve a soil conditioning index (SCI) of zero or higher and produce a positive trend in the Organic Matter (OM) subfactor over the life of the crop rotation. RUSLE2 or WEPS must be used to document SCI calculations.

**Before Situation:**

Resources are protected at the minimum level of the Conservation Practice Standard (CPS) 340 - Cover Crop

**After Situation:**

The adoption of this enhancement will provide resource protection above the minimum level as described in Conservation Practice Standard (CPS) 340 - Cover Crop

**Feature Measure:** Acre

**Scenario Unit::** Acre

**Scenario Typical Size:** 100.0

**Scenario Total Cost:** $1,137.12

**Scenario Cost/Unit:** $11.37

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 | $41.76 | 2 | $83.52 |
| **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 | $52.68 | 20 | $1,053.60 |

**Practice:** E340106Z4 - Use of SHA to assist with development of cover crop mix to improve soil health and increase SOM

**Scenario** #1 - Soil health assessment

**Scenario Description:**

Use of a soil health assessment to evaluate impact of current conservation crop rotation in addressing soil organic matter depletion (primary assessment made in Year 1). Soil health assessment results will be utilized to determine the correct Carbon to Nitrogen ratio of a multi-species cover crop mix that will be added to the crop rotation. During Year 3 a follow up assessment will be completed to allow time for the addition of a cover crop to increased soil organic matter.

**Before Situation:**

Resources are protected at the minimum level of the Conservation Practice Standard (CPS) 340 - Cover Crop

**After Situation:**

The adoption of this enhancement will provide resource protection above the minimum level as described in Conservation Practice Standard (CPS) 340 - Cover Crop

**Feature Measure:** Acre

**Scenario Unit::** Acre

**Scenario Typical Size:** 100.0

**Scenario Total Cost:** $1,493.67

**Scenario Cost/Unit:** $14.94

Cost Details:

| Component Name | ID | Description | Unit | Cost | QTY | Total |
|---|---|---|---|---|---|---|
| **Labor** | | | | | | |
| Skilled Labor | 230 | Labor requiring a high level skill set: Includes carpenters, welders, electricians, conservation professionals involved with data collection, monitoring, and or record keeping, etc. | Hour | $41.76 | 1 | $41.76 |
| 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 | $110.71 | 1 | $110.71 |
| **Materials** | | | | | | |
| Test, Soil Test, Standard | 299 | Includes materials, shiping, labor, and equipment costs. | Each | $10.04 | 15 | $150.60 |
| Three Species Mix, Warm Season, Annual Grasses and Legumes | 2326 | Warm season annual grass and legume mix. Includes material and shipping only. | Acre | $59.53 | 20 | $1,190.60 |

**Practice:** E340107Z - Cover crop to minimize soil compaction

**Scenario** #1 - Cover crop to minimize soil compaction

**Scenario Description:**

Establish a cover crop mix that includes plants with both fibrous root and deep rooted systems. Fibrous to treat and prevent both near surface (0-4???) and deep (>4???) soil compaction and deep rooted to break up deep compacted soils. Cover crop shall not be harvested, grazed, or burned.

**Before Situation:**

Resources are protected at the minimum level of the Conservation Practice Standard (CPS) 340 - Cover Crop

**After Situation:**

The adoption of this enhancement will provide resource protection above the minimum level as described in Conservation Practice Standard (CPS) 340 - Cover Crop

**Feature Measure:** Acre

**Scenario Unit::** Acre

**Scenario Typical Size:** 100.0

**Scenario Total Cost:** $1,095.36

**Scenario Cost/Unit:** $10.95

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 | $41.76 | 1 | $41.76 |
| **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 | $52.68 | 20 | $1,053.60 |

**Practice:** E340118Z - Cover crop to reduce water quality degradation by utilizing excess soil nutrients-surface water

**Scenario** #1 - Cover crop for WQ nutrients-runoff

**Scenario Description:**

Establish a cover crop mix to take up excess soil nutrients. Select cover crop species for their ability to effectively utilize nutrients. Terminate the cover crop as late as practical to maximize plant biomass production and nutrient uptake. Cover crop shall not be harvested, grazed, or burned.

**Before Situation:**

Resources are protected at the minimum level of the Conservation Practice Standard (CPS) 340 - Cover Crop

**After Situation:**

The adoption of this enhancement will provide resource protection above the minimum level as described in Conservation Practice Standard (CPS) 340 - Cover Crop

**Feature Measure:** Acre

**Scenario Unit::** Acre

**Scenario Typical Size:** 100.0

**Scenario Total Cost:** $1,095.36

**Scenario Cost/Unit:** $10.95

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 | $41.76 | 1 | $41.76 |
| **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 | $52.68 | 20 | $1,053.60 |

**Practice:** E340119Z - Cover crop to reduce water quality degradation by utilizing excess soil nutrients-ground water

**Scenario** #1 - Cover crops for WQ nutrients-drainage

**Scenario Description:**

Establish a cover crop mix to take up excess soil nutrients. Select cover crop species for their ability to effectively utilize nutrients. Terminate the cover crop as late as practical to maximize plant biomass production and nutrient uptake. Cover crop shall not be harvested, grazed, or burned.

**Before Situation:**

Resources are protected at the minimum level of the Conservation Practice Standard (CPS) 340 - Cover Crop

**After Situation:**

The adoption of this enhancement will provide resource protection above the minimum level as described in Conservation Practice Standard (CPS) 340 - Cover Crop

**Feature Measure:** Acre

**Scenario Unit::** Acre

**Scenario Typical Size:** 100.0

**Scenario Total Cost:** $1,095.36

**Scenario Cost/Unit:** $10.95

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 | $41.76 | 1 | $41.76 |
| **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 | $52.68 | 20 | $1,053.60 |

**Practice:** E340134Z - Cover crop to suppress excessive weed pressures and break pest cycles

**Scenario** #1 - Cover crops for suppression

**Scenario Description:**

Establish a cover crop mix to suppress excessive weed pressures and break pest cycles. Select cover crop species for their life cycles, growth habits, and other biological, chemical and/or physical characteristics. Select cover crop species that do not harbor pests or diseases of subsequent crops in the rotation. Cover crop shall not be harvested, grazed, or burned.

**Before Situation:**

Resources are protected at the minimum level of the Conservation Practice Standard (CPS) 340 - Cover Crop

**After Situation:**

The adoption of this enhancement will provide resource protection above the minimum level as described in Conservation Practice Standard (CPS) 340 - Cover Crop

**Feature Measure:** Acre

**Scenario Unit::** Acre

**Scenario Typical Size:** 100.0

**Scenario Total Cost:** $1,137.12

**Scenario Cost/Unit:** $11.37

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 | $41.76 | 2 | $83.52 |
| **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 | $52.68 | 20 | $1,053.60 |

**Practice:** E345101Z - Reduced tillage to reduce water erosion

**Scenario** #1 - Reduced tillage to reduce water erosion

**Scenario Description:**

Establish a reduced tillage system to reduce sheet and rill erosion soil loss. Field(s) must have a soil loss at or below the soil tolerance (T) level for water erosion for the crop rotation and a Soil Tillage Intensity Rating (STIR) of no greater than 40 for each crop in the planned rotation. RUSLE2 must be used to calculate soil loss and STIR.

**Before Situation:**

Resources are protected at the minimum level of the Conservation Practice Standard (CPS) 345 - Residue and Tillage Management, Reduced Till

**After Situation:**

The adoption of this enhancement will provide resource protection above the minimum level as described in Conservation Practice Standard (CPS) 345 - Residue and Tillage Management, Reduced Till

**Feature Measure:** Acre

**Scenario Unit::** Acre

**Scenario Typical Size:** 100.0

**Scenario Total Cost:** $442.84

**Scenario Cost/Unit:** $4.43

Cost Details:

| Component Name | ID | Description | Unit | Cost | QTY | Total |
|---|---|---|---|---|---|---|
| **Labor** | | | | | | |
| Specialist Labor | 235 | Labor requiring a specialized skill set: Includes Agronomists, Foresters, Biologists, etc. to provide additional technical information during the planning and implementation of the practice. Does not include NRCS or TSP services. | Hour | $110.71 | 4 | $442.84 |

**Practice:** E345102Z - Reduced tillage to reduce wind erosion

**Scenario** #1 - Reduced tillage to reduce wind erosion

**Scenario Description:**

Establish a reduced tillage system to reduce wind erosion soil loss. Field(s) must have a soil loss at or below the soil tolerance (T) level for wind erosion for the crop rotation and a Soil Tillage Intensity Rating (STIR) of no greater than 40 for each crop in the planned rotation. WEPS must be used to calculate soil loss and STIR.

**Before Situation:**

Resources are protected at the minimum level of the Conservation Practice Standard (CPS) 345 - Residue and Tillage Management, Reduced Till

**After Situation:**

The adoption of this enhancement will provide resource protection above the minimum level as described in Conservation Practice Standard (CPS) 345 - Residue and Tillage Management, Reduced Till

**Feature Measure:** Acre

**Scenario Unit::** Acre

**Scenario Typical Size:** 100.0

**Scenario Total Cost:** $332.13

**Scenario Cost/Unit:** $3.32

Cost Details:

| Component Name | ID | Description | Unit | Cost | QTY | Total |
|---|---|---|---|---|---|---|
| **Labor** | | | | | | |
| Specialist Labor | 235 | Labor requiring a specialized skill set: Includes Agronomists, Foresters, Biologists, etc. to provide additional technical information during the planning and implementation of the practice. Does not include NRCS or TSP services. | Hour | $110.71 | 3 | $332.13 |

**Practice:** E345106Z - Reduced tillage to increase soil health and soil organic matter content

**Scenario** #1 - Reduced tillage for SH and SOM

**Scenario Description:**

Establish a reduced till system to increase soil health and soil organic matter content. Each crop in the crop rotation shall have a Soil Tillage Intensity Rating (STIR) of no greater than 80. The crop rotation must achieve a soil conditioning index (SCI) of zero or higher and produce a positive trend in the Organic Matter (OM) subfactor over the life of the crop rotation. RUSLE2 or WEPS must be used to document STIR and SCI calculations. Residue shall not be burned, grazed, or harvested.

**Before Situation:**

Resources are protected at the minimum level of the Conservation Practice Standard (CPS) 345 - Residue and Tillage Management, Reduced Till

**After Situation:**

The adoption of this enhancement will provide resource protection above the minimum level as described in Conservation Practice Standard (CPS) 345 - Residue and Tillage Management, Reduced Till

**Feature Measure:** Acre

**Scenario Unit::** Acre

**Scenario Typical Size:** 100.0

**Scenario Total Cost:** $442.84

**Scenario Cost/Unit:** $4.43

Cost Details:

| Component Name | ID | Description | Unit | Cost | QTY | Total |
|---|---|---|---|---|---|---|
| **Labor** | | | | | | |
| Specialist Labor | 235 | Labor requiring a specialized skill set: Includes Agronomists, Foresters, Biologists, etc. to provide additional technical information during the planning and implementation of the practice. Does not include NRCS or TSP services. | Hour | $110.71 | 4 | $442.84 |

**Practice:** E345114Z - Reduced tillage to increase plant-available moisture: irrigation water

**Scenario** #1 - Reduced tillage for IWM

**Scenario Description:**

Establish a reduced till system to increase plant-available moisture. Each crop in the crop rotation shall have a Soil Tillage Intensity Rating (STIR) of no greater than 80. RUSLE2 or WEPS must be used to document STIR calculations. Maintain a minimum 60 percent surface residue cover throughout the year to reduce evaporation from the soil surface.

**Before Situation:**

Resources are protected at the minimum level of the Conservation Practice Standard (CPS) 345 - Residue and Tillage Management, Reduced Till

**After Situation:**

The adoption of this enhancement will provide resource protection above the minimum level as described in Conservation Practice Standard (CPS) 345 - Residue and Tillage Management, Reduced Till

**Feature Measure:** Acre

**Scenario Unit::** Acre

**Scenario Typical Size:** 100.0

**Scenario Total Cost:** $332.13

**Scenario Cost/Unit:** $3.32

Cost Details:

| Component Name | ID | Description | Unit | Cost | QTY | Total |
|---|---|---|---|---|---|---|
| **Labor** | | | | | | |
| Specialist Labor | 235 | Labor requiring a specialized skill set: Includes Agronomists, Foresters, Biologists, etc. to provide additional technical information during the planning and implementation of the practice. Does not include NRCS or TSP services. | Hour | $110.71 | 3 | $332.13 |

**Practice:** E345115Z - Reduced tillage to increase plant-available moisture: moisture management

**Scenario** #1 - Reduced tillage for moisture mgmt

**Scenario Description:**

Establish a reduced till system to increase plant-available moisture. Each crop in the crop rotation shall have a Soil Tillage Intensity Rating (STIR) of no greater than 80. RUSLE2 or WEPS must be used to document STIR calculations. Maintain a minimum 60 percent surface residue cover throughout the year to reduce evaporation from the soil surface.

**Before Situation:**

Resources are protected at the minimum level of the Conservation Practice Standard (CPS) 345 - Residue and Tillage Management, Reduced Till

**After Situation:**

The adoption of this enhancement will provide resource protection above the minimum level as described in Conservation Practice Standard (CPS) 345 - Residue and Tillage Management, Reduced Till

**Feature Measure:** Acre

**Scenario Unit::** Acre

**Scenario Typical Size:** 100.0

**Scenario Total Cost:** $332.13

**Scenario Cost/Unit:** $3.32

Cost Details:

| Component Name | ID | Description | Unit | Cost | QTY | Total |
|---|---|---|---|---|---|---|
| **Labor** | | | | | | |
| Specialist Labor | 235 | Labor requiring a specialized skill set: Includes Agronomists, Foresters, Biologists, etc. to provide additional technical information during the planning and implementation of the practice. Does not include NRCS or TSP services. | Hour | $110.71 | 3 | $332.13 |

**Practice:** E345128Z - Reduced tillage to reduce tillage induced particulate matter

**Scenario** #1 - Reduced tillage to reduce PM

**Scenario Description:**

Establish a reduced tillage system to reduce tillage induced particulate matter. Field(s) must have a soil loss at or below the soil tolerance (T) level for the crop rotation and a Soil Tillage Intensity Rating (STIR) of no greater than 40 for each crop in the planned rotation. RUSLE2 or WEPS must be used to document soil loss and STIR calculations.

**Before Situation:**

Resources are protected at the minimum level of the Conservation Practice Standard (CPS) 345 - Residue and Tillage Management, Reduced Till

**After Situation:**

The adoption of this enhancement will provide resource protection above the minimum level as described in Conservation Practice Standard (CPS) 345 - Residue and Tillage Management, Reduced Till

**Feature Measure:** Acre

**Scenario Unit::** Acre

**Scenario Typical Size:** 100.0

**Scenario Total Cost:** $332.13

**Scenario Cost/Unit:** $3.32

Cost Details:

| Component Name | ID | Description | Unit | Cost | QTY | Total |
|---|---|---|---|---|---|---|
| **Labor** | | | | | | |
| Specialist Labor | 235 | Labor requiring a specialized skill set: Includes Agronomists, Foresters, Biologists, etc. to provide additional technical information during the planning and implementation of the practice. Does not include NRCS or TSP services. | Hour | $110.71 | 3 | $332.13 |

**Practice:** E345144Z - Reduced tillage to reduce energy use

**Scenario** #1 - Reduced tillage to reduce energy use

**Scenario Description:**

Establish a reduced tillage system which reduces total energy consumption associated with field operations by at least 25% compared to conventional tillage systems (benchmark). Each crop in the crop rotation shall have a Soil Tillage Intensity Rating (STIR) of no greater than 80. RUSLE2 must be used to document STIR calculations and energy consumption. <State lists will be prepared providing conventional system benchmark energy values and reduced tillage system values for those systems using at least 25% less energy>

**Before Situation:**

Resources are protected at the minimum level of the Conservation Practice Standard (CPS) 345 - Residue and Tillage Management, Reduced Till

**After Situation:**

The adoption of this enhancement will provide resource protection above the minimum level as described in Conservation Practice Standard (CPS) 345 - Residue and Tillage Management, Reduced Till

**Feature Measure:** Acre

**Scenario Unit::** Acre

**Scenario Typical Size:** 100.0

**Scenario Total Cost:** $442.84

**Scenario Cost/Unit:** $4.43

Cost Details:

| Component Name | ID | Description | Unit | Cost | QTY | Total |
|---|---|---|---|---|---|---|
| **Labor** | | | | | | |
| Specialist Labor | 235 | Labor requiring a specialized skill set: Includes Agronomists, Foresters, Biologists, etc. to provide additional technical information during the planning and implementation of the practice. Does not include NRCS or TSP services. | Hour | $110.71 | 4 | $442.84 |

**Practice:** E374144Z1 - Install variable frequency drive(s) on pump(s)

**Scenario** #1 - Variable frequency drives

**Scenario Description:**

Install Variable Frequency Drive(s) (CPS 533 Pumping Plant) with the correct sensors, on all pumps indicated in the energy audit.

**Before Situation:**

Resources are protected at the minimum level of the Conservation Practice Standard (CPS) 374 - Farmstead Energy Improvement

**After Situation:**

The adoption of this enhancement will provide resource protection above the minimum level as described in Conservation Practice Standard (CPS) 374 - Farmstead Energy Improvement

**Feature Measure:** Each

**Scenario Unit::** Brake Horse Power

**Scenario Typical Size:** 50.0

**Scenario Total Cost:** $12,179.50

**Scenario Cost/Unit:** $243.59

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 | $243.59 | 50 | $12,179.50 |

**Practice:** E374144Z2 - Switch fuel source for pump motor(s)

**Scenario** #1 - Switch fuel source for pump motor(s)

**Scenario Description:**

Switch fuel source for the pump motor(s) indicated in the audit to a renewable source (wind, solar, geothermal, etc..). (CPS 533 Pumping Plant)

**Before Situation:**

Resources are protected at the minimum level of the Conservation Practice Standard (CPS) 374 - Farmstead Energy Improvement

**After Situation:**

The adoption of this enhancement will provide resource protection above the minimum level as described in Conservation Practice Standard (CPS) 374 - Farmstead Energy Improvement

**Feature Measure:** Horsepower

**Scenario Unit::** Horsepower

**Scenario Typical Size:** 5.0

**Scenario Total Cost:** $38,700.46

**Scenario Cost/Unit:** $7,740.09

Cost Details:

| Component Name | ID | Description | Unit | Cost | QTY | Total |
|---|---|---|---|---|---|---|
| **Equipment Installation** | | | | | | |
| Truck, Pickup | 939 | Equipment and power unit costs. Labor not included. | Hour | $21.79 | 1 | $21.79 |
| **Labor** | | | | | | |
| Skilled Labor | 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 | $41.76 | 12 | $501.12 |
| Specialist Labor | 235 | Labor requiring a specialized skill set: Includes Agronomists, Foresters, Biologists, etc. to provide additional technical information during the planning and implementation of the practice. Does not include NRCS or TSP services. | Hour | $110.71 | 2 | $221.42 |
| **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 moto | Horsepower | $413.86 | 5 | $2,069.30 |
| 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 incl | Each | $460.51 | 5 | $2,302.55 |
| Solar Panels, variable cost portion | 1135 | Variable cost portion of the Solar Panels. This portion IS dependent on the total Kilowatt for the Solar Panels. The total cost of any Solar Panels will include this variable cost plus the fixed cost portion. The completed Solar Panels will include all ma | Kilowatt | $8,258.60 | 4 | $33,034.40 |

**Practice:** E376128Z - Modify field operations to reduce particulate matter

**Scenario** #1 - Mod field ops to reduce PM

**Scenario Description:**
Modify tillage and/or harvest operations to reduce particulates by at least 20 percent below the required levels.

**Before Situation:**
Resources are protected at the minimum level of the Conservation Practice Standard (CPS) 376 - Field Operations Emissions Reduction

**After Situation:**
The adoption of this enhancement will provide resource protection above the minimum level as described in Conservation Practice Standard (CPS) 376 - Field Operations Emissions Reduction

**Feature Measure:** Acre

**Scenario Unit::** Acre

**Scenario Typical Size:** 100.0

**Scenario Total Cost:** $332.13

**Scenario Cost/Unit:** $3.32

Cost Details:

| Component Name | ID | Description | Unit | Cost | QTY | Total |
|---|---|---|---|---|---|---|
| **Labor** | | | | | | |
| Specialist Labor | 235 | Labor requiring a specialized skill set: Includes Agronomists, Foresters, Biologists, etc. to provide additional technical information during the planning and implementation of the practice. Does not include NRCS or TSP services. | Hour | $110.71 | 3 | $332.13 |

**Practice:** E381133Z - Silvopasture for wildlife habitat (structure and composition)

**Scenario** #1 - Silvopasture-structure and comp

**Scenario Description:**

Establishing a combination of trees or shrubs and compatible forages on the same acreage, providing forage for livestock and the production of wood products, and including a purpose of enhancing wildlife habitat.

**Before Situation:**

Resources are protected at the minimum level of the Conservation Practice Standard (CPS) 381 - Silvopasture

**After Situation:**

The adoption of this enhancement will provide resource protection above the minimum level as described in Conservation Practice Standard (CPS) 381 - Silvopasture

**Feature Measure:** Acre

**Scenario Unit::** Acre

**Scenario Typical Size:** 100.0

**Scenario Total Cost:** $8,532.78

**Scenario Cost/Unit:** $85.33

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 | $6.13 | 20 | $122.60 |
| **Foregone Income** | | | | | | |
| FI, Grazing AUMs | 2079 | Grazing is the Primary Land Use | Animal Unit Month | $16.65 | 200 | $3,330.00 |
| **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 | $45.69 | 2 | $91.38 |
| **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 | $17.48 | 20 | $349.60 |
| Shrub, seedling or transplant, bare root, 36-60" | 1508 | Bare root shrubs 3 to 5 foot tall. Includes materials and shipping only. | Each | $1.68 | 200 | $336.00 |
| Three plus Species Mix, Warm Season, Native Perennial | 2327 | Native, warm season perennial grass. Includes material and shipping only. | Acre | $215.16 | 20 | $4,303.20 |

**Practice:** E381137Z - Silvopasture for wildlife habitat (cover and shelter)

**Scenario** #1 - Silvopasture for wildlife habitat-food

**Scenario Description:**

Establishing a combination of trees or shrubs and compatible forages on the same acreage, providing forage for livestock and the production of wood products, and including a purpose of enhancing wildlife cover and shelter.

**Before Situation:**

Resources are protected at the minimum level of the Conservation Practice Standard (CPS) 381 - Silvopasture

**After Situation:**

The adoption of this enhancement will provide resource protection above the minimum level as described in Conservation Practice Standard (CPS) 381 - Silvopasture

**Feature Measure:** Acre

**Scenario Unit::** Acre

**Scenario Typical Size:** 100.0

**Scenario Total Cost:** $8,978.74

**Scenario Cost/Unit:** $89.79

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 | $6.13 | 20 | $122.60 |
| **Foregone Income** | | | | | | |
| FI, Grazing AUMs | 2079 | Grazing is the Primary Land Use | Animal Unit Month | $16.65 | 200 | $3,330.00 |
| **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 | $25.31 | 16 | $404.96 |
| 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 | $45.69 | 2 | $91.38 |
| **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 | $17.48 | 20 | $349.60 |
| Shrub, seedling or transplant, bare root, 36-60" | 1508 | Bare root shrubs 3 to 5 foot tall. Includes materials and shipping only. | Each | $1.68 | 200 | $336.00 |
| Tree, conifer, seedling, bare root, 3-0 | 1515 | Bare root conifer trees, 3-0 (3 years old). Includes materials and shipping only. | Each | $0.41 | 100 | $41.00 |
| Three plus Species Mix, Warm Season, Native Perennial | 2327 | Native, warm season perennial grass. Includes material and shipping only. | Acre | $215.16 | 20 | $4,303.20 |

**Practice:** E383135Z - Grazing-maintained fuel break to reduce the risk of fire

**Scenario** #1 - Grazed fuel break

**Scenario Description:**

The property has existing fuel breaks of 30 to 60 feet in width. Warm-season perennial vegetation will be established on the fuel breaks, and will be over-seeded with cool-season annual forages in the fall. Grazing will be managed on the fuel break to remove or modify the fine fuel vegetation, to reduce the risk of fire spread from ground fires, maintain adequate soil cover, control erosion, and facilitate prescribed burning.

**Before Situation:**

Resources are protected at the minimum level of the Conservation Practice Standard (CPS) 383 - Fuel Break

**After Situation:**

The adoption of this enhancement will provide resource protection above the minimum level as described in Conservation Practice Standard (CPS) 383 - Fuel Break

**Feature Measure:** Acre

**Scenario Unit::** Acre

**Scenario Typical Size:** 10.0

**Scenario Total Cost:** $2,626.81

**Scenario Cost/Unit:** $262.68

Cost Details:

| Component Name | ID | Description | Unit | Cost | QTY | Total |
|---|---|---|---|---|---|---|
| **Equipment Installation** | | | | | | |
| Fertilizer, ground application, dry bulk | 950 | Dry bulk fertilizer application performed by ground equipment. Includes equipment, power unit and labor costs. | Acre | $6.62 | 10 | $66.20 |
| Seeding Operation, No Till/Grass Drill | 960 | No Till drill or grass drill for seeding. Includes equipment, power unit and labor costs. | Acre | $21.36 | 10 | $213.60 |
| **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 | $25.31 | 24 | $607.44 |
| **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 | $0.49 | 1000 | $490.00 |
| Three Species Mix, Cool Season, Introduced Perennial Grass | 2315 | Cool season, introduced grass mix. Includes material and shipping only. | Acre | $45.35 | 10 | $453.50 |
| 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 | $62.40 | 10 | $624.00 |
| **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 | $172.07 | 1 | $172.07 |

**Practice:** E384135Z - Biochar production from woody residue

**Scenario** #1 - Biochar production from woody residue

**Scenario Description:**

Utilizes woody debris remaining after fuel reduction harvests or wildfires to create biochar. Biochar stores carbon and is a useful soil amendment that improves SOM and water-holding capacity.

**Before Situation:**

Resources are protected at the minimum level of the Conservation Practice Standard (CPS) 384 - Woody Residue Treatment

**After Situation:**

The adoption of this enhancement will provide resource protection above the minimum level as described in Conservation Practice Standard (CPS) 384 - Woody Residue Treatment

**Feature Measure:** Acre

**Scenario Unit::** Acre

**Scenario Typical Size:** 2.0

**Scenario Total Cost:** $9,694.21

**Scenario Cost/Unit:** $4,847.11

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 | $62.74 | 40 | $2,509.60 |
| Chainsaw | 937 | Equipment and power unit costs. Labor not included. | Hour | $4.37 | 40 | $174.80 |
| Truck, Pickup | 939 | Equipment and power unit costs. Labor not included. | Hour | $21.79 | 15 | $326.85 |
| 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 | $2.42 | 80 | $193.60 |
| Wood Processor | 2680 | Towable equipment used to cut and split wood, Daily rental rate. All materials and equipment included | Day | $184.40 | 5 | $922.00 |
| Biochar Kiln, open fire | 2681 | Open fire kiln or metal container used to produce biochar/charcoal production. Daily rental rate. Includes all material and equipment | Hour | $1.41 | 320 | $451.20 |
| **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 | $25.31 | 120 | $3,037.20 |
| Equipment Operators, Light | 232 | Includes: Skid Steer Loaders, Hydraulic Excavators <50 HP, Trenchers <12", Ag Equipment <150 HP, Pickup Trucks, Forklifts, Mulchers | Hour | $25.23 | 40 | $1,009.20 |
| 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 | $110.71 | 5 | $553.55 |
| **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 | $172.07 | 3 | $516.21 |

**Practice:** E386101Z - Enhanced field borders to reduce water induced erosion along the edge(s) of a field

**Scenario** #1 - Field borders to reduce water erosion

**Scenario Description:**

Enhance existing field borders to a width of at least 30 feet and establish a single specie or mixture of species that provide a dense ground cover along the edge(s) of the field.

**Before Situation:**

Resources are protected at the minimum level of the Conservation Practice Standard (CPS) 386 - Field Border

**After Situation:**

The adoption of this enhancement will provide resource protection above the minimum level as described in Conservation Practice Standard (CPS) 386 - Field Border

**Feature Measure:** Acre

**Scenario Unit::** Acre

**Scenario Typical Size:** 1.0

**Scenario Total Cost:** $707.20

**Scenario Cost/Unit:** $707.20

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 | $11.14 | 1 | $11.14 |
| Chemical, ground application | 948 | Chemical application performed by ground equipment. Includes equipment, power unit and labor costs. | Acre | $6.13 | 1 | $6.13 |
| Seeding Operation, No Till/Grass Drill | 960 | No Till drill or grass drill for seeding. Includes equipment, power unit and labor costs. | Acre | $21.36 | 1 | $21.36 |
| Cultipacking | 1100 | Includes equipment, power unit and labor costs. | Acre | $7.70 | 1 | $7.70 |
| **Foregone Income** | | | | | | |
| FI, Corn Dryland | 1959 | Dryland Corn is Primary Crop | Acre | $376.15 | 0.41 | $154.22 |
| FI, Soybeans Dryland | 1961 | Dryland Soybeans is Primary Crop | Acre | $361.97 | 0.36 | $130.31 |
| FI, Wheat Dryland | 1963 | Dryland Wheat is Primary Crop | Acre | $269.62 | 0.23 | $62.01 |
| **Materials** | | | | | | |
| Five Species Mix, Cool Season, Annual Grasses and Legumes | 2320 | Cool season, introduced grass and legume mix. Includes material and shipping only. | Acre | $58.50 | 1 | $58.50 |
| **Mobilization** | | | | | | |
| Mobilization, medium equipment | 1139 | Equipment with 70-150 HP or typical weights between 14,000 and 30,000 pounds. | Each | $255.83 | 1 | $255.83 |

**Practice:** E386102Z - Enhanced field borders to reduce wind induced erosion along the windward side(s) of a field

**Scenario** #1 - Field borders to reduce wind erosion

**Scenario Description:**

Enhance existing field borders to a width of at least 30 feet and establish a single specie or mixture of species that provide a dense ground cover along the edge(s) of the field.

**Before Situation:**

Resources are protected at the minimum level of the Conservation Practice Standard (CPS) 386 - Field Border

**After Situation:**

The adoption of this enhancement will provide resource protection above the minimum level as described in Conservation Practice Standard (CPS) 386 - Field Border

**Feature Measure:** Acre

**Scenario Unit::** Acre

**Scenario Typical Size:** 1.0

**Scenario Total Cost:** $707.20

**Scenario Cost/Unit:** $707.20

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 | $11.14 | 1 | $11.14 |
| Chemical, ground application | 948 | Chemical application performed by ground equipment. Includes equipment, power unit and labor costs. | Acre | $6.13 | 1 | $6.13 |
| Seeding Operation, No Till/Grass Drill | 960 | No Till drill or grass drill for seeding. Includes equipment, power unit and labor costs. | Acre | $21.36 | 1 | $21.36 |
| Cultipacking | 1100 | Includes equipment, power unit and labor costs. | Acre | $7.70 | 1 | $7.70 |
| **Foregone Income** | | | | | | |
| FI, Corn Dryland | 1959 | Dryland Corn is Primary Crop | Acre | $376.15 | 0.41 | $154.22 |
| FI, Soybeans Dryland | 1961 | Dryland Soybeans is Primary Crop | Acre | $361.97 | 0.36 | $130.31 |
| FI, Wheat Dryland | 1963 | Dryland Wheat is Primary Crop | Acre | $269.62 | 0.23 | $62.01 |
| **Materials** | | | | | | |
| Five Species Mix, Cool Season, Annual Grasses and Legumes | 2320 | Cool season, introduced grass and legume mix. Includes material and shipping only. | Acre | $58.50 | 1 | $58.50 |
| **Mobilization** | | | | | | |
| Mobilization, medium equipment | 1139 | Equipment with 70-150 HP or typical weights between 14,000 and 30,000 pounds. | Each | $255.83 | 1 | $255.83 |

**Practice:** E386106Z - Enhanced field borders to increase carbon storage along the edge(s) of the field

**Scenario** #1 - Field borders to increase carbon storage

**Scenario Description:**

Enhance existing field borders to a width of at least 30 feet and establish a single specie or mixture of species that provide a dense ground cover and dense rooting system along the edge(s) of the field.

**Before Situation:**

Resources are protected at the minimum level of the Conservation Practice Standard (CPS) 386 - Field Border

**After Situation:**

The adoption of this enhancement will provide resource protection above the minimum level as described in Conservation Practice Standard (CPS) 386 - Field Border

**Feature Measure:** Acre

**Scenario Unit::** Acre

**Scenario Typical Size:** 1.0

**Scenario Total Cost:** $707.20

**Scenario Cost/Unit:** $707.20

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 | $11.14 | 1 | $11.14 |
| Chemical, ground application | 948 | Chemical application performed by ground equipment. Includes equipment, power unit and labor costs. | Acre | $6.13 | 1 | $6.13 |
| Seeding Operation, No Till/Grass Drill | 960 | No Till drill or grass drill for seeding. Includes equipment, power unit and labor costs. | Acre | $21.36 | 1 | $21.36 |
| Cultipacking | 1100 | Includes equipment, power unit and labor costs. | Acre | $7.70 | 1 | $7.70 |
| **Foregone Income** | | | | | | |
| FI, Corn Dryland | 1959 | Dryland Corn is Primary Crop | Acre | $376.15 | 0.41 | $154.22 |
| FI, Soybeans Dryland | 1961 | Dryland Soybeans is Primary Crop | Acre | $361.97 | 0.36 | $130.31 |
| FI, Wheat Dryland | 1963 | Dryland Wheat is Primary Crop | Acre | $269.62 | 0.23 | $62.01 |
| **Materials** | | | | | | |
| Five Species Mix, Cool Season, Annual Grasses and Legumes | 2320 | Cool season, introduced grass and legume mix. Includes material and shipping only. | Acre | $58.50 | 1 | $58.50 |
| **Mobilization** | | | | | | |
| Mobilization, medium equipment | 1139 | Equipment with 70-150 HP or typical weights between 14,000 and 30,000 pounds. | Each | $255.83 | 1 | $255.83 |

**Practice:** E386128Z - Enhanced field borders to decrease particulate emissions along the edge(s) of the field

**Scenario** #1 - Field borders to decrease particulates

**Scenario Description:**
Enhance existing field borders to a width of at least 40 feet and establish a mixture of species that decrease the particulate emissions along the edge(s) of the field.

**Before Situation:**
Resources are protected at the minimum level of the Conservation Practice Standard (CPS) 386 - Field Border

**After Situation:**
The adoption of this enhancement will provide resource protection above the minimum level as described in Conservation Practice Standard (CPS) 386 - Field Border

**Feature Measure:** Acre

**Scenario Unit::** Acre

**Scenario Typical Size:** 1.0

**Scenario Total Cost:** $707.20

**Scenario Cost/Unit:** $707.20

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 | $11.14 | 1 | $11.14 |
| Chemical, ground application | 948 | Chemical application performed by ground equipment. Includes equipment, power unit and labor costs. | Acre | $6.13 | 1 | $6.13 |
| Seeding Operation, No Till/Grass Drill | 960 | No Till drill or grass drill for seeding. Includes equipment, power unit and labor costs. | Acre | $21.36 | 1 | $21.36 |
| Cultipacking | 1100 | Includes equipment, power unit and labor costs. | Acre | $7.70 | 1 | $7.70 |
| **Foregone Income** | | | | | | |
| FI, Corn Dryland | 1959 | Dryland Corn is Primary Crop | Acre | $376.15 | 0.41 | $154.22 |
| FI, Soybeans Dryland | 1961 | Dryland Soybeans is Primary Crop | Acre | $361.97 | 0.36 | $130.31 |
| FI, Wheat Dryland | 1963 | Dryland Wheat is Primary Crop | Acre | $269.62 | 0.23 | $62.01 |
| **Materials** | | | | | | |
| Five Species Mix, Cool Season, Annual Grasses and Legumes | 2320 | Cool season, introduced grass and legume mix. Includes material and shipping only. | Acre | $58.50 | 1 | $58.50 |
| **Mobilization** | | | | | | |
| Mobilization, medium equipment | 1139 | Equipment with 70-150 HP or typical weights between 14,000 and 30,000 pounds. | Each | $255.83 | 1 | $255.83 |

**Practice:** E386136Z - Enhanced field border to provide wildlife food for pollinators along the edge(s) of a field

**Scenario** #1 - Field border to provide wildlife food

**Scenario Description:**
Enhance existing field borders to a width of at least 40 feet and establish a mixture of species that provide food for pollinators along the edge(s) of the field.

**Before Situation:**
Resources are protected at the minimum level of the Conservation Practice Standard (CPS) 386 - Field Border

**After Situation:**
The adoption of this enhancement will provide resource protection above the minimum level as described in Conservation Practice Standard (CPS) 386 - Field Border

**Feature Measure:** Acre

**Scenario Unit::** Acre

**Scenario Typical Size:** 1.0

**Scenario Total Cost:** $707.20

**Scenario Cost/Unit:** $707.20

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 | $11.14 | 1 | $11.14 |
| Chemical, ground application | 948 | Chemical application performed by ground equipment. Includes equipment, power unit and labor costs. | Acre | $6.13 | 1 | $6.13 |
| Seeding Operation, No Till/Grass Drill | 960 | No Till drill or grass drill for seeding. Includes equipment, power unit and labor costs. | Acre | $21.36 | 1 | $21.36 |
| Cultipacking | 1100 | Includes equipment, power unit and labor costs. | Acre | $7.70 | 1 | $7.70 |
| **Foregone Income** | | | | | | |
| FI, Corn Dryland | 1959 | Dryland Corn is Primary Crop | Acre | $376.15 | 0.41 | $154.22 |
| FI, Soybeans Dryland | 1961 | Dryland Soybeans is Primary Crop | Acre | $361.97 | 0.36 | $130.31 |
| FI, Wheat Dryland | 1963 | Dryland Wheat is Primary Crop | Acre | $269.62 | 0.23 | $62.01 |
| **Materials** | | | | | | |
| Five Species Mix, Cool Season, Annual Grasses and Legumes | 2320 | Cool season, introduced grass and legume mix. Includes material and shipping only. | Acre | $58.50 | 1 | $58.50 |
| **Mobilization** | | | | | | |
| Mobilization, medium equipment | 1139 | Equipment with 70-150 HP or typical weights between 14,000 and 30,000 pounds. | Each | $255.83 | 1 | $255.83 |

**Practice:** E386137Z - Enhanced field border to provide wildlife cover or shelter along the edge(s) of a field

**Scenario** #1 - Field border to provide wildlife cover

**Scenario Description:**
Enhance existing field borders to a width of at least 40 feet and establish a mixture of species that provide wildlife food and cover along the edge(s) of the field.

**Before Situation:**
Resources are protected at the minimum level of the Conservation Practice Standard (CPS) 386 - Field Border

**After Situation:**
The adoption of this enhancement will provide resource protection above the minimum level as described in Conservation Practice Standard (CPS) 386 - Field Border

**Feature Measure:** Acre

**Scenario Unit::** Acre

**Scenario Typical Size:** 1.0

**Scenario Total Cost:** $707.20

**Scenario Cost/Unit:** $707.20

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 | $11.14 | 1 | $11.14 |
| Chemical, ground application | 948 | Chemical application performed by ground equipment. Includes equipment, power unit and labor costs. | Acre | $6.13 | 1 | $6.13 |
| Seeding Operation, No Till/Grass Drill | 960 | No Till drill or grass drill for seeding. Includes equipment, power unit and labor costs. | Acre | $21.36 | 1 | $21.36 |
| Cultipacking | 1100 | Includes equipment, power unit and labor costs. | Acre | $7.70 | 1 | $7.70 |
| **Foregone Income** | | | | | | |
| FI, Corn Dryland | 1959 | Dryland Corn is Primary Crop | Acre | $376.15 | 0.41 | $154.22 |
| FI, Soybeans Dryland | 1961 | Dryland Soybeans is Primary Crop | Acre | $361.97 | 0.36 | $130.31 |
| FI, Wheat Dryland | 1963 | Dryland Wheat is Primary Crop | Acre | $269.62 | 0.23 | $62.01 |
| **Materials** | | | | | | |
| Five Species Mix, Cool Season, Annual Grasses and Legumes | 2320 | Cool season, introduced grass and legume mix. Includes material and shipping only. | Acre | $58.50 | 1 | $58.50 |
| **Mobilization** | | | | | | |
| Mobilization, medium equipment | 1139 | Equipment with 70-150 HP or typical weights between 14,000 and 30,000 pounds. | Each | $255.83 | 1 | $255.83 |

**Practice:** E386139Z - Enhanced field border to provide wildlife habitat continuity along the edge(s) of a field

**Scenario** #1 - Field border to provide continuity

**Scenario Description:**
Enhance existing field borders to a width of at least 40 feet and establish a mixture of species that provide wildlife habitat continuity along the edge(s) of the field.

**Before Situation:**
Resources are protected at the minimum level of the Conservation Practice Standard (CPS) 386 - Field Border

**After Situation:**
The adoption of this enhancement will provide resource protection above the minimum level as described in Conservation Practice Standard (CPS) 386 - Field Border

**Feature Measure:** Acre

**Scenario Unit::** Acre

**Scenario Typical Size:** 1.0

**Scenario Total Cost:** $707.20

**Scenario Cost/Unit:** $707.20

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 | $11.14 | 1 | $11.14 |
| Chemical, ground application | 948 | Chemical application performed by ground equipment. Includes equipment, power unit and labor costs. | Acre | $6.13 | 1 | $6.13 |
| Seeding Operation, No Till/Grass Drill | 960 | No Till drill or grass drill for seeding. Includes equipment, power unit and labor costs. | Acre | $21.36 | 1 | $21.36 |
| Cultipacking | 1100 | Includes equipment, power unit and labor costs. | Acre | $7.70 | 1 | $7.70 |
| **Foregone Income** | | | | | | |
| FI, Corn Dryland | 1959 | Dryland Corn is Primary Crop | Acre | $376.15 | 0.41 | $154.22 |
| FI, Soybeans Dryland | 1961 | Dryland Soybeans is Primary Crop | Acre | $361.97 | 0.36 | $130.31 |
| FI, Wheat Dryland | 1963 | Dryland Wheat is Primary Crop | Acre | $269.62 | 0.23 | $62.01 |
| **Materials** | | | | | | |
| Five Species Mix, Cool Season, Annual Grasses and Legumes | 2320 | Cool season, introduced grass and legume mix. Includes material and shipping only. | Acre | $58.50 | 1 | $58.50 |
| **Mobilization** | | | | | | |
| Mobilization, medium equipment | 1139 | Equipment with 70-150 HP or typical weights between 14,000 and 30,000 pounds. | Each | $255.83 | 1 | $255.83 |

**Practice:** E390118Z - Increase riparian herbaceous cover width for nutrient reduction

**Scenario** #1 - Riparian herbaceous cover-nut reduction

**Scenario Description:**

Where an existing herbaceous riparian buffer is located along a river, stream, pond, lake, or other waterbody, increase the width of the buffer in order to allow a greater percentage of nutrient removal from surface and subsurface flows. Saturated buffer or nutrient control wetland to capture subsurface drainage.

**Before Situation:**

Resources are protected at the minimum level of the Conservation Practice Standard (CPS) 390 - Riparian Herbaceous Cover

**After Situation:**

The adoption of this enhancement will provide resource protection above the minimum level as described in Conservation Practice Standard (CPS) 390 - Riparian Herbaceous Cover

**Feature Measure:** Acre

**Scenario Unit::** Acre

**Scenario Typical Size:** 2.0

**Scenario Total Cost:** $1,136.43

**Scenario Cost/Unit:** $568.21

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 | $6.13 | 2 | $12.26 |
| Seeding Operation, No Till/Grass Drill | 960 | No Till drill or grass drill for seeding. Includes equipment, power unit and labor costs. | Acre | $21.36 | 2 | $42.72 |
| **Foregone Income** | | | | | | |
| FI, Corn Dryland | 1959 | Dryland Corn is Primary Crop | Acre | $376.15 | 0.82 | $308.44 |
| FI, Soybeans Dryland | 1961 | Dryland Soybeans is Primary Crop | Acre | $361.97 | 0.72 | $260.62 |
| FI, Wheat Dryland | 1963 | Dryland Wheat is Primary Crop | Acre | $269.62 | 0.46 | $124.03 |
| **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 | $37.13 | 2 | $74.26 |
| One Species, Cool Season, Native Perennial Grass | 2312 | Native, cool season perennial grass. Includes material and shipping only. | Acre | $157.05 | 2 | $314.10 |

**Practice:** E390126Z - Increase riparian herbaceous cover width to reduce sediment loading

**Scenario** #1 - Riparian herbaceous cover-sed loading

**Scenario Description:**

Where an existing herbaceous riparian buffer is located along a river, stream, pond, lake, or other waterbody, increase the width of the buffer in order to allow a greater percentage of nutrient removal from surface and subsurface flows.

**Before Situation:**

Resources are protected at the minimum level of the Conservation Practice Standard (CPS) 390 - Riparian Herbaceous Cover

**After Situation:**

The adoption of this enhancement will provide resource protection above the minimum level as described in Conservation Practice Standard (CPS) 390 - Riparian Herbaceous Cover

**Feature Measure:** Acre

**Scenario Unit::** Acre

**Scenario Typical Size:** 2.0

**Scenario Total Cost:** $1,136.43

**Scenario Cost/Unit:** $568.21

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 | $6.13 | 2 | $12.26 |
| Seeding Operation, No Till/Grass Drill | 960 | No Till drill or grass drill for seeding. Includes equipment, power unit and labor costs. | Acre | $21.36 | 2 | $42.72 |
| **Foregone Income** | | | | | | |
| FI, Corn Dryland | 1959 | Dryland Corn is Primary Crop | Acre | $376.15 | 0.82 | $308.44 |
| FI, Soybeans Dryland | 1961 | Dryland Soybeans is Primary Crop | Acre | $361.97 | 0.72 | $260.62 |
| FI, Wheat Dryland | 1963 | Dryland Wheat is Primary Crop | Acre | $269.62 | 0.46 | $124.03 |
| **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 | $37.13 | 2 | $74.26 |
| One Species, Cool Season, Native Perennial Grass | 2312 | Native, cool season perennial grass. Includes material and shipping only. | Acre | $157.05 | 2 | $314.10 |

**Practice:** E390136Z - Increase riparian herbaceous cover width to enhance wildlife habitat

**Scenario** #1 - Riparian herbaceous cover-habitat

**Scenario Description:**

Where an existing herbaceous riparian buffer is located along a river, stream, pond, lake, or other waterbody, increase the diversity of native species, control invasive species, install fencing and relocate equipment operations, trails, and livestock, and increase the width of the buffer.

**Before Situation:**

Resources are protected at the minimum level of the Conservation Practice Standard (CPS) 390 - Riparian Herbaceous Cover

**After Situation:**

The adoption of this enhancement will provide resource protection above the minimum level as described in Conservation Practice Standard (CPS) 390 - Riparian Herbaceous Cover

**Feature Measure:** Acre

**Scenario Unit::** Acre

**Scenario Typical Size:** 4.0

**Scenario Total Cost:** $3,075.33

**Scenario Cost/Unit:** $768.83

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 | $6.13 | 4 | $24.52 |
| Seeding Operation, No Till/Grass Drill | 960 | No Till drill or grass drill for seeding. Includes equipment, power unit and labor costs. | Acre | $21.36 | 2 | $42.72 |
| **Foregone Income** | | | | | | |
| FI, Corn Dryland | 1959 | Dryland Corn is Primary Crop | Acre | $376.15 | 1 | $376.15 |
| FI, Soybeans Dryland | 1961 | Dryland Soybeans is Primary Crop | Acre | $361.97 | 1 | $361.97 |
| FI, Wheat Dryland | 1963 | Dryland Wheat is Primary Crop | Acre | $269.62 | 0.46 | $124.03 |
| **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 | $37.13 | 4 | $148.52 |
| Specialized native grass and forb mix | 2619 | A mix of native grass and forbs to be used for specialized purposes such as wildlife (including pollinators) or ecosystem restoration, requiring species not readility available and/or difficult to produce and harvest. Includes material and shipping only | Acre | $998.71 | 2 | $1,997.42 |

**Practice:** E391118Z - Increase riparian forest buffer width for nutrient reduction

**Scenario** #1 - Riparian forest buffer-nut reduction

**Scenario Description:**

Where an existing forested riparian area is located along a river, stream, pond, lake, or other waterbody, increase the width of the buffer in order to allow a greater percentage of nutrient removal from surface and subsurface flows. Saturated buffer or nutrient control wetland to capture subsurface drainage.

**Before Situation:**

Resources are protected at the minimum level of the Conservation Practice Standard (CPS) 391 - Riparian Forest Buffer

**After Situation:**

The adoption of this enhancement will provide resource protection above the minimum level as described in Conservation Practice Standard (CPS) 391 - Riparian Forest Buffer

**Feature Measure:** Acre

**Scenario Unit::** Acre

**Scenario Typical Size:** 2.0

**Scenario Total Cost:** $3,720.85

**Scenario Cost/Unit:** $1,860.42

Cost Details:

| Component Name | ID | Description | Unit | Cost | QTY | Total |
|---|---|---|---|---|---|---|
| **Equipment Installation** | | | | | | |
| Truck, Pickup | 939 | Equipment and power unit costs. Labor not included. | Hour | $21.79 | 16 | $348.64 |
| Mower, Bush Hog | 940 | Equipment and power unit costs. Labor not included. | Hour | $51.91 | 2 | $103.82 |
| Chemical, ground application | 948 | Chemical application performed by ground equipment. Includes equipment, power unit and labor costs. | Acre | $6.13 | 1 | $6.13 |
| Chemical, ground application | 948 | Chemical application performed by ground equipment. Includes equipment, power unit and labor costs. | Acre | $6.13 | 1 | $6.13 |
| Tractor, agricultural, 60 HP | 963 | Agricultural tractor with horsepower range of 50 to 90. Equipment and power unit costs. Labor not included. | Hour | $24.77 | 4 | $99.08 |
| Hand tools, tree planting | 1590 | Various hand tools for digging holes and planting trees such as augers, dibble bars, planting shovel, hoe-dad. Equipment only. Labor not included. | Hour | $12.04 | 16 | $192.64 |
| **Foregone Income** | | | | | | |
| FI, Corn Dryland | 1959 | Dryland Corn is Primary Crop | Acre | $376.15 | 0.82 | $308.44 |
| FI, Soybeans Dryland | 1961 | Dryland Soybeans is Primary Crop | Acre | $361.97 | 0.72 | $260.62 |
| FI, Wheat Dryland | 1963 | Dryland Wheat is Primary Crop | Acre | $269.62 | 0.46 | $124.03 |
| **Labor** | | | | | | |
| General Labor | 231 | Labor performed using basic tools such as power tool, shovels, and other tools that do not require extensive training. Ex. pipe layer, herder, concrete placement, materials spreader, flagger, etc. | Hour | $25.31 | 2 | $50.62 |
| General Labor | 231 | Labor performed using basic tools such as power tool, shovels, and other tools that do not require extensive training. Ex. pipe layer, herder, concrete placement, materials spreader, flagger, etc. | Hour | $25.31 | 16 | $404.96 |
| Equipment Operators, Light | 232 | Includes: Skid Steer Loaders, Hydraulic Excavators <50 HP, Trenchers <12", Ag Equipment <150 HP, Pickup Trucks, Forklifts, Mulchers | Hour | $25.23 | 4 | $100.92 |
| 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 | $45.69 | 4 | $182.76 |
| **Materials** | | | | | | |
| Herbicide, Glyphosate | 334 | A broad-spectrum, non-selective systemic herbicide. Refer to WIN-PST for product names and active ingredients. Includes materials and shipping only. | Acre | $17.48 | 1 | $17.48 |
| 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 | $25.63 | 1 | $25.63 |
| 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 shi | Acre | $1.28 | 1 | $1.28 |

| | | | | | | |
|---|---|---|---|---|---|---|
| Tree, hardwood, seedling or transplant, bare root, 16-36" | 1510 | Bare root hardwood trees 18-36" tall. Includes materials and shipping only. | Each | $0.80 | 872 | $697.60 |
| Tree shelter, solid tube type, 4" x 48" | 1566 | 4" x 48" tree tube for protection from animal damage. Materials only. | Each | $4.14 | 100 | $414.00 |
| Stakes, wood, 1" x 1" x 48" | 1578 | 1" x 1" x 48" wood stakes to fasten items in place. Includes materials only. | Each | $2.04 | 100 | $204.00 |
| **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 | $172.07 | 1 | $172.07 |

**Practice:** E391126Z - Increase riparian forest buffer width to reduce sediment loading

**Scenario** #1 - Riparian forest buffer-sed loading

**Scenario Description:**

Where an existing forested riparian area is located along a river, stream, pond, lake, or other waterbody, increase the width of the buffer in order to allow a greater percentage of nutrient removal from surface and subsurface flows.

**Before Situation:**

Resources are protected at the minimum level of the Conservation Practice Standard (CPS) 391 - Riparian Forest Buffer

**After Situation:**

The adoption of this enhancement will provide resource protection above the minimum level as described in Conservation Practice Standard (CPS) 391 - Riparian Forest Buffer

**Feature Measure:** Acre

**Scenario Unit::** Acre

**Scenario Typical Size:** 2.0

**Scenario Total Cost:** $3,720.85

**Scenario Cost/Unit:** $1,860.42

Cost Details:

| Component Name | ID | Description | Unit | Cost | QTY | Total |
|---|---|---|---|---|---|---|
| **Equipment Installation** | | | | | | |
| Truck, Pickup | 939 | Equipment and power unit costs. Labor not included. | Hour | $21.79 | 16 | $348.64 |
| Mower, Bush Hog | 940 | Equipment and power unit costs. Labor not included. | Hour | $51.91 | 2 | $103.82 |
| Chemical, ground application | 948 | Chemical application performed by ground equipment. Includes equipment, power unit and labor costs. | Acre | $6.13 | 1 | $6.13 |
| Chemical, ground application | 948 | Chemical application performed by ground equipment. Includes equipment, power unit and labor costs. | Acre | $6.13 | 1 | $6.13 |
| Tractor, agricultural, 60 HP | 963 | Agricultural tractor with horsepower range of 50 to 90. Equipment and power unit costs. Labor not included. | Hour | $24.77 | 4 | $99.08 |
| Hand tools, tree planting | 1590 | Various hand tools for digging holes and planting trees such as augers, dibble bars, planting shovel, hoe-dad. Equipment only. Labor not included. | Hour | $12.04 | 16 | $192.64 |
| **Foregone Income** | | | | | | |
| FI, Corn Dryland | 1959 | Dryland Corn is Primary Crop | Acre | $376.15 | 0.82 | $308.44 |
| FI, Soybeans Dryland | 1961 | Dryland Soybeans is Primary Crop | Acre | $361.97 | 0.72 | $260.62 |
| FI, Wheat Dryland | 1963 | Dryland Wheat is Primary Crop | Acre | $269.62 | 0.46 | $124.03 |
| **Labor** | | | | | | |
| General Labor | 231 | Labor performed using basic tools such as power tool, shovels, and other tools that do not require extensive training. Ex. pipe layer, herder, concrete placement, materials spreader, flagger, etc. | Hour | $25.31 | 2 | $50.62 |
| General Labor | 231 | Labor performed using basic tools such as power tool, shovels, and other tools that do not require extensive training. Ex. pipe layer, herder, concrete placement, materials spreader, flagger, etc. | Hour | $25.31 | 16 | $404.96 |
| Equipment Operators, Light | 232 | Includes: Skid Steer Loaders, Hydraulic Excavators <50 HP, Trenchers <12", Ag Equipment <150 HP, Pickup Trucks, Forklifts, Mulchers | Hour | $25.23 | 4 | $100.92 |
| 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 | $45.69 | 4 | $182.76 |
| **Materials** | | | | | | |
| Herbicide, Glyphosate | 334 | A broad-spectrum, non-selective systemic herbicide. Refer to WIN-PST for product names and active ingredients. Includes materials and shipping only. | Acre | $17.48 | 1 | $17.48 |
| 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 | $25.63 | 1 | $25.63 |
| 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 shi | Acre | $1.28 | 1 | $1.28 |

| | | | | | | |
|---|---|---|---|---|---|---|
| Tree, hardwood, seedling or transplant, bare root, 16-36" | 1510 | Bare root hardwood trees 18-36" tall. Includes materials and shipping only. | Each | $0.80 | 872 | $697.60 |
| Tree shelter, solid tube type, 4" x 48" | 1566 | 4" x 48" tree tube for protection from animal damage. Materials only. | Each | $4.14 | 100 | $414.00 |
| Stakes, wood, 1" x 1" x 48" | 1578 | 1" x 1" x 48" wood stakes to fasten items in place. Includes materials only. | Each | $2.04 | 100 | $204.00 |
| **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 | $172.07 | 1 | $172.07 |

**Practice:** E391127Z - Increase stream shading for stream temperature reduction

**Scenario** #1 - Shade stream to reduce temp

**Scenario Description:**
Riparian area tree canopy cover density is increased and the extent of the forested riparian area is increased to provide greater stream shading.

**Before Situation:**
Resources are protected at the minimum level of the Conservation Practice Standard (CPS) 391 - Riparian Forest Buffer

**After Situation:**
The adoption of this enhancement will provide resource protection above the minimum level as described in Conservation Practice Standard (CPS) 391 - Riparian Forest Buffer

**Feature Measure:** Acre

**Scenario Unit::** Acre

**Scenario Typical Size:** 2.0

**Scenario Total Cost:** $3,720.85

**Scenario Cost/Unit:** $1,860.42

Cost Details:

| Component Name | ID | Description | Unit | Cost | QTY | Total |
|---|---|---|---|---|---|---|
| **Equipment Installation** | | | | | | |
| Truck, Pickup | 939 | Equipment and power unit costs. Labor not included. | Hour | $21.79 | 16 | $348.64 |
| Mower, Bush Hog | 940 | Equipment and power unit costs. Labor not included. | Hour | $51.91 | 2 | $103.82 |
| Chemical, ground application | 948 | Chemical application performed by ground equipment. Includes equipment, power unit and labor costs. | Acre | $6.13 | 1 | $6.13 |
| Chemical, ground application | 948 | Chemical application performed by ground equipment. Includes equipment, power unit and labor costs. | Acre | $6.13 | 1 | $6.13 |
| Tractor, agricultural, 60 HP | 963 | Agricultural tractor with horsepower range of 50 to 90. Equipment and power unit costs. Labor not included. | Hour | $24.77 | 4 | $99.08 |
| Hand tools, tree planting | 1590 | Various hand tools for digging holes and planting trees such as augers, dibble bars, planting shovel, hoe-dad. Equipment only. Labor not included. | Hour | $12.04 | 16 | $192.64 |
| **Foregone Income** | | | | | | |
| FI, Corn Dryland | 1959 | Dryland Corn is Primary Crop | Acre | $376.15 | 0.82 | $308.44 |
| FI, Soybeans Dryland | 1961 | Dryland Soybeans is Primary Crop | Acre | $361.97 | 0.72 | $260.62 |
| FI, Wheat Dryland | 1963 | Dryland Wheat is Primary Crop | Acre | $269.62 | 0.46 | $124.03 |
| **Labor** | | | | | | |
| General Labor | 231 | Labor performed using basic tools such as power tool, shovels, and other tools that do not require extensive training. Ex. pipe layer, herder, concrete placement, materials spreader, flagger, etc. | Hour | $25.31 | 2 | $50.62 |
| General Labor | 231 | Labor performed using basic tools such as power tool, shovels, and other tools that do not require extensive training. Ex. pipe layer, herder, concrete placement, materials spreader, flagger, etc. | Hour | $25.31 | 16 | $404.96 |
| Equipment Operators, Light | 232 | Includes: Skid Steer Loaders, Hydraulic Excavators <50 HP, Trenchers <12", Ag Equipment <150 HP, Pickup Trucks, Forklifts, Mulchers | Hour | $25.23 | 4 | $100.92 |
| 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 | $45.69 | 4 | $182.76 |
| **Materials** | | | | | | |
| Herbicide, Glyphosate | 334 | A broad-spectrum, non-selective systemic herbicide. Refer to WIN-PST for product names and active ingredients. Includes materials and shipping only. | Acre | $17.48 | 1 | $17.48 |
| 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 | $25.63 | 1 | $25.63 |
| 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 shi | Acre | $1.28 | 1 | $1.28 |

| | | | | | | |
|---|---|---|---|---|---|---|
| Tree, hardwood, seedling or transplant, bare root, 16-36" | 1510 | Bare root hardwood trees 18-36" tall. Includes materials and shipping only. | Each | $0.80 | 872 | $697.60 |
| Tree shelter, solid tube type, 4" x 48" | 1566 | 4" x 48" tree tube for protection from animal damage. Materials only. | Each | $4.14 | 100 | $414.00 |
| Stakes, wood, 1" x 1" x 48" | 1578 | 1" x 1" x 48" wood stakes to fasten items in place. Includes materials only. | Each | $2.04 | 100 | $204.00 |
| **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 | $172.07 | 1 | $172.07 |

**Practice:** E391136Z - Increase riparian forest buffer width to enhance wildlife habitat

**Scenario** #1 - Riparian forest buffer-habitat

**Scenario Description:**

Where an existing forested riparian area is located along a river, stream, pond, lake, or other waterbody, increase the diversity of native species, control invasive species, install fencing and relocate equipment operations, trails, and livestock, and increase the width of the buffer.

**Before Situation:**

Resources are protected at the minimum level of the Conservation Practice Standard (CPS) 391 - Riparian Forest Buffer

**After Situation:**

The adoption of this enhancement will provide resource protection above the minimum level as described in Conservation Practice Standard (CPS) 391 - Riparian Forest Buffer

**Feature Measure:** Acre

**Scenario Unit::** Acre

**Scenario Typical Size:** 2.0

**Scenario Total Cost:** $3,720.85

**Scenario Cost/Unit:** $1,860.42

Cost Details:

| Component Name | ID | Description | Unit | Cost | QTY | Total |
|---|---|---|---|---|---|---|
| **Equipment Installation** | | | | | | |
| Truck, Pickup | 939 | Equipment and power unit costs. Labor not included. | Hour | $21.79 | 16 | $348.64 |
| Mower, Bush Hog | 940 | Equipment and power unit costs. Labor not included. | Hour | $51.91 | 2 | $103.82 |
| Chemical, ground application | 948 | Chemical application performed by ground equipment. Includes equipment, power unit and labor costs. | Acre | $6.13 | 1 | $6.13 |
| Chemical, ground application | 948 | Chemical application performed by ground equipment. Includes equipment, power unit and labor costs. | Acre | $6.13 | 1 | $6.13 |
| Tractor, agricultural, 60 HP | 963 | Agricultural tractor with horsepower range of 50 to 90. Equipment and power unit costs. Labor not included. | Hour | $24.77 | 4 | $99.08 |
| Hand tools, tree planting | 1590 | Various hand tools for digging holes and planting trees such as augers, dibble bars, planting shovel, hoe-dad. Equipment only. Labor not included. | Hour | $12.04 | 16 | $192.64 |
| **Foregone Income** | | | | | | |
| FI, Corn Dryland | 1959 | Dryland Corn is Primary Crop | Acre | $376.15 | 0.82 | $308.44 |
| FI, Soybeans Dryland | 1961 | Dryland Soybeans is Primary Crop | Acre | $361.97 | 0.72 | $260.62 |
| FI, Wheat Dryland | 1963 | Dryland Wheat is Primary Crop | Acre | $269.62 | 0.46 | $124.03 |
| **Labor** | | | | | | |
| General Labor | 231 | Labor performed using basic tools such as power tool, shovels, and other tools that do not require extensive training. Ex. pipe layer, herder, concrete placement, materials spreader, flagger, etc. | Hour | $25.31 | 2 | $50.62 |
| General Labor | 231 | Labor performed using basic tools such as power tool, shovels, and other tools that do not require extensive training. Ex. pipe layer, herder, concrete placement, materials spreader, flagger, etc. | Hour | $25.31 | 16 | $404.96 |
| Equipment Operators, Light | 232 | Includes: Skid Steer Loaders, Hydraulic Excavators <50 HP, Trenchers <12", Ag Equipment <150 HP, Pickup Trucks, Forklifts, Mulchers | Hour | $25.23 | 4 | $100.92 |
| 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 | $45.69 | 4 | $182.76 |
| **Materials** | | | | | | |
| Herbicide, Glyphosate | 334 | A broad-spectrum, non-selective systemic herbicide. Refer to WIN-PST for product names and active ingredients. Includes materials and shipping only. | Acre | $17.48 | 1 | $17.48 |
| 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 | $25.63 | 1 | $25.63 |
| 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 shi | Acre | $1.28 | 1 | $1.28 |

| | | | | | | |
|---|---|---|---|---|---|---|
| Tree, hardwood, seedling or transplant, bare root, 16-36" | 1510 | Bare root hardwood trees 18-36" tall. Includes materials and shipping only. | Each | $0.80 | 872 | $697.60 |
| Tree shelter, solid tube type, 4" x 48" | 1566 | 4" x 48" tree tube for protection from animal damage. Materials only. | Each | $4.14 | 100 | $414.00 |
| Stakes, wood, 1" x 1" x 48" | 1578 | 1" x 1" x 48" wood stakes to fasten items in place. Includes materials only. | Each | $2.04 | 100 | $204.00 |
| **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 | $172.07 | 1 | $172.07 |

**Practice:** E393118Z - Extend existing filter strip to reduce excess nutrients in surface water

**Scenario** #1 - Extend filter strips- nut runoff

**Scenario Description:**

Extend existing filter strips for water quality protection (reduce excess nutrients in surface water). Extend the existing buffer for a total of 60 feet or more to enhance water quality functions. The extended buffers must be composed of at least 5 species of non-noxious, wildlife friendly grasses and/or perennial forbs best suited to site conditions. Include species that provide pollinator food and habitat where possible.

**Before Situation:**

Resources are protected at the minimum level of the Conservation Practice Standard (CPS) 393 - Filter Strip

**After Situation:**

The adoption of this enhancement will provide resource protection above the minimum level as described in Conservation Practice Standard (CPS) 393 - Filter Strip

**Feature Measure:** Acre

**Scenario Unit::** Acre

**Scenario Typical Size:** 1.0

**Scenario Total Cost:** $928.62

**Scenario Cost/Unit:** $928.62

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 | $11.14 | 1 | $11.14 |
| Chemical, ground application | 948 | Chemical application performed by ground equipment. Includes equipment, power unit and labor costs. | Acre | $6.13 | 1 | $6.13 |
| Seeding Operation, No Till/Grass Drill | 960 | No Till drill or grass drill for seeding. Includes equipment, power unit and labor costs. | Acre | $21.36 | 1 | $21.36 |
| Cultipacking | 1100 | Includes equipment, power unit and labor costs. | Acre | $7.70 | 1 | $7.70 |
| **Foregone Income** | | | | | | |
| FI, Corn Dryland | 1959 | Dryland Corn is Primary Crop | Acre | $376.15 | 0.41 | $154.22 |
| FI, Soybeans Dryland | 1961 | Dryland Soybeans is Primary Crop | Acre | $361.97 | 0.36 | $130.31 |
| FI, Wheat Dryland | 1963 | Dryland Wheat is Primary Crop | Acre | $269.62 | 0.23 | $62.01 |
| **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 | $110.71 | 2 | $221.42 |
| **Materials** | | | | | | |
| Five Species Mix, Cool Season, Annual Grasses and Legumes | 2320 | Cool season, introduced grass and legume mix. Includes material and shipping only. | Acre | $58.50 | 1 | $58.50 |
| **Mobilization** | | | | | | |
| Mobilization, medium equipment | 1139 | Equipment with 70-150 HP or typical weights between 14,000 and 30,000 pounds. | Each | $255.83 | 1 | $255.83 |

**Practice:** E393122Z - Extend existing filter strip to reduce excess pathogens and chemicals in surface water

**Scenario** #1 - Extend filter strips-pathogen runoff

**Scenario Description:**

Extend existing filter strips for water quality protection (reduce excess pathogens and chemicals from manure, bio-solids or compost applications in surface waters ). Extend the existing buffer for a total of 60 feet or more to enhance water quality functions. The extended buffers must be composed of at least 5 species of non-noxious, wildlife friendly grasses and/or perennial forbs best suited to site conditions. Include species that provide pollinator food and habitat where possible.

**Before Situation:**

Resources are protected at the minimum level of the Conservation Practice Standard (CPS) 393 - Filter Strip

**After Situation:**

The adoption of this enhancement will provide resource protection above the minimum level as described in Conservation Practice Standard (CPS) 393 - Filter Strip

**Feature Measure:** Acre

**Scenario Unit::** Acre

**Scenario Typical Size:** 1.0

**Scenario Total Cost:** $928.62

**Scenario Cost/Unit:** $928.62

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 | $11.14 | 1 | $11.14 |
| Chemical, ground application | 948 | Chemical application performed by ground equipment. Includes equipment, power unit and labor costs. | Acre | $6.13 | 1 | $6.13 |
| Seeding Operation, No Till/Grass Drill | 960 | No Till drill or grass drill for seeding. Includes equipment, power unit and labor costs. | Acre | $21.36 | 1 | $21.36 |
| Cultipacking | 1100 | Includes equipment, power unit and labor costs. | Acre | $7.70 | 1 | $7.70 |
| **Foregone Income** | | | | | | |
| FI, Corn Dryland | 1959 | Dryland Corn is Primary Crop | Acre | $376.15 | 0.41 | $154.22 |
| FI, Soybeans Dryland | 1961 | Dryland Soybeans is Primary Crop | Acre | $361.97 | 0.36 | $130.31 |
| FI, Wheat Dryland | 1963 | Dryland Wheat is Primary Crop | Acre | $269.62 | 0.23 | $62.01 |
| **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 | $110.71 | 2 | $221.42 |
| **Materials** | | | | | | |
| Five Species Mix, Cool Season, Annual Grasses and Legumes | 2320 | Cool season, introduced grass and legume mix. Includes material and shipping only. | Acre | $58.50 | 1 | $58.50 |
| **Mobilization** | | | | | | |
| Mobilization, medium equipment | 1139 | Equipment with 70-150 HP or typical weights between 14,000 and 30,000 pounds. | Each | $255.83 | 1 | $255.83 |

**Practice:** E393126Z - Extend existing filter strip to reduce excess sediment in surface water

**Scenario** #1 - Extend filter strips-sediment

**Scenario Description:**

Extend existing filter strips for water quality protection (reduce excess sediment in surface waters ). Extend the existing buffer for a total of 60 feet or more to enhance water quality functions. The extended buffers must be composed of at least 5 species of non-noxious, wildlife friendly grasses and/or perennial forbs best suited to site conditions. Include species that provide pollinator food and habitat where possible.

**Before Situation:**

Resources are protected at the minimum level of the Conservation Practice Standard (CPS) 393 - Filter Strip

**After Situation:**

The adoption of this enhancement will provide resource protection above the minimum level as described in Conservation Practice Standard (CPS) 393 - Filter Strip

**Feature Measure:** Acre

**Scenario Unit::** Acre

**Scenario Typical Size:** 1.0

**Scenario Total Cost:** $928.62

**Scenario Cost/Unit:** $928.62

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 | $11.14 | 1 | $11.14 |
| Chemical, ground application | 948 | Chemical application performed by ground equipment. Includes equipment, power unit and labor costs. | Acre | $6.13 | 1 | $6.13 |
| Seeding Operation, No Till/Grass Drill | 960 | No Till drill or grass drill for seeding. Includes equipment, power unit and labor costs. | Acre | $21.36 | 1 | $21.36 |
| Cultipacking | 1100 | Includes equipment, power unit and labor costs. | Acre | $7.70 | 1 | $7.70 |
| **Foregone Income** | | | | | | |
| FI, Corn Dryland | 1959 | Dryland Corn is Primary Crop | Acre | $376.15 | 0.41 | $154.22 |
| FI, Soybeans Dryland | 1961 | Dryland Soybeans is Primary Crop | Acre | $361.97 | 0.36 | $130.31 |
| FI, Wheat Dryland | 1963 | Dryland Wheat is Primary Crop | Acre | $269.62 | 0.23 | $62.01 |
| **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 | $110.71 | 2 | $221.42 |
| **Materials** | | | | | | |
| Five Species Mix, Cool Season, Annual Grasses and Legumes | 2320 | Cool season, introduced grass and legume mix. Includes material and shipping only. | Acre | $58.50 | 1 | $58.50 |
| **Mobilization** | | | | | | |
| Mobilization, medium equipment | 1139 | Equipment with 70-150 HP or typical weights between 14,000 and 30,000 pounds. | Each | $255.83 | 1 | $255.83 |

**Practice:** E395137X - Stream habitat improvement through placement of woody biomass

**Scenario** #1 - Stream habitat improvement with wood

**Scenario Description:**

Flexible placement of wood (unanchored/unpinned) in small, 1st and 2nd order streams to improve stream habitat conditions for aquatic species and natural stream processes.

**Before Situation:**

Resources are protected at the minimum level of the Conservation Practice Standard (CPS) 395 - Stream Habitat Improvement and Management

**After Situation:**

The adoption of this enhancement will provide resource protection above the minimum level as described in Conservation Practice Standard (CPS) 395 - Stream Habitat Improvement and Management

**Feature Measure:** Bankfull width X Length

**Scenario Unit::** Acre

**Scenario Typical Size:** 1.0

**Scenario Total Cost:** $21,424.20

**Scenario Cost/Unit:** $21,424.20

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 | $164.46 | 16 | $2,631.36 |
| Truck, dump, 12 CY | 1215 | Dump truck for moving bulk material. Typically capacity is 16 ton or 12 cubic yards. Includes equipment only. | Hour | $96.73 | 8 | $773.84 |
| **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 | $44.37 | 24 | $1,064.88 |
| **Materials** | | | | | | |
| Aggregate, Sand, Graded, Washed | 45 | Sand, typical ASTM C33 gradation, includes materials, equipment and labor to transport and place | Cubic Yard | $34.29 | 20 | $685.80 |
| Aggregate, Gravel, Graded | 46 | Gravel, includes materials, equipment and labor to transport and place. Includes washed and unwashed gravel. | Cubic Yard | $34.75 | 30 | $1,042.50 |
| Compost | 265 | A mixture of decaying organic matter, as from leaves and manure, used to improve soil structure and provide nutrients. | Ton | $43.27 | 1 | $43.27 |
| Cuttings, woody, large size | 1309 | Woody pole cuttings or posts 2" to 6" in diameter and 6' long. Includes materials and shipping only. | Each | $17.90 | 300 | $5,370.00 |
| Boulder | 1761 | Rock boulders (approximately 5 ft dia. 6.67 Tons) Inlcudes materials and delivery (up to 100 miles) only. | Ton | $34.32 | 40 | $1,372.80 |
| Steel, rebar | 1832 | Steel rebar, grade 60. Materials only. | Pound | $0.52 | 50 | $26.00 |
| Aggregate, river rock | 1834 | Well graded, rounded mineral substrates derived from local riverine settings. Includes materials and local delivery | Ton | $29.15 | 15 | $437.25 |
| Log, un-anchored | 2035 | Price of log picked up at the Mill. Includes material only. | Ton | $227.38 | 30 | $6,821.40 |
| Root Wad | 2045 | Tree stump buried into the streambank with the roots left exposed. Includes material only. | Ton | $8.91 | 20 | $178.20 |
| **Mobilization** | | | | | | |
| Mobilization, large equipment | 1140 | Equipment >150HP or typical weights greater than 30,000 pounds or loads requiring over width or over length permits. | Each | $488.45 | 2 | $976.90 |

## USDA - Natural Resources Conservation Service

**Massachusetts**

**Practice:** E399137X - Fishpond management for native aquatic and terrestrial species

**Scenario** #1 - Fishpond mgmt

**Scenario Description:**

Pond rehabilitation (e.g., dredging), buffer, and watershed management actions are taken to improve habitat for native species of fish, amphibians, and shorebirds.

**Before Situation:**

Resources are protected at the minimum level of the Conservation Practice Standard (CPS) 399 - Fishpond Management

**After Situation:**

The adoption of this enhancement will provide resource protection above the minimum level as described in Conservation Practice Standard (CPS) 399 - Fishpond Management

**Feature Measure:** Pond area + buffer area

**Scenario Unit::** Acre

**Scenario Typical Size:** 2.0

**Scenario Total Cost:** $3,701.56

**Scenario Cost/Unit:** $1,850.78

Cost Details:

| Component Name | ID | Description | Unit | Cost | QTY | Total |
|---|---|---|---|---|---|---|
| **Equipment Installation** | | | | | | |
| Truck, Pickup | 939 | Equipment and power unit costs. Labor not included. | Hour | $21.79 | 4 | $87.16 |
| Chemical, ground application | 948 | Chemical application performed by ground equipment. Includes equipment, power unit and labor costs. | Acre | $6.13 | 1 | $6.13 |
| Seeding Operation, No Till/Grass Drill | 960 | No Till drill or grass drill for seeding. Includes equipment, power unit and labor costs. | Acre | $21.36 | 1 | $21.36 |
| **Labor** | | | | | | |
| Skilled Labor | 230 | Labor requiring a high level skill set: Includes carpenters, welders, electricians, conservation professionals involved with data collection, monitoring, and or record keeping, etc. | Hour | $41.76 | 3 | $125.28 |
| 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 | $25.31 | 32 | $809.92 |
| **Materials** | | | | | | |
| Herbicide, Imazapyr | 336 | Pre and post-emergent, non-selective herbicide for control of undesirable vegetation in non-crop areas. Refer to WIN-PST for product names and active ingredients. Includes materials and shipping only. | Acre | $37.13 | 1 | $37.13 |
| Herbicide, Diquat dibromide | 1820 | Aquatic herbicide and plant growth regulator. Refer to WIN-PST for product names and active ingredients. Includes materials and shipping only. | Gallon | $113.80 | 1 | $113.80 |
| Native Aquatic Plants, Emergent or Submerged | 2336 | Native aquatic emergent or submerged. All required materials for establishing vegetation. Includes material and shipping. | Each | $1.33 | 1000 | $1,330.00 |
| Specialized native grass and forb mix | 2619 | A mix of native grass and forbs to be used for specialized purposes such as wildlife (including pollinators) or ecosystem restoration, requiring species not readility available and/or difficult to produce and harvest. Includes material and shipping only | Acre | $998.71 | 1 | $998.71 |
| **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 | $172.07 | 1 | $172.07 |

**Practice:** E449114Z1 - Advanced IWM--Soil moisture is monitored, recorded, and used in decision making

**Scenario** #1 - Advanced IWM-soil moisture

**Scenario Description:**

Advanced irrigation water management using soil moisture monitoring (one sensor per 40 acres or more) with data loggers. Record keeping is such that a daily water balance is calculated, and future irrigations forecast.

**Before Situation:**

Resources are protected at the minimum level of the Conservation Practice Standard (CPS) 449 - Irrigation Water Management

**After Situation:**

The adoption of this enhancement will provide resource protection above the minimum level as described in Conservation Practice Standard (CPS) 449 - Irrigation Water Management

**Feature Measure:** Acre

**Scenario Unit::** Acre

**Scenario Typical Size:** 80.0

**Scenario Total Cost:** $4,716.71

**Scenario Cost/Unit:** $58.96

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 | $41.76 | 40 | $1,670.40 |
| 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 | $25.31 | 10 | $253.10 |
| Specialist Labor | 235 | Labor requiring a specialized skill set: Includes Agronomists, Foresters, Biologists, etc. to provide additional technical information during the planning and implementation of the practice. Does not include NRCS or TSP services. | Hour | $110.71 | 6 | $664.26 |
| **Materials** | | | | | | |
| 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 | $449.51 | 1 | $449.51 |
| 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 |

**Practice:** E449114Z2 - Advanced IWM--Weather is monitored, recorded and used in decision making

**Scenario** #1 - Advanced IWM-weather

**Scenario Description:**

Advanced irrigation water management using on-site weather measurements to calculate real-time evapotranspiration and forecast future water use by plants. Record keeping is such that a daily water balance is calculated and future irrigations forecast.

**Before Situation:**

Resources are protected at the minimum level of the Conservation Practice Standard (CPS) 449 - Irrigation Water Management

**After Situation:**

The adoption of this enhancement will provide resource protection above the minimum level as described in Conservation Practice Standard (CPS) 449 - Irrigation Water Management

**Feature Measure:** Acre

**Scenario Unit::** Acre

**Scenario Typical Size:** 80.0

**Scenario Total Cost:** $5,244.46

**Scenario Cost/Unit:** $65.56

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 | $25.31 | 20 | $506.20 |
| 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 | $110.71 | 4 | $442.84 |
| **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 incl | Each | $460.51 | 1 | $460.51 |
| 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 | $655.75 | 1 | $655.75 |
| 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 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 | 2 | $73.48 |
| Weather Station, Advanced | 2550 | Advance Weather Station which collects and records recording rainfall, humidity, barometric pressure, wind speed, temperature, and solar radiation from a solar powered self-standing tripod to an advance weather recording console. Used for both 449 advance | Each | $1,070.10 | 1 | $1,070.10 |
| **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 | $70.64 | 1 | $70.64 |

**Practice:** E449114Z3 - Complete pumping plant eval for all pumps on a farm to determine the VFD potential

**Scenario** #1 - Pumping plant evaluation for VFD

**Scenario Description:**

On branching systems, or pumps that service multiple fields, or multiple pumps, install a Variable Frequency Drive motor controller(s) if recommended in the pump test and the simple payback in terms of energy savings is less than 10 years.

**Before Situation:**

Resources are protected at the minimum level of the Conservation Practice Standard (CPS) 449 - Irrigation Water Management

**After Situation:**

The adoption of this enhancement will provide resource protection above the minimum level as described in Conservation Practice Standard (CPS) 449 - Irrigation Water Management

**Feature Measure:** Acre

**Scenario Unit::** Acre

**Scenario Typical Size:** 640.0

**Scenario Total Cost:** $3,496.69

**Scenario Cost/Unit:** $5.46

Cost Details:

| Component Name | ID | Description | Unit | Cost | QTY | Total |
|---|---|---|---|---|---|---|
| **Labor** | | | | | | |
| CAP Labor, professional engineer | 1297 | Conservation Activity Plan labor to apply knowledge of engineering technology and biological science to agricultural problems concerned with power and machinery, electrification, structures, soil and water conservation, and processing of agricultural prod | Hour | $88.79 | 35 | $3,107.65 |
| 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 | $31.84 | 10 | $318.40 |
| **Mobilization** | | | | | | |
| Mobilization, very small equipment | 1137 | Equipment that is small enough to be transported by a pick-up truck with typical weights less than 3,500 pounds. Can be multiple pieces of equipment if all hauled simultaneously. | Each | $70.64 | 1 | $70.64 |

**Practice:** E449114Z4 - Intermittent flooding of rice fields

**Scenario** #1 - Intermittent flooding of rice fields

**Scenario Description:**
Rice fields are drained and allowed to "dry down" to a saturated soil condition prior to re-flooding the field

**Before Situation:**
Resources are protected at the minimum level of the Conservation Practice Standard (CPS) 449 - Irrigation Water Management

**After Situation:**
The adoption of this enhancement will provide resource protection above the minimum level as described in Conservation Practice Standard (CPS) 449 - Irrigation Water Management

**Feature Measure:** acre

**Scenario Unit::** Acre

**Scenario Typical Size:** 40.0

**Scenario Total Cost:** $3,140.42

**Scenario Cost/Unit:** $78.51

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 | $25.31 | 40 | $1,012.40 |
| 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 | $45.69 | 6 | $274.14 |
| **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 |

**Practice:** E449144Z - Complete pumping plant evaluation for all pumps on a farm.

**Scenario** #1 - Pumping plant evaluation

**Scenario Description:**
Rehabilitate/replace/reconfigure all pumps that have the potential to perform 10% more efficiently as identified in the pump test.

**Before Situation:**
Resources are protected at the minimum level of the Conservation Practice Standard (CPS) 449 - Irrigation Water Management

**After Situation:**
The adoption of this enhancement will provide resource protection above the minimum level as described in Conservation Practice Standard (CPS) 449 - Irrigation Water Management

**Feature Measure:** Acre

**Scenario Unit::** Acre

**Scenario Typical Size:** 640.0

**Scenario Total Cost:** $3,496.69

**Scenario Cost/Unit:** $5.46

Cost Details:

| Component Name | ID | Description | Unit | Cost | QTY | Total |
|---|---|---|---|---|---|---|
| **Labor** | | | | | | |
| CAP Labor, professional engineer | 1297 | Conservation Activity Plan labor to apply knowledge of engineering technology and biological science to agricultural problems concerned with power and machinery, electrification, structures, soil and water conservation, and processing of agricultural prod | Hour | $88.79 | 35 | $3,107.65 |
| 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 | $31.84 | 10 | $318.40 |
| **Mobilization** | | | | | | |
| Mobilization, very small equipment | 1137 | Equipment that is small enough to be transported by a pick-up truck with typical weights less than 3,500 pounds. Can be multiple pieces of equipment if all hauled simultaneously. | Each | $70.64 | 1 | $70.64 |

**Practice:** E472118Z - Manage livestock access to streams/ditches/other waterbodies to reduce nutrients in surface water

**Scenario** #1 - Livestock access to waterbody-nutrients

**Scenario Description:**

Installation of structures and implementation of grazing management actions that restrict livestock access to streams, ditches, and other waterbodies in order to reduce nutrient loading to surface waters.

**Before Situation:**

Resources are protected at the minimum level of the Conservation Practice Standard (CPS) 472 - Access Control

**After Situation:**

The adoption of this enhancement will provide resource protection above the minimum level as described in Conservation Practice Standard (CPS) 472 - Access Control

**Feature Measure:** (Stream length protected * 2) + ((C

**Scenario Unit::** Foot

**Scenario Typical Size:** 1,320.0

**Scenario Total Cost:** $3,091.74

**Scenario Cost/Unit:** $2.34

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 | $7.31 | 5 | $36.55 |
| Truck, Pickup | 939 | Equipment and power unit costs. Labor not included. | Hour | $21.79 | 5 | $108.95 |
| Tractor, agricultural, 60 HP | 963 | Agricultural tractor with horsepower range of 50 to 90. Equipment and power unit costs. Labor not included. | Hour | $24.77 | 5 | $123.85 |
| **Labor** | | | | | | |
| General Labor | 231 | Labor performed using basic tools such as power tool, shovels, and other tools that do not require extensive training. Ex. pipe layer, herder, concrete placement, materials spreader, flagger, etc. | Hour | $25.31 | 33 | $835.23 |
| Equipment Operators, Light | 232 | Includes: Skid Steer Loaders, Hydraulic Excavators <50 HP, Trenchers <12", Ag Equipment <150 HP, Pickup Trucks, Forklifts, Mulchers | Hour | $25.23 | 5 | $126.15 |
| **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 |
| 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 | 20 | $125.20 |
| 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, Steel T, 1.33 lbs, 6' | 15 | Steel Post, Studded 6' - 1.33 lb. Includes materials and shipping only. | Each | $6.68 | 90 | $601.20 |
| Fence, Wire Assembly, Barbed Wire | 30 | Brace pins, battens, clips, staples. Includes materials and shipping only. | Foot | $0.17 | 1320 | $224.40 |
| Gate, Pipe, 12' | 1057 | 6 rail tube gate, 16 gauge. Includes materials and shipping only. | Each | $166.29 | 2 | $332.58 |
| **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 | $172.07 | 1 | $172.07 |

**Practice:** E472122Z - Manage livestock access to streams/ditches/other waterbodies to reduce pathogens in surface water

**Scenario** #1 - Livestock access to waterbody-pathogens

**Scenario Description:**

Installation of structures and implementation of grazing management actions that restrict livestock access to streams, ditches, and other waterbodies in order to reduce the introduction of pathogens to surface waters.

**Before Situation:**

Resources are protected at the minimum level of the Conservation Practice Standard (CPS) 472 - Access Control

**After Situation:**

The adoption of this enhancement will provide resource protection above the minimum level as described in Conservation Practice Standard (CPS) 472 - Access Control

**Feature Measure:** (Stream length protected * 2) + ((C

**Scenario Unit::** Foot

**Scenario Typical Size:** 1,320.0

**Scenario Total Cost:** $3,091.74

**Scenario Cost/Unit:** $2.34

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 | $7.31 | 5 | $36.55 |
| Truck, Pickup | 939 | Equipment and power unit costs. Labor not included. | Hour | $21.79 | 5 | $108.95 |
| Tractor, agricultural, 60 HP | 963 | Agricultural tractor with horsepower range of 50 to 90. Equipment and power unit costs. Labor not included. | Hour | $24.77 | 5 | $123.85 |
| **Labor** | | | | | | |
| General Labor | 231 | Labor performed using basic tools such as power tool, shovels, and other tools that do not require extensive training. Ex. pipe layer, herder, concrete placement, materials spreader, flagger, etc. | Hour | $25.31 | 33 | $835.23 |
| Equipment Operators, Light | 232 | Includes: Skid Steer Loaders, Hydraulic Excavators <50 HP, Trenchers <12", Ag Equipment <150 HP, Pickup Trucks, Forklifts, Mulchers | Hour | $25.23 | 5 | $126.15 |
| **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 |
| 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 | 20 | $125.20 |
| 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, Steel T, 1.33 lbs, 6' | 15 | Steel Post, Studded 6' - 1.33 lb. Includes materials and shipping only. | Each | $6.68 | 90 | $601.20 |
| Fence, Wire Assembly, Barbed Wire | 30 | Brace pins, battens, clips, staples. Includes materials and shipping only. | Foot | $0.17 | 1320 | $224.40 |
| Gate, Pipe, 12' | 1057 | 6 rail tube gate, 16 gauge. Includes materials and shipping only. | Each | $166.29 | 2 | $332.58 |
| **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 | $172.07 | 1 | $172.07 |

**Practice:** E484106Z - Mulching to improve soil health

**Scenario** #1 - Mulching to improve soil health

**Scenario Description:**

Implement a crop rotation which utilizes mulch and addresses all four principle components of soil health: increases diversity of the cropping system; maintains residue throughout the year; keeps a living root; and minimizes soil chemical, physical and biological disturbance. Plant-based mulching materials will be applied at least once during the rotation. The rotation will include at least 4 different crop and/or cover crop types (crop types include cool season grass, warm season grass, cool season broadleaf, warm season broadleaf) grown in a sequence that will produce a positive trend in the Organic Matter (OM) subfactor value over the life of the rotation, as determined by the Soil Conditioning Index (SCI). RUSLE2 or WEPS must be used to document the rotation and SCI calculations.

**Before Situation:**

Resources are protected at the minimum level of the Conservation Practice Standard (CPS) 484 - Mulching

**After Situation:**

The adoption of this enhancement will provide resource protection above the minimum level as described in Conservation Practice Standard (CPS) 484 - Mulching

**Feature Measure:** Acre

**Scenario Unit::** Acre

**Scenario Typical Size:** 100.0

**Scenario Total Cost:** $221.42

**Scenario Cost/Unit:** $2.21

Cost Details:

| Component Name | ID | Description | Unit | Cost | QTY | Total |
|---|---|---|---|---|---|---|
| **Labor** | | | | | | |
| Specialist Labor | 235 | Labor requiring a specialized skill set: Includes Agronomists, Foresters, Biologists, etc. to provide additional technical information during the planning and implementation of the practice. Does not include NRCS or TSP services. | Hour | $110.71 | 2 | $221.42 |

**Practice:** E511137Z1 - Harvest of crops (hay or small grains) using measures that allow desired species to flush or escape

**Scenario** #1 - Harvest using wildlife friendly methods

**Scenario Description:**

Harvest of crops (hay or small grains) using conservation measures that allow desired species to flush or escape. <species list State Wildlife Action Plan> Conservation measures include timing of harvest, idling land during the nesting or fawning period, and applying harvest techniques that reduce mortality to wildlife.

**Before Situation:**

Resources are protected at the minimum level of the Conservation Practice Standard (CPS) 511 - Forage Harvest Management

**After Situation:**

The adoption of this enhancement will provide resource protection above the minimum level as described in Conservation Practice Standard (CPS) 511 - Forage Harvest Management

**Feature Measure:** Acre

**Scenario Unit::** Acre

**Scenario Typical Size:** 50.0

**Scenario Total Cost:** $205.15

**Scenario Cost/Unit:** $4.10

Cost Details:

| Component Name | ID | Description | Unit | Cost | QTY | Total |
|---|---|---|---|---|---|---|
| **Foregone Income** | | | | | | |
| FI, Hay, General Grass | 2122 | General Grass Hay is Primary Land Use | Ton | $42.52 | 1.67 | $71.01 |
| **Labor** | | | | | | |
| Skilled Labor | 230 | Labor requiring a high level skill set: Includes carpenters, welders, electricians, conservation professionals involved with data collection, monitoring, and or record keeping, etc. | Hour | $41.76 | 2 | $83.52 |
| General Labor | 231 | Labor performed using basic tools such as power tool, shovels, and other tools that do not require extensive training. Ex. pipe layer, herder, concrete placement, materials spreader, flagger, etc. | Hour | $25.31 | 2 | $50.62 |

**Practice:** E511137Z2 - Forage harvest management that helps maintain or improve wildlife habitat (cover and shelter)

**Scenario** #1 - FHM for cover and shelter

**Scenario Description:**

The timely cutting and removal of forages from the field as hay, green-chop, or ensilage in such as way and time frames so as optimize both forage yield/quality and wildlife cover and shelter.

**Before Situation:**

Resources are protected at the minimum level of the Conservation Practice Standard (CPS) 511 - Forage Harvest Management

**After Situation:**

The adoption of this enhancement will provide resource protection above the minimum level as described in Conservation Practice Standard (CPS) 511 - Forage Harvest Management

**Feature Measure:** Acre

**Scenario Unit::** Acre

**Scenario Typical Size:** 100.0

**Scenario Total Cost:** $461.94

**Scenario Cost/Unit:** $4.62

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 | $16.65 | 25 | $416.25 |
| **Labor** | | | | | | |
| Supervisor or Manager | 234 | Labor involving supervision or management activities. Includes crew supervisors, foremen and farm/ranch managers time required for adopting new technology, etc. | Hour | $45.69 | 1 | $45.69 |

**Practice:** E511139Z1 - Enhanced wildlife habitat on expired grass/legume covered CRP acres

**Scenario** #1 - FHM on expired CRP acres

**Scenario Description:**

Implement a forage management plan focused on wildlife habitat for the benefit of selected wildlife species on expired CRP grass/legume covered acres that have CRP conservation cover. Identify the target wildlife species or suite of species described in need of action within the State Wildlife Action Plan.

**Before Situation:**

Resources are protected at the minimum level of the Conservation Practice Standard (CPS) 511 - Forage Harvest Management

**After Situation:**

The adoption of this enhancement will provide resource protection above the minimum level as described in Conservation Practice Standard (CPS) 511 - Forage Harvest Management

**Feature Measure:** Acre

**Scenario Unit::** Acre

**Scenario Typical Size:** 50.0

**Scenario Total Cost:** $7,347.86

**Scenario Cost/Unit:** $146.96

Cost Details:

| Component Name | ID | Description | Unit | Cost | QTY | Total |
|---|---|---|---|---|---|---|
| **Foregone Income** | | | | | | |
| FI, Hay, General Grass | 2122 | General Grass Hay is Primary Land Use | Ton | $42.52 | 166.5 | $7,079.58 |
| **Labor** | | | | | | |
| Skilled Labor | 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 | $41.76 | 4 | $167.04 |
| 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 | $25.31 | 4 | $101.24 |

**Practice:** E511139Z2 - Forage harvest management that helps maintain wildlife habitat continuity (space)

**Scenario** #1 - FHM for habitat space continuity

**Scenario Description:**

The timely cutting and removal of forages from the field as hay, green-chop, or ensilage in such as way and time frames so as optimize both forage yield/quality and wildlife cover and shelter for habitat and/or continuity between otherwise disconnected habitats.

**Before Situation:**

Resources are protected at the minimum level of the Conservation Practice Standard (CPS) 511 - Forage Harvest Management

**After Situation:**

The adoption of this enhancement will provide resource protection above the minimum level as described in Conservation Practice Standard (CPS) 511 - Forage Harvest Management

**Feature Measure:** Acre

**Scenario Unit::** Acre

**Scenario Typical Size:** 50.0

**Scenario Total Cost:** $205.15

**Scenario Cost/Unit:** $4.10

Cost Details:

| Component Name | ID | Description | Unit | Cost | QTY | Total |
|---|---|---|---|---|---|---|
| **Foregone Income** | | | | | | |
| FI, Hay, General Grass | 2122 | General Grass Hay is Primary Land Use | Ton | $42.52 | 1.67 | $71.01 |
| **Labor** | | | | | | |
| Skilled Labor | 230 | Labor requiring a high level skill set: Includes carpenters, welders, electricians, conservation professionals involved with data collection, monitoring, and or record keeping, etc. | Hour | $41.76 | 2 | $83.52 |
| General Labor | 231 | Labor performed using basic tools such as power tool, shovels, and other tools that do not require extensive training. Ex. pipe layer, herder, concrete placement, materials spreader, flagger, etc. | Hour | $25.31 | 2 | $50.62 |

**Practice:** E512101Z1 - Cropland conversion to grass-based agriculture to reduce water erosion

**Scenario** #1 - Convert crop to grass for water erosion

**Scenario Description:**

Conversion of cropped land to grass-based agriculture. Mixtures of perennial grasses, forbs, and/or legume species are established on cropland where annually-seeded cash crops have been grown.

**Before Situation:**

Resources are protected at the minimum level of the Conservation Practice Standard (CPS) 512 - Forage and Biomass Planting

**After Situation:**

The adoption of this enhancement will provide resource protection above the minimum level as described in Conservation Practice Standard (CPS) 512 - Forage and Biomass Planting

**Feature Measure:** Acre

**Scenario Unit::** Acre

**Scenario Typical Size:** 100.0

**Scenario Total Cost:** $508.38

**Scenario Cost/Unit:** $5.08

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 | $45.69 | 2 | $91.38 |
| **Materials** | | | | | | |
| 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 | $20.85 | 20 | $417.00 |

**Practice:** E512101Z2 - Forage and biomass planting for water erosion to improve soil health

**Scenario** #1 - Forage planting for SH

**Scenario Description:**

Establishing adapted and/or compatible species, varieties, or cultivars of herbaceous species suitable for pasture, hay, or biomass production that can provide for reduced soil erosion, improving soil health.

**Before Situation:**

Resources are protected at the minimum level of the Conservation Practice Standard (CPS) 512 - Forage and Biomass Planting

**After Situation:**

The adoption of this enhancement will provide resource protection above the minimum level as described in Conservation Practice Standard (CPS) 512 - Forage and Biomass Planting

**Feature Measure:** Acre

**Scenario Unit::** Acre

**Scenario Typical Size:** 100.0

**Scenario Total Cost:** $1,472.58

**Scenario Cost/Unit:** $14.73

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 | $45.69 | 2 | $91.38 |
| **Materials** | | | | | | |
| One Species, Warm Season, Native Perennial Grass | 2322 | Native, warm season perennial grass. Includes material and shipping only. | Acre | $69.06 | 20 | $1,381.20 |

**Practice:** E512102Z - Cropland conversion to grass-based agriculture to reduce wind erosion

**Scenario** #1 - Convert crop to grass for wind erosion

**Scenario Description:**

Conversion of cropped land to grass-based agriculture. Mixtures of perennial grasses, forbs, and/or legume species are established on cropland where annually-seeded cash crops have been grown.

**Before Situation:**

Resources are protected at the minimum level of the Conservation Practice Standard (CPS) 512 - Forage and Biomass Planting

**After Situation:**

The adoption of this enhancement will provide resource protection above the minimum level as described in Conservation Practice Standard (CPS) 512 - Forage and Biomass Planting

**Feature Measure:** Acre

**Scenario Unit::** Acre

**Scenario Typical Size:** 100.0

**Scenario Total Cost:** $1,121.49

**Scenario Cost/Unit:** $11.21

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 | $45.69 | 1 | $45.69 |
| **Materials** | | | | | | |
| Three plus Species Mix, Warm Season, Native Perennial | 2327 | Native, warm season perennial grass. Includes material and shipping only. | Acre | $215.16 | 5 | $1,075.80 |

**Practice:** E512106Z1 - Cropland conversion to grass-based agriculture for soil organic matter improvement

**Scenario** #1 - Convert crop to grass for SOM

**Scenario Description:**

Conversion of cropped land to grass-based agriculture. Mixtures of perennial grasses, forbs, and/or legume species are established on cropland where annually-seeded cash crops have been grown.

**Before Situation:**

Resources are protected at the minimum level of the Conservation Practice Standard (CPS) 512 - Forage and Biomass Planting

**After Situation:**

The adoption of this enhancement will provide resource protection above the minimum level as described in Conservation Practice Standard (CPS) 512 - Forage and Biomass Planting

**Feature Measure:** Acre

**Scenario Unit::** Acre

**Scenario Typical Size:** 100.0

**Scenario Total Cost:** $1,460.26

**Scenario Cost/Unit:** $14.60

Cost Details:

| Component Name | ID | Description | Unit | Cost | QTY | Total |
|---|---|---|---|---|---|---|
| **Labor** | | | | | | |
| General Labor | 231 | Labor performed using basic tools such as power tool, shovels, and other tools that do not require extensive training. Ex. pipe layer, herder, concrete placement, materials spreader, flagger, etc. | Hour | $25.31 | 2 | $50.62 |
| Specialist Labor | 235 | Labor requiring a specialized skill set: Includes 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 | $110.71 | 4 | $442.84 |
| **Materials** | | | | | | |
| Four Species Mix, Cool Season, Introduced Perennial (2 grasses, 2 legumes) | 2317 | Cool season grass and legume mix. Includes material and shipping only. | Acre | $48.34 | 20 | $966.80 |

**Practice:** E512106Z2 - Forage plantings that can help increase organic matter in depleted soils

**Scenario** #1 - Forage planting for SOM

**Scenario Description:**

Establishing adapted and/or compatible species, varieties, or cultivars of herbaceous species suitable for pasture, hay, or biomass production that can help improve soil quality of depleted sites through increase or conservation of the organic matter in the soil.

**Before Situation:**

Resources are protected at the minimum level of the Conservation Practice Standard (CPS) 512 - Forage and Biomass Planting

**After Situation:**

The adoption of this enhancement will provide resource protection above the minimum level as described in Conservation Practice Standard (CPS) 512 - Forage and Biomass Planting

**Feature Measure:** Acre

**Scenario Unit::** Acre

**Scenario Typical Size:** 100.0

**Scenario Total Cost:** $1,474.43

**Scenario Cost/Unit:** $14.74

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 | $16.65 | 25 | $416.25 |
| **Labor** | | | | | | |
| Supervisor or Manager | 234 | Labor involving supervision or management activities. Includes crew supervisors, foremen and farm/ranch managers time required for adopting new technology, etc. | Hour | $45.69 | 2 | $91.38 |
| **Materials** | | | | | | |
| Four Species Mix, Cool Season, Introduced Perennial (2 grasses, 2 legumes) | 2317 | Cool season grass and legume mix. Includes material and shipping only. | Acre | $48.34 | 20 | $966.80 |

**Practice:** E512126Z - Cropland conversion to grass-based agriculture to reduce sediment loading

**Scenario** #1 - Convert crop to grass-reduce sed loading

**Scenario Description:**

Conversion of cropped land to grass-based agriculture. Mixtures of perennial grasses, forbs, and/or legume species are established on cropland where annually-seeded cash crops have been grown.

**Before Situation:**

Resources are protected at the minimum level of the Conservation Practice Standard (CPS) 512 - Forage and Biomass Planting

**After Situation:**

The adoption of this enhancement will provide resource protection above the minimum level as described in Conservation Practice Standard (CPS) 512 - Forage and Biomass Planting

**Feature Measure:** Acre

**Scenario Unit::** Acre

**Scenario Typical Size:** 100.0

**Scenario Total Cost:** $1,236.29

**Scenario Cost/Unit:** $12.36

Cost Details:

| Component Name | ID | Description | Unit | Cost | QTY | Total |
|---|---|---|---|---|---|---|
| **Labor** | | | | | | |
| Supervisor or Manager | 234 | Labor involving supervision or management activities. Includes crew supervisors, foremen and farm/ranch managers time required for adopting new technology, etc. | Hour | $45.69 | 1 | $45.69 |
| **Materials** | | | | | | |
| Three Species Mix, Warm Season, Annual Grasses and Legumes | 2326 | Warm season annual grass and legume mix. Includes material and shipping only. | Acre | $59.53 | 20 | $1,190.60 |

**Practice:** E512132Z1 - Forage and biomass planting that produces feedstock for biofuels or energy production

**Scenario** #1 - Forage planting for feedstocks

**Scenario Description:**

Conversion of cropped land to grass-based agriculture. Mixtures of perennial grasses, forbs, and/or legume species are established on cropland where annually-seeded cash crops have been grown.

**Before Situation:**

Resources are protected at the minimum level of the Conservation Practice Standard (CPS) 512 - Forage and Biomass Planting

**After Situation:**

The adoption of this enhancement will provide resource protection above the minimum level as described in Conservation Practice Standard (CPS) 512 - Forage and Biomass Planting

**Feature Measure:** Acre

**Scenario Unit::** Acre

**Scenario Typical Size:** 100.0

**Scenario Total Cost:** $3,674.42

**Scenario Cost/Unit:** $36.74

Cost Details:

| Component Name | ID | Description | Unit | Cost | QTY | Total |
|---|---|---|---|---|---|---|
| **Labor** | | | | | | |
| Specialist Labor | 235 | Labor requiring a specialized skill set: Includes Agronomists, Foresters, Biologists, etc. to provide additional technical information during the planning and implementation of the practice. Does not include NRCS or TSP services. | Hour | $110.71 | 2 | $221.42 |
| **Materials** | | | | | | |
| One Species, Warm Season, Native Perennial Grass | 2322 | Native, warm season perennial grass. Includes material and shipping only. | Acre | $69.06 | 50 | $3,453.00 |

**Practice:** E512132Z2 - Native grasses or legumes in forage base to improve plant productivity and health

**Scenario** #1 - Native grasses/legumes-plant health

**Scenario Description:**

Establishing adapted and/or compatible species, varieties, or cultivars of perennial, herbaceous species that can provide the structure and composition needed to enhance livestock and wildlife habitat, particularly when targeted forage supply and quality, cover, and shelter are not available in other pastures.

**Before Situation:**

Resources are protected at the minimum level of the Conservation Practice Standard (CPS) 512 - Forage and Biomass Planting

**After Situation:**

The adoption of this enhancement will provide resource protection above the minimum level as described in Conservation Practice Standard (CPS) 512 - Forage and Biomass Planting

**Feature Measure:** Acre

**Scenario Unit::** Acre

**Scenario Typical Size:** 100.0

**Scenario Total Cost:** $2,176.91

**Scenario Cost/Unit:** $21.77

Cost Details:

| Component Name | ID | Description | Unit | Cost | QTY | Total |
|---|---|---|---|---|---|---|
| **Labor** | | | | | | |
| General Labor | 231 | Labor performed using basic tools such as power tool, shovels, and other tools that do not require extensive training. Ex. pipe layer, herder, concrete placement, materials spreader, flagger, etc. | Hour | $25.31 | 1 | $25.31 |
| **Materials** | | | | | | |
| Three plus Species Mix, Warm Season, Native Perennial | 2327 | Native, warm season perennial grass. Includes material and shipping only. | Acre | $215.16 | 10 | $2,151.60 |

**Practice:** E512133Z1 - Native grasses or legumes in forage base to improve plant community structure and composition

**Scenario** #1 - Native grasses/legumes-structure/comp

**Scenario Description:**

Establishing adapted and/or compatible species, varieties, or cultivars of perennial, herbaceous species that can provide the structure and composition needed to enhance livestock and wildlife habitat, particularly when targeted forage supply and quality, cover, and shelter are not available in other pastures.

**Before Situation:**

Resources are protected at the minimum level of the Conservation Practice Standard (CPS) 512 - Forage and Biomass Planting

**After Situation:**

The adoption of this enhancement will provide resource protection above the minimum level as described in Conservation Practice Standard (CPS) 512 - Forage and Biomass Planting

**Feature Measure:** Acre

**Scenario Unit::** Acre

**Scenario Typical Size:** 100.0

**Scenario Total Cost:** $5,600.42

**Scenario Cost/Unit:** $56.00

Cost Details:

| Component Name | ID | Description | Unit | Cost | QTY | Total |
|---|---|---|---|---|---|---|
| **Labor** | | | | | | |
| Specialist Labor | 235 | Labor requiring a specialized skill set: Includes Agronomists, Foresters, Biologists, etc. to provide additional technical information during the planning and implementation of the practice. Does not include NRCS or TSP services. | Hour | $110.71 | 2 | $221.42 |
| **Materials** | | | | | | |
| Three plus Species Mix, Warm Season, Native Perennial | 2327 | Native, warm season perennial grass. Includes material and shipping only. | Acre | $215.16 | 25 | $5,379.00 |

**Practice:** E512133Z2 - Forage plantings that enhance bird habitat (structure and composition)

**Scenario** #1 - Forage planting for structure/comp

**Scenario Description:**

Establishing adapted and/or compatible species, varieties, or cultivars of herbaceous species suitable for pasture, hay, or biomass production that can provide cover and shelter components of bird habitat.

**Before Situation:**

Resources are protected at the minimum level of the Conservation Practice Standard (CPS) 512 - Forage and Biomass Planting

**After Situation:**

The adoption of this enhancement will provide resource protection above the minimum level as described in Conservation Practice Standard (CPS) 512 - Forage and Biomass Planting

**Feature Measure:** Acre

**Scenario Unit::** Acre

**Scenario Typical Size:** 100.0

**Scenario Total Cost:** $7,524.62

**Scenario Cost/Unit:** $75.25

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 | $41.76 | 2 | $83.52 |
| **Materials** | | | | | | |
| One Species, Warm Season, Native Perennial Grass | 2322 | Native, warm season perennial grass. Includes material and shipping only. | Acre | $69.06 | 25 | $1,726.50 |
| Three Species Mix, Native Forb | 2333 | Native forb mix. Includes material and shipping only. | Acre | $571.46 | 10 | $5,714.60 |

**Practice:** E512136Z1 - Establish pollinator and/or beneficial insect food habitat

**Scenario** #1 - Establish pollinator habitat-food

**Scenario Description:**

Establishing adapted and/or compatible species, varieties, or cultivars of herbaceous species that can provide nectar for pollinators and forage and other habitat values for wildlife and livestock, particularly at times when targeted nectar, forage supply and quality, cover, and shelter are not available in other pastures.

**Before Situation:**

Resources are protected at the minimum level of the Conservation Practice Standard (CPS) 512 - Forage and Biomass Planting

**After Situation:**

The adoption of this enhancement will provide resource protection above the minimum level as described in Conservation Practice Standard (CPS) 512 - Forage and Biomass Planting

**Feature Measure:** Acre

**Scenario Unit::** Acre

**Scenario Typical Size:** 100.0

**Scenario Total Cost:** $5,825.31

**Scenario Cost/Unit:** $58.25

Cost Details:

| Component Name | ID | Description | Unit | Cost | QTY | Total |
|---|---|---|---|---|---|---|
| **Labor** | | | | | | |
| Specialist Labor | 235 | Labor requiring a specialized skill set: Includes Agronomists, Foresters, Biologists, etc. to provide additional technical information during the planning and implementation of the practice. Does not include NRCS or TSP services. | Hour | $110.71 | 1 | $110.71 |
| **Materials** | | | | | | |
| Three Species Mix, Native Forb | 2333 | Native forb mix. Includes material and shipping only. | Acre | $571.46 | 10 | $5,714.60 |

**Practice:** E512136Z2 - Native grass or legumes in forage base to provide wildlife food

**Scenario** #1 - Native grasses/legumes-wildlife food

**Scenario Description:**

Establishing adapted and/or compatible species, varieties, or cultivars of perennial, herbaceous species that can provide the structure and composition needed to enhance livestock and wildlife habitat, particularly when targeted forage supply and quality, cover, and shelter are not available in other pastures.

**Before Situation:**

Resources are protected at the minimum level of the Conservation Practice Standard (CPS) 512 - Forage and Biomass Planting

**After Situation:**

The adoption of this enhancement will provide resource protection above the minimum level as described in Conservation Practice Standard (CPS) 512 - Forage and Biomass Planting

**Feature Measure:** Acre

**Scenario Unit::** Acre

**Scenario Typical Size:** 100.0

**Scenario Total Cost:** $5,825.31

**Scenario Cost/Unit:** $58.25

Cost Details:

| Component Name | ID | Description | Unit | Cost | QTY | Total |
|---|---|---|---|---|---|---|
| **Labor** | | | | | | |
| Specialist Labor | 235 | Labor requiring a specialized skill set: Includes Agronomists, Foresters, Biologists, etc. to provide additional technical information during the planning and implementation of the practice. Does not include NRCS or TSP services. | Hour | $110.71 | 1 | $110.71 |
| **Materials** | | | | | | |
| Three Species Mix, Native Forb | 2333 | Native forb mix. Includes material and shipping only. | Acre | $571.46 | 10 | $5,714.60 |

**Practice:** E512137Z - Forage plantings that enhance bird habitat (cover and shelter)

**Scenario** #1 - Forage planting for cover and shelter

**Scenario Description:**

Establishing adapted and/or compatible species, varieties, or cultivars of herbaceous species suitable for pasture, hay, or biomass production that can provide cover and shelter components of bird habitat.

**Before Situation:**

Resources are protected at the minimum level of the Conservation Practice Standard (CPS) 512 - Forage and Biomass Planting

**After Situation:**

The adoption of this enhancement will provide resource protection above the minimum level as described in Conservation Practice Standard (CPS) 512 - Forage and Biomass Planting

**Feature Measure:** Acre

**Scenario Unit::** Acre

**Scenario Typical Size:** 100.0

**Scenario Total Cost:** $7,524.62

**Scenario Cost/Unit:** $75.25

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 | $41.76 | 2 | $83.52 |
| **Materials** | | | | | | |
| One Species, Warm Season, Native Perennial Grass | 2322 | Native, warm season perennial grass. Includes material and shipping only. | Acre | $69.06 | 25 | $1,726.50 |
| Three Species Mix, Native Forb | 2333 | Native forb mix. Includes material and shipping only. | Acre | $571.46 | 10 | $5,714.60 |

**Practice:** E512138Z - Establish wildlife corridors to enhance access to water

**Scenario** #1 - Corridors for water access

**Scenario Description:**

Establishing adapted and/or compatible species, varieties, or cultivars of perennial, herbaceous species that can provide cover needed for wildlife species of concern to move from food/cover/water sources to other food/cover/water sources as needed for their life cycles, and/or to enhance the utility of underused wildlife habitat areas.

**Before Situation:**

Resources are protected at the minimum level of the Conservation Practice Standard (CPS) 512 - Forage and Biomass Planting

**After Situation:**

The adoption of this enhancement will provide resource protection above the minimum level as described in Conservation Practice Standard (CPS) 512 - Forage and Biomass Planting

**Feature Measure:** Acre

**Scenario Unit::** Acre

**Scenario Typical Size:** 100.0

**Scenario Total Cost:** $2,659.23

**Scenario Cost/Unit:** $26.59

Cost Details:

| Component Name | ID | Description | Unit | Cost | QTY | Total |
|---|---|---|---|---|---|---|
| **Foregone Income** | | | | | | |
| FI, Grazing AUMs | 2079 | Grazing is the Primary Land Use | Animal Unit Month | $16.65 | 25 | $416.25 |
| **Labor** | | | | | | |
| Supervisor or Manager | 234 | Labor involving supervision or management activities. Includes crew supervisors, foremen and farm/ranch managers time required for adopting new technology, etc. | Hour | $45.69 | 2 | $91.38 |
| **Materials** | | | | | | |
| Three plus Species Mix, Warm Season, Native Perennial | 2327 | Native, warm season perennial grass. Includes material and shipping only. | Acre | $215.16 | 10 | $2,151.60 |

**Practice:** E512139Z1 - Establish wildlife corridors to provide habitat continuity

**Scenario** #1 - Corridors for habitat continuity

**Scenario Description:**

Establishing adapted and/or compatible species, varieties, or cultivars of perennial, herbaceous species that can provide cover needed for wildlife species of concern to move from food/cover/water sources to other food/cover/water sources as needed for their life cycles, and/or to enhance the utility of underused wildlife habitat areas.

**Before Situation:**

Resources are protected at the minimum level of the Conservation Practice Standard (CPS) 512 - Forage and Biomass Planting

**After Situation:**

The adoption of this enhancement will provide resource protection above the minimum level as described in Conservation Practice Standard (CPS) 512 - Forage and Biomass Planting

**Feature Measure:** Acre

**Scenario Unit::** Acre

**Scenario Typical Size:** 100.0

**Scenario Total Cost:** $2,531.70

**Scenario Cost/Unit:** $25.32

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 | $21.36 | 10 | $213.60 |
| **Foregone Income** | | | | | | |
| FI, Grazing AUMs | 2079 | Grazing is the Primary Land Use | Animal Unit Month | $16.65 | 10 | $166.50 |
| **Materials** | | | | | | |
| Three plus Species Mix, Warm Season, Native Perennial | 2327 | Native, warm season perennial grass. Includes material and shipping only. | Acre | $215.16 | 10 | $2,151.60 |

**Practice:** E512139Z2 - Establish pollinator and/or beneficial insect habitat continuity (space)

**Scenario** #1 - Establish pollinator habitat-space

**Scenario Description:**

Establishing adapted and/or compatible species, varieties, or cultivars of herbaceous species that can provide nectar for pollinators and forage and other habitat values for wildlife and livestock, particularly at times when targeted nectar, forage supply and quality, cover, and shelter are not available in other pastures.

**Before Situation:**

Resources are protected at the minimum level of the Conservation Practice Standard (CPS) 512 - Forage and Biomass Planting

**After Situation:**

The adoption of this enhancement will provide resource protection above the minimum level as described in Conservation Practice Standard (CPS) 512 - Forage and Biomass Planting

**Feature Measure:** Acre

**Scenario Unit::** Acre

**Scenario Typical Size:** 100.0

**Scenario Total Cost:** $5,936.02

**Scenario Cost/Unit:** $59.36

Cost Details:

| Component Name | ID | Description | Unit | Cost | QTY | Total |
|---|---|---|---|---|---|---|
| **Labor** | | | | | | |
| Specialist Labor | 235 | Labor requiring a specialized skill set: Includes Agronomists, Foresters, Biologists, etc. to provide additional technical information during the planning and implementation of the practice. Does not include NRCS or TSP services. | Hour | $110.71 | 2 | $221.42 |
| **Materials** | | | | | | |
| Three Species Mix, Native Forb | 2333 | Native forb mix. Includes material and shipping only. | Acre | $571.46 | 10 | $5,714.60 |

**Practice:** E512139Z3 - Establish Monarch butterfly habitat in pastures

**Scenario** #1 - Establish Monarch Butterfly Habitat in pastures

**Scenario Description:**

Establishing adapted and/or compatible species, varieties, or cultivars of herbaceous species that can provide nectar for Monarch butterflies and forage and other habitat values for wildlife and livestock, particularly at times when targeted nectar, forage supply and quality, cover, and shelter are not available in other pastures.

**Before Situation:**

Resources are protected at the minimum level of the Conservation Practice Standard (CPS) 512 - Forage and Biomass Planting

**After Situation:**

The adoption of this enhancement will provide resource protection above the minimum level as described in Conservation Practice Standard (CPS) 512 - Forage and Biomass Planting

**Feature Measure:** Acre

**Scenario Unit::** Acre

**Scenario Typical Size:** 100.0

**Scenario Total Cost:** $5,936.02

**Scenario Cost/Unit:** $59.36

Cost Details:

| Component Name | ID | Description | Unit | Cost | QTY | Total |
|---|---|---|---|---|---|---|
| **Labor** | | | | | | |
| Specialist Labor | 235 | Labor requiring a specialized skill set: Includes Agronomists, Foresters, Biologists, etc. to provide additional technical information during the planning and implementation of the practice. Does not include NRCS or TSP services. | Hour | $110.71 | 2 | $221.42 |
| **Materials** | | | | | | |
| Three Species Mix, Native Forb | 2333 | Native forb mix. Includes material and shipping only. | Acre | $571.46 | 10 | $5,714.60 |

**Practice:** E512140Z - Native grasses or legumes in forage base

**Scenario** #1 - Native grasses or legumes in forage base

**Scenario Description:**

Establishing adapted and/or compatible species, varieties, or cultivars of perennial, herbaceous species that can provide the structure and composition needed to enhance livestock and wildlife habitat, particularly when targeted forage supply and quality, cover, and shelter are not available in other pastures.

**Before Situation:**

Resources are protected at the minimum level of the Conservation Practice Standard (CPS) 512 - Forage and Biomass Planting

**After Situation:**

The adoption of this enhancement will provide resource protection above the minimum level as described in Conservation Practice Standard (CPS) 512 - Forage and Biomass Planting

**Feature Measure:** Acre

**Scenario Unit::** Acre

**Scenario Typical Size:** 100.0

**Scenario Total Cost:** $5,470.38

**Scenario Cost/Unit:** $54.70

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 | $45.69 | 2 | $91.38 |
| **Materials** | | | | | | |
| Three plus Species Mix, Warm Season, Native Perennial | 2327 | Native, warm season perennial grass. Includes material and shipping only. | Acre | $215.16 | 25 | $5,379.00 |

**Practice:** E528101Z - Improved grazing management for water erosion through monitoring activities

**Scenario** #1 - Grazing mgmt for water erosion

**Scenario Description:**

Three predominant key grazing areas are evaluated utilizing the Rangeland Health Assessment protocols to determine how well the ecological processes of the site(s) are functioning. Departure from reference categories will be determined, justified, and ratings described for soil and site stability, hydrologic function, and biotic integrity. Utilizing knowledge learned from this as a part of the ranch resource assessment, a Certified Range Management Consultant or Certified Professional in Range Management will provide recommendations or follow-up evaluations toward mitigating some of the degradation risks that are initially identified.

**Before Situation:**

Resources are protected at the minimum level of the Conservation Practice Standard (CPS) 528 - Prescribed Grazing

**After Situation:**

The adoption of this enhancement will provide resource protection above the minimum level as described in Conservation Practice Standard (CPS) 528 - Prescribed Grazing

**Feature Measure:** Acre

**Scenario Unit::** Acre

**Scenario Typical Size:** 1,000.0

**Scenario Total Cost:** $2,054.54

**Scenario Cost/Unit:** $2.05

Cost Details:

| Component Name | ID | Description | Unit | Cost | QTY | Total |
|---|---|---|---|---|---|---|
| **Acquisition of Technical Knowledge** | | | | | | |
| Training, Workshops | 294 | Educational seminar or series of meetings emphasizing interaction and exchange of information among a usually small number of participants. | Each | $63.92 | 1 | $63.92 |
| **Equipment Installation** | | | | | | |
| All terrain vehicles, ATV | 965 | Includes equipment, power unit and labor costs. | Hour | $28.28 | 8 | $226.24 |
| **Labor** | | | | | | |
| General Labor | 231 | Labor performed using basic tools such as power tool, shovels, and other tools that do not require extensive training. Ex. pipe layer, herder, concrete placement, materials spreader, flagger, etc. | Hour | $25.31 | 10 | $253.10 |
| 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 | $45.69 | 4 | $182.76 |
| 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 | $110.71 | 12 | $1,328.52 |

**Practice:** E528104Z - Grazing management that protects sensitive areas from gully erosion

**Scenario** #1 - Grazing mgmt-sensitive areas-erosion

**Scenario Description:**

Grazing management employed will provide cover and density needed in the watershed in order to protect sensitive areas such as sinkholes, streams, highly erodible areas, or locations with plants that cannot tolerate defoliation.

**Before Situation:**

Resources are protected at the minimum level of the Conservation Practice Standard (CPS) 528 - Prescribed Grazing

**After Situation:**

The adoption of this enhancement will provide resource protection above the minimum level as described in Conservation Practice Standard (CPS) 528 - Prescribed Grazing

**Feature Measure:** Acre

**Scenario Unit::** Acre

**Scenario Typical Size:** 1,000.0

**Scenario Total Cost:** $1,639.11

**Scenario Cost/Unit:** $1.64

Cost Details:

| Component Name | ID | Description | Unit | Cost | QTY | Total |
|---|---|---|---|---|---|---|
| **Acquisition of Technical Knowledge** | | | | | | |
| Training, Workshops | 294 | Educational seminar or series of meetings emphasizing interaction and exchange of information among a usually small number of participants. | Each | $63.92 | 1 | $63.92 |
| **Equipment Installation** | | | | | | |
| Truck, Pickup | 939 | Equipment and power unit costs. Labor not included. | Hour | $21.79 | 4 | $87.16 |
| All terrain vehicles, ATV | 965 | Includes equipment, power unit and labor costs. | Hour | $28.28 | 12 | $339.36 |
| **Labor** | | | | | | |
| General Labor | 231 | Labor performed using basic tools such as power tool, shovels, and other tools that do not require extensive training. Ex. pipe layer, herder, concrete placement, materials spreader, flagger, etc. | Hour | $25.31 | 17 | $430.27 |
| Supervisor 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 | $45.69 | 2 | $91.38 |
| **Materials** | | | | | | |
| Wire, Polytape | 7 | Wire, Polytape for electric fence. Rolls of 655' to 825'. Includes materials and shipping only. | Each | $50.07 | 1 | $50.07 |
| Electric, Energizer, Solar | 27 | Electric, Energizer, Solar for electric fence. Includes materials and shipping only. | Each | $319.43 | 1 | $319.43 |
| Tank, Polyethylene, 300 gallon | 291 | Portable heavy duty rubber stock tank. | Each | $257.52 | 1 | $257.52 |

**Practice:** E528105Z - Prescribed grazing that improves or maintains riparian and watershed function-erosion

**Scenario** #1 - Prescribed grazing-erosion

**Scenario Description:**

Grazing management employed will provide cover and density needed in the watershed in order to reduce runoff, improve infiltration, provide for above ground water filtration and sustain applicable fish and wildlife species habitat.

**Before Situation:**

Resources are protected at the minimum level of the Conservation Practice Standard (CPS) 528 - Prescribed Grazing

**After Situation:**

The adoption of this enhancement will provide resource protection above the minimum level as described in Conservation Practice Standard (CPS) 528 - Prescribed Grazing

**Feature Measure:** Acre

**Scenario Unit::** Acre

**Scenario Typical Size:** 100.0

**Scenario Total Cost:** $941.94

**Scenario Cost/Unit:** $9.42

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 | $63.92 | 1 | $63.92 |
| **Foregone Income** | | | | | | |
| FI, Grazing AUMs | 2079 | Grazing is the Primary Land Use | Animal Unit Month | $16.65 | 10 | $166.50 |
| **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 | $25.31 | 10 | $253.10 |
| 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 | $45.69 | 2 | $91.38 |
| **Materials** | | | | | | |
| Wire, Polywire | 8 | Wire, Polywire for electric fence - 1,300 roll. Includes materials and shipping only. | Each | $47.61 | 1 | $47.61 |
| Electric, Energizer, Solar | 27 | Electric, Energizer, Solar for electric fence. Includes materials and shipping only. | Each | $319.43 | 1 | $319.43 |

**Practice:** E528107Z1 - Improved grazing management for soil compaction through monitoring activities

**Scenario** #1 - Grazing mgmt to improve compaction

**Scenario Description:**

Managing the harvest of vegetation with grazing and/or browsing animals as adjusted when following recommendations of a Certified Forage and Grassland Professional, Certified Range Management Consultant, or Certified Professional in Range Management, generated through pasture condition scoring (PCS).

**Before Situation:**

Resources are protected at the minimum level of the Conservation Practice Standard (CPS) 528 - Prescribed Grazing

**After Situation:**

The adoption of this enhancement will provide resource protection above the minimum level as described in Conservation Practice Standard (CPS) 528 - Prescribed Grazing

**Feature Measure:** Acre

**Scenario Unit::** Acre

**Scenario Typical Size:** 100.0

**Scenario Total Cost:** $801.96

**Scenario Cost/Unit:** $8.02

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 | $16.65 | 10 | $166.50 |
| **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 | $25.31 | 4 | $101.24 |
| 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 | $45.69 | 2 | $91.38 |
| Specialist Labor | 235 | Labor requiring a specialized skill set: Includes Agronomists, Foresters, Biologists, etc. to provide additional technical information during the planning and implementation of the practice. Does not include NRCS or TSP services. | Hour | $110.71 | 4 | $442.84 |

**Practice:** E528107Z2 - Improved grazing management for soil compaction on rangeland through monitoring activities

**Scenario** #1 - Grazing mgmt-compaction on rangeland

**Scenario Description:**

Three predominant key grazing areas are evaluated utilizing the Rangeland Health Assessment protocols to determine how well the ecological processes of the site(s) are functioning. Departure from reference categories will be determined, justified, and ratings described for soil and site stability, hydrologic function, and biotic integrity. Utilizing knowledge learned from this as a part of the ranch resource assessment, a Certified Range Management Consultant or Certified Professional in Range Management will provide recommendations or follow-up evaluations toward mitigating some of the degradation risks that are initially identified.

**Before Situation:**

Resources are protected at the minimum level of the Conservation Practice Standard (CPS) 528 - Prescribed Grazing

**After Situation:**

The adoption of this enhancement will provide resource protection above the minimum level as described in Conservation Practice Standard (CPS) 528 - Prescribed Grazing

**Feature Measure:** Acre

**Scenario Unit::** Acre

**Scenario Typical Size:** 1,000.0

**Scenario Total Cost:** $2,054.54

**Scenario Cost/Unit:** $2.05

Cost Details:

| Component Name | ID | Description | Unit | Cost | QTY | Total |
|---|---|---|---|---|---|---|
| **Acquisition of Technical Knowledge** | | | | | | |
| Training, Workshops | 294 | Educational seminar or series of meetings emphasizing interaction and exchange of information among a usually small number of participants. | Each | $63.92 | 1 | $63.92 |
| **Equipment Installation** | | | | | | |
| All terrain vehicles, ATV | 965 | Includes equipment, power unit and labor costs. | Hour | $28.28 | 8 | $226.24 |
| **Labor** | | | | | | |
| General Labor | 231 | Labor performed using basic tools such as power tool, shovels, and other tools that do not require extensive training. Ex. pipe layer, herder, concrete placement, materials spreader, flagger, etc. | Hour | $25.31 | 10 | $253.10 |
| 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 | $45.69 | 4 | $182.76 |
| 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 | $110.71 | 12 | $1,328.52 |

**Practice:** E528118Z1 - Prescribed grazing that maintains/improves riparian/watershed function impairment from nutrients

**Scenario** #1 - Prescribed grazing-nut runoff

**Scenario Description:**

Grazing management employed will provide cover and density needed in the watershed in order to reduce runoff, improve infiltration, provide for above ground water filtration and sustain applicable fish and wildlife species habitat.

**Before Situation:**

Resources are protected at the minimum level of the Conservation Practice Standard (CPS) 528 - Prescribed Grazing

**After Situation:**

The adoption of this enhancement will provide resource protection above the minimum level as described in Conservation Practice Standard (CPS) 528 - Prescribed Grazing

**Feature Measure:** Acre

**Scenario Unit::** Acre

**Scenario Typical Size:** 100.0

**Scenario Total Cost:** $1,504.93

**Scenario Cost/Unit:** $15.05

Cost Details:

| Component Name | ID | Description | Unit | Cost | QTY | Total |
|---|---|---|---|---|---|---|
| **Acquisition of Technical Knowledge** | | | | | | |
| Training, Workshops | 294 | Educational seminar or series of meetings emphasizing interaction and exchange of information among a usually small number of participants. | Each | $63.92 | 1 | $63.92 |
| **Equipment Installation** | | | | | | |
| Truck, Pickup | 939 | Equipment and power unit costs. Labor not included. | Hour | $21.79 | 2 | $43.58 |
| All terrain vehicles, ATV | 965 | Includes equipment, power unit and labor costs. | Hour | $28.28 | 6 | $169.68 |
| **Foregone Income** | | | | | | |
| FI, Grazing AUMs | 2079 | Grazing is the Primary Land Use | Animal Unit Month | $16.65 | 10 | $166.50 |
| **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 | $25.31 | 8 | $202.48 |
| Supervisor or Manager | 234 | Labor involving supervision or management activities. Includes crew supervisors, foremen and farm/ranch managers time required for adopting new technology, etc. | Hour | $45.69 | 2 | $91.38 |
| **Materials** | | | | | | |
| Wire, Polywire | 8 | Wire, Polywire for electric fence - 1,300 roll. Includes materials and shipping only. | Each | $47.61 | 4 | $190.44 |
| Electric, Energizer, Solar | 27 | Electric, Energizer, Solar for electric fence. Includes materials and shipping only. | Each | $319.43 | 1 | $319.43 |
| Tank, Polyethylene, 300 gallon | 291 | Portable heavy duty rubber stock tank. | Each | $257.52 | 1 | $257.52 |

**Practice:** E528118Z2 - Grazing management that protects sensitive areas-surface water from nutrients

**Scenario** #1 - Grazing mgmt-sensitive areas-nut runoff

**Scenario Description:**

Grazing management employed will provide cover and density needed in the watershed in order to protect sensitive areas such as sinkholes, streams, highly erodible areas, or locations with plants that cannot tolerate defoliation.

**Before Situation:**

Resources are protected at the minimum level of the Conservation Practice Standard (CPS) 528 - Prescribed Grazing

**After Situation:**

The adoption of this enhancement will provide resource protection above the minimum level as described in Conservation Practice Standard (CPS) 528 - Prescribed Grazing

**Feature Measure:** Acre

**Scenario Unit::** Acre

**Scenario Typical Size:** 1,000.0

**Scenario Total Cost:** $1,789.32

**Scenario Cost/Unit:** $1.79

Cost Details:

| Component Name | ID | Description | Unit | Cost | QTY | Total |
|---|---|---|---|---|---|---|
| **Acquisition of Technical Knowledge** | | | | | | |
| Training, Workshops | 294 | Educational seminar or series of meetings emphasizing interaction and exchange of information among a usually small number of participants. | Each | $63.92 | 1 | $63.92 |
| **Equipment Installation** | | | | | | |
| Truck, Pickup | 939 | Equipment and power unit costs. Labor not included. | Hour | $21.79 | 4 | $87.16 |
| All terrain vehicles, ATV | 965 | Includes equipment, power unit and labor costs. | Hour | $28.28 | 12 | $339.36 |
| **Labor** | | | | | | |
| General Labor | 231 | Labor performed using basic tools such as power tool, shovels, and other tools that do not require extensive training. Ex. pipe layer, herder, concrete placement, materials spreader, flagger, etc. | Hour | $25.31 | 17 | $430.27 |
| Supervisor 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 | $45.69 | 2 | $91.38 |
| **Materials** | | | | | | |
| Wire, Polytape | 7 | Wire, Polytape for electric fence. Rolls of 655' to 825'. Includes materials and shipping only. | Each | $50.07 | 4 | $200.28 |
| Electric, Energizer, Solar | 27 | Electric, Energizer, Solar for electric fence. Includes materials and shipping only. | Each | $319.43 | 1 | $319.43 |
| Tank, Polyethylene, 300 gallon | 291 | Portable heavy duty rubber stock tank. | Each | $257.52 | 1 | $257.52 |

**Practice:** E528119Z - Grazing management that protects sensitive areas-ground water from nutrients

**Scenario** #1 - Grazing mgmt-sensitive area-nut sub water

**Scenario Description:**

Grazing management employed will provide cover and density needed in the watershed in order to protect sensitive areas such as sinkholes, streams, highly erodible areas, or locations with plants that cannot tolerate defoliation.

**Before Situation:**

Resources are protected at the minimum level of the Conservation Practice Standard (CPS) 528 - Prescribed Grazing

**After Situation:**

The adoption of this enhancement will provide resource protection above the minimum level as described in Conservation Practice Standard (CPS) 528 - Prescribed Grazing

**Feature Measure:** Acre

**Scenario Unit::** Acre

**Scenario Typical Size:** 1,000.0

**Scenario Total Cost:** $1,789.32

**Scenario Cost/Unit:** $1.79

Cost Details:

| Component Name | ID | Description | Unit | Cost | QTY | Total |
|---|---|---|---|---|---|---|
| **Acquisition of Technical Knowledge** | | | | | | |
| Training, Workshops | 294 | Educational seminar or series of meetings emphasizing interaction and exchange of information among a usually small number of participants. | Each | $63.92 | 1 | $63.92 |
| **Equipment Installation** | | | | | | |
| Truck, Pickup | 939 | Equipment and power unit costs. Labor not included. | Hour | $21.79 | 4 | $87.16 |
| All terrain vehicles, ATV | 965 | Includes equipment, power unit and labor costs. | Hour | $28.28 | 12 | $339.36 |
| **Labor** | | | | | | |
| General Labor | 231 | Labor performed using basic tools such as power tool, shovels, and other tools that do not require extensive training. Ex. pipe layer, herder, concrete placement, materials spreader, flagger, etc. | Hour | $25.31 | 17 | $430.27 |
| Supervisor 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 | $45.69 | 2 | $91.38 |
| **Materials** | | | | | | |
| Wire, Polytape | 7 | Wire, Polytape for electric fence. Rolls of 655' to 825'. Includes materials and shipping only. | Each | $50.07 | 4 | $200.28 |
| Electric, Energizer, Solar | 27 | Electric, Energizer, Solar for electric fence. Includes materials and shipping only. | Each | $319.43 | 1 | $319.43 |
| Tank, Polyethylene, 300 gallon | 291 | Portable heavy duty rubber stock tank. | Each | $257.52 | 1 | $257.52 |

**Practice:** E528122Z - Prescribed grazing that maintains/improves riparian/watershed function-pathogens/chemicals

**Scenario** #1 - Prescribed grazing-pathogens

**Scenario Description:**

Grazing management employed will provide cover and density needed in the watershed in order to reduce runoff, improve infiltration, provide for above ground water filtration and sustain applicable fish and wildlife species habitat.

**Before Situation:**

Resources are protected at the minimum level of the Conservation Practice Standard (CPS) 528 - Prescribed Grazing

**After Situation:**

The adoption of this enhancement will provide resource protection above the minimum level as described in Conservation Practice Standard (CPS) 528 - Prescribed Grazing

**Feature Measure:** Acre

**Scenario Unit::** Acre

**Scenario Typical Size:** 100.0

**Scenario Total Cost:** $1,504.93

**Scenario Cost/Unit:** $15.05

Cost Details:

| Component Name | ID | Description | Unit | Cost | QTY | Total |
|---|---|---|---|---|---|---|
| **Acquisition of Technical Knowledge** | | | | | | |
| Training, Workshops | 294 | Educational seminar or series of meetings emphasizing interaction and exchange of information among a usually small number of participants. | Each | $63.92 | 1 | $63.92 |
| **Equipment Installation** | | | | | | |
| Truck, Pickup | 939 | Equipment and power unit costs. Labor not included. | Hour | $21.79 | 2 | $43.58 |
| All terrain vehicles, ATV | 965 | Includes equipment, power unit and labor costs. | Hour | $28.28 | 6 | $169.68 |
| **Foregone Income** | | | | | | |
| FI, Grazing AUMs | 2079 | Grazing is the Primary Land Use | Animal Unit Month | $16.65 | 10 | $166.50 |
| **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 | $25.31 | 8 | $202.48 |
| Supervisor or Manager | 234 | Labor involving supervision or management activities. Includes crew supervisors, foremen and farm/ranch managers time required for adopting new technology, etc. | Hour | $45.69 | 2 | $91.38 |
| **Materials** | | | | | | |
| Wire, Polywire | 8 | Wire, Polywire for electric fence - 1,300 roll. Includes materials and shipping only. | Each | $47.61 | 4 | $190.44 |
| Electric, Energizer, Solar | 27 | Electric, Energizer, Solar for electric fence. Includes materials and shipping only. | Each | $319.43 | 1 | $319.43 |
| Tank, Polyethylene, 300 gallon | 291 | Portable heavy duty rubber stock tank. | Each | $257.52 | 1 | $257.52 |

**Practice:** E528126Z - Prescribed grazing that maintains/improves riparian/watershed function-min sediment in surface water

**Scenario** #1 - Prescribed grazing-sediment

**Scenario Description:**

Grazing management employed will provide cover and density needed in the watershed in order to reduce runoff, improve infiltration, provide for above ground water filtration and sustain applicable fish and wildlife species habitat.

**Before Situation:**

Resources are protected at the minimum level of the Conservation Practice Standard (CPS) 528 - Prescribed Grazing

**After Situation:**

The adoption of this enhancement will provide resource protection above the minimum level as described in Conservation Practice Standard (CPS) 528 - Prescribed Grazing

**Feature Measure:** Acre

**Scenario Unit::** Acre

**Scenario Typical Size:** 100.0

**Scenario Total Cost:** $1,338.43

**Scenario Cost/Unit:** $13.38

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 | $63.92 | 1 | $63.92 |
| **Equipment Installation** | | | | | | |
| Truck, Pickup | 939 | Equipment and power unit costs. Labor not included. | Hour | $21.79 | 2 | $43.58 |
| All terrain vehicles, ATV | 965 | Includes equipment, power unit and labor costs. | Hour | $28.28 | 6 | $169.68 |
| **Labor** | | | | | | |
| General Labor | 231 | Labor performed using basic tools such as power tool, shovels, and other tools that do not require extensive training. Ex. pipe layer, herder, concrete placement, materials spreader, flagger, etc. | Hour | $25.31 | 8 | $202.48 |
| Supervisor or Manager | 234 | Labor involving supervision or management activities. Includes crew supervisors, foremen and farm/ranch managers time required for adopting new technology, etc. | Hour | $45.69 | 2 | $91.38 |
| **Materials** | | | | | | |
| Wire, Polywire | 8 | Wire, Polywire for electric fence - 1,300 roll. Includes materials and shipping only. | Each | $47.61 | 4 | $190.44 |
| Electric, Energizer, Solar | 27 | Electric, Energizer, Solar for electric fence. Includes materials and shipping only. | Each | $319.43 | 1 | $319.43 |
| Tank, Polyethylene, 300 gallon | 291 | Portable heavy duty rubber stock tank. | Each | $257.52 | 1 | $257.52 |

**Practice:** E528132Z1 - Improved grazing mgmt for plant productivity/health through monitoring

**Scenario** #1 - Grazing mgmt-plant health

**Scenario Description:**

Managing the harvest of vegetation with grazing and/or browsing animals as adjusted when following recommendations of a Certified Forage and Grassland Professional, Certified Range Management Consultant, or Certified Professional in Range Management, generated through pasture condition scoring (PCS).

**Before Situation:**

Resources are protected at the minimum level of the Conservation Practice Standard (CPS) 528 - Prescribed Grazing

**After Situation:**

The adoption of this enhancement will provide resource protection above the minimum level as described in Conservation Practice Standard (CPS) 528 - Prescribed Grazing

**Feature Measure:** Acre

**Scenario Unit::** Acre

**Scenario Typical Size:** 100.0

**Scenario Total Cost:** $952.38

**Scenario Cost/Unit:** $9.52

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 | $16.65 | 30 | $499.50 |
| **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 | $110.71 | 4 | $442.84 |
| **Materials** | | | | | | |
| Test, Soil Test, Standard | 299 | Includes materials, shiping, labor, and equipment costs. | Each | $10.04 | 1 | $10.04 |

## USDA - Natural Resources Conservation Service

**Massachusetts**

**Practice:** E528132Z2 - Stockpiling cool season forage to improve plant productivity and health

**Scenario** #1 - Stockpile cool season forage-plant prod

**Scenario Description:**

Grazing management employed to stop grazing events of selected paddock(s) to allow pasture forages to grow to maximum vegetative biomass accumulation before the end of the growing season.

**Before Situation:**

Resources are protected at the minimum level of the Conservation Practice Standard (CPS) 528 - Prescribed Grazing

**After Situation:**

The adoption of this enhancement will provide resource protection above the minimum level as described in Conservation Practice Standard (CPS) 528 - Prescribed Grazing

**Feature Measure:** Acre

**Scenario Unit::** Acre

**Scenario Typical Size:** 100.0

**Scenario Total Cost:** $2,372.22

**Scenario Cost/Unit:** $23.72

Cost Details:

| Component Name | ID | Description | Unit | Cost | QTY | Total |
|---|---|---|---|---|---|---|
| **Acquisition of Technical Knowledge** | | | | | | |
| Training, Workshops | 294 | Educational seminar or series of meetings emphasizing interaction and exchange of information among a usually small number of participants. | Each | $63.92 | 1 | $63.92 |
| **Equipment Installation** | | | | | | |
| Truck, Pickup | 939 | Equipment and power unit costs. Labor not included. | Hour | $21.79 | 2 | $43.58 |
| All terrain vehicles, ATV | 965 | Includes equipment, power unit and labor costs. | Hour | $28.28 | 6 | $169.68 |
| **Foregone Income** | | | | | | |
| FI, Grazing AUMs | 2079 | Grazing is the Primary Land Use | Animal Unit Month | $16.65 | 10 | $166.50 |
| **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 | $25.31 | 8 | $202.48 |
| Supervisor or Manager | 234 | Labor involving supervision or management activities. Includes crew supervisors, foremen and farm/ranch managers time required for adopting new technology, etc. | Hour | $45.69 | 2 | $91.38 |
| **Materials** | | | | | | |
| Wire, Polywire | 8 | Wire, Polywire for electric fence - 1,300 roll. Includes materials and shipping only. | Each | $47.61 | 1 | $47.61 |
| Electric, Energizer, Solar | 27 | Electric, Energizer, Solar for electric fence. Includes materials and shipping only. | Each | $319.43 | 1 | $319.43 |
| 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 | $0.49 | 2000 | $980.00 |
| Tank, Polyethylene, 300 gallon | 291 | Portable heavy duty rubber stock tank. | Each | $257.52 | 1 | $257.52 |
| Test, Soil Test, Standard | 299 | Includes materials, shiping, labor, and equipment costs. | Each | $10.04 | 3 | $30.12 |

**Practice:** E528132Z3 - Improved grazing management for plant productivity/health through monitoring

**Scenario** #1 - Gazing mgmt-plant health

**Scenario Description:**

Three predominant key grazing areas are evaluated utilizing the Rangeland Health Assessment protocols to determine how well the ecological processes of the site(s) are functioning. Departure from reference categories will be determined, justified, and ratings described for soil and site stability, hydrologic function, and biotic integrity. Utilizing knowledge learned from this as a part of the ranch resource assessment, a Certified Range Management Consultant or Certified Professional in Range Management will provide recommendations or follow-up evaluations toward mitigating some of the degradation risks that are initially identified.

**Before Situation:**

Resources are protected at the minimum level of the Conservation Practice Standard (CPS) 528 - Prescribed Grazing

**After Situation:**

The adoption of this enhancement will provide resource protection above the minimum level as described in Conservation Practice Standard (CPS) 528 - Prescribed Grazing

**Feature Measure:** Acre

**Scenario Unit::** Acre

**Scenario Typical Size:** 1,000.0

**Scenario Total Cost:** $2,054.54

**Scenario Cost/Unit:** $2.05

Cost Details:

| Component Name | ID | Description | Unit | Cost | QTY | Total |
|---|---|---|---|---|---|---|
| **Acquisition of Technical Knowledge** | | | | | | |
| Training, Workshops | 294 | Educational seminar or series of meetings emphasizing interaction and exchange of information among a usually small number of participants. | Each | $63.92 | 1 | $63.92 |
| **Equipment Installation** | | | | | | |
| All terrain vehicles, ATV | 965 | Includes equipment, power unit and labor costs. | Hour | $28.28 | 8 | $226.24 |
| **Labor** | | | | | | |
| General Labor | 231 | Labor performed using basic tools such as power tool, shovels, and other tools that do not require extensive training. Ex. pipe layer, herder, concrete placement, materials spreader, flagger, etc. | Hour | $25.31 | 10 | $253.10 |
| 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 | $45.69 | 4 | $182.76 |
| 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 | $110.71 | 12 | $1,328.52 |

**Practice:** E528133Z1 - Stockpiling cool season forage to improve structure and composition.

**Scenario** #1 - Stockpile cool season forage-structure

**Scenario Description:**

Grazing management employed will stop grazing events of selected paddock(s) to allow pasture forages to grow to maximum vegetative biomass accumulation before the end of the growing season.

**Before Situation:**

Resources are protected at the minimum level of the Conservation Practice Standard (CPS) 528 - Prescribed Grazing

**After Situation:**

The adoption of this enhancement will provide resource protection above the minimum level as described in Conservation Practice Standard (CPS) 528 - Prescribed Grazing

**Feature Measure:** Acre

**Scenario Unit::** Acre

**Scenario Typical Size:** 100.0

**Scenario Total Cost:** $2,372.22

**Scenario Cost/Unit:** $23.72

Cost Details:

| Component Name | ID | Description | Unit | Cost | QTY | Total |
|---|---|---|---|---|---|---|
| **Acquisition of Technical Knowledge** | | | | | | |
| Training, Workshops | 294 | Educational seminar or series of meetings emphasizing interaction and exchange of information among a usually small number of participants. | Each | $63.92 | 1 | $63.92 |
| **Equipment Installation** | | | | | | |
| Truck, Pickup | 939 | Equipment and power unit costs. Labor not included. | Hour | $21.79 | 2 | $43.58 |
| All terrain vehicles, ATV | 965 | Includes equipment, power unit and labor costs. | Hour | $28.28 | 6 | $169.68 |
| **Foregone Income** | | | | | | |
| FI, Grazing AUMs | 2079 | Grazing is the Primary Land Use | Animal Unit Month | $16.65 | 10 | $166.50 |
| **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 | $25.31 | 8 | $202.48 |
| Supervisor or Manager | 234 | Labor involving supervision or management activities. Includes crew supervisors, foremen and farm/ranch managers time required for adopting new technology, etc. | Hour | $45.69 | 2 | $91.38 |
| **Materials** | | | | | | |
| Wire, Polywire | 8 | Wire, Polywire for electric fence - 1,300 roll. Includes materials and shipping only. | Each | $47.61 | 1 | $47.61 |
| Electric, Energizer, Solar | 27 | Electric, Energizer, Solar for electric fence. Includes materials and shipping only. | Each | $319.43 | 1 | $319.43 |
| 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 | $0.49 | 2000 | $980.00 |
| Tank, Polyethylene, 300 gallon | 291 | Portable heavy duty rubber stock tank. | Each | $257.52 | 1 | $257.52 |
| Test, Soil Test, Standard | 299 | Includes materials, shiping, labor, and equipment costs. | Each | $10.04 | 3 | $30.12 |

**Practice:** E528133Z2 - Grazing management for improving quantity/quality of plant structure/composition for wildlife

**Scenario** #1 - Grazing mgmt-structure for wildlife

**Scenario Description:**

Managing the harvest of vegetation with grazing and/or browsing animals for the purpose of improving or maintaining the structure and composition of the plant community that is available for wildlife.

**Before Situation:**

Resources are protected at the minimum level of the Conservation Practice Standard (CPS) 528 - Prescribed Grazing

**After Situation:**

The adoption of this enhancement will provide resource protection above the minimum level as described in Conservation Practice Standard (CPS) 528 - Prescribed Grazing

**Feature Measure:** Acre

**Scenario Unit::** Acre

**Scenario Typical Size:** 100.0

**Scenario Total Cost:** $295.44

**Scenario Cost/Unit:** $2.95

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 | $16.65 | 15 | $249.75 |
| **Labor** | | | | | | |
| Supervisor or Manager | 234 | Labor involving supervision or management activities. Includes crew supervisors, foremen and farm/ranch managers time required for adopting new technology, etc. | Hour | $45.69 | 1 | $45.69 |

**Practice:** E528133Z3 - Improved grazing management for plant structure and composition through monitoring activities

**Scenario** #1 - Grazing mgmt-structure

**Scenario Description:**

Three predominant key grazing areas are evaluated utilizing the Rangeland Health Assessment protocols to determine how well the ecological processes of the site(s) are functioning. Departure from reference categories will be determined, justified, and ratings described for soil and site stability, hydrologic function, and biotic integrity. Utilizing knowledge learned from this as a part of the ranch resource assessment, a Certified Range Management Consultant or Certified Professional in Range Management will provide recommendations or follow-up evaluations toward mitigating some of the degradation risks that are initially identified.

**Before Situation:**

Resources are protected at the minimum level of the Conservation Practice Standard (CPS) 528 - Prescribed Grazing

**After Situation:**

The adoption of this enhancement will provide resource protection above the minimum level as described in Conservation Practice Standard (CPS) 528 - Prescribed Grazing

**Feature Measure:** Acre

**Scenario Unit::** Acre

**Scenario Typical Size:** 1,000.0

**Scenario Total Cost:** $2,054.54

**Scenario Cost/Unit:** $2.05

Cost Details:

| Component Name | ID | Description | Unit | Cost | QTY | Total |
|---|---|---|---|---|---|---|
| **Acquisition of Technical Knowledge** | | | | | | |
| Training, Workshops | 294 | Educational seminar or series of meetings emphasizing interaction and exchange of information among a usually small number of participants. | Each | $63.92 | 1 | $63.92 |
| **Equipment Installation** | | | | | | |
| All terrain vehicles, ATV | 965 | Includes equipment, power unit and labor costs. | Hour | $28.28 | 8 | $226.24 |
| **Labor** | | | | | | |
| General Labor | 231 | Labor performed using basic tools such as power tool, shovels, and other tools that do not require extensive training. Ex. pipe layer, herder, concrete placement, materials spreader, flagger, etc. | Hour | $25.31 | 10 | $253.10 |
| 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 | $45.69 | 4 | $182.76 |
| 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 | $110.71 | 12 | $1,328.52 |

**Practice:** E528134Z - Improved grazing management that reduces undesirable plant pest pressure through monitoring

**Scenario** #1 - Grazing mgmt-pest pressure

**Scenario Description:**

Three predominant key grazing areas are evaluated utilizing the Rangeland Health Assessment protocols to determine how well the ecological processes of the site(s) are functioning. Departure from reference categories will be determined, justified, and ratings described for soil and site stability, hydrologic function, and biotic integrity. Utilizing knowledge learned from this as a part of the ranch resource assessment, a Certified Range Management Consultant or Certified Professional in Range Management will provide recommendations or follow-up evaluations toward mitigating some of the degradation risks that are initially identified.

**Before Situation:**

Resources are protected at the minimum level of the Conservation Practice Standard (CPS) 528 - Prescribed Grazing

**After Situation:**

The adoption of this enhancement will provide resource protection above the minimum level as described in Conservation Practice Standard (CPS) 528 - Prescribed Grazing

**Feature Measure:** Acre

**Scenario Unit::** Acre

**Scenario Typical Size:** 1,000.0

**Scenario Total Cost:** $2,054.54

**Scenario Cost/Unit:** $2.05

Cost Details:

| Component Name | ID | Description | Unit | Cost | QTY | Total |
|---|---|---|---|---|---|---|
| **Acquisition of Technical Knowledge** | | | | | | |
| Training, Workshops | 294 | Educational seminar or series of meetings emphasizing interaction and exchange of information among a usually small number of participants. | Each | $63.92 | 1 | $63.92 |
| **Equipment Installation** | | | | | | |
| All terrain vehicles, ATV | 965 | Includes equipment, power unit and labor costs. | Hour | $28.28 | 8 | $226.24 |
| **Labor** | | | | | | |
| General Labor | 231 | Labor performed using basic tools such as power tool, shovels, and other tools that do not require extensive training. Ex. pipe layer, herder, concrete placement, materials spreader, flagger, etc. | Hour | $25.31 | 10 | $253.10 |
| 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 | $45.69 | 4 | $182.76 |
| 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 | $110.71 | 12 | $1,328.52 |

**Practice:** E528136Z1 - Grazing management for improving quantity and quality of food for wildlife

**Scenario** #1 - Grazing mgmt-food

**Scenario Description:**
Grazing management employed will provide plant structure, density and diversity needed for the desired wildlife species of concern.

**Before Situation:**
Resources are protected at the minimum level of the Conservation Practice Standard (CPS) 528 - Prescribed Grazing

**After Situation:**
The adoption of this enhancement will provide resource protection above the minimum level as described in Conservation Practice Standard (CPS) 528 - Prescribed Grazing

**Feature Measure:** Acre

**Scenario Unit::** Acre

**Scenario Typical Size:** 1,000.0

**Scenario Total Cost:** $520.82

**Scenario Cost/Unit:** $0.52

Cost Details:

| Component Name | ID | Description | Unit | Cost | QTY | Total |
|---|---|---|---|---|---|---|
| **Acquisition of Technical Knowledge** | | | | | | |
| Training, Workshops | 294 | Educational seminar or series of meetings emphasizing interaction and exchange of information among a usually small number of participants. | Each | $63.92 | 1 | $63.92 |
| **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 | $45.69 | 10 | $456.90 |

**Practice:** E528136Z2 - Incorporating wildlife refuge areas in contingency plans for wildlife food

**Scenario** #1 - Add wildlife refuge area-food

**Scenario Description:**

A prescribed grazing plan that includes 18 month (or longer) deferment of a pasture that consists of native grasses and/or legumes and/or perennial forbs for the purpose of meeting the needs for drought/disaster contingency plans that will also provide wildlife habitat for a period of time.

**Before Situation:**

Resources are protected at the minimum level of the Conservation Practice Standard (CPS) 528 - Prescribed Grazing

**After Situation:**

The adoption of this enhancement will provide resource protection above the minimum level as described in Conservation Practice Standard (CPS) 528 - Prescribed Grazing

**Feature Measure:** Acre

**Scenario Unit::** Acre

**Scenario Typical Size:** 100.0

**Scenario Total Cost:** $1,588.18

**Scenario Cost/Unit:** $15.88

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 | $63.92 | 1 | $63.92 |
| **Equipment Installation** | | | | | | |
| Truck, Pickup | 939 | Equipment and power unit costs. Labor not included. | Hour | $21.79 | 2 | $43.58 |
| All terrain vehicles, ATV | 965 | Includes equipment, power unit and labor costs. | Hour | $28.28 | 6 | $169.68 |
| **Foregone Income** | | | | | | |
| FI, Grazing AUMs | 2079 | Grazing is the Primary Land Use | Animal Unit Month | $16.65 | 15 | $249.75 |
| **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 | $25.31 | 8 | $202.48 |
| Supervisor or Manager | 234 | Labor involving supervision or management activities. Includes crew supervisors, foremen and farm/ranch managers time required for adopting new technology, etc. | Hour | $45.69 | 2 | $91.38 |
| **Materials** | | | | | | |
| Wire, Polywire | 8 | Wire, Polywire for electric fence - 1,300 roll. Includes materials and shipping only. | Each | $47.61 | 4 | $190.44 |
| Electric, Energizer, Solar | 27 | Electric, Energizer, Solar for electric fence. Includes materials and shipping only. | Each | $319.43 | 1 | $319.43 |
| Tank, Polyethylene, 300 gallon | 291 | Portable heavy duty rubber stock tank. | Each | $257.52 | 1 | $257.52 |

**Practice:** E528136Z3 - Grazing management that improves Monarch butterfly habitat

**Scenario** #1 - Grazing mgmt-Monarch

**Scenario Description:**

Implement a grazing management plan that will increase the abundance and diversity of monarch nectar-producing perennial forbs, including milkweed, while maintaining ecosystem benefits for other wildlife and livestock.

**Before Situation:**

Resources are protected at the minimum level of the Conservation Practice Standard (CPS) 528 - Prescribed Grazing

**After Situation:**

The adoption of this enhancement will provide resource protection above the minimum level as described in Conservation Practice Standard (CPS) 528 - Prescribed Grazing

**Feature Measure:** Acre

**Scenario Unit::** Acre

**Scenario Typical Size:** 100.0

**Scenario Total Cost:** $863.02

**Scenario Cost/Unit:** $8.63

Cost Details:

| Component Name | ID | Description | Unit | Cost | QTY | Total |
|---|---|---|---|---|---|---|
| **Acquisition of Technical Knowledge** | | | | | | |
| Training, Workshops | 294 | Educational seminar or series of meetings emphasizing interaction and exchange of information among a usually small number of participants. | Each | $63.92 | 1 | $63.92 |
| **Foregone Income** | | | | | | |
| FI, Grazing AUMs | 2079 | Grazing is the Primary Land Use | Animal Unit Month | $16.65 | 2.5 | $41.63 |
| **Labor** | | | | | | |
| General Labor | 231 | Labor performed using basic tools such as power tool, shovels, and other tools that do not require extensive training. Ex. pipe layer, herder, concrete placement, materials spreader, flagger, etc. | Hour | $25.31 | 1 | $25.31 |
| Supervisor or Manager | 234 | Labor involving supervision or management activities. Includes crew supervisors, foremen and farm/ranch managers time required for adopting new technology, etc. | Hour | $45.69 | 1 | $45.69 |
| **Materials** | | | | | | |
| Wire, Polywire | 8 | Wire, Polywire for electric fence - 1,300 roll. Includes materials and shipping only. | Each | $47.61 | 1 | $47.61 |
| Electric, Energizer, Solar | 27 | Electric, Energizer, Solar for electric fence. Includes materials and shipping only. | Each | $319.43 | 2 | $638.86 |

**Practice:** E528137Z1 - Grazing management for improving quantity and quality of cover and shelter for wildlife

**Scenario** #1 - Grazing mgmt-shelter

**Scenario Description:**
Grazing management employed will provide plant structure, density and diversity needed for the desired wildlife species of concern.

**Before Situation:**
Resources are protected at the minimum level of the Conservation Practice Standard (CPS) 528 - Prescribed Grazing

**After Situation:**
The adoption of this enhancement will provide resource protection above the minimum level as described in Conservation Practice Standard (CPS) 528 - Prescribed Grazing

**Feature Measure:** Acre

**Scenario Unit::** Acre

**Scenario Typical Size:** 1,000.0

**Scenario Total Cost:** $520.82

**Scenario Cost/Unit:** $0.52

Cost Details:

| Component Name | ID | Description | Unit | Cost | QTY | Total |
|---|---|---|---|---|---|---|
| **Acquisition of Technical Knowledge** | | | | | | |
| Training, Workshops | 294 | Educational seminar or series of meetings emphasizing interaction and exchange of information among a usually small number of participants. | Each | $63.92 | 1 | $63.92 |
| **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 | $45.69 | 10 | $456.90 |

**Practice:** E528137Z2 - Incorporating wildlife refuge areas in contingency plans for prescribed grazing-cover/shelter

**Scenario** #1 - Add wildlife refuge area-shelter

**Scenario Description:**

A prescribed grazing plan that includes 12 month (or longer) deferment of a pasture that consists of native grasses and/or legumes and/or perennial forbs for the purpose of meeting the needs for drought/disaster contingency plans that will also provide wildlife habitat for a period of time.

**Before Situation:**

Resources are protected at the minimum level of the Conservation Practice Standard (CPS) 528 - Prescribed Grazing

**After Situation:**

The adoption of this enhancement will provide resource protection above the minimum level as described in Conservation Practice Standard (CPS) 528 - Prescribed Grazing

**Feature Measure:** Acre

**Scenario Unit::** Acre

**Scenario Typical Size:** 100.0

**Scenario Total Cost:** $1,588.18

**Scenario Cost/Unit:** $15.88

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 | $63.92 | 1 | $63.92 |
| **Equipment Installation** | | | | | | |
| Truck, Pickup | 939 | Equipment and power unit costs. Labor not included. | Hour | $21.79 | 2 | $43.58 |
| All terrain vehicles, ATV | 965 | Includes equipment, power unit and labor costs. | Hour | $28.28 | 6 | $169.68 |
| **Foregone Income** | | | | | | |
| FI, Grazing AUMs | 2079 | Grazing is the Primary Land Use | Animal Unit Month | $16.65 | 15 | $249.75 |
| **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 | $25.31 | 8 | $202.48 |
| Supervisor or Manager | 234 | Labor involving supervision or management activities. Includes crew supervisors, foremen and farm/ranch managers time required for adopting new technology, etc. | Hour | $45.69 | 2 | $91.38 |
| **Materials** | | | | | | |
| Wire, Polywire | 8 | Wire, Polywire for electric fence - 1,300 roll. Includes materials and shipping only. | Each | $47.61 | 4 | $190.44 |
| Electric, Energizer, Solar | 27 | Electric, Energizer, Solar for electric fence. Includes materials and shipping only. | Each | $319.43 | 1 | $319.43 |
| Tank, Polyethylene, 300 gallon | 291 | Portable heavy duty rubber stock tank. | Each | $257.52 | 1 | $257.52 |

**Practice:** E528138Z - Incorporating wildlife refuge areas in contingency plans for prescribed grazing-water access

**Scenario** #1 - Add wildlife refuge area-water

**Scenario Description:**

A prescribed grazing plan that includes 12 month (or longer) deferment of a pasture that consists of native grasses and/or legumes and/or perennial forbs for the purpose of meeting the needs for drought/disaster contingency plans that will also provide wildlife habitat for a period of time.

**Before Situation:**

Resources are protected at the minimum level of the Conservation Practice Standard (CPS) 528 - Prescribed Grazing

**After Situation:**

The adoption of this enhancement will provide resource protection above the minimum level as described in Conservation Practice Standard (CPS) 528 - Prescribed Grazing

**Feature Measure:** Acre

**Scenario Unit::** Acre

**Scenario Typical Size:** 100.0

**Scenario Total Cost:** $1,588.18

**Scenario Cost/Unit:** $15.88

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 | $63.92 | 1 | $63.92 |
| **Equipment Installation** | | | | | | |
| Truck, Pickup | 939 | Equipment and power unit costs. Labor not included. | Hour | $21.79 | 2 | $43.58 |
| All terrain vehicles, ATV | 965 | Includes equipment, power unit and labor costs. | Hour | $28.28 | 6 | $169.68 |
| **Foregone Income** | | | | | | |
| FI, Grazing AUMs | 2079 | Grazing is the Primary Land Use | Animal Unit Month | $16.65 | 15 | $249.75 |
| **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 | $25.31 | 8 | $202.48 |
| Supervisor or Manager | 234 | Labor involving supervision or management activities. Includes crew supervisors, foremen and farm/ranch managers time required for adopting new technology, etc. | Hour | $45.69 | 2 | $91.38 |
| **Materials** | | | | | | |
| Wire, Polywire | 8 | Wire, Polywire for electric fence - 1,300 roll. Includes materials and shipping only. | Each | $47.61 | 4 | $190.44 |
| Electric, Energizer, Solar | 27 | Electric, Energizer, Solar for electric fence. Includes materials and shipping only. | Each | $319.43 | 1 | $319.43 |
| Tank, Polyethylene, 300 gallon | 291 | Portable heavy duty rubber stock tank. | Each | $257.52 | 1 | $257.52 |

**Practice:** E528140Z1 - Maintaining quantity and quality of forage for animal health and productivity

**Scenario** #1 - Maintain forage quantity and quality

**Scenario Description:**

Managing the harvest of vegetation with grazing and/or browsing animals for the purposes of maintaining desired pasture composition/plant vigor and improving/maintaining quantity and quality of forage for the animals' health and productivity..

**Before Situation:**

Resources are protected at the minimum level of the Conservation Practice Standard (CPS) 528 - Prescribed Grazing

**After Situation:**

The adoption of this enhancement will provide resource protection above the minimum level as described in Conservation Practice Standard (CPS) 528 - Prescribed Grazing

**Feature Measure:** Acre

**Scenario Unit::** Acre

**Scenario Typical Size:** 1,000.0

**Scenario Total Cost:** $2,478.09

**Scenario Cost/Unit:** $2.48

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 | $63.92 | 1 | $63.92 |
| **Equipment Installation** | | | | | | |
| Truck, Pickup | 939 | Equipment and power unit costs. Labor not included. | Hour | $21.79 | 4 | $87.16 |
| All terrain vehicles, ATV | 965 | Includes equipment, power unit and labor costs. | Hour | $28.28 | 12 | $339.36 |
| **Foregone Income** | | | | | | |
| FI, Grazing AUMs | 2079 | Grazing is the Primary Land Use | Animal Unit Month | $16.65 | 36 | $599.40 |
| **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 | $25.31 | 17 | $430.27 |
| Supervisor 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 | $45.69 | 2 | $91.38 |
| **Materials** | | | | | | |
| Wire, Polywire | 8 | Wire, Polywire for electric fence - 1,300 roll. Includes materials and shipping only. | Each | $47.61 | 1 | $47.61 |
| Electric, Energizer, Solar | 27 | Electric, Energizer, Solar for electric fence. Includes materials and shipping only. | Each | $319.43 | 1 | $319.43 |
| Tank, Polyethylene, 300 gallon | 291 | Portable heavy duty rubber stock tank. | Each | $257.52 | 1 | $257.52 |
| Nutritional Balance Analyzer, fecal sample analysis only | 1127 | NIRS fecal analysis, animal performance report. Includes materials and shipping only. | Each | $40.34 | 6 | $242.04 |

**Practice:** E528140Z2 - Incorporating wildlife refuge areas in contingency plans for livestock feed and forage

**Scenario** #1 - Add wildlife refuge area-forage

**Scenario Description:**

A prescribed grazing plan that includes 18 month (or longer) deferment of a pasture that consists of native grasses and/or legumes and/or perennial forbs for the purpose of meeting the needs for drought/disaster contingency plans that will also provide wildlife habitat for a period of time.

**Before Situation:**

Resources are protected at the minimum level of the Conservation Practice Standard (CPS) 528 - Prescribed Grazing

**After Situation:**

The adoption of this enhancement will provide resource protection above the minimum level as described in Conservation Practice Standard (CPS) 528 - Prescribed Grazing

**Feature Measure:** Acre

**Scenario Unit::** Acre

**Scenario Typical Size:** 1,000.0

**Scenario Total Cost:** $2,678.58

**Scenario Cost/Unit:** $2.68

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 | $63.92 | 1 | $63.92 |
| **Equipment Installation** | | | | | | |
| Truck, Pickup | 939 | Equipment and power unit costs. Labor not included. | Hour | $21.79 | 4 | $87.16 |
| All terrain vehicles, ATV | 965 | Includes equipment, power unit and labor costs. | Hour | $28.28 | 12 | $339.36 |
| **Foregone Income** | | | | | | |
| FI, Grazing AUMs | 2079 | Grazing is the Primary Land Use | Animal Unit Month | $16.65 | 54 | $899.10 |
| **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 | $25.31 | 17 | $430.27 |
| Supervisor 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 | $45.69 | 2 | $91.38 |
| **Materials** | | | | | | |
| Wire, Polywire | 8 | Wire, Polywire for electric fence - 1,300 roll. Includes materials and shipping only. | Each | $47.61 | 4 | $190.44 |
| Electric, Energizer, Solar | 27 | Electric, Energizer, Solar for electric fence. Includes materials and shipping only. | Each | $319.43 | 1 | $319.43 |
| Tank, Polyethylene, 300 gallon | 291 | Portable heavy duty rubber stock tank. | Each | $257.52 | 1 | $257.52 |

**Practice:** E550106Z - Range planting for increasing/maintaining organic matter

**Scenario** #1 - Range planting for SOM

**Scenario Description:**

Establishment of adapted perennial or self-sustaining vegetation such as grasses, forbs, legumes, shrubs and trees for the purpose of increasing or maintaining organic matter levels in the soil.

**Before Situation:**

Resources are protected at the minimum level of the Conservation Practice Standard (CPS) 550 - Range Planting

**After Situation:**

The adoption of this enhancement will provide resource protection above the minimum level as described in Conservation Practice Standard (CPS) 550 - Range Planting

**Feature Measure:** Acre

**Scenario Unit::** Acre

**Scenario Typical Size:** 100.0

**Scenario Total Cost:** $4,157.28

**Scenario Cost/Unit:** $41.57

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 | $16.65 | 15 | $249.75 |
| **Labor** | | | | | | |
| Supervisor or Manager | 234 | Labor involving supervision or management activities. Includes crew supervisors, foremen and farm/ranch managers time required for adopting new technology, etc. | Hour | $45.69 | 2 | $91.38 |
| **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 | $254.41 | 15 | $3,816.15 |

**Practice:** E550136Z - Range planting for improving forage, browse, or cover for wildlife

**Scenario** #1 - Range planting for wildlife

**Scenario Description:**

Establishment of adapted perennial or self-sustaining vegetation such as grasses, forbs, legumes, shrubs and trees for the purpose of improving forage, browse, or cover for wildlife on areas that have been degraded beyond recovery via ecological principles, or old crop fields and pastures devoid of desirable, native rangeland species that range within an ecological site description steady state.

**Before Situation:**

Resources are protected at the minimum level of the Conservation Practice Standard (CPS) 550 - Range Planting

**After Situation:**

The adoption of this enhancement will provide resource protection above the minimum level as described in Conservation Practice Standard (CPS) 550 - Range Planting

**Feature Measure:** Acre

**Scenario Unit::** Acre

**Scenario Typical Size:** 100.0

**Scenario Total Cost:** $9,828.02

**Scenario Cost/Unit:** $98.28

Cost Details:

| Component Name | ID | Description | Unit | Cost | QTY | Total |
|---|---|---|---|---|---|---|
| **Labor** | | | | | | |
| Specialist Labor | 235 | Labor requiring a specialized skill set: Includes Agronomists, Foresters, Biologists, etc. to provide additional technical information during the planning and implementation of the practice. Does not include NRCS or TSP services. | Hour | $110.71 | 2 | $221.42 |
| **Materials** | | | | | | |
| Six Species Mix, Native Forb | 2334 | Native forb mix. Includes material and shipping only. | Acre | $960.66 | 10 | $9,606.60 |

**Practice:** E554118Z1 - Installation of end of pipe or ditch treatment for phosphorus

**Scenario** #1 - Installation of treatment for P

**Scenario Description:**
Add end of pipe treatment. If dissolved Phosphorus is the pollutant of concern, add Interim standard 782, Phosphorus Treatment Structure for each pipe outlet in a field.

**Before Situation:**
Resources are protected at the minimum level of the Conservation Practice Standard (CPS) 554 - Drainage Water Management

**After Situation:**
The adoption of this enhancement will provide resource protection above the minimum level as described in Conservation Practice Standard (CPS) 554 - Drainage Water Management

**Feature Measure:** Each

**Scenario Unit::** Each

**Scenario Typical Size:** 1.0

**Scenario Total Cost:** $8,312.99

**Scenario Cost/Unit:** $8,312.99

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 | $510.00 | 6 | $3,060.00 |
| 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 | $2.36 | 40 | $94.40 |
| Earthfill, Dumped and Spread | 51 | Earthfill, dumped and spread without compaction effort, includes equipment and labor | Cubic Yard | $3.65 | 40 | $146.00 |
| 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 | $62.74 | 16 | $1,003.84 |
| **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 | $25.31 | 16 | $404.96 |
| Equipment Operators, Light | 232 | Includes: Skid Steer Loaders, Hydraulic Excavators <50 HP, Trenchers <12", Ag Equipment <150 HP, Pickup Trucks, Forklifts, Mulchers | Hour | $25.23 | 16 | $403.68 |
| Specialist Labor | 235 | Labor requiring a specialized skill set: Includes Agronomists, Foresters, Biologists, etc. to provide additional technical information during the planning and implementation of the practice. Does not include NRCS or TSP services. | Hour | $110.71 | 4 | $442.84 |
| **Materials** | | | | | | |
| Aggregate, Gravel, Graded | 46 | Gravel, includes materials, equipment and labor to transport and place. Includes washed and unwashed gravel. | Cubic Yard | $34.75 | 20 | $695.00 |
| Pipe, PVC, 4", SDR 41 | 983 | Materials: - 4" - PVC - SDR 41 100 psi - ASTM D2241 | Foot | $1.91 | 80 | $152.80 |
| Tank, Poly enclosed Storage, 300-1000 gal | 1074 | Water storage tanks. Includes materials and shipping only. | Gallon | $0.90 | 0 | $0.00 |
| 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 | $38.31 | 20 | $766.20 |
| 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 | 36 | $434.88 |
| **Mobilization** | | | | | | |
| Mobilization, medium equipment | 1139 | Equipment with 70-150 HP or typical weights between 14,000 and 30,000 pounds. | Each | $255.83 | 1 | $255.83 |
| Aggregate, Shipping, Cubic Yard-mile | 2360 | Mobilization of aggregate material beyond 20 miles of local delivery from quarry to construction site. Cubic Yard-mile (Cubic Yard * miles of haul). | Cubic Yard Mile | $0.35 | 400 | $140.00 |

**Practice:** E554118Z2 - Installation of a saturated buffer drain outlet

**Scenario** #1 - Installation of a vegetated outlet

**Scenario Description:**
Install Conservation Practice Standard 604, Saturated Buffer so all of the drain outlets on a field are routed through an appropriate buffer.

**Before Situation:**
Resources are protected at the minimum level of the Conservation Practice Standard (CPS) 554 - Drainage Water Management

**After Situation:**
The adoption of this enhancement will provide resource protection above the minimum level as described in Conservation Practice Standard (CPS) 554 - Drainage Water Management

**Feature Measure:** Acre

**Scenario Unit::** Acre

**Scenario Typical Size:** 1.0

**Scenario Total Cost:** $3,630.63

**Scenario Cost/Unit:** $3,630.63

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 | $1.38 | 400 | $552.00 |
| Backhoe, 80 HP | 926 | Wheel mounted backhoe excavator with horsepower range of 60 to 90. Equipment and power unit costs. Labor not included. | Hour | $56.05 | 4 | $224.20 |
| **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 | $25.31 | 4 | $101.24 |
| Equipment Operators, Light | 232 | Includes: Skid Steer Loaders, Hydraulic Excavators <50 HP, Trenchers <12", Ag Equipment <150 HP, Pickup Trucks, Forklifts, Mulchers | Hour | $25.23 | 4 | $100.92 |
| 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 | $45.69 | 4 | $182.76 |
| **Materials** | | | | | | |
| Pipe, HDPE, 5", PCPT, Single Wall | 1271 | Pipe, Corrugated Plastic Tubing, Single Wall, Perforated, 5" diameter - ASTM F405. Material cost only. | Foot | $0.70 | 400 | $280.00 |
| Water Level Control Structure, Inline, 2 Baffle, 10" diameter | 2021 | Inline Inlet WCS 6' High x 10" Dia.connections , 2 baffle (3 compartments) | Each | $1,933.68 | 1 | $1,933.68 |
| **Mobilization** | | | | | | |
| Mobilization, medium equipment | 1139 | Equipment with 70-150 HP or typical weights between 14,000 and 30,000 pounds. | Each | $255.83 | 1 | $255.83 |

## USDA - Natural Resources Conservation Service

**Massachusetts**

**Practice:** E554118Z3 - Installation of end of pipe or ditch treatment for nitrogen

**Scenario** #1 - Installation of treatment for N

**Scenario Description:**

Add end of pipe/ditch treatment if Nitrogen is the pollutant of concern. Add CPS 605, Denitrifying Bioreactor for each drainage outlet in a field.

**Before Situation:**

Resources are protected at the minimum level of the Conservation Practice Standard (CPS) 554 - Drainage Water Management

**After Situation:**

The adoption of this enhancement will provide resource protection above the minimum level as described in Conservation Practice Standard (CPS) 554 - Drainage Water Management

**Feature Measure:** Each

**Scenario Unit::** Each

**Scenario Typical Size:** 1.0

**Scenario Total Cost:** $19,188.32

**Scenario Cost/Unit:** $19,188.32

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 | $2.53 | 800 | $2,024.00 |
| 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 | $2.36 | 333 | $785.88 |
| Earthfill, Dumped and Spread | 51 | Earthfill, dumped and spread without compaction effort, includes equipment and labor | Cubic Yard | $3.65 | 333 | $1,215.45 |
| Skidsteer, 80 HP | 933 | Skidsteer loader with horsepower range of 60 to 90. Equipment and power unit costs. Labor not included. | Hour | $44.60 | 8 | $356.80 |
| Aggregate, Wood Chips | 1098 | Includes materials, equipment and labor | Cubic Yard | $22.66 | 366 | $8,293.56 |
| Trenching, Earth, 24" x 60" | 1460 | Trenching, earth, 24" wide x 60" depth, includes equipment and labor for trenching and backfilling. | Foot | $3.80 | 50 | $190.00 |
| **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 | $25.31 | 16 | $404.96 |
| Equipment Operators, Light | 232 | Includes: Skid Steer Loaders, Hydraulic Excavators <50 HP, Trenchers <12", Ag Equipment <150 HP, Pickup Trucks, Forklifts, Mulchers | Hour | $25.23 | 8 | $201.84 |
| **Materials** | | | | | | |
| Pipe, HDPE, 6", CPT, Single Wall | 1242 | Pipe, Corrugated Plastic Tubing, Single Wall, 6" diameter - ASTM F405. Material cost only. | Foot | $1.13 | 90 | $101.70 |
| Water Level Control Structure, Inline, 2 Baffle, 10" diameter | 2021 | Inline Inlet WCS 6' High x 10" Dia.connections , 2 baffle (3 compartments) | Each | $1,933.68 | 1 | $1,933.68 |
| 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 | 60 | $724.80 |
| Water Level Control Structure, Inline, 2 Baffle, 8" diameter | 2187 | Inline Inlet WCS 6' High x 8" Dia.connections , 2 baffle (3 compartments) | Each | $1,730.56 | 1 | $1,730.56 |
| Pipe, HDPE, CPT, Double Wall, Water Tight, 10" | 2204 | Pipe, Corrugated HDPE Double Wall 10" diameter with water tight joints meeting ASTM F477. Material cost only. | Foot | $5.72 | 40 | $228.80 |
| **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 | $172.07 | 1 | $172.07 |
| Mobilization, medium equipment | 1139 | Equipment with 70-150 HP or typical weights between 14,000 and 30,000 pounds. | Each | $255.83 | 2 | $511.66 |

**Practice:** E554138X - Extend the periods of soil saturation or shallow ponding for wildlife

**Scenario** #1 - Extend saturation/ponding period

**Scenario Description:**

Extending the periods of wetness (soil saturation or shallow water), in excess of those required under National Conservation Practice Standard (NCP) Drainage Water Management (554), to meet the additional consideration of wildlife.

**Before Situation:**

Resources are protected at the minimum level of the Conservation Practice Standard (CPS) 554 - Drainage Water Management

**After Situation:**

The adoption of this enhancement will provide resource protection above the minimum level as described in Conservation Practice Standard (CPS) 554 - Drainage Water Management

**Feature Measure:** Acre

**Scenario Unit::** Acre

**Scenario Typical Size:** 25.0

**Scenario Total Cost:** $228.80

**Scenario Cost/Unit:** $9.15

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 | $28.28 | 2 | $56.56 |
| **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 | $25.31 | 5 | $126.55 |
| Supervisor 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 | $45.69 | 1 | $45.69 |

**Practice:** E578139X - Stream crossing elimination

**Scenario** #1 - Stream crossing elimination

**Scenario Description:**
Existing stream crossings on an operation are consolidated into fewer crossings in order to reduce impacts to stream habitat.

**Before Situation:**
Resources are protected at the minimum level of the Conservation Practice Standard (CPS) 578 - Stream Crossing

**After Situation:**
The adoption of this enhancement will provide resource protection above the minimum level as described in Conservation Practice Standard (CPS) 578 - Stream Crossing

**Feature Measure:** Typical feature is 0.09 acres

**Scenario Unit::** Each

**Scenario Typical Size:** 1.0

**Scenario Total Cost:** $8,058.55

**Scenario Cost/Unit:** $8,058.55

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 | $66.13 | 16 | $1,058.08 |
| 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 | $113.75 | 8 | $910.00 |
| 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 | $12.60 | 0.1 | $1.26 |
| Truck, dump, 12 CY | 1215 | Dump truck for moving bulk material. Typically capacity is 16 ton or 12 cubic yards. Includes equipment only. | Hour | $96.73 | 16 | $1,547.68 |
| **Labor** | | | | | | |
| General Labor | 231 | Labor performed using basic tools such as power tool, shovels, and other tools that do not require extensive training. Ex. pipe layer, herder, concrete placement, materials spreader, flagger, etc. | Hour | $25.31 | 32 | $809.92 |
| Equipment Operators, Light | 232 | Includes: Skid Steer Loaders, Hydraulic Excavators <50 HP, Trenchers <12", Ag Equipment <150 HP, Pickup Trucks, Forklifts, Mulchers | Hour | $25.23 | 32 | $807.36 |
| Supervisor or Manager | 234 | Labor involving supervision or management activities. Includes crew supervisors, foremen and farm/ranch managers time required for adopting new technology, etc. | Hour | $45.69 | 16 | $731.04 |
| **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 | $1.30 | 300 | $390.00 |
| 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 | $0.48 | 300 | $144.00 |
| Aggregate, river rock | 1834 | Well graded, rounded mineral substrates derived from local riverine settings. Includes materials and local delivery | Ton | $29.15 | 42 | $1,224.30 |
| One Species, Cool Season, Annual Grass or Legume | 2311 | Cool season annual grass or legume. Includes material and shipping only. | Acre | $38.26 | 0.1 | $3.83 |
| One Species, Cool Season, Introduced Perennial Grass | 2313 | Introduced, cool season perennial grass. Includes material and shipping only. | Acre | $31.86 | 0.1 | $3.19 |
| **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 | $172.07 | 1 | $172.07 |
| Mobilization, medium equipment | 1139 | Equipment with 70-150 HP or typical weights between 14,000 and 30,000 pounds. | Each | $255.83 | 1 | $255.83 |

**Practice:** E580105Z - Stream corridor bank stability improvement

**Scenario** #1 - Stream bank stability improvement

**Scenario Description:**
Stream corridor bank vegetation components are established to provide additional streambank stability.

**Before Situation:**
Resources are protected at the minimum level of the Conservation Practice Standard (CPS) 580 - Streambank and Shoreline Protection

**After Situation:**
The adoption of this enhancement will provide resource protection above the minimum level as described in Conservation Practice Standard (CPS) 580 - Streambank and Shoreline Protection

**Feature Measure:** Area planted

**Scenario Unit::** Acre

**Scenario Typical Size:** 2.0

**Scenario Total Cost:** $3,889.89

**Scenario Cost/Unit:** $1,944.95

Cost Details:

| Component Name | ID | Description | Unit | Cost | QTY | Total |
|---|---|---|---|---|---|---|
| **Equipment Installation** | | | | | | |
| Truck, Pickup | 939 | Equipment and power unit costs. Labor not included. | Hour | $21.79 | 8 | $174.32 |
| All terrain vehicles, ATV | 965 | Includes equipment, power unit and labor costs. | Hour | $28.28 | 8 | $226.24 |
| Trailer, enclosed, small | 1503 | Small enclosed trailer (typically less than 30' in length) pulled by a pickup to transport materials and equipment. Truck not included. | Hour | $7.12 | 8 | $56.96 |
| 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 | $25.31 | 48 | $1,214.88 |
| 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 | $45.69 | 8 | $365.52 |
| **Materials** | | | | | | |
| Shrub, seedling or transplant, potted, 1/2 to 1 gal. | 1526 | Potted shrub, 1/2 to 1 gal. Includes materials and shipping only. | Each | $4.52 | 65 | $293.80 |
| Tree, hardwood, seedling or transplant, potted, 1/2 to 1 gal. | 1531 | Potted hardwood tree, 1/2 to 1 gal. Includes materials and shipping only. | Each | $4.54 | 65 | $295.10 |
| Tree, conifer, seedling or transplant, potted, 1/2 to 1 gal. | 1536 | Potted conifer, 1/2 to 1 gal. Includes materials and shipping only. | Each | $4.41 | 65 | $286.65 |
| Tree shelter, mesh tree tube, 48" | 1556 | 48" tall vexar or other open weave tubular tree shelter to protect from animal damage. Materials only. | Each | $1.09 | 65 | $70.85 |
| Tree shelter, solid tube type, 4" x 24" | 1563 | 4" x 24" tree tube for protection from animal damage. Materials only. | Each | $2.19 | 65 | $142.35 |
| Tree shelter, solid tube type, 4" x 48" | 1566 | 4" x 48" tree tube for protection from animal damage. Materials only. | Each | $4.14 | 65 | $269.10 |
| Stakes, wood, 1" x 1" x 48" | 1578 | 1" x 1" x 48" wood stakes to fasten items in place. Includes materials only. | Each | $2.04 | 195 | $397.80 |

**Practice:** E580137Z - Stream corridor bank vegetation improvement

**Scenario** #1 - Stream corridor bank veg improvement

**Scenario Description:**
Stream corridor bank vegetation components are established to improve ecosystem functioning and stability.

**Before Situation:**
Resources are protected at the minimum level of the Conservation Practice Standard (CPS) 580 - Streambank and Shoreline Protection

**After Situation:**
The adoption of this enhancement will provide resource protection above the minimum level as described in Conservation Practice Standard (CPS) 580 - Streambank and Shoreline Protection

**Feature Measure:** Area planted

**Scenario Unit::** Acre

**Scenario Typical Size:** 2.0

**Scenario Total Cost:** $3,889.89

**Scenario Cost/Unit:** $1,944.95

Cost Details:

| Component Name | ID | Description | Unit | Cost | QTY | Total |
|---|---|---|---|---|---|---|
| **Equipment Installation** | | | | | | |
| Truck, Pickup | 939 | Equipment and power unit costs. Labor not included. | Hour | $21.79 | 8 | $174.32 |
| All terrain vehicles, ATV | 965 | Includes equipment, power unit and labor costs. | Hour | $28.28 | 8 | $226.24 |
| Trailer, enclosed, small | 1503 | Small enclosed trailer (typically less than 30' in length) pulled by a pickup to transport materials and equipment. Truck not included. | Hour | $7.12 | 8 | $56.96 |
| 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 | $25.31 | 48 | $1,214.88 |
| 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 | $45.69 | 8 | $365.52 |
| **Materials** | | | | | | |
| Shrub, seedling or transplant, potted, 1/2 to 1 gal. | 1526 | Potted shrub, 1/2 to 1 gal. Includes materials and shipping only. | Each | $4.52 | 65 | $293.80 |
| Tree, hardwood, seedling or transplant, potted, 1/2 to 1 gal. | 1531 | Potted hardwood tree, 1/2 to 1 gal. Includes materials and shipping only. | Each | $4.54 | 65 | $295.10 |
| Tree, conifer, seedling or transplant, potted, 1/2 to 1 gal. | 1536 | Potted conifer, 1/2 to 1 gal. Includes materials and shipping only. | Each | $4.41 | 65 | $286.65 |
| Tree shelter, mesh tree tube, 48" | 1556 | 48" tall vexar or other open weave tubular tree shelter to protect from animal damage. Materials only. | Each | $1.09 | 65 | $70.85 |
| Tree shelter, solid tube type, 4" x 24" | 1563 | 4" x 24" tree tube for protection from animal damage. Materials only. | Each | $2.19 | 65 | $142.35 |
| Tree shelter, solid tube type, 4" x 48" | 1566 | 4" x 48" tree tube for protection from animal damage. Materials only. | Each | $4.14 | 65 | $269.10 |
| Stakes, wood, 1" x 1" x 48" | 1578 | 1" x 1" x 48" wood stakes to fasten items in place. Includes materials only. | Each | $2.04 | 195 | $397.80 |

**Practice:** E590118X - Reduce risks of nutrient losses to surface water by utilizing precision ag technologies

**Scenario** #1 - Precision ag for nut reduction

**Scenario Description:**

Utilize precision application technology and techniques to reduce risk of nutrients in surface water by reducing total amount of applied and reducing the potential for delivery of nutrients into water bodies. Precision agriculture technology is utilized to plan and apply nutrients to improve nutrient use efficiency and reduce risk of nutrient losses.

**Before Situation:**

Resources are protected at the minimum level of the Conservation Practice Standard (CPS) 590 - Nutrient Management

**After Situation:**

The adoption of this enhancement will provide resource protection above the minimum level as described in Conservation Practice Standard (CPS) 590 - Nutrient Management

**Feature Measure:** Acre

**Scenario Unit::** Acre

**Scenario Typical Size:** 100.0

**Scenario Total Cost:** $1,546.17

**Scenario Cost/Unit:** $15.46

Cost Details:

| Component Name | ID | Description | Unit | Cost | QTY | Total |
|---|---|---|---|---|---|---|
| **Equipment Installation** | | | | | | |
| Fertilizer, precision application | 952 | Fertilizer application performed by light bar/GPS navigation system. Includes equipment, power unit and labor costs. | Acre | $10.67 | 100 | $1,067.00 |
| **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 | $110.71 | 2 | $221.42 |
| **Materials** | | | | | | |
| Test, Soil Test, Precision, Grid or Zone DELETION SCHEDULED for PS FY 2018 , USE CID 299 | 300 | Includes materials, shipping, labor, and equipment costs. DELETION SCHEDULED for PS FY 2018 , USE CID 299 | Each | $10.31 | 25 | $257.75 |

**Practice:** E590118Z - Improving nutrient uptake efficiency and reducing risk of nutrient losses to surface water

**Scenario** #1 - Nut mgmt for surface water

**Scenario Description:**

Nutrient management encompasses managing the amount, source, placement, and timing of the application of plant nutrients and soil amendments. Nutrients are currently being applied on the farm based on the 4R nutrient stewardship principles. Enhanced nutrient use efficiency strategies or technologies are utilized to improve nutrient use efficiency and reduce risk of nutrient losses.

**Before Situation:**

Resources are protected at the minimum level of the Conservation Practice Standard (CPS) 590 - Nutrient Management

**After Situation:**

The adoption of this enhancement will provide resource protection above the minimum level as described in Conservation Practice Standard (CPS) 590 - Nutrient Management

**Feature Measure:** Acre

**Scenario Unit::** Acre

**Scenario Typical Size:** 100.0

**Scenario Total Cost:** $1,139.62

**Scenario Cost/Unit:** $11.40

Cost Details:

| Component Name | ID | Description | Unit | Cost | QTY | Total |
|---|---|---|---|---|---|---|
| **Labor** | | | | | | |
| Specialist Labor | 235 | Labor requiring a specialized skill set: Includes Agronomists, Foresters, Biologists, etc. to provide additional technical information during the planning and implementation of the practice. Does not include NRCS or TSP services. | Hour | $110.71 | 2 | $221.42 |
| **Materials** | | | | | | |
| Nitrogen-Urease inhibitor | 260 | Nitrogen-Urease inhibitor | Acre | $8.55 | 100 | $855.00 |
| Test, Soil Nitrogen Testing | 311 | Pre-Side Dress/Deep Soil Testing. Includes materials and shipping only. | Each | $12.64 | 5 | $63.20 |

**Practice:** E590119Z - Improving nutrient uptake efficiency and reducing risk of nutrient losses to groundwater

**Scenario** #1 - Nut mgmt for groundwater

**Scenario Description:**

Nutrient management encompasses managing the amount, source, placement, and timing of the application of plant nutrients and soil amendments. Nutrients are currently being applied on the farm based on the 4R nutrient stewardship principles. Enhanced nutrient use efficiency strategies or technologies are utilized to improve nutrient use efficiency and reduce risk of nutrient losses.

**Before Situation:**

Resources are protected at the minimum level of the Conservation Practice Standard (CPS) 590 - Nutrient Management

**After Situation:**

The adoption of this enhancement will provide resource protection above the minimum level as described in Conservation Practice Standard (CPS) 590 - Nutrient Management

**Feature Measure:** Acre

**Scenario Unit::** Acre

**Scenario Typical Size:** 100.0

**Scenario Total Cost:** $1,139.62

**Scenario Cost/Unit:** $11.40

Cost Details:

| Component Name | ID | Description | Unit | Cost | QTY | Total |
|---|---|---|---|---|---|---|
| **Labor** | | | | | | |
| Specialist Labor | 235 | Labor requiring a specialized skill set: Includes Agronomists, Foresters, Biologists, etc. to provide additional technical information during the planning and implementation of the practice. Does not include NRCS or TSP services. | Hour | $110.71 | 2 | $221.42 |
| **Materials** | | | | | | |
| Nitrogen-Urease inhibitor | 260 | Nitrogen-Urease inhibitor | Acre | $8.55 | 100 | $855.00 |
| Test, Soil Nitrogen Testing | 311 | Pre-Side Dress/Deep Soil Testing. Includes materials and shipping only. | Each | $12.64 | 5 | $63.20 |

**Practice:** E595116X - Reduce risk of pesticides in surface water by utilizing precision pesticide application techniques

**Scenario** #1 - Pest mgmt for surface water

**Scenario Description:**

Utilize precision application techniques to reduce risk of pesticides in surface water by reducing total amount of chemical applied and reducing the potential for delivery of chemicals into water bodies.

**Before Situation:**

Resources are protected at the minimum level of the Conservation Practice Standard (CPS) 595 - Integrated Pest Management

**After Situation:**

The adoption of this enhancement will provide resource protection above the minimum level as described in Conservation Practice Standard (CPS) 595 - Integrated Pest Management

**Feature Measure:** Acre

**Scenario Unit::** Acre

**Scenario Typical Size:** 100.0

**Scenario Total Cost:** $1,317.13

**Scenario Cost/Unit:** $13.17

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 | $9.85 | 100 | $985.00 |
| **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 | $110.71 | 3 | $332.13 |

**Practice:** E595116Z - Reduce risk of pesticides in surface water by utilizing IPM PAMS techniques

**Scenario** #1 - IPM PAMS techniques

**Scenario Description:**

Utilize integrated pest management (IPM) prevent, avoidance, monitoring, and suppression (PAMS) techniques to reduce risk of pesticides in surface water and reducing the potential for delivery of chemicals into water bodies.

**Before Situation:**

Resources are protected at the minimum level of the Conservation Practice Standard (CPS) 595 - Integrated Pest Management

**After Situation:**

The adoption of this enhancement will provide resource protection above the minimum level as described in Conservation Practice Standard (CPS) 595 - Integrated Pest Management

**Feature Measure:** Acre

**Scenario Unit::** Acre

**Scenario Typical Size:** 100.0

**Scenario Total Cost:** $749.73

**Scenario Cost/Unit:** $7.50

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 | $41.76 | 10 | $417.60 |
| Specialist Labor | 235 | Labor requiring a specialized skill set: Includes Agronomists, Foresters, Biologists, etc. to provide additional technical information during the planning and implementation of the practice. Does not include NRCS or TSP services. | Hour | $110.71 | 3 | $332.13 |

**Practice:** E595129Z - Reduce ozone precursor emissions related to pesticides by utilizing IPM PAMS techniques

**Scenario** #1 - IPM PAMS techniques for ozone reduction

**Scenario Description:**

Utilize integrated pest management (IPM) prevent, avoidance, monitoring, and suppression (PAMS) techniques to reduce ozone precursor emissions related to pesticides.

**Before Situation:**

Resources are protected at the minimum level of the Conservation Practice Standard (CPS) 595 - Integrated Pest Management

**After Situation:**

The adoption of this enhancement will provide resource protection above the minimum level as described in Conservation Practice Standard (CPS) 595 - Integrated Pest Management

**Feature Measure:** Acre

**Scenario Unit::** Acre

**Scenario Typical Size:** 100.0

**Scenario Total Cost:** $749.73

**Scenario Cost/Unit:** $7.50

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 | $41.76 | 10 | $417.60 |
| Specialist Labor | 235 | Labor requiring a specialized skill set: Includes Agronomists, Foresters, Biologists, etc. to provide additional technical information during the planning and implementation of the practice. Does not include NRCS or TSP services. | Hour | $110.71 | 3 | $332.13 |

**Practice:** E612101Z - Cropland conversion to trees or shrubs for long term water erosion control

**Scenario** #1 - Convert crop to trees-water erosion

**Scenario Description:**

Conversion of cropped land to trees for long term erosion control and improvement of water quality. Trees are established on cropland where annually-seeded cash crops have been grown.

**Before Situation:**

Resources are protected at the minimum level of the Conservation Practice Standard (CPS) 612 - Tree/Shrub Establishment

**After Situation:**

The adoption of this enhancement will provide resource protection above the minimum level as described in Conservation Practice Standard (CPS) 612 - Tree/Shrub Establishment

**Feature Measure:** Acre

**Scenario Unit::** Acre

**Scenario Typical Size:** 10.0

**Scenario Total Cost:** $7,578.90

**Scenario Cost/Unit:** $757.89

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 | $21.36 | 10 | $213.60 |
| 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 | $19.94 | 10 | $199.40 |
| **Materials** | | | | | | |
| Tree or shrub seedling, Tropical, native or non-native, 1 gal | 1543 | tree or shrub topical seedling, native or non-native, 1 gallon pot. Includes materials and shipping only. | Each | $13.85 | 500 | $6,925.00 |
| Four Species Mix, Cool Season, Introduced Perennial Grass | 2318 | Introduced, cool season perennial grass. Includes material and shipping only. | Acre | $24.09 | 10 | $240.90 |

**Practice:** E612102Z - Cropland conversion to trees or shrubs for long term wind erosion control

**Scenario** #1 - Convert crop to trees-wind erosion

**Scenario Description:**

Conversion of cropped land to trees for long term erosion control and improvement of water quality. Trees are established on cropland where annually-seeded cash crops have been grown.

**Before Situation:**

Resources are protected at the minimum level of the Conservation Practice Standard (CPS) 612 - Tree/Shrub Establishment

**After Situation:**

The adoption of this enhancement will provide resource protection above the minimum level as described in Conservation Practice Standard (CPS) 612 - Tree/Shrub Establishment

**Feature Measure:** Acre

**Scenario Unit::** Acre

**Scenario Typical Size:** 10.0

**Scenario Total Cost:** $7,578.90

**Scenario Cost/Unit:** $757.89

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 | $21.36 | 10 | $213.60 |
| 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 | $19.94 | 10 | $199.40 |
| **Materials** | | | | | | |
| Tree or shrub seedling, Tropical, native or non-native, 1 gal | 1543 | tree or shrub topical seedling, native or non-native, 1 gallon pot. Includes materials and shipping only. | Each | $13.85 | 500 | $6,925.00 |
| Four Species Mix, Cool Season, Introduced Perennial Grass | 2318 | Introduced, cool season perennial grass. Includes material and shipping only. | Acre | $24.09 | 10 | $240.90 |

**Practice:** E612126Z - Cropland conversion to trees or shrubs for long term improvement of water quality

**Scenario** #1 - Convert crop to trees-WQ

**Scenario Description:**

Conversion of cropped land to trees for long term erosion control and improvement of water quality. Trees are established on cropland where annually-seeded cash crops have been grown

**Before Situation:**

Resources are protected at the minimum level of the Conservation Practice Standard (CPS) 612 - Tree/Shrub Establishment

**After Situation:**

The adoption of this enhancement will provide resource protection above the minimum level as described in Conservation Practice Standard (CPS) 612 - Tree/Shrub Establishment

**Feature Measure:** Acre

**Scenario Unit::** Acre

**Scenario Typical Size:** 10.0

**Scenario Total Cost:** $7,578.90

**Scenario Cost/Unit:** $757.89

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 | $21.36 | 10 | $213.60 |
| 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 | $19.94 | 10 | $199.40 |
| **Materials** | | | | | | |
| Tree or shrub seedling, Tropical, native or non-native, 1 gal | 1543 | tree or shrub topical seedling, native or non-native, 1 gallon pot. Includes materials and shipping only. | Each | $13.85 | 500 | $6,925.00 |
| Four Species Mix, Cool Season, Introduced Perennial Grass | 2318 | Introduced, cool season perennial grass. Includes material and shipping only. | Acre | $24.09 | 10 | $240.90 |

**Practice:** E612130Z - Planting for high carbon sequestration rate

**Scenario** #1 - Planting for high carbon sequestration

**Scenario Description:**

Plant tree species and use stocking levels for higher growth to increase the rate of carbon sequestration (capture). Use species with a longer life span as well as relatively fast growth, and species suitable for durable manufactured products. Increase stocking levels in forests that are not fully stocked. Implement afforestation on appropriate open lands.

**Before Situation:**

Resources are protected at the minimum level of the Conservation Practice Standard (CPS) 612 - Tree/Shrub Establishment

**After Situation:**

The adoption of this enhancement will provide resource protection above the minimum level as described in Conservation Practice Standard (CPS) 612 - Tree/Shrub Establishment

**Feature Measure:** Acre

**Scenario Unit::** Acre

**Scenario Typical Size:** 10.0

**Scenario Total Cost:** $10,576.50

**Scenario Cost/Unit:** $1,057.65

Cost Details:

| Component Name | ID | Description | Unit | Cost | QTY | Total |
|---|---|---|---|---|---|---|
| **Equipment Installation** | | | | | | |
| Truck, Pickup | 939 | Equipment and power unit costs. Labor not included. | Hour | $21.79 | 6 | $130.74 |
| Chemical, ground application | 948 | Chemical application performed by ground equipment. Includes equipment, power unit and labor costs. | Acre | $6.13 | 4 | $24.52 |
| Chemical, ground application | 948 | Chemical application performed by ground equipment. Includes equipment, power unit and labor costs. | Acre | $6.13 | 1 | $6.13 |
| Tractor, agricultural, 60 HP | 963 | Agricultural tractor with horsepower range of 50 to 90. Equipment and power unit costs. Labor not included. | Hour | $24.77 | 6 | $148.62 |
| 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 | 6 | $41.04 |
| **Foregone Income** | | | | | | |
| FI, Corn Dryland | 1959 | Dryland Corn is Primary Crop | Acre | $376.15 | 4 | $1,504.60 |
| FI, Soybeans Dryland | 1961 | Dryland Soybeans is Primary Crop | Acre | $361.97 | 4 | $1,447.88 |
| FI, Wheat Dryland | 1963 | Dryland Wheat is Primary Crop | Acre | $269.62 | 2 | $539.24 |
| **Labor** | | | | | | |
| General Labor | 231 | Labor performed using basic tools such as power tool, shovels, and other tools that do not require extensive training. Ex. pipe layer, herder, concrete placement, materials spreader, flagger, etc. | Hour | $25.31 | 6 | $151.86 |
| Equipment Operators, Light | 232 | Includes: Skid Steer Loaders, Hydraulic Excavators <50 HP, Trenchers <12", Ag Equipment <150 HP, Pickup Trucks, Forklifts, Mulchers | Hour | $25.23 | 6 | $151.38 |
| Supervisor 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 | $45.69 | 6 | $274.14 |
| **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 | $17.48 | 4 | $69.92 |
| 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 | $25.63 | 4 | $102.52 |
| 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 shi | Acre | $1.28 | 3 | $3.84 |
| Tree, hardwood, seedling or transplant, bare root, 16-36" | 1510 | Bare root hardwood trees 18-36" tall. Includes materials and shipping only. | Each | $0.80 | 7260 | $5,808.00 |
| **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 | $172.07 | 1 | $172.07 |

**Practice:** E612132Z - Establishing tree/shrub species to restore native plant communities

**Scenario** #1 - Tree/shrubs-restore native communities

**Scenario Description:**

Establish trees and/or shrubs to restore elements of plant diversity that have been lost through past diseases or improper management. For example, disease-resistant varieties of elm and chestnut can be established to restore the ecological functions of American elm and American chestnut. At the stand level, past forest management may have eliminated certain native tree species. Restoring stand-level diversity and function addresses a wide array of resource concerns and strengthens ongoing management activities. This enhancement improves a forest that is already in good condition by increasing plant diversity, and improving health and vigor through adding plants with resistance to disease, pests, or other local hazards. Additional benefits include contributing to carbon storage, and providing diversity in wildlife habitat and food sources.

**Before Situation:**

Resources are protected at the minimum level of the Conservation Practice Standard (CPS) 612 - Tree/Shrub Establishment

**After Situation:**

The adoption of this enhancement will provide resource protection above the minimum level as described in Conservation Practice Standard (CPS) 612 - Tree/Shrub Establishment

**Feature Measure:** Acre

**Scenario Unit::** Acre

**Scenario Typical Size:** 5.0

**Scenario Total Cost:** $3,185.34

**Scenario Cost/Unit:** $637.07

Cost Details:

| Component Name | ID | Description | Unit | Cost | QTY | Total |
|---|---|---|---|---|---|---|
| **Equipment Installation** | | | | | | |
| Truck, Pickup | 939 | Equipment and power unit costs. Labor not included. | Hour | $21.79 | 2 | $43.58 |
| Hand tools, tree planting | 1590 | Various hand tools for digging holes and planting trees such as augers, dibble bars, planting shovel, hoe-dad. Equipment only. Labor not included. | Hour | $12.04 | 12 | $144.48 |
| **Labor** | | | | | | |
| General Labor | 231 | Labor performed using basic tools such as power tool, shovels, and other tools that do not require extensive training. Ex. pipe layer, herder, concrete placement, materials spreader, flagger, etc. | Hour | $25.31 | 12 | $303.72 |
| 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 t | Hour | $71.89 | 4 | $287.56 |
| **Materials** | | | | | | |
| Shrub, seedling or transplant, potted, 1/2 to 1 gal. | 1526 | Potted shrub, 1/2 to 1 gal. Includes materials and shipping only. | Each | $4.52 | 50 | $226.00 |
| 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 | $7.15 | 100 | $715.00 |
| Tree, conifer, seedling or transplant, potted or B&B, 2-3 gal. | 1537 | Potted or balled and burlapped conifer tree, 2-3 gal. Includes materials and shipping only. | Each | $6.97 | 100 | $697.00 |
| Tree shelter, solid tube type, 4" x 60" | 1567 | 4" x 60" tree tube for protection from animal damage. Materials only. | Each | $5.12 | 150 | $768.00 |

**Practice:** E612133X1 - Adding food-producing trees and shrubs to existing plantings

**Scenario** #1 - Adding food-producing trees and shrubs

**Scenario Description:**

Plant food-producing trees and shrubs for wildlife or human consumption within windbreaks, alley cropping, multi-story cropping, or silvopasture systems, or riparian forest buffers.

**Before Situation:**

Resources are protected at the minimum level of the Conservation Practice Standard (CPS) 612 - Tree/Shrub Establishment

**After Situation:**

The adoption of this enhancement will provide resource protection above the minimum level as described in Conservation Practice Standard (CPS) 612 - Tree/Shrub Establishment

**Feature Measure:** Each

**Scenario Unit::** Each

**Scenario Typical Size:** 1.0

**Scenario Total Cost:** $1,452.58

**Scenario Cost/Unit:** $1,452.58

Cost Details:

| Component Name | ID | Description | Unit | Cost | QTY | Total |
|---|---|---|---|---|---|---|
| **Equipment Installation** | | | | | | |
| Truck, Pickup | 939 | Equipment and power unit costs. Labor not included. | Hour | $21.79 | 2 | $43.58 |
| Chemical, ground application | 948 | Chemical application performed by ground equipment. Includes equipment, power unit and labor costs. | Acre | $6.13 | 1 | $6.13 |
| 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 |
| **Foregone Income** | | | | | | |
| FI, Corn Dryland | 1959 | Dryland Corn is Primary Crop | Acre | $376.15 | 0.41 | $154.22 |
| FI, Soybeans Dryland | 1961 | Dryland Soybeans is Primary Crop | Acre | $361.97 | 0.36 | $130.31 |
| FI, Wheat Dryland | 1963 | Dryland Wheat is Primary Crop | Acre | $269.62 | 0.23 | $62.01 |
| **Labor** | | | | | | |
| General Labor | 231 | Labor performed using basic tools such as power tool, shovels, and other tools that do not require extensive training. Ex. pipe layer, herder, concrete placement, materials spreader, flagger, etc. | Hour | $25.31 | 10 | $253.10 |
| **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 | $17.48 | 1 | $17.48 |
| 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 | $25.63 | 1 | $25.63 |
| 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 shi | Acre | $1.28 | 1 | $1.28 |
| Shrub, seedling or transplant, bare root, 18"-36" | 1507 | Bare root hardwood trees 18-36" tall. Includes materials and shipping only. | Each | $0.57 | 341 | $194.37 |
| Tree, hardwood, seedling or transplant, bare root, 16-36" | 1510 | Bare root hardwood trees 18-36" tall. Includes materials and shipping only. | Each | $0.80 | 340 | $272.00 |
| **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 | $172.07 | 1 | $172.07 |

**Practice:** E612133X2 - Cultural plantings

**Scenario** #1 - Cultural plantings

**Scenario Description:**

Plant trees and shrubs that are of cultural significance, such as those species utilized by Tribes in traditional practices, medicinals, species used in basket-making, etc. (e.g., paper birch, slippery elm, witch hazel).

**Before Situation:**

Resources are protected at the minimum level of the Conservation Practice Standard (CPS) 612 - Tree/Shrub Establishment

**After Situation:**

The adoption of this enhancement will provide resource protection above the minimum level as described in Conservation Practice Standard (CPS) 612 - Tree/Shrub Establishment

**Feature Measure:** Acre

**Scenario Unit::** Acre

**Scenario Typical Size:** 1.0

**Scenario Total Cost:** $1,531.01

**Scenario Cost/Unit:** $1,531.01

Cost Details:

| Component Name | ID | Description | Unit | Cost | QTY | Total |
|---|---|---|---|---|---|---|
| **Equipment Installation** | | | | | | |
| Truck, Pickup | 939 | Equipment and power unit costs. Labor not included. | Hour | $21.79 | 2 | $43.58 |
| Chemical, ground application | 948 | Chemical application performed by ground equipment. Includes equipment, power unit and labor costs. | Acre | $6.13 | 1 | $6.13 |
| 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 |
| **Foregone Income** | | | | | | |
| FI, Corn Dryland | 1959 | Dryland Corn is Primary Crop | Acre | $376.15 | 0.41 | $154.22 |
| FI, Soybeans Dryland | 1961 | Dryland Soybeans is Primary Crop | Acre | $361.97 | 0.36 | $130.31 |
| FI, Wheat Dryland | 1963 | Dryland Wheat is Primary Crop | Acre | $269.62 | 0.23 | $62.01 |
| **Labor** | | | | | | |
| General Labor | 231 | Labor performed using basic tools such as power tool, shovels, and other tools that do not require extensive training. Ex. pipe layer, herder, concrete placement, materials spreader, flagger, etc. | Hour | $25.31 | 10 | $253.10 |
| **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 | $17.48 | 1 | $17.48 |
| 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 | $25.63 | 1 | $25.63 |
| 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 shi | Acre | $1.28 | 1 | $1.28 |
| Tree, hardwood, seedling or transplant, bare root, 16-36" | 1510 | Bare root hardwood trees 18-36" tall. Includes materials and shipping only. | Each | $0.80 | 681 | $544.80 |
| **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 | $172.07 | 1 | $172.07 |

**Practice:** E612133X3 - Sugarbush management

**Scenario** #1 - Sugarbush management

**Scenario Description:**

Maintain at least 20% of basal area in species other than sugar maple to provide species diversity. Half of the trees that are not sugar maples (10%) will be mast-producing species. Use maple tree tapping guidelines that minimize tree damage.

**Before Situation:**

Resources are protected at the minimum level of the Conservation Practice Standard (CPS) 612 - Tree/Shrub Establishment

**After Situation:**

The adoption of this enhancement will provide resource protection above the minimum level as described in Conservation Practice Standard (CPS) 612 - Tree/Shrub Establishment

**Feature Measure:** Each

**Scenario Unit::** Each

**Scenario Typical Size:** 20.0

**Scenario Total Cost:** $682.94

**Scenario Cost/Unit:** $34.15

Cost Details:

| Component Name | ID | Description | Unit | Cost | QTY | Total |
|---|---|---|---|---|---|---|
| **Equipment Installation** | | | | | | |
| Chainsaw | 937 | Equipment and power unit costs. Labor not included. | Hour | $4.37 | 2 | $8.74 |
| Truck, Pickup | 939 | Equipment and power unit costs. Labor not included. | Hour | $21.79 | 2 | $43.58 |
| 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 | $64.90 | 1 | $64.90 |
| 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 | $25.31 | 10 | $253.10 |
| **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 | $17.48 | 0.5 | $8.74 |
| 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 | $7.15 | 20 | $143.00 |
| Tree shelter, solid tube type, 4" x 60" | 1567 | 4" x 60" tree tube for protection from animal damage. Materials only. | Each | $5.12 | 20 | $102.40 |
| Cable ties, plastic | 1575 | Plastic cable ties (typ. 8-12") to assist in securing items. Materials only. | Each | $0.05 | 60 | $3.00 |
| Stakes, wood, 3/4" x 3/4" x 60" | 1583 | 3/4" x 3/4" x 60" wood stakes to fasten items in place. Includes materials only. | Each | $1.57 | 20 | $31.40 |

**Practice:** E612136Z - Tree/shrub planting for wildlife food

**Scenario** #1 - Tree/shrub planting for wildlife food

**Scenario Description:**

Tree or shrub planting to enhance habitat for native wildlife. A minimum of five tree or shrub species will be used; they will be species that provide food and/or cover for identified wildlife species.

**Before Situation:**

Resources are protected at the minimum level of the Conservation Practice Standard (CPS) 612 - Tree/Shrub Establishment

**After Situation:**

The adoption of this enhancement will provide resource protection above the minimum level as described in Conservation Practice Standard (CPS) 612 - Tree/Shrub Establishment

**Feature Measure:** Acre

**Scenario Unit::** Acre

**Scenario Typical Size:** 1.0

**Scenario Total Cost:** $1,542.81

**Scenario Cost/Unit:** $1,542.81

Cost Details:

| Component Name | ID | Description | Unit | Cost | QTY | Total |
|---|---|---|---|---|---|---|
| **Equipment Installation** | | | | | | |
| Truck, Pickup | 939 | Equipment and power unit costs. Labor not included. | Hour | $21.79 | 2 | $43.58 |
| Chemical, ground application | 948 | Chemical application performed by ground equipment. Includes equipment, power unit and labor costs. | Acre | $6.13 | 1 | $6.13 |
| 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 | 11 | $132.44 |
| **Foregone Income** | | | | | | |
| FI, Corn Dryland | 1959 | Dryland Corn is Primary Crop | Acre | $376.15 | 0.41 | $154.22 |
| FI, Soybeans Dryland | 1961 | Dryland Soybeans is Primary Crop | Acre | $361.97 | 0.36 | $130.31 |
| FI, Wheat Dryland | 1963 | Dryland Wheat is Primary Crop | Acre | $269.62 | 0.23 | $62.01 |
| **Labor** | | | | | | |
| General Labor | 231 | Labor performed using basic tools such as power tool, shovels, and other tools that do not require extensive training. Ex. pipe layer, herder, concrete placement, materials spreader, flagger, etc. | Hour | $25.31 | 11 | $278.41 |
| **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 | $17.48 | 1 | $17.48 |
| 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 | $25.63 | 1 | $25.63 |
| 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 shi | Acre | $1.28 | 1 | $1.28 |
| Shrub, seedling or transplant, bare root, 18"-36" | 1507 | Bare root hardwood trees 18-36" tall. Includes materials and shipping only. | Each | $0.57 | 605 | $344.85 |
| Tree, hardwood, seedling or transplant, bare root, 16-36" | 1510 | Bare root hardwood trees 18-36" tall. Includes materials and shipping only. | Each | $0.80 | 218 | $174.40 |
| **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 | $172.07 | 1 | $172.07 |

**Practice:** E612137Z - Tree/shrub planting for wildlife cover

**Scenario** #1 - Tree/shrub planting for wildlife cover

**Scenario Description:**

Tree or shrub planting to enhance habitat for native wildlife. A minimum of five tree or shrub species will be used; they will be species that provide food and/or cover for identified wildlife species.

**Before Situation:**

Resources are protected at the minimum level of the Conservation Practice Standard (CPS) 612 - Tree/Shrub Establishment

**After Situation:**

The adoption of this enhancement will provide resource protection above the minimum level as described in Conservation Practice Standard (CPS) 612 - Tree/Shrub Establishment

**Feature Measure:** Acre

**Scenario Unit::** Acre

**Scenario Typical Size:** 1.0

**Scenario Total Cost:** $1,542.81

**Scenario Cost/Unit:** $1,542.81

Cost Details:

| Component Name | ID | Description | Unit | Cost | QTY | Total |
|---|---|---|---|---|---|---|
| **Equipment Installation** | | | | | | |
| Truck, Pickup | 939 | Equipment and power unit costs. Labor not included. | Hour | $21.79 | 2 | $43.58 |
| Chemical, ground application | 948 | Chemical application performed by ground equipment. Includes equipment, power unit and labor costs. | Acre | $6.13 | 1 | $6.13 |
| 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 | 11 | $132.44 |
| **Foregone Income** | | | | | | |
| FI, Corn Dryland | 1959 | Dryland Corn is Primary Crop | Acre | $376.15 | 0.41 | $154.22 |
| FI, Soybeans Dryland | 1961 | Dryland Soybeans is Primary Crop | Acre | $361.97 | 0.36 | $130.31 |
| FI, Wheat Dryland | 1963 | Dryland Wheat is Primary Crop | Acre | $269.62 | 0.23 | $62.01 |
| **Labor** | | | | | | |
| General Labor | 231 | Labor performed using basic tools such as power tool, shovels, and other tools that do not require extensive training. Ex. pipe layer, herder, concrete placement, materials spreader, flagger, etc. | Hour | $25.31 | 11 | $278.41 |
| **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 | $17.48 | 1 | $17.48 |
| 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 | $25.63 | 1 | $25.63 |
| 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 shi | Acre | $1.28 | 1 | $1.28 |
| Shrub, seedling or transplant, bare root, 18"-36" | 1507 | Bare root hardwood trees 18-36" tall. Includes materials and shipping only. | Each | $0.57 | 605 | $344.85 |
| Tree, hardwood, seedling or transplant, bare root, 16-36" | 1510 | Bare root hardwood trees 18-36" tall. Includes materials and shipping only. | Each | $0.80 | 218 | $174.40 |
| **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 | $172.07 | 1 | $172.07 |

**Practice:** E643132X - Restoration of sensitive coastal vegetative communities

**Scenario** #1 - Restore sensitive coastal veg community

**Scenario Description:**

Enhance the level of restoration in unique and diminishing coastal ecosystems by establishing native herbaceous and woody plants. Protect established vegetation, and manage to maintain floristic quality and the provision of environmental services.

**Before Situation:**

Resources are protected at the minimum level of the Conservation Practice Standard (CPS) 643 - Restoration and Management of Rare and Declining Habitats

**After Situation:**

The adoption of this enhancement will provide resource protection above the minimum level as described in Conservation Practice Standard (CPS) 643 - Restoration and Management of Rare and Declining Habitats

**Feature Measure:** Each

**Scenario Unit::** Each

**Scenario Typical Size:** 25.0

**Scenario Total Cost:** $1,985.38

**Scenario Cost/Unit:** $79.42

Cost Details:

| Component Name | ID | Description | Unit | Cost | QTY | Total |
|---|---|---|---|---|---|---|
| **Labor** | | | | | | |
| Equipment Operators, Light | 232 | Includes: Skid Steer Loaders, Hydraulic Excavators <50 HP, Trenchers <12", Ag Equipment <150 HP, Pickup Trucks, Forklifts, Mulchers | Hour | $25.23 | 16 | $403.68 |
| 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 t | Hour | $71.89 | 4 | $287.56 |
| **Materials** | | | | | | |
| Post, Steel T, 1.33 lbs, 6' | 15 | Steel Post, Studded 6' - 1.33 lb. Includes materials and shipping only. | Each | $6.68 | 50 | $334.00 |
| Cattle Panel | 1409 | Welded wire cattle panel typically 1/4" galvanized steel rods, 50" high x 16' long. Materials only. | Each | $20.89 | 25 | $522.25 |
| Tree, hardwood, seedling or transplant, potted or B&B, 5 gal. | 1533 | Potted or balled and burlapped hardwood tree, 5 gal. Includes materials and shipping only. | Each | $14.69 | 25 | $367.25 |
| **Mobilization** | | | | | | |
| Mobilization, very small equipment | 1137 | Equipment that is small enough to be transported by a pick-up truck with typical weights less than 3,500 pounds. Can be multiple pieces of equipment if all hauled simultaneously. | Each | $70.64 | 1 | $70.64 |

## USDA - Natural Resources Conservation Service

**Massachusetts**

**Practice:** E643139X - Creating native plant refugia

**Scenario** #1 - Creating native plant refugia

**Scenario Description:**

Provide protection from adverse environmental conditions to create refugia for documented occurrences of sensitive plant communities.

**Before Situation:**

Resources are protected at the minimum level of the Conservation Practice Standard (CPS) 643 - Restoration and Management of Rare and Declining Habitats

**After Situation:**

The adoption of this enhancement will provide resource protection above the minimum level as described in Conservation Practice Standard (CPS) 643 - Restoration and Management of Rare and Declining Habitats

**Feature Measure:** Feet of Fence

**Scenario Unit::** Foot

**Scenario Typical Size:** 440.0

**Scenario Total Cost:** $3,434.75

**Scenario Cost/Unit:** $7.81

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 | $7.31 | 8 | $58.48 |
| Chainsaw | 937 | Equipment and power unit costs. Labor not included. | Hour | $4.37 | 2 | $8.74 |
| Truck, Pickup | 939 | Equipment and power unit costs. Labor not included. | Hour | $21.79 | 8 | $174.32 |
| Tractor, agricultural, 60 HP | 963 | Agricultural tractor with horsepower range of 50 to 90. Equipment and power unit costs. Labor not included. | Hour | $24.77 | 8 | $198.16 |
| **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 | $25.31 | 16 | $404.96 |
| Specialist Labor | 235 | Labor requiring a specialized skill set: Includes Agronomists, Foresters, Biologists, etc. to provide additional technical information during the planning and implementation of the practice. Does not include NRCS or TSP services. | Hour | $110.71 | 2 | $221.42 |
| **Materials** | | | | | | |
| Wire, Woven, Galvanized, 12.5 Gauge, 48" | 4 | Galvanized 12.5 gauge, 48" - 330' roll. Includes materials and shipping only. | Each | $257.12 | 3 | $771.36 |
| 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 | 38 | $1,025.24 |
| Fence, Wire Assembly, Woven Wire | 35 | Brace pins, twist sticks, staples. Includes materials and shipping only. | Foot | $0.12 | 1648 | $197.76 |
| Gate, Game, 8' High X 4' | 1082 | 4' Wide Game Gate (8' Tall). Includes materials and shipping only. | Each | $202.24 | 1 | $202.24 |
| **Mobilization** | | | | | | |
| Mobilization, small equipment | 1138 | Equipment <70 HP but can't be transported by a pick-up truck or with typical weights between 3,500 to 14,000 pounds. | Each | $172.07 | 1 | $172.07 |

**Practice:** E645137Z - Reduction of attractants to human-subsidized predators in sensitive wildlife species habitat

**Scenario** #1 - Reduce human-subsidized predators

**Scenario Description:**

Reduction of artificial perching sites, nest sites, food, and water available to subsidized predators in areas where human-subsidized predators are a threat to sensitive wildlife species. Human-subsidized predators may include ravens, crows, magpies, coyotes, foxes, skunks, raccoons, and other species. Activities under this enhancement may include removal of non- native or invasive trees; removal of unused power poles, corrals, windmills, buildings, and other vertical structures; and/or removal or management of watering facilities, dead livestock, road kill, garbage, animal feed, dumps, and other non-natural food sources.

**Before Situation:**

Resources are protected at the minimum level of the Conservation Practice Standard (CPS) 645 - Upland Wildlife Habitat Management

**After Situation:**

The adoption of this enhancement will provide resource protection above the minimum level as described in Conservation Practice Standard (CPS) 645 - Upland Wildlife Habitat Management

**Feature Measure:** Acre

**Scenario Unit::** Acre

**Scenario Typical Size:** 40.0

**Scenario Total Cost:** $3,468.47

**Scenario Cost/Unit:** $86.71

Cost Details:

| Component Name | ID | Description | Unit | Cost | QTY | Total |
|---|---|---|---|---|---|---|
| **Equipment Installation** | | | | | | |
| Truck, Pickup | 939 | Equipment and power unit costs. Labor not included. | Hour | $21.79 | 72 | $1,568.88 |
| Trailer, enclosed, small | 1503 | Small enclosed trailer (typically less than 30' in length) pulled by a pickup to transport materials and equipment. Truck not included. | Hour | $7.12 | 72 | $512.64 |
| **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 | $25.31 | 48 | $1,214.88 |
| **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 | $172.07 | 1 | $172.07 |

**Practice:** E646136Z1 - Close structures to capture/retain rainfall to improve food for waterfowl/wading birds during winter

**Scenario** #1 - Close structures to improve food

**Scenario Description:**

When flooded to shallow depths during fall and winter, agricultural fields provide ideal foraging habitat for myriad species of waterfowl and wading birds . In addition, flooded conditions promote establishment of aquatic invertebrate populations, thus providing protein-rich food sources for shorebirds as well as waterfowl and wading birds.

**Before Situation:**

Resources are protected at the minimum level of the Conservation Practice Standard (CPS) 646 - Shallow Water Development and Management

**After Situation:**

The adoption of this enhancement will provide resource protection above the minimum level as described in Conservation Practice Standard (CPS) 646 - Shallow Water Development and Management

**Feature Measure:** acre

**Scenario Unit::** Acre

**Scenario Typical Size:** 50.0

**Scenario Total Cost:** $1,436.26

**Scenario Cost/Unit:** $28.73

Cost Details:

| Component Name | ID | Description | Unit | Cost | QTY | Total |
|---|---|---|---|---|---|---|
| **Equipment Installation** | | | | | | |
| Truck, Pickup | 939 | Equipment and power unit costs. Labor not included. | Hour | $21.79 | 9 | $196.11 |
| Mower, Bush Hog | 940 | Equipment and power unit costs. Labor not included. | Hour | $51.91 | 2.5 | $129.78 |
| **Labor** | | | | | | |
| General Labor | 231 | Labor performed using basic tools such as power tool, shovels, and other tools that do not require extensive training. Ex. pipe layer, herder, concrete placement, materials spreader, flagger, etc. | Hour | $25.31 | 22 | $556.82 |
| Specialist Labor | 235 | Labor requiring a specialized skill set: Includes 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 | $110.71 | 5 | $553.55 |

**Practice:** E646136Z2 - Extend retention of rainfall to provide food for late winter habitat

**Scenario** #1 - Extend retention - food

**Scenario Description:**

When flooded to shallow depths during fall and retention of the captured rainfall is extended into late winter, agricultural fields provide maximum foraging habitat for myriad species of waterfowl and wading birds. Agriculture fields are typically drained in preparation of spring planting, but retention of water into late winter will provide high quality food for wildlife during a time when it may otherwise be in low abundance.???

**Before Situation:**

Resources are protected at the minimum level of the Conservation Practice Standard (CPS) 646 - Shallow Water Development and Management

**After Situation:**

The adoption of this enhancement will provide resource protection above the minimum level as described in Conservation Practice Standard (CPS) 646 - Shallow Water Development and Management

**Feature Measure:** acre

**Scenario Unit::** Acre

**Scenario Typical Size:** 50.0

**Scenario Total Cost:** $1,691.79

**Scenario Cost/Unit:** $33.84

Cost Details:

| Component Name | ID | Description | Unit | Cost | QTY | Total |
|---|---|---|---|---|---|---|
| **Equipment Installation** | | | | | | |
| Truck, Pickup | 939 | Equipment and power unit costs. Labor not included. | Hour | $21.79 | 11 | $239.69 |
| Mower, Bush Hog | 940 | Equipment and power unit costs. Labor not included. | Hour | $51.91 | 2.5 | $129.78 |
| **Labor** | | | | | | |
| General Labor | 231 | Labor performed using basic tools such as power tool, shovels, and other tools that do not require extensive training. Ex. pipe layer, herder, concrete placement, materials spreader, flagger, etc. | Hour | $25.31 | 26 | $658.06 |
| Specialist Labor | 235 | Labor requiring a specialized skill set: Includes 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 | $110.71 | 6 | $664.26 |

**Practice:** E646136Z3 - Shorebird habitat, late season shallow water with manipulation to improve food sources

**Scenario** #1 - Late season shallow water - food

**Scenario Description:**

Suitable shorebird habitat is limited during the summer and fall as birds migrate south post-breeding and providing shallow water and mud flat habitat will benefit a variety of shorebird species. Optimal conditions are created when water levels are slowly reduced through evaporation, which allows for propagation of invertebrates (typically insect larvae) used as food by shorebirds. Manipulation of vegetation, preferably through rolling, creates open conditions required by this suite of birds as a means to detect and avoid predators, and provides nutrient inputs for invertebrate production.

**Before Situation:**

Resources are protected at the minimum level of the Conservation Practice Standard (CPS) 646 - Shallow Water Development and Management

**After Situation:**

The adoption of this enhancement will provide resource protection above the minimum level as described in Conservation Practice Standard (CPS) 646 - Shallow Water Development and Management

**Feature Measure:** acre

**Scenario Unit::** Acre

**Scenario Typical Size:** 50.0

**Scenario Total Cost:** $2,714.22

**Scenario Cost/Unit:** $54.28

Cost Details:

| Component Name | ID | Description | Unit | Cost | QTY | Total |
|---|---|---|---|---|---|---|
| **Equipment Installation** | | | | | | |
| Truck, Pickup | 939 | Equipment and power unit costs. Labor not included. | Hour | $21.79 | 9 | $196.11 |
| Mower, Bush Hog | 940 | Equipment and power unit costs. Labor not included. | Hour | $51.91 | 4.5 | $233.60 |
| Tillage, Primary | 946 | Includes heavy disking (offset) or chisel plow. Includes equipment, power unit and labor costs. | Acre | $16.60 | 50 | $830.00 |
| **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 | $25.31 | 22 | $556.82 |
| Specialist Labor | 235 | Labor requiring a specialized skill set: Includes 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 | $110.71 | 5 | $553.55 |
| **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 | $172.07 | 2 | $344.14 |

**Practice:** E646136Z4 - Shorebird habitat, extended late season shallow water with manipulation to improve food sources

**Scenario** #1 - Extended late season shallow water-food

**Scenario Description:**

When flooded to shallow depths during fall and retention of the captured rainfall is extended into late winter, the shallow water and mud flat habitat will benefit a variety of shorebird species. Optimal conditions are created when water levels are slowly reduced through evaporation, which allows for propagation of invertebrates (typically insect larvae) used as food by shorebirds. Agriculture fields are typically drained in preparation of spring planting, but retention of water into late winter will provide high quality food for wildlife during a time when it may otherwise be in low abundance. Manipulation of vegetation, preferably through rolling, creates open conditions required by this suite of birds as a means to detect and avoid predators, and provides nutrient inputs for invertebrate production.

**Before Situation:**

Resources are protected at the minimum level of the Conservation Practice Standard (CPS) 646 - Shallow Water Development and Management

**After Situation:**

The adoption of this enhancement will provide resource protection above the minimum level as described in Conservation Practice Standard (CPS) 646 - Shallow Water Development and Management

**Feature Measure:** acre

**Scenario Unit::** Acre

**Scenario Typical Size:** 50.0

**Scenario Total Cost:** $3,021.66

**Scenario Cost/Unit:** $60.43

Cost Details:

| Component Name | ID | Description | Unit | Cost | QTY | Total |
|---|---|---|---|---|---|---|
| **Equipment Installation** | | | | | | |
| Truck, Pickup | 939 | Equipment and power unit costs. Labor not included. | Hour | $21.79 | 11 | $239.69 |
| Mower, Bush Hog | 940 | Equipment and power unit costs. Labor not included. | Hour | $51.91 | 5.5 | $285.51 |
| Tillage, Primary | 946 | Includes heavy disking (offset) or chisel plow. Includes equipment, power unit and labor costs. | Acre | $16.60 | 50 | $830.00 |
| **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 | $25.31 | 26 | $658.06 |
| Specialist Labor | 235 | Labor requiring a specialized skill set: Includes 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 | $110.71 | 6 | $664.26 |
| **Mobilization** | | | | | | |
| Mobilization, small equipment | 1138 | Equipment <70 HP but can't be transported by a pick-up truck or with typical weights between 3,500 to 14,000 pounds. | Each | $172.07 | 2 | $344.14 |

**Practice:** E646137X - Renovate small, shallow pothole and playa sites which may seasonally hold water

**Scenario** #1 - Shallow water development and management

**Scenario Description:**
Renovate small, shallow pothole and playa sites which may seasonally hold water.

**Before Situation:**
Resources are protected at the minimum level of the Conservation Practice Standard (CPS) 646 - Shallow Water Development and Management

**After Situation:**
The adoption of this enhancement will provide resource protection above the minimum level as described in Conservation Practice Standard (CPS) 646 - Shallow Water Development and Management

**Feature Measure:** Acre

**Scenario Unit::** Acre

**Scenario Typical Size:** 4.0

**Scenario Total Cost:** $7,042.52

**Scenario Cost/Unit:** $1,760.63

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 | $2.36 | 1613 | $3,806.68 |
| Chemical, ground application | 948 | Chemical application performed by ground equipment. Includes equipment, power unit and labor costs. | Acre | $6.13 | 4 | $24.52 |
| Seeding Operation, No Till/Grass Drill | 960 | No Till drill or grass drill for seeding. Includes equipment, power unit and labor costs. | Acre | $21.36 | 3 | $64.08 |
| **Foregone Income** | | | | | | |
| FI, Corn Dryland | 1959 | Dryland Corn is Primary Crop | Acre | $376.15 | 0.41 | $154.22 |
| FI, Soybeans Dryland | 1961 | Dryland Soybeans is Primary Crop | Acre | $361.97 | 0.23 | $83.25 |
| FI, Wheat Dryland | 1963 | Dryland Wheat is Primary Crop | Acre | $269.62 | 0.36 | $97.06 |
| **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 | $37.13 | 4 | $148.52 |
| Six Species Mix, Native Forb | 2334 | Native forb mix. Includes material and shipping only. | Acre | $960.66 | 2 | $1,921.32 |
| 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 | $254.41 | 1 | $254.41 |
| **Mobilization** | | | | | | |
| Mobilization, large equipment | 1140 | Equipment >150HP or typical weights greater than 30,000 pounds or loads requiring over width or over length permits. | Each | $488.45 | 1 | $488.45 |

**Practice:** E646137Z1 - Close structures to capture and retain rainfall to improve cover and shelter for birds during winter

**Scenario** #1 - Close structures during winter.

**Scenario Description:**
When flooded to shallow depths during fall and winter, agricultural fields provide ideal cover and shelter for myriad species of waterfowl and wading birds.

**Before Situation:**
Resources are protected at the minimum level of the Conservation Practice Standard (CPS) 646 - Shallow Water Development and Management

**After Situation:**
The adoption of this enhancement will provide resource protection above the minimum level as described in Conservation Practice Standard (CPS) 646 - Shallow Water Development and Management

**Feature Measure:** acre

**Scenario Unit::** Acre

**Scenario Typical Size:** 50.0

**Scenario Total Cost:** $1,436.26

**Scenario Cost/Unit:** $28.73

Cost Details:

| Component Name | ID | Description | Unit | Cost | QTY | Total |
|---|---|---|---|---|---|---|
| **Equipment Installation** | | | | | | |
| Truck, Pickup | 939 | Equipment and power unit costs. Labor not included. | Hour | $21.79 | 9 | $196.11 |
| Mower, Bush Hog | 940 | Equipment and power unit costs. Labor not included. | Hour | $51.91 | 2.5 | $129.78 |
| **Labor** | | | | | | |
| General Labor | 231 | Labor performed using basic tools such as power tool, shovels, and other tools that do not require extensive training. Ex. pipe layer, herder, concrete placement, materials spreader, flagger, etc. | Hour | $25.31 | 22 | $556.82 |
| Specialist Labor | 235 | Labor requiring a specialized skill set: Includes 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 | $110.71 | 5 | $553.55 |

**Practice:** E646137Z2 - Extend retention of captured rainfall to provide enhanced cover and shelter for late winter habitat

**Scenario** #1 - Extend retention-cover and shelter

**Scenario Description:**

When flooded to shallow depths during the fall and retained into late winter, agricultural fields provide maximum shelter and cover for myriad species of waterfowl and wading birds. Agriculture fields are typically drained in preparation of spring planting, but retention of water into late winter will provide shelter and cover for waterfowl and shorebirds during a time when it may otherwise be in low abundance.

**Before Situation:**

Resources are protected at the minimum level of the Conservation Practice Standard (CPS) 646 - Shallow Water Development and Management

**After Situation:**

The adoption of this enhancement will provide resource protection above the minimum level as described in Conservation Practice Standard (CPS) 646 - Shallow Water Development and Management

**Feature Measure:** acre

**Scenario Unit::** Acre

**Scenario Typical Size:** 50.0

**Scenario Total Cost:** $1,691.79

**Scenario Cost/Unit:** $33.84

Cost Details:

| Component Name | ID | Description | Unit | Cost | QTY | Total |
|---|---|---|---|---|---|---|
| **Equipment Installation** | | | | | | |
| Truck, Pickup | 939 | Equipment and power unit costs. Labor not included. | Hour | $21.79 | 11 | $239.69 |
| Mower, Bush Hog | 940 | Equipment and power unit costs. Labor not included. | Hour | $51.91 | 2.5 | $129.78 |
| **Labor** | | | | | | |
| General Labor | 231 | Labor performed using basic tools such as power tool, shovels, and other tools that do not require extensive training. Ex. pipe layer, herder, concrete placement, materials spreader, flagger, etc. | Hour | $25.31 | 26 | $658.06 |
| Specialist Labor | 235 | Labor requiring a specialized skill set: Includes 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 | $110.71 | 6 | $664.26 |

**Practice:** E646137Z3 - Shorebird habitat, late season shallow water with manipulation to improve cover and shelter

**Scenario** #1 - Late season shallow water - cover

**Scenario Description:**

Suitable shorebird habitat is limited during the summer and fall as birds migrate south post-breeding. Providing shallow water and mud flat habitat will benefit a variety of shorebird species. Improved conditions are created when water levels are slowly reduced through evaporation, which allows for propagation of invertebrates (typically insect larvae) used as food by shorebirds. Manipulation of vegetation, preferably through rolling, creates open conditions required by this suite of birds as a means to detect and avoid predators, and provides nutrient inputs for invertebrate production.

**Before Situation:**

Resources are protected at the minimum level of the Conservation Practice Standard (CPS) 646 - Shallow Water Development and Management

**After Situation:**

The adoption of this enhancement will provide resource protection above the minimum level as described in Conservation Practice Standard (CPS) 646 - Shallow Water Development and Management

**Feature Measure:** acre

**Scenario Unit::** Acre

**Scenario Typical Size:** 50.0

**Scenario Total Cost:** $2,714.22

**Scenario Cost/Unit:** $54.28

Cost Details:

| Component Name | ID | Description | Unit | Cost | QTY | Total |
|---|---|---|---|---|---|---|
| **Equipment Installation** | | | | | | |
| Truck, Pickup | 939 | Equipment and power unit costs. Labor not included. | Hour | $21.79 | 9 | $196.11 |
| Mower, Bush Hog | 940 | Equipment and power unit costs. Labor not included. | Hour | $51.91 | 4.5 | $233.60 |
| Tillage, Primary | 946 | Includes heavy disking (offset) or chisel plow. Includes equipment, power unit and labor costs. | Acre | $16.60 | 50 | $830.00 |
| **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 | $25.31 | 22 | $556.82 |
| Specialist Labor | 235 | Labor requiring a specialized skill set: Includes 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 | $110.71 | 5 | $553.55 |
| **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 | $172.07 | 2 | $344.14 |

**Practice:** E646137Z4 - Extended late season shallow water with manipulation to improve cover and shelter

**Scenario** #1 - Extended late season shallow water-cover

**Scenario Description:**

Suitable shorebird habitat is limited during the summer and fall as birds migrate south post-breeding. Agriculture fields are typically drained in preparation of spring planting, but retention of water into late winter will provide shelter and cover for waterfowl and shorebirds during a time when it may otherwise be in low abundance. Optimal conditions are created when water levels are slowly reduced and manipulation of vegetation, preferably through rolling, creates open conditions required by this suite of birds as a means to detect and avoid predators, and provides nutrient inputs for invertebrate production.

**Before Situation:**

Resources are protected at the minimum level of the Conservation Practice Standard (CPS) 646 - Shallow Water Development and Management

**After Situation:**

The adoption of this enhancement will provide resource protection above the minimum level as described in Conservation Practice Standard (CPS) 646 - Shallow Water Development and Management

**Feature Measure:** acre

**Scenario Unit::** Acre

**Scenario Typical Size:** 50.0

**Scenario Total Cost:** $3,021.66

**Scenario Cost/Unit:** $60.43

Cost Details:

| Component Name | ID | Description | Unit | Cost | QTY | Total |
|---|---|---|---|---|---|---|
| **Equipment Installation** | | | | | | |
| Truck, Pickup | 939 | Equipment and power unit costs. Labor not included. | Hour | $21.79 | 11 | $239.69 |
| Mower, Bush Hog | 940 | Equipment and power unit costs. Labor not included. | Hour | $51.91 | 5.5 | $285.51 |
| Tillage, Primary | 946 | Includes heavy disking (offset) or chisel plow. Includes equipment, power unit and labor costs. | Acre | $16.60 | 50 | $830.00 |
| **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 | $25.31 | 26 | $658.06 |
| Specialist Labor | 235 | Labor requiring a specialized skill set: Includes 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 | $110.71 | 6 | $664.26 |
| **Mobilization** | | | | | | |
| Mobilization, small equipment | 1138 | Equipment <70 HP but can't be transported by a pick-up truck or with typical weights between 3,500 to 14,000 pounds. | Each | $172.07 | 2 | $344.14 |

**Practice:** E646138Z1 - Close structures to capture and retain rainfall to provide water for birds during winter

**Scenario** #1 - Close structures to provide water

**Scenario Description:**
When flooded to shallow depths during fall and winter, agricultural fields provide water essential for myriad species of waterfowl and wading birds.

**Before Situation:**
Resources are protected at the minimum level of the Conservation Practice Standard (CPS) 646 - Shallow Water Development and Management

**After Situation:**
The adoption of this enhancement will provide resource protection above the minimum level as described in Conservation Practice Standard (CPS) 646 - Shallow Water Development and Management

**Feature Measure:** acre

**Scenario Unit::** Acre

**Scenario Typical Size:** 50.0

**Scenario Total Cost:** $1,436.26

**Scenario Cost/Unit:** $28.73

Cost Details:

| Component Name | ID | Description | Unit | Cost | QTY | Total |
|---|---|---|---|---|---|---|
| **Equipment Installation** | | | | | | |
| Truck, Pickup | 939 | Equipment and power unit costs. Labor not included. | Hour | $21.79 | 9 | $196.11 |
| Mower, Bush Hog | 940 | Equipment and power unit costs. Labor not included. | Hour | $51.91 | 2.5 | $129.78 |
| **Labor** | | | | | | |
| General Labor | 231 | Labor performed using basic tools such as power tool, shovels, and other tools that do not require extensive training. Ex. pipe layer, herder, concrete placement, materials spreader, flagger, etc. | Hour | $25.31 | 22 | $556.82 |
| Specialist Labor | 235 | Labor requiring a specialized skill set: Includes 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 | $110.71 | 5 | $553.55 |

**Practice:** E646138Z2 - Extend retention of captured rainfall to provide late winter water habitat

**Scenario** #1 - Extend winter water habitat

**Scenario Description:**

When flooded to shallow depths during fall and winter, agricultural fields provide water essential for myriad species of waterfowl and wading birds. Agriculture fields are typically drained in preparation of spring planting, but retention of water into late winter will provide water for shorebirds and waterfowl during a time when it may otherwise be in low abundance.

**Before Situation:**

Resources are protected at the minimum level of the Conservation Practice Standard (CPS) 646 - Shallow Water Development and Management

**After Situation:**

The adoption of this enhancement will provide resource protection above the minimum level as described in Conservation Practice Standard (CPS) 646 - Shallow Water Development and Management

**Feature Measure:** acre

**Scenario Unit::** Acre

**Scenario Typical Size:** 50.0

**Scenario Total Cost:** $1,691.79

**Scenario Cost/Unit:** $33.84

Cost Details:

| Component Name | ID | Description | Unit | Cost | QTY | Total |
|---|---|---|---|---|---|---|
| **Equipment Installation** | | | | | | |
| Truck, Pickup | 939 | Equipment and power unit costs. Labor not included. | Hour | $21.79 | 11 | $239.69 |
| Mower, Bush Hog | 940 | Equipment and power unit costs. Labor not included. | Hour | $51.91 | 2.5 | $129.78 |
| **Labor** | | | | | | |
| General Labor | 231 | Labor performed using basic tools such as power tool, shovels, and other tools that do not require extensive training. Ex. pipe layer, herder, concrete placement, materials spreader, flagger, etc. | Hour | $25.31 | 26 | $658.06 |
| Specialist Labor | 235 | Labor requiring a specialized skill set: Includes 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 | $110.71 | 6 | $664.26 |

**Practice:** E646138Z3 - Shorebird habitat, late season shallow water with manipulation

**Scenario** #1 - Late season shallow water

**Scenario Description:**

Suitable water is limited during the summer and fall as birds migrate south post-breeding. Providing shallow water and mud flat habitat will benefit a variety of shorebird species. Improved conditions are created when water levels are slowly reduced through evaporation. Manipulation of vegetation, preferably through rolling, creates open water conditions required by this suite of birds as a means to detect and avoid predators, and provides nutrient inputs for invertebrate production.

**Before Situation:**

Resources are protected at the minimum level of the Conservation Practice Standard (CPS) 646 - Shallow Water Development and Management

**After Situation:**

The adoption of this enhancement will provide resource protection above the minimum level as described in Conservation Practice Standard (CPS) 646 - Shallow Water Development and Management

**Feature Measure:** acre

**Scenario Unit::** Acre

**Scenario Typical Size:** 50.0

**Scenario Total Cost:** $2,714.22

**Scenario Cost/Unit:** $54.28

Cost Details:

| Component Name | ID | Description | Unit | Cost | QTY | Total |
|---|---|---|---|---|---|---|
| **Equipment Installation** | | | | | | |
| Truck, Pickup | 939 | Equipment and power unit costs. Labor not included. | Hour | $21.79 | 9 | $196.11 |
| Mower, Bush Hog | 940 | Equipment and power unit costs. Labor not included. | Hour | $51.91 | 4.5 | $233.60 |
| Tillage, Primary | 946 | Includes heavy disking (offset) or chisel plow. Includes equipment, power unit and labor costs. | Acre | $16.60 | 50 | $830.00 |
| **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 | $25.31 | 22 | $556.82 |
| Specialist Labor | 235 | Labor requiring a specialized skill set: Includes 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 | $110.71 | 5 | $553.55 |
| **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 | $172.07 | 2 | $344.14 |

**Practice:** E646138Z4 - Shorebird habitat, extended late season shallow water with manipulation

**Scenario** #1 - Extended late season shallow water

**Scenario Description:**

Suitable water is limited during the summer and fall as birds migrate south post-breeding. Agriculture fields are typically drained in preparation of spring planting, but retention of water into late winter will provide habitat during a time when it may otherwise be in low abundance. Optimal conditions are created when water levels are slowly reduced and manipulation of vegetation, preferably through rolling, creates open water conditions required by this suite of birds as a means to detect and avoid predators, and provides nutrient inputs for invertebrate production.

**Before Situation:**

Resources are protected at the minimum level of the Conservation Practice Standard (CPS) 646 - Shallow Water Development and Management

**After Situation:**

The adoption of this enhancement will provide resource protection above the minimum level as described in Conservation Practice Standard (CPS) 646 - Shallow Water Development and Management

**Feature Measure:** acre

**Scenario Unit::** Acre

**Scenario Typical Size:** 50.0

**Scenario Total Cost:** $3,021.66

**Scenario Cost/Unit:** $60.43

Cost Details:

| Component Name | ID | Description | Unit | Cost | QTY | Total |
|---|---|---|---|---|---|---|
| **Equipment Installation** | | | | | | |
| Truck, Pickup | 939 | Equipment and power unit costs. Labor not included. | Hour | $21.79 | 11 | $239.69 |
| Mower, Bush Hog | 940 | Equipment and power unit costs. Labor not included. | Hour | $51.91 | 5.5 | $285.51 |
| Tillage, Primary | 946 | Includes heavy disking (offset) or chisel plow. Includes equipment, power unit and labor costs. | Acre | $16.60 | 50 | $830.00 |
| **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 | $25.31 | 26 | $658.06 |
| Specialist Labor | 235 | Labor requiring a specialized skill set: Includes 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 | $110.71 | 6 | $664.26 |
| **Mobilization** | | | | | | |
| Mobilization, small equipment | 1138 | Equipment <70 HP but can't be transported by a pick-up truck or with typical weights between 3,500 to 14,000 pounds. | Each | $172.07 | 2 | $344.14 |

**Practice:** E646139Z1 - Close structures to capture and retain rainfall for birds to improve habitat continuity

**Scenario** #1 - Close structures - habitat continuity

**Scenario Description:**

When flooded to shallow depths during fall and winter, agricultural fields provide habitat for myriad species of migratory birds. Those flooded conditions promote a network or continuity of habitat that is available to migratory waterfowl, shorebirds, and wading birds.

**Before Situation:**

Resources are protected at the minimum level of the Conservation Practice Standard (CPS) 646 - Shallow Water Development and Management

**After Situation:**

The adoption of this enhancement will provide resource protection above the minimum level as described in Conservation Practice Standard (CPS) 646 - Shallow Water Development and Management

**Feature Measure:** acre

**Scenario Unit::** Acre

**Scenario Typical Size:** 50.0

**Scenario Total Cost:** $1,436.26

**Scenario Cost/Unit:** $28.73

Cost Details:

| Component Name | ID | Description | Unit | Cost | QTY | Total |
|---|---|---|---|---|---|---|
| **Equipment Installation** | | | | | | |
| Truck, Pickup | 939 | Equipment and power unit costs. Labor not included. | Hour | $21.79 | 9 | $196.11 |
| Mower, Bush Hog | 940 | Equipment and power unit costs. Labor not included. | Hour | $51.91 | 2.5 | $129.78 |
| **Labor** | | | | | | |
| General Labor | 231 | Labor performed using basic tools such as power tool, shovels, and other tools that do not require extensive training. Ex. pipe layer, herder, concrete placement, materials spreader, flagger, etc. | Hour | $25.31 | 22 | $556.82 |
| Specialist Labor | 235 | Labor requiring a specialized skill set: Includes 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 | $110.71 | 5 | $553.55 |

**Practice:** E646139Z2 - Extend retention of captured rainfall to provide habitat continuity during late winter

**Scenario** #1 - Extend retention - habitat continuity

**Scenario Description:**

When flooded to shallow depths during the fall and retained into late winter, agricultural fields provide habitat for myriad species of migratory birds. Agriculture fields are typically drained in preparation of spring planting, but retention of water into late winter will provide a network or continuity of habitat for waterfowl, wading birds, and shorebirds during a time when it may otherwise be in low abundance.

**Before Situation:**

Resources are protected at the minimum level of the Conservation Practice Standard (CPS) 646 - Shallow Water Development and Management

**After Situation:**

The adoption of this enhancement will provide resource protection above the minimum level as described in Conservation Practice Standard (CPS) 646 - Shallow Water Development and Management

**Feature Measure:** acre

**Scenario Unit::** Acre

**Scenario Typical Size:** 50.0

**Scenario Total Cost:** $1,691.79

**Scenario Cost/Unit:** $33.84

Cost Details:

| Component Name | ID | Description | Unit | Cost | QTY | Total |
|---|---|---|---|---|---|---|
| **Equipment Installation** | | | | | | |
| Truck, Pickup | 939 | Equipment and power unit costs. Labor not included. | Hour | $21.79 | 11 | $239.69 |
| Mower, Bush Hog | 940 | Equipment and power unit costs. Labor not included. | Hour | $51.91 | 2.5 | $129.78 |
| **Labor** | | | | | | |
| General Labor | 231 | Labor performed using basic tools such as power tool, shovels, and other tools that do not require extensive training. Ex. pipe layer, herder, concrete placement, materials spreader, flagger, etc. | Hour | $25.31 | 26 | $658.06 |
| Specialist Labor | 235 | Labor requiring a specialized skill set: Includes 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 | $110.71 | 6 | $664.26 |

**Practice:** E646139Z3 - Shorebird habitat, late season shallow water with manipulation to enhance habitat continuity

**Scenario** #1 - Late season shallow water-continuity

**Scenario Description:**

Suitable water is limited during the summer and fall as birds migrate south post-breeding. Providing shallow water and mud flat habitat will benefit a variety of shorebird species. Improved conditions are created when water levels are slowly reduced through evaporation. Manipulation of vegetation, preferably through rolling, creates open water conditions required by this suite of birds as a means to detect and avoid predators, and provides nutrient inputs for invertebrate production.

**Before Situation:**

Resources are protected at the minimum level of the Conservation Practice Standard (CPS) 646 - Shallow Water Development and Management

**After Situation:**

The adoption of this enhancement will provide resource protection above the minimum level as described in Conservation Practice Standard (CPS) 646 - Shallow Water Development and Management

**Feature Measure:** acre

**Scenario Unit::** Acre

**Scenario Typical Size:** 50.0

**Scenario Total Cost:** $2,714.22

**Scenario Cost/Unit:** $54.28

Cost Details:

| Component Name | ID | Description | Unit | Cost | QTY | Total |
|---|---|---|---|---|---|---|
| **Equipment Installation** | | | | | | |
| Truck, Pickup | 939 | Equipment and power unit costs. Labor not included. | Hour | $21.79 | 9 | $196.11 |
| Mower, Bush Hog | 940 | Equipment and power unit costs. Labor not included. | Hour | $51.91 | 4.5 | $233.60 |
| Tillage, Primary | 946 | Includes heavy disking (offset) or chisel plow. Includes equipment, power unit and labor costs. | Acre | $16.60 | 50 | $830.00 |
| **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 | $25.31 | 22 | $556.82 |
| Specialist Labor | 235 | Labor requiring a specialized skill set: Includes 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 | $110.71 | 5 | $553.55 |
| **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 | $172.07 | 2 | $344.14 |

**Practice:** E646139Z4 - Shorebird habitat, extended late season shallow water with manipulation - habitat continuity

**Scenario** #1 - Extended late season water-continuity

**Scenario Description:**

Suitable water is limited during the summer and fall as birds migrate south post-breeding. Providing shallow water with manipulation of vegetation creates a network or continuity of habitat required by this suite of migratory birds during a time when it may otherwise be in low abundance.

**Before Situation:**

Resources are protected at the minimum level of the Conservation Practice Standard (CPS) 646 - Shallow Water Development and Management

**After Situation:**

The adoption of this enhancement will provide resource protection above the minimum level as described in Conservation Practice Standard (CPS) 646 - Shallow Water Development and Management

**Feature Measure:** acre

**Scenario Unit::** Acre

**Scenario Typical Size:** 50.0

**Scenario Total Cost:** $3,021.66

**Scenario Cost/Unit:** $60.43

Cost Details:

| Component Name | ID | Description | Unit | Cost | QTY | Total |
|---|---|---|---|---|---|---|
| **Equipment Installation** | | | | | | |
| Truck, Pickup | 939 | Equipment and power unit costs. Labor not included. | Hour | $21.79 | 11 | $239.69 |
| Mower, Bush Hog | 940 | Equipment and power unit costs. Labor not included. | Hour | $51.91 | 5.5 | $285.51 |
| Tillage, Primary | 946 | Includes heavy disking (offset) or chisel plow. Includes equipment, power unit and labor costs. | Acre | $16.60 | 50 | $830.00 |
| **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 | $25.31 | 26 | $658.06 |
| Specialist Labor | 235 | Labor requiring a specialized skill set: Includes 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 | $110.71 | 6 | $664.26 |
| **Mobilization** | | | | | | |
| Mobilization, small equipment | 1138 | Equipment <70 HP but can't be transported by a pick-up truck or with typical weights between 3,500 to 14,000 pounds. | Each | $172.07 | 2 | $344.14 |

**Practice:** E647136Z1 - Manipulate vegetation on fields where rainfall is to be captured and retained-food

**Scenario** #1 - Manipulate veg for food

**Scenario Description:**

Harvested and idled agricultural lands, notably those occurring within rice rotations, contain high densities of residual (i.e., waste) grain and natural seeds following harvest. Seed densities in harvested rice fields may rival those documented in intensively managed moist-soil units. When flooded to shallow depths during fall and winter, these agricultural fields provide ideal foraging habitat for myriad species of waterfowl and wading birds. In addition, flooded conditions promote establishment of aquatic invertebrate populations, thus providing protein-rich food sources for shorebirds as well as waterfowl and wading birds. In many cases, light manipulation of dense vegetation is needed to improve the accessibility of food resources to waterfowl, wading birds, and shorebirds.

**Before Situation:**

Resources are protected at the minimum level of the Conservation Practice Standard (CPS) 647 - Early Successional Habitat Development and Management

**After Situation:**

The adoption of this enhancement will provide resource protection above the minimum level as described in Conservation Practice Standard (CPS) 647 - Early Successional Habitat Development and Management

**Feature Measure:** Acre

**Scenario Unit::** Acre

**Scenario Typical Size:** 50.0

**Scenario Total Cost:** $1,175.10

**Scenario Cost/Unit:** $23.50

Cost Details:

| Component Name | ID | Description | Unit | Cost | QTY | Total |
|---|---|---|---|---|---|---|
| **Equipment Installation** | | | | | | |
| Tractor, agricultural, 120 HP | 962 | Agricultural tractor with horsepower range of 90 to 140. Equipment and power unit costs. Labor not included. | Hour | $57.70 | 8 | $461.60 |
| **Labor** | | | | | | |
| Equipment Operators, Light | 232 | Includes: Skid Steer Loaders, Hydraulic Excavators <50 HP, Trenchers <12", Ag Equipment <150 HP, Pickup Trucks, Forklifts, Mulchers | Hour | $25.23 | 8 | $201.84 |
| **Mobilization** | | | | | | |
| Mobilization, medium equipment | 1139 | Equipment with 70-150 HP or typical weights between 14,000 and 30,000 pounds. | Each | $255.83 | 2 | $511.66 |

**Practice:** E647136Z2 - Provide early successional habitat between first rice crop and ratoon crop-food

**Scenario** #1 - Ratoon crop food sources

**Scenario Description:**

This enhancement is to encourage the establishment of early successional, naturally occurring vegetation in ditches, side slope and bank borders to provide cover, critical nesting and brood rearing habitat as well as filtering overland flow and improving water quality. Ditches perform the critical function of removing water from agricultural lands. Allowing naturally occurring vegetation to develop along ditches, including side slopes, banks and borders, will help provide food and cover for wildlife while enhancing aquatic habitat and improving water quality. Ditches and ditch borders provide a foundation that supports a diverse wildlife community including Northern Bobwhite (Colinus virginianus) and other birds preferring early successional cover. Rabbits, furbearers, amphibians and many other species that inhabit agriculture areas will use this vegetative cover. These areas can also provide critical nesting habitat for the Mottled Duck (Anas fulvigula).

**Before Situation:**

Resources are protected at the minimum level of the Conservation Practice Standard (CPS) 647 - Early Successional Habitat Development and Management

**After Situation:**

The adoption of this enhancement will provide resource protection above the minimum level as described in Conservation Practice Standard (CPS) 647 - Early Successional Habitat Development and Management

**Feature Measure:** Acre

**Scenario Unit::** Acre

**Scenario Typical Size:** 50.0

**Scenario Total Cost:** $1,175.10

**Scenario Cost/Unit:** $23.50

Cost Details:

| Component Name | ID | Description | Unit | Cost | QTY | Total |
|---|---|---|---|---|---|---|
| **Equipment Installation** | | | | | | |
| Tractor, agricultural, 120 HP | 962 | Agricultural tractor with horsepower range of 90 to 140. Equipment and power unit costs. Labor not included. | Hour | $57.70 | 8 | $461.60 |
| **Labor** | | | | | | |
| Equipment Operators, Light | 232 | Includes: Skid Steer Loaders, Hydraulic Excavators <50 HP, Trenchers <12", Ag Equipment <150 HP, Pickup Trucks, Forklifts, Mulchers | Hour | $25.23 | 8 | $201.84 |
| **Mobilization** | | | | | | |
| Mobilization, medium equipment | 1139 | Equipment with 70-150 HP or typical weights between 14,000 and 30,000 pounds. | Each | $255.83 | 2 | $511.66 |

**Practice:** E647136Z3 - Establish and maintenance of moist soil vegetation on cropland edges to increase wildlife food

**Scenario** #1 - Moist soil vegetation-food

**Scenario Description:**

The wetter or more water saturated portions of cropland fields such as areas adjacent to field drains, have the potential to produce a significant amount of moist soil plants which are a tremendously valuable source of forage and cover for many waterfowl, shorebird and wading bird species, especially during a period of time when such plants may be limited. Under normal cropland production, the native vegetation is restricted on these sites through mechanical and/or chemical control. These maintained moist soil plants also will provide filtering and improve water quality.

**Before Situation:**

Resources are protected at the minimum level of the Conservation Practice Standard (CPS) 647 - Early Successional Habitat Development and Management

**After Situation:**

The adoption of this enhancement will provide resource protection above the minimum level as described in Conservation Practice Standard (CPS) 647 - Early Successional Habitat Development and Management

**Feature Measure:** Acre

**Scenario Unit::** Acre

**Scenario Typical Size:** 50.0

**Scenario Total Cost:** $575.56

**Scenario Cost/Unit:** $11.51

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 | $51.91 | 3 | $155.73 |
| **Labor** | | | | | | |
| Equipment Operators, Light | 232 | Includes: Skid Steer Loaders, Hydraulic Excavators <50 HP, Trenchers <12", Ag Equipment <150 HP, Pickup Trucks, Forklifts, Mulchers | Hour | $25.23 | 3 | $75.69 |
| **Mobilization** | | | | | | |
| Mobilization, small equipment | 1138 | Equipment <70 HP but can't be transported by a pick-up truck or with typical weights between 3,500 to 14,000 pounds. | Each | $172.07 | 2 | $344.14 |

**Practice:** E647137Z1 - Manipulate vegetation on fields where rainfall is to be captured and retained-cover/shelter

**Scenario** #1 - Manipulate veg for cover/shelter

**Scenario Description:**

This enhancement is to provide cover and shelter for wildlife by retaining some standing rice stubble and by encouraging the establishment of early successional, naturally occurring vegetation in fields post harvest. Allowing some standing rice stubble and naturally occurring vegetation to develop will help provide food and cover for wildlife while enhancing aquatic habitat and improving water quality.

**Before Situation:**

Resources are protected at the minimum level of the Conservation Practice Standard (CPS) 647 - Early Successional Habitat Development and Management

**After Situation:**

The adoption of this enhancement will provide resource protection above the minimum level as described in Conservation Practice Standard (CPS) 647 - Early Successional Habitat Development and Management

**Feature Measure:** Acre

**Scenario Unit::** Acre

**Scenario Typical Size:** 50.0

**Scenario Total Cost:** $1,175.10

**Scenario Cost/Unit:** $23.50

Cost Details:

| Component Name | ID | Description | Unit | Cost | QTY | Total |
|---|---|---|---|---|---|---|
| **Equipment Installation** | | | | | | |
| Tractor, agricultural, 120 HP | 962 | Agricultural tractor with horsepower range of 90 to 140. Equipment and power unit costs. Labor not included. | Hour | $57.70 | 8 | $461.60 |
| **Labor** | | | | | | |
| Equipment Operators, Light | 232 | Includes: Skid Steer Loaders, Hydraulic Excavators <50 HP, Trenchers <12", Ag Equipment <150 HP, Pickup Trucks, Forklifts, Mulchers | Hour | $25.23 | 8 | $201.84 |
| **Mobilization** | | | | | | |
| Mobilization, medium equipment | 1139 | Equipment with 70-150 HP or typical weights between 14,000 and 30,000 pounds. | Each | $255.83 | 2 | $511.66 |

**Practice:** E647137Z2 - Establish and maintenance of moist soil vegetation on cropland edges to increase cover/shelter

**Scenario** #1 - Moist soil vegetation-cover/shelter

**Scenario Description:**

The wetter or more water saturated portions of cropland fields such as areas adjacent to field drains, have the potential to produce a significant amount of moist soil plants which are a tremendously valuable source of forage and cover for many waterfowl, shorebird and wading bird species, especially during a period of time when such plants may be limited. Under normal cropland production, the native vegetation is restricted on these sites through mechanical and/or chemical control. These maintained moist soil plants also will provide filtering and improve water quality.

**Before Situation:**

Resources are protected at the minimum level of the Conservation Practice Standard (CPS) 647 - Early Successional Habitat Development and Management

**After Situation:**

The adoption of this enhancement will provide resource protection above the minimum level as described in Conservation Practice Standard (CPS) 647 - Early Successional Habitat Development and Management

**Feature Measure:** Acre

**Scenario Unit::** Acre

**Scenario Typical Size:** 50.0

**Scenario Total Cost:** $575.56

**Scenario Cost/Unit:** $11.51

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 | $51.91 | 3 | $155.73 |
| **Labor** | | | | | | |
| Equipment Operators, Light | 232 | Includes: Skid Steer Loaders, Hydraulic Excavators <50 HP, Trenchers <12", Ag Equipment <150 HP, Pickup Trucks, Forklifts, Mulchers | Hour | $25.23 | 3 | $75.69 |
| **Mobilization** | | | | | | |
| Mobilization, small equipment | 1138 | Equipment <70 HP but can't be transported by a pick-up truck or with typical weights between 3,500 to 14,000 pounds. | Each | $172.07 | 2 | $344.14 |

**Practice:** E647139Z1 - Establish/maintain habitat continuity, naturally occurring vegetation in ditches/ditch bank borders

**Scenario** #1 - Naturally occurring veg in ditches

**Scenario Description:**

This enhancement is to encourage the establishment of early successional, naturally occurring vegetation in ditches, side slope and bank borders to provide cover, critical nesting and brood rearing habitat as well as filtering overland flow and improving water quality. Ditches perform the critical function of removing water from agricultural lands. Allowing naturally occurring vegetation to develop along ditches, including side slopes, banks and borders, will help provide food and cover for wildlife while enhancing aquatic habitat and improving water quality. Ditches and ditch borders provide a foundation that supports a diverse wildlife community including Northern Bobwhite (Colinus virginianus) and other birds preferring early successional cover. Rabbits, furbearers, amphibians and many other species that inhabit agriculture areas will use this vegetative cover. These areas can also provide critical nesting habitat for the Mottled Duck (Anas fulvigula).

**Before Situation:**

Resources are protected at the minimum level of the Conservation Practice Standard (CPS) 647 - Early Successional Habitat Development and Management

**After Situation:**

The adoption of this enhancement will provide resource protection above the minimum level as described in Conservation Practice Standard (CPS) 647 - Early Successional Habitat Development and Management

**Feature Measure:** Acre

**Scenario Unit::** Acre

**Scenario Typical Size:** 50.0

**Scenario Total Cost:** $575.56

**Scenario Cost/Unit:** $11.51

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 | $51.91 | 3 | $155.73 |
| **Labor** | | | | | | |
| Equipment Operators, Light | 232 | Includes: Skid Steer Loaders, Hydraulic Excavators <50 HP, Trenchers <12", Ag Equipment <150 HP, Pickup Trucks, Forklifts, Mulchers | Hour | $25.23 | 3 | $75.69 |
| **Mobilization** | | | | | | |
| Mobilization, small equipment | 1138 | Equipment <70 HP but can't be transported by a pick-up truck or with typical weights between 3,500 to 14,000 pounds. | Each | $172.07 | 2 | $344.14 |

**Practice:** E647139Z2 - Provide early successional habitat between first rice crop and ratoon crop-continuity

**Scenario** #1 - Ratoon crop-continuity

**Scenario Description:**

Many declining suites of wildlife species rely on early successional habitats for at least part of their life cycle needs. Migratory shorebird species in particular rely on open, moist soil or shallowly flooded conditions for foraging and security. Rice farms support many migratory and resident water bird species. The first rice crop harvest often coincides with the arrival of early migrating shorebirds. This time of year is also the highest rainfall months. If standing rice stubble from the first crop is rolled to push above-ground stalks level with the soil surface, the first component of this type of habitat is met. When moisture is added to this situation, short-term habitat is available until the ratoon crop initiates growth to a height beyond that which would provide benefit to the early successional species.

**Before Situation:**

Resources are protected at the minimum level of the Conservation Practice Standard (CPS) 647 - Early Successional Habitat Development and Management

**After Situation:**

The adoption of this enhancement will provide resource protection above the minimum level as described in Conservation Practice Standard (CPS) 647 - Early Successional Habitat Development and Management

**Feature Measure:** Acre

**Scenario Unit::** Acre

**Scenario Typical Size:** 50.0

**Scenario Total Cost:** $1,175.10

**Scenario Cost/Unit:** $23.50

Cost Details:

| Component Name | ID | Description | Unit | Cost | QTY | Total |
|---|---|---|---|---|---|---|
| **Equipment Installation** | | | | | | |
| Tractor, agricultural, 120 HP | 962 | Agricultural tractor with horsepower range of 90 to 140. Equipment and power unit costs. Labor not included. | Hour | $57.70 | 8 | $461.60 |
| **Labor** | | | | | | |
| Equipment Operators, Light | 232 | Includes: Skid Steer Loaders, Hydraulic Excavators <50 HP, Trenchers <12", Ag Equipment <150 HP, Pickup Trucks, Forklifts, Mulchers | Hour | $25.23 | 8 | $201.84 |
| **Mobilization** | | | | | | |
| Mobilization, medium equipment | 1139 | Equipment with 70-150 HP or typical weights between 14,000 and 30,000 pounds. | Each | $255.83 | 2 | $511.66 |

**Practice:** E666106Z1 - Implementing sustainable practices for pine straw raking

**Scenario** #1 - Sustainable pine straw raking

**Scenario Description:**

Adopts guidelines for sustaining soil quality and wildlife habitat on sites where pine straw raking is currently practiced. Raking and removal of pine needles ("pine straw") provides valuable landscaping material but at a high cost to soil fertility, soil organic matter, wildlife habitat, and in some cases, soil compaction, soil erosion and water quality degradation. Straw removal also makes prescribed burning less feasible by removal of the fine fuels needed to carry frequent surface fires that maintain longleaf pine and its characteristic understory. This enhancement is most applicable to longleaf pine forestland because: (1) longleaf-dominated ecosystems with their characteristic suite of flora and fauna historically predominated in most places where pines are currently grown in the Southeast, and (2) longleaf is the favored species for pine straw operations.

**Before Situation:**

Resources are protected at the minimum level of the Conservation Practice Standard (CPS) 666 - Forest Stand Improvement

**After Situation:**

The adoption of this enhancement will provide resource protection above the minimum level as described in Conservation Practice Standard (CPS) 666 - Forest Stand Improvement

**Feature Measure:** Acre

**Scenario Unit::** Acre

**Scenario Typical Size:** 50.0

**Scenario Total Cost:** $1,407.50

**Scenario Cost/Unit:** $28.15

Cost Details:

| Component Name | ID | Description | Unit | Cost | QTY | Total |
|---|---|---|---|---|---|---|
| **Equipment Installation** | | | | | | |
| Truck, Pickup | 939 | Equipment and power unit costs. Labor not included. | Hour | $21.79 | 2 | $43.58 |
| All terrain vehicles, ATV | 965 | Includes equipment, power unit and labor costs. | Hour | $28.28 | 4 | $113.12 |
| **Labor** | | | | | | |
| Specialist Labor | 235 | Labor requiring a specialized skill set: Includes Agronomists, Foresters, Biologists, etc. to provide additional technical information during the planning and implementation of the practice. Does not include NRCS or TSP services. | Hour | $110.71 | 10 | $1,107.10 |
| **Materials** | | | | | | |
| Test, Soil Test, Standard | 299 | Includes materials, shiping, labor, and equipment costs. | Each | $10.04 | 10 | $100.40 |
| Tree Marking Paint | 313 | Trees to be cut through tree marking are physically identified through the application of paint on the tree. Typically one quart of paint is used to mark one acre of trees. Includes materials and shipping only. | Acre | $6.96 | 5 | $34.80 |
| One Species, Cool Season, Native Perennial Grass Sprig, Plug or Culm | 2696 | Native perennial grass sprig, plug or culms used to stabilize areas, such as sand dunes and riparian areas. Includes materials and shipping. | Each | $0.17 | 50 | $8.50 |

**Practice:** E666106Z2 - Maintaining and improving forest soil quality

**Scenario** #1 - Maintain/improve forest SQ

**Scenario Description:**

Adopts guidelines for maintaining and improving soil quality on sites where forest management activities are practiced. These guidelines will increase soil organic matter content, improve nutrient cycling, and increase infiltration and retention of precipitation. Avoiding soil compaction will allow for greater root development and tree growth, limit windthrow, and reduce drought stress. Increasing carbon storage on site will maintain the soil microbial community and provide wildlife benefits.

**Before Situation:**

Resources are protected at the minimum level of the Conservation Practice Standard (CPS) 666 - Forest Stand Improvement

**After Situation:**

The adoption of this enhancement will provide resource protection above the minimum level as described in Conservation Practice Standard (CPS) 666 - Forest Stand Improvement

**Feature Measure:** Acre

**Scenario Unit::** Acre

**Scenario Typical Size:** 50.0

**Scenario Total Cost:** $2,437.14

**Scenario Cost/Unit:** $48.74

Cost Details:

| Component Name | ID | Description | Unit | Cost | QTY | Total |
|---|---|---|---|---|---|---|
| **Equipment Installation** | | | | | | |
| Chainsaw | 937 | Equipment and power unit costs. Labor not included. | Hour | $4.37 | 4 | $17.48 |
| Truck, Pickup | 939 | Equipment and power unit costs. Labor not included. | Hour | $21.79 | 2 | $43.58 |
| All terrain vehicles, ATV | 965 | Includes equipment, power unit and labor costs. | Hour | $28.28 | 4 | $113.12 |
| **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 | $25.31 | 8 | $202.48 |
| 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 | $110.71 | 10 | $1,107.10 |
| 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 t | Hour | $71.89 | 8 | $575.12 |
| **Materials** | | | | | | |
| Test, Soil Test, Standard | 299 | Includes materials, shiping, labor, and equipment costs. | Each | $10.04 | 10 | $100.40 |
| Tree Marking Paint | 313 | Trees to be cut through tree marking are physically identified through the application of paint on the tree. Typically one quart of paint is used to mark one acre of trees. Includes materials and shipping only. | Acre | $6.96 | 5 | $34.80 |
| Certified Organic, Three plus Species Mix, Cool Season, Annual Grasses and Legumes | 2343 | Certified organic cool season annual grass and legume mix. Includes material and shipping only. | Acre | $81.02 | 3 | $243.06 |

**Practice:** E666107Z - Maintaining and improving forest soil quality by limiting compaction

**Scenario** #1 - Maintain/improve forest compaction

**Scenario Description:**

Adopts guidelines for maintaining and improving soil quality on sites where forest management activities are practiced. These guidelines will increase soil organic matter content, improve nutrient cycling, and increase infiltration and retention of precipitation. Avoiding soil compaction will allow for greater root development and tree growth, limit windthrow, and reduce drought stress. Increasing carbon storage on site will maintain the soil microbial community and provide wildlife benefits.

**Before Situation:**

Resources are protected at the minimum level of the Conservation Practice Standard (CPS) 666 - Forest Stand Improvement

**After Situation:**

The adoption of this enhancement will provide resource protection above the minimum level as described in Conservation Practice Standard (CPS) 666 - Forest Stand Improvement

**Feature Measure:** Acre

**Scenario Unit::** Acre

**Scenario Typical Size:** 50.0

**Scenario Total Cost:** $2,437.14

**Scenario Cost/Unit:** $48.74

Cost Details:

| Component Name | ID | Description | Unit | Cost | QTY | Total |
|---|---|---|---|---|---|---|
| **Equipment Installation** | | | | | | |
| Chainsaw | 937 | Equipment and power unit costs. Labor not included. | Hour | $4.37 | 4 | $17.48 |
| Truck, Pickup | 939 | Equipment and power unit costs. Labor not included. | Hour | $21.79 | 2 | $43.58 |
| All terrain vehicles, ATV | 965 | Includes equipment, power unit and labor costs. | Hour | $28.28 | 4 | $113.12 |
| **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 | $25.31 | 8 | $202.48 |
| 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 | $110.71 | 10 | $1,107.10 |
| 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 t | Hour | $71.89 | 8 | $575.12 |
| **Materials** | | | | | | |
| Test, Soil Test, Standard | 299 | Includes materials, shiping, labor, and equipment costs. | Each | $10.04 | 10 | $100.40 |
| Tree Marking Paint | 313 | Trees to be cut through tree marking are physically identified through the application of paint on the tree. Typically one quart of paint is used to mark one acre of trees. Includes materials and shipping only. | Acre | $6.96 | 5 | $34.80 |
| Certified Organic, Three plus Species Mix, Cool Season, Annual Grasses and Legumes | 2343 | Certified organic cool season annual grass and legume mix. Includes material and shipping only. | Acre | $81.02 | 3 | $243.06 |

**Practice:** E666115Z1 - Converting loblolly and slash pine plantations to longleaf pine to retain soil moisture

**Scenario** #1 - Convert to longleaf pine-soil moisture

**Scenario Description:**

Longleaf pine has greater wildlife habitat value, is more resistant to insects and disease, and is better able to withstand hurricane-force winds than other southern pines, particularly loblolly and slash pines. Because of rapid early growth, loblolly and slash pines have often been planted on soils and sites better suited to longleaf. Loblolly has a higher rate of evapotranspiration than longleaf and can deplete soil moisture. Loblolly and slash pine plantations can be converted to longleaf by clearcutting and planting seedlings but mature tree cover is then lost for 20 or more years. This enhancement will gradually convert an existing loblolly or slash pine plantation to longleaf while at the same time maintaining mature tree cover with the associated benefits of wildlife habitat and visual quality, and moderating effects on soil temperature, soil moisture and understory plants.

**Before Situation:**

Resources are protected at the minimum level of the Conservation Practice Standard (CPS) 666 - Forest Stand Improvement

**After Situation:**

The adoption of this enhancement will provide resource protection above the minimum level as described in Conservation Practice Standard (CPS) 666 - Forest Stand Improvement

**Feature Measure:** Acre

**Scenario Unit::** Acre

**Scenario Typical Size:** 50.0

**Scenario Total Cost:** $6,525.09

**Scenario Cost/Unit:** $130.50

Cost Details:

| Component Name | ID | Description | Unit | Cost | QTY | Total |
|---|---|---|---|---|---|---|
| **Equipment Installation** | | | | | | |
| Truck, Pickup | 939 | Equipment and power unit costs. Labor not included. | Hour | $21.79 | 14 | $305.06 |
| Chemical, ground application | 948 | Chemical application performed by ground equipment. Includes equipment, power unit and labor costs. | Acre | $6.13 | 10 | $61.30 |
| All terrain vehicles, ATV | 965 | Includes equipment, power unit and labor costs. | Hour | $28.28 | 2 | $56.56 |
| **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 | $41.76 | 16 | $668.16 |
| 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 | $25.31 | 48 | $1,214.88 |
| 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 | $110.71 | 18 | $1,992.78 |
| **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 | $6.96 | 10 | $69.60 |
| 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 | $37.13 | 10 | $371.30 |
| 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 shi | Acre | $1.28 | 10 | $12.80 |
| 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 | $0.25 | 6050 | $1,512.50 |
| Fuel, ignition fuel mixture | 1596 | Mixture of gasoline and diesel for ignition of prescribed burns. Materials only. | Gallon | $4.32 | 1 | $4.32 |
| **Mobilization** | | | | | | |
| Mobilization, medium equipment | 1139 | Equipment with 70-150 HP or typical weights between 14,000 and 30,000 pounds. | Each | $255.83 | 1 | $255.83 |

**Practice:** E666115Z2 - Enhance development of the forest understory to improve site moisture

**Scenario** #1 - Forest understory to improve moisture

**Scenario Description:**

Forest stand improvement to manage the structure and composition of overstory and understory vegetation so that additional moisture is captured and filtered through the vegetation and soil. Managing the understory vegetation will increase available water to the plants, minimize run-off and erosion, and improve water quality.

**Before Situation:**

Resources are protected at the minimum level of the Conservation Practice Standard (CPS) 666 - Forest Stand Improvement

**After Situation:**

The adoption of this enhancement will provide resource protection above the minimum level as described in Conservation Practice Standard (CPS) 666 - Forest Stand Improvement

**Feature Measure:** Acre

**Scenario Unit::** Acre

**Scenario Typical Size:** 20.0

**Scenario Total Cost:** $4,708.00

**Scenario Cost/Unit:** $235.40

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 | $64.90 | 16 | $1,038.40 |
| **Labor** | | | | | | |
| Equipment Operators, Light | 232 | Includes: Skid Steer Loaders, Hydraulic Excavators <50 HP, Trenchers <12", Ag Equipment <150 HP, Pickup Trucks, Forklifts, Mulchers | Hour | $25.23 | 16 | $403.68 |
| Specialist Labor | 235 | Labor requiring a specialized skill set: Includes Agronomists, Foresters, Biologists, etc. to provide additional technical information during the planning and implementation of the practice. Does not include NRCS or TSP services. | Hour | $110.71 | 8 | $885.68 |
| 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 t | Hour | $71.89 | 4 | $287.56 |
| **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 | $37.13 | 20 | $742.60 |

**Practice:** E666118Z - Enhance development of the forest understory to capture nutrients in surface water

**Scenario** #1 - Understory-nutrients in surface water

**Scenario Description:**

Forest stand improvement to manage the structure and composition of overstory and understory vegetation so that additional moisture is captured and filtered through the vegetation and soil, thus minimizing nutrient movement in surface water. Managing the understory vegetation will increase available water to the plants, minimize run-off and erosion, and improve water quality.

**Before Situation:**

Resources are protected at the minimum level of the Conservation Practice Standard (CPS) 666 - Forest Stand Improvement

**After Situation:**

The adoption of this enhancement will provide resource protection above the minimum level as described in Conservation Practice Standard (CPS) 666 - Forest Stand Improvement

**Feature Measure:** Acre

**Scenario Unit::** Acre

**Scenario Typical Size:** 20.0

**Scenario Total Cost:** $4,708.00

**Scenario Cost/Unit:** $235.40

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 | $64.90 | 16 | $1,038.40 |
| **Labor** | | | | | | |
| Equipment Operators, Light | 232 | Includes: Skid Steer Loaders, Hydraulic Excavators <50 HP, Trenchers <12", Ag Equipment <150 HP, Pickup Trucks, Forklifts, Mulchers | Hour | $25.23 | 16 | $403.68 |
| Specialist Labor | 235 | Labor requiring a specialized skill set: Includes Agronomists, Foresters, Biologists, etc. to provide additional technical information during the planning and implementation of the practice. Does not include NRCS or TSP services. | Hour | $110.71 | 8 | $885.68 |
| 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 t | Hour | $71.89 | 4 | $287.56 |
| **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 | $37.13 | 20 | $742.60 |

**Practice:** E666119Z - Enhance development of the forest understory to capture nutrients -ground water

**Scenario** #1 - Understory-nutrients in ground water

**Scenario Description:**

Forest stand improvement to manage the structure and composition of overstory and understory vegetation so that additional moisture is captured and filtered through the vegetation and soil, thus minimizing nutrient loss through ground water. Managing the understory vegetation will increase available water to the plants, minimize run-off and erosion, and improve water quality.

**Before Situation:**

Resources are protected at the minimum level of the Conservation Practice Standard (CPS) 666 - Forest Stand Improvement

**After Situation:**

The adoption of this enhancement will provide resource protection above the minimum level as described in Conservation Practice Standard (CPS) 666 - Forest Stand Improvement

**Feature Measure:** Acre

**Scenario Unit::** Acre

**Scenario Typical Size:** 20.0

**Scenario Total Cost:** $4,708.00

**Scenario Cost/Unit:** $235.40

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 | $64.90 | 16 | $1,038.40 |
| **Labor** | | | | | | |
| Equipment Operators, Light | 232 | Includes: Skid Steer Loaders, Hydraulic Excavators <50 HP, Trenchers <12", Ag Equipment <150 HP, Pickup Trucks, Forklifts, Mulchers | Hour | $25.23 | 16 | $403.68 |
| Specialist Labor | 235 | Labor requiring a specialized skill set: Includes Agronomists, Foresters, Biologists, etc. to provide additional technical information during the planning and implementation of the practice. Does not include NRCS or TSP services. | Hour | $110.71 | 8 | $885.68 |
| 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 t | Hour | $71.89 | 4 | $287.56 |
| **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 | $37.13 | 20 | $742.60 |

**Practice:** E666130Z - Increase on-site carbon storage

**Scenario** #1 - Increase on-site carbon storage

**Scenario Description:**

Utilize forest management techniques to increase on-site carbon storage, including uneven-aged management, longer rotations, leave-tree retention, snags and down woody debris, and soil organic ma

**Before Situation:**

Resources are protected at the minimum level of the Conservation Practice Standard (CPS) 666 - Forest Stand Improvement

**After Situation:**

The adoption of this enhancement will provide resource protection above the minimum level as described in Conservation Practice Standard (CPS) 666 - Forest Stand Improvement

**Feature Measure:** Acre

**Scenario Unit::** Acre

**Scenario Typical Size:** 100.0

**Scenario Total Cost:** $1,222.13

**Scenario Cost/Unit:** $12.22

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 t | Hour | $71.89 | 17 | $1,222.13 |

**Practice:** E666132Z1 - Crop tree management for mast production

**Scenario** #1 - Crop tree management for mast production

**Scenario Description:**
Forest stand improvement using crop tree management techniques to increase mast production

**Before Situation:**
Resources are protected at the minimum level of the Conservation Practice Standard (CPS) 666 - Forest Stand Improvement

**After Situation:**
The adoption of this enhancement will provide resource protection above the minimum level as described in Conservation Practice Standard (CPS) 666 - Forest Stand Improvement

**Feature Measure:** Acre

**Scenario Unit::** Acre

**Scenario Typical Size:** 10.0

**Scenario Total Cost:** $3,619.82

**Scenario Cost/Unit:** $361.98

Cost Details:

| Component Name | ID | Description | Unit | Cost | QTY | Total |
|---|---|---|---|---|---|---|
| **Equipment Installation** | | | | | | |
| Chainsaw | 937 | Equipment and power unit costs. Labor not included. | Hour | $4.37 | 25 | $109.25 |
| Truck, Pickup | 939 | Equipment and power unit costs. Labor not included. | Hour | $21.79 | 6 | $130.74 |
| 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 | $64.90 | 25 | $1,622.50 |
| **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 | $25.31 | 25 | $632.75 |
| Specialist Labor | 235 | Labor requiring a specialized skill set: Includes 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 | $110.71 | 8 | $885.68 |
| **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 | $6.96 | 10 | $69.60 |
| Herbicide, Picloram | 337 | Refer to WIN-PST for product names and active ingredients. Includes materials and shipping only. | Acre | $16.93 | 10 | $169.30 |

**Practice:** E666132Z2 - Reduce forest stand density to improve a degraded plant community

**Scenario** #1 - Forest density-degraded plant community

**Scenario Description:**

Open pine or conifer management reduces the number of trees per acre while still maintaining the stand as forest land. It restores elements of stand structure that were formerly created by fire on sites where it is not currently feasible to conduct prescribed burning at the intensity needed to open the canopy. The open stand condition allows a significant amount of sunlight to reach the forest floor and stimulate understory vegetation. The initial treatment creates a stand structure that allows prescribed burning to be applied to limit redevelopment of the woody component of the understory and maintain open conditions. The vegetation management, and wide spacing between trees or clumps of trees, provides visual appeal, reduces the risk of wildfire, and provides wildlife habitat for many at-risk and listed wildlife species.

**Before Situation:**

Resources are protected at the minimum level of the Conservation Practice Standard (CPS) 666 - Forest Stand Improvement

**After Situation:**

The adoption of this enhancement will provide resource protection above the minimum level as described in Conservation Practice Standard (CPS) 666 - Forest Stand Improvement

**Feature Measure:** Acre

**Scenario Unit::** Acre

**Scenario Typical Size:** 20.0

**Scenario Total Cost:** $5,578.11

**Scenario Cost/Unit:** $278.91

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 | 20 | $1,687.60 |
| Chemical, spot treatment, single stem application | 964 | Ground applied chemical to individual plants or group of plants, e.g., backpack sprayer treatment. Equipment and labor cost included. | Hour | $64.90 | 20 | $1,298.00 |
| **Labor** | | | | | | |
| Equipment Operators, Light | 232 | Includes: Skid Steer Loaders, Hydraulic Excavators <50 HP, Trenchers <12", Ag Equipment <150 HP, Pickup Trucks, Forklifts, Mulchers | Hour | $25.23 | 20 | $504.60 |
| Specialist Labor | 235 | Labor requiring a specialized skill set: Includes Agronomists, Foresters, Biologists, etc. to provide additional technical information during the planning and implementation of the practice. Does not include NRCS or TSP services. | Hour | $110.71 | 8 | $885.68 |
| 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 t | Hour | $71.89 | 4 | $287.56 |
| **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 | $37.13 | 20 | $742.60 |
| **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 | $172.07 | 1 | $172.07 |

**Practice:** E666133X - Forest Stand Improvement to rehabilitate degraded hardwood stands

**Scenario** #1 - FSI-structure/composition in hardwoods

**Scenario Description:**

Mixed species hardwood stands have been subjected to poor logging practices (???high-grading???) for decades. Without professional forestry assistance the best species and individual trees are removed, often before maturity (???diameter-limit cutting???), leaving the poorest species and individual trees to regenerate the stand. Reversing this process requires cutting or killing poor quality trees while retaining any desirable species that might still be present. A combination of 3 silvicultural methods are applied: crop tree release, group selection (all trees removed from an area 0.25 to 1.0 acre in size) and small clear-cuts (all trees removed from an area 1-3 acres in size). A professional forester is needed to recognize and mark crop trees to be retained and delineate areas without crop trees to be clearcut. Thinning and forest stand improvement will include cutting with hand tools (chainsaws) and injection. Costs involved in any commercial harvesting including marking, access, and transportation are not included in this scenario. However the costs involved in marking trees to be treated or left and supervising the TSI work is included.

**Before Situation:**

Resources are protected at the minimum level of the Conservation Practice Standard (CPS) 666 - Forest Stand Improvement

**After Situation:**

The adoption of this enhancement will provide resource protection above the minimum level as described in Conservation Practice Standard (CPS) 666 - Forest Stand Improvement

**Feature Measure:** Acres treated

**Scenario Unit::** Acre

**Scenario Typical Size:** 10.0

**Scenario Total Cost:** $5,282.86

**Scenario Cost/Unit:** $528.29

Cost Details:

| Component Name | ID | Description | Unit | Cost | QTY | Total |
|---|---|---|---|---|---|---|
| **Equipment Installation** | | | | | | |
| Chainsaw | 937 | Equipment and power unit costs. Labor not included. | Hour | $4.37 | 16 | $69.92 |
| Truck, Pickup | 939 | Equipment and power unit costs. Labor not included. | Hour | $21.79 | 2 | $43.58 |
| 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 | $64.90 | 40 | $2,596.00 |
| All terrain vehicles, ATV | 965 | Includes equipment, power unit and labor costs. | Hour | $28.28 | 16 | $452.48 |
| **Labor** | | | | | | |
| General Labor | 231 | Labor performed using basic tools such as power tool, shovels, and other tools that do not require extensive training. Ex. pipe layer, herder, concrete placement, materials spreader, flagger, etc. | Hour | $25.31 | 16 | $404.96 |
| Specialist Labor | 235 | Labor requiring a specialized skill set: Includes Agronomists, Foresters, Biologists, etc. to provide additional technical information during the planning and implementation of the practice. Does not include NRCS or TSP services. | Hour | $110.71 | 8 | $885.68 |
| **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 | $6.96 | 10 | $69.60 |
| Herbicide, Triazine | 1321 | Broad spectrum herbicide. Refer to WIN-PST for product names and active ingredients. Includes materials and shipping only. | Acre | $41.65 | 10 | $416.50 |
| **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 | $172.07 | 2 | $344.14 |

**Practice:** E666133Z1 - Creating structural diversity with patch openings

**Scenario** #1 - Structural diversity with patch openings

**Scenario Description:**

Forest stand improvement that creates patch openings. Size and shape of patches will be based on characteristic natural wind disturbances, which will vary geographically and by forest type.

**Before Situation:**

Resources are protected at the minimum level of the Conservation Practice Standard (CPS) 666 - Forest Stand Improvement

**After Situation:**

The adoption of this enhancement will provide resource protection above the minimum level as described in Conservation Practice Standard (CPS) 666 - Forest Stand Improvement

**Feature Measure:** Acre

**Scenario Unit::** Acre

**Scenario Typical Size:** 15.0

**Scenario Total Cost:** $8,100.15

**Scenario Cost/Unit:** $540.01

Cost Details:

| Component Name | ID | Description | Unit | Cost | QTY | Total |
|---|---|---|---|---|---|---|
| **Equipment Installation** | | | | | | |
| Chainsaw | 937 | Equipment and power unit costs. Labor not included. | Hour | $4.37 | 150 | $655.50 |
| Truck, Pickup | 939 | Equipment and power unit costs. Labor not included. | Hour | $21.79 | 15 | $326.85 |
| **Labor** | | | | | | |
| General Labor | 231 | Labor performed using basic tools such as power tool, shovels, and other tools that do not require extensive training. Ex. pipe layer, herder, concrete placement, materials spreader, flagger, etc. | Hour | $25.31 | 150 | $3,796.50 |
| Specialist Labor | 235 | Labor requiring a specialized skill set: Includes 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 | $110.71 | 30 | $3,321.30 |

**Practice:** E666133Z2 - Converting loblolly and slash pine plantations to longleaf pine with FSI and prescribed burning

**Scenario** #1 - Convert to longleaf pine-FSI and burning

**Scenario Description:**

Longleaf pine has greater wildlife habitat value, is more resistant to insects and disease, and is better able to withstand hurricane-force winds than other southern pines, particularly loblolly and slash pines. Because of rapid early growth, loblolly and slash pines have often been planted on soils and sites better suited to longleaf. Loblolly and slash pine plantations can be converted to longleaf by clearcutting and planting seedlings but mature tree cover is then lost for 20 or more years. This enhancement will gradually convert an existing loblolly or slash pine plantation to longleaf while at the same time maintaining mature tree cover with the associated benefits of wildlife habitat and visual quality, and moderating effects on soil temperature, soil moisture and understory plants.

**Before Situation:**

Resources are protected at the minimum level of the Conservation Practice Standard (CPS) 666 - Forest Stand Improvement

**After Situation:**

The adoption of this enhancement will provide resource protection above the minimum level as described in Conservation Practice Standard (CPS) 666 - Forest Stand Improvement

**Feature Measure:** Acre

**Scenario Unit::** Acre

**Scenario Typical Size:** 50.0

**Scenario Total Cost:** $6,525.09

**Scenario Cost/Unit:** $130.50

Cost Details:

| Component Name | ID | Description | Unit | Cost | QTY | Total |
|---|---|---|---|---|---|---|
| **Equipment Installation** | | | | | | |
| Truck, Pickup | 939 | Equipment and power unit costs. Labor not included. | Hour | $21.79 | 14 | $305.06 |
| Chemical, ground application | 948 | Chemical application performed by ground equipment. Includes equipment, power unit and labor costs. | Acre | $6.13 | 10 | $61.30 |
| All terrain vehicles, ATV | 965 | Includes equipment, power unit and labor costs. | Hour | $28.28 | 2 | $56.56 |
| **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 | $41.76 | 16 | $668.16 |
| 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 | $25.31 | 48 | $1,214.88 |
| 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 | $110.71 | 18 | $1,992.78 |
| **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 | $6.96 | 10 | $69.60 |
| 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 | $37.13 | 10 | $371.30 |
| 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 shi | Acre | $1.28 | 10 | $12.80 |
| 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 | $0.25 | 6050 | $1,512.50 |
| Fuel, ignition fuel mixture | 1596 | Mixture of gasoline and diesel for ignition of prescribed burns. Materials only. | Gallon | $4.32 | 1 | $4.32 |
| **Mobilization** | | | | | | |
| Mobilization, medium equipment | 1139 | Equipment with 70-150 HP or typical weights between 14,000 and 30,000 pounds. | Each | $255.83 | 1 | $255.83 |

**Practice:** E666134Z - Enhance development of the forest understory to create conditions resistant to pests

**Scenario** #1 - Forest understory-resistant to pests

**Scenario Description:**

Forest stand improvement that manages the structure and composition of overstory and understory vegetation to reduce vulnerability to damage by insects and diseases of forest trees. Managing the understory vegetation will also reduce the risk of wildfire, and promote development of herbaceous plants that benefit wildlife.

**Before Situation:**

Resources are protected at the minimum level of the Conservation Practice Standard (CPS) 666 - Forest Stand Improvement

**After Situation:**

The adoption of this enhancement will provide resource protection above the minimum level as described in Conservation Practice Standard (CPS) 666 - Forest Stand Improvement

**Feature Measure:** Acre

**Scenario Unit::** Acre

**Scenario Typical Size:** 20.0

**Scenario Total Cost:** $4,708.00

**Scenario Cost/Unit:** $235.40

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 | $64.90 | 16 | $1,038.40 |
| **Labor** | | | | | | |
| Equipment Operators, Light | 232 | Includes: Skid Steer Loaders, Hydraulic Excavators <50 HP, Trenchers <12", Ag Equipment <150 HP, Pickup Trucks, Forklifts, Mulchers | Hour | $25.23 | 16 | $403.68 |
| Specialist Labor | 235 | Labor requiring a specialized skill set: Includes Agronomists, Foresters, Biologists, etc. to provide additional technical information during the planning and implementation of the practice. Does not include NRCS or TSP services. | Hour | $110.71 | 8 | $885.68 |
| 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 t | Hour | $71.89 | 4 | $287.56 |
| **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 | $37.13 | 20 | $742.60 |

**Practice:** E666135Z1 - Reduce height of the forest understory to limit wildfire risk

**Scenario** #1 - Forest understory-limit wildfire risk

**Scenario Description:**

Forest stand improvement that manages forest structure to reduce the risk of wildfire, and creates conditions that facilitate prescribed burning. The fire risk reduction is accomplished by reducing the height of the woody understory and midstory, creating space between the ground cover and the tree canopy.

**Before Situation:**

Resources are protected at the minimum level of the Conservation Practice Standard (CPS) 666 - Forest Stand Improvement

**After Situation:**

The adoption of this enhancement will provide resource protection above the minimum level as described in Conservation Practice Standard (CPS) 666 - Forest Stand Improvement

**Feature Measure:** Acre

**Scenario Unit::** Acre

**Scenario Typical Size:** 20.0

**Scenario Total Cost:** $4,708.00

**Scenario Cost/Unit:** $235.40

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 | $64.90 | 16 | $1,038.40 |
| **Labor** | | | | | | |
| Equipment Operators, Light | 232 | Includes: Skid Steer Loaders, Hydraulic Excavators <50 HP, Trenchers <12", Ag Equipment <150 HP, Pickup Trucks, Forklifts, Mulchers | Hour | $25.23 | 16 | $403.68 |
| Specialist Labor | 235 | Labor requiring a specialized skill set: Includes Agronomists, Foresters, Biologists, etc. to provide additional technical information during the planning and implementation of the practice. Does not include NRCS or TSP services. | Hour | $110.71 | 8 | $885.68 |
| 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 t | Hour | $71.89 | 4 | $287.56 |
| **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 | $37.13 | 20 | $742.60 |

**Practice:** E666135Z2 - Reduce forest density and manage understory along roads to limit wildfire risk

**Scenario** #1 - Manage understory-limit wildfire risk

**Scenario Description:**

Opening the tree canopy along roads ("daylighting"), and providing space between ground vegetation and tree crowns, minimizes the spread of wildfires that often start along roads. Additionally, opening the canopy will allow more sunlight to reach the forest floor and promote flowering plants, and will reduce maintenance needs by allowing moisture to evaporate from roads.

**Before Situation:**

Resources are protected at the minimum level of the Conservation Practice Standard (CPS) 666 - Forest Stand Improvement

**After Situation:**

The adoption of this enhancement will provide resource protection above the minimum level as described in Conservation Practice Standard (CPS) 666 - Forest Stand Improvement

**Feature Measure:** Acre

**Scenario Unit::** Acre

**Scenario Typical Size:** 10.0

**Scenario Total Cost:** $2,890.50

**Scenario Cost/Unit:** $289.05

Cost Details:

| Component Name | ID | Description | Unit | Cost | QTY | Total |
|---|---|---|---|---|---|---|
| **Equipment Installation** | | | | | | |
| Chainsaw | 937 | Equipment and power unit costs. Labor not included. | Hour | $4.37 | 8 | $34.96 |
| Mechanical cutter, chopper | 943 | Forestry mulcher, flail shredder, hydro axe, brush cutter, etc. Equipment and power unit costs. Labor not included. | Hour | $84.38 | 8 | $675.04 |
| Chemical, spot treatment, single stem application | 964 | Ground applied chemical to individual plants or group of plants, e.g., backpack sprayer treatment. Equipment and labor cost included. | Hour | $64.90 | 8 | $519.20 |
| **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 | $25.31 | 8 | $202.48 |
| Equipment Operators, Light | 232 | Includes: Skid Steer Loaders, Hydraulic Excavators <50 HP, Trenchers <12", Ag Equipment <150 HP, Pickup Trucks, Forklifts, Mulchers | Hour | $25.23 | 8 | $201.84 |
| Specialist Labor | 235 | Labor requiring a specialized skill set: Includes Agronomists, Foresters, Biologists, etc. to provide additional technical information during the planning and implementation of the practice. Does not include NRCS or TSP services. | Hour | $110.71 | 8 | $885.68 |
| **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 | $37.13 | 10 | $371.30 |

**Practice:** E666136Z1 - Reduce forest density and manage understory along roads to improve wildlife food sources

**Scenario** #1 - Manage understory-wildlife food sources

**Scenario Description:**

Opening the tree canopy along roads ("daylighting") allows more sunlight to reach the forest floor and promotes the growth of herbaceous plants. The resulting condition is more visually appealing for users of the roadway, and improves wildlife habitat and food sources for many wildlife species.

**Before Situation:**

Resources are protected at the minimum level of the Conservation Practice Standard (CPS) 666 - Forest Stand Improvement

**After Situation:**

The adoption of this enhancement will provide resource protection above the minimum level as described in Conservation Practice Standard (CPS) 666 - Forest Stand Improvement

**Feature Measure:** Acre

**Scenario Unit::** Acre

**Scenario Typical Size:** 10.0

**Scenario Total Cost:** $2,890.50

**Scenario Cost/Unit:** $289.05

Cost Details:

| Component Name | ID | Description | Unit | Cost | QTY | Total |
|---|---|---|---|---|---|---|
| **Equipment Installation** | | | | | | |
| Chainsaw | 937 | Equipment and power unit costs. Labor not included. | Hour | $4.37 | 8 | $34.96 |
| Mechanical cutter, chopper | 943 | Forestry mulcher, flail shredder, hydro axe, brush cutter, etc. Equipment and power unit costs. Labor not included. | Hour | $84.38 | 8 | $675.04 |
| Chemical, spot treatment, single stem application | 964 | Ground applied chemical to individual plants or group of plants, e.g., backpack sprayer treatment. Equipment and labor cost included. | Hour | $64.90 | 8 | $519.20 |
| **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 | $25.31 | 8 | $202.48 |
| Equipment Operators, Light | 232 | Includes: Skid Steer Loaders, Hydraulic Excavators <50 HP, Trenchers <12", Ag Equipment <150 HP, Pickup Trucks, Forklifts, Mulchers | Hour | $25.23 | 8 | $201.84 |
| Specialist Labor | 235 | Labor requiring a specialized skill set: Includes Agronomists, Foresters, Biologists, etc. to provide additional technical information during the planning and implementation of the practice. Does not include NRCS or TSP services. | Hour | $110.71 | 8 | $885.68 |
| **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 | $37.13 | 10 | $371.30 |

**Practice:** E666136Z2 - Reduce forest stand density to improve wildlife food sources

**Scenario** #1 - Stand density-wildlife food sources

**Scenario Description:**

Open pine or conifer management reduces the number of trees per acre while still maintaining the stand as forest land. It restores elements of wildlife habitat that formerly resulted from fire, on sites where it is not currently feasible to conduct prescribed burning. The open stand condition allows a significant amount of sunlight to reach the forest floor and stimulate understory vegetation. The initial treatment creates a stand structure that allows prescribed burning to be applied, where feasible, to limit redevelopment of the woody component of the understory and maintain open conditions. The vegetation management, and wide spacing between trees or clumps of trees, provides visual appeal, reduces the risk of wildfire, and provides wildlife habitat for many at-risk and listed wildlife species.

**Before Situation:**

Resources are protected at the minimum level of the Conservation Practice Standard (CPS) 666 - Forest Stand Improvement

**After Situation:**

The adoption of this enhancement will provide resource protection above the minimum level as described in Conservation Practice Standard (CPS) 666 - Forest Stand Improvement

**Feature Measure:** Acre

**Scenario Unit::** Acre

**Scenario Typical Size:** 20.0

**Scenario Total Cost:** $5,578.11

**Scenario Cost/Unit:** $278.91

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 | 20 | $1,687.60 |
| Chemical, spot treatment, single stem application | 964 | Ground applied chemical to individual plants or group of plants, e.g., backpack sprayer treatment. Equipment and labor cost included. | Hour | $64.90 | 20 | $1,298.00 |
| **Labor** | | | | | | |
| Equipment Operators, Light | 232 | Includes: Skid Steer Loaders, Hydraulic Excavators <50 HP, Trenchers <12", Ag Equipment <150 HP, Pickup Trucks, Forklifts, Mulchers | Hour | $25.23 | 20 | $504.60 |
| Specialist Labor | 235 | Labor requiring a specialized skill set: Includes Agronomists, Foresters, Biologists, etc. to provide additional technical information during the planning and implementation of the practice. Does not include NRCS or TSP services. | Hour | $110.71 | 8 | $885.68 |
| 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 t | Hour | $71.89 | 4 | $287.56 |
| **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 | $37.13 | 20 | $742.60 |
| **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 | $172.07 | 1 | $172.07 |

**Practice:** E666136Z3 - Create patch openings to enhance wildlife food sources and availability

**Scenario** #1 - Patch openings-food and availability

**Scenario Description:**

Forest stand improvement that creates patch openings. Size, shape, and arrangement of patches will be based on natural features, and emulate patches that would result from natural disturbance regimes of wind or fire, varying geographically and by forest type. The treatment will create diversity in stand composition and structure, and enhance wildlife food availability.

**Before Situation:**

Resources are protected at the minimum level of the Conservation Practice Standard (CPS) 666 - Forest Stand Improvement

**After Situation:**

The adoption of this enhancement will provide resource protection above the minimum level as described in Conservation Practice Standard (CPS) 666 - Forest Stand Improvement

**Feature Measure:** Acre

**Scenario Unit::** Acre

**Scenario Typical Size:** 15.0

**Scenario Total Cost:** $8,387.71

**Scenario Cost/Unit:** $559.18

Cost Details:

| Component Name | ID | Description | Unit | Cost | QTY | Total |
|---|---|---|---|---|---|---|
| **Equipment Installation** | | | | | | |
| Chainsaw | 937 | Equipment and power unit costs. Labor not included. | Hour | $4.37 | 150 | $655.50 |
| Truck, Pickup | 939 | Equipment and power unit costs. Labor not included. | Hour | $21.79 | 15 | $326.85 |
| **Labor** | | | | | | |
| General Labor | 231 | Labor performed using basic tools such as power tool, shovels, and other tools that do not require extensive training. Ex. pipe layer, herder, concrete placement, materials spreader, flagger, etc. | Hour | $25.31 | 150 | $3,796.50 |
| Specialist Labor | 235 | Labor requiring a specialized skill set: Includes 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 | $110.71 | 30 | $3,321.30 |
| 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 t | Hour | $71.89 | 4 | $287.56 |

**Practice:** E666137Z1 - Snags, den trees, and coarse woody debris for wildlife habitat

**Scenario** #1 - Snags and den trees for wildlife

**Scenario Description:**
Create and retain snags, den trees, forest stand structural diversity, and coarse woody debris on the forest floor to provide cover/shelter for native wildlife species.

**Before Situation:**
Resources are protected at the minimum level of the Conservation Practice Standard (CPS) 666 - Forest Stand Improvement

**After Situation:**
The adoption of this enhancement will provide resource protection above the minimum level as described in Conservation Practice Standard (CPS) 666 - Forest Stand Improvement

**Feature Measure:** Acre

**Scenario Unit::** Acre

**Scenario Typical Size:** 10.0

**Scenario Total Cost:** $556.33

**Scenario Cost/Unit:** $55.63

Cost Details:

| Component Name | ID | Description | Unit | Cost | QTY | Total |
|---|---|---|---|---|---|---|
| **Equipment Installation** | | | | | | |
| Chainsaw | 937 | Equipment and power unit costs. Labor not included. | Hour | $4.37 | 7 | $30.59 |
| Truck, Pickup | 939 | Equipment and power unit costs. Labor not included. | Hour | $21.79 | 1 | $21.79 |
| 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 | $64.90 | 3 | $194.70 |
| **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 | $41.76 | 7 | $292.32 |
| **Materials** | | | | | | |
| Herbicide, Picloram | 337 | Refer to WIN-PST for product names and active ingredients. Includes materials and shipping only. | Acre | $16.93 | 1 | $16.93 |

**Practice:** E666137Z2 - Summer roosting habitat for native forest-dwelling bat species

**Scenario** #1 - Summer roosting habitat for bats

**Scenario Description:**
Creates new potential roost trees within upland and riparian forests to achieve desired summer habitat for forest dwelling bat species.

**Before Situation:**
Resources are protected at the minimum level of the Conservation Practice Standard (CPS) 666 - Forest Stand Improvement

**After Situation:**
The adoption of this enhancement will provide resource protection above the minimum level as described in Conservation Practice Standard (CPS) 666 - Forest Stand Improvement

**Feature Measure:** Acre

**Scenario Unit::** Acre

**Scenario Typical Size:** 10.0

**Scenario Total Cost:** $2,042.02

**Scenario Cost/Unit:** $204.20

Cost Details:

| Component Name | ID | Description | Unit | Cost | QTY | Total |
|---|---|---|---|---|---|---|
| **Equipment Installation** | | | | | | |
| Chainsaw | 937 | Equipment and power unit costs. Labor not included. | Hour | $4.37 | 13 | $56.81 |
| Truck, Pickup | 939 | Equipment and power unit costs. Labor not included. | Hour | $21.79 | 6 | $130.74 |
| 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 | $64.90 | 13 | $843.70 |
| **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 | $25.31 | 13 | $329.03 |
| Specialist Labor | 235 | Labor requiring a specialized skill set: Includes 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 | $110.71 | 4 | $442.84 |
| **Materials** | | | | | | |
| Tree Marking Paint | 313 | Trees to be cut through tree marking are physically identified through the application of paint on the tree. Typically one quart of paint is used to mark one acre of trees. Includes materials and shipping only. | Acre | $6.96 | 10 | $69.60 |
| Herbicide, Picloram | 337 | Refer to WIN-PST for product names and active ingredients. Includes materials and shipping only. | Acre | $16.93 | 10 | $169.30 |

**Practice:** E666137Z3 - Increase diversity in pine plantation monocultures

**Scenario** #1 - Improve pine plantation diversity

**Scenario Description:**

Creates small openings to provide diversity in pine plantations, which are typically monocultures and inhospitable to wildlife. Small openings are one-half (0.5) to three (3) acres in size. The cleared area will have the vegetation removed through harvesting, mulching, or other means compatible with the site.

**Before Situation:**

Resources are protected at the minimum level of the Conservation Practice Standard (CPS) 666 - Forest Stand Improvement

**After Situation:**

The adoption of this enhancement will provide resource protection above the minimum level as described in Conservation Practice Standard (CPS) 666 - Forest Stand Improvement

**Feature Measure:** Acre

**Scenario Unit::** Acre

**Scenario Typical Size:** 2.0

**Scenario Total Cost:** $1,080.02

**Scenario Cost/Unit:** $540.01

Cost Details:

| Component Name | ID | Description | Unit | Cost | QTY | Total |
|---|---|---|---|---|---|---|
| **Equipment Installation** | | | | | | |
| Chainsaw | 937 | Equipment and power unit costs. Labor not included. | Hour | $4.37 | 20 | $87.40 |
| Truck, Pickup | 939 | Equipment and power unit costs. Labor not included. | Hour | $21.79 | 2 | $43.58 |
| **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 | $25.31 | 20 | $506.20 |
| 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 | $110.71 | 4 | $442.84 |

**Practice:** E666137Z4 - Converting loblolly and slash pine plantations to longleaf pine to enhance wildlife habitat

**Scenario** #1 - Convert to longleaf pine-habitat

**Scenario Description:**

Longleaf pine has greater wildlife habitat value, is more resistant to insects and disease, and is better able to withstand hurricane-force winds than other southern pines, particularly loblolly and slash pines. Because of rapid early growth, loblolly and slash pines have often been planted on soils and sites better suited to longleaf. Loblolly and slash pine plantations can be converted to longleaf by clearcutting and planting seedlings but mature tree cover is then lost for 20 or more years. This enhancement will gradually convert an existing loblolly or slash pine plantation to longleaf while at the same time maintaining mature tree cover with the associated benefits of wildlife habitat and visual quality, and moderating effects on soil temperature, soil moisture and understory plants.

**Before Situation:**

Resources are protected at the minimum level of the Conservation Practice Standard (CPS) 666 - Forest Stand Improvement

**After Situation:**

The adoption of this enhancement will provide resource protection above the minimum level as described in Conservation Practice Standard (CPS) 666 - Forest Stand Improvement

**Feature Measure:** Acre

**Scenario Unit::** Acre

**Scenario Typical Size:** 50.0

**Scenario Total Cost:** $6,525.09

**Scenario Cost/Unit:** $130.50

Cost Details:

| Component Name | ID | Description | Unit | Cost | QTY | Total |
|---|---|---|---|---|---|---|
| **Equipment Installation** | | | | | | |
| Truck, Pickup | 939 | Equipment and power unit costs. Labor not included. | Hour | $21.79 | 14 | $305.06 |
| Chemical, ground application | 948 | Chemical application performed by ground equipment. Includes equipment, power unit and labor costs. | Acre | $6.13 | 10 | $61.30 |
| All terrain vehicles, ATV | 965 | Includes equipment, power unit and labor costs. | Hour | $28.28 | 2 | $56.56 |
| **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 | $41.76 | 16 | $668.16 |
| 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 | $25.31 | 48 | $1,214.88 |
| 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 | $110.71 | 18 | $1,992.78 |
| **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 | $6.96 | 10 | $69.60 |
| 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 | $37.13 | 10 | $371.30 |
| 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 shi | Acre | $1.28 | 10 | $12.80 |
| 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 | $0.25 | 6050 | $1,512.50 |
| Fuel, ignition fuel mixture | 1596 | Mixture of gasoline and diesel for ignition of prescribed burns. Materials only. | Gallon | $4.32 | 1 | $4.32 |
| **Mobilization** | | | | | | |
| Mobilization, medium equipment | 1139 | Equipment with 70-150 HP or typical weights between 14,000 and 30,000 pounds. | Each | $255.83 | 1 | $255.83 |

**Practice:** E666137Z5 - Implementing sustainable practices for pine straw raking to enhance wildlife habitat

**Scenario** #1 - Sustainable pine straw raking-habitat

**Scenario Description:**

Adopts guidelines for sustaining soil quality and wildlife habitat on sites where pine straw raking is currently practiced. Raking and removal of pine needles ("pine straw") provides valuable landscaping material but at a high cost to soil fertility, soil organic matter, wildlife habitat, and in some cases, soil compaction, soil erosion and water quality degradation. Straw removal also makes prescribed burning less feasible by removal of the fine fuels needed to carry frequent surface fires that maintain longleaf pine and its characteristic understory. This enhancement is most applicable to longleaf pine forestland because: (1) longleaf-dominated ecosystems with their characteristic suite of flora and fauna historically predominated in most places where pines are currently grown in the Southeast, and (2) longleaf is the favored species for pine straw operations.

**Before Situation:**

Resources are protected at the minimum level of the Conservation Practice Standard (CPS) 666 - Forest Stand Improvement

**After Situation:**

The adoption of this enhancement will provide resource protection above the minimum level as described in Conservation Practice Standard (CPS) 666 - Forest Stand Improvement

**Feature Measure:** Acre

**Scenario Unit::** Acre

**Scenario Typical Size:** 50.0

**Scenario Total Cost:** $1,407.50

**Scenario Cost/Unit:** $28.15

Cost Details:

| Component Name | ID | Description | Unit | Cost | QTY | Total |
|---|---|---|---|---|---|---|
| **Equipment Installation** | | | | | | |
| Truck, Pickup | 939 | Equipment and power unit costs. Labor not included. | Hour | $21.79 | 2 | $43.58 |
| All terrain vehicles, ATV | 965 | Includes equipment, power unit and labor costs. | Hour | $28.28 | 4 | $113.12 |
| **Labor** | | | | | | |
| Specialist Labor | 235 | Labor requiring a specialized skill set: Includes Agronomists, Foresters, Biologists, etc. to provide additional technical information during the planning and implementation of the practice. Does not include NRCS or TSP services. | Hour | $110.71 | 10 | $1,107.10 |
| **Materials** | | | | | | |
| Test, Soil Test, Standard | 299 | Includes materials, shiping, labor, and equipment costs. | Each | $10.04 | 10 | $100.40 |
| Tree Marking Paint | 313 | Trees to be cut through tree marking are physically identified through the application of paint on the tree. Typically one quart of paint is used to mark one acre of trees. Includes materials and shipping only. | Acre | $6.96 | 5 | $34.80 |
| One Species, Cool Season, Native Perennial Grass Sprig, Plug or Culm | 2696 | Native perennial grass sprig, plug or culms used to stabilize areas, such as sand dunes and riparian areas. Includes materials and shipping. | Each | $0.17 | 50 | $8.50 |

**Practice:** E666137Z6 - Create patch openings to enhance wildlife cover and shelter

**Scenario** #1 - Patch openings-cover and shelter

**Scenario Description:**

Forest stand improvement that creates patch openings. Size, shape, and arrangement of patches will be based on natural features, and emulate patches that would result from natural disturbance regimes of wind or fire, varying geographically and by forest type. The treatment will create diversity in stand composition and structure, and enhance the availability of wildlife food and cover.

**Before Situation:**

Resources are protected at the minimum level of the Conservation Practice Standard (CPS) 666 - Forest Stand Improvement

**After Situation:**

The adoption of this enhancement will provide resource protection above the minimum level as described in Conservation Practice Standard (CPS) 666 - Forest Stand Improvement

**Feature Measure:** Acre

**Scenario Unit::** Acre

**Scenario Typical Size:** 15.0

**Scenario Total Cost:** $8,387.71

**Scenario Cost/Unit:** $559.18

Cost Details:

| Component Name | ID | Description | Unit | Cost | QTY | Total |
|---|---|---|---|---|---|---|
| **Equipment Installation** | | | | | | |
| Chainsaw | 937 | Equipment and power unit costs. Labor not included. | Hour | $4.37 | 150 | $655.50 |
| Truck, Pickup | 939 | Equipment and power unit costs. Labor not included. | Hour | $21.79 | 15 | $326.85 |
| **Labor** | | | | | | |
| General Labor | 231 | Labor performed using basic tools such as power tool, shovels, and other tools that do not require extensive training. Ex. pipe layer, herder, concrete placement, materials spreader, flagger, etc. | Hour | $25.31 | 150 | $3,796.50 |
| Specialist Labor | 235 | Labor requiring a specialized skill set: Includes 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 | $110.71 | 30 | $3,321.30 |
| 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 t | Hour | $71.89 | 4 | $287.56 |

**Practice:** E666137Z7 - Enhance development of the forest understory to provide wildlife cover and shelter

**Scenario** #1 - Understory to provide cover/shelter

**Scenario Description:**

Forest stand improvement that manages the structure and composition of overstory and understory vegetation to improve the quantity and quality of wildlife cover and shelter. Reducing the number of trees per acre provides canopy openings that allow sunlight to reach the forest floor and promote the growth of herbaceous plants, improving wildlife shelter and cover in the forest understory. The treatment also creates conditions that facilitate the use of prescribed burning as a follow-up practice to maintain wildlife shelter and cover.

**Before Situation:**

Resources are protected at the minimum level of the Conservation Practice Standard (CPS) 666 - Forest Stand Improvement

**After Situation:**

The adoption of this enhancement will provide resource protection above the minimum level as described in Conservation Practice Standard (CPS) 666 - Forest Stand Improvement

**Feature Measure:** Acre

**Scenario Unit::** Acre

**Scenario Typical Size:** 20.0

**Scenario Total Cost:** $4,880.07

**Scenario Cost/Unit:** $244.00

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 | $64.90 | 16 | $1,038.40 |
| **Labor** | | | | | | |
| Equipment Operators, Light | 232 | Includes: Skid Steer Loaders, Hydraulic Excavators <50 HP, Trenchers <12", Ag Equipment <150 HP, Pickup Trucks, Forklifts, Mulchers | Hour | $25.23 | 16 | $403.68 |
| Specialist Labor | 235 | Labor requiring a specialized skill set: Includes Agronomists, Foresters, Biologists, etc. to provide additional technical information during the planning and implementation of the practice. Does not include NRCS or TSP services. | Hour | $110.71 | 8 | $885.68 |
| 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 t | Hour | $71.89 | 4 | $287.56 |
| **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 | $37.13 | 20 | $742.60 |
| **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 | $172.07 | 1 | $172.07 |