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**IRRIGATION SYSTEM SPECIFICATIONS – GENERAL**

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**1.0 GENERAL**

**1.1 SCOPE OF WORK**

- 1.1.1 The work included under these Specification's shall consist of the furnishing of all materials, sprinkler equipment, plant material and labour, necessary for the complete installation of the underground sprinkler irrigation system and landscape rehabilitation work in accordance with the following Specifications.
- 1.1.2 It is the intent of these Specifications and Drawings, to form a guide for the construction of a complete irrigation system and/or for the upgrading of an existing irrigation system. Therefore, any minor items not specifically noted, but reasonably necessary for a complete installation shall be furnished under this Contract and included in the unit prices, no separate payment will be made for any minor items.
- 1.1.3 The system shall efficiently and uniformly irrigate all areas and perform, as required by these Plans and Specifications.

**1.2 CODES, PERMITS AND LICENSES**

- 1.2.1 Materials and installation shall conform to all Provincial and Local Codes and Regulations governing the trades included in this work. Requirements of these plans and specifications, not conflicting therewith, but exceeding code requirements shall govern.
- 1.2.2 The Contractor shall obtain and pay for all necessary permits required for this work. Permits are required for plumbing, excavating work and electrical work.
- 1.2.3 The Contractor shall be licensed as required by the City of Lethbridge for work to be performed.
- 1.2.4 The Contractor shall carry out the work in accordance with all applicable statutes and regulations of the Province relating to pollution control of water and air.

**1.3 SUBMITTALS**

- 1.3.1 The Contractor shall submit evidence of project personnel having the required certifications in High-Density Polyethylene Butt-Fusion and electro fusion prior to commencing with the work.
- 1.3.2 The Contractor shall submit evidence of project personnel having certification in Backflow Cross connection prior to commencing with the work.
- 1.3.3 The Contractor shall submit shop drawings and product literature for approval by the Engineer prior to construction.
- 1.3.4 The Contractor shall provide any necessary tools as supplied by the manufacturer, for servicing the irrigation equipment installed.
- 1.3.5 The Contractor shall provide to the Engineer all records from the HDPE fusion data logging prior to pressure testing the pipe.

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**1.4 MEASUREMENT AND PAYMENT**

- 1.4.1 Payments will be based on unit pricing. Payment shall include the supply and installation of all materials shown on the drawings, and all materials incidental to the completion of the work, and shall include all costs for the maintenance and warranty of the system.
- 1.4.2 Progress claims submitted by the Contractor shall be based on the unit prices submitted or the percentage of work completed in the Tender Form for the work completed at date of claim and approved by the Engineer and Owner prior to payment.
- 1.4.3 No payment shall be made for materials delivered and stored onsite that have not been properly installed and tested.
- 1.4.4 The unit prices for supply shall include supplying, delivering, loading, unloading and all allowances for handling, storage, breakage and waste. Payment will be made only for material actually installed and tested in the work.

**1.5 WORKING CONDITIONS**

- 1.5.1 All losses or damage to material, equipment, or the City's property, while in the possession of or being used by the Contractor, shall be the responsibility of the Contractor, and he shall repair, replace, or otherwise compensate the City for any such loss.
- 1.5.2 The Contractor at all times at his own expense shall provide adequate security of materials and work on site.
- 1.5.3 The working area shall be kept clean of all debris, rock, waste, or dirt.
- 1.5.4 The interior of all pipes, fittings and other accessories shall be kept free from dirt and foreign matter at all times.
- 1.5.5 Clean-up and removal of all equipment, excess materials, etc., shall be completed before acceptance will be approved by the City.
- 1.5.6 Overtime work will be at the Contractor's option and expense, unless requested in writing by the Engineer, in which case an agreed overtime premium will be paid by the City.

**1.6 UTILITIES AND PROTECTION**

- 1.6.1 The City shall make available to the Contractor upon request all necessary information regarding the location of City utilities. The Contractor shall contact all affected City utilities and all other utilities for on site location prior to any excavation.
- 1.6.2 The Contractor shall be liable for damages to, or the cost of repairing and/or replacing buried conduit, cables, or piping, encountered during installation work, unless they were not marked or he was not previously informed of such underground utilities, etc. If the Contractor is aware of such buried lines, he shall immediately have incurred damages repaired at his own expense.

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- 1.6.3 The City shall be liable for the cost of replacing or repairing damages to, or caused by existing City utilities of which the Contractor had not been previously informed. No additional or separate payment shall be made for locating or crossing of any utilities.

**1.7 TIME OF INSTALLATION**

- 1.7.1 The Contractor shall commence work no later than five (5) days after awarding of the Contract, unless specified otherwise by the City representative.

**1.8 WORKMANSHIP**

- 1.8.1 The Contractor shall have considerable experience and demonstrated ability in the installation of sprinkler irrigation systems of this type. All irrigation work shall be done by qualified contractor(s) with valid certification from an industry recognized association and/or a minimum of five (5) years industry experience.

**1.9 QUALITY ASSURANCE**

- 1.9.1 All underground work shall be inspected and approved by the Engineer, for correctness and completeness before backfilling. Notify the Engineer and obtain approvals for inspection and testing of irrigation system, as specified in this section.

- 1.9.2 Provide the Engineer and Owner minimum 48 hours' notice prior to required inspections or meetings.

- 1.9.3 The inspections will include, but are not limited to;
1. Main line trench inspections
  2. Main line Pressure Test
  3. Sprinkler lay out
  4. Lateral inspection
  5. CCC inspection
  6. FAC inspection

- 1.9.4 The Contractor shall guarantee all materials, equipment, and installation work, for a period of one (1) year against defective workmanship, and handling. This also includes system performance, head spacing and adequate system pressure.

**1.10 WARRANTY**

- 1.10.1 Warranties shall become effective from the date of the Construction Completion Certificate (CCC). If the contractor maintains the project, the warranties would remain in effect until completion of the Final Acceptance Certificate (FAC).

- 1.10.2 The irrigation system warranty will include but not be limited to the following specific items in addition to the normal warranty coverage:

- 1.10.3 Repair and replace pipes, which have been found during subsequent construction to be installed with insufficient cover.

- 1.10.4 Repair and/or replace materials which do not meet the Specifications and whose substitution was not approved by the Engineer.

- 1.10.5 Adjust electric valves as required to attain design pressures for all zones on automatic systems.

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- 1.10.6 The following items to be done by the Contractor during the first month of actual system operation by the City on a bi-weekly basis as well as during spring start-up and during the two-week period prior to expiration of the warranty period:
  - 1. Clean and adjust sprinklers for proper operation.
  - 2. Adjust sprinklers and valve boxes to grade.
  - 3. Re-tighten loose fittings, sprinklers and valves.
- 1.10.7 Correct any works not in accordance with the Plans and Specifications unless specifically authorized by the Engineer, which may be discovered during the warranty period.
- 1.10.8 Warranties on trees, shrubs, turf sodded and turf seeded areas shall be in accordance with the contract specifications outlined in the other sections or as specified otherwise.

**1.11 RECORD DRAWINGS**

- 1.11.1 During the course of construction the Contractor shall record as-constructed information on a set of plans for record drawing purposes. All changes to the contract shall be recorded on the drawing.
- 1.11.2 All components of the irrigation system shall be shown as installed, with clear measurements from an identifiable reference point to the location of the controller and its circuit breaker, master valve, mainline, sleeves, zone control valves, main water connection, blow-out fittings, pipe drains, sprinklers and any other similar features. Show all other deviations from the irrigation design drawing provided to the Contractor.
- 1.11.3 Record locations of concealed elements of mechanical and electrical services.
- 1.11.4 The Contractor shall maintain the record drawings in good condition at all times on site, updating the drawings daily during construction (as needed), and make the record drawings available for inspection by the Engineer.
- 1.11.5 The as-built drawing shall be submitted prior to issue of Construction Completion. The Contractor shall maintain the as-built record throughout the maintenance and warranty period and issue a revised As-Built Irrigation Plan at Final Acceptance.
- 1.11.6 The Contractor shall guarantee the accuracy of the Record Drawings until the expiration of the warranty period or until such date specified in the Invitation and Instructions to Bidders.
- 1.11.7 System components damaged as a result of an error of more than 1.0 m in open areas and 0.5 m near fixed boundaries in the as-built information provided by the Contractor, shall be repaired by the Contractor at his cost.
- 1.11.8 After the completion of construction and prior to the final progress certificate payment, submit the record drawing to the Engineer. Preparation of the final progress certificate payment will be delayed until the record drawings have been received and approved by the Engineer.
- 1.11.9 Final records must be recorded using GPS technology (or equivalent) in digital format as per City of Lethbridge “Digital File Submission Standards” and “Open Space Irrigation Digital Records Files” documents.

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**1.12 OPERATING / MAINTENANCE MANUALS**

- 1.12.1 After the completion of construction the Contractor shall submit two (2) copies (one with original information) of an operating and maintenance manual containing information on the manufacturer's installation, operation and maintenance of the equipment installed in the system, such as the controller and control valves.
- 1.12.2 The manual shall consist of a hard covered three-ring binder with tabbed sections and a table of contents. All information must be written. In the last section of the manual the Contractor shall provide information on the names and addresses of the equipment supplier, manufacturer's and any sub-contractors (i.e. electrical contractor).
- 1.12.3 All equipment manufacturer's information shall be bound into the binder.
- 1.12.4 The manual (both copies) shall be submitted to the Engineer prior to the final progress certificate being issued.
- 1.12.5 Additionally, the manual shall include a schedule showing the proposed run times for each zone relative to differing plant water requirements and precipitation rates, and a schedule of run times suggested for various weather conditions.

**1.13 QUANTITIES**

- 1.13.1 The quantities shown have been indicated as closely as possible but are approximate only. The Contractor shall be advised not to make a detailed material take-off from the plans. Actual quantities and measurements shall be taken in the field to determine quantities for payment.

**1.14 REPAIR AND INSTRUCTION OBLIGATIONS**

- 1.14.1 During execution of this Contract the Contractor shall keep a technically qualified person on the job full time and maintain adequate labour and equipment at the site to immediately repair the system or components in the event of may leak or failure.
- 1.14.2 Prior to completion of the job, the Contractor shall thoroughly instruct the Owner's personnel in the proper operation, maintenance and repair of the system.

**1.15 WINTERIZING THE SYSTEM**

- 1.15.1 The Contractor shall be responsible as part of the project to drain, "blow down" and winterize the complete system including controllers, pumps and other associated equipment.
- 1.15.2 All irrigation systems that are under the Contractor warranty period shall be winterized no later than October 31.
- 1.15.3 He is also responsible for the start-up of the system the following spring including all valve and sprinkler adjustments as may be required.

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- 1.15.4 All adjustments and repair work must take place and be completed the following day after the inspection, so there are no delays to the use of the open space areas. If the system is not operational during the construction year, the Contractor will be responsible for winterizing and spring start-up the following year.
- 1.15.5 On sites where the project is an addition or alteration to an existing sprinkler system, the City will winterize and start-up the system, however, the Contractor will supervise the work and will be responsible for his work. The Contractor, may at his option, re-winterize the system.
- 1.15.6 Valve and sprinkler adjustments during spring start-up are the responsibility of the Contractor.

**1.16 STAKING AND LAYOUT**

- 1.16.1 The Contractor shall be responsible to determine and stake the location of all sprinklers, valves, piping, and landscape components.
- 1.16.2 The Owner's representative will check the locations before actual construction begins, however, this shall not relieve the Contractor of his responsibility to construct the works as shown on the drawings or as directed by the Owner's representative.

**1.17 SITE SAFETY**

- 1.17.1 Contractor shall designate a Safety Officer, who is familiar with the latest edition of the Occupational Health and Safety Statute and Regulations.
- 1.17.2 The Safety Officer is responsible to hold safety meetings with the Engineer and officials of Occupational Health and Safety.

**1.18 CONSTRUCTION MEETINGS**

- 1.18.1 Construction meetings shall be held regularly on site. The Contractor shall have an authorized representative attend these meetings.
- 1.18.2 Time and frequency of these meetings will typically be determined at the construction start-up meeting by the City or the Engineer.

**1.19 MAINTENANCE AND CLEANUP OF WORK SITE**

- 1.19.1 The Contractor shall be responsible to maintain and cleanup the work site on an ongoing basis from the commencement of construction to the completion of the project.
- 1.19.2 The work site shall be maintained in an orderly manner and shall not be used to store the Contractor's equipment and materials, which are not used for this project.
- 1.19.3 Waste, debris, unnecessary excess material shall not be stockpiled on the work site and shall be disposed of properly by the Contractor.