



**SPECIAL PROVISIONS  
FOR  
IRRIGATION**

**Polk County  
NHSX-U-1945(408)--8S-77**

**Effective Date  
March 19, 2013**

**THE STANDARD SPECIFICATIONS, SERIES 2012, ARE AMENDED BY THE FOLLOWING MODIFICATIONS AND ADDITIONS. THESE ARE SPECIAL PROVISIONS AND THEY SHALL PREVAIL OVER THOSE PUBLISHED IN THE STANDARD SPECIFICATIONS.**

**1. GENERAL**

**1.1 SUMMARY**

**A. DESCRIPTION**

1. This Special Provision includes all labor, materials equipment, and supervision required to furnish and install a complete irrigation system.
2. It include the requirements for irrigation piping, pipe fittings, valves, secondary wiring, sprinkler heads, control equipment, valve boxes and sleeves.

**B. MEASUREMENT AND PAYMENT**

1. Measurement for the irrigation system will be the lump sum for the complete system installed in accordance with the contract documents.
2. Payment for irrigation system shall be full compensation for all labor, materials, tools, equipment and supervision required to furnish and install a complete irrigation system. The lump sum price shall include but not limited to the material and installation of irrigation piping, pipe fittings, valves, secondary wiring, sprinkler heads, control equipment, thrust blocks, valve boxes and sleeves, for all the proper operation of the system. Payment shall occur only after the complete system is accepted.

**1.2 DELIVERY, HANDLING, AND STORAGE**

- A.** Materials shall be delivered to the site in accordance with manufacturer's recommendations for shipment and protection of materials.

- B. Handling of materials as recommended by manufacturer.
- C. Storage of all materials in locations designated and approved by Engineer.

### **1.3 CODES, INSPECTIONS, AND PERMITS**

- A. The entire installation shall fully comply with all local and state laws and ordinances, and with all the established codes applicable thereto.
- B. The Contractor shall take out all required permits, arrange for all necessary inspections and shall pay any fees and expenses in conjunction with the same as a part of the work under this section.

### **1.4 SITE DISTURBANCES**

- A. The Contractor shall take precautions to insure that equipment and vehicles do not disturb or damage existing site grading, walks, curbs, pavements, utilities, plants, and other existing items and elements on public and private property.
- B. Verify locations and depths of all underground utilities prior to commencing excavation.
- C. Repair and/or return to original condition any damage caused by Contractor's negligence at no cost to the Contracting Authority.
- D. Existing Utilities:
  - 1. Provide connection to existing main line located at east ends of SE 9th intersection – see plan.
  - 2. Locate existing underground utilities in areas of work. If utilities are to remain in place, provide adequate means of support and protection during this work.
  - 3. Should uncharted, or incorrectly charted, piping or other utilities be encountered during excavation, consult utility owner immediately for directions. Cooperate with Contracting Authority and utility companies in keeping respective services and facilities in full operation. Repair damaged utilities to satisfaction of utility owner, at no additional cost to the Contracting Authority.
  - 4. Do not interrupt existing utilities serving facilities occupied and used by Contracting Authority or others during occupied hours, except when permitted in writing by Contracting Authority and then only after acceptable temporary utility services have been provided.
  - 5. Provide minimum of 48 hour notice to Contracting Authority and Engineer and receive written notice to proceed before interrupting any utility.
  - 6. Demolish and completely remove from site existing underground utilities indicated to be removed after complete deactivation. Coordinate with utility companies for shut-off of services if lines are active.
- E. Protection of Persons and Property:
  - 1. Barricade open excavations occurring as part of this work and post warning lights.
  - 2. Operate warning lights as recommended by authorities having jurisdiction.

3. Protect structures, utilities, sidewalks, pavements, curbs, and other facilities from damage caused by settlement, lateral movement, undermining, washout, and other hazards created by this work.

## 1.5 GUARANTEE

- A. For a period of 1 year from date of final documented acceptance by Contracting Authority of work performed under this Section, the Contractor shall promptly furnish and install any and all parts and equipment which prove defective in materials at no additional cost to Contracting Authority.
- B. During the 1 year guarantee period, the Contractor shall drain the irrigation system and winterize each fall for the winter and shall put the irrigation system back into operation each spring at no additional cost to Contracting Authority from final project acceptance.

## 2. PRODUCTS

Irrigation equipment shall be Toro brand, purchased from authorized regional distributor, as specified and shown on plan.

### 2.1 DUCTILE IRON PIPING:

Deep socket ductile iron fitting shall be used on all fittings 2 ½ inches or larger and thrust blocked.

### 2.2 PVC

- A. Sizes as shown on plans.
- B. Virgin, high impact, poly-vinyl chloride (PVC) pipe, Schedule 1120-1220, Class 200 having a minimum of 200psi working pressure rating.
- C. Continuously and permanently marked with manufacturer's name, material, size, and schedule or type.
- D. Pipe: Conform to CS 207-60 or latest revision.
- E. Material: Conform to CS 256-63 or latest revision.

### 2.3 PVC FITTINGS

- A. Sch. 40 PVC solvent weld or belled fittings; saddles prohibited.
- B. Conform to ASTM D1784, ASTM D2466 – or latest revision.

### 2.4 POLYETHYLENE PIPE

100# NSF regulated pressure pipe.

### 2.5 POLYETHYLENE FITTINGS

Insert type fittings double clamped with all stainless clamps – 1 inch only.

### 2.6 SADDLE TEES

Blazing Saddle self-tapping fitting as manufactured by Blazing Products Inc., St. Louis, MO, or pre-approved equal on 1inch poly piping only (unless noted).

## **2.7 SPRINKLER RISER OFF POLYETHYLENE PIPE**

Rotors and spray heads only – see plans and details.

## **2.8 ELECTRICAL CONTROL VALVE**

See plan.

## **2.9 SECONDARY FIELD WIRING**

All secondary wiring shall be type PE solid copper for operation of 600 maximum voltage with #14 hot and #12 common. Make secondary wire connections with R-DBY or R-DBR type splice kits and provide expansion turns at every 200 feet with 3 feet of slack at each electric valve. (All wiring shall be installed in accordance with NEC requirements and installed as per manufacturers recommendation).

## **2.10 SPRINKLER HEADS**

- A. As specified on plans.
- B. Spacing of heads shall not exceed manufacturer's maximum recommendations.
- C. Matched precipitation will be required on all sprinklers operating on the same zone.
- D. Conform to manufacturer's specifications concerning diameter of throw and gallonage at given pressures.

## **2.11 CONTROL EQUIPMENT**

- A. Existing - See Plan for location and wire drops for connection.
- B. Location as shown on the plans is diagrammatic – confirm with Engineer and General Contractor.

## **2.12 QUICK COUPLING VALVES**

- A. 1 inch Quick Coupling Valves.
- B. Install quick coupling valve (as per detail).
- C. Provide one matching quick coupler keys with hose swivels.

## **2.13 ISOLATION VALVES**

- A. As specified on plans.
- B. Size valve to match line size.
- C. Install isolation valves in 12 inch standard valve box according to the plans.

## **2.14 VALVE BOX FOR ELECTRIC CONTROL VALVES AND ISOLATION VALVES**

- A. Single Valve Setup: Armor 10 inch round plastic access box.
- B. Multi-Valve Setup: Armor 12 inch standard box. Use manufacturer's recommended extension

kits if required.

## **2.15 METER & BACKFLOW PREVENTER**

- A. Existing Backflow Preventer - See Plan for location.
- B. Existing Meter - See plan for location.

## **2.16 SLEEVES**

See plans and details for actual size and depth.

## **2.17 THRUST BLOCK**

- A. Pour concrete thrust blocks to insure against pipe separation at all changes of directions.
- B. As shown on construction details.

## **2.18 SWING JOINTS**

On all quick coupling valves with stabilizer – see detail.

## **3. EXECUTION**

### **3.1 LAYOUT**

- A. As shown on plans.
- B. Irrigation system components is diagrammatic. Exact locations of piping sprinkler heads, valves and other components shall be established by the Contractor in the field at time of installation and on the approved shop drawings.
  - 1. Space sprinkler components as indicated, not to exceed manufacturer recommendations.
  - 2. Minor adjustments in system layout will be permitted to clear existing fixed obstructions; final system layout shall be acceptable to the Engineer based on the approved shop drawings.

### **3.2 TIMING**

Coordinate time schedule with the Engineer.

### **3.3 INSTALLATION**

#### **A. Excavating and Backfilling**

- 1. Excavation shall include all materials encountered, except materials that cannot be excavated by normal mechanical means.
- 2. Rock excavation: Shall be in accordance with Article 1109.03, B of the Standard Specifications.
- 3. Excavate trenches of sufficient depth and width to permit proper handling and installation of pipe and fittings.
- 4. If the pulling method is used, the pipe "plow" shall be a vibratory type. Starting and finishing holes for pipe pulling shall not exceed a 1 foot 0 inches by 3 feet 0 inches opening.

(Secondary wiring shall not be pulled).

5. Excavate to depths required to provide 2 inch depth of earth fill or sand bedding for piping when rock or other unsuitable bearing material is encountered.
6. Fill to match adjacent grade elevations with approved earth fill material. Place and compact fill in layers not greater than 8 inch depth.
  - a. Provide approved earth fill or sand to a point 4 inches above the top of pipe.
  - b. Overfill with approved excavated or borrow fill materials free of lumps or rocks larger than 3 inches in any dimension. Level, compact and water settle. Should settlement occur, refill and re-sod as required.
7. Except as indicated, install irrigation mains with a minimum cover of 18 inches based on finished grades. Install irrigation laterals with a minimum cover of 12 inches based on finished grades.
8. Excavate trenches and install piping and fill during the same working day. Do not leave open trenches or partially filled trenches open overnight.

#### **B. Plastic Pipe**

1. Install plastic pipe in accordance with manufacturer's installation instructions. Provide for thermal expansion and contraction.
2. Saw cut plastic pipe. Use a square-in-sawing vice to ensure a square cut. Remove burrs and shavings at cut ends prior to installation.
3. Make plastic to plastic joints with solvent welded joints or slip seal joints. Use only solvent recommended by the pipe manufacturer. Install plastic pipe fittings in accordance with pipe manufacturer's instructions. Contractor shall make arrangements with pipe manufacturer for all necessary field assistance.
4. Make plastic solvent weld joints in accordance with manufacturer's recommendation.
5. Allow joints to set at least 24 hours before pulling or pressure is applied to the system.
6. Uncoil poly-pipe and insert fitting full depth. Secure poly-pipe to insert fittings with stainless steel clamps. Double clamp pipe.
7. Maintain pipe interiors free of dirt and debris. Close open ends of pipe by acceptable methods when pipe installation is not in progress and over all nonworking hours.

#### **C. Sprinklers, Fittings, Valves, and Accessories**

1. Install fittings, valves, sprinkler heads, risers, and accessories in accordance with manufacturer's instructions, except as otherwise indicated. Provide concrete thrust blocks where required at fittings and valves.
2. Set sprinkler heads perpendicular to finish grades, except as otherwise indicated or as per manufacturers recommendations.
3. Obtain the Engineer's review and acceptance of height for proposed sprinkler heads and valves prior to installation.
4. Locate sprinkler heads to assure proper coverage of indicated areas. Do not exceed

sprinkler head spacing distances indicated. Refer to irrigation plan for specified sprinkler model and type.

5. Install quick-coupling valves in 10 inches valve box on 360 degree swing joint assembly as per manufacturer's recommendation with stabilizer.
6. Install fittings and accessories as shown or required to complete the system.
7. Install controller as detailed:
  - a. Pedestal mount.
  - b. Waterproof wire conduit to provide a complete, waterproof, permanent and neat job.
  - c. Ground controller in accordance with manufacturer's recommendations.
8. Install in-ground control valves in a valve access box as indicated.
9. Install valve access boxes on a suitable base of gravel to provide a level foundation at proper grade to provide drainage of the access box.
10. Seal threaded connections on pressure side of control valves as per manufacturer's recommendations.

#### **D. Control Wiring**

1. Install electric control cable in the piping trenches wherever possible. Place wire in trench adjacent to pipe. Install wire with slack to allow for thermal expansion and contraction. Expansion joints in wire shall be provided at 200-foot intervals by making 5-6 turns of the wire around a piece of 1/2 inch pipe instead of slack. Where necessary to run wire in a separate trench, provide a minimum cover of 18 inches.
2. Provide sufficient slack at site connections at remote control valves in control boxes, and at all wire splices to allow raising the valve bonnet or splice to the surface without disconnecting the wires when repair is required.
3. Connect each remote control valve to one station of a controller except as otherwise indicated.
4. Connect remote control valves to a common ground wire system independent of all other controllers. A separate common neutral wire is required for each controller.
5. Make secondary wire connections to remote control electric valves and splices of wire in the field, using PE listed burial splice connections (ie: 3M R-DBY or 3M RDBR), in accordance with manufacturer's recommendations.
6. Provide tight joints to prevent leakage or water and corrosion build-up on the joint.
7. Provide new sleeves for all locations where existing sleeves are not indicated. Install new sleeves prior to paving installation – see plan.

#### **E. Sleeves**

See plans for depth.

#### **F. Flushing, Testing, and Adjustment**

1. After sprinkler piping and risers are installed and before sprinkler heads are installed, open control valves and flush out the system with full head of water.

2. Perform system testing upon completion of each section. Make necessary repairs and re-test repaired sections as required.
3. Adjust sprinklers after installation for proper and adequate distribution of the water over the coverage pattern. Adjust for the proper arc of coverage.
4. Tighten nozzles on spray type sprinklers after installation. Adjust sprinkler adjusting screw on lateral line or circuit as required for proper radius. Interchange nozzles patterns as directed by the Engineer to give best arc of coverage.
5. Adjust all electric remote control valve flow control stems and pressure regulating devices for system balance.
6. Test and demonstrate the controller by operating appropriate day, hour, and station selection features as required to automatically start and shut down irrigation cycles to accommodate plant requirements and weather conditions.

### **3.4 RECORD DRAWING**

- A. Furnish accurate reproducible Mylar "as-built" drawings of all components. State the size, manufacturer, model number, part number, and exact location of each and every item furnished and installed. Show specific diagram layouts of piping with key locational dimensions.
- B. Contractor shall furnish the Engineer with two bound copies of instruction sheets and parts lists covering all operating equipment.

### **3.5 DISPOSAL OF WASTE MATERIAL**

- A. Stockpile, haul from site, and legally dispose of waste materials, including unsuitable excavated materials, rock, trash, and debris.
- B. Maintain disposal route clear, clean and free of debris.
- C. Repair any damage to private or public property improvements to the project resulting from irrigation system installation.

### **3.6 ACCEPTANCE**

- A. Test and demonstrate to the Engineer the satisfactory operation of the system free of leaks.
- B. Instruct the Engineer in the operation of the system, including adjustment of sprinklers, controller(s), and valves.
- C. Upon acceptance, the Contracting Authority will assume operation of the system.

### **3.7 SPECIAL INSTRUCTIONS**

- A. The Contractor shall coordinate and cooperate with the General Contractor, Mechanical/Electrical Contractors, and all subcontractors, during the installation of this system.
- B. During the bidding period, the Irrigation Contractor shall inform the Bidding General Contractors of any system items or elements that are required for operation of the system specified herein, that are not being furnished and installed by the Irrigation Contractor.

- C.** The irrigation system must be in full operation by the time the new sod/seed is placed. It is the intent and mandatory requirement that the sprinklers be installed before the sod/seed and provide the water for the newly placed sod/seed.
- D.** It is the intent of the Contracting Authority to use moderate to heavy motorized lawn mowers to maintain the sod on this project. All sprinkler heads shall safely sustain these loads without failure.