

**SPECIFICATIONS - DETAILED PROVISIONS**  
**Section 02810 - Irrigation System**

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**SECTION 02810  
IRRIGATION SYSTEM**

**PART 1 - GENERAL**

1.01 SUMMARY

- A. System Placement. Provide irrigation system where shown on the Drawings, and as specified herein, complete in place, tested and approved, including but not necessarily limited to: Lawn and shrub sprinkler system and automatic controller and remote control valves.
- B. Related Work. Documents affecting work of this section include, but are not necessarily limited to, General Conditions, Supplementary Conditions and Sections in Division 1 of these Specifications. Section 02950: Trees, plants, and ground cover.

1.02 SUBMITTALS

- A. Provisions. Comply with pertinent provisions of the General Conditions Section F - Labor & Construction F-30, Equipment and Material Items.
- B. Product Data. Within 35 calendar days after the contractor has received the Owner's Notice to Proceed, he must submit: a materials list of items proposed to be provided under this Section; manufacturer's specifications and other data needed to prove compliance with the specified requirements; and manufacturer's recommended installation procedures which, when approved by the District, will become the basis for accepting or rejecting actual installation procedures used on the work.
- C. Manual. Submit two copies of a preliminary draft of the proposed manual to the Owner for review and comments. After approval of draft, submit three copies of final manual to the Owner prior to indoctrination of maintenance personnel.
  - 1. Format:
    - a) Size: 8½" X 11"
    - b) Paper: White bond, min. 20 weight
    - c) Text: Neatly typewritten
    - d) Drawings: Bind in with text all drawings up to 11" x 17". Larger drawings are to be folded and placed in a drawing packet provided in the back of the manual.
    - e) Flysheets: Separate each section with a labeled fly-sheet.

- f) Binding: Use heavy duty plastic covers with the binding inside the manual; a 3-ring binder is acceptable. Clearly identify by table of contents.

2. Contents:

- a) Neatly typewritten index near the front of the manual, giving location of information.
- b) Complete instructions regarding operation and maintenance of all equipment.
- c) Complete nomenclature of all parts of all equipment.
- d) Complete nomenclature and part number of all replaceable parts with the name and address of nearest vendor.
- e) Copies of all guarantees and warranties issued.
- f) Manufacturers bulletins, cuts and data sheets.
- g) Such other data that may be pertinent to this installation.

1.03 QUALITY ASSURANCE

Skilled Workers. Use adequate numbers of skilled workmen who are thoroughly trained and experienced in the necessary crafts and who are completely familiar with the specified requirements and the methods needed for proper performance of the work of this section.

1.04 DELIVERY, STORAGE AND HANDLING

Deliver products to the job site in the manufacturer's original container or packing, with labels intact and legible. Maintain materials in original packing until time of use. Protect from damage and weathering. Promptly remove any damaged material and unsuitable items from the job site and replace with the approved required materials, at no cost to the Owner.

**PART 2 - PRODUCTS**

2.01 PIPE

- A. Plastic Pipe. Use AWWA C-900 alertline PVC for all pressure lines 4" and larger. Use schedule 40 PVC, CL-315 PVC or CL-200 PVC, marked 1120-1220, and bearing the seal of the National Sanitation Foundation for potable systems, for pipe less than 4". Fittings: Use schedule 40 Pvc, type I-II, bearing the seal of the National Sanitation Foundation, and complying with ASTM D2466. For joining pipe less than 4", use a solvent complying with ASTM D2466 and recommended by the manufacturer of the approved pipe. Pipe identification: Continuously and permanently marked with manufacturer's name, pipe size, Class or schedule number, type of material and code number.

- B. Galvanized Steel Pipe.
  - 1. Comply with ASTM A120 or ASTM A53, galvanized, Schedule 40, threaded, coupled, and hot-dip galvanized.
  - 2. Fittings: Use 150 lb rated galvanized malleable iron, banded pattern.

## 2.02 RISERS

- A. Lawn Heads. Use galvanized steel pipe risers with flexible and damage resistant rubber nipple below grade, or swing joint assembly.
- B. Shrub Heads. Use galvanized steel pipe risers with flexible and damage resistant rubber nipple below grade. Stake each shrub head with number 3 reinforcing steel bar, and secure with adjustable stainless steel geared clamp to ensure stability for long life.
- C. Quick Coupling Valves. Use galvanized steel pipe risers with multiple swing joint assembly of galvanized nipples and elbows to permit readjustment of valve angle. Stake each quick coupling valve with 2" x 2" knot free Redwood stake set at least 24" into the earth, and extending sufficiently above the ground to ensure stability. Secure riser to the stake with adjustable stainless steel geared clamp.

## 2.03 VALVES

- A. Gate Valve. Provide 125 lb. rated valve of size required for the line as shown on the drawings, with "O" ring and operating nut, adaptable to the pipe without AC adapters. Acceptable manufacturers: American Valve; Red-White #206; Fairbanks 125-S 250; Wolverine Brass 50293; Milwaukee Valve #1105M, #105, NRS 200 psi; Stockham B-103 Brass.
- B. Quick Coupling Valves. Provide 1", one piece construction, all brass, lockable top, per drawing requirements. Deliver to the Owner three keys for lockable tops, three couplers, and three hose swivels, all matching the approved quick coupling valves.

## 2.04 MANUAL VALVE SLEEVES

- A. For Manual Control Valve. Provide PVC class 200-1120 sleeve and rubber marker.
- B. For Gate Valves. Provide round approved boxes with precast lids, with the words "Valve" for potable systems and "Reclaimed Water", for non-potable systems, cast into the lids. Acceptable manufacturers: Christy Products, Brooks Products, Ametek Products.

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2.05 SPRINKLER HEADS

Provide sprinkler heads as shown on the drawings and schedules.

2.06 VACUUM BREAKER

Provide vacuum breakers shown on the schedules & drawings.

2.07 AUTOMATIC IRRIGATION CONTROLLER

Provide 117 V input, 26.5 V output, with the number of valve stations and in, type and model number shown on the drawings. Acceptable manufacturers: Rainbird ISC models, Buckner, Toro, Rain Master, Cal-sense-2000.

2.08 REMOTE CONTROL VALVES

Use valves as required in drawings, slow opening and slow closing, in type and model numbers as shown on the drawing schedules, brass or PVC construction, 24 V, with epoxy sealed solenoid coils and throttling system.

2.09 OTHER MATERIALS

Provide other materials, not specifically described but required for a complete and proper installation, as selected by the Contractor subject to approval.

**PART 3 - EXECUTION**

3.01 SURFACE CONDITIONS

Unsatisfactory Conditions. Examine the areas and conditions under which work of this Section will be performed. Correct conditions detrimental to timely and proper completion of the work. Do not proceed until unsatisfactory conditions are corrected and approved.

3.02 FIELD MEASUREMENTS

Make necessary measurements in the field to ensure precise fit of items in accordance with the approved design.

3.03 TRENCHING AND BACKFILLING

Trench, backfill, and compact in accordance with provisions of section 02221.

3.04 INSTALLATION OF PIPING

- A. General. Lay out the piping system in accordance with arrangement shown on the drawings. Where piping is shown on the drawings to be under paved areas but running parallel and adjacent to planted areas the intention is too install the piping in the planted areas.

- B. Piping Depth. Install piping with the minimum following depth;

<u>Type of Material</u>	<u>Cover</u>
Galvanized steel	18"
Plastic	18" (less than 4" dia.)
Plastic	36" (4" & 6" diameter; see Section 02718)

- C. Under Existing Pavement. Piping may be installed under existing pavement by jacking, boring, or hydraulic driving except, no hydraulic driving will be permitted under asphalt concrete pavement. Where cutting or breaking of existing pavement is necessary, secure permission from the owner before cutting or breaking pavement, and then make necessary repairs and replacements to the approval of the owner.
- D. Inspection of Materials. Carefully inspect pipe and fittings before installation, removing all foreign materials as necessary. Install pipe with markings up for visual inspection.
- E. Plastic Pipe. Exercise care in handling, loading, unloading and storing plastic pipe and fittings. Store under cover until ready to install. Transport only on a vehicle with a bed long enough to allow pipe to lay flat to avoid undue bending and concentrated external load. Repair dented or damaged pipe by cutting out and discarding the dented or damaged section, rejoin with a coupling. In joining, use only the specified solvent and make joints in accordance with the manufacturer's recommendations. Give solvent at least 15 minutes set-up time before moving or handling, and 24 hours curing time before filling with water. Centerload plastic pipe with a small amount of backfill to prevent arching and whipping under pressure. For plastic-to-steel connections: Work the steel connection first. Use a non-hardening pipe dope or teflon tape, 4 raps min. Use only light wrench pressure.

### 3.05 INSTALLATION OF EQUIPMENT

- A. Control Valves. Install control valves where indicated on the drawings and in accordance with the manufacturer's recommendations.
- B. Quick Coupling Valves. Install in lawn areas with top flush with the finished grade, and 8" from pavements and sprinkler heads. Install in planting areas with top 2" above grade and 8" from pavement and sprinkler heads.

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- C. Lawn Sprinkler Heads. Install where indicated on the drawings and in accordance with the manufacturer's recommendations. Set heads 4" above grade on temporary risers for the maintenance period, except along walks and driveways where finished grade is established set heads flush with surface of pavement at time of installation, and 1-1/2" from pavement. Upon completion of maintenance period, reset heads flush with the grade and firmly anchored with soil. Set heads for minimum 90% coverage.
- D. Shrub Spray Heads. Install where indicated on the drawings and in accordance with the manufacturer's recommendation. Set top of heads minimum 6" above grade. Install part-circle heads 12" from curbs and 8" from walks, securely staked into position. Set heads along curbs in parking areas flush with top of curb. Minimum coverage shall be 90%. Height of riser is to be set at no less than 2" below expected height of shrub at maturity.
- E. Vacuum Breaker. Install where indicated on the drawings and in accordance with all pertinent codes, regulation, and manufacturer's recommendations.

3.06 TESTING AND INSPECTING

- A. Covering or Enclosing. Do not allow or cause any of the work of this Section to be covered up or enclosed until it is inspected, tested and approved.
- B. Backfilling. Before backfilling the main line, and with control valves in place but before lateral pipes are connected, completely flush and test the main line. Repair any leaks or damaged sections. Flush out each section of lateral pipe before sprinkler heads are attached.
- C. Testing. Make necessary provision for thoroughly bleeding the line of air and debris. Before testing, fill the line with water for a period of at least 24 hours and check for leaks. After valves have been installed, test live water lines for leaks at a pressure of 150 psi for a period of two hours, with couplings exposed and pipe sections center-loaded. Provide required testing equipment and personnel. Repair any leaks, and retest until acceptance by inspector.
- D. Final Inspection. Clean, adjust and balance all systems. Verify:
  - 1. Remote control valves are properly balanced;
  - 2. Heads are properly adjusted for radius and arc of coverage;
  - 3. The installed system is workable, clean and efficient.



3.07 INSTRUCTIONS

- A. Legend. Attach a typewritten legend inside each controller door, stating the areas covered by each remote control valve. Enclose in clear plastic for protection.
  
- B. Maintenance Personnel. After the system has been completed, inspected, and approved, instruct the Owners maintenance personnel in the operation and maintenance of the system.

**END OF SECTION 02810**

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