

SECTION 02441 - IRRIGATION SYSTEM

PART 1 - GENERAL

1.1 DESCRIPTION

- A. Provide an underground irrigation system as shown and specified. The work includes:
 - 1. Automatic irrigation system including piping, fittings, sprinkler heads, valves, and accessories.
 - 2. Backflow preventer.
 - 3. Controller and control wire.
 - 4. Testing.
 - 5. Excavation and backfilling.
 - 6. Associated exterior plumbing.
 - 7. Pipe sleeves.

1.2 RELATED WORK

- A. Section 02487 - Sodding.
- B. Section 02490 - Trees, plants, and ground covers.

1.3 QUALITY ASSURANCE

- A. The drawings are based on Hunter & Toro Irrigation equipment. Rainbird, Weathermatic, or other approved equal may be used provided the Contractor can provide equal flow and coverage. Unless otherwise noted, mixing of manufacturers' products will not be allowed.
- B. Materials, equipment, and methods of installation will comply with the following codes and standards:
 - 1. National Fire Protection Association (NFPA): National Electrical Code.
 - 2. American Society for Testing and Materials (ASTM).
 - 3. National Sanitation Foundation (NSF).
- C. The contractor shall have a minimum of 5 years experience installing commercial irrigation systems similar in size to the work proposed in these contract documents.

1.4 SUBMITTALS

- A. If equipment used is different from type shown on plan, submit layout plan showing revisions in sprinkler spacing, pipe size, and other changes necessary to achieve full spray coverage. Also submit product data for substitutions.
- B. Provide irrigation system record drawings. Legibly mark drawings to record any deviations in actual construction from the plans. Identify field changes of dimension and detail and changes made by change order. After acceptance, prepare complete drawings showing all changes and turn over to the Owner.

1.5 PROJECT CONDITIONS

- A. Consult the drawings of the Architect (Morgan, Hill, Sutton, Mitchell) for locations of known underground utilities.
- B. Promptly repair damage to adjacent facilities caused by irrigation work operations. Cost of repairs will be at the Contractor's expense.
- C. Promptly notify Landscape Architect of unexpected sub-surface conditions.

- D. Irrigation system layout is diagrammatic. Exact locations of piping, sprinkler heads, valves, and other components shall be established by the Contractor in the field at the time of installation. Coordinate sprinkler head location with landscape contractor for most consistent coverage and to prevent conflicts with locations of proposed plants. Relocate pipe runs as required to allow plants to be located as shown in the drawings. Space sprinkler components as indicated. Minor adjustments will be permitted to clear existing fixed obstructions. Final layout will be acceptable to the Landscape Architect.

PART 2 - PRODUCTS

2.1 ACCEPTABLE MANUFACTURERS

- A. Acceptable manufacturers are:
 - 1. Toro Co., Irrigation Division.
 - 2. Weathermatic Division / Telsco Industries (subject to provisions of 1.2.1 and 1.3.1 above).
 - 3. Rainbird Sprinkler Mfg. Co. (subject to provisions of 1.2.1 and 1.3.1 above).

2.2 MATERIALS

- A. Provide only new materials without flaws or defects and of the highest quality of their specified class and kind.
- B. Comply with pipe sizes indicated. No substitution of smaller pipe sizes will be permitted. Larger sizes may be used subject to acceptance by the Landscape Architect. Remove damaged and defective pipe.
- C. Provide pipe continuously marked with the manufacturer's name, size, schedule, and type of pipe, working pressure and NSF approval.
- D. Polyvinyl chloride pipe: ASTM D2241, rigid, unplasticized PVC, extruded from virgin material. SDR 21, class 200 for 1-1/4" diameter and over. SDR 26, class 160 for 1" and smaller. Schedule 80 for shrub risers and schedule 40 for sleeves under pavement.
- E. PVC pipe fittings: ASTM D2241 schedule 40. Fittings made of other material are not permitted. Saddle and cross fittings are not permitted. Use male adaptors for plastic to metal connections.
- F. Sprinkler heads, valves, controller, and associated equipment: refer to materials list on drawing. Valve wire to be sized according to manufacturer's recommendation.

2.3 ACCESSORIES

- A. Fill: Clean soil, free of stones and debris.
- B. Paint: Black.
- C. Valve Boxes: 10" diameter tapered enclosure of rigid plastic. Provide lid of same material, green in color.

PART 3 - EXECUTION

3.1 INSPECTION

- A. Examine grades and installation conditions. Do not begin work until unsatisfactory conditions are corrected.

3.2 PREPARATION

- A. Lay out and stake location of each pipe run and all heads and valves. Obtain Landscape Architects acceptance of layout prior to excavating. Place sleeves as indicated for installation of piping and control wire.

3.3 INSTALLATION

- A. Excavation shall include all materials encountered except materials that cannot be excavated by normal mechanical means.
- B. Excavate trenches of sufficient depth and width to permit proper handling and installation of pipe and fittings. Excavate to depths required to provide 2" depth of earth or sand bedding for pipe when rock or other unsuitable material is encountered. Fill to match adjacent grade. Place and compact fill in layers of 8" or less.
- C. Install irrigation mains with a minimum 12" cover based on finished grades. Install lateral (section) lines with a minimum 8" cover based on finished grades. Do not leave open or partially filled trenches open over night.
- D. Install pipe in accordance with manufacturer's installation instructions. Provide for thermal expansion and contraction. Remove burrs and shavings of saw cut pipe before installation. Use only solvent recommended by pipe manufacturer and make solvent joints in accordance with manufacturer's recommendations. Maintain pipe interiors free of dirt and debris. Close open ends of pipe when pipe installation is not in progress.
- E. Install sprinkler heads, valves, fittings and risers in accordance with manufacturer's recommendations. Set sprinkler heads perpendicular to and flush with finish grade. Provide polyethylene plastic nipples between piping and heads or risers. Provide schedule 80 risers for all stationary spray heads.
- F. Locate sprinklers to assure proper coverage of indicated areas. Do not exceed spacing distances indicated. Install shrub risers of sufficient height to prevent interruption of the stream by the plant material. Paint exposed risers that are not black with one coat of paint.
- G. Install back flow prevention system in accordance with standard plumbing codes and have inspection(s) as required by standard codes.
- H. Install and wire controller and valves in accordance with manufacturer's recommendations and the National Electrical Code. Install control wire in piping trenches whenever possible. Allow sufficient slack for thermal expansion and contraction. Make wire connections and splices only in valve boxes using sealing cement in accordance with manufacturer's recommendations.
- I. Use minimum 3" schedule 40 sleeves under pavement.
- J. Flush sprinkler lines before installation of nozzles. Perform system testing after completion of each section. Correct and repair as necessary. Adjust sprinklers for proper distribution and minimum overspray. Adjust valve flow regulators for system balance and optimum performance.
- K. Test and demonstrate the controller to the Owner. Set controller as directed by the Owner and the Landscape Contractor.
- L. Legally dispose of waste materials off site.

3.4 ACCEPTANCE

- A. Test and demonstrate the system to the Landscape architect, Owner, and Landscape Contractor. Instruct the Owner in the operation of the system including adjustment of sprinklers, controller(s), and valves.

B. Upon acceptance of the entire project, the Owner will assume operating of the system.

3.5 CLEANING

A. Perform cleaning during installation of the work and upon completion of the work. Remove from the site all excess materials, soil, debris, and equipment. Repair damage resulting from the irrigation system installation.

END OF SECTION 02441