## Practice: 443 - Irrigation System, Surface and Subsurface

## Scenario: #1 - Surge Valve & Controller

### Scenario Description:

This scenario would typically include installation and utilization of a 10-inch surge valve with automated controller (including all appurtenances) and installation labor needed to convert from a conventional surface irrigated system to a surge irrigation system. Typical field size is 80 acres. The surge valve will be used with PVC Gated Pipe or PE Gated Tubing to convey and distribute irrigation water to alternating irrigation sets in a timed surge cycle that results in reduced a surging irrigation application. The surging action increases rate of advance along set length, reduces deep percolation at upper end of field, increases uniformity of application along row length, and on lower intake soils can significantly reduce runoff losses. The result is improved irrigation efficiency, reduced leaching and erosion losses, and conserved energy. This scenario does not include gated pipe or associated practices.

Resource Concerns: Insufficient Water - Inefficient use of irrigation water, and Degraded Plant Condition - Undesirable plant productivity and health, Water Quality Degradation- Excess nutrients in surface and ground waters, Water Quality Degradation - Excessive sediment in surface waters, and Inefficient Energy Use - Equipment and facilities

Associated Practices: 464-Irrigation Land leveling, 533-Pumping Plant, 449- Irrigation Water Management, 430 - Irrigation Pipeline, 328-Conservation Crop Rotation, and 590 Nutrient Management.

### Before Situation:

Unacceptable irrigation application uniformity along existing surface irrigation system furrow or border length caused by excessive run length or soil infiltration rate when operated with continuous inflow on existing system. System is over irrigated in attempt to adequately irrigate low end of field.

### After Situation:

A surge surface irrigation system is in place. After implementation, distribution uniformity and irrigation efficiency is improved, by reducing irrigation application volume and deep percolation losses. Runoff reductions, reduced energy use, and air quality improvements can also result.

**Scenario Feature Measure:** Number of Surge Valves

**Scenario Unit:** Each

**Scenario Typical Size:** 1

**Scenario Cost:** $2,151.64 **Scenario Cost/Unit:** $2,151.64

### Cost Details (by category):

| Component Name | ID | Component Description | Unit | Price ($/unit) | Quantity | Cost |
|---|---|---|---|---|---|---|
| ***Labor*** | | | | | | |
| General Labor | 231 | Labor performed using basic tools such as power tool, shovels, and other tools that do not require extensive training. Ex. pipe layer, herder, concrete placement, materials spreader, flagger, etc. | Hour | $18.92 | 2 | $37.84 |
| ***Materials*** | | | | | | |
| Surge Valve And Controller | 1477 | Surge Valve and Controller, with appurtenances. Material cost includes valve, controller, all appurtenances, and mobilization. | Each | $2,113.80 | 1 | $2,113.80 |

## Practice: 443 - Irrigation System, Surface and Subsurface

## Scenario: #2 - Aluminum Gated Pipe

### Scenario Description:

Installation of surface Aluminum gated pipe to efficiently convey and distribute irrigation water in irrigation furrows, borders, or contour levees. A typical scenario would include 1,320 feet of 10-inch Aluminum gated pipe, with 40 inch gate spacing used to irrigate 60 acres. Appurtenances include: gates, couplings, fittings, in-line valves, pressure relief valves, and air vent valves. Does not include flow meters, or a permanent inlet structure with or without filtration.

Resource Concerns: Insufficient Water - Inefficient use of irrigation water, and Degraded Plant Condition - Undesirable Plant productivity and health.

Associated Practices: 464-Irrigation Land leveling, 533-Pumping Plant, 449- Irrigation Water Management, 430 - Irrigation Pipeline, 328-Conservation Crop Rotation, and 590 Nutrient Management.,

### Before Situation:

Typical before situation would include conveyance of water to surface irrigation distribution points with earthen ditches and distribution to individual furrows, borders, or contour levies by siphon tubes. The existing system would experience significant seepage ditch losses, and poor distribution uniformity.

### After Situation:

The installation will improve distribution uniformity, irrigation efficiency, and eliminate or reduce ditch seepage.

**Scenario Feature Measure:** Weight of Pipe

**Scenario Unit:** Pound

**Scenario Typical Size:** 2,442

**Scenario Cost:** $12,303.06 **Scenario Cost/Unit:** $5.04

### Cost Details (by category):

| Component Name | ID | Component Description | Unit | Price ($/unit) | Quantity | Cost |
|---|---|---|---|---|---|---|
| ***Labor*** | | | | | | |
| General Labor | 231 | Labor performed using basic tools such as power tool, shovels, and other tools that do not require extensive training. Ex. pipe layer, herder, concrete placement, materials spreader, flagger, etc. | Hour | $18.92 | 10 | $189.20 |
| ***Materials*** | | | | | | |
| Pipe, aluminum, smooth wall, weight priced | 1382 | Aluminum manufactured into smooth wall pipe | Pound | $4.51 | 2686 | $12,113.86 |

## Practice: 443 - Irrigation System, Surface and Subsurface

## Scenario: #3 - Polyvinyl Chloride (PVC) Gated Pipe

### Scenario Description:

Installation of surface PVC gated pipe to efficiently convey and distribute irrigation water in irrigation furrows, borders, or contour levees. A typical scenario would include 1,320 feet of 10-inch PVC gated pipe, with 40 inch gate spacing used to irrigate 60 acres. Appurtenances include: gates, couplings, fittings, in-line valves, pressure relief valves, and air vent valves. Does not include flow meters, or a permanent inlet structure with or without filtration.

Resource Concerns: Insufficient Water - Inefficient use of irrigation water, and Degraded Plant Condition - Undesirable Plant productivity and health.

Associated Practices: 464-Irrigation Land leveling, 533-Pumping Plant, 449- Irrigation Water Management, 430 - Irrigation Pipeline, 328-Conservation Crop Rotation, and 590 Nutrient Management.,

### Before Situation:

Typical before situation would include conveyance of water to surface irrigation distribution points with earthen ditches and distribution to individual furrows, borders, or contour levies by siphon tubes. The existing system would experience significant seepage ditch losses, and poor distribution uniformity.

### After Situation:

The installation will improve distribution uniformity, irrigation efficiency, and eliminate or reduce ditch seepage.

**Scenario Feature Measure:** Weight of Pipe

**Scenario Unit:** Pound

**Scenario Typical Size:** 3,320

**Scenario Cost:** $5,484.60 **Scenario Cost/Unit:** $1.65

### Cost Details (by category):

| Component Name | ID | Component Description | Unit | Price ($/unit) | Quantity | Cost |
|---|---|---|---|---|---|---|
| ***Labor*** | | | | | | |
| General Labor | 231 | Labor performed using basic tools such as power tool, shovels, and other tools that do not require extensive training. Ex. pipe layer, herder, concrete placement, materials spreader, flagger, etc. | Hour | $18.92 | 10 | $189.20 |
| ***Materials*** | | | | | | |
| Pipe, PVC, dia. < 18", weight priced | 1323 | Polyvinyl Chloride (PVC) pressure rated pipe priced by the weight of the pipe materials for pipes with diameters less than 18". Materials only. | Pound | $1.45 | 3652 | $5,295.40 |

## Practice: 443 - Irrigation System, Surface and Subsurface

## Scenario: #4 - Poly Irrigation Tubing

### Scenario Description:

This practice includes installation of thin wall Polyethylene (PE) irrigation tubing with 2½-inch gates, or gated pipe installed in shallow above ground trenches to replace above ground canals used to deliver water to individual basins within a contour levee or basin surface irrigation system. The typical scenario will use 1,320 feet of 15-inch, 10 mil, PE irrigation tubing (a 1,320-foot roll weighs 250 pounds) with 100 2½-inch gates spaced approximately 13 feet apart, installed in shallow above ground trenches to replace above ground canals used to deliver water to individual basins within a 40-acre irrigated field.

Resource Concerns: Insufficient Water - Inefficient use of irrigation water, and Degraded Plant Condition - Undesirable plant productivity and health, Water Quality Degradation- Excess nutrients in surface and ground waters, Water Quality Degradation - Excessive sediment in surface waters, and Inefficient Energy Use - Equipment and facilities

Associated Practices: 464-Irrigation Land leveling, 533-Pumping Plant, 449- Irrigation Water Management, 430 - Irrigation Pipeline, 328-Conservation Crop Rotation, and 590-Nutrient Management.

### Before Situation:

Typical before situation would include a contour levee or basin surface irrigation system. Irrigation water is delivered to individual basins in a 40-acre rice field split into paddies using irrigation canals and field ditches.

### After Situation:

After implementation irrigation efficiency is improved, while reducing irrigation application volume, runoff, evaporation losses, and cold water damage to crops. Reduced energy use and air quality improvements can also result.

**Scenario Feature Measure:** Weight of Pipe

**Scenario Unit:** Pounds

**Scenario Typical Size:** 250

**Scenario Cost:** $676.70 **Scenario Cost/Unit:** $2.71

### Cost Details (by category):

| Component Name | ID | Component Description | Unit | Price ($/unit) | Quantity | Cost |
|---|---|---|---|---|---|---|
| ***Labor*** | | | | | | |
| General Labor | 231 | Labor performed using basic tools such as power tool, shovels, and other tools that do not require extensive training. Ex. pipe layer, herder, concrete placement, materials spreader, flagger, etc. | Hour | $18.92 | 10 | $189.20 |
| ***Materials*** | | | | | | |
| Flap gate, plastic, 2½" | 1424 | 2 1/2" plastic flap gate for poly irrigation tubing. Materials only. | Each | $1.70 | 100 | $170.00 |
| Pipe, PE, collapsible, weight priced | 1385 | Polyethylene (PE) compound manufactured into collapsible tubing | Pound | $1.27 | 250 | $317.50 |