

PART 1 - GENERAL

1.01 OBJECTIVE

- A. The objective of these specifications is to provide for the installation of a Rainbird or Toro irrigation system (or pre-approved equal system), which shall effectively irrigate all areas to be covered and shall be installed in a professional, workmanlike manner. The specifications, design details, and irrigation drawings are to be considered part of the Contract and the Contractor shall follow the specifications precisely. The plans and specifications are intended to include everything requisite and necessary for the proper installation of the work whether each necessary item is mentioned herein or not. All labor, overhead, materials and profit for any and all tasks associated with the installation of this project shall be included in the bid price.
- B. The plans and specifications are intended to be cooperative and any item called for in one and not the other shall be as binding as if called for in both. If a discrepancy exists between an item called for in the plan and the specifications, contact the irrigation designer and the Park Representative by email asking for a determination.
- C. All work specified herein or called for on the drawings shall be executed in accordance with all governing ordinances, laws and regulations that meet all local conditions. If the Contractor performs any work contrary to such codes, laws or regulations, they shall assume full responsibility and bear all costs necessary to correct the work, without additional cost to the Park.
- D. The Contractor shall abide by and comply with the true intent and meaning of the drawings and specifications taken as a whole despite any manifest error or omission, should any exist. Figured dimensions of the drawing shall take precedence over measurements by scale.
- F. The Contractor shall finish all work including setting heads, quick coupling valves, controllers, and valve boxes to grade or as specified by the Park. Raising and lowering heads to proper height, filling trenches that have settled, packing soil firmly around heads and valve boxes is considered warranty work and shall be done at no additional cost to the Park during the warranty period.
- G. Upon the award of the contract the Contractor shall be supplied 4 sets of plans and specifications. Any additional sets shall be furnished from the Park at \$100 per set.
- H. Permits and licenses necessary for the prosecution of the work shall be secured and paid for by the Contractor. For this project, the Contractor and applicable subcontractors shall possess an active BC, BC-B, BC-33, CMC or CMC-A license or higher. Failure of the contractor and applicable subcontractors to provide copies of their appropriate license shall result in the disqualification of the bid. All licenses shall be verified via Tennessee Commerce and Insurance database before project award.
- I. The State of Tennessee shall not be held liable for any damage, loss of property, or injury of personnel resulting from actions of the contractor and/or his/her sub-contractors or employees. At all times, the Contractor shall have a copy of project specifications, permits, and certificate of insurance on-site. See **Attachment Reference A** for certificate of insurance requirements.
- J. The Contractor shall keep himself fully informed of all laws, ordinances and regulation of the Federal, State, County and local governments in any manner affecting those engaged or employed in the work or the materials used in the work or in any way affecting the conduct of the work and of all orders and decrees of bodies having any jurisdiction or authority over

the same. The Contractor shall observe and comply with all such laws ordinances and regulations and shall protect and indemnify the Park and Irrigation Consultant against the violation of such infraction whether by himself or by his employees.

- K. The Contractor shall provide a proposed schedule of installation tasks of all components with his bid. The schedule shall include each major component installation start and stop date and number of man/hours. The beginning date of the schedule shall not be before Nov 01, 2025, and the completion shall be no later than Feb 28, 2026. If the bid is submitted without this schedule of tasks for the entire period of time, the entire bid may be rejected. Delays resulting from acts of God, including but not limited to natural disasters or other unforeseen events beyond the control of the parties, shall be considered excusable and not subject to penalty.

1.02 STAKING

- A. The Contractor shall stake out the sprinkler locations before ditching. Prior to installation the Park's Representative shall check all locations and give his approval or disapproval. (Any changes made by the Park after approval and installation shall be at the Park's expense. An as-staked quantity shall be provided by the Contractor at the time of staking for review and comparison to the construction drawing of the same area.)
- B. Routing of the pipe shall be in accordance with the irrigation plan except that the Park reserves the right to change the routing of the pipe from that shown on the plan and/or to change the depth of the trench in case of rock or other obstacle. In no event shall field changes of this nature affect the overall cost of the project except where these changes may alter the quantity of material to be provided according to the plan or where excess depth of the trench and backfill is required.
- C. Stakes shall be clearly marked and flagged to designate the type of equipment to be installed at that point. Stakes shall be placed accurately to allow particular equipment to be installed within one foot from the indicated position. The Contractor shall maintain this staking, replacing all stakes disturbed to the correct position until all equipment is in place, and its position is properly indicated on the "As-Built" plan. Failure to protect stakes shall result in the Contractor being charged for their replacement.

1.03 AS-BUILT / RECORD DRAWINGS

- A. The As-Built/Construction Record Drawings (CRD) plan shall be an original of the irrigation system as constructed. It shall indicate the location of all sprinklers, valves (air, isolation, reducing, relief, and drain), controllers, wire routing, pipe routing, sizing of both and field programming. The construction record drawing shall be prepared in AUTOCAD 2025 format and data shall be gathered with GPS mapping equipment using differential surveying with sub-meter accuracy. All aspects of the As-Built are the Contractors' responsibility.
- B. The As-Built plan shall be made by an agent of the Contractor. The preparation of the As-Built plan shall be acceptable to the Irrigation Consultant.
- C. The As-Built plan shall be kept clean, dry and safe from damage at all times. It shall be brought up to date at the close of working day on each Friday and shall accurately indicate all equipment placed at the time.
- D. As-Built requirements: The Contractor shall provide and locate all of the following equipment on the As-Built record drawings.

- 1) Isolation valves
 - 2) Mainline gate valves
 - 3) Air release valves
 - 4) Drain valves
 - 5) Automatic valves
 - 6) Pipe Sizes for Mainline and laterals
 - 7) Wire splices (24 VAC, 120 VAC)
 - 8) Wire paths
 - 9) Provide notes as to any changes to the original plan
 - 10) All dimensions to mainline change of direction fittings.
 - 11) Note existing utilities, drainage and existing irrigation equipment.
- E. Before final walk-thru, the Contractor shall provide a final As-Built drawing via email in DWG and PDF format. This As-Built must be approved by the irrigation consultant prior to the final walk.

1.04 DRAWING, EXPLANATIONS AND VERIFICATIONS OF DIMENSIONS

- A. All plot dimensions are approximate. Before proceeding with the work, the Contractor shall carefully check and verify all dimensions and shall report all variations from those indicated in the plot to the Irrigation Designer.
- B. For purposes of clearness and legibility, the piping lines and the electrical lines are diagrammatic, the size and location of equipment are drawn to scale whenever possible.
- C. No consideration shall be given to any design changes until after the awarding of the contract. Should any changes be deemed necessary after awarding of the contract, for proper installation and operation of the system, the Park with the Contractor shall negotiate such changes on a unit basis.

1.05 CHANGES IN WORK

- A. The Park reserves the right to require alterations, additions to or deletions from the work shown on the drawings or described in the specifications without rendering the contract void. The changes shall not in any way affect the time of completion of the work as agreed upon, except as shall be further agreed in writing at the time of such changes.
- B. No material of any kind shall be installed on the project until they have been approved by the Irrigation Consultant and the Park's Representative who also reserve the right to observe installation of the irrigation system at any time and to reject any and/or all materials or workmanship that does not meet project specifications and/or industry standards.

1.06 WORKING DURING ADVERSE WEATHER

- A. Actual construction on the site shall cease during heavy rains or other inclement weather that shall adversely affect the quality of the work or cause damage to the site, as determined by the Park.
- B. The Contractor shall be required to protect all work and materials against damage or injury from weather. As determined by the Park, any work or materials that have been damaged or injured by reason of failure to protect such, all such materials or work shall be removed and replaced at the expense of the Contractor.

1.07 TRAINING OF COURSE PERSONNEL

- A. Upon completion of the work and acceptance by the Park, the Contractor shall be responsible for the training of golf course personnel in the operation, maintenance, and repair of the system.
- B. The Contractor shall furnish 4 copies in both printed and digital format of all available parts list, troubleshooting lists, specification sheets operators' manuals and catalog sheets to the Park prior to final payment.
- C. Initial programming of the Central Computer control system shall be the job of the Contractor and the Irrigation Product Distributor. All work must be satisfactory to the Irrigation Consultant and the Park Representative.
- D. The Contractor shall provide training for the golf course personnel for up to 8 hours spread over 5 days on all components of the system.

1.08 SUPERINTENDENT

- A. The Contractor shall keep on this job a full time, competent superintendent and any necessary assistants, all of whom must be approved by the Park. The Superintendent shall represent the Contractor in his absence and all directions given to him shall be as binding as if given to the Contractor. The Superintendent shall provide a cell phone number to the Park Representative upon arrival on site and respond to any questions or concerns in a reasonable timeframe.
- B. The name of the Superintendent and all support personnel shall be submitted with the qualifications of each, with the bid submittal.
- C. The Contractor shall not replace his superintendent as identified to the Park without written approval of the Park.

1.09 OWNER'S AUTHORIZED REPRESENTATIVE

- A. The only authority to approve work performed by the Contractor, make field changes that are deemed necessary and approve invoices submitted by the Contractor for payment, is the Park or his authorized representative. The Park shall notify to the Contractor in writing whom he authorizes as his Representative.
- B. For the scope of the plans and specifications, the term "Park" refers to the Golf Course Manager or his Authorized Representative.
- C. Changes involving monetary differences in the contract price must be approved by the Park prior to the performance of the work. No payment shall be made for such extra work until a change order has been signed by the Contractor and approved by the Park.
- D. The Park shall have the authority to approve or reject work performed by the Contractor. The Park has authority to stop work when necessary to ensure proper execution of the Contract. If the Contractor disagrees with a decision of the Park, he may file a complaint with the Park.

1.10 PROTECTION OF PROPERTY

- A. The Contractor shall protect from damage all trees, shrubs, flowers, fences, buildings, walks, roadways, utilities, drainage and other property. Any damage shall be repaired or replaced to the Park's satisfaction at the Contractor's expense immediately. The Contractor shall restore all areas to their original condition. The Contractor shall be responsible to contact the utility companies and the Park's Representative for staked locations of all utilities on the property. If staked and the Contractor damages utilities, the utilities shall be repaired at the Contractor's expense.
- B. The Contractor shall expose all underground utilities and drainage equipment to get approval to go over or under work by others. This information shall be noted on the As-Built drawing. In the event there is damage to other equipment in the ground, the Contractor shall immediately repair the broken item and restore it to the original condition.
- C. If, as determined by the Park, a malfunction or other failure renders the irrigation system or portion of the system in operable and this results in damage to the project during the construction period, the cost of corrective work necessary to an acceptable condition shall be the obligation of the Contractor.
- D. The Contractor shall at all times keep the premises on which the work is being done, and adjoining premises clean of rubbish caused by his work. Upon completion of the job, the Contractor shall clean up all debris caused by his work and leave the job in a neat and clean condition. The Contractor shall remove all spoils and debris off of the property in a proper manner once work is completed.
- E. The Contractor shall confine his apparatus, storage of materials and construction operations to such limits as may be directed by the Park's Representative and shall not unreasonably encumber the premises with his materials. The Contractor is responsible for the security of material and equipment. The Contractor is responsible for all theft, vandalism, arson, or other loss of any improvement until final acceptance of the project by the Park.
- F. The Contractor shall provide all temporary light and power from the utility company. All such wiring, service and control switches & circuit protections shall comply with the local underwriter's codes, sales and regulations. Upon conclusion of the temporary wiring, the Contractor shall bear all expenses required for repairing and damage incurred by him during the use of temporary power and light.

1.11 SCHEDULE OF WORK

- A. The Contractor shall commence the construction of the project not before: November 01, 2025.
- B. The Contractor shall complete the project and have it ready for final inspection by the Park and Irrigation Consultant by: February 28, 2026. If in the opinion of the Park or Irrigation Consultant, progress toward the February 28, 2026 deadline is not being fulfilled, the Park may require the Contractor to submit a new schedule to meet a new deadline. Work shall be scheduled to avoid any interference with normal operation of the park as much as possible. During the construction period, coordinate

construction schedules and operations with the Park Representative. Work may be performed at any time of day and on any day of the week, as necessary to maintain the project schedule.

- C. If the Contractor does not maintain this schedule, the Park shall have the option of ordering the Contractor to bring men and equipment onto the work site. If the Contractor does not or cannot maintain his schedule after such an order, the Park shall have the option of bringing additional Contractors onto the job to supplement Contractor's work and to back-charge the Contractor for any additional costs of the supplemental work over and above the Contract amount.
- D. In the event the project is not proceeding as specified, the Contractor shall within five (5) days of the beginning of such delay, notify the Park in writing, of the causes of the delay, who shall ascertain the facts and the extent of the delay and notify the Contractor of its decision in the matter.
- E. The Contractor shall submit a schedule showing start date and end date and all activities from beginning to end that shall ensure a properly scheduled installation.

1.12 LIST OF MATERIAL FOR APPROVAL

- A. The materials chosen for the design of the sprinkler system have been specifically referred to by manufacturer so as to enable the Park to establish the level of quality and performance required by the system design.
- B. The Contractor shall submit copies of a material list, complete with manufacturer's name and product numbers, lists of comparable installations in operation, including customer address and location of installation. Any engineering drawings that would alter the system design shall be the responsibility of the Contractor to provide the proposed changes to the Park for review.
- C. Equal product(s) may be submitted, provided that product(s) has been used on 5 other golf courses within a 75-mile radius of this site. Support for that product(s) must be local and not from long distances from the site. Notification of the submitted data for consideration of "as-equal" to the product(s) specified herein, shall be by the Irrigation Consultant prior to the contract being awarded. The opinion of the Irrigation Consultant shall be final, and no substitute material or article shall be purchased.
- D. The specific materials to be used shall be as designated on the plan or in the bid schedule of Unit Prices. All materials to be incorporated in this shall be new and of the best quality, meeting the requirements for such materials and for the purpose intended.

1.13 SUBMITTALS

- A. Four (4) material lists of all products and materials to be used on the project shall be submitted to the Irrigation Consultant for review and approval and then sent to the Park's Representative by the Irrigation Consultant for written approval prior to the installation of the irrigation system. The Park's Representative and Irrigation Consultant reserve the right to reject any and all materials that have been installed but have not been approved.
- B. The source for such products shall be submitted in PDF format to the Irrigation Consultant with detailed descriptions in the form of samples, shop drawings, specifications, tests or other means necessary to adequately describe the items submitted.

- C. If it is found that the sources of supply have not furnished products meeting the intent of the contract documents/specifications, the Contractor shall thereafter replace from the approved source and shall remove completed work incorporating products, which do not meet contract requirements.
- D. If rejected materials, equipment or work is not removed within (48) hours from the date of letter of notification, and the Park shall have the right and authority to stop the Contractor and his work immediately, which shall not extend the completion date. The Park shall have the right to arrange for removal of said rejected materials, equipment or work at the cost and expense of the Contractor.
- E. The failure of the Park or Irrigation Consultant to condemn improper materials and/or workmanship shall not be considered as a waiver of any defect, which may be discovered later, or for work actually defective.
- F. Included are, but not limited to for submittal are:
 - 1. Sprinkler head manufacture (each type)
 - 2. Automatic Valve
 - 3. Automatic control system
 - 4. Piping systems manufacture
 - 5. Mainline fittings
 - 6. Lateral fittings
 - 7. Swing joints
 - 8. Wire
 - 10. Isolation valves
 - 11. Lateral electric valves
 - 12. Proposed Construction Schedule
 - 13. Drain Valves
 - 14. Quick Coupling valves
 - 15. Electrical Components
 - 16. Grounding
 - 17. 24-volt connections
 - 18. 120-volt connectors
 - 19. Power condition
 - 20. Junction boxes
 - 21. Mainline valve
- G. All the above items are to be listed with:
 - 1. Agent and/or local distributor
 - 2. Local address, phone # and contact person
 - 3. Manufacturer's warranty

1.14 MATERIAL TESTING

- A. The inspection and testing of materials and finished articles to be incorporated in the work at the site shall be made by bureaus, laboratories or agencies approved by the Irrigation Consultant. The Contractor shall pay the cost of such inspection and testing. The Contractor shall furnish evidence satisfactory to the Park that the material and finished articles have passed the required tests prior to the incorporation of such articles into the work.
- B. The presence or observations of the Park, Park's Representative or Irrigation Consultant as the site shall not be construed to, or in any manner relieve the Contractor of the responsibility for strict compliance with the provisions of the contract documents.

- C. The testing for leakage shall be done under the supervision of the Park, and all pipe, joints and appurtenances shall be inspected while the system is under test pressure, and leaks corrected as directed. The testing shall extend over a period of time sufficient to allow for a complete inspection, but in no case for less than one hour.
- D. Required certificates of inspection shall be incurred by the Contractor. The Contractor having secured all certificates of inspection shall deliver it to the Park upon completion. If any work should be covered up without approval, it shall be uncovered for examination at the Contractor's expense.
- E. Upon notice from the Contractor that the work is completed, the Park and/or Irrigation Consultant shall make a final inspection of the work and shall notify the Contractor of all instances where the work and/or products fail to comply with the drawings and specifications as well as any defects discovered. The Contractor shall within 5 days, make such alterations as are necessary to make the work comply with the full intent of the project.
- F. The final payment shall not be due until the Contractor has completed all the work necessary and reasonably incidental to the Contract final clean up.
- G. Acceptance of the work and the making of final payment shall not constitute a waiver of any claims by the Park. Payments otherwise due to the Contractor may be withheld by the Park because of defective work with no remedied and unadjusted damage to others by the Contractor, Subcontractors, vendors or laborers.

1.15 BALANCING AND ADJUSTMENT

- A. The Contractor shall be responsible for the balancing and adjustments of the various components of the system, so the overall operation of the system is the most efficient. Balancing and adjustments, including but not limited to synchronization of the controllers, adjustments to pressure reducing valves, pressure relief valves, part circle sprinkler heads, and individual station adjustments on the controllers. The Contractor shall have the right to call in the Park or Irrigation Consultant to aid in balancing and adjusting the system.
- B. If, during such warranty period, any such product fails due to improper installation or defective material, the Contractor shall repair the defective component free of charge.
- C. The Contractor shall have 24 hours to respond to the failure. In the event the Contractor does not respond within this time frame, the Park shall back charge the Contractor the same schedule of service fees as provided to him for such repairs.
- D. In climates where winterization is required the Contractor shall perform such winterization and spring start-up. This service shall be performed within 48 hours of being notified by the Park. The Contractor shall be responsible for multiple start-ups and winterizations if necessary, during construction.
- E. Payment Bond. The Contractor shall provide to the State a payment bond guaranteeing that the Contractor's subcontractors, laborers, and material suppliers will be paid for performance under this Contract with the additional obligation that such contractor shall promptly make payment of all taxes, licenses, assessments, contributions, penalties, and interest. The payment bond will be in an amount equal to twenty-five percent (25%) of the Maximum Liability. The State reserves the right to review the bond amount and bonding requirements at any time during the Term. The Contractor shall submit the bond no later than 7 days preceding the end of the protest period and in the manner and form

prescribed by the State at **Attachment Reference B**. The bond shall be issued by a company licensed to issue such a bond in the State of Tennessee. The payment bond shall guarantee that the Contractor's subcontractors, laborers, and material suppliers will be paid for performance during the Term and all extensions or renewals of the Contract.

Failure to provide to the State the payment bond as required under this Contract may result in this Contract being terminated by the State. The payment bond required under this Contract shall not be reduced during the Term without the State of Tennessee Central Procurement Office's prior written approval.

1.16 PARK'S RESPONSIBILITY FOR MAINTENANCE

- A. It shall be the responsibility of the Park to maintain the system in working order during the warranty period, performing necessary minor repairs, keeping grass from obstruction the sprinkler heads, protecting against vandalism, and preventing damage during the landscape maintenance operation.
- B. Prior to the completion of the work, the Park may take over operation and/or use of the uncompleted project or portions thereof. Such prior use of facilities by the Park shall not be deemed as acceptance of any work or relieve the Contractor from any of the requirements of the contract.

1.17 SERVICE BY CONTRACTOR

- A. The Contractor shall service the system at the Park's request during the warranty period. The Park shall pay for any work performed, which is not covered by the warranty. If requested by the Park, the Contractor shall furnish the Park with a schedule of service fees and the work shall be subject to a change order for additional services.

1.18 DEMOLITION

- A. The Contractor shall be responsible for removing existing irrigation heads, valves and all valve boxes. The Contractor shall dispose of all components that the Park does not wish to keep.

1.19 SUBSTANTIAL COMPLETION INSPECTION

- A. The Contractor shall notify the Park's Representative in writing that the irrigation system is ready for inspection. All items shall be substantially complete.
- B. Perform the following prior to inspection:
 - 1. Complete all cleanups.
 - 2. Submit all required materials and information as specified.
 - 3. Complete the training program for the controller.
 - 4. Construction Record drawing field notes complete.
 - 5. Programming booklet
- C. The Contractor shall be responsible for notifying the Irrigation Designer in advance of the following observation meetings, according to the time indicated:

1. Head location staking - 5 days notice (Earlier requests or requested schedule changes shall be charged airfare penalty/extra charges).
2. Substantial Completion - 15 days
3. Final Acceptance - 15 days.

PART 2 - MATERIAL

2.01 PIPE

- A. PE Pipe shall be DR 11, IPS diameters, of a 4710 Bimodal Resin with a Slow Crack Growth Resistance (PENT) of >1500 hours per ASTM F1473. Pipe shall be manufactured BY ISCO Global, Flying W, or pre-approved equal.
 1. Pipe diameters 2" and larger shall be per ASTM F714 or ASTM D3035.
 2. Pipe diameters less than 3" shall be per ASTM D3035. Pipe shall be supplied in 40' or 50' lengths. 3" and smaller may be supplied in up to 2,000' coils. Coils must be straightened and re-rounded by the Contractor prior to use.
- B. Pipe connections must be connected by socket fusion, butt-fusion and electrofusion fittings.
- C. All pipe shall be installed with lavender marking tape on top to indicate effluent water. Tape shall be installed in conjunction with backfilling and tamping at a level of 6" below finished grade and shall be located directly above pipe.
- D. Include a purple tracer wire along all piping through the wooded areas.
- E. Install fiberglass position markers every 100' along all piping through the wooded areas. Fiberglass shall be installed in a concrete base.

2.02 FITTINGS

- A. PE Fittings shall be IPS diameters, made from PE 4710 resin with a cell classification of 445574C per ASTM D3350.
- B. Butt fusion fittings shall be DR 11. Contractor may use DR11 fittings with their ends machined to DR 13.5 at their preference.
- C. Molded butt fusion fittings shall be DR 11 per ASTM D3261 prior to optional machining of their ends.
- D. Reductions on Run and/or Branch Tee's shall be such that the size of the "main body" is that of the largest leg of the tee.
- E. Fittings fabricated from pipe are not permitted other than elbows with angles of deflection less than 45°. These elbows shall be DR 11/Class 160 psi and comply with AWWA C906 prior to machining of ends to DR 13.5.
- F. Side wall fusion branch saddles shall not be permitted.

G. Electrofusion Fittings including Electrofusion Couplings, Electrofusion Branch Saddles, Electrofusion x FNPT Saddles, and Electrofusion Swivel Saddles shall be rated DR 11 at a minimum per ASTM F1055.

H. Electrofusion Branch Saddles with branches of greater than 2" are not on mainline piping for a change of direction. Branches of electrofusion branch saddles shall be DR 11.

I. Flange adapters for PE Pipe

1. Flange adapters shall be molded or machined from stock and be DR 11 rated complying with ASTM F2880 prior to machining of end to DR 13.5.
2. Back Up Rings shall be Ductile Iron per ASTM A536 and DR 11 rated.
3. Accessories shall be 1/8" Neoprene Gaskets and Grade 5 or stronger, zinc plated Cap Screws or Threaded Rod and Nuts.

J. Threaded Transitions: HDPE x MNPT Brass or Stainless-Steel transitions shall be DR 11 rated.

K. Transition pieces with stiffeners are required at the outlet of the lateral isolation valve to connect with the lateral. The transition shall be DR 11.

L. All swing joint connections shall be made with clamp saddles that are connected to the mainline so that a vertical connection is made to the swing joint from the top of the mainline.

2.03 VALVES, VALVE BOXES AND WRENCHES

- A. Drain valves shall be of the type and size specified on the plan and installed at low point of the mainline.
- B. Each valve placed below grade must be placed in a valve box. The box shall be marked "irrigation". All valve boxes shall be Ametek #181104 or pre-approved equal with an 8" PVC sleeve, as noted on the plans.
- C. The Contractor shall furnish the Park with 2 sets of operational keys for each type of valve installed. They shall be of sufficient length to operate each valve smoothly and efficiently.

2.04 SPRINKLERS

- A. All rotary pop-up sprinklers and quick coupler valves shall be attached to the irrigation system piping with either triple or quad swing joints as necessary at the location and grades as indicated on the irrigation plan, properly fitted and adjusted, ready for use.
- B. All heads are to be of the valve in head type with solenoids rated to 20,000VAC electrical surge without failing.

2.05 SYSTEM INTERFACE UNITS

- A. The field interface unit shall be by Rainbird ICI-Connect – ICI-120. The field wiring shall be 14/2 Maxi cable for decoders at each irrigation head.

- B. An alternate for TORO or pre-approved equal can be submitted.

2.06 CENTRAL CONTROLLER AND WEATHER STATION

- A. Include a Rainbird Cirrus Pro software system, TORO Lynx Central control system or a pre-approved equal can be submitted.
- B. Include 3 APPLE IPAD Mini 7 (or the most current version), 256GB of memory with cell coverage and Wi-Fi 6E and 5G connectivity with the necessary software to operate the system from the cloud through either a browser on the iPad or an APP from the manufacturer. Include a weatherproof case on each IPAD. Park Representative shall approve for the model functions of the case.
- C. Include phone apps for 3 phones that shall operate the central software. Include all costs and set up fees with a 3-year software license subscription.

2.07 120 VOLT WIRING

- A. Include all 120VAC connections with grounding and necessary line conditioners.

2.08 GROUNDING

- A. Use grounding electrodes that are UL listed or manufactured to meet the minimum requirements of Article 250-52 of the 1999 National Electric Code (NEC). Install, (3) 10' Copper clad rods, spaced 15' apart in a triangular pattern, 5/8" diameter driven at every controller location connected by a #6 bare copper wire. Additionally, a copper ground plate shall be set off of one leg of the ground rod 30" deep, 15' long set into an irrigated area. Backfill each copper plate with two bags of Power Set "Gem Material". Use Cadweld connections between copper wire and ground rods. These devices must have a resistance of 50 Ohms or less to the ground in which it is driven. When the soil conditions dictate, additional grounding equipment may be required by the Contractor to achieve 50 ohms of resistance maximum.
- B. The local irrigation materials representative and/or manufacturer's service representative must test, inspect, and approve all grounding prior to operating the system.

2.09 24-VOLT WIRING

- A. All 24-volt control wires from the controllers to the remote-control valves shall be #14/2 PE Maxi wire or UF/UL, approved 600-volt direct burial wire.
- B. All 24-volt splices shall be done with 3M DBY or DBR kits.
- C. Wire shall be furnished in 2500' reels and all splices needed for "teeing-off" shall be done in valve boxes with a minimum of 18" extra lead wire provided for modifications and future use. All wires shall be labeled in splice boxes on either side of the splice with wrap-around labels.

2.10 AIR RELIEF VALVES

- A. Air and vacuum relief valves shall be sized as per the details and installed with the same size ball valve as per detail, as manufactured by Bermad or Crispin at all high points or dead ends of the mainline as shown on plan.

2.11 SWING JOINTS

- A. All sprinkler heads and quick-coupler valves shall be installed on Lasco unitized swing joints as noted on the plan with O-ring seal and wire clips.

2.12 SLEEVING

- A. All piping under roads, or river and creek crossings shall be made with Sch 40 steel or ductile iron pipe, two sizes larger than the mainline which shall be HDPE pipe, SDR11. The entire sleeve and mainline shall be encased in 2000 PSI concrete at least 12" W x 12" D x the length of the crossing with 24" beyond each end of the crossing limits.

PART 3: INSTALLATION

3.01 EXCAVATION, TRENCHING, AND BACK FILLING

- A. Trenches for the piping system, wiring and allied material shall be excavated of sufficient depth and width to permit proper handling and installation of the materials.
- B. Trenches for 10" and 12" pipe shall be excavated to a depth so as to provide a minimum soil coverage over the top of the pipe 24" and to a minimum width of 6" wider than the pipe size that is being installed.
- C. Trenches for 2" to 8" pipe shall be excavated to a depth so as to provide a minimum soil coverage over the top of the pipe to 24" or as indicated on the plan and to a minimum width of 4" wider than the pipe that is being installed.
- D. In cases where rock cannot be excavated with a 75 HP trencher the cost per cubic yard attached to the bid document shall be used. All pipes shall be installed with 18" cover and the trench brought back to grade with sand or fine gravel well tamped into place.
- E. Excavation shall be unclassified and shall include all materials encountered, except all materials that cannot be excavated by a 75 HP trencher. It shall then be brought to the attention of the Park prior to proceeding.
- F. When additional backfill, material is needed to replace unsuitable materials, it shall be the Contractor's responsibility and expense to supply such material (provided on site). It shall also be the Contractor's responsibility to dispose of (on site) the unsuitable material.
- G. Installation by trenchless method shall not be allowed.
- H. All water, sewer, drainage, electrical and other utility lines shall be protected where cut or damaged by the Contractor and shall be repaired at the expense of the Contractor and to the satisfaction of the Park and Irrigation Consultant.
- I. Backfill shall be compacted to 95% standard proctor density. All trench excavation shall be compacted in 6" lifts to ensure no settlement in the future. Contractor shall be responsible for the restoration of all settlement for a period of two (2) years from acceptance.

- J. Cutting of cart paths shall be permitted. Backfill trench under cart path with crusher-run (road base) flush with cart path surface. The Contractor shall be responsible for restoration of asphalt or concrete finish.

3.02 TESTING AND FLUSHING OF THE SYSTEM

- A. The entire system shall be tested at 125 psi for a period of one hour. Upon any visual inspection of the ground, should any leak be found, it shall be promptly repaired and re-tested until satisfactory. This test shall be under static conditions.
- B. All electrical circuits shall be tested in accordance with the control system manufacturer's recommendations prior to automatic sequencing.
- C. Each hole shall be isolated and inspected by the Park's Representative prior to the installation of any sprinkler heads. During this inspection all of the pipe system shall be "flushed" with water that is to be provided by the Park.

3.03 PIPE AND FITTINGS

- A. Suitable tools for safe and convenient handling of the pipe shall be used. The interior of all pipes, fittings and valves shall be cleaned before being assembled into piping system and shall be kept clean up to the time of completion and acceptance of the project. All open ends of pipe and fittings must be suitably blocked or covered during lunch hour and a night to prevent entry of ground vermin, leaves, etc.
- B. Appropriate pipe fittings must be inserted in the line where the angle exceeds four degrees off center. All male threads on screwed pipe fittings shall be coated with an approved pipe thread compound before being made up. Pipe compound shall not be applied to female threads on fittings or valves.
- C. Each pipe shall be supported uniformly throughout its length and shall not rest on any boulder, rock or other unyielding structure unless otherwise specifically designed on the drawings.
- D. Unless otherwise specified or indicated on the drawings, all sharp changes shall be made with forty-five-degree elbows and a nipple or short length of pipe as the conditions may require.
- E. All road crossings shall be made with ductile iron or steel pipe. Transition coupling length shall be 2x diameter of the pipe and a minimum of 12" long.
- F. If, at any time, the mainline must drop more than 12" to cross a road, connect to another pipe or any other reason, the drop shall be made with steel pipe with joint restraints.

3.04 POP-UP ROTARY SPRINKLERS AND QUICK COUPLING VALVES

- A. All sprinklers and quick coupling valves shall be installed on triple swing joints and shall be set plumb and level with the turf at locations staked by the Contractor and approved by the Park. Place a 4' straight edge perpendicular to trench to establish correct grade and avoid "bird baths".

- B. All sprinkler equipment shall be connected to the lateral or main line piping by using the type of swing joint as listed in the details.
- C. In the event the cart path has not been installed, the Contractor shall stub extra pipe, a riser and 10' of extra 24-volt wire within 5' of the cart path. When the path is complete the Contractor shall install the sprinkler within 6" of the cart path.
- D. The elevation of sprinkler heads and quick coupler valves is critical, and the Contractor shall exercise care and set them exactly on grade.

3.05 CENTRAL CONTROLLERS

- A. All central controllers shall be completely installed as designated on the irrigation plan and in accordance with manufacturer's specifications and shall be connected correctly to the specified field controllers.
- B. All field controllers shall be completely installed on approved pedestals mounted on concrete bases in accordance with manufacturer's recommendations and shall be connected to solenoids in correct fairway, green and/or tee zones at the locations and grades as approved by the Park, and shall be properly fitted, labeled and adjusted, ready for use.

3.06 CONTROL WIRING

- A. All wiring to be used for connecting the remote-control solenoids to the field controllers, and from field controller to the power source and central controllers shall be UF or PE/UL approved 600-volt, single solid copper wire.
- B. Verification of wire types and installation procedures shall be checked by the Contractor to conform to local codes.
- C. A minimum of 18" of wire for an expansion loop shall be allowed at each valve-in-head sprinkler and/or each electric control valve for contraction of wire or tightening of wire, in addition to every change of direction fitting.
- D. At no place in the entire wire network shall the wire be tight, it must be "snaked" into the trenches to provide expansion. It shall be bundled every 10' with electrical tape or wire ties.
- E. All wire shall be furnished in 2500' reels and all splices needed for "teeing-off" shall be done in valve boxes with minimum 18" excess for future.
- F. All 24-volt wiring shall be run with, or be in a common trench with, the main or lateral piping system. The only exception is to get from the controller to the pipe location.
- G. All splices are to be made out of the fairway areas and shall be placed in an appropriate valve box with a flush lid and a minimum of 18" excess for future use.
- H. All expansion loops shall be formed by wrapping wire at least 8 times around a 3/4" pipe and withdrawing the pipe.
- I. At each valve-in-head sprinkler, the Contractor shall use a Lasco "wire-holder clip" on each swing joint to secure wires in a location that shall protect wires from damage.

3.07 SURGE PROTECTION

- A. Surge protection shall be installed on the 115 VAC power wires and on the communication wires. Surge protection shall also be provided on all 24 VAC secondary circuits.
- B. Grounding shall be checked by the local manufacturer's representative prior to operating any part of the system and recorded.

3.08 SOD RESTORATION

- A. The Contractor shall bring trenches to a compaction level of 95%. Hand rake flush to grade. The Park shall re-grass trenches with approved seed after each hole is complete.

3.09 WARRANTY

- A. Ensure that all manufacturers' warranties on irrigation products and allied materials shall be in effect from the date of completion of entire project for two (2) continuous years of operation. Irrigation heads will be warrantied for 5 years. All warranties are turnkey including installation
- B. Ensure that all central hardware and software shall have an upgraded warranty for a total of 5 years from the date of completion of entire project.
- C. Ensure that all labor shall be warranted for a period of one (1) year following the date of final inspection of entire project.

PART 4: PAYMENT, APPROVAL AND DOCUMENTATION REQUIREMENTS :

3.01 INVOICE REQUIREMENTS AND WORK APPROVAL

- A. The Contractor shall invoice the State only for goods delivered and accepted by the State or services satisfactorily provided. Contractor shall submit invoices and necessary supporting documentation, no more frequently than once a month, and no later than thirty (30) days after goods or services have been provided.
- B. All work performed under this Contract shall be subject to inspection and approval by the Park's Representative or Irrigation Consultant. . No invoice for payment will be accepted unless the related work has been reviewed, verified, and signed off as complete and acceptable by the Park's Representative or Irrigation Consultant.

3.02 PROOF OF MATERIALS DELIVERED

- A. The Contractor shall provide verifiable proof of all materials delivered to the project site.
- B. Acceptable documentation includes, but is not limited to, signed delivery tickets, packing slips, bills of lading, or receipts clearly identifying the type, quantity, and date of materials received.

3.03 DOCUMENTATION FOR PAYMENT

- A. The Contractor shall submit all required documentation, including work approvals and proof of materials, with each invoice.
- B. Invoices submitted without proper documentation will be considered incomplete and will not be processed for payment.

3.04 NONCOMPLIANT WORK

- A. Any work found to be incomplete, defective, or noncompliant with the specifications shall be corrected at the Contractor's expense prior to approval and invoicing.
- B. The Contractor understands and agrees that an invoice under this Contract shall:
 - 1. Only include charges for goods delivered or services provided as described in the above requirements.
 - 2. Only be submitted for goods delivered or services completed and shall not include any charge for future goods to be delivered or services to be performed
 - 3. Not include Contractor's taxes which includes without limitation Contractor's sales and use tax, excise taxes, franchise taxes, real or personal property taxes, or income taxes; and
 - 4. Begin the timeframe for payment (and any discounts) only when the State is in receipt of the invoice, and the invoice meets the minimum requirements of this section.

Certificate of Insurance Requirements

Below is the list of requirements mandated by the state in order to conduct business on state property.

1. A Certificate of Insurance (COI) must list each insurer's **National Association of Insurance Commissioners (NAIC) number** be signed by an authorized representative of the insurer. a. The following information must also be included: i. Include Policy Number

ii. Policy effective date

iii. Policy expiration date

2. When (COI) forms are received by our office, and they contain General Liability (GL) coverage- **The State of Tennessee must be listed as Additionally Insured and contain an endorsement for a waiver of subrogation in favor of the State** in one of two ways: a. The Additional Insured (ADDL INSR) column & Subrogation Waived (SUBR WVD) column for Commercial General Liability needs to be marked with "X" / "Y"

OR

b. On the form under the label: *Description of Operations/Location*, it must read: i. The State of Tennessee is Additional Insured with respect to General Liability per contract. A waiver of subrogation is granted to the Additional Insured under the General Liability policy where required by written contract.

3. **Automobile Liability Insurance** must be a component of all contracts/purchase orders which involves a contractor's physical presence on State property. a. The contractor shall maintain Automobile Liability Insurance which shall cover liability arising out of any automobile (including owned, leased, hired, and non-owned automobiles). i. The following information must also be included: 1. Include Policy Number

2. Policy effective date

3. Policy expiration date

4. **Workers Compensation & Employers Liability Insurance** section is for Contractors statutorily required to carry workers' compensation and employer liability insurance; the Contractor shall maintain:

Certificate of Insurance Requirements

a. Workers' compensation in an amount not less than one million dollars (\$1,000,000) including employer liability of one million dollars (\$1,000,000) per accident for bodily injury by accident,

b. one million dollars (\$1,000,000) policy limit by disease,

c. and one million dollars (\$1,000,000) per employee for bodily injury by disease.

d. The following information must also be included:

i. Include Policy Number

ii. Policy effective date

iii. Policy expiration date

e. If the Contractor certifies that it is exempt from the requirements of Tenn. Code Ann. §§ 50-6-101 – 103, then the Contractor shall furnish written proof on company letterhead of such exemption for one or more of the following reasons:

i. The Contractor employs fewer than five (5) employees

ii. The Contractor is a sole proprietor/ Individual

iii. The Contractor is in the construction business or trades with no employees

iv. The Contractor is in the coal mining industry with no employees

v. The Contractor is a state or local government; or

vi. The Contractor self-insures its workers' compensation and is in compliance with the TDCI rules and Tenn. Code Ann. § 50-6-405.

5. The box labeled **Certificate Holder** must contain this information:

State of Tennessee, CPO Risk Manager

312 Rosa L. Parks Ave., 3rd Floor

Central Procurement Office

Nashville, TN 37243

If the form is not completed correctly, your insurance coverage is insufficient, you are in violation of the contract/purchase order, and you will be unable to continue working for the State of TN. This information must be applied to the form by the insurance carrier.

You may *NOT* enter this information on the form yourself.

We appreciate your adherence to the contract/purchase order insurance policies. We are happy to assist you in anyway if you have questions or need clarification. We appreciate doing business with your company.

Please see below for all insurance minimum coverage requirements and policy limits.

Certificate of Insurance Requirements

Insurance Certificate Requirements/Limits Required

Commercial General Liability

Commercial General Liability Insurance, including but not limited to, bodily injury, property damage, contractual liability, products liability, with combined single limits of not less than one million dollars **(\$1,000,000)** per occurrence with a minimum aggregate of two million dollars **(\$2,000,000)**.

Workers Compensation & Employers Liability Insurance

The contractor is required to provide Workers Compensation Insurance coverage to its employees in compliance with State law and Employer's Liability with the following limits:

Workers' Compensation in an amount not less than one million dollars **(\$1,000,000)**, including employer liability of one million dollars **(\$1,000,000)**, one million dollars **(\$1,000,000)** per accident for bodily injury by accident, one million dollars (\$1,000,000) policy limit by disease, and one million dollars **(\$1,000,000)** per employee for bodily injury by disease.

Auto Liability Insurance

- a. The contractor shall maintain Automobile Liability Insurance which shall cover liability arising out of any automobile (including owned, leased, hired, and non-owned automobiles).
- b. The contractor shall maintain bodily injury/property damage with a limit not less than one million dollars **(\$1,000,000)** per occurrence or combined single limit.

ATTACHMENT REFERENCE B**PAYMENT BOND TEMPLATE**

This template prescribes the format and content for a payment bond. Under Tenn. Code Ann. § 12-4-201, a payment bond is required for all public works projects with a contract price exceeding one hundred thousand dollars (\$ 100,000). The bond amount in paragraph two below shall be twenty-five percent (25%) of the contract price, as established by Tenn. Code Ann. § 12-4-201(a)(1).

Procurement professionals shall adhere to this template and follow, replace, or otherwise address red instructional text. Changes to this document other than those identified in the instructions require a Rule Exception as set forth in Tenn. Comp. R. & Regs. 0690-03-01-.17 and the *Procurement Procedures Manual of the Central Procurement Office*.

PAYMENT BOND FOR LABOR AND MATERIALS

This bond (the “Bond”) made **date**, by **contractor name** (“Principal”), a corporation organized under the laws of **name of state**, having its principal office at **contractor’s address**, as principal, and **surety name** (“Surety”), a corporation organized under the laws of **name of state**, and licensed to transact a surety business in the State of Tennessee, having its principal office at **surety’s address**, as surety.

OBLIGATION

WHEREAS, the parties are obligated to the State of Tennessee Department of General Services Central Procurement Office (“State”), whose principal address is 312 Rosa L. Parks Avenue, 3rd Floor, Nashville, TN 37243, as obligee, for the benefit of Claimants as defined below, in the amount of **written amount** (\$ **number**), for the payment of which Principal and Surety bind themselves, their heirs, representatives, successors and assigns, jointly and severally, firmly by this Bond.

WHEREAS, Principal has by written agreement, dated **date of agreement**, entered into a contract with State for **description of work** in accordance with the drawings and specifications prepared by **name of architect or engineer**, which contract is made a part of this Bond by this reference, and is referred to as the “Contract.”

CONDITION

The condition of this obligation is such that if the Principal shall promptly make payment to all Claimants as defined in SECTION ONE of this Bond for all labor and materials used or reasonably required for use in the performance of the Contract, then this obligation shall be void; otherwise it shall remain in full force and effect.

AGREEMENT

For the reasons recited above, and in consideration of the parties’ mutual covenants, the parties agree as follows:

SECTION ONE. CLAIMANT DEFINED

“Claimant” is defined as one having a direct contract with Principal or with a subcontractor of Principal for labor, materials, or both, used or reasonably required for use in the performance of the Contract, “labor and material” including that part of water, gas, power, light, heat, oil, gasoline, telephone service or rental of equipment directly applicable to the Contract.

SECTION TWO. ACTION ON SUMS DUE CLAIMANT

Principal and Surety jointly and severally agree with State that every Claimant who has not been paid in full before the expiration of a period of ninety (90) days after the date on which the last of such Claimant's work or labor was done or performed, or on which the last of such materials were furnished by Claimant, may sue on this Bond for the use of Claimant in the name of State, prosecute the suit to final judgment for such amount as may be justly due Claimant, and have execution, provided, however, that State shall not be liable for the payment of any costs or expenses of any such suit.

SECTION THREE. LIMITATIONS ON SUIT BY CLAIMANT

Any suit or action commenced under this Bond shall comply with Tenn. Code Ann. § 12-4-205. Claimant shall give written notice to any two of the following: Principal, State, or Surety, above named, within ninety (90) days after completion of the public work. The claim shall state with substantial accuracy the amount claimed and the name of the party to whom materials were furnished, or for whom the work or labor was done or performed. Such notice shall be personally served or sent by certified mail, return receipt requested, in an envelope addressed to Principal, State, or Surety, at any place where an office is regularly maintained for the transaction of business.

SECTION FOUR. PAYMENTS MADE

The amount of this Bond shall be reduced by and to the extent of any payment or payments made in good faith under this Bond, inclusive of the payment by Surety of mechanics' liens which may be filed of record against the improvement, whether or not claim for the amount of such lien be presented under and against this Bond.

The parties have executed this Bond at **place of execution** the day and year first above written.

PRINCIPAL:

Contractor name

By: _____
Contractor's authorized signatory

Printed name and title

SURETY:

Surety Name

By: _____
Surety's authorized signatory

Printed name and title