

## SECTION 32 8410

### IRRIGATION PUMP SYSTEM

#### PART 1 GENERAL

##### 1.1 SUMMARY

- A. Section Includes:
  - 1. Mechanical, plumbing, electrical systems and related accessories for proper construction of irrigation pump system.
  - 2. Connection to utilities.

##### 1.2 INCLUDED SECTIONS

- A. Pump Station(s)

##### 1.3 RELATED SECTIONS

- A. Refer to Architectural documents
- B. Refer to Civil documents
- C. Refer to Electrical documents
- D. Refer to Irrigation documents
- E. Refer to Landscape documents
- F. Refer to Mechanical documents

##### 1.4 REFERENCES

Materials and installation must be in compliance with applicable provisions of the latest edition of the following codes and standard specifications, as well as any other applicable codes and regulations set by jurisdictional authorities.

- A. NEC National Electrical Code
- B. NFPA National Fire Protection Association
- C. UBC Uniform Building Code
- D. UPC Uniform Plumbing Code
- E. ASTM American Society for Testing and Materials
- F. ANSI American National Standards Institute
- G. ASME American Society of Mechanical Engineering
- H. ASSE American Society of Sanitary Engineering
- I. AWWA American Water Works Association
- J. CS Commercial Standards
- K. NEMA National Electrical Manufacturers Association
- L. NSF National Sanitation Foundation
- M. AASHTO American Association of State Highway and Transportation Officials
- N. UL Underwriters Laboratories, Inc.

##### 1.5 SUBMITTALS

- A. Product Data: Include material list, manufacturer's data sheets, and installation instructions for each component and material. Specify and mark all details and options that will be provided, and cross reference to the material schedule.
- B. Shop drawings for the following equipment showing plans and elevations shall be supplied:
  - 1. Layout of equipment areas, pipe and conduit runs, fitting and fixture locations, pipe elevations, and dimensions between pipe center lines.

2. Wiring Diagram of control system.
  3. Dimensioned outline drawings of pump station(s) and electrical control panel(s).
  4. Connection to irrigation system.
  5. Drawings signed and sealed by licensed professional.
  6. Shop drawings shall also be provided for all custom fabrications.
  7. Shop drawings shall be coordinated with other trades prior to submittal.
  8. Power source requirements and connection to electrical.
- C. Closeout Submittals:
1. Operation and Maintenance Data: Include information required for operation and maintenance of irrigation pump system.
  2. Record drawings shall be submitted prior to final acceptance.

## **1.6 QUALITY ASSURANCE**

- A. Installer Qualifications:
1. Minimum 5 years documented experience in work of this Section.
  2. Successful completion of min. 3 projects of similar scope and complexity within past 5 years.
  3. Include list of completed work, work in progress, and references.
- B. When the specifications and drawings call for described materials, workmanship, or construction of a better quality, higher standard or larger size than is required for the above-mentioned rules and regulations, the provisions of these specifications and drawings shall take precedence over the requirements of said rules and regulations.
- C. Furnish, without extra charge, any additional material or labor required for compliance with these rules and regulations, although not mentioned in these specifications or indicated on the drawings.
- D. Control Panel(s) UL labeled – Industrial Control Panel.
- E. Electrical components shall be UL listed for conformance to US standards.
- F. Prefabricated pump assembly shall be hydrostatically factory tested.
- G. All components to be in compliance with local codes.

## **1.7 DELIVERY, STORAGE AND HANDLING**

- A. Protective covers, coatings and shipping material shall be retained to protect equipment from damage during shipment, delivery and storage.
- B. Protect electrical components against weather and contact with moisture from time of delivery through time of installation. Store and handle equipment as needed to protect against damage from weather, dust, dirt, construction traffic and other causes.
- C. Follow manufacturer's instructions for system delivery, storage and handling.

## **1.8 PROJECT CONDITIONS**

- A. Do not install pump station(s), electrical control panel(s) where ground water or other site conditions do not comply with manufacturer's recommendations.

## **1.9 COORDINATION**

- A. Any required backfill, anchoring, concrete foundations, dimensions, location and reinforcement shall be coordinated based on manufacturer's recommendations.
- B. Any required electrical power supply capacity and location shall be coordinated with Project Electrical Engineer and based on system demand, manufacturer's recommendations and comply with all local building codes.
- C. Any required pressure pipe or DWV plumbing capacity and location shall be coordinated based on manufacturer's recommendations and comply with all local building codes.

## PART 2 PRODUCTS

### 2.1 MANUFACTURERS

- A. Pump Station(s) and Control Panel(s): Are based on products by inCon-trol Water Systems, 410 Interchange St., McKinney, TX 75071, 214-733-8828 ([www.incontrolwatersystems.com](http://www.incontrolwatersystems.com)).
- B. Substitutions: Not permitted.

### 2.2 PUMP STATION

- A. As manufactured by inCon-trol Water Systems, 410 Interchange, McKinney, TX 75071, 214-733-8828.
  - 1. inCon-trol Water Systems, **HURRICANE FORCE SERIES**, irrigation booster pump station, providing \_\_\_\_ GPM at \_\_\_\_ PSI (\*Boost) at the pump discharge, for a total output of \_\_\_\_ GPM at \_\_\_\_ PSI. \* \_\_\_\_ GPM at \_\_\_\_ PSI required at the pump suction inlet.
    - a. Pump model number: **Contact inCon-trol Water Systems for Model Number.**
  - 2. Information below is provided for reference as to state the quality of the end product desired by the owner.
  - 3. Pump station(s) shall be a pre-manufactured skid mounted product. No individual components assembled in the field other than required connections to pre-manufactured pumping station will be allowed.
- B. Refer to design document for performance requirements.
- C. Pipe and Fittings:
  - 1. General: Identified on pipe by manufacturer indicating material, class or type, and pressure rating.
  - 2. PVC:
    - a. Pipe: Schedule 80 – ASTM D2464, Class 200 – ASTM D2241
    - b. Fittings: Schedule 80 – ASTM D2467. “Low Pressure” fittings are not acceptable.
  - 3. HDPE: Pipe and fittings shall be made from resin meeting the requirements of the Plastic Pipe Institute a PE3408. The resin shall meet the requirements of ASTM D3350-02 with cell classification of 345464C.
    - a. Pipe: AWWA C901 or C906, NSF Standard #61 and ASTM standards.
    - b. Fittings: AWWA C901 for sizes 1/2" to 2" and AWWA C906 for sizes 3" to 54".
  - 4. Copper:
    - a. Pipe: ASTM B88, drawn temper for solder type fittings, dead soft for use with compression type fittings.
    - b. Fittings:
      - 1. Wrought copper or cast bronze, ASTM B75 and ANSI B16.22.
      - 2. Brass compression fittings for copper tube: SAE CA377 and SAE CA 360.
  - 5. Steel:
    - a. Pipe: Constructed from ASTM A120, ASTM A53, or API 5L steel pipe. Piping 6" in diameter or smaller shall be constructed from schedule 40 steel pipe or heavier and piping 8" and larger shall be constructed of schedule 40 pipe of heavier.
    - b. Fittings:
      - 1. Welded fittings, ANSI B16.9, ASTM A234 and shall be schedule 40 or heavier.
      - 2. Flanged fittings, ANSI B16.5, ASTM A181 and A105 and shall be 150 lb.
- D. Thrust Blocks: Concrete, minimum 3000 psi compressive strength at 28 days.
- E. Pumps: As specified on the plans.
- F. Valves:
  - 1. PVC:
    - a. Schedule 80 true union ball valves; slip and threaded.
  - 2. Bronze:
    - a. Threaded gate valve; deep thread for steel pipe.
    - b. Threaded center line check valve; 2 inch pipe and smaller.

- c. Threaded ball valve.
  - d. Air relief valve.
  - e. Pressure regulating valve.
3. Steel:
- a. Lug style butterfly valve.
  - b. Flanged gate valve.
  - c. Flanged and wafer foot valve; check valve.
  - d. Swing style; no center line check valves.
  - e. Air relief valve.
- G. Flanged and Mechanical Joint Adapters: Shall be PE 3408 HDPE, Cell classification of 345464C as determined by ASTM D3350-02. Flanged and Mechanical Joint Adapters shall have a manufacturing standard of ASTM D3261. Fittings shall have a pressure rating equal to the pipe unless otherwise specified on the plans.
- H. Filter:
- 1. Self-cleaning type with automatic backwash.
  - 2. Sized to accommodate specified flow rate and pressure.
- I. Pump Station(s) Enclosure: As manufactured by inControl Water System.
- 1. Refer to design document for dimensions, material, and finish.
- J. Control Panel(s): As manufactured by inControl Water Systems; must be UL 508A labeled.
- K. Conduit
- 1. Within equipment enclosures: EMT, Flexible – (Sealtight).
  - 2. Buried or completely encased in concrete: PVC Schedule 40.
- L. Wire
- 1. Copper, 600 volt insulation, stranded for wire larger than 8 AWG, stranded for smaller wire. Do not use wire smaller than 12 AWG for power.
    - a. Types: THWN, THHN.
- M. Level Controls: As manufactured by inControl Water Systems.

## **PART 3 EXECUTION**

### **3.1 INSTALLATION - GENERAL**

- A. Install irrigation pump station(s) in accordance with manufacturer's instructions and approved Shop Drawings.
- B. Conceal piping and conduit unless otherwise indicated. Arrange exposed piping in neat, straight lines parallel or perpendicular to other construction. Brace all piping on above ground installations.
- C. Cut piping and conduit to fit without forcing or bending. Remove burs and rough edges. Follow manufactures recommendations for solvent weld and/or any other pipe materials specified.
- D. Bend piping and conduit to prevent damage and reduction of inside diameter. Do not place more than two 90 degree bends on single runs between accessible points.
- E. Arrange equipment so that elements requiring removal or maintenance are readily accessible without disturbing other components. Provide clear passage between components.
- F. Brace equipment and piping to maintain locations and minimize vibration.

- G. Seal open pipe and conduit ends to prevent entrance of dirt, debris, and water.
- H. Protect pipes, conduits, and equipment from damage from inclement weather.

### **3.2 INSTALLATION – PLUMBING**

- A. Install piping without loops and traps. For below grade installations, pipe shall also be properly bedded with sand or crushed aggregate.
- B. Make provisions for thermal expansion and contraction of piping.
- C. Provide flanges or unions to allow for removal and reinstallation of equipment without cutting.
- D. Install butterfly valves on suction lines for isolation purposes only. Use eccentric reducers to prevent trapping air in line.
- E. Provide butterfly, gate, globe, ball, plug, or other infinitely adjustable valves in discharge lines.
- F. Install P-traps on drains when required by Code.
- G. Underground piping:
  - 1. Trench for underground piping to provide sufficient slope and adequate space to allow for pipe installation.
  - 2. Install thrust blocks on pipe 2-1/2 inches in diameter and larger at directional changes, reducers, and line terminations.
  - 3. Backfill in maximum 6 inch lifts; compact each lift to minimum 95 percent maximum density.
- H. Penetrations:
  - 1. Make penetrations only at locations indicated unless otherwise approved.
  - 2. Provide core-drilled holes, with Link-Seal, passing through concrete wall, floor, or roof assemblies.
  - 3. Waterstop penetrations in exterior assemblies.

### **3.3 INSTALLATION – ELECTRICAL**

- A. All electrical components shall be installed by a licensed electrical contractor, and in accordance with manufacture's requirements, and within required state and local codes.
- B. The general contractor will supply a dedicated power source as shown on the plans for the irrigation pump station(s) and associated components' operation.
- C. The electrical contractor will install wire and conduit between the owner's power source and the pump control panel location.
- D. Install wiring in sealed conduits.
- E. Install dielectric fittings on connections between dissimilar conduit types and seal with dielectric thread compound.
- F. Do not use threadless connectors for conduit.
- G. Provide bushings where conduit enters boxes or fittings.
- H. Provide accessible covers at junctions, bends, and offsets on exposed conduit runs.
- I. Do not use threadless couplings or connectors on conduit in wet locations or where buried. Make joints using tapered pipe threads sealed with Teflon tape or sealant.

- J. Install conduit entering control panels at bottom of panel.
- K. All hardware and metal shall meet or exceed NEC requirements for bonding and GFIC.
- L. Underwater Junction Boxes:
  1. Fill boxes with approved potting compound.
  2. Prior to installing potting compound, make final connections and perform required testing.
- M. Wiring:
  1. Remove moisture and debris from conduit prior to installation of wiring.
  2. Do not install damaged wiring.
  3. Make connections to equipment susceptible to vibration or noise using flexible watertight conduit.
  4. Use THWN stranded wire in conduits between irrigation pump station(s) and control panel(s).
  5. Neatly group and distribute wiring.
  6. Use stranded copper wiring between with waterproof insulation between underwater equipment and control panels.
- N. Seal conduits after wiring installation.
- O. Cover conduit exposed to moisture with watertight plastic and make joints using watertight fittings.

### **3.4 INSTALLATION– PUMP STATION**

- A. Equipment skid shall be securely anchored, using electro-galvanized hardware.
- B. Concrete pad:
  1. Reinforced, 3000 psi compressive strength at 28 days.
  2. Sub-grade: compacted to 95%
  3. Vapor Barrier: 10 mil polyethylene sheet, type recommended for below-grade application and compatible waterproof tape.
  4. Medium broom finish

### **3.5 TESTING / ADJUSTING**

- A. Plumbing:
  1. Clean systems of debris prior to testing.
  2. 24 hours prior to backfilling and concreting, hydrostatically test completed system to system's maximum operating pressure. Do not include equipment that is not rated for or could be damaged as result of pressure in test.
  3. Perform test in presence of Owner or Owner's Representative.
  4. System shall withstand pressure testing without pressure loss and leaks during test.
  5. Repair or replace defective piping and components prior to concreting or backfilling, and retest to same requirements until acceptable results are achieved.
  6. Maintain pressure during backfilling or perform additional pressure testing after backfill is completed to ensure that damage has occurred during backfilling.
  7. Conduct any other plumbing tests as required by governing authorities.
  8. All equipment to show that it complies with specified requirements.
  9. Irrigation Contractor shall be responsible for flushing irrigation lines prior to connection to irrigation pump station(s).
- B. Conduct electrical tests as required by governing authorities.
- C. As soon as the pump station(s) & pipe systems have been installed and tested, and the mechanical and electrical equipment have been installed and tested, the equipment shall be considered as placed into operation.
- D. An authorized service technician from the pump equipment supplier shall provide the startup & calibration for the water pump equipment.

E. Make adjustments required for proper operation of irrigation pump system.

F. After system has been placed into operation, installing contractor and owner or owner's representative shall determine the water make up rates and whether such rates are normal and not a sign of leakage from system. If necessary, a water meter shall be placed on the makeup water line to document makeup rates.

### **3.6 DEMONSTRATION**

A. Demonstrate operation and maintenance of all components and aspects of rainwater harvesting/storm water detention system to Owner or Owner's Representative. At this time, provide Owner or Owner's Representative with any specialty tools required for the maintenance of the irrigation pump system.

### **3.7 PUMP STATION EQUIPMENT SCHEDULE**

A. Reference design documents for Pump Station(s) Schedule.

## **PART 4 WARRANTY**

### **4.1 SCOPE**

System integrator shall maintain a factory trained and managed network of service technicians to execute all field service and warranty claims. System Integrator shall provide technical support by telephone to the installer and owner both during and after the warranty period.

### **4.2 WARRANTY**

Manufacturer / Integrator shall warrant that fully integrated rainwater harvesting/storm water detention system to be free of manufacturer's defects for a period of one year. Provided installation and operation have been properly performed, Manufacturer / Integrator shall bear the cost of parts and labor necessary to repair or replace the defective component during the warranty period. Unauthorized repairs or replacements performed by non- Manufacturer / Integrator personnel may void the warranty.

**END OF SECTION**