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IRRIGATION COMPONENTS AND/OR SYSTEMS

PART 1 – GENERAL

SECTION INCLUDES

Work to be performed under this Section shall consist of furnishing all labor and materials necessary to construct a complete working and tested sprinkler irrigation system as per all drawings and specifications.

REFERENCES

- A. ANSI – American National Standards Institute.
- B. ASIG – American Society of Irrigation Consultants: ASIC Grounding Guideline.
- C. ASSE – American Society of Sanitary Engineering: ASSE 1013, 1015: Backflow Preventers, Pressure Reducers.
- D. ASTM – American Society of Testing and Materials.
- E. IA – The Irrigation Association: Main BMP Document.
- F. NFPA – National Fire Protection Association: NFPA 70 National Electrical Code.
- G. UL – Underwriters Laboratories: UL Wires and Cables.

PERFORMANCE REQUIREMENTS

- A. All work to be performed to current standards of SEI and of the local governing municipality.
- B. PVC Pipe: Must be stamped with certified NFS.
- C. Contractor shall be responsible to obtain all necessary permits and to comply with electrical company requirements.
- D. Notify the Landscape Architect of any substitutions.

QUALITY ASSURANCE

- A. Contractor shall have considerable experience and demonstrate ability in the installation of irrigation system(s) of specified type(s) in a neat, orderly, and responsible manner in accordance with recognized standards of workmanship.
- B. All work shall be performed in accordance with the best standards of practice relating to the trade.
- C. Contractor shall provide an irrigation as-built drawing to the RaceTrac Construction Project Manager.

WARRANTY

- A. Contractor shall provide a one year warranty that covers all workmanship and labor.

PART 2 - PRODUCTS

PIPE AND FITTINGS

- A. Material: PVC.
- B. Pressure Pipe: Class 200.
- C. Lateral Pipe: Class 200, Polyethylene for Northeastern Climate.
- D. Fittings: Schedule 40, solvent welded or threaded.
- E. Risers: Schedule 80, threaded.
- F. Sieves: Schedule 40, minimum 4

AUTOMATIC CONTROLLER

- A. Irrigation controller specifications include but are not limited to:
  - 1. The controller shall be of a hybrid type that is microelectronic circuitry capable of fully automatic or manual operation.
- 2. All stations shall have the capability of independently obeying or ignoring the weather sensor as well as using or not using the master valve.
- 3. The controller shall have the capability of shutting off the system on rainy days.
- B. Control zone kit for drip zones with flows from 3 to 15 gpm (11.4 to 56.8 l/m), including control valve (CV) and pressure-regulating filter (PRF).
- 1. Control Valve (CV) component specifications include:
  - a. Valve body and bonnet constructed of high impact, weather-resistant plastic, stainless steel and other chemical/ultra-violet resistant materials.
- b. One unit diaphragm constructed of durable Buna-N rubber with a clog resistant metering orifice.
- c. Inlet pressure rating of 15 to 150 psi (1.0 to 10.3 bar).
- 2. Pressure Regulating Filter (PRF) component specifications include:
  - a. Compact "Y" filter body and cap configuration constructed of glass-filled, ultra-violet resistant polypropylene, with 150 psi (10.3 bar) operating pressure rating.
- b. 200 mesh (75 micron) filter screen constructed of stainless steel.
- c. Normally-open pressure regulating device with preset outlet pressure of 40 psi (2.8 bar).
- 3. Regulated pressure of 40 psi (2.8 bar).
- C. Low flow control zone kit for drip zones with flows from 0.2 to 5.0 gpm (0.8 to 18.9 l/m), including Low Flow Valve (LFV) and Pressure-Regulating Filter (PRF).

- 1. Low flow valve (LFV) component specifications include:
  - a. Valve body and bonnet constructed of high impact, weather-resistant plastic, stainless steel and other chemical/ultra-violet resistant materials.
- b. One unit diaphragm constructed of durable Buna-N rubber material with a clog resistant metering orifice.
- c. Inlet pressure rating of 15 to 150 psi (1.0 to 10.3 bar).
- 2. Pressure regulating filter (PRF) component specifications include:
  - a. Compact "Y" filter body and cap configuration constructed of glass-filled, ultra-violet resistant polypropylene, with 150 psi (10.3 bar) operating pressure rating.
- b. 200 mesh (75 micron) filter screen constructed of stainless steel.
- c. Normally-open pressure regulating device with preset outlet pressure of 30 psi (2.1 bar).
- 3. Regulated pressure of 30 psi (2.1 bar).

POP-UP SPRINKLERS

- A. Irrigation spray body for small turf areas (2.5-24 feet (0.8-7.3m) with a 30 psi (2.0 bar) pressure regulating device specifications include but are not limited to:
  - 1. Parts and components to withstand harsh operating conditions using chemically treated recycled water (reclaimed/non-potable), dirty water containing grit, debris, and other particulates, high operating pressures common in commercial irrigation and ultra-violet light.
- 2. Pressure-activated, co-molded soft elastomer wiper seal composed of three wipers and a base seal to ensure a positive seal without excess "flow-by" which enables more heads to be installed on the same valve.
- 3. Recessed debris pockets located in the base of the spray body to prevent recirculation of harmful debris during operation.
- 4. Shall include a check valve to prevent low head drainage of up to 14 feet (4.3 m); 6 psi (0.4 bar).
- 5. Shall include technology built into the stem to prevent water loss and alert maintenance when a spray nozzle is removed.
- 6. Flow by rating of 0 at 15 psi (1.0 bar) or greater, 0.5 gpm (0.1 m3/h; 0.03 l/s) otherwise.
- 7. Shall include 1/2" (15/21) NPT female threaded bottom inlet.
- 8. The spray body, stem, nozzle, and screen shall be constructed of heavy-duty and ultra-violet resistant plastic.
- B. Irrigation spray body for small turf areas (2.5-24 feet (0.8-7.3m) with a 45 psi (3.1 bar) pressure regulating device specifications include but are not limited to:
  - 1. Parts and components to withstand harsh operating conditions using chemically treated recycled water (reclaimed/non-potable), dirty water containing grit, debris, and other particulates, high operating pressures common in commercial irrigation and ultra-violet light.
- 2. Pressure-activated, co-molded soft elastomer wiper seal composed of three wipers and a base seal to ensure a positive seal without excess "flow-by" which enables more heads to be installed on the same valve.
- 3. Recessed debris pockets located in the base of the spray body to prevent recirculation of harmful debris during operation.
- 4. Shall include a check valve to prevent low head drainage of up to 14 feet (4.3 m); 6 psi (0.4 bar).
- 5. Shall include technology built into the stem to prevent water loss and alert maintenance when a spray nozzle is removed.
- 6. Flow by rating of 0 at 15 psi (1.0 bar) or greater, 0.5 gpm (0.1 m3/h; 0.03 l/s) otherwise.
- 7. Shall include 1/2" (15/21) NPT female threaded bottom inlet.
- 8. The spray body, stem, nozzle, and screen shall be constructed of heavy-duty and ultra-violet resistant plastic.

SPRAY NOZZLES

- A. Fixed or variable arc matched precipitation rate spray nozzle for small turf areas (3-15 feet (.91-4.6 m), maximum 30 psi (2.1 bar) specifications include but are not limited to:
  - 1. Shall be constructed of ultra-violet resistant plastic.
- 2. Shall contain a stainless steel flow and radius adjustment screw allowing up to 25% radius reduction.
- 3. Nozzle shall have a precipitation rate that is matched across sets and patterns of spray nozzles up to 15 feet (4.6 m).
- 4. Shall include color coding marking on top of nozzle for easy identification of spray radius.
- B. Dual orifice fixed arc nozzle for small turf areas (5-15 feet (1.7-4.6 m), maximum 30 psi (2.1 bar) specifications include but are not limited to:
  - 1. Shall be constructed of ultra-violet resistant plastic.
- 2. Shall contain a stainless steel flow and radius adjustment screw allowing up to 25% radius reduction.
- 3. The nozzle shall have dual orifices for both in-close watering and standard pattern watering with a matched precipitation rate between sets and matched flow and with other matched precipitation rate fixed spray nozzles up to 15 feet (4.6 m).
- 4. Shall include color coding marking on top of nozzle for easy identification of spray radius.
- C. Multi stream rotating nozzle for small turf areas (8-24 feet (2.4-7.4m), maximum 55 psi (3.8 bar) specifications include but are not limited to:
  - 1. Shall be constructed of ultra-violet resistant plastic.
- 2. Shall contain a stainless steel radius adjustment screw allowing reduction to 13 feet (4.0 m).
- 3. Shall have a matched precipitation rate of 0.60 in/hr (15.2 mm/hr).
- 4. Shall have a color coded radius reduction plug to allow for easy identification of fixed arc pattern.

PART 3 - EXECUTION

EXCAVATION

- A. Stake pipe and equipment layout for Construction Project Manager's review and approval. Review does not relieve installer from coverage problems due to improper placement after staking.
- B. Excavate trenches for irrigation system pipe to provide minimum cover per plans and details.
- C. Barricade trenches that are left open overnight.

INSTALLATION

- A. General: Plans are diagrammatic. Proceed with installation in accordance with the following:
  - 1. Install stop and waste valves, backflow preventers, and other equipment required by local authorities according to laws and regulations in order to make system complete.
- a. Coordinate with the General Contractor who will be responsible for installing the preventer and other irrigation items at the connection point.
- b. Coordinate with the General Contractor the exact location of the irrigation point.
- 2. Thoroughly flush main lines before installing automatic control valves, and laterals before installing sprinklers. Flush supply lines thoroughly before installing backflow regulating devices.
- B. Piping: Assemble all mainline and lateral lines in accordance with manufacturer's recommendations with no cul-de-sacs. Assure positive drainage.
- C. Sleeves: General Contractor shall install sleeves before concrete/paving work.
  - 1. General Contractor shall stub-up and flag sleeve locations for the Irrigation Contractors locating.
- 2. Sleeves should be a minimum two times the diameter of the pipe passing through them.
- 3. Sleeve locations shall be approximate to that shown on the Irrigation Plan.
- D. Control Valves:
  - 1. Install one valve per valve box and provide 12 inches of expansion loop slack wire at all connections inside valve box.
- E. Manual Drains:
  - 1. Install per manufacturer's recommendations on upstream and downstream side of backflow preventers and at lowest point along main pressure pipe.
- F. Quick-Coupling Valves:
  - 1. Install using 1 inch PVC nipples and schedule 40 ells as detailed. Location as indicated on plans.
- G. Backflow Preventer:
  - 1. Install assembly complete for irrigation system with 2 drain valves and 2 shut off valves per detail, local laws and regulations, and per manufacturer's specifications.
  - 2. Install assemblies with drain valves in below grade installations. Provide open box floor with gravel drain sump.
- H. Valve Boxes
  - 1. Install over all remote control valves, manual control valves, zone shutoff valves, gate or globe valves. Size to provide adequate room for maintenance.
  - 2. Install boxes on level subgrade with proper drainage so that top of boxes are flush with grade material (soil, mulch, rock, etc.). Place parallel or perpendicular to adjacent sidewalks, or driveways.
- 3. Place washed gravel aggregate in sump as shown on details.
- I. Automatic Controller
  - 1. Properly ground controller per local laws and regulations. Make all control wire connections automatic controller. Coordinate controller installation with other electrical work.
- 2. Connect remote control valves to controller in numerical sequence as shown on Plans.
- J. Wire and Electrical Work
  - 1. Use electrical control and ground wire suitable for sprinkler control cable.
  - 2. Provide 120-volt power connection (by others) to automatic controller to conform to local ordinances and authorities having jurisdiction.
- 3. Low Voltage Wiring:
  - a. Bury control wiring between controller and electric valves in pressure supply line strung as close as possible to main pipe lines with such wires to be below and to one side of the pipe, or in separate trenches, consistently located
- b. Bundle all 24-volt wires at 10-foot intervals and lay with pressure supply line pipe to side of trench.
- c. Install control wire for each control valve.
- d. Run 2 spare #14-1 wires from controller pedestal or electric control valve on each every leg of mainline.
- K. Sprinkler Heads, Emitters, Rotators, and Rotors
  - 1. Flush circuit piping with full head of water and install sprinklers after hydrostatic test is completed.
- 2. Adjust nozzles to allow for adequate coverage and to minimize overspray onto walks, driveways, and buildings.
- 3. Stake emitter tubing with 1/4" Rainbird® TS-025 tubing stakes.
- 4. Adjust heads to be plumb and flush with finish grades, even with top of soil level or top of material level after completion of grading, seeding, sodding, and rolling of grass.
- L. Drip Tubing
  - 1. Install all drip tubing in locations shown on the Irrigation Plan. To be laid out and installed the irrigation drip details in a grid pattern with headers. (sheet L-2.1).
- 2. Install flush caps as indicated on details.
- 3. Install drip indicator on all drip zones.
- M. Thrust Blocks and/or Joint Restraints
  - 1. Install on pipe sized 2" or larger wherever the main pipe line:
    - a. Changes any direction at tees, angles, and crosses vertical and horizontal.
    - b. Changes at reducers.
    - c. Stops at a dead-end.
    - d. Valves at which thrust develops when closed.

BACKFILLING

- A. Do not begin backfilling operations until system tests and approvals have been completed.
- B. Bed all pipe a minimum of 2 inches. Backfill to 6 inches above pipe with soil free of rocks over 1-inch diameter, debris, or organic matter. Backfill remainder of trench with soil of like quality to adjacent areas. Haul away all material not suitable for backfill.
- C. Compact backfill in 6-inch lifts thoroughly to prevent settling damage to grades or plant material. Leave trenches slightly mounded to allow for settlement after backfilling is completed. Low areas and damage caused by settling will be repaired by Contractor at no additional cost to the Project or Owner.
- D. Prevent soil, rocks, or debris from entering pipes or sleeves.

FLUSHING AND TESTING

- A. Flushing: After piping, risers, and valves are in place and connected, but prior to installation of sprinkler heads, thoroughly flush piping system under full head of water pressure from dead fittings. Maintain flushing for 5 minutes through furthestmost valves. Cap risers after flushing.

INSPECTION

- A. Arrange for Construction Project Manager's presence 48 hours in advance of inspection walk-through.
- B. As necessary Landscape Architect will generate a list of items to be corrected prior to Final Acceptance.

RESTORATION AND CLEANING

- A. Flush dirt and debris from piping before installing sprinklers and other devices.
- B. Adjust automatic control valves to provide flow rate of rated operating pressure required for each sprinkler circuit.
- C. Restore all damaged areas to original condition unless otherwise shown on plans at no additional cost to the Project or Owner.

ROTOR HEADS

- A. Pop-up rotor sprinkler for medium turf areas (25-47 feet (7.6-14.3 m), maximum 75 psi (5.2 bar) specifications include but are not limited to:
  - 1. Shall have adjustable arc rotation of 40 to 360 degrees (0.7 to 6.3 rad) and reversing full circle rotation.
- 2. Shall have a flow shut-off device that is integrated into the flow path of the sprinkler.
- 3. Shall have a pressure-activated, multi-function wiper seal that protects internals from debris and assures positive pop-up and retraction.
- 4. Shall contain additional o-rings and seals for extra protection in "gritty" water.
- 5. Operating precipitation rate of 0.20 to 1.01 inches per hour (5 to 26 mm/h).
- 6. Operating flow rate of 0.73 to 8.31 gpm (0.17 to 1.85 m3/h).
- 7. The body, stem, nozzle, and screen shall be constructed of heavy-duty and ultra-violet resistant plastic.
- 8. Shall include a 45 psi (3.1 bar) pressure regulating device to prevent high pressure misting to the nozzle stream.
- 9. Shall include an internal check valve to prevent low head drainage of up to 7 feet (2.1 m) to prevent puddling, run-off and erosion.
- 10. Shall include a set of twelve interchangeable nozzles, 8 nozzles with 25 degree (0.4 rad) trajectory and 4 low-angle nozzles with 10 degree (0.2 rad) trajectory.

FLEXIBLE SWING PIPE

- A. Swing pipe specifications include but are not limited to:
  - 1. Swing pipe shall be flexible black tubing constructed of linear low density polyethylene with a wall thickness of 0.098" (0.3 cm) with a nominal inside diameter of 0.49" (1.2 cm).
- 2. Pipe shall be capable of a flow up to 8 gpm (0.5 l/s).

DRIPLINE

- A. Distribution tubing specifications include but are not limited to:
  - 1. The blank tubing shall be manufactured from flexible polyethylene material with a wall thickness of 0.049" (1.2 mm), outside diameter of 0.634" (16.1 mm), and inside diameter of 0.536" (13.6 mm).
- 2. The tubing shall be dual-layered (brown over black).

INLINE EMITTER DRIPLINE

- A. Sub-surface inline emitter tubing specifications include but are not limited to:
  - 1. The tubing shall be manufactured from flexible polyethylene material with wall thickness of 0.049" (1.2 mm), outside diameter of 0.634" (16 mm), and inside diameter of 0.536" (13.6 mm).
- 2. The tubing shall have factory installed pressure-compensating, inline emitters with a copper shield device installed every 12, 18, or 24 inches (30.5, 45.7, 61 cm) as indicated on construction drawings.
- 3. Operating pressure range of 8.5 to 60 psi (0.6 to 4.1 bar).
- 4. Operating emitter flow rates of 0.6 and 0.9 gph (2.3 l/hr and 3.5 l/hr).

DISTRIBUTION TUBING

- A. 1/2" distribution tubing for emitters and other devices specifications include but are not limited to:
  - 1. The blank tubing shall be extruded from ultra-violet resistant polyethylene resin materials with wall thickness of 0.04" (1 mm), outside diameter of 0.250" (6.3 mm), and inside diameter of 0.170" (4.3 mm).
- 2. Operating pressure range from 0 to 60 psi (0 to 4.1 bar).

EMITTERS

- A. Point source emission device specifications include but are not limited to:
  - 1. The emitter shall be constructed of ultra-violet resistant acetyl materials.
- 2. Shall have a pressure-compensating design to deliver a uniform flow throughout a pressure range of 15 to 50 psi (1.0 to 3.4 bar).
- 3. Flow rates that range from 0.5 to 2 gph (1.89 to 7.57 l/h) at a pressure range of 15 to 50 psi (1.0 to 3.4 bar).

VALVE BOX

- A. Valve boxes specifications include but are not limited to:
  - 1. Shall be made of structural foam HPDE resin that is resistant to ultra-violet light, weather, moisture and chemical action of soils.
- 2. Lids shall be clearly marked with the words "IRRIGATION CONTROL VALVE" molded onto top.
- 3. Lid colors are available in black, green and purple designating non-potable water use.

SPECIAL INSTRUCTION

- A. The contractor shall coordinate with the Landscape Architect, General Contractor, Mechanical/Electrical Contractors, and all subcontractors, during the installation of this system. Installation of sleeves to be coordinated between the Irrigation Contractor and the General Contractor.
- B. During the Bidding period the Irrigation Contractor shall inform the RaceTrac Construction Manager of any system items or elements that are required for operation of the system specified herein, but installed or finished by others.
- C. It is the intent that the irrigation system be installed and fully operational before planting operations begin. (Except for drip tubing, which shall be installed after planting but prior to mulch installation.)

PERMIT SET  
MUST BE ON JOBSITE AT ALL  
TIMES DURING CONSTRUCTION

NOTICE  
INSPECTION REQUIRED  
24 HRS. PRIOR TO COMMENCING ANY  
WORK IN THE PUBLIC ROW CONTACT  
THE BROWARD COUNTY HIGHWAY  
CONSTRUCTION AND ENGINEERING  
DIVISION AT 954-577-4600 FOR  
INSPECTION.

NOTE:  
APPROVAL OF THIS PLAN DOES  
NOT CONSTITUTE A PERMIT FOR  
CONSTRUCTION.

A PERMIT FOR CONSTRUCTION MUST  
BE OBTAINED FROM THE BROWARD  
COUNTY HIGHWAY CONSTRUCTION  
AND ENGINEERING DIVISION PRIOR TO  
COMMENCING CONSTRUCTION IN THE  
PUBLIC RIGHT OF WAY.

ALL MATERIALS USED AND  
INSTALLATIONS WITHIN THE PUBLIC  
RIGHT OF WAY OR EASEMENTS SHALL BE  
IN ACCORDANCE WITH BROWARD COUNTY  
HIGHWAY CONSTRUCTION AND  
ENGINEERING DIVISION SPECIFICATIONS.

BROWARD COUNTY HIGHWAY CONSTRUCTION  
AND ENGINEERING DIVISION

PLAN CONSISTENT  
WITH PLAN REQUIREMENTS

PUBLIC RIGHT OF WAY APPROVAL  
FOR PAVING, GRADING AND DRAINAGE

BY: \_\_\_\_\_ DATE: \_\_\_\_\_

DOES NOT INCLUDE APPROVAL  
OF PAVEMENT MARKING & SIGNS

BELOW IS AN AUTHORIZED DIGITAL SIGNATURE AND SEAL OF THE PROFESSIONAL LISTED BY  
WAY OF THIS SIGNATURE I ATTEST THAT THE DOCUMENTS HEREIN, IF UNDER A VERIFIED  
ELECTRONIC SEAL, WERE PREPARED, SIGNED AND AUTHORIZED FOR SUBMITTAL BY ME ON THE  
DATE OF SENDING, WITH ALL AUTHORITY AND RIGHTS GRANTED TO ME BY THE STATE OF  
FLORIDA, §§ 40, 360 PART I AND ASSOCIATED THEREIN.

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