

Practice: 642 - Water Well

Scenario: #1 - Dug Well

Scenario Description: Typical construction is for the excavation of a shallow dug well. The purpose of the practice is to provide water for livestock. A typical dug well is 4 foot in diameter and 12 feet in depth. The well is excavated using a backhoe. Excavate to a depth where the water recharge is greater than the equipment can remove. Washed gravel is placed in the base of the dug opening. Concrete manhole risers are installed to hold the water. Pea gravel is placed above the washed gravel to transition to the earth backfill. The hole is backfilled and sloped to direct surface water away from entering the manhole cover.

Before Situation: Livestock have insufficient water or are fenced from their water source. There is insufficient water for use in micro-irrigation.

After Situation: Sufficient water is available for livestock or micro-irrigation. Utilize Pumping Plant (533), Pipeline (516), Irrigation Pipeline (430) as associated practices. Use Critical Area Seeding (342) where necessary to prevent erosion following construction activities.

Scenario Feature Measure: No.

Scenario Unit: Each

Scenario Typical Size: 1

Total Scenario Cost: \$11,136.10

Scenario Cost/Unit: \$11,136.10

Cost Details

Component Name	Id	Description	Unit	Cost	Qty	Total
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Materials

Aggregate, Gravel, Graded	46	Gravel, includes materials, equipment and labor to transport and place. Includes washed and unwashed gravel.	Cubic Yard	\$36.06	3	\$108.19
Aggregate, gravel, washed, pea gravel	1331	Washed and graded pea gravel river stone. Includes materials and local delivery within 20 miles of quarry.	Cubic Yard	\$39.75	1	\$39.75
Chlorine	1335	Liquid chlorine bleach. Includes materials only.	Gallon	\$2.74	5	\$13.69
Grout, cement	1333	Cement grout meeting ASTM specifications for well sealing. Includes both neat-cement grout and bentonite grout mixtures. Includes materials, equipment and labor to place.	Cubic Yard	\$952.66	5	\$4,763.32
Manhole, 4' x 4'	1053	Precast Manhole with base and top delivered. 4' diameter x 4' depth. Materials only.	Each	\$1,717.65	3	\$5,152.94
Test, Standard Water Test, Well Water	309	Well Water Suitability test. Includes materials and shipping only.	Each	\$42.13	1	\$42.13

Labor

Equipment Operators, Heavy	233	Includes: Cranes, Hydraulic Excavators >=50 HP, Dozers, Paving Machines, Rock Trenchers, Trenchers >=12", Dump Trucks, Ag Equipment >=150 HP, Scrapers, Water Wagons.	Hour	\$36.00	6	\$215.99
General Labor	231	Labor performed using basic tools such as power tool, shovels, and other tools that do not require extensive training. Ex. pipe layer, herder, concrete placement, materials spreader, flagger, etc.	Hour	\$26.15	8	\$209.22

Equipment Installation

Backhoe, 80 HP	926	Wheel mounted backhoe excavator with horsepower range of 60 to 90. Equipment and power unit costs. Labor not included.	Hour	\$55.93	6	\$335.59
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Mobilization

Mobilization, medium equipment	1139	Equipment with 70-150 HP or typical weights between 14,000 and 30,000 pounds.	Each	\$255.27	1	\$255.27
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Practice: 642 - Water Well

Scenario: #2 - Shallow Well

Scenario Description: Typical construction is for the installation of a well, in areas where sufficient water is known to occur within 100 feet of the ground surface. The well shall be drilled, dug, driven, bored, jetted or otherwise constructed to an aquifer for water supply. The purpose of the practice is to provide water for livestock or irrigation. An average well depth is 50 feet. Well casings is 4" in diameter. Steel casing is installed to a depth of 30 feet.

Before Situation: Livestock have insufficient water or are fenced from their water source. There is insufficient water for use in micro-irrigation.

After Situation: Sufficient water is available for livestock or irrigation. Utilize Pumping Plant (533), Irrigation Pipeline (430), Pipeline (516) as associated practices. Use Critical Area Seeding (342) where necessary to prevent erosion following construction activities.

Scenario Feature Measure: No.

Scenario Unit: Each

Scenario Typical Size: 1

Total Scenario Cost: \$3,926.90

Scenario Cost/Unit: \$3,926.90

Cost Details

Component Name	Id	Description	Unit	Cost	Qty	Total
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Equipment Installation

Concrete, CIP, formless, non reinforced	36	Non reinforced concrete cast-in-placed without forms by chute placement. Typical strength is 3000 to 4000 psi. Includes materials, labor and equipment to transport, place and finish.	Cubic Yard	\$162.01	0.16	\$25.92
Rotary Drill Rig	1595	Rotary drill rig including equipment and power unit costs. Labor not included.	Hour	\$338.72	4	\$1,354.88

Materials

Chlorine	1335	Liquid chlorine bleach. Includes materials only.	Gallon	\$2.74	1	\$2.74
Grout, cement	1333	Cement grout meeting ASTM specifications for well sealing. Includes both neat-cement grout and bentonite grout mixtures. Includes materials, equipment and labor to place.	Cubic Yard	\$952.66	2	\$1,905.33
Test, Standard Water Test, Well Water	309	Well Water Suitability test. Includes materials and shipping only.	Each	\$42.13	1	\$42.13
Well Cap, 4"	1785	Well cap, 4". Materials only.	Each	\$25.67	1	\$25.67
Well Casing, Metal, 4"	1809	Steel well casing, 4". Materials only.	Foot	\$8.14	30	\$244.29
Well Screen, plastic, 4"	1998	4" PVC well screen. Materials only.	Foot	\$7.07	10	\$70.67

Mobilization

Mobilization, medium equipment	1139	Equipment with 70-150 HP or typical weights between 14,000 and 30,000 pounds.	Each	\$255.27	1	\$255.27
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Practice: 642 - Water Well

Scenario: #3 - Typical Well

Scenario Description: Typical construction is for the installation of a well, in areas where sufficient water is known to occur 100 - 600 feet of the ground surface. The well shall be drilled, driven, bored, jetted or otherwise constructed to an aquifer for water supply. The purpose of the practice is to provide water for livestock or micro-irrigation. An average well depth is 400 feet. Well casings are 4-6" in diameter. Steel casing is installed to a depth of 100 feet.

Before Situation: Livestock have insufficient water or are fenced from their water source. There is insufficient water for use in micro-irrigation.

After Situation: Sufficient water is available for livestock or micro-irrigation. Utilize Pumping Plant (533), Irrigation Pipeline (430), and Pipeline (516) as associated practices. Use Critical Area Seeding (342) where necessary to prevent erosion following construction activities.

Scenario Feature Measure: No.

Scenario Unit: Each

Scenario Typical Size: 1

Total Scenario Cost: \$7,007.04

Scenario Cost/Unit: \$7,007.04

Cost Details

Component Name	Id	Description	Unit	Cost	Qty	Total
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Equipment Installation

Concrete, CIP, formless, non reinforced	36	Non reinforced concrete cast-in-placed without forms by chute placement. Typical strength is 3000 to 4000 psi. Includes materials, labor and equipment to transport, place and finish.	Cubic Yard	\$162.01	0.2	\$32.40
Rotary Drill Rig	1595	Rotary drill rig including equipment and power unit costs. Labor not included.	Hour	\$338.72	8	\$2,709.76

Materials

Chlorine	1335	Liquid chlorine bleach. Includes materials only.	Gallon	\$2.74	1	\$2.74
Grout, cement	1333	Cement grout meeting ASTM specifications for well sealing. Includes both neat-cement grout and bentonite gout mixtures. Includes materials, equipment and labor to place.	Cubic Yard	\$952.66	2	\$1,905.33
Test, Standard Water Test, Well Water	309	Well Water Suitability test. Includes materials and shipping only.	Each	\$42.13	1	\$42.13
Well Cap, 6"	1786	Well cap, 6". Materials only.	Each	\$33.60	1	\$33.60
Well Casing, Metal, 6"	1810	Steel well casing, 6". Materials only.	Foot	\$14.14	100	\$1,414.29
Well Screen, stainless steel, 6"	1995	6" Stainless steel well screen. Materials only.	Foot	\$61.15	10	\$611.52

Mobilization

Mobilization, medium equipment	1139	Equipment with 70-150 HP or typical weights between 14,000 and 30,000 pounds.	Each	\$255.27	1	\$255.27
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Practice: 642 - Water Well

Scenario: #4 - Deep Well

Scenario Description: Typical construction is for the installation of a well, in areas where sufficient water is known to occur > 600 feet of the ground surface. The well shall be drilled, driven, bored, jetted or otherwise constructed to an aquifer for water supply. The purpose of the practice is to provide water for livestock or micro-irrigation. An average well depth is 800 feet. Well casings are 4-6" in diameter. Steel casing is installed to a depth of 100 feet.

Before Situation: Livestock have insufficient water or are fenced from their water source. There is insufficient water for use in micro-irrigation.

After Situation: Sufficient water is available for livestock or micro-irrigation. Utilize Pumping Plant (533), Irrigation Pipeline (430), and Pipeline (516) as associated practices. Use Critical Area Seeding (342) where necessary to prevent erosion following construction activities.

Scenario Feature Measure: No.

Scenario Unit: Each

Scenario Typical Size: 1

Total Scenario Cost: \$14,875.37

Scenario Cost/Unit: \$14,875.37

Cost Details

Component Name	Id	Description	Unit	Cost	Qty	Total
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Equipment Installation

Concrete, CIP, formless, non reinforced	36	Non reinforced concrete cast-in-placed without forms by chute placement. Typical strength is 3000 to 4000 psi. Includes materials, labor and equipment to transport, place and finish.	Cubic Yard	\$162.01	0.2	\$32.40
Rotary Drill Rig	1595	Rotary drill rig including equipment and power unit costs. Labor not included.	Hour	\$338.72	24	\$8,129.27

Materials

Chlorine	1335	Liquid chlorine bleach. Includes materials only.	Gallon	\$2.74	2	\$5.48
Grout, cement	1333	Cement grout meeting ASTM specifications for well sealing. Includes both neat-cement grout and bentonite grout mixtures. Includes materials, equipment and labor to place.	Cubic Yard	\$952.66	2	\$1,905.33
Test, Standard Water Test, Well Water	309	Well Water Suitability test. Includes materials and shipping only.	Each	\$42.13	1	\$42.13
Well Cap, 6"	1786	Well cap, 6". Materials only.	Each	\$33.60	1	\$33.60
Well Casing, Metal, 6"	1810	Steel well casing, 6". Materials only.	Foot	\$14.14	100	\$1,414.29
Well Screen, stainless steel, 6"	1995	6" Stainless steel well screen. Materials only.	Foot	\$61.15	50	\$3,057.60

Mobilization

Mobilization, medium equipment	1139	Equipment with 70-150 HP or typical weights between 14,000 and 30,000 pounds.	Each	\$255.27	1	\$255.27
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Practice: 642 - Water Well

Scenario: #5 - High Volume Shallow Well

Scenario Description: Typical construction is for the installation of a well, in areas where sufficient water is known to occur within 100 feet of the ground surface. The well shall be drilled, dug, driven, bored, jetted or otherwise constructed to an aquifer for water supply. The purpose of the practice is to provide water for overhead irrigation. An average well depth is 75 feet. Well casings are 8" in diameter. Steel casing is installed to a depth of 30 feet.

Before Situation: There is insufficient water for use in irrigation.

After Situation: Sufficient water is available for irrigation. Utilize Pumping Plant (533) and Irrigation Pipeline (430) as associated practices. Use Critical Area Seeding (342) where necessary to prevent erosion following construction activities.

Scenario Feature Measure: No.

Scenario Unit: Each

Scenario Typical Size: 1

Total Scenario Cost: \$6,636.96

Scenario Cost/Unit: \$6,636.96

Cost Details

Component Name	Id	Description	Unit	Cost	Qty	Total
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Equipment Installation

Concrete, CIP, formless, non reinforced	36	Non reinforced concrete cast-in-placed without forms by chute placement. Typical strength is 3000 to 4000 psi. Includes materials, labor and equipment to transport, place and finish.	Cubic Yard	\$162.01	0.2	\$32.40
Rotary Drill Rig	1595	Rotary drill rig including equipment and power unit costs. Labor not included.	Hour	\$338.72	8	\$2,709.76

Materials

Chlorine	1335	Liquid chlorine bleach. Includes materials only.	Gallon	\$2.74	1	\$2.74
Grout, cement	1333	Cement grout meeting ASTM specifications for well sealing. Includes both neat-cement grout and bentonite grout mixtures. Includes materials, equipment and labor to place.	Cubic Yard	\$952.66	2	\$1,905.33
Test, Standard Water Test, Well Water	309	Well Water Suitability test. Includes materials and shipping only.	Each	\$42.13	1	\$42.13
Well Cap, 8"	1787	Well cap, 8". Materials only.	Each	\$50.37	1	\$50.37
Well Casing, Metal, 8"	1811	Steel well casing, 8". Materials only.	Foot	\$22.75	30	\$682.46
Well Screen, stainless steel, 8"	1819	8" Stainless steel well screen. Materials only.	Foot	\$95.65	10	\$956.50

Mobilization

Mobilization, medium equipment	1139	Equipment with 70-150 HP or typical weights between 14,000 and 30,000 pounds.	Each	\$255.27	1	\$255.27
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Practice: 642 - Water Well

Scenario: #6 - High Volume Typical Well

Scenario Description: Typical construction is for the installation of a well, in areas where sufficient water is known to occur 100 - 600 feet of the ground surface. The well shall be drilled, driven, bored, jetted or otherwise constructed to an aquifer for water supply. The purpose of the practice is to provide water for livestock or micro-irrigation. An average well depth is 400 feet. Well casings are 8" in diameter. Steel casing is installed to a depth of 100 feet.

Before Situation: There is insufficient water for use in irrigation.

After Situation: Sufficient water is available for irrigation. Utilize Pumping Plant (533) and Irrigation Pipeline (430) as associated practices. Use Critical Area Seeding (342) where necessary to prevent erosion following construction activities.

Scenario Feature Measure: No.

Scenario Unit: Each

Scenario Typical Size: 1

Total Scenario Cost: \$10,939.12

Scenario Cost/Unit: \$10,939.12

Cost Details

Component Name	Id	Description	Unit	Cost	Qty	Total
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Equipment Installation

Concrete, CIP, formless, non reinforced	36	Non reinforced concrete cast-in-placed without forms by chute placement. Typical strength is 3000 to 4000 psi. Includes materials, labor and equipment to transport, place and finish.	Cubic Yard	\$162.01	0.2	\$32.40
Rotary Drill Rig	1595	Rotary drill rig including equipment and power unit costs. Labor not included.	Hour	\$338.72	16	\$5,419.51

Materials

Chlorine	1335	Liquid chlorine bleach. Includes materials only.	Gallon	\$2.74	1	\$2.74
Grout, cement	1333	Cement grout meeting ASTM specifications for well sealing. Includes both neat-cement grout and bentonite gout mixtures. Includes materials, equipment and labor to place.	Cubic Yard	\$952.66	2	\$1,905.33
Test, Standard Water Test, Well Water	309	Well Water Suitability test. Includes materials and shipping only.	Each	\$42.13	1	\$42.13
Well Cap, 8"	1787	Well cap, 8". Materials only.	Each	\$50.37	1	\$50.37
Well Casing, Metal, 8"	1811	Steel well casing, 8". Materials only.	Foot	\$22.75	100	\$2,274.86
Well Screen, stainless steel, 8"	1819	8" Stainless steel well screen. Materials only.	Foot	\$95.65	10	\$956.50

Mobilization

Mobilization, medium equipment	1139	Equipment with 70-150 HP or typical weights between 14,000 and 30,000 pounds.	Each	\$255.27	1	\$255.27
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Practice: 642 - Water Well

Scenario: #7 - High Volume Deep Well

Scenario Description: Typical construction is for the installation of a well, in areas where sufficient water is known to occur > 600 feet of the ground surface. The well shall be drilled, driven, bored, jetted or otherwise constructed to an aquifer for water supply. The purpose of the practice is to provide water for livestock or micro-irrigation. An average well depth is 800 feet. Well casings are 8" in diameter. Steel casing is installed to a depth of 100 feet.

Before Situation: There is insufficient water for use in irrigation.

After Situation: Sufficient water is available for irrigation. Utilize Pumping Plant (533) and Irrigation Pipeline (430) as associated practices. Use Critical Area Seeding (342) where necessary to prevent erosion following construction activities.

Scenario Feature Measure: No.

Scenario Unit: Each

Scenario Typical Size: 1

Total Scenario Cost: \$22,894.40

Scenario Cost/Unit: \$22,894.40

Cost Details

Component Name	Id	Description	Unit	Cost	Qty	Total
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Equipment Installation

Concrete, CIP, formless, non reinforced	36	Non reinforced concrete cast-in-placed without forms by chute placement. Typical strength is 3000 to 4000 psi. Includes materials, labor and equipment to transport, place and finish.	Cubic Yard	\$162.01	0.2	\$32.40
Rotary Drill Rig	1595	Rotary drill rig including equipment and power unit costs. Labor not included.	Hour	\$338.72	40	\$13,548.78

Materials

Chlorine	1335	Liquid chlorine bleach. Includes materials only.	Gallon	\$2.74	1	\$2.74
Grout, cement	1333	Cement grout meeting ASTM specifications for well sealing. Includes both neat-cement grout and bentonite gout mixtures. Includes materials, equipment and labor to place.	Cubic Yard	\$952.66	2	\$1,905.33
Test, Standard Water Test, Well Water	309	Well Water Suitability test. Includes materials and shipping only.	Each	\$42.13	1	\$42.13
Well Cap, 8"	1787	Well cap, 8". Materials only.	Each	\$50.37	1	\$50.37
Well Casing, Metal, 8"	1811	Steel well casing, 8". Materials only.	Foot	\$22.75	100	\$2,274.86
Well Screen, stainless steel, 8"	1819	8" Stainless steel well screen. Materials only.	Foot	\$95.65	50	\$4,782.51

Mobilization

Mobilization, medium equipment	1139	Equipment with 70-150 HP or typical weights between 14,000 and 30,000 pounds.	Each	\$255.27	1	\$255.27
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