Practice: 533 - Pumping Plant

Scenario # 1 Electric-Powered Pump ≤ 3 Hp

Scenario Description: **Louisiana**

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 Practice 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 Practice 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.

Scenario Feature Measure:

Pump Power Requirement

Scenario Typical Size:	1	Horse Power	Unit Cost	$833.45

Cost Category	Component Name	Quantity	Unit	Unit Cost	Cost
Materials	Pump, < 5 HP - Pump and motor, variable cost portion	1	Horsepower	$229.73	$229.73
Materials	Pump, < 5 HP - Pump and motor, fixed cost portion	1	Each	$175.60	$175.60
Equip./Install.	Truck, Pickup	2	Hour	$23.48	$46.96
Equip./Install.	Concrete, CIP, slab on grade, reinforced	0.25	Cubic yard	$209.92	$52.48
Labor	General Labor	6	Hour	$18.57	$111.42
Labor	Supervisor or Manager	6	Hour	$36.21	$217.26
				Total Cost:	$833.45

Practice: 533 - Pumping Plant

Scenario # 2 Electric-Powered Pump ≤ 3 HP with Pressure Tank

Scenario Description: **Louisiana**

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 Practice 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 Practice 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.

Scenario Feature Measure:

Pump Power Requirement

Scenario Typical Size:	1	Horse Power	Unit Cost	$1,097.45

Cost Category	Component Name	Quantity	Unit	Unit Cost	Cost
Materials	Pressure Tank, 40 gallon	1	Each	$264.00	$264.00
Materials	Pump, < 5 HP - Pump and motor, variable cost portion	1	Horsepower	$229.73	$229.73
Materials	Pump, < 5 HP - Pump and motor, fixed cost portion	1	Each	$175.60	$175.60
Equip./Install.	Truck, Pickup	2	Hour	$23.48	$46.96
Equip./Install.	Concrete, CIP, slab on grade, reinforced	0.25	Cubic yard	$209.92	$52.48
Labor	General Labor	6	Hour	$18.57	$111.42
Labor	Supervisor or Manager	6	Hour	$36.21	$217.26
				Total Cost:	$1,097.45

Practice: 533 - Pumping Plant

Scenario # 3 Electric-Powered Pump >3 to 10 HP

Scenario Description: **Louisiana**

This is a close-coupled 7.5 Hp electric-powered centrifugal pump, mounted on a platform. It is for a large, high-pressure (200 psi) livestock pipeline, used for watering livestock as part of a prescribed grazing system; or for pressurizing a medium-sized (200 gpm and 40 psi) irrigation system; or a medium-sized (400 gpm and 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 Practice 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 Practice 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.

Scenario Feature Measure:

Pump Power Requirement

Scenario Typical Size:	7.5	Horse Power	Unit Cost	$669.53

Cost Category	Component Name	Quantity	Unit	Unit Cost	Cost
Materials	Pump, > 5 HP - Pump and motor, fixed cost portion	1	Each	$2,247.40	$2,247.40
Materials	Pump, > 5 HP - Pump and motor, variable cost portion	7.5	Horsepower	$105.45	$790.88
Equip./Install.	Truck, Pickup	24	Hour	$23.48	$563.52
Equip./Install.	Concrete, CIP, slab on grade, reinforced	0.5	Cubic yard	$209.92	$104.96
Labor	General Labor	24	Hour	$18.57	$445.68
Labor	Supervisor or Manager	24	Hour	$36.21	$869.04
				Total Cost:	$5,021.48

Practice: 533 - Pumping Plant

Scenario # 4 Electric-Powered Pump >10 to 40 HP

Scenario Description: **Louisiana**

This is a close-coupled, 3-phase, 25 Hp electric-powered centrifugal pump mounted on a platform for pressurizing a medium-sized (600 gpm and 50 psi) sprinkler or large microirrigation (850 gpm and 35 psi) system or a large-sized surface irrigaiton system (1,200 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. This scenario does not cover a pumping plant installation that requires an L-pipe.

Before Practice 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 Practice 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.

Scenario Feature Measure:

Pump Power Requirement

Scenario Typical Size:	25	Horse Power	Unit Cost	$506.11

Cost Category	Component Name	Quantity	Unit	Unit Cost	Cost
Materials	Pump, > 5 HP - Pump and motor, fixed cost portion	1	Each	$2,247.40	$2,247.40
Materials	Pump, > 5 HP - Pump and motor, variable cost portion	25	Horsepower	$105.45	$2,636.25
Equip./Install.	Concrete, CIP, slab on grade, reinforced	2	Cubic yard	$209.92	$419.84
Equip./Install.	Truck, Pickup	56	Hour	$23.48	$1,314.88
Equip./Install.	Backhoe, 80 HP	8	Hour	$40.48	$323.84
Labor	Supervisor or Manager	56	Hour	$36.21	$2,027.76
Labor	General Labor	56	Hour	$18.57	$1,039.92
Labor	Skilled Labor	8	Hour	$26.82	$214.56
Labor	Equipment Operators, Heavy	8	Hour	$25.62	$204.96
Mobilization	Mobilization, medium equipment	2	Each	$133.51	$267.02
Materials	Pipe, Steel, 16", Std Wt, USED	40	Foot	$32.07	$1,282.80
Materials	Pipe, Steel, 18", Std Wt, USED	14	Foot	$39.61	$554.54
Equip./Install.	Portable Welder	8	Hour	$14.88	$119.04
				Total Cost:	$12,652.81

Practice: 533 - Pumping Plant

Scenario # 5 Electric-Powered Pump >40 HP

Scenario Description: **Louisiana**

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 (6,000 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. This scenario does not cover a pumping plant installation that requires an L-pipe.

Before Practice 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 Practice Situation:

Irrigation: A properly designed and efficient pumping plant is installed, reducing energy use and improving irrigation efficiency.

Scenario Feature Measure:

Pump Power Requirement

Scenario Typical Size:	50	Horse Power	Unit Cost	$318.16

Cost Category	Component Name	Quantity	Unit	Unit Cost	Cost
Materials	Pump, > 5 HP - Pump and motor, variable cost portion	50	Horsepower	$105.45	$5,272.50
Equip./Install.	Concrete, CIP, slab on grade, reinforced	2	Cubic yard	$209.92	$419.84
Equip./Install.	Truck, Pickup	56	Hour	$23.48	$1,314.88
Equip./Install.	Backhoe, 80 HP	8	Hour	$40.48	$323.84
Labor	Supervisor or Manager	56	Hour	$36.21	$2,027.76
Labor	General Labor	56	Hour	$18.57	$1,039.92
Labor	Skilled Labor	8	Hour	$26.82	$214.56
Labor	Equipment Operators, Heavy	8	Hour	$25.62	$204.96
Mobilization	Mobilization, medium equipment	2	Each	$133.51	$267.02
Materials	Pipe, Steel, 20", Std Wt, USED	40	Foot	$42.53	$1,701.20
Materials	Pipe, Steel, 24", Std Wt, USED	14	Foot	$53.94	$755.16
Equip./Install.	Portable Welder	8	Hour	$14.88	$119.04
Materials	Pump, > 5 HP - Pump and motor, fixed cost portion	1	Each	$2,247.40	$2,247.40
				Total Cost:	$15,908.08

Practice: 533 - Pumping Plant

Scenario # 6 Variable Frequency Drive

Scenario Description: **Louisiana**

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 Practice 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 Practice Situation:

VFD Modifications are implemented at the pump site to allow for varying the speed of a 40 Hp electric motor to match the pressure and flow requirements for a center pivot irrigation system.

Scenario Feature Measure:

Pump Power Requirement

Scenario Typical Size:	50	Horse Power	Unit Cost	$146.80

Cost Category	Component Name	Quantity	Unit	Unit Cost	Cost
Materials	Variable Speed Drive, 50 HP	50	Horsepower	$146.80	$7,340.00
				Total Cost:	$7,340.00

Practice: 533 - Pumping Plant

Scenario # 7 Internal Combustion-Powered Pump ≤ 7½ HP

Scenario Description: **Louisiana**

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 Practice 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 Practice 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.

Scenario Feature Measure:

Pump Power Requirement

Scenario Typical Size: 5 | Horse Power | Unit Cost | $268.71

Cost Category	Component Name	Quantity	Unit	Unit Cost	Cost
Materials	Pump, < 50 HP, Pump & ICE power unit	5	Horsepower	$205.00	$1,025.00
Equip./Install.	Concrete, CIP, slab on grade, reinforced	0.25	Cubic yard	$209.92	$52.48
Equip./Install.	Truck, Pickup	2	Hour	$23.48	$46.96
Labor	Supervisor or Manager	4	Hour	$36.21	$144.84
Labor	General Labor	4	Hour	$18.57	$74.28
				Total Cost:	$1,343.56

Practice: 533 - Pumping Plant

Scenario # 8 Internal Combustion-Powered Pump > 7½ to 75 HP

Scenario Description: **Louisiana**

The typical scenario supports installation of a pump in an existing irrigation system or installation of a new pump on cropland with a 40 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. This scenario does not cover a pumping plant installation that requires an L-pipe.

Before Practice 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 Practice 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.

Scenario Feature Measure:

Pump Power Requirement

Scenario Typical Size:	40	Horse Power	Unit Cost	$508.08

Cost Category	Component Name	Quantity	Unit	Unit Cost	Cost
Materials	Pipe, Steel, 30", Std Wt, USED	14	Foot	$89.69	$1,255.66
Materials	Pipe, Steel, 24", Std Wt, USED	40	Foot	$53.94	$2,157.60
Materials	Swing Check Valve, metal, 14"	1	Each	$4,892.56	$4,892.56
Materials	Pump, < 50 HP, Pump & ICE power unit	40	Horsepower	$205.00	$8,200.00
Equip./Install.	Concrete, CIP, slab on grade, reinforced	1	Cubic yard	$209.92	$209.92
Equip./Install.	Hydraulic Excavator, 2 CY	8	Hour	$139.36	$1,114.88
Equip./Install.	Truck, Pickup	4	Hour	$23.48	$93.92
Equip./Install.	Portable Welder	8	Hour	$14.88	$119.04
Labor	General Labor	32	Hour	$18.57	$594.24
Labor	Skilled Labor	16	Hour	$26.82	$429.12
Labor	Equipment Operators, Heavy	16	Hour	$25.62	$409.92
Labor	Supervisor or Manager	16	Hour	$36.21	$579.36
Mobilization	Mobilization, medium equipment	2	Each	$133.51	$267.02
				Total Cost:	$20,323.24

Practice: 533 - Pumping Plant

Scenario # 9 Internal Combustion-Powered Pump > 75 HP

Scenario Description: **Louisiana**

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 Practice Situation:

Irrigation: Either an existing irrigation system employs an inefficient, improperly-sized pump that leads to inefficient water delivery resulting in high energy costs, orWaste Transfer: various types of semi-solid or liquid waste at the headquarters is uncollected causing surface and ground water issues.

After Practice 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.

Scenario Feature Measure:

Pump Power Requirement

Scenario Typical Size: 80 Horse Power Unit Cost $353.60

Cost Category	Component Name	Quantity	Unit	Unit Cost	Cost
Materials	Pump, > 70 HP, Pump & ICE power unit	80	Horsepower	$142.00	$11,360.00
Equip./Install.	Concrete, CIP, slab on grade, reinforced	2	Cubic yard	$209.92	$419.84
Equip./Install.	Truck, Pickup	6	Hour	$23.48	$140.88
Equip./Install.	Hydraulic Excavator, 2 CY	8	Hour	$139.36	$1,114.88
Labor	Supervisor or Manager	24	Hour	$36.21	$869.04
Labor	General Labor	48	Hour	$18.57	$891.36
Labor	Skilled Labor	8	Hour	$26.82	$214.56
Labor	Equipment Operators, Heavy	8	Hour	$25.62	$204.96
Mobilization	Mobilization, medium equipment	2	Each	$133.51	$267.02
Materials	Pipe, Steel, 30", Std Wt, USED	40	Foot	$89.69	$3,587.60
Materials	Pipe, Steel, 36", Std Wt, USED	14	Foot	$104.98	$1,469.72
Equip./Install.	Portable Welder	8	Hour	$14.88	$119.04
Materials	Pipe, Steel, 18", Std Wt, USED	20	Foot	$39.61	$792.20
Materials	Swing Check Valve, metal, 16"	1	Each	$6,837.20	$6,837.20
				Total Cost:	$28,288.30

Practice: 533 - Pumping Plant

Scenario # 10 Tractor Power Take Off (PTO) Pump

Scenario Description: **Louisiana**

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 Practice 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 Practice 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.

Scenario Feature Measure:

Pump Power Requirement

Scenario Typical Size:	60	Horse Power	Unit Cost	$130.91

Cost Category	Component Name	Quantity	Unit	Unit Cost	Cost
Materials	Pump, Ag Water PTO, 1,000 GPM	1	Each	$6,182.70	$6,182.70
Equip./Install.	Truck, Pickup	16	Hour	$23.48	$375.68
Equip./Install.	Concrete, CIP, slab on grade, reinforced	2	Cubic yard	$209.92	$419.84
Labor	General Labor	16	Hour	$18.57	$297.12
Labor	Supervisor or Manager	16	Hour	$36.21	$579.36
				Total Cost:	$7,854.70

Practice: 533 - Pumping Plant

Scenario # 11 Windmill-Powered Pump

Scenario Description: **Louisiana**

A windmill is installed in order to supply a reliable water source for livestock and/or wildlife. The windmill includes the tower, concrete footings, wheel blade unit, sucker rod, down pipe, gear box, pump, plumbing, and well head protection concrete pad. The typical scenario will be a windmill system with a 10 ft diameter mill and 27-foot tower which is pumping from a 150-foot well. As a result of installing this windmill, resource concerns of inadequate stock water, plant establishment, growth, productivity, health, and vigor, and water quantity can be addressed.Resource Concerns: Insufficient stockwater.

Before Practice Situation:

In a rangeland or pasture setting, a reliable source of water for livestock is not available, or the spacing between water sources is such that grazing distribution and plant health are adversely impacted.

After Practice Situation:

A windmill, with a wheel ranging from 6' to 16' in diameter, will be installed over a well that is located to provide a reliable source of livestock water at the rate of at least 2 gpm, to facilitate proper grazing distribution and improved plant health. To increase reliability, water is pumped into a storage tank to provide a given number of days of supply. Installation includes the footings, wellhead protection concrete pad, tower, gear box, sail, sucker rod, down hole accessories, and a short outlet pipe to a storage tank.

Scenario Feature Measure:

Diameter of Mill Wheel

Scenario Typical Size:	10	Feet	Unit Cost	$843.10

Cost Category	Component Name	Quantity	Unit	Unit Cost	Cost
Materials	Windmill, 10', fan diameter	1	Each	$6,159.20	$6,159.20
Equip./Install.	Truck, Pickup	4	Hour	$23.48	$93.92
Equip./Install.	Aerial lift, telescoping bucket	8	Hour	$39.68	$317.44
Equip./Install.	Concrete, CIP, slab on grade, reinforced	2	Cubic yard	$209.92	$419.84
Labor	General Labor	32	Hour	$18.57	$594.24
Labor	Supervisor or Manager	16	Hour	$36.21	$579.36
Mobilization	Mobilization, medium equipment	2	Each	$133.51	$267.02
				Total Cost:	$8,431.02

Practice: 533 - Pumping Plant

Scenario # 12 Photovoltaic-Powered Pump <= 250 ft total head

Scenario Description: **Louisiana**

The installation of a photovoltaic-powered pumping plant with a design operating total head on pump less than or equal to 250 feet. The typical scenario assumes the installation of a submersible solar-powered pump 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 Practice 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 Practice Situation:

The typical scenario assumes installation of a 230-watt photovoltaic (PV) panel, capable of operating a 1/2 Hp (0.5 Hp) solar-powered submersible pump in a 100 foot deep 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 1/2 Hp solar-powered submersible pump to deliver about 5 gpm and develop a pressure at the pump outlet of about 60 psi.). The installation includes the pump, wiring, pipeline in the well, solar panels, frame mounts, inverter, and all appurtenances. Water will be pumped to an existing storage tank at a higher elevation from which it will be used to pressurize the Livestock Pipeline (516) or Irrigation Pipeline (430). Grazing - Livestock exclusion from surface water will result in improved surface water quality and reduced erosion. Grazing has potential to be well distributed. Irrigation: Improved pressure and flow rate will improve irrigation efficiency.

Scenario Feature Measure:

Each Pumping Plant

Scenario Typical Size:	1	Each	Unit Cost	$4,939.95

Cost Category	Component Name	Quantity	Unit	Unit Cost	Cost
Materials	Solar Panels, fixed cost portion	1	Each	$2,155.70	$2,155.70
Materials	Solar Panels, variable cost portion	0.372	Kilowatt	$3,337.70	$1,241.62
Materials	Pump, < 5 HP - Pump and motor, variable cost portion	0.5	Horsepower	$229.73	$114.87
Materials	Pump, < 5 HP - Pump and motor, fixed cost portion	1	Each	$175.60	$175.60
Equip./Install.	Truck, Pickup	16	Hour	$23.48	$375.68
Labor	General Labor	16	Hour	$18.57	$297.12
Labor	Supervisor or Manager	16	Hour	$36.21	$579.36
				Total Cost:	$4,939.95

Practice: 533 - Pumping Plant

Scenario # 13 Photovoltaic-Powered Pump 251-400 ft total head

Scenario Description: **Louisiana**

The installation of a photovoltaic-powered pumping plant with a design operating total head on pump between 251 feet to 400 feet. The typical scenario assumes installation of a submersible solar-powered pump 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 Practice 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 Practice Situation:

The typical scenario assumes installation of a 230-watt photovoltaic (PV) panel, capable of operating a 1 Hp solar-powered submersible pump in a 250 foot 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.). 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.

Scenario Feature Measure:

Each Pumping Plant

Scenario Typical Size:	1	Each	Unit Cost	$6,303.11

Cost Category	Component Name	Quantity	Unit	Unit Cost	Cost
Materials	Solar Panels, fixed cost portion	1	Each	$2,155.70	$2,155.70
Materials	Solar Panels, variable cost portion	0.746	Kilowatt	$3,337.70	$2,489.92
Materials	Pump, < 5 HP - Pump and motor, variable cost portion	1	Horsepower	$229.73	$229.73
Materials	Pump, < 5 HP - Pump and motor, fixed cost portion	1	Each	$175.60	$175.60
Equip./Install.	Truck, Pickup	16	Hour	$23.48	$375.68
Labor	General Labor	16	Hour	$18.57	$297.12
Labor	Supervisor or Manager	16	Hour	$36.21	$579.36
				Total Cost:	$6,303.11

Practice: 533 - Pumping Plant

Scenario # 14 Water Ram Pump

Scenario Description: **Louisiana**

A water ram is used to transfer water from a live stream to a Watering Facility (614) or small Irrigation Reservoir (436) utilizing the energy of moving water to transfer a portion of that water to a higher elevation. It is anchored to a small concrete pad. Bypass water (which could easily be 90% of the water diverted from the stream) is returned to the stream or transferred in a pipe, to a lower elevation tank (614 or 436), without erosion or impairment to water quality. In the livestock scenario, 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 while also improving water quality. The cattle thus have access to drinking water without having to enter the stream. The water ram may need to be fenced for protection from curious bovines. While it is generally not considered practical for irrigation, in the irrigation scenario, water can be retrieved from a stream and stored in a small 436 to provide water for a very small (0.1 acre) irrigation system.Resource Concerns: Insufficient stockwater.Associated Practices: 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 Practice Situation:

Water in a nearby stream is not available at the desired location, pressure and/or flow rate.

After Practice Situation:

A 2" diameter inlet pipe is installed and connected to a water ram pump with all appurtenances and anchored to a concrete pad (9 ft x 4 ft x 5 in) or other appropriate secure base. Depending upon the application, either a 1-inch diameter Livestock Pipeline (516) or an Irrigation Pipeline (430) is installed from the water ram to a 5,000 gallon storage facility. Improved water quantity or quality, grazing management, plant diversity, animal health, and/or irrigation purposes as outlined in the appropriate NRCS irrigation system standard. A 2" water ram, with 10 gpm of inlet flow and 10 feet of drop, can supply about 1.0 gpm to a location about 50 feet higher than the water ram.

Scenario Feature Measure:

Nominal Diameter of Inlet Pipe

Scenario Typical Size:	2	Inches	Unit Cost	$936.06

Cost Category	Component Name	Quantity	Unit	Unit Cost	Cost
Materials	Pump, Ram	1	Each	$515.00	$515.00
Equip./Install.	Truck, Pickup	16	Hour	$23.48	$375.68
Equip./Install.	Concrete, CIP, slab on grade, reinforced	0.5	Cubic yard	$209.92	$104.96
Labor	General Labor	16	Hour	$18.57	$297.12
Labor	Supervisor or Manager	16	Hour	$36.21	$579.36
				Total Cost:	$1,872.12

Practice: 533 - Pumping Plant

Scenario # 15 Electric-Powered Pump >10 to 40 HP without L-Pipe

Scenario Description: **Louisiana**

This is a close-coupled, 3-phase, 25 Hp electric-powered centrifugal pump mounted on a platform for pressurizing a medium-sized (600 gpm and 50 psi) sprinkler or large microirrigation (850 gpm and 35 psi) system or a large-sized surface irrigaiton system (1,200 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. This scenario does not cover a pumping plant installation that requires an L-pipe.

Before Practice 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 Practice 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.

Scenario Feature Measure:

Pump Power Requirement

Scenario Typical Size:	25	Horse Power	Unit Cost	$419.27

Cost Category	Component Name	Quantity	Unit	Unit Cost	Cost
Materials	Pump, > 5 HP - Pump and motor, fixed cost portion	1	Each	$2,247.40	$2,247.40
Materials	Pump, > 5 HP - Pump and motor, variable cost portion	25	Horsepower	$105.45	$2,636.25
Equip./Install.	Concrete, CIP, slab on grade, reinforced	2	Cubic yard	$209.92	$419.84
Equip./Install.	Truck, Pickup	56	Hour	$23.48	$1,314.88
Equip./Install.	Backhoe, 80 HP	8	Hour	$40.48	$323.84
Labor	Supervisor or Manager	56	Hour	$36.21	$2,027.76
Labor	General Labor	56	Hour	$18.57	$1,039.92
Labor	Equipment Operators, Heavy	8	Hour	$25.62	$204.96
Mobilization	Mobilization, medium equipment	2	Each	$133.51	$267.02
				Total Cost:	$10,481.87

Practice: 533 - Pumping Plant

Scenario # 16 Electric-Powered Pump >40 HP without L-Pipe

Scenario Description: **Louisiana**

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 (6,000 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. This scenario does not cover a pumping plant installation that requires an L-pipe.

Before Practice 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 Practice Situation:

Irrigation: A properly designed and efficient pumping plant is installed, reducing energy use and improving irrigation efficiency.

Scenario Feature Measure:

Pump Power Requirement

Scenario Typical Size:	50	Horse Power	Unit Cost	$262.36

Cost Category	Component Name	Quantity	Unit	Unit Cost	Cost
Materials	Pump, > 5 HP - Pump and motor, fixed cost portion	1	Each	$2,247.40	$2,247.40
Materials	Pump, > 5 HP - Pump and motor, variable cost portion	50	Horsepower	$105.45	$5,272.50
Equip./Install.	Concrete, CIP, slab on grade, reinforced	2	Cubic yard	$209.92	$419.84
Equip./Install.	Truck, Pickup	56	Hour	$23.48	$1,314.88
Equip./Install.	Backhoe, 80 HP	8	Hour	$40.48	$323.84
Labor	Supervisor or Manager	56	Hour	$36.21	$2,027.76
Labor	General Labor	56	Hour	$18.57	$1,039.92
Labor	Equipment Operators, Heavy	8	Hour	$25.62	$204.96
Mobilization	Mobilization, medium equipment	2	Each	$133.51	$267.02
				Total Cost:	$13,118.12

Practice: 533 - Pumping Plant

Scenario # 17 Internal Combustion-Powered Pump > 7½ to 75 HP without L-Pipe

Scenario Description: **Louisiana**

The typical scenario supports installation of a pump in an existing irrigation system or installation of a new pump on cropland with a 50 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. This scenario does not cover a pumping plant installation that requires an L-pipe.

Before Practice 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 Practice 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.

Scenario Feature Measure:

Pump Power Requirement

Scenario Typical Size:	40	Horse Power	Unit Cost	$403.92

Cost Category	Component Name	Quantity	Unit	Unit Cost	Cost
Materials	Swing Check Valve, metal, 14"	1	Each	$4,892.56	$4,892.56
Materials	Pump, < 50 HP, Pump & ICE power unit	40	Horsepower	$205.00	$8,200.00
Equip./Install.	Concrete, CIP, slab on grade, reinforced	1	Cubic yard	$209.92	$209.92
Equip./Install.	Hydraulic Excavator, 2 CY	8	Hour	$139.36	$1,114.88
Equip./Install.	Truck, Pickup	4	Hour	$23.48	$93.92
Labor	General Labor	32	Hour	$18.57	$594.24
Labor	Equipment Operators, Heavy	8	Hour	$25.62	$204.96
Labor	Supervisor or Manager	16	Hour	$36.21	$579.36
Mobilization	Mobilization, medium equipment	2	Each	$133.51	$267.02
				Total Cost:	$16,156.86

Practice: 533 - Pumping Plant

Scenario # 18 Internal Combustion-Powered Pump > 75 HP without L-Pipe

Scenario Description: **Louisiana**

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 Practice Situation:

Irrigation: Either an existing irrigation system employs an inefficient, improperly-sized pump that leads to inefficient water delivery resulting in high energy costs, orWaste Transfer: various types of semi-solid or liquid waste at the headquarters is uncollected causing surface and ground water issues.

After Practice 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.

Scenario Feature Measure:

Pump Power Requirement

Scenario Typical Size: 80 Horse Power Unit Cost $276.31

Cost Category	Component Name	Quantity	Unit	Unit Cost	Cost
Materials	Pump, > 70 HP, Pump & ICE power unit	80	Horsepower	$142.00	$11,360.00
Equip./Install.	Concrete, CIP, slab on grade, reinforced	2	Cubic yard	$209.92	$419.84
Equip./Install.	Truck, Pickup	6	Hour	$23.48	$140.88
Equip./Install.	Hydraulic Excavator, 2 CY	8	Hour	$139.36	$1,114.88
Labor	Supervisor or Manager	24	Hour	$36.21	$869.04
Labor	General Labor	48	Hour	$18.57	$891.36
Labor	Equipment Operators, Heavy	8	Hour	$25.62	$204.96
Mobilization	Mobilization, medium equipment	2	Each	$133.51	$267.02
Materials	Swing Check Valve, metal, 16"	1	Each	$6,837.20	$6,837.20
				Total Cost:	$22,105.18

Practice: 533 - Pumping Plant

Scenario # 19 L-pipe > 20 ft lift

Scenario Description: **Louisiana**

The typical scenario for when the location of the surface water from a river, stream or lake requires a lift greater than the common 20 ft.

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 Practice Situation:

Irrigation: Either an existing irrigation system employs an inefficient, improperly-sized pump that leads to inefficient water delivery resulting in high energy costs, orWaste Transfer: various types of semi-solid or liquid waste at the headquarters is uncollected causing surface and ground water issues.

After Practice 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.

Scenario Feature Measure:

Length of Lift

Scenario Typical Size:	30	Linear Foot		Unit Cost	$194.61

Cost Category	Component Name	Quantity	Unit	Unit Cost	Cost
Materials	Pipe, Steel, 30", Std Wt, USED	30	Foot	$89.69	$2,690.70
Materials	Pipe, Steel, 24", Std Wt, USED	20	Foot	$53.94	$1,078.80
Equip./Install.	Backhoe, 80 HP	16	Hour	$40.48	$647.68
Equip./Install.	Truck, Pickup	2	Hour	$23.48	$46.96
Labor	Equipment Operators, Heavy	16	Hour	$25.62	$409.92
Labor	General Labor	16	Hour	$18.57	$297.12
Labor	Skilled Labor	16	Hour	$26.82	$429.12
Equip./Install.	Portable Welder	16	Hour	$14.88	$238.08
				Total Cost:	$5,838.38

Practice: 533 - Pumping Plant

Scenario # 20 Dual Intake on L-Pipe

Scenario Description: **Louisiana**

An intake from the reservoir is required to allow for gravity feed pipelines and direct pumping from the reservoir. Typical pipe of 24" intake pipe in conjuction with 2800 gpm relift pump that is installed through the reservoir levee that is typically 100 feet from toe to toe.

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 Practice Situation:

Irrigation: Either an existing irrigation system employs an inefficient, improperly-sized pump that leads to inefficient water delivery resulting in high energy costs, orWaste Transfer: various types of semi-solid or liquid waste at the headquarters is uncollected causing surface and ground water issues.

After Practice 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.

Scenario Feature Measure:

Length of Intake

Scenario Typical Size:	100	Linear Foot	Unit Cost	$65.66

Cost Category	Component Name	Quantity	Unit	Unit Cost	Cost
Materials	Pipe, Steel, 24", Std Wt, USED	100	Foot	$53.94	$5,394.00
Equip./Install.	Backhoe, 80 HP	6	Hour	$40.48	$242.88
Equip./Install.	Truck, Pickup	1	Hour	$23.48	$23.48
Equip./Install.	Dozer, 80 HP	6	Hour	$49.22	$295.32
Labor	Equipment Operators, Heavy	4	Hour	$25.62	$102.48
Labor	General Labor	4	Hour	$18.57	$74.28
Labor	Skilled Labor	4	Hour	$26.82	$107.28
Mobilization	Mobilization, medium equipment	2	Each	$133.51	$267.02
Equip./Install.	Portable Welder	4	Hour	$14.88	$59.52
				Total Cost:	$6,566.26

Practice: 533 - Pumping Plant

Scenario # 21 Pump Automation

Scenario Description: **Louisiana**

Typical: a diesel or electrical pump is set up with telemetry capabilities to operate the pump while recording important data such as the fuel levels, the temperature, oil levels, water levels in the reservoir or tailwater pit or both, and rainfall at the site. This data is collected and obtainable by the producers from any location.
Resource Concerns: Excess/Insufficent Water - Inefficient Use of Irrigation Water & Water Quality Degragation
Associated Practices: 449 - Irrigation Water Management

Before Practice Situation:

Pumps are manually started. Oil, fuel, and water level in reservoir/tailwater pit are manually read. Requires a person to physically be on site to maniputate the pump and to take readings. Excess irrigation water is allowed to run off the crops and farmland when situations occur where farm labor is unable to operate the pump when irrigation is needed or needs have been met.

After Practice Situation:

Pump has an automatic pump start/stop remotely controlled from any location based on the information relayed from water availability or unavailibility. This prevents the landowner from being physically at the site when sufficient water is available or not for irrigation. Crops are supplied the required water needs and excess is not allowed to leave the farm, thus preventing damage to the pumping system, increased labor of the overall farm operation and increasing effiency, preventing sediment loss, reducing turbidity, over saturation of the plants, water quality turbity or excess water use in critical ground water areas.

Scenario Feature Measure:

automation of a pump

Scenario Typical Size:	1	each	Unit Cost	$3,137.56

Cost Category	Component Name	Quantity	Unit	Unit Cost	Cost
Materials	Switches and Controls, programmable controller	1	Each	$149.00	$149.00
Materials	Switches and Controls, Wi-Fi system and software	1	Each	$750.00	$750.00
Materials	Switches and Controls, radio system	1	Each	$770.00	$770.00
Materials	Data Logger with Telemetry System	1	Each	$1,119.75	$1,119.75
Materials	Weather Station	1	Each	$153.29	$153.29
Labor	General Labor	8	Hour	$18.57	$148.56
Equip./Install.	Truck, Pickup	2	Hour	$23.48	$46.96
				Total Cost:	$3,137.56

Practice: 533 - Pumping Plant

Scenario # 22 Pump Conversion to Low Pressure

Scenario Description: **Louisiana**

This scenario involves converting an existing pump which is set up to operate any high pressure system to a pump set up to operate a low pressure system, when the existing high pressure system is being converted to low pressure system.

Resource Concerns: Excess/Insufficent Water - Inefficient Use of Irrigation Water & Water Quality Degragation; Energy Conservation

Associated Practices: 449 - Irrigation Water Management, 442 - Irrigation System, Sprinkler

Before Practice Situation:

An existing irrigation pump is operating a high pressure center pivot system and needs to be converted to a low pressure pump to efficiently operate a center pivot system converted to low pressure.

After Practice Situation:

The existing high pressure pump is pulled and stages are removed in order to reduce the pressure which the pump will produce, this will cause a more energy efficient system and a system which is more efficiently distributing water.

Scenario Feature Measure:

conversion of pump

Scenario Typical Size:	1	Each	Unit Cost	$3,998.20

Cost Category	Component Name	Quantity	Unit	Unit Cost	Cost
Equip./Install.	Crane, truck mounted, hydraulic, 12 ton	6	Hour	$74.89	$449.34
Materials	Pump, Bowl replacement, 30 to 100 HP	50	Horsepower	$61.96	$3,098.00
Labor	General Labor	6	Hour	$18.57	$111.42
Labor	Supervisor or Manager	2	Hour	$36.21	$72.42
Mobilization	Mobilization, medium equipment	2	Each	$133.51	$267.02
				Total Cost:	$3,998.20