

PART 1 - GENERAL

1.1 Related Documents

A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 1 Specification Sections, apply to this Section.

1.2 Summary

A. This Section specifies irrigation materials and installation, protection, maintenance and related work.

1.3 Related Sections includes the following:

A. Related Work Specified Elsewhere. Coordinate requirements in other Sections/Drawings:

1. Division 1 Section "Product substitutions"
2. Division 1 Section "Project Record Drawings"
3. Division 2 Section "Tree Protection & Trimming"
4. Division 2 Section "Site Clearing"
5. Division 2 Section "Earthwork"
6. Division 2 Section "Landscaping"

1.4 Scope of Work

A. Furnish all labor, materials, tools and equipment as necessary for proper execution and completion of all irrigation work, including double check valve, sleeving, piping, valves, sprinkler heads, controller, rain sensor, quick couplers, fittings etc. Whether specifically mentioned or not, the intent is that the Irrigation Contractor to furnish a complete and operable system as indicated on the drawings that provides full coverage and matched precipitation rates. No substitutions are acceptable without prior written consent of the Landscape Architect. Approved "Record Drawings" are to be submitted prior to final acceptance.

1.5 Responsibility

A. The Irrigation Contractor to be responsible for protection of adjacent property, existing vegetation designated for preservation (refer to Landscaping section 02900 =, 3.07, B & C) and the safety of the general public.

B. Utilities: The Irrigation Contractor is required to call the Underground Utilities Locater Service (1-800-424-5555) prior to starting work. Irrigation Contractor to be held responsible for the protection of, and any damage to existing utilities and structures. Irrigation Contractor to verify location of utilities with the General Contractor.

C. The Irrigation Contractor is responsible for all damages to the grounds, walks, curbs, roads, walls, stairs, buildings, piping systems, electrical systems and their equipment and contents caused by leaks in the irrigation system being installed or having been installed by the Irrigation Contractor. The Irrigation Contractor is to repair all damage, at their own expense, to the Owner's satisfaction.

1.6 Substitutions

A) Changes in materials and placement to only be made with the approval of the Architect or Landscape Architect. Any request for substitutions or changes in materials to be made in writing to the Architect in accordance with Division 1 Section "Product Substitutions".

B) Provide the amount of cost savings if the substituted item is accepted.

C) Changes in materials or placement at the time of installation to be made only with the approval of the Architect or Landscape Architect.

1.7 Submittals, Warranty and Replacement

A) Submittals: Provide the following:

1. Record Drawings, according to Division 1 Section "Project Record Documents". PDF copies transmitted electronically, showing the actual installed locations of all irrigation equipment is to be provided prior to conditional acceptance.

2. Provide signed and approved sprinkler/plumbing/health/electrical permits as are applicable.

3. System familiarization: Upon acceptance of system by the Landscape Architect, the Irrigation Contractor is to provide necessary keys (2 each) and/or other tools needed to operate/drain/activate system and is to spend sufficient time with the Owner to insure that the Owner will be able to operate, maintain and winterize the system. The Irrigation Contractor is to label circuits clearly on the controller to match Record Drawings.

B) Warranty materials and workmanship for one year from date of conditional acceptance. This warranty excludes work done on the system by others after final acceptance. Provide owner with all pertinent manufacturer's data and warranty documents.

1.8 Contractor Qualifications and Quality Assurance

A) Irrigation Contractor and supplier to be "Specialist" in irrigation system installation and have a minimum of five (5) years experience installing similar work. Superintendent is to be experience and fully qualified to direct and perform all work in this section. Workers are to be qualified and competent.

1.9 Verification of Existing Conditions

A) Before proceeding with any work, the Irrigation Contractor is to verify all dimensions pertaining to the location of the irrigation equipment. Should any errors or conflicts occur in the drawings and/or specifications, the Irrigation Contractor is to immediately notify the Landscape Architect.

B) Prior to the start of any work, the Irrigation Contractor is to verify irrigation water meter and static pressure (PSI) and gallons per minute (GPM) at point of connection to water service and note PSI and GPM on the Record Drawings. 50psi at new 3/4" meter is the basis of the design.

1.10 Site Preparation

A) Site to be cleared and subgrades set prior to installation of irrigation system.

B) Installation of 110 volt electrical service from electrical source to automatic controller, including wire hook-up into mounted controller to be provided by the Electrical Contractor. Irrigation Contractor will mount controller per design, and coordinate with General Contractor.

C) Water source connect to existing 3/4" irrigation water meter services/point of connection at approximate locations shown on drawings. See Civil drawings. Provide threaded stub out at discharge side of irrigation water meter.

1.11 Coordination

A) During the entire construction period, schedule and coordinate all work to avoid interference with the work of other contractors. Schedule work hours, staging areas, access

routes, parking, utility connections and similar items, under the direction of Owner and General Contractor.

1.12 Permits

A) The Irrigation Contractor is to apply and pay for all necessary permits and fees required by the governing codes. including, but not limited to, backflow device, water meter (if for any reason, the existing water meter is not used) and low voltage wiring.

1.13 Daily Cleanup

A) All areas to be kept clean, neat and orderly at all times. Debris is to be kept off both paved and planted areas during construction. Project area is to be left clean and neat at the end of each working day. All walks, walls, stairs, buildings, paving etc. to be left in a clean and safe condition.

1.14 Site Observations

A) Irrigation Contractor is required to give Architect and Landscape Architect 48 hours notice when prepared for the desired observation. Coordinate with regularly scheduled progress meetings if possible. Observations are required as follows. Additional observations than those listed below and/or re-observations are to be paid for by the Irrigation Contractor.

1. Trench Depth and System Layout Observation: to review system layout, trench depths and conduct pressure tests as specified prior to backfilling.

2. Performance Test Observation: is to be conducted as specified upon completion of system installation.

3. Final Acceptance Observation: Request an observation upon completion of all tests, punch list items, submittals and any other work required under this contract. The date of final acceptance of the work establishes the beginning of the guarantee period.

PART 2 - MATERIALS

2.1 Galvanized Pipe

A) No galvanized pipe shall be used.

2.2 Plastic Pipe

A) Shall be PVC 1120 or 1220, SDR 21C, Class 200 for all lateral piping, and PVC Schedule 40 for all mainline piping, and galvanized between meter and double check valve.

B) Pipe to be marked with manufacturer's name, class of pipe, NSF seal and date and shift of manufacturing run. Pipe to bear no evidence of interior or exterior extrusion marks.

C) Pipe wall to be uniform, smooth and glossy. Pipe may be pre-belled or with individual solvent-weld couplings.

D) Fittings to be Schedule 40, full size. Fittings, cement, and thinner to be of brand(s) recommended by the pipe manufacturer. Cement to be applied in temperature recommended by the manufacturer.

E) Sleeving to be Schedule 40 PVC.

2.3 Remote Control Valves

A) As indicated on drawings, or approved equivalent.

2.4 Automatic Controller

- A) As indicated on drawings, or approved equivalent.

2.5 Weather Sensor

- A) As indicated on drawings, or approved equivalent.

2.6 Control Wire

- A) To be #14-1 UF direct burial wire. White to be the common, red the valve impulse, and orange for the spare wires. Blue and yellow wires shall be used for the master valve. Provide three spare wires.
- B) Wire splices to be by 3M DBY/R

2.7 Backflow Prevention Device

- A) As indicated on drawings, or approved equivalent.

2.8 Quick Coupling Valves

- A) Quick coupling valve to be as indicated on drawing or approved equivalent. Provide 2 keys with hose swivel ends.

2.9 Valve Boxes

- A) Remote control valve assemblies to be installed in Carson Standard Boxes, or approved equivalent.
- B) Double check valve to be installed in Carson Jumbo Box with extensions, or approved equivalent.
- C) Quick coupling valves to be installed in Carson 10" round valve boxes, or approved equivalent.
- D) Flush valves for drip irrigation to be installed in Carson 10" round valve boxes, or approved equivalent.
- E) Air relief valves for drip irrigation to be installed in Carson 6" round valve boxes, or approved equivalent.

2.10 Sprinklers

- A) As indicated on drawings, or approved equivalent.

2.11 Drip Irrigation

- A) As indicated on drawings, or approved equivalent.

PART 3 - INSTALLATION

3.1 All work to be per local codes and installed per manufacturer's written specifications.

3.2 Sprinklers

- A) All pop-ups to be on flexible swing pipe and set flush with finish grade.

- B) Sprinkler heads to be set 4 inches from walks and curbs, and set flush with top of walks and curbs.
- C) All nozzles to be adjusted and balanced.

3.3 Drip Irrigation

- A) Install per drawing, details, and manufacturer's recommendations.
- B) Install trees and larger shrubs prior to drip line installation
- C) Install drip line 2 " below surface of final soil finish grade. Contractor may choose to install final 2" soil lift after drip line installation. Do not cover until drip line performance has been observed by the Landscape Architect or Architect.
- D) Flush thoroughly before final connections

3.4 Trenching/Pipe Depth

- A) Trenches to be straight and uniform so that the pipe has continuous support on the trench bottom.
Trench bottoms to be flat and free of any large or sharp rocks. The trench to be deep enough to allow 18 inches of clean cover over main line, 12 inches of cover lateral lines and 24" over sleeving.

3.5 Remote Control Valves

- A) Before installation, supply line to be thoroughly flushed.
- B) Enclose valve in valve box with box extensions as required.
- C) Provide one c.f. 3/4" minus washed gravel sump 6" deep under each valve.
- D) Provide minimum 4" clearance between bottom of valve and gravel sump

3.6 Quick Coupling Valves

- A) Install as noted on drawings.

3.7 Control Wire

- A) Control wire to be taped together at 10-foot intervals and laid under mainline.
- B) Provide a 24" loop of control wire in each valve box and run additional wire for future expansion.

3.8 Automatic Controller

- A) Electrical wiring to be installed per state and local code. The cost of all electrical work necessary to make the automatic equipment operate properly, other than that included in Section 1.02 - Work by Others, to be included in this contract.
- B) Location and type of mounting of controller to be per drawings and details.
- C) Sequence valves per numbering system on drawings.

3.9 Pipe Fittings

- A) Due to the nature of PVC pipe and fittings, the Irrigation Contractor to exercise care in handling, loading, unloading and storing to avoid damage. The fittings to be stored under cover, and to be transported in a vehicle with a bed long enough to allow the length of the pipe to lay flat, so as not to be subject to undue bending or concentrated external load at any point.
- B) Solvent welding joints to be given at least 15 minute set-up time before moving or handling. Pipe

to be partially center loaded to prevent slipping. No water to be permitted in pipe for at least 10 hours to allow for solvent weld setting and curing.

- C) Backfilling to be done when the pipe is not in an expanded condition due to heat or pressure.
- D) Before pressure testing, solvent weld joints to be given at least 24 hours curing time.
- E) No PVC pipe may be threaded or connected to a threaded fitting without an adapter.
- F) The inside of the pipe must be kept absolutely clean. Protect pipe ends when they are not being worked on.

3.10 Pipe Sleeves

- A) Piping and wiring to be enclosed in sleeving wherever irrigation lines or wiring cross beneath paved surfaces.
- B) Sleeving size to be two times the pipe diameter.
- C) Provide separate, 2" sleeve for wiring.
- D) Coordinate with site and paving contractors.

3.11 System Flushing

- A) Prior to backfilling and before connection of the line flushing valves, flush the entire system to remove any dirt or sediment that may have entered the system during the installation.

3.12 Pressure Tests

- A) Irrigation contractor to provide hydrostatic pressure testing equipment.
- B) After installation of control valves, mainline, and quick coupling valves, fill mainline with water and thoroughly flush all air from main line.
- C) Connect test equipment and pressurize main line to 150 psi for 60 minutes. Up to 5psi loss within the testing period is acceptable. If loss is greater, the main line must be repaired and re-tested at the irrigation contractor's expense.
- D) Thoroughly flush all lateral lines and cap all swing joints. Cap all drip irrigation supply headers. Manually open all control valves and test lateral lines at service pressure for 30 minutes. Up to 5psi loss within that period is acceptable. If loss is greater, laterals must be repaired and re-tested at the irrigation contractor's expense.

3.13 Performance Tests

- A) Upon completion of system installation, the Irrigation Contractor to operate system in the presence of the Landscape Architect and Owner.
- B) Automatic system to be cycled to the satisfaction of the Landscape Architect and Owner.

3.14 Restoration and Cleanup

- A) Restore all landscape areas to original condition prior to beginning work.
- B) Repair and replace any damaged plant material.
- C) Remove all roots, rocks and debris from site.
- D) Sweep and wash "Spotlessly" clean all buildings, walls, walks, pavement, curbs, drives, signage, lighting, etc.

PART 4 - WARRANTY

4.1 Contractor's Responsibility

- A) During the one year warranty period, the Irrigation Contractor will check, and otherwise ensure adequate operation of the system as directed by the Owner, and in any event, at least once within the one year period.
- B) The Irrigation Contractor to be responsible for deactivating and draining the system prior to the onset of the freezing season and for reactivating at the onset of the spring growing system; each event must be accomplished once during the one year warranty period. In the event that the system is completed in a season when the system will not be in use, the Irrigation Contractor will winterize the system upon completion of testing and approval of the Landscape Architect, and will reactivate the system the following spring. The Irrigation Contractor to, upon completion of the winterizing phase, submit a letter to the Landscape Architect, with a copy to the Owner, certifying that the system was winterized and indicating the date that this was accomplished. The Irrigation Contractor will be liable for any damage resulting from failure to comply with the above.
- C) Upon final acceptance, the Irrigation Contractor to submit a letter to the Landscape Architect, with a copy to the Owner, stating the date that the warranty goes into effect.

END SECTION 32 8100