

SECTION 32 8423**UNDERGROUND SPRINKLERS****PART 1 - GENERAL****1.1 SUMMARY**

- A. Includes But Not Limited To:
 - 1. Furnish and install planting irrigation system as described in Contract Documents complete with accessories necessary for proper function.
- B. Related Requirements:
 - 1. Section 22 1116: Stop and waste valve.
 - 2. Division 26: Controller conduit and power to controller.

1.2 ADMINISTRATIVE REQUIREMENTS

- A. Pre-Installation Conference: Schedule pre-installation conference before irrigation system installation begins. In addition to items listed in Division 01, the landscape architect or designated landscape consultant shall demonstrate or describe method to be used to maintain head spacing from concrete and to stabilize heads.
- B. Sequencing: Install sleeves before installation of cast-in-place concrete site elements and paving.

1.3 SUBMITTALS

- A. Informational Submittals:
 - 1. Test And Evaluation Reports: Results of service pressure test before beginning work on system.
- B. Closeout Submittals:
 - 1. Record Drawings:
 - a. As installation occurs, prepare accurate record drawing to be submitted before final inspection, including:
 - 1) Detail and dimension changes made during construction.
 - 2) Significant details and dimensions not shown in original Contract Documents.
 - 3) Field dimensioned locations of valve boxes, manual drains, quick-coupler valves, control wire runs not in mainline ditch, soil moisture sensors (if soil moisture sensor technology is selected for the site) and both ends of sleeves.
 - 4) Take dimensions from permanent constructed surfaces or edges located at or above finish grade.
 - 5) Take and record dimensions at time of installation.
 - b. Reduce copy of record drawing to 11 by 17 inches, color key circuits, and laminate both sides with 5 mil thick or heavier plastic. Drill two 1/2 inch holes at top of board and hang on hooks in Custodial Room or location designated by FM group.
 - 2. Operations And Maintenance Manual Data:
 - a. Modify and add to requirements of Section 01 7800 as follows:
 - 1) Instruction manual that contains complete directions for system operation and maintenance, including winterizing, controller program worksheet and annual service and scheduling calendar based on local site specific conditions.
 - 2) Complete instructions on how to drain entire backflow preventer to prevent freezing.
 - 3) Manufacturer's cut sheets for each element of system.
 - 4) Parts lists for operating elements of system.

- 5) Manufacturer's printed literature on operation and maintenance of operating elements of system.
 3. Final payment for system will not be authorized until Closeout Submittals are received and accepted by Architect and landscape consultant.
- C. Maintenance Material Submittals:
1. Tools:
 - a. Furnish following items before Final Closeout Review:
 - 1) One heavy-duty key for stop and waste or main shut-off valve.
 - 2) One quick coupler key with brass hose swivel.

1.4 QUALITY ASSURANCE

- A. Regulatory Requirements: Work and materials shall be in accordance with latest rules and regulations, and other applicable state or local laws. Nothing in Contract Documents is to be construed to permit work not conforming to these codes.
- B. Qualifications:
1. Installers:
 - a. Use trained factory certified personnel familiar with required irrigation system and SMART controller installation procedures. Follow requirements shown in PART 3 Execution 3.1 Installers.
 - b. Perform installation under direction of foreman or supervisor with five years minimum experience in sprinkling system installations.

1.5 DELIVERY, STORAGE, AND HANDLING

- A. During delivery, installation, and storage, protect materials from damage and prolonged exposure to sunlight.

1.6 WARRANTY

- A. Standard one year guarantee stipulated in General Conditions Article 12.2 shall include:
1. Filling and repairing depressions and replacing plantings due to settlement of irrigation system trenches.
 2. Adjusting system to supply proper coverage of areas to receive water.
 3. Ensuring system can be adequately drained.

PART 2 - PRODUCTS

2.1 SYSTEM

- A. Manufacturers:
1. Manufacturer Contact List (for reference only):
 - a. Acclima, Inc. Meridian, ID www.acclima.com.
 - b. Action Machining Inc, Bountiful, UT www.actionfilters.com.
 - c. Amiad www.amiadusa.com.
 - d. Carson Industries LLC, Glendora, CA www.carsonind.com.
 - e. Hunter Industries, San Marcos, CA www.hunterindustries.com.
 - f. HydroPoint Data Systems, Inc. (makers of Weather TRAK) Petaluma, CA www.hydropoint.com.
 - g. King Innovation, St Charles, MO www.kinginovation.com.
 - h. Netafim, Inc. www.netafimusa.com.
 - i. Nibco Inc, Elkhart, IN www.nibco.com.

- j. Orbit Irrigation Products, Bountiful, UT www.orbitonline.com.
 - k. Rain Bird Sprinkler Manufacturing Corp, Glendora, CA www.rainbird.com.
 - l. Rain Master www.rainmaster.com.
 - m. Salco Products, Fontana, CA www.salcodrip.com.
 - n. 3M, Austin, TX www.3m.com/elpd.
 - o. Toro Company, Irrigation Div, Riverside, CA www.toro.com.
 - p. Valve and Filter Corporation, Arvada, CO www.valveandfilter.com.
 - q. Weathermatic Irrigation Products, Garland, TX www.weathermatic.com.
- B. Materials:
1. Rock-Free Soil:
 - a. Backfill soil around PVC pipe.
 - b. Soil having rocks no larger than 1/2 inch in any dimension.
 2. Pea Gravel:
 - a. For use around drains, valves, and quick couplers.
 - b. 1/2 inch maximum dimension, washed rock.
 3. Sand: Fine granular material naturally produced by rock disintegration and free from organic material, mica, loam, clay, and other deleterious substances.
 4. Native Material: Soil native to project site free of wood and other deleterious materials and rocks over 1-1/2 inches.
 5. Topsoil: Remove rocks, roots, sticks, clods, debris, and other foreign matter over 1-1/2 inches longest dimension encountered during trenching.
 6. Pipe, Pipe Fittings, And Connections:
 - a. Pipe shall be continuously and permanently marked with Manufacturer's name, size, schedule, type, and working pressure.
 - b. Pipe sizes shown on Drawings are minimum. Larger sizes may be substituted if at no additional cost to Owner.
 - c. Southern Climate Zone Pipe:
 - 1) Pressure Lines: Schedule 40 PVC.
 - 2) Lateral Lines: Schedule 40 PVC.
 - 3) Backflow Assembly Piping: Galvanized steel.
 - 4) Quick Coupler Piping: Galvanized steel.
 - d. Fittings: Same material as pipe, except where detailed otherwise.
 - e. Sleeves:
 - 1) Under Parking Area And Driveway Paving: Schedule 40 PVC Pipe.
 - 2) All Other: Class 200 PVC Pipe.
 - 3) Sleeve diameter shall be two times larger than pipe installed in sleeve.
 7. Sprinkler Heads:
 - a. Each type of head shall be product of single manufacturer.
 - b. Shrub Head Bubblers:
 - 1) Category Four Approved Products. See Section 01 6200 for definitions of Categories.
 - a) Hunter: S-8A, S-16A series (stream spray), PCN, PCB, MSBN series.
 - b) Orbit: 5400 series.
 - c) Rainbird: 5 Series stream bubbler, FB series (flood bubbler).
 - Toro: SB series (stream bubbler).
 - Weathermatic: 102 Series, 106 series.
 - c. Spray Heads in Shrub and Ground Cover Areas:
 - 1) Category Four Approved Products. See Section 01 6200 for definitions of Categories.
 - a) Rainbird: 1812 PRS Series with MPR nozzles or with PA-8S shrub adapter. SAM optional.
 - d. Spray Heads in Lawn Areas:
 - 1) Category Four Approved Products. See Section 01 6200 for definitions of Categories.
 - a) Rainbird: 1806 PRS Series with MPR nozzles. SAM optional.
 - e. Stream Heads, 16 to 22 foot in Lawn and Shrub Areas:
 - 1) Category Four Approved Products. See Section 01 6200 for definitions of Categories.
 - a) Hunter Sprinkler: MP Rotator.
 - f. Gear Driven Rotor Pop-ups:
 - 1) Category Four Approved Products. See Section 01 6200 for definitions of Categories.
 - a) Hunter: , I-20 Series (17 to 45 feet),
 8. Sprinkler Risers:

- a. All stationary spray heads shall have Rain Bird model SA125050 pre-manufactured swing assemblies or equal approved as approved by Architect before installation. Swing assembly shall be 1/2" x 1/2" x 12" NPT.
 - b. All 3/4" inlet rotor pop-up sprinklers shall have an adjustable pre-assembled swing assembly riser. Swing assemblies shall be Rain Bird model TSJ-12075 or equal approved as approved by Architect before installation. Swing assemblies shall be 3/4" x 12" and shall be threaded both ends.
 - c. All 1" inlet rotor pop-up sprinklers shall have an adjustable pre-assembled double swing joint riser. Swing joints shall be Rain Bird model TSJ-12 or equal approved as approved by Architect before installation. Swing joints shall be 1" x 12" and shall be threaded both ends.
 - d. Pop-up rotor sprinkler heads shall have adjustable riser assembly, three ell swing joint assembly, unless detailed otherwise on Drawings. These swing joint fittings shall be of schedule 40 PVC plastic and nipples schedule 80 gray PVC unless otherwise designated on Drawings. Horizontal nipple parallel to side of lateral line shall be 8 inches long minimum. All other nipples on swing joint riser shall be of length required for proper installation of sprinkler heads.
 - e. Pop-up sprinkler heads, shrub spray heads, bubbler heads, and stationary spray sprinkler heads shall have risers made up one of the following ways:
 - 1) Three schedule 40 street ells or Marlex street ells connected to lateral tee to form an adjustable riser or pop-up riser as detailed.
 - 2) Risers for sprinkler heads 14 inches long minimum and 24 inches maximum.
 - a) Type Two Acceptable Products:
 - b) Rainbird: Swing Pipe with barbed fittings.
 - c) Hunter: SJ series with barbed fittings.
 - d) Toro: Super Funny Pipe with barbed fittings, SPFA-5125, SPFA-51275.
 - e) Equal as approved by Architect before installation. See Section 01 6200.
9. Automatic Irrigation Control Wiring And Controller:
- a. Control wire shall be UF-UL listed, color coded PE insulated copper conductor direct burial size 14. For wire runs exceeding 3,3000 feet, use 12 AWG wire. Do not use green color coded wire. Common Wire (white) shall be size 12 AWG wire.
 - b. Waterproof Wire Connectors:
 - 1) Control wire connections shall consist of a properly-sized wire nut inserted in a waterproof grease cap.
 - 2) Type Two Acceptable Products:
 - a) DBY or DBR by 3M
 - c. Automatic controllers:
 - 1) Category Four Approved Products. See Section 01 6200 for definitions of Categories.
 - a) HydoPoint WeatherTRAK: WTPRO2C-##-CWM.
 - d. Automatic Rain/Freeze Sensors:
 - 1) Category Four Approved Products. See Section 01 6200 for definitions of Categories.
 - a) Hunter: MINI-CLIK, WRFC.
 - b) Orbit: RX-1, RX1.5, RX-2 (solar powered, remote)
 - c) Toro: TWRS (wireless)
 - d) Weathermatic : 955 Rain Sense
10. Valves:
- a. Manual Drain Valves:
 - 1) PVC ball valve with 'T' handle on main lines and in valve boxes on lateral lines.
 - 2) Category Four Approved Products. See Section 01 6200 for definitions of Categories.
 - a) Rainbird: BV Series, 1/2 inch.
 - b. Automatic Valves:
 - 1) Category Four Approved Products. See Section 01 6200 for definitions of Categories.
 - a) Rainbird: PEB series
 - c. Isolation Valves:
 - 1) PVC ball valves, size to match pipe size (use in warm climates- eco-regions 6.0, 7.0, 8.2, 9.1, 9.2, 10.1, 10.2, 11.0, 12.0, 13.0, 14.0, 15.0).
 - 2) Nibco T-113 non-rising stem gate valve, size to match pipe size (use in cold, northern climates- eco-regions 6.0, 9.1 and 10.1).
 - d. Backflow Preventer: Make and Model shown on Drawings or as required by local code.
 - e. Hydrometer:
 - 1) Category Four Approved Products. See Section 01 6200 for definitions of Categories.

- a) Netafim:
 - (1) HydroPoint WeatherTRAK: LHM15TG1-MEL, LHM2TG1-MEL.
 - f. Pressure Reducing Valve (if required): Make and model shown on Drawings or as required by local code.
 - g. Quick Coupling Valves and Keys:
 - 1) Category Four Approved Products. See Section 01 6200 for definitions of Categories.
 - a) Rainbird: 5RC with SH-O swivel.
- 11. Valve Accessories:
 - a. Valve manifolds:
 - 1) Type Two Acceptable Products.
 - a) Action: 1800 Series, Models 18001, and 18002, 1, 1-1/2, and 2 inch sizes.
 - b) Orbit: Model 57955/ 2 port.
 - c) Rainbird: MS Series.
 - d) Equals as approved by Architect before use. See Section 01 6200.
 - b. Valve Boxes And Extensions:
 - 1) Lid Colors:
 - a) Green: Lawn areas.
 - b) Brown: Bare soil and rock areas.
 - c) Purple: Secondary water.
 - 2) Type Two Acceptable Products:
 - a) Carson Industries: Model 1419-12, Model 1419-18, Model 1730-18 Jumbo, or Super Jumbo
 - b) Equal as approved by Architect before use. See Section 01 6200.
 - c. Valve ID tags:
 - 1) Type Two Acceptable Products:
 - a) Rainbird: VID1Y24, VID24Y48, VID1P24, VID24P48.
 - b) Christie Manufacturing Valve ID Tags
 - c) Equal as approved by Architect before use. See Section 01 6200.
 - d. Valve Box Supports: Standard size fired clay paving bricks without holes.
- 12. Drip System:
 - a. Drip Valve Assembly:
 - 1) Category Four Approved Products. See Section 01 6200 for definitions of Categories.
 - a) Rainbird: XCZ-100-PRB-COM Series
 - b. Distribution Tubing:
 - 1) Category Four Approved Products. See Section 01 6200 for definitions of Categories.
 - a) Salco: PVC-AR flex hose with fittings.
 - b) Rainbird: Swing Pipe with barbed fittings.
 - c. Drip Emitters
 - 1) Category Four Approved Products. See Section 01 6200 for definitions of Categories.
 - a) Netafim: Techline CV tubing, flush valves, and fittings.
 - d. Valve Boxes:
 - 1) Lid Colors:
 - a) Green: Lawn areas.
 - b) Brown: Bare soil and rock areas.
 - c) Purple: Secondary water.
 - 2) Type Two Acceptable Products:
 - a) Carson Industries 12 Inch Standard Series: Model 1419-12, Model 1419-18.
 - b) Equal as approved by Architect before use. See Section 01 6200.
 - e. Emitter Boxes:
 - 1) Lid Colors:
 - a) Green: Lawn areas.
 - b) Brown: Bare soil and rock areas.
 - c) Purple: Secondary water.
 - 2) Type Two Acceptable Products:
 - a) Carson Industries Model 1910-10.
 - b) Equal as approved by Architect before use. See Section 01 6200.
- 13. Other Components:
 - a. Recommended by Manufacturer and subject to Architect's review and acceptance before installation.
 - b. Provide components necessary to complete system and make operational.

PART 3 - EXECUTION

3.1 INSTALLERS

- A. Approved Irrigation System Installers:
 - 1. **<Insert Acceptable Installer>**.
 - 2. **<Insert Acceptable Installer>**.
 - 3. **<Insert Acceptable Installer>**.
- B. Approved irrigation system installers shall be pre-approved and included in Construction Documents by Addendum.
- C. Approved SMART controller installers:
 - 1. WeatherTRAK: Factory approved installer having completed WeatherTRAK certified contractor training (see www.weathertrak.com for details).

3.2 EXAMINATION

- A. Site Verification Of Conditions: Perform pressure test at stub-out on main water line provided for irrigation system, or at near-by fire hydrant. Notify Architect if pressures over 80 psi under 65 psi are found to determine if some re-design of system is necessary before beginning work on system.

3.3 PREPARATION

- A. Protection:
 - 1. Repair or replace work damaged during course of the Work at no additional cost to Owner. If damaged work is new, installer of original work shall perform repair or replacement.
 - 2. Do not cut existing tree roots measuring over 2 inches in diameter in order to install irrigation lines.
- B. Layout of Irrigation Heads:
 - 1. Location of heads and piping shown on Drawings is approximate. Actual placement may vary slightly as is required to achieve full, even coverage without spraying onto buildings, sidewalks, fences, etc.
 - 2. During layout, consult with Architect to verify proper placement and make recommendations, where revisions are advisable.
 - 3. Minor adjustments in system layout will be permitted to avoid existing fixed obstructions.
 - 4. Make certain changes from Contract Documents are shown on record drawings.

3.4 INSTALLATION

- A. Trenching And Backfilling:
 - 1. Pulling of pipe is not permitted.
 - 2. Excavate trenches to specified depth. Remove rocks larger than 1-1/2 inch in any direction from bottom of trench. Separate out rocks larger than 1-1/2 inch in any direction uncovered in trenching operation from excavated material and remove from areas to receive landscaping.
 - 3. Cover pipe both top and sides with 2 inches of rock-free soil as specified under PART 2 PRODUCTS. Remainder of backfill to within 5 inches of finish grade shall be as specified in Section 31 2323. Top 5 inches of backfill shall be topsoil as specified in Section 32 9113.
 - 4. Do not cover pressure main, irrigation pipe, or fittings until Architect has inspected and approved system.
- B. Sleeving:

1. Sleeve water lines and control wires under walks and paving. Extend sleeves 6 inches minimum beyond walk or pavement edge. Cover sleeve ends until pipes and wires are installed to keep sleeve clean and free of dirt and debris.
 2. Position sleeves with respect to buildings and other obstructions so pipe can be easily removed.
- C. Grades And Draining:
1. In localities where winterization is required, grade piping so system can be completely drained or blown out with compressed air. If system is not designed to be blown out with compressed air:
 - a. Slope pipe to drain to control valve box where possible.
 - b. Where this is not possible, slope pipe to a minimum number of low points. At these low points, install:
 - 1) 3/4 inch brass ball valve for manual drain. Do not use automatic drain valves.
 - 2) Install 2 inch Class 200 PVC pipe over top of drain and cut at finish grade.
 - 3) Provide rubber valve cap marker.
 - 4) Provide one cu ft pea gravel sump at outlet of each drain.
 - c. Slope pipes under parking areas or driveways to drain outside these areas.
 - d. Provide and install quick-coupling valve or valves in location for easy blowout of entire system. Install quick coupler valves with 4 lineal feet minimum of Schedule 80 PVC pipe between valve and main line.
- D. Installation of Pipe:
1. Install pipe in manner to provide for expansion and contraction as recommended by Manufacturer.
 2. Unless otherwise indicated on Drawings, install main lines and lateral lines connecting pop-up rotor and impact sprinklers with minimum cover of 18 inches based on finished grade. Install remaining lateral lines, including those connecting drip tubing, with minimum of 12 inches cover based on finish grade.
 3. Install pipe and wires under driveways or parking areas in specified sleeves 18 inches below finish grade or as shown on Drawings.
 4. Locate no sprinkler head closer than 12 inches from building foundation. Heads immediately adjacent to mow strips, walks, or curbs shall be one inch below top of mow strip, walk, or curb and have one to 3 inches clearance between head and mow strip, walk, or curb.
 5. Cut plastic pipe square. Remove burrs at cut ends before installation so unobstructed flow will result.
 6. Make solvent weld joints as follows:
 - a. Do not make solvent weld joints if ambient temperature is below 35 deg F.
 - b. Clean mating pipe and fitting with clean, dry cloth and apply one coat of P-70 primer to each.
 - c. Apply uniform coat of 711 solvent to outside of pipe.
 - d. Apply solvent to fitting in similar manner.
 - e. Give pipe or fitting a quarter turn to insure even distribution of solvent and make sure pipe is inserted to full depth of fitting socket.
 - f. Allow joints to set at least 24 hours before applying pressure to PVC pipe.
 7. Tape threaded connections with teflon tape.
 8. If pipe is larger than 3 inches, install concrete thrust blocks wherever change of direction occurs on PVC main pressure lines.
- E. Control Valves And Controller
1. Install valves in plastic boxes with reinforced heavy duty plastic covers. Locate valve boxes within 12 inches of sidewalks and shrub bed edges with tops at finish grade. Do not install more than two valves in single box.
 2. Place 3 inches minimum of pea gravel below bricks supporting valve boxes to drain box. Set valve boxes over valve so all parts of valve can be reached for service. Set cover of valve box even with finish grade. Valve box cavity shall be reasonably free from dirt and debris.
 3. Wiring:
 - a. Tape control wire to side of main line every 10 feet. Where control wire leaves main or lateral line, enclose it in Class 200 PVC conduit.
 - b. Use waterproof wire connectors consisting of properly-sized wire nut and grease cap at splices and locate all splices within valve boxes.
 - c. Use white or gray color for common wire and other colors for all other wire. Each common wire may serve only one controller.

- d. Run one spare control wire from panel continuously from valve to valve throughout system similar to common wire for use as a replacement if a wire fails. Spare wire shall be different color than other wires, except use of green wire is not acceptable. Mark spare control wire in control box as an unconnected wire. Extend spare control wires 24 inches and leave coiled in each valve box.
- F. Soil Moisture Sensors (if soil moisture sensor technology is selected for the site):
1. Install soil moisture sensors in a horizontal position as located on drawings, 3 to 4 inches deep.
 2. Install 6-inch round plastic junction box in direct line between valve box and sensor to protect the sensor wire connection and to locate the buried sensor.
- G. Backflow Preventer:
1. Install 24 inches minimum from structures or hardscaping.
 2. When installed adjacent to any structure, mount test cocks on side away from structure.
 3. After installation, remove handles and turn over to Owner together with extra maintenance materials.
- H. Sprinkler Heads:
1. Set sprinkler heads and quick-coupling valves perpendicular to finish grade.
 2. Do not install sprinklers using side inlets. Install using base inlets only.
 3. Set sprinkler heads at a consistent distance from existing walks, curbs, and other paved areas and to grade by using specified components or other method demonstrated in Pre-Construction Conference.
- I. Drip Assembly:
1. Install pipe providing for expansion and contraction as recommended by Manufacturer.
 2. Cut tubing square and remove burrs at cut ends.
 3. Distribution tubing shall be between 14 inches minimum and 48 inches maximum long. Layout PVC lateral lines as necessary to keep distribution tubing lengths within specified tolerances.
 4. Locate drip emitter on uphill side of plant within rootball zone.
 5. Layout in-line tubing for trees as indicated on Drawings. Layout in-line tubing for shrubs and groundcovers so plants receive water within rootball zones.
 6. Locate in-line tubing on top of soil but under bark mulch and filter fabric.
 7. Staple in-line tubing to ground at 6 foot maximum intervals and within 12 inches of ends and intersections.
 8. Assembly Using Solvent Weld Joints:
 - a. Do not make solvent weld joint if ambient temperature is below 35 deg .
 - b. Clean mating pipe and fitting with clean, dry cloth. Apply uniform coat of Weld-On PVC 721 solvent to outside of pipe and inside socket of fitting. Give joint quarter turn and make certain pipe is inserted to full depth of fitting socket.
 - c. Allow joints to set 24 hours minimum before applying pressure to pipe.
 9. Assembly Using 'Funny Pipe' Type Joints:
 - a. Connect distribution tubing to lateral line using barbed ell fitting.
 - b. Connect fitting to distribution tubing using straight barbed fitting with 1/2 inch threaded end.
- J. Before installation of sprinkler heads and drip emitters, open control valves and use full head of water to flush out system.
- K. Arrange valve stations to operate in an easy-to-view progressive sequence around building. Tag valves with waterproof labels showing final sequence station assignments.

3.5 FIELD QUALITY CONTROL

- A. Site Tests: Before backfilling main line, test pressure at 100 psi minimum for 2 hours minimum and make certain there are no leaks. Notify Architect 2 working days minimum before conducting test.
- B. Inspections:

1. Architect's irrigation design consultant, or certified water auditor recommended by consultant and approved in writing by Architect, will review irrigation system before substantial completion.
2. Installations completed after water source has been turned off for season, as determined by Architect, will be accepted following spring, after system can be checked for proper operation.
3. Upon acceptance of irrigation system, reviewer will provide signed acceptance certificate to be included in Operations and Maintenance Manual. Certificate will include name and signature of reviewer, reviewer's company, date of review, and reviewer's telephone number.
4. It will be the responsibility of the Irrigation Contractor to provide a reliable communication system (i.e. Two way radios or remote radio control activation system) for Substantial Completion and all periodic inspections.

3.6 ADJUSTING

- A. Adjust sprinkler heads to proper grade when turf is sufficiently established to allow walking on it without appreciable harm. Such lowering and raising of sprinkler heads shall be part of original contract with no additional cost to Owner.
- B. Adjust sprinkler heads for proper distribution and trim so spray does not fall on building.
- C. Adjust watering time of valves to provide proper amounts of water to plants.

3.7 CLOSEOUT ACTIVITIES

- A. Instruction of Owner:
 1. After system is installed and approved, instruct Owner's designated personnel in complete operation and maintenance procedures using the Meetinghouse Site Management Plan (MSMP) on new construction projects.

3.8 SYSTEM WINTERIZING

- A. Contractor's responsibility to winterize the irrigation system the first winter following Substantial Completion of the Project

PART 4.0 – CODES, PERMITS, WARRANTY, AND GUARANTEE

4.1 CODES AND ORDINANCES

- A. All materials, installation parameters, and operations shall conform to all applicable codes and ordinances. It is the Contractor's responsibility to investigate and follow all regulations. Contractor is responsible to verify applicable codes and ordinances prior to submitting bid. Before bid submittal, it is the Contractor's responsibility to notify the Irrigation Consultant/Designer at least 5 days before bid submittal, of any changes due to code or ordinance discrepancies. If the Contractor does not comply with this process and notification, the Contractor shall be responsible for the necessary installation change and redesign costs for non-compliance.

4.2 PERMITS AND FEES

- A. The Contractor shall obtain, at his expense, all required permits and shall pay all required fees. Any penalties imposed due to failure to obtain any permit or pay any fee shall be the responsibility of the Contractor.

END OF SECTION