



STANDARD TEXT GUIDELINE FOR

Field Irrigation System

for

ELEMENTARY AND SECONDARY SCHOOLS

Prepared by the Plant Department

With assistance from *Principle Water Resources Inc.*

Formatted by the Design Department

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1 INSTRUCTIONS TO ARCHITECTS

1.1 SPECIAL NOTES

- 1.1.1 The enclosed is not a specification. It is a Guideline of minimum requirements for a Field Irrigation System for Elementary/Secondary Schools' playing fields.
- 1.1.2 The Field Irrigation System is to be included in the Contract Documents for new schools as well as additions. The system is to be installed by an Irrigation Sub-Contractor to the General Contractor.
- 1.1.3 It is the responsibility of the Consultants not to rely on this document other than as a Guideline, but to develop a specification to be reviewed by the Design Department of the Board, prior to tendering.
- 1.1.4 The Consultants must note that due to the potential placement of portables, the Field Irrigation System is to be installed for organized sport playing fields (Soccer, Football etc.) ONLY.
- 1.1.5 Unless funded by the school, irrigation for planting beds or sodded areas around, and to the front of the school buildings is not to be considered.
- 1.1.6 Irrigation is to be installed prior to fine grading and sodding of field areas.
- 1.1.7 Installation of the Irrigation System and specifically the Controller must be compatible to the Board's Central Control System. The Consultants must note the specific equipment requirements identified in this Guideline.
- 1.1.8 The Consultants must further note that the specifications and drawings must be compatible with each other, especially in the sole supply of the Irrigation Controller and the catch can type rain sensor.

2 CERTIFIED IRRIGATION DESIGNER

2.1 SERVICES OF A CERTIFIED IRRIGATION DESIGNER

- 2.1.1 The Board expects that the Architect, (Prime Consultant) or the Landscape Architect, as part of either of their fee, commissions an independent Certified Irrigation Designer registered with the Irrigation Association to design and site supervise the Irrigation System.
- 2.1.2 The Certified Irrigation Designer is to follow the design guidelines of Best Management Practices as outlined by the Irrigation Association, (www.irrigation.org) as well as this Guideline, whichever is the more stringent.
- 2.1.3 The Certified Irrigation Designer must not be in the employ, or have contractual relationship with any Irrigation Sub-Contractor or Irrigation Supplier.

3 PERFORMANCE AND EFFICIENCY REVIEWS

3.1 REVIEW OF IRRIGATION SPECIFICATIONS AND DRAWINGS

- 3.1.1 At the Board's Plant Department cost, the Board's Certified Installation Specialist will review the drawings and specifications for compliance with the Guidelines, specifically the sole supply of the Irrigation Controller and the catch can type rain sensor.

3.2 AUDIT OF THE IRRIGATION SYSTEM

- 3.2.1 At the Board's Plant Department cost, upon completion of the project, an audit to determine the distribution uniformity of the system will be conducted by the Board's Certified Irrigation Specialist.
- 3.2.2 Any non-adherence to the drawings and specifications and the substitution of specified items will be identified by the Board's Certified Installation Specialist to the Plant, Design and Construction Departments as well as to the Prime Consultant.

3.3 ASSESSMENT OF THE IRRIGATION SYSTEM

- 3.3.1 At the Board's Plant Department cost, an assessment of the installation of the entire system will be conducted by the Board's Irrigation Specialist and any deficiencies will be reported to the Plant, Design and Construction Departments as well as to the Prime Consultant.

3.4 TESTING OF THE IRRIGATION SYSTEM

- 3.4.1 As part of the specification, upon completion of the Irrigation System, the Irrigation Sub-Contractor must test the system with verifiable measuring results.
- 3.4.2 Specify that the system testing is to be conducted in the presence of the Certified Irrigation Designer who designed the system.

4 QUALIFICATIONS OF THE IRRIGATION SUB-CONTRACTOR

- 4.1.1 All irrigation work shall be carried out by a Company specializing in performing field irrigation installation, with at least five (5) years of proven experience. The Irrigation Sub-Contractor is to provide appropriate references.
- 4.1.2 The Irrigation Sub-Contractor must be professionally registered with the Irrigation Association as a Certified Irrigation Contractor (CIC) and is not to have any contractual relationship with, or be in the employ of, or be part of any irrigation material supply company or any landscape company.

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5 DIVISION OF WORK

5.1.1 In order to design and install an Irrigation System based on the Dufferin-Peel Catholic District School Board's requirements, the Prime Consultant or the Certified Irrigation Designer should clearly identify the Division of Work for each trade involved in the installation.

5.2 GENERAL CONTRACTOR'S WORK

5.2.1 Prior to any irrigation work commencing, the General Contractor and his/her sub-contractors – Mechanical, Electrical, Landscape and Irrigation - shall confer with the Prime Consultant, or Certified Irrigation Designer, the School Principal (in case of additions) and the Board's Construction Department representative concerning the work of the Irrigation Contract, to ensure minimum disruption of services.

5.2.2 The General Contractor is to be responsible for the complete installation of the Irrigation System by involving his/her four Sub-Contractors, Mechanical, Electrical, Landscape and Irrigation.

5.2.3 It is the General Contractor's responsibility to ensure that all materials and construction conform to the latest applicable codes and municipal standards.

5.2.4 On new projects and additions where an irrigation system is included as part of the Contract, the General Contractor shall have the overall responsibility to restore all surfaces, damaged or cut as a result of the excavations to their original condition and in a manner approved by the Prime Consultant (Architect).

5.2.5 On new schools and additions the General Contractor shall have the overall responsibility to remove from the site all subsoil excavated from the trenches to keep the sub-grade elevations parallel with finished elevations.

5.2.6 The General Contractor will be responsible for proper backfilling and compacting of the underground materials installed by the Irrigation Sub-Contractor, the laying of top soil and sod; and the compaction of sub base and installation of asphalt.

5.2.7 On additions, the General Contractor will be responsible to provide water supply from an existing main, located within the school. Exact location of connection at backflow preventor is to be determined through consultation with the Prime Consultant or the Certified Irrigation Designer.

5.2.8 On new school projects, the General Contractor must provide and pay for water from appropriate source for proper testing of the system.

5.2.9 Permits and Fees

5.2.9.1 The General Contractor is to obtain and pay for all permits and required fees to any Authorities Having Jurisdiction over the work.

5.2.9.2 The General Contractor shall arrange inspections required by local ordinances during the course of construction.

5.3 LANDSCAPE SUB-CONTRACTOR'S WORK

- 5.3.1 The Landscape Sub-Contractor's work shall consist, but not be limited to the coordination between the Landscape Sub-Contractor and the Irrigation Sub-Contractor plus all of the landscaping traditionally associated with the work of that Sub-Contractor.

5.4 MECHANICAL SUB CONTRACTOR'S WORK

NOTE: All pipe and pipe connections within the building are to meet plumbing codes.

The Mechanical Sub-Contractor's work includes, but is not necessary limited to the following:

- 5.4.1 The supply and installation of a "Berkley" Booster pump.
- 5.4.1.1 The booster pump shall be equipped with necessary unions, isolation valves to make it a permanent, year round, installation. It shall have a flow switch and pressure relief valve to protect its operation.
- 5.4.2 The supply and installation of a 50 mm shut-off valve
- 5.4.3 The supply and installation of a 50 mm backflow preventor
- 5.4.4 The supply and installation of a Hydrometer within the building
- 5.4.4.1 The device is to act both as a flow meter and master valve (normally closed) in one unit. (Wiring between the Hydrometer and the Controller is to be by the Irrigation Sub-Contractor.)
- 5.4.5 The supply and installation of male and female adapters as required for winterization
- 5.4.6 The supply and installation of drain valves and unions as required
- 5.4.7 The supply and installation of 100 mm flexible PVC pipe from last union in the building, through an appropriate sleeve at the building foundations to the edge of hard landscape as determined by the Certified Irrigation Designer,
- 5.4.7.1 The PVC pipe is to terminate with a 50 mm female adapter, 500 mm beyond the hard landscape.

5.5 ELECTRICAL SUB CONTRACTOR'S WORK

NOTE: All electrical conduit and connections within the building are to meet electrical codes.

The Electrical Sub-Contractor's work includes, but is not limited to the following:

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- 5.5.1 The supply and installation of a 115 VAC outlet, located a maximum of 200 mm from planned location of Irrigation Controller. (Proper grounding and surge protection is required prior to installing the Irrigation Controller.)
- 5.5.2 The supply and installation of a back box and 30 mm conduit with pull string for future Ethernet data drop. Back box is to be located a maximum of 200 mm from planned location of Irrigation Controller. Conduit is to terminate at an electrical tray above corridor ceiling. (Data wiring and “Lantronix” unit is installed by Board appointed data contractors.)
- 5.5.3 The supply and installation of a 25 mm conduit with pull string from the building foundations to the edge of hard landscape. Exact location is to be determined by the Certified Irrigation Designer.
 - 5.5.3.1 The conduit is to be laid next to the mechanical PVC sleeve. Conduit through and beyond the foundation wall shall be for exterior applications as per electrical code.
 - 5.5.3.2 Install a connection box to conduit at a maximum of 200 mm from planned location of Irrigation Controller.
- 5.5.4 The supply and installation of 230 VAC, 30 amp power outlet for the booster pump, located a maximum of 500 mm from planned location of the booster pump. The booster pump shall be hard wired.

5.6 IRRIGATION SUB-CONTRACTOR’S WORK

- 5.6.1 Inside the Building:
 - 5.6.1.1 The supply and installation of the Irrigation Controller ESP-SAT Site type as outlined in this Guideline under *Materials*.
 - 5.6.1.2 The supply and installation of control wires from the Controller to electric valves located beyond the hard landscape area. Wiring is to be # 14 gauge AWG.
 - 5.6.1.3 The supply and installation of hard wiring from the hydrometer (supplied by Mechanical Sub-Contractor) to the Irrigation Controller
 - 5.6.1.4 The supply and installation of a dedicated Ethernet data drop located within 200 mm of Irrigation Controller location
 - 5.6.1.5 The supply and installation of a catch can type rain sensor(s) capable of pulse output. The location of the catch can is to be designated by the Certified Irrigation Designer.
 - 5.6.1.6 The supply of the appropriate wiring for the catch can to the Irrigation Controller.
- 5.6.2 Outside the building:
 - 5.6.2.1 The supply and installation of all components, from termination point of the Mechanical & Electrical Sub-Contractors (at the edge of hard landscape as determined by the Certified Irrigation Designer) and

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connections to the work of the Mechanical and Electrical Sub-Contractors.

- 5.6.2.2 The supply and installation of the components shall include, but not necessarily be limited to the following:

- All plastic and copper piping and fittings
- Jumbo Valve Boxes
- Manual and remote control electric valves
- Rain sensor
- Sprinkler heads
- Quick coupling valves and keys
- Backflow prevention units and thrust blocks

AND

- 5.6.3 The furnishing of all labour, materials and equipment for the proper installation of the entire irrigation system.

6 DESIGN REQUIREMENTS FOR THE IRRIGATION SYSTEM

6.1 DESIGN REQUIREMENTS

- 6.1.1 Specify that the Irrigation Sub-Contractor is to prepare an irrigation layout plan for review and approval by the Certified Irrigation Designer.
- 6.1.2 The irrigation layout shall contain the following minimum elements:
- 6.1.2.1 Name of project an address/location
 - 6.1.2.2 North compass indication
 - 6.1.2.3 Prevailing wind direction
 - 6.1.2.4 Design scale to 1:300 (minimum). Sheet size is to be as for all other plans for this project.
 - 6.1.2.5 Date of design
 - 6.1.2.6 Certified Irrigation Designer seal and signature
 - 6.1.2.7 System component legend with clear, consistent symbols of all components
 - 6.1.2.8 Calculation of precipitation rate for each zone as a guide for programming
 - 6.1.2.9 Installation details and specifications describing and/or illustrating all material used and the installation thereof. These may be brief statements shown on the plan or included in a supplemental document
 - 6.1.2.10 Point of connection shall indicate location and size of meter and size, length and type of service

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- 6.1.2.11 Type and location of rain by-pass and/or moisture sensing device
- 6.1.2.12 Static pressure and design pressure
- 6.1.2.13 Pressure loss calculation
- 6.1.2.14 The Irrigation design is to include a programming chart indicating the proposed schedule of the Irrigation Controller for review by the Board's Plant Department representative.

6.2 AS BUILT FIELD IRRIGATION DRAWINGS

- 6.2.1 Specify that the Irrigation Sub-Contractor is to prepare and submit "As Built" drawings in digital format which shall show any deviations from the bid documents made during construction affecting the main line pipe, Controller and catch can type rain sensor location(s), main shut off and remote control valves, quick-coupling valves, all sprinkler heads and location of buried sleeves.
 - 6.2.1.1 The drawings shall also indicate and show approved substitutions of size, material and manufacturer's name and catalogue name and catalogue number.
 - 6.2.1.2 Three sets of drawings and a digital CADD format shall be delivered to the Prime Consultant or Certified Irrigation Designer before final acceptance of work.
- 6.2.2 Specify that the Irrigation Sub-Contractor is to provide two copies of the completed Controller programming chart to the Prime Consultant or Certified Irrigation Designer and post an additional framed copy in the location of the Controller.

6.3 DESCRIPTION OF WORK

- 6.3.1 The work includes, but is not necessarily limited to, the following:
 - 6.3.1.1 Production and submission of approved irrigation plans for all areas within limit of contract
 - 6.3.1.2 Trenching and backfilling (Compacting by General Contractor)
 - 6.3.1.3 Testing of all systems and making them operative
 - 6.3.1.4 Laying out of the irrigation system
 - 6.3.1.5 Preparing "As-Built" Drawings
 - 6.3.1.6 Providing training sessions for Board staff and agents

6.4 ALTERNATES

- 6.4.1 This Guideline refers to materials manufactured by "Rainbird" for all equipment and is *Base Bid*.

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- 6.4.2 The only acceptable Irrigation Controller is ESP-SAT Site type controller manufactured by “Rainbird.” With the exception of the Irrigation Controller, other irrigation type materials may be considered by the Board, but only upon review and approval by the Board’s Plant and Design Departments, a minimum of four weeks prior to the issuance of Tender Documents by the Prime Consultant or Certified Irrigation Designer.
- 6.4.3 Any proposed substitutions by the Irrigation Sub-Contractor must be accompanied by scaled shop drawings showing how alternative products will be applied to the specific site.
- 6.4.3.1 It must be noted that any substituted products must be consistent for each product application. (I.e. All 1½” valves shall be of the same model.)

6.5 SUBSTITUTIONS

- 6.5.1 Specify that the Board reserves the right to substitute, add or delete any material or work as the work progresses. Adjustment to the Contract Price shall be negotiated - if deemed necessary – by the Board.
- 6.5.2 The Board reserves the right to reject material or work that does not conform to the Contract Documents. Rejected work shall be removed or corrected at the earliest possible time.

6.6 COORDINATION AND SCHEDULES

- 6.6.1 Specify that the Irrigation Sub-Contractor must co-ordinate and co-operate with all other contractors, (e. g. grading and sodding) to enable the work to proceed as rapidly and efficiently as possible.
- 6.6.2 Specify that within two weeks after award of Contract, the Irrigation Sub-Contractor shall submit a work schedule to the Consultant.

6.7 ACCEPTANCE OF THE SITE

- 6.7.1 Specify that the Irrigation Sub-Contractor shall conduct the scheduled work as directed by the Prime Consultant or the Certified Irrigation Designer.
- 6.7.2 Specify that the Irrigation Sub-Contractor must become acquainted with all site conditions including water pressure. The Irrigation Sub-Contractor will be responsible for locating all utilities prior to initiating construction. Failure to do so will make the Irrigation Sub-Contractor liable for any and all damage thereto arising from his/her operations.
- 6.7.3 Specify that the Irrigation Sub-Contractor shall make necessary adjustments in the layout as may be required to connect to existing stub-outs at no increase to the tendered cost.

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6.8 PROTECTION OF EXISTING PLANTS AND SITE CONDITIONS

- 6.8.1 Specify that the Irrigation Sub-Contractor shall take necessary precautions to protect site conditions that are to remain. Should damage be incurred, the Irrigation Sub-Contractor shall repair the damaged area to its original condition at no additional cost to the tendered cost.
- 6.8.2 Where alternatives occur or new and existing wires join, the Irrigation Sub-Contractor is to cut, remove, patch, repair or finish the adjacent surfaces as required and approved by the Prime Consultant or Certified Irrigation Designer.

6.9 FINAL ACCEPTANCE

- 6.9.1 Specify that final acceptance of the work may be obtained from the Prime Consultant upon the satisfactory completion of all work.

6.10 GUARANTEE

- 6.10.1 Specify that all work shall be guaranteed by the Irrigation Sub-Contractor for two years from date of Substantial Performance against all defects in material, equipment and workmanship.
 - 6.10.1.1 The guarantee shall also cover repair of damage to any part of the premises resulting from leaks or other defects in material, equipment and workmanship to the satisfaction of the Certified Irrigation Designer.
 - 6.10.1.2 Repairs, if required, shall be done promptly at no cost to the Board.
 - 6.10.1.3 Warranty on materials and equipment may extend beyond the irrigation system guarantee date. Should equipment fail within manufacturer's warranty period but beyond the guarantee period, specify that the Irrigation Sub-Contractor shall be entitled to labour costs for the replacement of parts, only if accompanied by an acceptable rate of labour costs.

7 MATERIALS

7.1 GENERAL

- 7.1.1 Specify that the Irrigation Sub-Contractor shall also submit to the Prime Consultant or Certified Irrigation Designer, a complete list of proposed materials to be installed. Quantities of materials need not be included.
- 7.1.2 Specify that whenever any material is identified by name and/or number thereof, such specifications shall be deemed to be used for the purpose of facilitating a description of the materials and establishing quality.

7.1.3 Specify that all materials shall be new and in perfect condition. One month after award of the Contract, the Irrigation Sub-Contractor shall submit for approval six copies of the Irrigation Design Plans if different from design drawings prepared by the Certified Irrigation Designer.

7.1.4 Specify that all products must be consistent for each product application. (I.e. All 1½" valves shall be of the same model.)

7.2 PRESSURE REGULATING DEVICE

7.2.1 Specify that the systems shall be designed to the lowest static pressure available in any 12-month period, or as otherwise noted by Prime Consultant or Certified Irrigation Designer.

7.2.2 If static pressure exceeds design pressure by 15 PSI or more, in any zone, a pressure-regulating device shall be used.

7.2.3 Pressure at any point within a zone shall not vary by more than 10% from the designed sprinkler operating pressure.

7.3 PLASTIC PIPING

7.3.1 All polyethylene pipe specified on plan shall be CSA rated, flexible non-toxic in perfect condition and all sizes shall have a minimum 75 PSI working pressure rating.

7.3.2 All polyethylene pipes shall be continuously and permanently marked with the pipe manufacturer's name, material, size, and schedule.

7.3.3 All PVC pipe specified in plan shall be virgin, high impact, polyvinyl chloride pipe, having a minimum working pressure rating of Class 160 (SDR26) or approved equivalent. PVC pipe 25mm diameter or smaller shall be Class 200 (SDR21).

7.3.4 All PVC pipe shall be continuously and permanently marked with manufacturer's name, material, sizes, and schedule or type.

7.4 PLASTIC FITTINGS

7.4.1 Schedule 40, PVC as shown on drawings or approved equal. Polyethylene Pipe fittings should be insert type or brass saddle tees where applicable.

7.4.2 All joints 1" (25 mm) and larger shall be double clamped with all stainless steel clamps.

7.5 SOLVENT CEMENT

7.5.1 Solvent cement shall be compatible with PVC pipe and of proper consistency.

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7.6 SPRINKLER HEAD RISERS

- 7.6.1 Specify that risers for extension purposes above the height of plant material shall be schedule 80 threaded nipple pipe. (Where product is elevated for plant material “Rainbird” Shrub 3500 or Shrub 500 Series model sprinkler heads are to be provided.)

7.7 COPPER PIPING

- 7.7.1 Copper piping shall be Type L or M, hard copper.

7.8 COPPER PIPE FITTINGS

- 7.8.1 Pipe fittings shall be wrought solder-type cast solder.

7.9 MANUAL VALVES

- 7.9.1 Manual valves shall be as specified on plan. Isolation valves are to be brass gate valves.

7.10 AUTOMATIC CONTROLLER

- 7.10.1 Specify that the only acceptable Irrigation Controller is to be ESP-SAT SITE type controller by “Rainbird” with multiple programming capability and rain sensor override, as specified on the plans.

7.10.1.1 The Controller must be designed to have a minimum of two (2) unused stations to allow for the possible expansion of the irrigations system.

7.10.1.2 Controller location must be easily accessible for maintenance.

7.10.1.3 The Controller shall be capable of operating 24 VAC electric remote control valves. The Controller shall be CSA certified.

7.10.1.4 AC wiring to the Controller shall be plug-in type. Control wires from Controller to valves and from Controller to rain sensor shall be hard wired.

7.11 RAIN SENSOR

- 7.11.1 Rain sensor(s) capable of pulse output is to be “Rainfall Gauge” tipping can by *Rainbird* mounted on the roof of the school where it will be unhindered by rainfall. Location and mounting of bracket is to be indicated by the Certified Irrigation Designer on the drawings of the Irrigation System. [Conduit and wiring from location of Controller to the location(s) of the rain sensor(s) is by the Irrigation Sub-Contractor.]

7.12 ISOLATION VALVE

- 7.12.1 Specify that the **Isolation Valve** is to be supplied by the Irrigation Sub-Contractor and is to be located in the first Jumbo Valve Box beyond the connection point (closest to the hard landscape).

7.13 REMOTE CONTROL VALVES

- 7.13.1 Specify that valves for use in electrically controlled automatic control systems shall be diaphragm actuated and hydraulically operated solenoid valves as will be specified on the plans, or “Rainbird 150 PGA” for 40mm main and “Rainbird 200 PGA” for 50 mm main, or approved equivalents.
- 7.13.2 Specify that all remote control valves are to be installed in properly sized and lockable Jumbo Valve Boxes with gravel bedding.
- 7.13.3 Specify that the Electric Master Valve is to be located in a Jumbo Valve Box and is to be operated as a control valve in normally closed position and controlled by master valve output on Controller.
- 7.13.4 The Certified Irrigation Designer is to locate the field irrigation valves into one or two Jumbo Valve Box locations. (Refer to Illustrative Sketches.)

7.14 CONTROL WIRES

- 7.14.1 Specify that control wires shall be supplied and installed by the Irrigation Sub-Contractor from the Controller to electric valves. The Control Wires, from the end of the conduit supplied by the electrical sub-contractor to the main Jumbo Valve Box may be enclosed in PVC electrical circuit.
- 7.14.2 Specify that the installed wire must be approved for direct burial in ground. Minimum wire size is to be as specified on the plans as prepared by the Certified Irrigation Designer in compliance with manufacturer’s recommendations, and the electrical code. (AWG 14) Wire for control and common.
- 7.14.3 Where there are no control valve wires located in lateral pipe trenches, a single 14 AWG strand shall be included in trench for the purpose of future utility locates.

7.15 SLEEVES

- 7.15.1 The Certified Irrigation Designer is to specify sleeves under all walks and asphalt paving.

7.16 CONSOLIDATED VALVE BOXES (JUMBO)

- 7.16.1 The Certified Irrigation Designer is to design “Jumbo” Valve Boxes (with a minimum 25 mm granular base) to consolidate the irrigation valves as much as possible. (Refer to Illustrative Sketches – Water Supply Schematic.)

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- 7.16.2 Valve boxes (Brookes or equivalent) shall be lockable and located normally outside of student traffic patterns. Covers are to be vandal-resistant.

7.17 SPRINKLER HEADS

- 7.17.1 Specify that all full and part circle sprinklers shall be “Rainbird” as indicated on the approved plans. For playing/sports field areas “Rainbird” model 7005 shall be used.
- 7.17.2 The sprinklers shall be easily serviced from the top.
- 7.17.3 Sprinklers shall have an accessible screening device and shall perform to the manufacturer's specifications with regards to the diameter of throw and gallonage at a given pressure.
- 7.17.4 Spacing of heads shall not exceed the manufacturer's maximum recommendation.
- 7.17.5 Matched precipitation is required on all full and part circle sprinklers operating on the same zone.
- 7.17.6 All sprinkler heads shall be complete with swing joints and couplers.

7.18 QUICK COUPLING VALVES AND KEYS:

- 7.18.1 Specify that quick coupling valves and keys shall be as detailed on the drawings. Valves should be installed on triple elbow swing joints and properly secured with minimum 750 mm length metal T-bar and stainless hose clamp.

7.19 THRUST BLOCKS

- 7.19.1 Specify that thrust blocks are to be installed where required for pressure adjustment where the pipe changes direction and as per Irrigation Drawings.

7.20 BACKFLOW PREVENTION UNIT (BY MECHANICAL SUB-CONTRACTOR)

- 7.20.1 Specify that backflow prevention units shall be installed as shown on the plans by the Mechanical Sub-Contractor. Backflow device shall meet local and provincial standards.

7.21 HYDROMETER (COMBINED MASTER VALVE & FLOW SENSOR)

- 7.21.1 Specify that a **hydrometer** shall be supplied and installed by the Mechanical Sub-Contractor for irrigation system water usage monitoring. **Hydrometer is to be “Netafim” Hydrometer.** (Irrigation Sub-Contractor is to hard wire hydrometer to Controller.)

7.22 BOOSTER PUMP (BY MECHANICAL SUB-CONTRACTOR)

- 7.22.1 As part of the irrigation system, and regardless of static or dynamic pressure, a “Berkley” Booster pump is to be supplied and installed by the Mechanical Sub-Contractor.
- 7.22.1.1 The pump must be of a sufficient size as to provide a minimum 345 kPa (50 psi) dynamic pressure to furthest sports field rotor.)
- 7.22.1.2 Specify that the booster pump shall have a flow switch and pressure relief valve to protect the operations of the booster pump.

8 EXECUTION**8.1 SPRINKLER HEAD LOCATION AND SPACING**

- 8.1.1.1 Refer to Illustrative Sketches for typical head location and spacing.

8.2 WORKMANSHIP

- 8.2.1 Specify that all work shall be performed by skilled trades, with a minimum of five years experience in the field. All finishing shall be of the highest quality.
- 8.2.2 Specify that the layout work by the Irrigation Sub-Contractor is to follow accurately as possible the drawings prepared by the Certified Irrigation Designer. Drawings may be generally diagrammatic but swing joints, offsets and most fittings should be shown.
- 8.2.3 Specify that the Irrigation Sub-Contractor shall be responsible for full 100% coverage of all irrigated areas and shall make any necessary minor adjustments at no additional cost to the Board.
- 8.2.4 Specify that any major revisions to the irrigation system drawings and specifications as prepared by the Certified Irrigation Designer must be submitted to the Certified Irrigation Designer along with any change in contract price.
- 8.2.5 If applicable, the Irrigation Sub-Contractor is to schedule work to minimize interruptions to existing services.
- 8.2.5.1 The Irrigation Sub-Contractor is to submit schedule of expected interruptions to the Certified Irrigation Designer for approval, and adhere to interruption schedule as approved by the Certified Irrigation Designer.
- 8.2.5.2 The Irrigation Sub-Contractor shall notify the Certified Irrigation Designer, and the Principal (in case of additions) as well as Board staff, a minimum of 48 hours in advance of any interruption in service.
- 8.2.5.3 The Irrigation Sub-Contractor must not interrupt water service for more than 3 hours.

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8.2.5.4 The Irrigation Sub-Contractor must notify fire department of any planned or accidental interruption of water supply to hydrants.

8.3 EXCAVATING AND TRENCHING

8.3.1 Specify that the Irrigation Sub-Contractor shall perform all excavations as required for the complete installation of the work, including shoring of earth banks to prevent cave-ins.

8.3.2 On new projects and additions where an irrigation system is included as part of the Contract the General Contractor, through the work of the Landscape Sub-Contractor shall restore all surfaces, damaged or cut as a result of the excavations to their original condition and in a manner approved by the Prime Consultant (Architect).

8.3.3 Specify that trenches shall be made wide enough to allow a minimum of 150 mm between parallel pipe lines. Trenches for pipe lines shall be made of sufficient depths to provide the minimum cover from finish grade as follows:

8.3.3.1 600 mm minimum cover over main lines

8.3.3.2 500 mm minimum cover over conduit with control wires from Controller to valves

8.3.3.3 500 mm minimum cover over lateral lines to heads

8.3.4 Specify that pipes may be pulled into position through the use of vibratory plows. The same depths of burial as above should be maintained. Wire may also be installed with the use of a vibratory plow provided it is installed with a wire blade.

8.3.4.1 Trenches to be minimum width excavated 50 mm deeper than pipe invert

8.3.5 Trench locations are to be approved by the Certified Irrigation Designer prior to installation of system.

8.3.6 On new schools and additions specify that the General Contractor, through the work of the Landscape Sub-Contractor shall remove from the site all subsoil excavated from the trenches to keep the sub-grade elevations parallel with finished elevations.

8.3.6.1 Topsoil to be integral over pipes as in surrounding areas

8.4 PIPE LINE ASSEMBLY

8.4.1 Specify that the Irrigation Sub-Contractor shall install remote control valves where shown and group together where practical; place no closer than 300 mm to walk edges, buildings, and walls.

8.4.2 Plastic pipe and fittings shall be solvent welded using solvents and methods as recommended by manufacturer of the pipe, except where screwed connections are required.

- 8.4.3 Pipe and fittings shall be thoroughly cleaned of dirt, dust and moisture before applying solvent with a non-synthetic bristle brush. Polyethylene pipe shall use barbed insert fittings.
- 8.4.4 Pipe 25mm (1") and larger shall be double clamped with all stainless steel clamps.
- 8.4.5 Pipe joints shall be allowed to set for 24 hours in normal conditions before pressure is applied to the system on PVC pipe.

8.5 CLOSING OF PIPE AND FLUSHING LINES

- 8.5.1 Specify that the Irrigation Sub-Contractor shall cap or plug all openings as soon as lines have been installed to prevent the entrance of materials that would obstruct the pipe. Leave in place until removal is necessary for completion of installation.
- 8.5.2 Thoroughly flush out all water lines before installing heads, valves and other hydrants.
- 8.5.3 Upon completion of testing and to Certified Irrigation Designer approval, the Irrigation Sub-Contractor shall complete assembly and adjust sprinkler heads for proper distribution.

8.6 AUTOMATIC CONTROL WIRING

- 8.6.1 Specify that the Irrigation Sub-Contractor shall install control wires that are not in conduit, at least 600 mm below finish grade and lay to the side of main line.
- 8.6.2 Provide looped slack at valves and snake wires in trench. Wire connections shall be made with approved watertight sealants.
- 8.6.3 All control circuitry passing through the wall of the building or beneath any walk, road, or drive, shall be installed in a suitable sleeve.

8.7 SPRINKLERS

- 8.7.1 Specify the following:
 - 8.7.1.1 Install sprinklers at grade to 10 mm below grade.
 - 8.7.1.2 Heads shall not be located in centre field or goal areas.

8.8 BACKFILL AND COMPACTING

- 8.8.1 Specify that after the system is operating and required tests and inspections have been made to approval of Certified Irrigation Designer, the General Contractor (through the Landscape Sub-Contractor) shall backfill excavations and trenches with clean soil, free of rubbish to match surrounding soil regimes.

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8.8.2 Backfill for all trenches, regardless of the type of pipe covered, shall be compacted to minimum 90% density. Compaction around sprinkler heads should be at the same density as pipe trenches. Dress off all areas to finish grades.

8.9 TESTING

8.9.1 Specify that the Irrigation Sub-Contractor shall perform the following operations:

8.9.1.1 Flush all lines and ensure that all air is expelled from the system

8.9.1.2 Inspect all pumps, visible piping and buried lines for leakage

8.9.1.3 Verify all sprinkler settings, overlap, nozzle sizes and operating pressures.

8.10 CLEAN-UP

8.10.1 Specify that the Irrigation Sub-Contractor shall remove from the site and dispose off-site all debris resulting from work of this section.

8.11 WINTERIZATION

8.11.1 Specify that included in the supply and installation of the Irrigation System, this Irrigation Sub-Contractor is to provide the first fall season winterization.

8.12 FIRST SEASON SPRING STARTUP

8.12.1 Specify that included in the supply and installation of the Irrigation System, this Irrigation Sub-Contractor is to provide first season spring start-up at no additional charge to the Board.

8.12.2 The first spring start-up must include an operation check to insure that the irrigation heads and all zones are working properly.

8.13 ADJUSTMENT OF IRRIGATION HEADS

8.13.1 Specify that included in the supply and installation of the Irrigation System, this Irrigation Sub-Contractor is to provide, at the time of the first season spring start-up, the adjustment of irrigations heads to he proper elevation of surrounding surfaces.

8.14 SPECIAL CONDITIONS

8.14.1 Specify that the Irrigation Sub-Contractor is to assemble and provide operational manuals to the Certified Irrigation Designer for review and that the Irrigation Sub-Contractor shall provide a training session for the Board's grounds staff following acceptance of the irrigation work.

- 8.14.2 Specify that in compliance with the above, the Irrigation Sub-Contractor shall provide to the Prime Consultant or the Certified Irrigation Designer with a purchase order to a recognized distributor for all necessary material.
- 8.14.3 Specify that the distributor shall provide, along with a copy of the Irrigation Sub-Contractor's purchase order, the Prime Consultant or the Certified Irrigation Designer with a letter stating that the materials as specified have been shipped.

END OF FIELD IRRIGATION SYSTEM GUIDELINE

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LATEST REVISIONS ARE IN GREEN FONT