

Scenario Worksheet

Practice and Scenario Description:

Information Type	Data
Region	Appalachian
State	North Carolina
Discipline Group	Engineering General
Practice Code/Name	587 - Structure for Water Control
Scenario ID	4
Scenario Name	Commercial Inline Flashboard Riser
Scenario Description	An inline Water Control Structure (WCS) composed of plastic that maintains a desired water surface elevation, controls the direction or rate of flow, or conveys water to address the resource concern: Inadequate habitat for Fish and Wildlife. The water surface elevation is controlled by addition or removal of slats or "stoplogs". This scenario is applicable to variable crest weir structures where the elevation is controlled at point along a pipe extending through an embankment, providing ease of access to the structure and provide better protection against beaver activity. There are commercially available models composed of plastic that are commonly used when the width of the is 24" or less. Payment rate is based upon the Flashboard Weir Length in inches multiplied by the outlet length in feet (Inch-Foot). Cost estimate is based on a using 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 16" SCH 40 PVC (inlet and outlet combined).
Before Practice Situation	The landowner wishes to provide for a way to control the water surface elevation in a wetland area. The landowner wishes to enhance and enlarge the area to provide habitat for fish and wildlife.
After Practice Situation	A WCS is installed in a flow line allowing shallow water impoundments. A wetland area is enhanced and water levels can be varied to better accommodate wildlife needs. Any needed re-vegetation of disturbed areas use Critical Area Planting (342). Other associated practices such as; Wetland Creation (658), Wetland Enhancement (659) Wetland Wildlife Habitat Management (644), Dike (356), Wetland Wildlife Habitat Management (644), and Grade Stabilization Structure (410) will use the corresponding Standard(s) as appropriate.
Scenario Feature Measure	Flashboard Weir Length (in) x Barrel Length (ft)
Scenario Unit	Inch-Foot
Scenario Typical Size	1000

Cost Summary:

Cost Category	Scenario Cost	Scenario Cost/Unit
Materials	\$3,132.26	\$3.13
Equipment/Installation	\$758.37	\$0.76
Labor	\$265.26	\$0.27
Mobilization	\$118.24	\$0.12
Acquisition of Technical Knowledge	\$0.00	\$0.00
Foregone Income	\$0.00	\$0.00
Total	\$4,274.13	\$4.27

Cost Details:

Cost Category	Component ID	Component Name	Component Description	Unit	Price (\$/unit)	Quantity	Cost
Materials	1353	Pipe, PVC, 16", SCH 80	Materials: - 16" - PVC - SCH 80 - ASTM D1785	Foot	\$35.32	50	\$1,766.00
Materials	1425	Water Control Structure, Stoplog, Inline, 20"x24"x6', 15" diameter	Water Level Control Structure, Inline stoplog type, 20" wide x 24" deep x 6' high suitable for a 15" diameter pipe. Typically made of PVC or fiberglass materials. Materials only.	Each	\$1,366.26	1	\$1,366.26
Equipment/Installation	930	Hydraulic Excavator, .5 CY	Track mounted hydraulic excavator with bucket capacity range of 0.3 to 0.8 CY. Equipment and power unit costs. Labor not included.	Hour	\$46.31	2	\$92.62
Equipment/Installation	50	Earthfill, Manually Compacted	Earthfill, manually compacted, includes equipment and labor	Cubic yard	\$4.23	15	\$63.45
Equipment/Installation	49	Earthfill, Roller Compacted	Earthfill, roller or machine compacted, includes equipment and labor	Cubic yard	\$3.17	190	\$602.30
Labor	233	Equipment Operators, Heavy	Includes: Cranes, Hydraulic Excavators >=50 HP, Dozers, Paving Machines, Rock Trenchers, Trenchers >=12", Dump Trucks, Ag Equipment >=150 HP, Scrapers, Water Wagons.	Hour	\$21.98	2	\$43.96
Labor	230	Skilled Labor	Labor requiring a high level skill set: Includes carpenters, welders, electricians, conservation professionals involved with data collection, monitoring, and or record keeping, etc.	Hour	\$23.98	3	\$71.94
Labor	231	General Labor	Labor performed using basic tools such as power tool, shovels, and other tools that do not require extensive training. Ex. pipe layer, herder, concrete placement, materials spreader, flagger, etc.	Hour	\$18.67	8	\$149.36
Mobilization	1139	Mobilization, medium equipment	Equipment with 70-150 HP or typical weights between 14,000 and 30,000 pounds.	Each	\$92.60	1	\$92.60
Mobilization	1137	Mobilization, very small equipment	Equipment that is small enough to be transported by a pick-up truck with typical weights less than 3,500 pounds. Can be multiple pieces of equipment if all hauled simultaneously.	Each	\$25.64	1	\$25.64

Scenario Worksheet

Practice and Scenario Description:

Information Type	Data
Region	Appalachian
State	North Carolina
Discipline Group	Engineering General
Practice Code/Name	587 - Structure for Water Control
Scenario ID	3
Scenario Name	Flashboard Riser w/ Double Headwall
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. They can also be fabricated from vertical pipes with the stoplogs are located in the middle (i.e. Full-Rounds) and are called in-line structures. This scenario also includes two headwalls, one installed on the upstream and one installed on the downstream section of the barrel. 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 42" smooth steel pipe, a 50' long - 30" outlet pipe passing through an embankment (weir (42) x barrel length (50) = 2100) with two headwalls.
Before Practice Situation	The operator presently flood irrigates his field and has no means to accurately maintain a constant water level at varying elevations resulting in a lack of flexibility, and inefficient use of water and energy during pumping. The operator also desires to maintain a permanent pool for water fowl during the winter.
After Practice Situation	The operator has the capability to more efficiently control and maintain a range of water surface elevations thereby reducing the flow rate needed. Less water is wasted and both water and energy is conserved. The operator is now able to maintain adequate water during the winter as a benefit to waterfowl. Any needed re-vegetation of disturbed areas use Critical Area Planting (342). Other associated practices such as; Irrigation Water Management (449), Irrigation Land Leveling (464), Irrigation Canal or Lateral (320), Irrigation System, Tailwater Recovery (447), Dike (356), Wetland Wildlife Habitat Management (644), and Grade Stabilization Structure (410) will use the corresponding Standard(s) as appropriate.
Scenario Feature Measure	Flashboard Weir Length (in) x Barrel Length (ft)
Scenario Unit	Inch-Foot
Scenario Typical Size	2100

Cost Summary:

Cost Category	Scenario Cost	Scenario Cost/Unit
Materials	\$7,929.18	\$3.78
Equipment/Installation	\$12,020.84	\$5.72
Labor	\$299.86	\$0.14
Mobilization	\$118.24	\$0.06
Acquisition of Technical Knowledge	\$0.00	\$0.00
Foregone Income	\$0.00	\$0.00
Total	\$20,368.12	\$9.70

Cost Details:

Cost Category	Component ID	Component Name	Component Description	Unit	Price (\$/unit)	Quantity	Cost
Materials	1371	Pipe, Steel, 42", Std Wt	Materials: - 42" - Steel Std Wt	Foot	\$181.65	6	\$1,089.90
Materials	1369	Pipe, Steel, 30", Std Wt	Materials: - 30" - Steel Std Wt	Foot	\$129.44	50	\$6,472.00
Materials	1372	Steel, Angle, 3" x 3" x 1/4"	Materials: Angle, 3" x 3" x 1/4", Meets ASTM A36	Foot	\$2.94	24	\$70.56
Materials	1609	Lumber, planks, posts and timbers, treated	Treated dimension lumber with nominal thickness greater than 2". Includes lumber and fasteners. Does not include labor.	Board Foot	\$1.17	32	\$37.44
Materials	45	Aggregate, Sand, Graded, Washed	Sand, typical ASTM C33 gradation, includes materials, equipment and labor to transport and place	Cubic yard	\$23.11	8	\$184.88
Materials	1375	Steel, Plate, 3/8"	Flat steel plate, 3/8" thickness. Materials only.	Square Foot	\$12.40	6	\$74.40
Equipment/Installation	50	Earthfill, Manually Compacted	Earthfill, manually compacted, includes equipment and labor	Cubic yard	\$4.23	10	\$42.30
Equipment/Installation	49	Earthfill, Roller Compacted	Earthfill, roller or machine compacted, includes equipment and labor	Cubic yard	\$3.17	390	\$1,236.30
Equipment/Installation	48	Excavation, Common Earth, side cast, small equipment	Bulk excavation and side casting of common earth with hydraulic excavator with less than 1 CY capacity. Includes equipment and labor.	Cubic yard	\$1.71	400	\$684.00
Equipment/Installation	38	Concrete, CIP, formed reinforced	Steel reinforced concrete formed and cast-in-place in formed structures such as walls or suspended slabs by chute placement. Typical strength is 3000 to 4000 psi. Includes materials, labor and equipment to transport, place and finish.	Cubic yard	\$329.10	30	\$9,873.00
Equipment/Installation	930	Hydraulic Excavator, .5 CY	Track mounted hydraulic excavator with bucket capacity range of 0.3 to 0.8 CY. Equipment and power unit costs. Labor not included.	Hour	\$46.31	4	\$185.24
Labor	230	Skilled Labor	Labor requiring a high level skill set: Includes carpenters, welders, electricians, conservation professionals involved with data collection, monitoring, and or record keeping, etc.	Hour	\$23.98	6	\$143.88
Labor	233	Equipment Operators, Heavy	Includes: Cranes, Hydraulic Excavators >=50 HP, Dozers, Paving Machines, Rock Trenchers, Trenchers >=12", Dump Trucks, Ag Equipment >=150 HP, Scrapers, Water Wagons.	Hour	\$21.98	2	\$43.96

Labor	231	General Labor	Labor performed using basic tools such as power tool, shovels, and other tools that do not require extensive training. Ex. pipe layer, herder, concrete placement, materials spreader, flagger, etc.	Hour	\$18.67	6	\$112.02
Mobilization	1139	Mobilization, medium equipment	Equipment with 70-150 HP or typical weights between 14,000 and 30,000 pounds.	Each	\$92.60	1	\$92.60
Mobilization	1137	Mobilization, very small equipment	Equipment that is small enough to be transported by a pick-up truck with typical weights less than 3,500 pounds. Can be multiple pieces of equipment if all hauled simultaneously.	Each	\$25.64	1	\$25.64

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Practice and Scenario Description:

Information Type	Data
Region	Appalachian
State	North Carolina
Discipline Group	Engineering General
Practice Code/Name	587 - Structure for Water Control
Scenario ID	2
Scenario Name	Flashboard Riser w/ Single Headwall
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. They can also be fabricated from vertical pipes with the stoplogs are located in the middle (i.e. Full-Rounds) and are called in-line structures. This scenario also includes a headwall installed on either the upstream or downstream section of the barrel. 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 42" smooth steel pipe, a 50' long - 30" outlet pipe passing through an embankment (weir (42) x barrel length (50) = 2100) with a headwall.
Before Practice Situation	The operator presently flood irrigates his field and has no means to accurately maintain a constant water level at varying elevations resulting in a lack of flexibility, and inefficient use of water and energy during pumping. The operator also desires to maintain a permanent pool for water fowl during the winter.
After Practice Situation	The operator has the capability to more efficiently control and maintain a range of water surface elevations thereby reducing the flow rate needed. Less water is wasted and both water and energy is conserved. The operator is now able to maintain adequate water during the winter as a benefit to waterfowl. Any needed re-vegetation of disturbed areas use Critical Area Planting (342). Other associated practices such as; Irrigation Water Management (449), Irrigation Land Leveling (464), Irrigation Canal or Lateral (320), Irrigation System, Tailwater Recovery (447), Dike (356), Wetland Wildlife Habitat Management (644), and Grade Stabilization Structure (410) will use the corresponding Standard(s) as appropriate.
Scenario Feature Measure	Flashboard Weir Length (in) x Barrel Length (ft)
Scenario Unit	Inch-Foot
Scenario Typical Size	2100

Cost Summary:

Cost Category	Scenario Cost	Scenario Cost/Unit
Materials	\$7,836.74	\$3.73
Equipment/Installation	\$6,742.34	\$3.21
Labor	\$299.86	\$0.14
Mobilization	\$118.24	\$0.06
Acquisition of Technical Knowledge	\$0.00	\$0.00
Foregone Income	\$0.00	\$0.00
Total	\$14,997.18	\$7.14

Cost Details:

Cost Category	Component ID	Component Name	Component Description	Unit	Price (\$/unit)	Quantity	Cost
Materials	1371	Pipe, Steel, 42", Std Wt	Materials: - 42" - Steel Std Wt	Foot	\$181.65	6	\$1,089.90
Materials	1369	Pipe, Steel, 30", Std Wt	Materials: - 30" - Steel Std Wt	Foot	\$129.44	50	\$6,472.00
Materials	1372	Steel, Angle, 3" x 3" x 1/4"	Materials: Angle, 3" x 3" x 1/4", Meets ASTM A36	Foot	\$2.94	24	\$70.56
Materials	1609	Lumber, planks, posts and timbers, treated	Treated dimension lumber with nominal thickness greater than 2". Includes lumber and fasteners. Does not include labor.	Board Foot	\$1.17	32	\$37.44
Materials	45	Aggregate, Sand, Graded, Washed	Sand, typical ASTM C33 gradation, includes materials, equipment and labor to transport and place	Cubic yard	\$23.11	4	\$92.44
Materials	1375	Steel, Plate, 3/8"	Flat steel plate, 3/8" thickness. Materials only.	Square Foot	\$12.40	6	\$74.40
Equipment/Installation	50	Earthfill, Manually Compacted	Earthfill, manually compacted, includes equipment and labor	Cubic yard	\$4.23	10	\$42.30
Equipment/Installation	49	Earthfill, Roller Compacted	Earthfill, roller or machine compacted, includes equipment and labor	Cubic yard	\$3.17	390	\$1,236.30
Equipment/Installation	48	Excavation, Common Earth, side cast, small equipment	Bulk excavation and side casting of common earth with hydraulic excavator with less than 1 CY capacity. Includes equipment and labor.	Cubic yard	\$1.71	200	\$342.00
Equipment/Installation	38	Concrete, CIP, formed reinforced	Steel reinforced concrete formed and cast-in-place in formed structures such as walls or suspended slabs by chute placement. Typical strength is 3000 to 4000 psi. Includes materials, labor and equipment to transport, place and finish.	Cubic yard	\$329.10	15	\$4,936.50
Equipment/Installation	930	Hydraulic Excavator, .5 CY	Track mounted hydraulic excavator with bucket capacity range of 0.3 to 0.8 CY. Equipment and power unit costs. Labor not included.	Hour	\$46.31	4	\$185.24
Labor	230	Skilled Labor	Labor requiring a high level skill set: Includes carpenters, welders, electricians, conservation professionals involved with data collection, monitoring, and or record keeping, etc.	Hour	\$23.98	6	\$143.88
Labor	233	Equipment Operators, Heavy	Includes: Cranes, Hydraulic Excavators >=50 HP, Dozers, Paving Machines, Rock Trenchers, Trenchers >=12", Dump Trucks, Ag Equipment >=150 HP, Scrapers, Water Wagons.	Hour	\$21.98	2	\$43.96

Labor	231	General Labor	Labor performed using basic tools such as power tool, shovels, and other tools that do not require extensive training. Ex. pipe layer, herder, concrete placement, materials spreader, flagger, etc.	Hour	\$18.67	6	\$112.02
Mobilization	1139	Mobilization, medium equipment	Equipment with 70-150 HP or typical weights between 14,000 and 30,000 pounds.	Each	\$92.60	1	\$92.60
Mobilization	1137	Mobilization, very small equipment	Equipment that is small enough to be transported by a pick-up truck with typical weights less than 3,500 pounds. Can be multiple pieces of equipment if all hauled simultaneously.	Each	\$25.64	1	\$25.64

Scenario Worksheet

Practice and Scenario Description:

Information Type	Data
Region	Appalachian
State	North Carolina
Discipline Group	Engineering General
Practice Code/Name	587 - Structure for Water Control
Scenario ID	1
Scenario Name	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. They can also be fabricated from vertical pipes with the stoplogs are located in the middle (i.e. Full-Rounds) and are called in-line structures. 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 42" smooth steel pipe, a 50' long - 30" outlet pipe passing through an embankment (weir (42) x barrel length (50) = 2100).
Before Practice Situation	The operator presently flood irrigates his field and has no means to accurately maintain a constant water level at varying elevations resulting in a lack of flexibility, and inefficient use of water and energy during pumping. The operator also desires to maintain a permanent pool for water fowl during the winter.
After Practice Situation	The operator has the capability to more efficiently control and maintain a range of water surface elevations thereby reducing the flow rate needed. Less water is wasted and both water and energy is conserved. The operator is now able to maintain adequate water during the winter as a benefit to waterfowl. Any needed revegetation 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), Wetland Wildlife Habitat Management (644), and Grade Stabilization Structure (410) will use the corresponding Standard(s) as appropriate.
Scenario Feature Measure	Flashboard Weir Length (in) x barrel Length (ft)
Scenario Unit	Inch-Foot
Scenario Typical Size	2100

Cost Summary:

Cost Category	Scenario Cost	Scenario Cost/Unit
Materials	\$7,744.30	\$3.69
Equipment/Installation	\$829.84	\$0.40
Labor	\$299.86	\$0.14
Mobilization	\$118.24	\$0.06
Acquisition of Technical Knowledge	\$0.00	\$0.00
Foregone Income	\$0.00	\$0.00
Total	\$8,992.24	\$4.28

Cost Details:

Cost Category	Component ID	Component Name	Component Description	Unit	Price (\$/unit)	Quantity	Cost
Materials	1371	Pipe, Steel, 42", Std Wt	Materials: - 42" - Steel Std Wt	Foot	\$181.65	6	\$1,089.90
Materials	1369	Pipe, Steel, 30", Std Wt	Materials: - 30" - Steel Std Wt	Foot	\$129.44	50	\$6,472.00
Materials	1372	Steel, Angle, 3" x 3" x 1/4"	Materials: Angle, 3" x 3" x 1/4", Meets ASTM A36	Foot	\$2.94	24	\$70.56
Materials	1609	Lumber, planks, posts and timbers, treated	Treated dimension lumber with nominal thickness greater than 2". Includes lumber and fasteners. Does not include labor.	Board Foot	\$1.17	32	\$37.44
Materials	1375	Steel, Plate, 3/8"	Flat steel plate, 3/8" thickness. Materials only.	Square Foot	\$12.40	6	\$74.40
Equipment/Installation	50	Earthfill, Manually Compacted	Earthfill, manually compacted, includes equipment and labor	Cubic yard	\$4.23	10	\$42.30
Equipment/Installation	49	Earthfill, Roller Compacted	Earthfill, roller or machine compacted, includes equipment and labor	Cubic yard	\$3.17	190	\$602.30
Equipment/Installation	930	Hydraulic Excavator, .5 CY	Track mounted hydraulic excavator with bucket capacity range of 0.3 to 0.8 CY. Equipment and power unit costs. Labor not included.	Hour	\$46.31	4	\$185.24
Labor	230	Skilled Labor	Labor requiring a high level skill set: Includes carpenters, welders, electricians, conservation professionals involved with data collection, monitoring, and or record keeping, etc.	Hour	\$23.98	6	\$143.88
Labor	233	Equipment Operators, Heavy	Includes: Cranes, Hydraulic Excavators >=50 HP, Dozers, Paving Machines, Rock Trenchers, Trenchers >=12", Dump Trucks, Ag Equipment >=150 HP, Scrapers, Water Wagons.	Hour	\$21.98	2	\$43.96
Labor	231	General Labor	Labor performed using basic tools such as power tool, shovels, and other tools that do not require extensive training. Ex. pipe layer, herder, concrete placement, materials spreader, flagger, etc.	Hour	\$18.67	6	\$112.02
Mobilization	1139	Mobilization, medium equipment	Equipment with 70-150 HP or typical weights between 14,000 and 30,000 pounds.	Each	\$92.60	1	\$92.60
Mobilization	1137	Mobilization, very small equipment	Equipment that is small enough to be transported by a pick-up truck with typical weights less than 3,500 pounds. Can be multiple pieces of equipment if all hauled simultaneously.	Each	\$25.64	1	\$25.64

Scenario Worksheet

Practice and Scenario Description:

Information Type	Data
Region	Appalachian
State	North Carolina
Discipline Group	Engineering General
Practice Code/Name	587 - Structure for Water Control
Scenario ID	10
Scenario Name	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 Practice 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 Practice 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.
Scenario Feature Measure	Tons of rock installed
Scenario Unit	Ton
Scenario Typical Size	87

Cost Summary:

Cost Category	Scenario Cost	Scenario Cost/Unit
Materials	\$3,247.86	\$37.33
Equipment/Installation	\$119.28	\$1.37
Labor	\$149.36	\$1.72
Mobilization	\$173.20	\$1.99
Acquisition of Technical Knowledge	\$0.00	\$0.00
Foregone Income	\$0.00	\$0.00
Total	\$3,689.70	\$42.41

Cost Details:

Cost Category	Component ID	Component Name	Component Description	Unit	Price (\$/unit)	Quantity	Cost
Materials	44	Rock Riprap, Placed with geotextile	Rock Riprap, placed with geotextile, includes materials, equipment and labor to transport and place	Cubic yard	\$56.98	57	\$3,247.86
Equipment/Installation	1222	Excavation, common earth, large equipment, 50 ft	Bulk excavation of common earth including sand and gravel with dozer >100 HP with average push distance of 50 feet. Includes equipment and labor.	Cubic Yard	\$1.42	84	\$119.28
Labor	231	General Labor	Labor performed using basic tools such as power tool, shovels, and other tools that do not require extensive training. Ex. pipe layer, herder, concrete placement, materials spreader, flagger, etc.	Hour	\$18.67	8	\$149.36
Mobilization	1140	Mobilization, large equipment	Equipment >150HP or typical weights greater than 30,000 pounds or loads requiring over width or over length permits.	Each	\$173.20	1	\$173.20

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Practice and Scenario Description:

Information Type	Data
Region	Appalachian
State	North Carolina
Discipline Group	Engineering General
Practice Code/Name	587 - Structure for Water Control
Scenario ID	12
Scenario Name	Flow Meter with Mechanical Index
Scenario Description	<p>Permanently installed water flow meter with mechanical, cumulative volume and rate index. Meters can be any flow measurement device for metering, turbines, propellers, acoustic, magnetic, venturi, orifice, etc.) with or without straightening vanes.</p> <p>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</p> <p>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.</p>
Before Practice Situation	Producer estimates seasonal and individual irrigation application flow rate and volumes based on energy costs, system operating pressure, or other means.
After Practice Situation	Producer is able to access instantaneous rate and cumulative flow volume data at the meter location. The information gained will enable the irrigator to improve irrigation water management, recognize system performance issues before they become critical, and reduce energy use.
Scenario Feature Measure	Nominal Diameter of Meter
Scenario Unit	Inch
Scenario Typical Size	10

Cost Summary:

Cost Category	Scenario Cost	Scenario Cost/Unit
Materials	\$1,141.12	\$114.11
Equipment/Installation	\$0.00	\$0.00
Labor	\$0.00	\$0.00
Mobilization	\$51.28	\$5.13
Acquisition of Technical Knowledge	\$0.00	\$0.00
Foregone Income	\$0.00	\$0.00
Total	\$1,192.40	\$119.24

Cost Details:

Cost Category	Component ID	Component Name	Component Description	Unit	Price (\$/unit)	Quantity	Cost
Materials	1450	Flow Meter, with mechanical Index	10 inch, Turbine Type Flow Meter with Mechanical Index, permanently installed. Includes material, labor and installation.	Each	\$1,141.12	1	\$1,141.12
Mobilization	1137	Mobilization, very small equipment	Equipment that is small enough to be transported by a pick-up truck with typical weights less than 3,500 pounds. Can be multiple pieces of equipment if all hauled simultaneously.	Each	\$25.64	2	\$51.28

Scenario Worksheet

Practice and Scenario Description:

Information Type	Data
Region	Appalachian
State	North Carolina
Discipline Group	Engineering General
Practice Code/Name	587 - Structure for Water Control
Scenario ID	8
Scenario Name	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.
Before Practice Situation	A wetland or other area is in need of a flap gate to control the direction of the water.
After Practice Situation	A flap gate 4' wide is installed.
Scenario Feature Measure	Feet Diameter (of Gate)
Scenario Unit	Foot
Scenario Typical Size	4

Cost Summary:

Cost Category	Scenario Cost	Scenario Cost/Unit
Materials	\$5,070.33	\$1,267.58
Equipment/Installation	\$272.22	\$68.06
Labor	\$643.68	\$160.92
Mobilization	\$92.60	\$23.15
Acquisition of Technical Knowledge	\$0.00	\$0.00
Foregone Income	\$0.00	\$0.00
Total	\$6,078.83	\$1,519.71

Cost Details:

Cost Category	Component ID	Component Name	Component Description	Unit	Price (\$/unit)	Quantity	Cost
Materials	1745	Flap Gate, cast iron, 4' diameter	4' diameter cast iron flap gate. Materials only.	Each	\$5,070.33	1	\$5,070.33
Equipment/Installation	926	Backhoe, 80 HP	Wheel mounted backhoe excavator with horsepower range of 60 to 90. Equipment and power unit costs. Labor not included.	Hour	\$45.37	6	\$272.22
Labor	230	Skilled Labor	Labor requiring a high level skill set: Includes carpenters, welders, electricians, conservation professionals involved with data collection, monitoring, and or record keeping, etc.	Hour	\$23.98	12	\$287.76
Labor	233	Equipment Operators, Heavy	Includes: Cranes, Hydraulic Excavators >=50 HP, Dozers, Paving Machines, Rock Trenchers, Trenchers >=12", Dump Trucks, Ag Equipment >=150 HP, Scrapers, Water Wagons.	Hour	\$21.98	6	\$131.88
Labor	231	General Labor	Labor performed using basic tools such as power tool, shovels, and other tools that do not require extensive training. Ex. pipe layer, herder, concrete placement, materials spreader, flagger, etc.	Hour	\$18.67	12	\$224.04
Mobilization	1139	Mobilization, medium equipment	Equipment with 70-150 HP or typical weights between 14,000 and 30,000 pounds.	Each	\$92.60	1	\$92.60

Scenario Worksheet

Practice and Scenario Description:

Information Type	Data
Region	Appalachian
State	North Carolina
Discipline Group	Engineering General
Practice Code/Name	587 - Structure for Water Control
Scenario ID	9
Scenario Name	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 Practice Situation	Tides or flooding inundate and affect water quality of wetlands or other managed systems.
After Practice Situation	Tide or flood inundation is controlled. Associated practices could be Aquaculture Ponds (397), Aquatic Organism Passage (396), Bivalve Aquaculture Gear and Biofouling Control (400), Constructed Wetland (656), Drainage Water Management (554), Irrigation Canal or Lateral (320), Irrigation Field Ditch (388), Irrigation System, Surface and Subsurface (443), Irrigation Water Management (449), Salinity and Sodic Soil Management (610), Subsurface Drain (606), Surface Drain, Field Ditch (607), Surface Drain, Main or Lateral (608), Wetland Creation (658), Wetland Enhancement (659), Wetland Restoration (657), and Wetland Wildlife Habitat Management (644).
Scenario Feature Measure	Cubic Yards of Concrete
Scenario Unit	Cubic Yard
Scenario Typical Size	10

Cost Summary:

Cost Category	Scenario Cost	Scenario Cost/Unit
Materials	\$5,162.77	\$516.28
Equipment/Installation	\$4,267.00	\$426.70
Labor	\$18.67	\$1.87
Mobilization	\$203.75	\$20.38
Acquisition of Technical Knowledge	\$0.00	\$0.00
Foregone Income	\$0.00	\$0.00
Total	\$9,652.19	\$965.22

Cost Details:

Cost Category	Component ID	Component Name	Component Description	Unit	Price (\$/unit)	Quantity	Cost
Materials	1745	Flap Gate, cast iron, 4' diameter	4' diameter cast iron flap gate. Materials only.	Each	\$5,070.33	1	\$5,070.33
Equipment/Installation	38	Concrete, CIP, formed reinforced	Steel reinforced concrete formed and cast-in-place in formed structures such as walls or suspended slabs by chute placement. Typical strength is 3000 to 4000 psi. Includes materials, labor and equipment to transport, place and finish.	Cubic yard	\$329.10	10	\$3,291.00
Materials	45	Aggregate, Sand, Graded, Washed	Sand, typical ASTM C33 gradation, includes materials, equipment and labor to transport and place	Cubic yard	\$23.11	4	\$92.44
Equipment/Installation	48	Excavation, Common Earth, side cast, small equipment	Bulk excavation and side casting of common earth with hydraulic excavator with less than 1 CY capacity. Includes equipment and labor.	Cubic yard	\$1.71	200	\$342.00
Equipment/Installation	49	Earthfill, Roller Compacted	Earthfill, roller or machine compacted, includes equipment and labor	Cubic yard	\$3.17	200	\$634.00
Labor	231	General Labor	Labor performed using basic tools such as power tool, shovels, and other tools that do not require extensive training. Ex. pipe layer, herder, concrete placement, materials spreader, flagger, etc.	Hour	\$18.67	1	\$18.67
Mobilization	1142	Mobilization, General labor	Mobilization of general labor: Ex. pipe layer, herder, concrete placement, materials spreader, flagger, etc.	Hour	\$18.55	1	\$18.55
Mobilization	1139	Mobilization, medium equipment	Equipment with 70-150 HP or typical weights between 14,000 and 30,000 pounds.	Each	\$92.60	2	\$185.20