

Scenario Worksheet

Practice and Scenario Description:

Information Type	Data
Region	New England
State	Connecticut
Discipline Group	Water Management Engineering
Practice Code/Name	436 - Irrigation Reservoir
Scenario ID	1
Scenario Name	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 Practice 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 Practice 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.
Scenario Feature Measure	Volume of Compacted Earthfill
Scenario Unit	Cubic Yards
Scenario Typical Size	4,500

Cost Summary:

Cost Category	Scenario Cost	Scenario Cost/Unit
Materials	\$2,926.64	\$0.65
Equipment/Installation	\$18,000.00	\$4.00
Labor	\$744.80	\$0.17
Mobilization	\$1,574.86	\$0.35
Acquisition of Technical Knowledge	\$0.00	\$0.00
Foregone Income	\$0.00	\$0.00
Total	\$23,246.30	\$5.17

Cost Details:

Cost Category	Component ID	Component Name	Component Description	Unit	Price (\$/unit)	Quantity	Cost
Materials	1917	Screw gate, cast iron, 18" diameter, 10/0 head	18" diameter cast iron screw (canal) gate rated at 10 seating head 0 feet unseating head. Materials only.	Each	\$958.00	1	\$958.00
Materials	1244	Pipe, HDPE, CPT, Double Wall, Soil Tight, 12"	Pipe, Corrugated HDPE Double Wall, 12" diameter with soil tight joints - AASHTO M294. Material cost only.	Foot	\$8.33	36	\$299.88
Materials	1245	Pipe, HDPE, CPT, Double Wall, Soil Tight, 18"	Pipe, Corrugated HDPE Double Wall, 18" diameter with soil tight joints - AASHTO M294. Material cost only.	Foot	\$10.75	120	\$1,290.00
Materials	1921	Coupling, HDPE CPT Dual Wall, Tee, 18"x18"x12"	Tee, 18"x18"x12" - HDPE CPT Tee. Materials only.	Each	\$378.76	1	\$378.76
Equipment/Installation	49	Earthfill, Roller Compacted	Earthfill, roller or machine compacted, includes equipment and labor	Cubic yard	\$4.00	4500	\$18,000.00
Labor	234	Supervisor or Manager	Labor involving supervision or management activities. Includes crew supervisors, foremen and farm/ranch managers time required for adopting new technology, etc.	Hour	\$41.68	8	\$333.44
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	\$25.71	16	\$411.36
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	\$513.10	2	\$1,026.20
Mobilization	1139	Mobilization, medium equipment	Equipment with 70-150 HP or typical weights between 14,000 and 30,000 pounds.	Each	\$274.33	2	\$548.66
Foregone Income	1276	Foregone income, place holder	This is a place holder component for foregone income. The existence of this component indicates that the practice is eligible for foregone income payment. The component will be replaced when the actual FI components become available.	Acre	\$0.00	1	\$0.00

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Information Type	Data
Region	New England
State	Connecticut
Discipline Group	Water Management Engineering
Practice Code/Name	436 - Irrigation Reservoir
Scenario ID	11
Scenario Name	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 Practice Situation	Current system relies on an intermittent or low-flow rate water source. This results in untimely and/or inefficient water application.
After Practice 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.
Scenario Feature Measure	Volume of excavated earth
Scenario Unit	Cubic Yard
Scenario Typical Size	2400

Cost Summary:

Cost Category	Scenario Cost	Scenario Cost/Unit
Materials	\$0.00	\$0.00
Equipment/Installation	\$15,939.84	\$6.64
Labor	\$1,435.44	\$0.60
Mobilization	\$1,026.20	\$0.43
Acquisition of Technical Knowledge	\$0.00	\$0.00
Foregone Income	\$0.00	\$0.00
Total	\$18,401.48	\$7.67

Cost Details:

Cost Category	Component ID	Component Name	Component Description	Unit	Price (\$/unit)	Quantity	Cost
Equipment/Installation	928	Dozer, 200 HP	Track mounted Dozer with horsepower range of 160 to 250. Equipment and power unit costs. Labor not included.	Hour	\$156.16	24	\$3,747.84
Equipment/Installation	1615	Hauling, bulk, highway truck	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	\$0.28	12000	\$3,360.00
Equipment/Installation	1221	Excavation, common earth, large equipment, 1500 ft	Bulk excavation of common earth including sand and gravel with scrapers with average haul distance of 1500 feet. Includes equipment and labor.	Cubic Yard	\$3.68	2400	\$8,832.00
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	\$34.10	24	\$818.40
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	\$25.71	24	\$617.04
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	\$513.10	2	\$1,026.20

Scenario Worksheet

Practice and Scenario Description:

Information Type	Data
Region	New England
State	Connecticut
Discipline Group	Water Management Engineering
Practice Code/Name	436 - Irrigation Reservoir
Scenario ID	10
Scenario Name	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 hauled for spreading 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 Practice Situation	Current system relies on an intermittent or low-flow rate water source. This results in untimely and/or inefficient water application.
After Practice 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.
Scenario Feature Measure	Volume of excavated earth
Scenario Unit	Cubic Yard
Scenario Typical Size	2400

Cost Summary:

Cost Category	Scenario Cost	Scenario Cost/Unit
Materials	\$0.00	\$0.00
Equipment/Installation	\$12,579.84	\$5.24
Labor	\$1,435.44	\$0.60
Mobilization	\$1,026.20	\$0.43
Acquisition of Technical Knowledge	\$0.00	\$0.00
Foregone Income	\$0.00	\$0.00
Total	\$15,041.48	\$6.27

Cost Details:

Cost Category	Component ID	Component Name	Component Description	Unit	Price (\$/unit)	Quantity	Cost
Equipment/Installation	1221	Excavation, common earth, large equipment, 1500 ft	Bulk excavation of common earth including sand and gravel with scrapers with average haul distance of 1500 feet. Includes equipment and labor.	Cubic Yard	\$3.68	2400	\$8,832.00
Equipment/Installation	928	Dozer, 200 HP	Track mounted Dozer with horsepower range of 160 to 250. Equipment and power unit costs. Labor not included.	Hour	\$156.16	24	\$3,747.84
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	\$25.71	24	\$617.04
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	\$34.10	24	\$818.40
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	\$513.10	2	\$1,026.20

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Information Type	Data
Region	New England
State	Connecticut
Discipline Group	Water Management Engineering
Practice Code/Name	436 - Irrigation Reservoir
Scenario ID	8
Scenario Name	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 Practice Situation	Insufficient volume of water to complete an irrigation cycle at the required flow rate.
After Practice 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.
Scenario Feature Measure	Volume of Tank Storage
Scenario Unit	Gallons
Scenario Typical Size	10,000

Cost Summary:

Cost Category	Scenario Cost	Scenario Cost/Unit
Materials	\$7,294.93	\$0.73
Equipment/Installation	\$300.40	\$0.03
Labor	\$2,301.52	\$0.23
Mobilization	\$700.58	\$0.07
Acquisition of Technical Knowledge	\$0.00	\$0.00
Foregone Income	\$0.00	\$0.00
Total	\$10,597.43	\$1.06

Cost Details:

Cost Category	Component ID	Component Name	Component Description	Unit	Price (\$/unit)	Quantity	Cost
Materials	1099	Aggregate, Gravel, Ungraded, Quarry Run	Includes materials, equipment and labor	Cubic yard	\$19.98	6	\$119.88
Materials	1919	Tank, Fiberglass Enclosed Storage, 10,000 gallon	10,000 gallon capacity enclosed fiberglass water storage tank. Includes tank anchoring materials and delivery.	Each	\$7,175.05	1	\$7,175.05
Equipment/Installation	933	Skidsteer, 80 HP	Skidsteer loader with horsepower range of 60 to 90. Equipment and power unit costs. Labor not included.	Hour	\$35.33	8	\$282.64
Equipment/Installation	1915	Plate compactor	Manually guided vibratroy plate compactor. Equipment only.	Hour	\$4.44	4	\$17.76
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	\$34.10	8	\$272.80
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	\$25.71	40	\$1,028.40
Labor	234	Supervisor or Manager	Labor involving supervision or management activities. Includes crew supervisors, foremen and farm/ranch managers time required for adopting new technology, etc.	Hour	\$41.68	24	\$1,000.32
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	\$75.96	2	\$151.92
Mobilization	1139	Mobilization, medium equipment	Equipment with 70-150 HP or typical weights between 14,000 and 30,000 pounds.	Each	\$274.33	2	\$548.66

Scenario Worksheet

Practice and Scenario Description:

Information Type	Data
Region	New England
State	Connecticut
Discipline Group	Water Management Engineering
Practice Code/Name	436 - Irrigation Reservoir
Scenario ID	12
Scenario Name	Tailwater Recovery Greenhouse
Scenario Description	A 1,000 Gallon, above-ground, 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 Practice Situation	Insufficient volume of water to complete an irrigation cycle at the required flow rate.
After Practice 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.
Scenario Feature Measure	Volume of Tank Storage
Scenario Unit	Gallon
Scenario Typical Size	1000

Cost Summary:

Cost Category	Scenario Cost	Scenario Cost/Unit
Materials	\$893.55	\$0.89
Equipment/Installation	\$60.96	\$0.06
Labor	\$205.68	\$0.21
Mobilization	\$75.96	\$0.08
Acquisition of Technical Knowledge	\$0.00	\$0.00
Foregone Income	\$0.00	\$0.00
Total	\$1,236.15	\$1.24

Cost Details:

Cost Category	Component ID	Component Name	Component Description	Unit	Price (\$/unit)	Quantity	Cost
Materials	45	Aggregate, Sand, Graded, Washed	Sand, typical ASTM C33 gradation, includes materials, equipment and labor to transport and place	Cubic yard	\$26.71	5	\$133.55
Materials	1075	Tank, Poly Enclosed Storage, >1,000	Includes materials	Gallon	\$0.76	1000	\$760.00
Equipment/Installation	1915	Plate compactor	Manually guided vibratroy plate compactor. Equipment only.	Hour	\$4.44	4	\$17.76
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	\$2.16	20	\$43.20
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	\$25.71	8	\$205.68
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	\$75.96	1	\$75.96

Scenario Worksheet

Practice and Scenario Description:

Information Type	Data
Region	New England
State	Connecticut
Discipline Group	Water Management Engineering
Practice Code/Name	436 - Irrigation Reservoir
Scenario ID	6
Scenario Name	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 Practice Situation	Insufficient volume of water to complete an irrigation cycle at the required flow rate. 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.
After Practice Situation	
Scenario Feature Measure	Volume of Tank Storage
Scenario Unit	Gallons
Scenario Typical Size	3,000

Cost Summary:

Cost Category	Scenario Cost	Scenario Cost/Unit
Materials	\$2,319.96	\$0.77
Equipment/Installation	\$229.74	\$0.08
Labor	\$1,360.76	\$0.45
Mobilization	\$350.29	\$0.12
Acquisition of Technical Knowledge	\$0.00	\$0.00
Foregone Income	\$0.00	\$0.00
Total	\$4,260.75	\$1.42

Cost Details:

Cost Category	Component ID	Component Name	Component Description	Unit	Price (\$/unit)	Quantity	Cost
Materials	1099	Aggregate, Gravel, Ungraded, Quarry Run	Includes materials, equipment and labor	Cubic yard	\$19.98	2	\$39.96
Materials	1075	Tank, Poly Enclosed Storage, >1,000	Includes materials	Gallon	\$0.76	3000	\$2,280.00
Equipment/Installation	933	Skidsteer, 80 HP	Skidsteer loader with horsepower range of 60 to 90. Equipment and power unit costs. Labor not included.	Hour	\$35.33	6	\$211.98
Equipment/Installation	1915	Plate compactor	Manually guided vibratroy plate compactor. Equipment only.	Hour	\$4.44	4	\$17.76
Labor	234	Supervisor or Manager	Labor involving supervision or management activities. Includes crew supervisors, foremen and farm/ranch managers time required for adopting new technology, etc.	Hour	\$41.68	8	\$333.44
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	\$34.10	6	\$204.60
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	\$25.71	32	\$822.72
Mobilization	1139	Mobilization, medium equipment	Equipment with 70-150 HP or typical weights between 14,000 and 30,000 pounds.	Each	\$274.33	1	\$274.33
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	\$75.96	1	\$75.96

Scenario Worksheet

Practice and Scenario Description:

Information Type	Data
Region	New England
State	Connecticut
Discipline Group	Water Management Engineering
Practice Code/Name	436 - Irrigation Reservoir
Scenario ID	7
Scenario Name	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 Practice Situation	Insufficient volume of water to complete an irrigation cycle at the required flow rate.
After Practice 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.
Scenario Feature Measure	Volume of Tank Storage
Scenario Unit	Gallons
Scenario Typical Size	3,000

Cost Summary:

Cost Category	Scenario Cost	Scenario Cost/Unit
Materials	\$2,319.96	\$0.77
Equipment/Installation	\$766.80	\$0.26
Labor	\$1,428.96	\$0.48
Mobilization	\$426.25	\$0.14
Acquisition of Technical Knowledge	\$0.00	\$0.00
Foregone Income	\$0.00	\$0.00
Total	\$4,941.97	\$1.65

Cost Details:

Cost Category	Component ID	Component Name	Component Description	Unit	Price (\$/unit)	Quantity	Cost
Materials	1099	Aggregate, Gravel, Ungraded, Quarry Run	Includes materials, equipment and labor	Cubic yard	\$19.98	2	\$39.96
Materials	1075	Tank, Poly Enclosed Storage, >1,000	Includes materials	Gallon	\$0.76	3000	\$2,280.00
Equipment/Installation	49	Earthfill, Roller Compacted	Earthfill, roller or machine compacted, includes equipment and labor	Cubic yard	\$4.00	90	\$360.00
Equipment/Installation	1223	Excavation, common earth, large equipment, 150 ft	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	\$3.39	120	\$406.80
Labor	234	Supervisor or Manager	Labor involving supervision or management activities. Includes crew supervisors, foremen and farm/ranch managers time required for adopting new technology, etc.	Hour	\$41.68	8	\$333.44
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	\$34.10	8	\$272.80
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	\$25.71	32	\$822.72
Mobilization	1139	Mobilization, medium equipment	Equipment with 70-150 HP or typical weights between 14,000 and 30,000 pounds.	Each	\$274.33	1	\$274.33
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	\$75.96	2	\$151.92

Scenario Worksheet

Practice and Scenario Description:

Information Type	Data
Region	New England
State	Connecticut
Discipline Group	Water Management Engineering
Practice Code/Name	436 - Irrigation Reservoir
Scenario ID	3
Scenario Name	Embankment Reservoir > 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: Inefficient 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 Practice Situation	Current system relies on an intermittent or low-flow rate water source. This results in untimely and/or inefficient water application.
After Practice 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.
Scenario Feature Measure	Volume of Compacted Earthfill
Scenario Unit	Cubic Yards
Scenario Typical Size	104,200

Cost Summary:

Cost Category	Scenario Cost	Scenario Cost/Unit
Materials	\$12,465.00	\$0.12
Equipment/Installation	\$416,800.00	\$4.00
Labor	\$1,078.24	\$0.01
Mobilization	\$1,813.63	\$0.02
Acquisition of Technical Knowledge	\$0.00	\$0.00
Foregone Income	\$0.00	\$0.00
Total	\$432,156.87	\$4.15

Cost Details:

Cost Category	Component ID	Component Name	Component Description	Unit	Price (\$/unit)	Quantity	Cost
Materials	1918	Catwalk, metal	Metal pedestrian walk way giving access to the valve on a structure, typically 3' wide with railing. Materials only.	Foot	\$57.52	50	\$2,876.00
Materials	1917	Screw gate, cast iron, 18" diameter, 10/0 head	18" diameter cast iron screw (canal) gate rated at 10 seating head 0 feet unseating head. Materials only.	Each	\$958.00	1	\$958.00
Materials	1366	Pipe, Steel, 18", Std Wt	Materials: - 18" - Steel Std Wt	Foot	\$86.31	100	\$8,631.00
Equipment/Installation	49	Earthfill, Roller Compacted	Earthfill, roller or machine compacted, includes equipment and labor	Cubic yard	\$4.00	104200	\$416,800.00
Labor	234	Supervisor or Manager	Labor involving supervision or management activities. Includes crew supervisors, foremen and farm/ranch managers time required for adopting new technology, etc.	Hour	\$41.68	16	\$666.88
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	\$25.71	16	\$411.36
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	\$513.10	3	\$1,539.30
Mobilization	1139	Mobilization, medium equipment	Equipment with 70-150 HP or typical weights between 14,000 and 30,000 pounds.	Each	\$274.33	1	\$274.33
Foregone Income	1276	Foregone income, place holder	This is a place holder component for foregone income. The existence of this component indicates that the practice is eligible for foregone income payment. The component will be replaced when the actual FI components become available.	Acre	\$0.00	40	\$0.00

Scenario Worksheet

Practice and Scenario Description:

Information Type	Data
Region	New England
State	Connecticut
Discipline Group	Water Management Engineering
Practice Code/Name	436 - Irrigation Reservoir
Scenario ID	2
Scenario Name	Embankment Reservoir ≤ 30 Acre-Feet
Scenario Description	<p>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).</p> <p>Resource Concern: Insufficient Water - Inefficient use of irrigation water.</p> <p>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.</p>
Before Practice Situation	Current system relies on an intermittent or low-flow rate water source. This results in untimely and/or inefficient water application.
After Practice 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.
Scenario Feature Measure	Volume of Compacted Earthfill
Scenario Unit	Cubic Yards
Scenario Typical Size	28,500

Cost Summary:

Cost Category	Scenario Cost	Scenario Cost/Unit
Materials	\$2,355.40	\$0.08
Equipment/Installation	\$114,000.00	\$4.00
Labor	\$744.80	\$0.03
Mobilization	\$1,574.86	\$0.06
Acquisition of Technical Knowledge	\$0.00	\$0.00
Foregone Income	\$0.00	\$0.00
Total	\$118,675.06	\$4.16

Cost Details:

Cost Category	Component ID	Component Name	Component Description	Unit	Price (\$/unit)	Quantity	Cost
Materials	1918	Catwalk, metal	Metal pedestrian walk way giving access to the valve on a structure, typically 3' wide with railing. Materials only.	Foot	\$57.52	20	\$1,150.40
Materials	1916	Screw gate, cast iron, 10" diameter, 10/0 head	10" diameter cast iron screw (canal) gate rated at 10 seating head 0 feet unseating head. Materials only.	Each	\$659.00	1	\$659.00
Materials	1243	Pipe, HDPE, CPT, Double Wall, Soil Tight, 10"	Pipe, Corrugated HDPE Double Wall, 10" diameter with soil tight joints - AASHTO M252. Material cost only.	Foot	\$5.46	100	\$546.00
Equipment/Installation	49	Earthfill, Roller Compacted	Earthfill, roller or machine compacted, includes equipment and labor	Cubic yard	\$4.00	28500	\$114,000.00
Labor	234	Supervisor or Manager	Labor involving supervision or management activities. Includes crew supervisors, foremen and farm/ranch managers time required for adopting new technology, etc.	Hour	\$41.68	8	\$333.44
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	\$25.71	16	\$411.36
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	\$513.10	2	\$1,026.20
Mobilization	1139	Mobilization, medium equipment	Equipment with 70-150 HP or typical weights between 14,000 and 30,000 pounds.	Each	\$274.33	2	\$548.66
Foregone Income	1276	Foregone income, place holder	This is a place holder component for foregone income. The existence of this component indicates that the practice is eligible for foregone income payment. The component will be replaced when the actual FI components become available.	Acre	\$0.00	4	\$0.00

Scenario Worksheet

Practice and Scenario Description:

Information Type	Data
Region	New England
State	Connecticut
Discipline Group	Water Management Engineering
Practice Code/Name	436 - Irrigation Reservoir
Scenario ID	5
Scenario Name	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" or 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: Inefficient 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 Practice Situation	Insufficient volume of water to complete an irrigation cycle at the required flow rate.
After Practice 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.
Scenario Feature Measure	Volume of Tank Storage
Scenario Unit	Gallons
Scenario Typical Size	20,000

Cost Summary:

Cost Category	Scenario Cost	Scenario Cost/Unit
Materials	\$28,729.44	\$1.44
Equipment/Installation	\$406.58	\$0.02
Labor	\$4,269.60	\$0.21
Mobilization	\$700.58	\$0.04
Acquisition of Technical Knowledge	\$0.00	\$0.00
Foregone Income	\$0.00	\$0.00
Total	\$34,106.20	\$1.71

Cost Details:

Cost Category	Component ID	Component Name	Component Description	Unit	Price (\$/unit)	Quantity	Cost
Materials	1099	Aggregate, Gravel, Ungraded, Quarry Run	Includes materials, equipment and labor	Cubic yard	\$19.98	12	\$239.76
Materials	1920	Tank, Corrugated Metal Storage, 20,000 gallon	20,000 gallon capacity enclosed corrugated Metal Storage tank. Includes delivery to the site and anchoring material.	Each	\$28,276.00	1	\$28,276.00
Materials	45	Aggregate, Sand, Graded, Washed	Sand, typical ASTM C33 gradation, includes materials, equipment and labor to transport and place	Cubic yard	\$26.71	8	\$213.68
Equipment/Installation	933	Skidsteer, 80 HP	Skidsteer loader with horsepower range of 60 to 90. Equipment and power unit costs. Labor not included.	Hour	\$35.33	10	\$353.30
Equipment/Installation	1915	Plate compactor	Manually guided vibratroy plate compactor. Equipment only.	Hour	\$4.44	12	\$53.28
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	\$34.10	16	\$545.60
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	\$25.71	80	\$2,056.80
Labor	234	Supervisor or Manager	Labor involving supervision or management activities. Includes crew supervisors, foremen and farm/ranch managers time required for adopting new technology, etc.	Hour	\$41.68	40	\$1,667.20
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	\$75.96	2	\$151.92
Mobilization	1139	Mobilization, medium equipment	Equipment with 70-150 HP or typical weights between 14,000 and 30,000 pounds.	Each	\$274.33	2	\$548.66

Scenario Worksheet

Practice and Scenario Description:

Information Type	Data
Region	New England
State	Connecticut
Discipline Group	Water Management Engineering
Practice Code/Name	436 - Irrigation Reservoir
Scenario ID	4
Scenario Name	Excavated Tailwater Pit
Scenario Description	<p>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).</p> <p>Resource concern: Insufficient Water - Inefficient use of irrigation water.</p> <p>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.</p>
Before Practice Situation	Current system relies on an intermittent or low-flow rate water source. This results in untimely and/or inefficient water application.
After Practice 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.
Scenario Feature Measure	Volume of Earth Excavated
Scenario Unit	Cubic Yards
Scenario Typical Size	19,600

Cost Summary:

Cost Category	Scenario Cost	Scenario Cost/Unit
Materials	\$0.00	\$0.00
Equipment/Installation	\$42,336.00	\$2.16
Labor	\$0.00	\$0.00
Mobilization	\$1,300.53	\$0.07
Acquisition of Technical Knowledge	\$0.00	\$0.00
Foregone Income	\$0.00	\$0.00
Total	\$43,636.53	\$2.23

Cost Details:

Cost Category	Component ID	Component Name	Component Description	Unit	Price (\$/unit)	Quantity	Cost
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	\$2.16	19600	\$42,336.00
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	\$513.10	2	\$1,026.20
Mobilization	1139	Mobilization, medium equipment	Equipment with 70-150 HP or typical weights between 14,000 and 30,000 pounds.	Each	\$274.33	1	\$274.33
Foregone Income	1276	Foregone income, place holder	This is a place holder component for foregone income. The existence of this component indicates that the practice is eligible for foregone income payment. The component will be replaced when the actual FI components become available.	Acre	\$0.00	4	\$0.00