

**CITY OF RAMSEY
NORTH COMMONS
IRRIGATION SPECIFICATIONS**

24 May 2012

PART 1 – GENERAL

1.01 RELATED DOCUMENTS:

A. Letter inviting quotations, Irrigation Plan, and bid form are hereby made part of this section by reference.

1.02 SCOPE:

A. Furnish and install the complete underground irrigation system including materials, labor, equipment and apparatus for the testing, re-testing and re-adjusting as required to place the system in an approved operational condition. The work shall include, but not be limited to, the following:

1. Supply all materials.
2. Arrange for, obtain and pay for necessary permits, bonds, and fees.
3. Excavating and backfill for all work as specified herein.
4. Install complete irrigation system including controllers, heads, automatic valves, soil moisture sensors, decoders and all related irrigation equipment included in design.
5. Program controller to fully incorporate irrigation system.
6. Test: The entire testing of the underground piping system.
7. Furnish, at no expense to the owner, a technician to instruct the Owner's operating personnel in the maintenance and operation of the system.

1.03 QUALIFICATIONS:

- A. Installer to be an irrigation contractor who has had at least 5 years continuous, satisfactory, and documented experience installing underground irrigation systems of a similar size and type.
- B. As a prerequisite of qualification to bid, the irrigation construction company shall provide verifiable documentation that such person or company is licensed by the Minnesota State Board of Electricity as a Technology Systems Contractor and that company employs not less than one Power Limited Technician and that such licenses are considered "in good standing" by the Minnesota State Board of Electricity. "Verifiable Documentation" shall include but not be limited to submission of copies of Technology System Contractor and Power Limited Technician credentials.

1.04 SUBMITTALS:

- A. Contractor shall furnish the articles, equipment, materials, or processes specified by name in the drawings and specifications. NO substitutions will be allowed .
- B. Contractor shall provide complete "As Built" drawings showing all changes from the original design and specifications and exact "as built" locations, sizes, and types of equipment. Prints of the original design are available from the Owner at cost.

1.05 EXAMINATION OF SITE:

- A. The submission of any proposal in respect to the above named project shall be considered evidence that the Contractor has examined the site:

1.06 CONDUCT OF WORK:

- A. The Contractor shall maintain a skilled journeyman on the jobsite during progress, together with a competent superintendent who has the authority to act in all matters pertaining to the work specified herein.
- B. The Contractor shall coordinate his work with other trades, if any.
- C. The Contractor shall confine operations to the areas to be improved and allotted for material and equipment storage.

1.07 HANDLING OF MATERIALS AND EQUIPMENT:

- A. The contractor shall provide and pay for all transportation required to deliver and remove from the site all materials and equipment required for all the work shown and specified.
- 1.08 **CONTRACTORS RESPONSIBILITY:**
- A. The Contractor shall be responsible for his work and for all materials, tools, and property of every description used in connection.
- B. The Contractor shall protect the Owner against all liabilities, claims, or demands for injuries or damages to any persons or property growing out of the performance of the work under this contract, except such liability, claims or demands for injuries or damages resulting from acts or failure to act by the Owner.
- 1.09 **WORK BY OTHERS:**
- A. Water service, including water meters, backflow prevention, concrete pad and steel enclosure or garden shed shall be by others.
- B. 110 VAC electrical service to the irrigation enclosure or shed shall be by others.
- 1.10 **CODES AND INSPECTION:**
- A. The entire installation shall fully comply with all local, state laws and ordinances and with all the established codes applicable thereto. The Contractor shall be responsible for all required permits, and arrange for all necessary inspection and pay for any and all expenses in conjunction with the irrigation portion of the work.
- 1.11 **FIELD MEASUREMENTS:**
- A. **Verify that field measurements are as shown on drawings and that area within limits are 100% covered.**
- 1.12 **CLEANING PROCESS:**
- A. The contractor shall at all times keep the premises on which the work is being done, and the adjoining premises, clean of rubbish caused by his work.
- B. Upon completion of the job, the Contractor shall clean up all debris caused by his/her work and leave the job in a neat and clean condition. All debris from the job shall be taken away from the premises.

PART 2 - PRODUCTS

All materials shall be new and especially designed for the intended use.

2.01 **PRODUCTS:**

Hunter Irrigation Products I 20's
ACCLIMA controller Model # CS3500
Acclima Decoders Model # ACC-DCR-002 or 001
Acclima Moisture Sensors Model # ACC-SEN-TDT
MP ROTATOR Matched Precipitation Rate Rotary Sprinklers W/ mpr-40-04 bodies

2.02 **PIPING:**

- A. Pressure Main Piping on the supply side of the zone valves shall be class 160 PVC, as indicated in drawings. Fittings shall be solvent welded, schedule 40 socket type PVC, rated for pressure applications. All Solvent cement shall meet ANSI/ASTM B2564 for PVC pipe and fittings.
- B. Lateral piping less than or equal to 1 1/4" shall be 100 psi rated polyethylene. Fittings shall be insert type secured with all stainless steel clamps (double clamped).
- C. Lateral piping greater than or equal to 1 1/2" shall be Class 160 PVC, solvent weld, bell end. Fittings shall be solvent welded, socket type schedule 40, rated for pressure applications.

- 2.03 **SLEEVES:**
A. Sleeves to be installed under drives and sidewalks shall be class 160 PVC of the appropriate size and depth to accommodate piping and low voltage wiring.
B. Sleeves shall extend beyond the edge of paving or construction by 12” minimum.
- 2.04 **VALVES:**
A. Automatic Remote Control Valves shall operate each zone and shall be Hunter PGV
- 2.05 **VALVE BOXES:**
A. Valve boxes for Automatic Remote Control Valves shall be NDS Pro Series model 214BC, 14” x 19” x 12 deep rectangular box. Valve boxes shall have bolt on covers. Valve boxes for Soil Moisture Sensor splices shall be 7” round “econo boxes”
- 2.06 **CONTROLS:**
A. Automatic Controller shall be Acclima CS3500 located per plan.
B. Soil Moisture Sensors shall be Acclima ACC- SEN-TDT sensors
C. Decoders shall be Acclima ACC-DCR-002 or 001
- 2.07 **OUTLETS:**
A. Gear drive sprinklers shall be Hunter I 20 and, nozzled per plan.
B. Fluid brake rotary sprinklers shall be MP Rotators, as indicated in plan.
- 2.08 **SWING JOINTS:**
A.
- 2.09 **WIRE:**
A. Wire shall be 14 gauge P.E. solid conductor approved for direct burial.
- 2.09
- 2.10 **GROUNDING AND GROUND RODS:**
A. Decoders must be grounded to manufacture specifications in the valve box with the decoders
B. The ground rods need to be properly ohm (10 or less) and decoder must be attached to the grounding rod with a ground clamp pursuant to Acclima specifications.
- 2.11 **PRESSURE REGULATORS:**
N.A.
- 2.12 **ENCLOSURE:**
By others
- 2.13 **BOOSTER PUMP:**
N.A.
- 2.14 **SOIL MOISTURE SENSOR:**
A. Acclima ACC-SEN-TDT Moisture Sensor (TWO each test bed, that read identically).
- 2.15 **ACCESSORIES:**
N.A.

PART 3 - EXECUTION

- 3.01 **PROTECTION:**
A. Protect trees, shrubs, lawn, sidewalks, drives, curbs, utilities, and other features on or adjacent to the site from damage from the work of this section. Contractor is liable for the repair of any and all damage.

3.02 **WORKMANSHIP:**

- A. All material shall be installed in accordance with local trade practices and codes and in accordance with approved design shop drawings and the manufacturer's recommendations.

3.03 **UNDERGROUND STRUCTURE:**

- A. The contractor shall contact the appropriate public utilities for location and marking of those utilities.
- B. The Owner/General Contractor shall make available to the Irrigation contractor, upon written request, all available information regarding the exact location of existing underground equipment including, but not limited to, owner owned security cables, electrical parking lot and signage wiring, etc.
- C. Except in the case of mismarked or unmarked buried equipment, the Contractor shall be liable for the damages to and the cost of repairing or replacing any buried conduit, cables or piping encountered during the installation of the work.

3.04 **EXAMINATION:**

- A. Verify that field conditions are acceptable and are ready for work.
- B. Verify that required utilities are installed and that adequate water pressure is available and in proper location and ready for use. A minimum static water pressure of 60 psi is required at the water source.
- C. Beginning of installation means installer accepts existing conditions.

3.05 **PREPARATION:**

- A. Layout work accurately according to the Drawing. The Drawings, though carefully drawn are generally diagrammatic and head and pipe locations may need moderate adjustment to complement actual field conditions.
- B. Layout and stake location of all system components.

3.06. **EXCAVATING AND BACKFILLING:**

- A. Excavation: Contractor shall do all necessary excavation required for the proper installation of his work. Trench to accommodate proposed grade changes and slope to drain when possible.
- B. Maintain trenches free of debris, material or obstructions that may damage pipe.
- C. Backfill: Excavated soil may be used to backfill the remainder of the trench. All Backfill material shall be free from rock, large stone or other unsuitable substances. Backfilling of trenches containing plastic piping shall be done when pipe is cool to avoid excessive contraction. All backfill material will be compacted in 6" layers as it is brought up to finish grade as to insure that no settling results. Replace topsoil and compact to consistency and level of adjacent topsoil.

3.07 **INSTALLATION OF PIPING:**

- A. All shall be installed in accordance with the manufacturer's recommendation.
- B. Mainline piping shall be installed with a minimum depth of cover of 18".
- C. Lateral piping shall be installed with a minimum depth of cover of 12".
- D. Piping shall be securely capped at the end of each day's work to prevent entrance of foreign material.

3.08 **INSTALLATION OF WIRING:**

- A. Wire shall be installed with main line piping in the same trench, but separate sleeve or conduit. At each valve, or valve box location, sufficient slack of at least 18" shall be provided to facilitate future service.
- B. There shall be no splices between valve boxes. All wire splices shall be enclosed in valve boxes. Splices shall be made by twisting conductors together with pliers and then securing with proper sized wire nut. Wire nut shall then be inserted into splice tube filled with waterproof

dielectric gel sealant. **Grease filled wire nuts shall not be allowed.**

3.09 **SLEEVING:**

- A. Pipe and wire shall be enclosed in separate Class 160 PVC sleeves at each walk, road or path crossing as shown on the irrigation plan. Coordinate locations of sleeves to accommodate system. Sleeves under existing roads, sidewalks, and paths shall be bored or cut & patched as indicated on plan..

3.10 **ROCK EXCAVATION:**

- A. If rock or other underground debris is encountered in the alignment and depth shown on the plan, the alignment and/ or depth shall be adjusted in order to avoid its excavation if at all possible. If alignment and depth adjustment cannot be made and it becomes necessary to remove the rock, the Contractor shall be paid for additional cost incurred in the handling of it.

3.11 **WATER SUPPLY:**

- A. Water source for irrigation shall be 1 ½' galvanized pipe stubbed at location indicated on plan. Contractor shall be responsible for all piping and appurtenances downstream of and including the point of connection.

3.12 **CONTROLLER INSTALLATION:**

- A. The controller shall be located and installed in irrigation enclosure. Connect to 110 VAC power supply at location. Controller must be grounded. All power, control and communication lines connected to controller shall be enclosed in conduit.
- B. TDT soil moisture sensors shall be installed at locations shown in plan. These locations are approximate and exact locations shall be determined by the City, the Irrigation Consultant and the Irrigation Contractor. The sensors shall be installed at a depth indicative of the root zone for the surrounding plant material (3" – 4" for turf). Sensors shall be installed horizontally and backfilled with original soil. Backfill shall be compacted to ensure that no voids exist around the sensor and to restore excavated soil as close as possible to original bulk density. **Install & Calibrate sensors per manufacturer's instructions.**
- C. Contractor shall configure Controller to utilize soil moisture sensors to efficiently irrigate the site. Confer with owner for any time restrictions.

3.13 **ELECTRICAL WORK:**

- A. Contractor shall be responsible for all low voltage wiring at controller location. Wiring installation shall comply with all state and local codes.

3.14 **AUTOMATIC CONTROL VALVE INSTALLATION:**

- A. All control valves shall be installed in valve boxes that provide adequate space for valve servicing without excavation. Provide waterproof connections where control wires attach to valve. Make connections using wire nuts and splice tubes filled with waterproof dielectric gel sealant. **Grease filled wire nuts shall not be allowed.** Center valve in an upright position within the valve box. **Valve boxes shall be set on a 6" base of crushed rock with brick supports on each corner.** (Buckshot or pea gravel is available free from the Owner.)

3.15 **ISOLATION VALVE INSTALLATION:**

- A. N.A.

3.16 **SPRINKLER HEAD INSTALLATION:**

- A. Sprinkler heads shall be set plumb to within 1/16" and level to finish grade and be re-adjusted and /or changed as directed after lawn areas are completed to assure proper operation

3.17 **DRIPPERLINE INSTALLATION:**

- A. N.A.

3.18 **RAIN SENSOR INSTALLATION:**

N.A.

3.19 **IMPROPERLY OPERATING OR LOCATED EQUIPMENT:**

- A. Any equipment, which fails to operate properly and/or is located incorrectly for 100% coverage shall be promptly relocated and/or removed at the direction of the Architect, Landscape Architect, Owner, and/or General Contractor, at the Irrigation Contractor's expense. Before any piping or equipment is located other than shown on the plans, permission to do so shall be obtained from the aforementioned authorities.

3.20 **PERFORMANCE TEST:**

- A. Contractor shall notify Owner that all systems are in place and ready for a performance test. The Contractor is cautioned not to notify the Owner until he, the contractor, has thoroughly observed the operation of the system and found it to be in good working order. In the event the performance test fails and additional visits are required by the Owner, the Irrigation Contractor may be liable to compensate the Owner for those additional visits.
- B. The Contractor shall provide all manpower necessary to conduct the performance test.
- C. The Contractor shall provide preliminary "As built" drawings, if different from those provided to the Irrigation Contractor, to the Owner for use during the performance test. The "As Built" drawings will be used to verify the location and operation of the equipment, if different from the original plans.

3.21 **SYSTEM IDENTIFICATION:**

- A. Location of the irrigation system heads, piping and valves shall be marked to avoid damage by others during completion of the landscaping work.

3.22 **SITE REESTABLISHMENT:**

- A. Replace planting and permanent features disturbed by installation of the underground irrigation system.

3.23 **INSTRUCTIONS:**

- A. After completion and testing of the system, the Contractor will instruct the Owner's personnel in the proper operation and maintenance of the system. Contractor shall also provide Owner, one (1) copy of the construction and maintenance manuals on all equipment installed and a manufacturer's parts catalog, as well as an as-built drawing in digital form.

3.24 **GUARANTEE:**

- A. For a period of one year from date of final acceptance of the work performed under this contract, the Contractor shall promptly furnish, without cost to the Owner, any and all parts and or labor required to correct materials or workmanship, which prove to be defective. In the fall, following the installation, the Irrigation Contractor shall drain the system by evacuating water with compressed air (including municipal side of the water supply). In the Spring, following the installation, the Irrigation Contractor shall recharge the system.

3.25 **EXCEPTIONS:**

It is recognized that the practice of Irrigation Design and installation varies considerably depending on the geographic location, prevalent soil and climate conditions and type of plants irrigated. The information contained herein is for the purpose of providing general guidelines to the contractor and inspector. Thus, specific conditions could require a deviation from these guidelines. The irrigation Contractor shall be responsible to provide all information on any deviation, regardless of size or scope. Irrigation Contractor shall provide the Owner information containing, (a) the nature of the deviation, (b) the reason for the deviation and (c) the justification for the standard used. The irrigation Contractor may make recommendations on the nature of the change, if any, however, the Owner will have the authority to make changes to the specifications. The Irrigation Contractor must obtain the written authority of the Owner before material and equipment may be changed.