1. GENERAL

1.1 Section Includes

.1 Provision of all labour, equipment, materials, sub trades and services to complete tree removal, clearing, and grubbing included in the Work of the Contract.

1.3 Definitions

.1 Felling: consists of cutting off standing trees, dead trees and/or tall stumps, and removing at or close to existing grade.

.2 Removing Isolated Trees: consists of cutting off to the specified height above ground of designated single trees and disposing of debris.

.3 Grubbing: consists of excavation, by machine and with hand tools, and disposal of stumps, roots, boulders, and rock fragments of specified size, and any other buried debris to the specified depth below the existing ground surface.

1.4 Performance Requirements

.1 Tree Removal:

.1 Remove designated trees as indicated on the Contract Drawings, by cutting by cutting to the height required to enable removal of the tree, stump, roots, etc.

.2 Utilize only handwork for grubbing inside drip line of any tree, or groups of trees to be retained.

.2 Tree Protection Fencing:

.1 Protective fencing, in accordance with the Contract Drawings, shall be installed to approval of Project Representative (PR), in advance of commencement of clearing and grubbing operation.

1.6 Safety

.1 Comply with all WCB Alberta requirements.

.2 Safety Requirements: worker protection.

.1 Workers must wear protective clothing and equipment as per WCB Alberta regulations.

.2 Workers must not eat or drink on the worksite, except in designated areas during breaks. No food waste may be placed in commercial bins. Disposal of food waste in approved bear bins only.

.3 No smoking or vaping is permitted on the site.

.4 No drug or alcohol consumption on the Worksite.

.5 Any worker under influence of drugs or alcohol shall be removed from the Worksite.

.6 Clean up spills of any contaminating materials immediately, with absorbent material, and safely discard to approved disposal facility.

1.7 Storage and Protection

.1 Prevent damage to retained trees, shrub understory, root systems of trees and shrub understory, grass and soils which are to remain.

.1 Repair any damage to approval of the PR.

.2 Replace trees designated to remain, if damaged.

.3 Do not store any equipment or materials under the canopy or dripline of any tree designated for retention.

1.8 Waste Management and Disposal

.1 Removal of all felled trees and parts thereof, including roots and stumps arising from the grubbing operation, is the responsibility of the Contractor. Salvaged timber shall be limbed and bucked to suitable lengths for public use.

.2 All waste from secondary operations such as wood chipping, including sawdust, shall be removed off site and disposed of at an authorized facility.

.3 Waste material is not to be spread on site or incorporated into the ground, unless so directed by the PR.

2. PRODUCTS

2.1 Materials

.1 Tree Wound Paint: bituminous based paint of standard manufacture, specially formulated for treatment of tree wounds and abrasions.

.2 Soil material used for fill:

.1 Excavated mineral soil, free of debris, roots, wood, scrap material, vegetative matter, refuse, soft unsound particles, deleterious, contaminated, or objectionable materials.

3. EXECUTION

3.1 Temporary Erosion, Sedimentation and Pollution Control

.1 Provide temporary erosion and sedimentation control measures as needed.

.2 Control discharge of soil-bearing water runoff and/or airborne dust.

.3 Inspect, repair, and maintain erosion and sedimentation control measures during the clearing and grubbing operation.

.4 Remove erosion and sedimentation controls at a time directed by the PR and restore and stabilize areas disturbed during removal.

3.2 Preparation

.1 Site Inspection: Prior to commencing work, Inspect the site and confirm with PR those items designated to remain.

.2 Existing Utility Lines and Services:

.1 Become familiar with location of known underground utilities and take action to avoid contact or disruption of same.

.2 Notify PR immediately if unexpected utility lines or services are encountered.

.3 Site Hazards

.1 Protect against fire or explosion caused by gas or vapour (e.g. temporary fuel storage).

.2 Workers, other trades and the general public are to be protected from hazards associated with operating machinery and dust arising during the course of the Work.

.3 The cemetery will be open to the general public for the duration of the Work. The Owner will place signs, identifying the work being undertaken, however the Contractor must take reasonable action to protect the general public from hazards.

.4 Unforeseen Hazards and Unrecorded Features:

.1 Contractor shall immediately give notice to the PR of any unrecorded features or hazards, including voids, tanks, chemicals, or other hazards encountered during the course of the Work.

.2 Method of Safe Removal to be agreed upon with the PR prior to removal of any such unrecorded hazards.

3.3 Site Access and Egress

.1 Contractor shall review site access and egress requirements with the PR prior to commencing Work.

3.4 Tree and Shrub Understory Clearance

.1 Limits of Work: to be marked out on site by the Contractor for PR approval prior to commencing work.

.2 Tree and Shrub Identification:

.1 Tree and understory shrubs planned for removal shall be flagged by the Contractor for approval by the PR prior to commencing the Work.

.2 Trees and understory shrubs to be retained shall be identified by the PR to commencement of the Work.

.3 Felling:

.1 Cut down and remove any trees identified for removal.

.2 When working near trees to be retained, the Contractor shall take care to avoid damage to adjacent trees that are to be retained, particularly where tree canopies overlap, and in confined spaces.

.3 Do not operate mobile equipment or vehicles under the canopy of any trees designated to be retained.

.4 Do not use adjacent trees or shrubs being retained as support anchors.

.5 Ensure that ground disturbance is kept to a minimum to preserve the integrity of the root structures and minimize loss of soil volume.

.4 Grubbing:

.1 Grub out and remove all tree stumps and roots.

.2 Contractor to ensure that topsoil and subsoil are removed from the root structure of removed trees and stumps. Removed soil is to be backfilled into the root ball void space.

.3 Ensure intermixing of topsoil and subsoil is minimized during the grubbing operation.

3.5 Progressive and Final Cleaning

.2 Ensure pavement areas adjacent to the site are kept clean and free from mud, dirt, and debris at all times.

.3 Minimize dust from the Work by spraying work areas with water, as needed.

.4 Prevent mud and debris from being tracked onto adjacent public streets. Arrange for road flushing and sweeping as necessary, or as directed by the PR.

.5 Leave ground surface in condition suitable for immediate grading operations, to PR approval.

END OF SECTION

1. GENERAL

1.1 Section Includes

All labour, tools, equipment, and supervision required to install exterior site furnishings shown and described on the Contract Drawings.

1.3 Project Conditions

.1 Conform to limits recommended by manufacturer for optimum results. Do not exceed environmental limits identified by manufacturer.

.2 Protect products before and after installation, until site work is complete and all work in the immediate area is finished.

1.4 Delivery, Storage and Handling

.1 All materials to be stored, handled, and adequately protected to prevent damage and theft.

.2 Materials and components shall be stored off the ground and be adequately protected from weather to prevent deterioration, damage, or impairment of structural or essential properties.

2. PRODUCTS

2.1 Benches – (Supplied by Owner for Installation by Contractor)

.1 Park Benches Series BR – In-ground

.2 Available from: Custom Park and Leisure Ltd.

Website: http://custompark.com
Bay 22, 240023 Frontier Crescent
Rocky View County, AB T1X 0W5
Tel.: (403) 569 4544 Toll-free: (866) 569 8104

2.2 Columbaria

.1 Approved Columbaria Suppliers.
Columbaria shown on the Contract Drawings may be supplied and installed by the following pre-approved trades, or approved, qualified alternates. Contractor to include name of specialized columbaria subcontractor that will be employed on the work on the Contract Tender Form.

.1 Sunset Memorial and Stone Ltd.
Calgary, Alberta
Contact Susan Johnstone
tel. (403) 243-3393:

email: susan@sunsetstone.com
website: https://sunsetstone.com

.2 Rock of Ages – A Polycor Inc. Company
4 Rue Rock of Ages
Stanstead, Quebec
tel. 1 (819) 876-2745
website: https://rockofages.com

.3 Kyber Columbarium and Consulting
tel.: 1-855-592-3722
email: info@khybercc.com or
derek@kybercc.com
website: https://www.kybercc.com

.4 CMC-Carrier Mausoleums Construction Inc.
tel: 1-800-663-7954
website: www.cmc-carrier.com

.2 Columbaria Units

.1 Refer to contract drawings for Quantities.

.3 Columbaria Specifications

.1 Drawings:

Refer to the contract drawings for the layout, arrangement and overall dimensions of the columbaria. The drawings are to be read in conjunction with the specifications and will inform the contractors shop drawings for the columbaria.

.2 Dimensions:

The columbaria dimensions shown on the contract drawings shall be adhered to as closely as possible by the contractor. Minor deviations from the dimensions shown on the contract drawings will be permitted. However, the contractor will be required to provide the columbaria per the layout of the contract drawings.

.3 Columbaria Niche Shutters

.1 Provide niches as noted on the contract drawings.
.2 Columbaria niches to have individual shutters.

.4 Internal Dimensions of the Columbaria Niches

.1 Single columbaria niche internal dimensions shall enable the interment of a maximum of two cremated remains within industry standard containers/ urns. Minimum dimensions: 11 ¾" H. 11 ¾" W. 16" Deep.

.4 Columbaria Schedule of Materials.

.1 Columbaria materials as noted on contract drawings.

.5 Columbaria Shop Drawings

.1 Fully dimensioned and accurate shop drawings shall be provided by the contractor to the CA for approval prior to stone cutting, manufacture and installation of the columbaria. Shop drawings shall include but not be limited to:

.1 Exact external and internal dimensions
.2 Internal niche construction materials, structural details
.3 Niche shutter method of attachment/ removal
.4 Stone sizes and materials and finishes

.2 Stone Cutting Schedule: As part of the shop drawings the contractor shall supply a stone cutting schedule confirming the material, product ref, supplier, colour and finishes for each element of the columbaria for approval by the C.A prior to procuring and cutting the stone.

.6 Samples

.1 The contractor shall supply samples of the specified stone materials and finishes;

.2 One set of samples shall be sent to the Owner, and another set of samples shall be sent to the CA for review and approval;

.7 Spare Shutters

.1 Provide 12 spare shutters for each columbaria.

.8 Mix Batches of Stone Shutters and Trims

.1 Mix batches of stone shutters and trims to ensure an even and consistent spread of tonal range and colour across all columbaria units.

.9 Keyed-Alike Locking Security Mechanism

.1 Constrictor to provide keyed-alike security mechanisms to all columbaria niches as part of the internal metal shutter.

.10 Rosettes

.1 Rosettes are required to columbaria shutters and fitted with vandal-proof attachments.

.11 Natural Stone Performance Requirements

.1 Natural Stone Material Standards: Contractor shall provide specifications for all natural stone materials.

.2 Natural Inclusions in the Stone: Natural inclusions visible on the outside faces of the columbaria will not be permitted.

.3 Columbaria Shutters: Shutter material shall be of sufficient thickness and consistent hardness to enable sand blasting (by others) of lettering as follows:

.1 Sand blasted lettering shall not be less than 5mm deep
.2 Lettering shall have crisp clean edges. Flakes, ragged edges or chips will not be permitted.

3. EXECUTION

3.1 Preparation

.1 Do not begin installation until site has been approved for work.

.2 Clean surfaces thoroughly prior to installation.

.3 Prepare surfaces by removing any irregularities that may interfere with installation of benches.

3.2 Installation

.1 Benches

.1 Assemble on-site as per manufacturer’s instructions.

.2 Place square and plumb, as per Contract Drawings. Confirm positioning with Project Representative (PR) prior to pouring footing.

.3 Do not shim; prepare surface for level installation.

.5 Take all necessary precautions and use appropriate tools to avoid damage to stone surfacing through all stages of installation.

.2 Touch up, repair or replace any damage prior to completion.

END OF SECTION

1. GENERAL

1.1 Section Includes

.1 Supply of all labour, equipment, material, and services to design and construct a fully operational automatic irrigation system as described in the Contract Drawings and Specifications.

1.2 Related Sections

.1 Refer to the Town of Canmore Engineering Design and Construction Guidelines.

1.3 Reference Standards

.1 ASTM D2241 - Poly Vinyl Chloride (PVC) Plastic Pipe (SDR-PR).

.2 ASTM D2564 - Solvent Cement for Poly Vinyl Chloride (PVC) Plastic Pipe and Fittings.

.3 CSA B137.0-12: - Thermoplastic Pressure Piping.

.4 *Turf & Landscape Irrigation Best Management Practices* - The Irrigation Association (IA).

1.4 Quality Assurance

.1 The Contractor performing the Work shall be a *Certified Irrigation Contractor* as certified by The Canadian Prairie Chapter of the Irrigation Association (CPCIA) or The Irrigation Association (IA), having trained, experienced, and insured personnel qualified to complete the Work as specified.

.2 The Irrigation Contractor shall be a member in good standing of the Canadian Prairie Chapter of the Irrigation Association (CPCIA) or the Irrigation Association (IA).

.3 A Certified Cross-Connection Specialist Certificate is **not** required for this Work.

1.5 Submittals

.1 Materials List: Include main shut-off valve, isolation valves, double check valve assembly (DCVA), 24 VAC electric control valves, valve boxes, irrigation supply main and lateral piping, Rainbird TBOS™ controllers, Rainbird™ irrigation sprinkler heads, and other related components, valves, quick-coupler valves, and related items. Quantities of items is not required.

.2 Shop Drawings, Product Data, and Samples:

.1 Provide fully dimensioned and annotated shop drawings of proposed irrigation system, detailing pipe sizes and location, irrigation head types and location, valve sizes, valve boxes,

controller locations and all other components.

.3 Record Documents:

.1 As-constructed drawings of the completed new irrigation system are required per Town of Canmore Guidelines.

.4 Supply as part of this Contract, the following tools:

.1 Two [2] sets of tools required for removing, disassembling, and adjusting each type of sprinkler and valve supplied for this Contract.

.2 One [1] 2.4 m long valve key for operation of gate valves;

.3 One [1] quick-coupler key and matching hose swivel for each quick-coupling valve installed;

.4 Above equipment shall be delivered to the Owner's Representative at the time of inspection for Construction Completion.

.5 Maintenance Log: Create and maintain on site, a written log of all repairs and adjustments carried out during the warranty/maintenance period.

.1 Deliver the log, in a labelled three-ring binder to the Owner's Representative upon Final Acceptance of the Contract.

1.6 Operation and Maintenance Manuals

.1 Assemble and deliver to the Owner, not less than ten (10) calendar days prior to completion of construction, two (2) copies of the following information, bound in appropriately labelled 3-ring binders:

.1 Title sheet showing Irrigation Contractor's company name, business address, business telephone number, emergency contact number and email address;

.2 Index of contents;

.3 List of equipment, suppliers, and manufacturers, with contact names and addresses, telephone, and email contacts of local representatives;

.4 Catalog and parts sheets for all materials and equipment installed under this Contract;

.5 Contractor's guarantee statement;

.6 Equipment warranties;

.7 Complete operating and maintenance instructions;

.8 Reduced-scale (11” x 17” fold-out) as-constructed irrigation layout plans and construction details for the system;

1.7 Inspections and Testing

.1 Inspection and testing of the system shall be scheduled and conducted in the presence of the Contract Administrator (CA) and Owner's Representative.

.2 Provide not less than three [3] days notice prior to scheduled tests or requested inspections.

1.8 Construction Review

.1 The purpose of on-site inspections (Field Reviews) by the CA and/or Owner's Representative is to periodically observe work in progress, confirm the Contractor's interpretation of construction documents, and to address questions that may arise with regard to Contract requirements.

.2 Schedule review of irrigation system layout and installation with CA prior to commencement on construction.

.3 Impromptu field reviews may occur at any time during construction.

.4 A general review and inspection will occur at completion of the irrigation system installation, and Project Record Document submittal.

1.9 Site Conditions

.1 The Contractor shall verify the existence and location of all existing underground utilities and services prior to commencement of the work.

.2 Contractor is responsible for consultation with the CA to adjust the design, if necessary, to respond to site conditions which may be at variance with the Contract Documents, prior to commencement of the Work.

.3 Protect from damage associated with the Work, all existing landscape features, plant material, existing trees, structures, utility services, and road rights-of-way improvements.

.4 Ensure that sequencing of the work is carried out in coordination with the work of other trades.

1.10 Delivery, Storage and Handling

.1 Deliver equipment and materials, and store securely as directed by the CA.

.2 Ensure emptied containers and packaging are stored safely and disposed of in an approved manner.

1.11 Substitutions

.1 Where materials are specified by brand name and model number, such specifications shall be deemed to facilitate a description of the materials and material quality and shall establish a standard for performance and quality, against which proposed substitutes will be evaluated.

.2 Requests for substitution will only be considered if submitted in writing not less than seven [7] business days prior to the advertised Close of Tenders,

with sufficient descriptive literature and product samples, to permit product comparison by the CA and/or Consultant.

.3 Proposed alternate materials shall be equal to, or better than, the specified materials in performance, flow, and pressure loss, so as not to compromise the intent of the design.

.4 Proposed alternate materials, if approved, shall be used in accordance with the manufacturer's specifications and recommendations.

.5 Written approval of the CA is required prior to the use of materials that differ from the Contract Drawings and Specifications. Installed materials which have not been approved by the CA will be subject to removal and replacement with approved materials, at the Contractor's expense.

1.12 Regulations

.1 The Contractor shall ensure compliance with all relevant federal, provincial, and municipal codes and regulations, for the duration of the Contract.

1.13 Supervision of Work

.1 The Irrigation Contract Supervisor shall commit his time exclusively to the Work of this Contract until the irrigation installation is substantially complete and operable, shall remain on the job during normal working hours, and shall attend designated progress meetings, as directed.

.2 The Irrigation Contract Supervisor may not be changed during the progress of the irrigation installation, without prior written approval of the CA.

.3 Any employee of the Irrigation Contractor, or any sub-subcontractor, deemed unsuitable in the opinion of the CA or Owner, shall be dismissed from the work for the duration of the Contract, upon direction by the CA or Owner.

1.14 Notification of Contract Administrator

.1 The Contractor shall report to the CA, in writing, any conditions or anomalies encountered on the site prior to start of, or during, the Work, upon which the work of this Section depends, and which in the opinion of the Contractor, may adversely effect the performance of the Work.

.2 The CA and Owner shall be notified, and approvals shall be obtained for inspection and testing of the irrigation system, or segments thereof, as specified in this Section.

.1 Provide not less than forty-eight [48] hours notice prior to planned inspections or meetings.

1.15 Guarantee/Warranty and Replacement

.1 The purpose of the guarantee/warranty is to ensure that the Owner receives irrigation equipment and materials of prime quality, installed, and maintained in a thorough, competent, and professional manner.

.2 The Irrigation Contractor shall be responsible for providing guarantee/ warranty of all irrigation materials, equipment, and workmanship against defects, for a period of not less than one [1] year, including fall shut-down and spring start-up procedures.

.3 Replace damaged or defective items with new and identical materials, using methods specified in Contract Documents or applicable codes.

.4 Make replacements at no additional cost to the Owner.

.5 Guarantee/warranties shall apply to originally installed materials and equipment, and replacements made during the guarantee/warranty period.

2. PRODUCTS

2.1 Product Quality

.1 Provide and install equipment and materials, delivered new to the site in unopened containers and confirmed to be without flaws or defects.

2.2 Polyvinylchloride (PVC) Pipe

.1 Polyvinylchloride pipe shall conform to CSA B137.3 . Pipe shall be new, extruded from virgin materials and continuously, permanently marked with the manufacturer's name, material, size, pressure rating and CSA approval.

.2 Series 200 (SDR 21) pipe shall be used for 25 mm size pipe and Series 160 (SDR 26) for 38 mm and larger irrigation lines.

.3 Jointing methods: Solvent weld for 50 mm (2") diameter and smaller size pipe, threaded connections for larger than 50 mm (2") diameter pipe.

2.3 Fittings

.1 Fittings for PVC lateral piping shall be solvent-weld Schedule 40 PVC.

.2 Nipples shall be Schedule 80 PVC.

.3 Sprinklers shall be fitted to lateral lines with triple-swing assemblies fabricated with three SCH 40 PVC ells and a SCH 80 PVC nipple.

.4 PVC pipe cement and primer combination shall be that recommended by the manufacturer which is suitable for the materials being used and the application, when used as directed, and meeting local codes.

.5 Threaded connections of PVC to metal shall have male threads on PVC and female threads on metal.

.6 The use of saddle tees on mainline piping during construction is not permitted.

2.4 Isolation Valves and Shut-off Valves

.1 Isolation and shut-off valves shall be brass construction with non-rising stems. Watts, Matco-Norca or Red & White are acceptable products.

.2 Valves shall be rated for a working pressure of 1,725 kPa (250 psig) and be tested to 3,450 kPa (500 psig).

2.5 Electric Control Valves

.1 Valves shall be Rainbird™ 100-PEB, 150-PEB, 200-PEB Electric Remote Control Valves, with optional PRS-D pressure regulating feature, or approved equivalent.

2.6 Irrigation Valve Boxes

.1 Valve boxes shall be used as enclosures for zone valves, quick-connect turf valves, control or isolation valves or other irrigation system components requiring subsurface protection for installation and maintenance.

.2 Boxes shall be fabricated from structural foam HDPE resin that is resistant to ultra-violet light, weather, moisture, and chemical action of soils.

.3 Valve boxes shall be sized to allow:

.1 Not less than 100 mm clearance between contained equipment and the inside of the box.

.2 Not less than 50 mm clearance between the base of valves and the top of the gravel fill, and not less than 50 mm clearance between the underside of the lid and the top of the valve.

.3 Box extensions may be used as needed to establish required clearances.

.4 Round valve boxes may be used for single-valve requirements. Rectangular boxes may be used for single or multiple valve configurations

.5 Shall have a five [5] year trade warranty.

.6 Valve boxes shall be Rainbird™, or approved equivalent.

2.7 MPR 15 Strip Series Border Spray Head Sprinklers

.1 Rainbird™ Matched Precipitation Rate spray heads with 15 Strip Series Nozzles, or approved equivalent.

.2 Sized as required for road boulevards and narrow planting beds.

.3 Operating range 0.9 – 4.6 m (3 – 15 feet); pressure range 15 to 30 psi (1.0 – 2.1 bar); optimum pressure 30 psi (2.1 bar).

2.8 HE-VAN Series Small Diameter Spray Head Sprinklers

.1 Rainbird™ High Efficiency Variable Arc spray heads, or approved equivalent.

.2 Stream spray, low trajectory spray.

.3 Full adjustability from 0 – 360°.

.4 Operating range 1.8 – 4.6 m (6 – 15 feet); pressure range 15 to 30 psi (1.0 – 2.1 bar; optimum pressure 30 psi (2.1 bar).

2.9 Intermediate Diameter Spray Head Sprinklers

.1 Rain Bird™ RD 1800 Series Spray Bodies or approved equivalent required for shrub planting beds.

.2 Spray bodies shall be comprised of components outlined in Rainbird™ specifications, in order to meet the irrigation demands, and control requirements of the zones they serve.

2.10 Large Diameter Rotor Pop-up Sprinklers

.1 Large diameter coverage rotor pop-up sprinklers shall be Rainbird™ Falcon 6504 F4-PC-SS and Rainbird™ Series 5000 heads, or approved equivalent.

.2 Rotor shall have a stainless steel covered nozzle turret and riser stem. The riser stem shall be tapered and conform to the standard plastic riser stem in all ways.

.3 Sprinkler heads shall be supplied with:

.1 25 mm NPT threaded bottom inlet;

.2 Integral check valve to prevent low head drainage;

.3 Nozzle sizes to provide optimal coverage for the water pressure, flow, and site characteristics.

2.11 Drip Irrigation Components

.1 Rain Bird Control Zone Kits - General

.1 Control zone kit assemblies for dripline irrigation zones must include control zone valve, filtration and pressure regulation components sized to meet the hydraulic demands and flow requirements of the zones the service.

.2 Shop drawings shall be provided for any dripline irrigation zones.

.2 Rain Bird Medium Flow Commercial Control Zone Kits

.1 Medium flow commercial Control Zone Kits for dripline zones with flows from 11,4 to 75,7 lpm (3.0 to 20.0 gpm), including Rain Bird PESB valve with PVC ball valve and pressure regulating quick-check basket filter and Rain Bird PGA valve with pressure regulating basket filter.

.1 PESB available model numbers:

.1 XCZ-100-PRB-COM -25mm (1") PVC ball valve, 25mm (1") Rain Bird PESB valve, and 25mm (1") PRB-QKCHK-100 quick check pressure regulating basket filter.

.2 PESB valve assembly component specifications:

.1 25mm (1") PVC full-port ball valve with female threaded inlet and outlet connections.
.2 PESB valve body and bonnet constructed of durable glass-filled nylon, stainless steel and other chemical/UV resistant materials.
.3 Diaphragm constructed of a durable Buna-N rubber material reinforced with nylon.
.4 One-piece solenoid with captured plunger and 200 micron (90 mesh) solenoid filter.
.5 External bleed for manual system flushing during start-up, internal bleed for manual zone activation during maintenance operations.
.6 Inlet pressure rating: 1,4 to 13,8 Bar (20 to 200 psi),
.7 Female threaded inlet and outlet connections.

.3 PGA available model number:

.1 XCZ-100-PRB-LC - 25mm (1") Rain Bird PGA valve, and 25mm (1") PRB-100 pressure regulating basket filter.

.4 PGA valve assembly component specifications:

.1 PGA valve body and bonnet constructed of durable glass-filled nylon, stainless steel and other chemical/UV resistant materials.
.2 Diaphragm constructed of a durable Buna-N rubber material reinforced with nylon.
.4 One-piece solenoid with captured plunger and 200 micron (90 mesh) solenoid filter.
.5 External bleed for manual system flushing during start-up, internal bleed for manual zone activation during maintenance operations.
.6 Inlet pressure rating: 1,4 to 13,8 Bar (20 to 200 psi),
.7 Female threaded inlet and outlet connections.

.1 Pressure Regulating Quick Check Basket Filter:

.1 Basket style body and jar-top cap constructed of heavy-duty glass-filled, UV-resistant polypropylene, with 10,3 Bar (150 psi) operating pressure rating.
.2 Maximum dimensions of body: height -165 mm (6½"); length -165 mm (6½"); width - 89 mm (3½").

.3 Indicator incorporated into filter cap that changes colour from green to red during operation, when the filter element requires cleaning.

.4 Standard 75 micron (200 mesh) filter screen constructed of stainless steel attached to a propylene frame. Screen to be serviceable for cleaning by unscrewing cap from filter body and removing filter element.

.5 Normally-open in-line pressure regulating device, constructed of durable, UV-resistant, non-corrosive material, able to accommodate an inlet pressure rating of not less than 10,3 Bar (150 psi), with pre-set outlet pressure of approximately 2,8 Bar (40 psi). Pressure regulating device to allow full flow with minimal pressure loss unless inlet pressure is greater than pre-set level. As inlet pressure increases above pre-set level, internal spring to compress to reduce downstream pressure.

.6 Male threaded 25mm (1") inlet and outlet connections.

.2 Rain Bird XF Series Dripline Components

.1 General Information

.1 Provide flexible dual-layered pressure-compensating inline XF Series Dripline manufactured by Rain Bird, with emitter spacing and dripline row spacing as shown on the approved shop drawings.

.2 Provide insert or compression fittings manufactured by Rain Bird that are compatible with inline emitter tubing as indicated on shop drawings.

2. Rain Bird XFS Sub-Surface Copper-Coloured Dripline with Copper Shield ™ Technology and pressure-compensating inline emitters.

.1 Available Rain Bird XFS Sub-Surface Copper-Coloured Dripline model numbers for potable water, dual layered, copper coloured dripline tubing with emitter flow rates and spacing as shown:

.1 Rain Bird XFS-06-12; 2,3 lph (0.6 gph) emitters 30 cm (12") on centre.

.2 Rain Bird® XFS-06-18; 2,3 lph (0.6 gph) emitters 45 cm (18") on centre.

.3 Rain Bird XFS-09-12; 3,4 lph (0.9 gph) emitters 30 cm (12") on centre.

.4 Rain Bird XFS-09-18; 3,4 lph (0.6 gph) emitters 45 cm (18") on centre.

.3 Dripline tubing material and performance specifications:

.1 XFS Copper-coloured, dual layered tubing conforming to an outside diameter (O.D.) of 16 mm (0.634") and an inside diameter (I.D.) of 13.6 mm (0.536 ") and wall thickness of 1.2 mm (0.049").

.2 Factory installed, pressure compensating, inline emitters welded to the inner circumference of the polyethylene tubing at spacing specified by model number.

.3 Inline XFS Sub-Surface Copper-Coloured Dripline emitters shall include Rain Bird's Copper Shield™ Technology which protects the emitter from root intrusion with a copper chip and without the use of herbicides.

.4 Consistent flow rate shall be provided at each installed inline emitter when emitter inlet pressure is supplied between the recommended operating range of 0,7 and 4,1 Bar (8.5 to 60 psi).

.5 Filtration provided for XF Series drip[line tubing and emitters shall be 125 microns (120 mesh).

.4 Rain Bird XF Series Dripline Tubing Insert Fittings

.1 Available model numbers, designed for compatibility with Rain Bird XF Series Dripline Tubing:

.1 Tee: XFF-TEE insert tee (17x17x17 mm)
.2 Coupling: XFF-COUP insert coupling (17x17 mm)
.3 Elbow: XFF-ELBOW insert elbow (17x17 mm)
.4 Cross: XFD-CROSS insert cross (17x17x17x17 mm)
.5 Insert Adapters:
a) 13mm(½") male pipe thread adapter-XFF-MA-050 (17mm x 13mm MPT)
b) 19mm(¾") male pipe thread adapter-XFF-MA-075 (17mm x 19mm MPT)
c) 19mm(¾") female pipe thread adapter-XFD-FA-075 (17mm x 19mm FPT)
d) 13mm(½") Tee male pipe thread adapter-XFF-TMA-050 (17mm x 13mm MPT x 17mm)
e) 19mm(¾") Tee female pipe thread adapter-XFD-TFA-75 (17mm x 19mm FPT x 17mm)

.5 XF Series insert fitting specifications and features:

.1 Constructed from black and/or brown acetyl plastic for long-term leak free connections
.2 Intended for use with polyethylene tubing with ID of 13.6 mm (0.536 "), including Rain Bird XF Dripline.
.3 Operating pressure range from 0 to 3,5 Bar (0 to 50 psi).

.3 Rain Bird Air Relief Valves

.1 Model designed for compatibility with Rain Bird XF Series Dripline Tubing:

.1 ARV050 Air Relief Valve - 13mm (½").

.3 Rain Bird Point Source Irrigation Emission Devices

.1 General Information

.1 Provide low-volume point-source emission devices, manufactured by Rain Bird, to efficiently deliver irrigation water at the plant root zone.

.2 Rain Bird Single-outlet Xeri-Bug™ Emitters

.1 Available model numbers with self-piercing barb inlet:

.1 XB-05PC (Blue); 1,89 lph (0.5 gph)
.2 XB-10PC (Black); 3,79 lph (1.0 gph)
.3 XB-20PC (Red); 7,57 lph (2.0 gph)

.2 Self-piercing barb inlet, with one-step insertion into drip tubing

.3 External surfaces constructed from UV resistant acetyl materials

.4 Self-flushing to minimize clogging

.5 Colour coded to identify flow

.6 Pressure-compensating over a pressure range of 1,0 to 3,5 Bar

(15 to 50 psi) with consistent flow rate.

.3 Rain Bird Single-outlet Pressure Compensating Modules

.1 Available model numbers with self-piercing inlet barbs:

.1 PC-05 (Light Brown); 19,95 lph (5 gph)
.2 PC-07 (Violet); 26,53 lph (7 gph)
.3 PC-10 (Green); 37,90 lph (10 gph)
.4 PC-12 (Dark Brown); 45,48 lph (12 gph)
.5 PC-18 (White); 68,22 lph (18 gph)
.6 PC-24 (Orange); 90,96 lph (24 gph)

.2 Self-piercing barb inlet, with one-step insertion into drip tubing.

.3 External surfaces constructed from UV resistant acetyl materials

.4 Colour-coded to identify flow.

.5 Pressure-compensating over a pressure range of 0,7 to 3,5 Bar (10 to 50 psi with consistent flow rate.

.4 Rain Bird PC Diffuser Cap

.1 PC Diffuser (Black) - for Pressure-Compensating Module zones with potable water source.

.2 Constructed from UV-resistant acetyl materials.

.3 Capable of snapping onto Rain Bird Pressure Compensating Modules to create a bubbler effect and prevent wash-out.

2.12 Quick Coupler Valves

.1 Quick coupler valves shall be 25 mm diameter, one-piece brass construction, with locking rubber covers, Rainbird™ mdl. 5LRC, or approved equivalent.

2.13 Controllers

.1 Controllers shall be Rainbird Turf Battery-Operated Controllers [TBOS™], Bluetooth operated and smartphone programmable.

.1 TBOS-BT or TBOS-BT-LT, one, two, four or six station.

.2 Three [3] independent programs, each with eight [8] start times per day.

.3 Stations may be assigned to several programs with different run times.

.4 Run time from one [1] minute to twelve [12] hours in one [1] minute increments.

.5 Independent station operation to allow sequential start times.

.6 Five [5] customizable watering day cycle modes

.7 Rain delay from one [1] to fourteen [14] days.

.8 No loss of irrigation program as a result of battery replacement.

.9 Direct rain sensor connection compatible with Rainbird RSD-BEx Rain Sensor.

2.15 RSD-BEx Rain Sensor Device

.1 Wired Rain Sensor Device, for automatic shutoff of irrigation system

.2 Ultra-violet resistant high-grade polymer body.

.3 Five inch [5”] heavy-duty latching aluminum bracket.

.4 Multiple rainfall settings from 5 - 20 mm [⅛” - ¾”] with twist dial

.5 Suitable for low-voltage 24 VAC control circuits.

.6 Switch electrical rating: 3A @ 125/250 VAC.

.7 Capacity: Electrical rating suitable for use with up to ten [10] 24 VAC, 7VA solenoid valves per station, plus one master valve.

2.16 TBOS-BT/LT Rain Shutoff Device

.1 Rain Shutoff Device will function correctly only when buried under 5 cm [2”] of sand. The device will be factory pre-set and will not be adjustable.

.2 The Shutoff Device will only function with a DC control system

.3 The Device will have a bypass switch.

.4 Install Rain Shutoff Device in accordance with manufacturer’s written instructions.

2.17 Electrical Products

.1 All electrical products shall be CSA approved and bear the CSA label. Alternately, where a product does not bear the required CSA label, it shall be approved in writing, by the authority having jurisdiction.

.2 Wire conduit shall be Grey PVC conduit pipe.

.3 Pull and Junction Boxes: to CSA C22.2 No. 40-1973 (R1981), sheet steel, screw-on or hinged covers, or approved equivalent.

2.18 Hard Surface Sleeving (Ducts)

.1 Shall be Schedule 40 PVC solid pipe.

.2 Diameter of sleeve (duct) shall be minimum twice the diameter of the sum of the wiring conduits or irrigation pipes passing through the sleeve.

2.19 Concrete

.1 Miscellaneous concrete for pads, thrust blocks, etc. shall be 25 MPa ready-mix or hand-mixed, with 80 mm slump. Use Type 50 cement.

2.20 Backfill Material

.1 Native Excavated Material: Clean, native excavated soil, free from organic matter, stones larger than 25 mm, building debris, and other foreign substances.

.2 Sand: Natural, coarse sand, with no clay or silt content.

.3 Gravel: 25 mm diameter washed aggregate.

3. EXECUTION

3.1 Protection of Existing Work

.1 Protect existing landscaping, trees, walks, utilities, and other site features, from damage or contamination. Reduce waste, mixing of waste, soil compaction or erosion, overspray, or run-off from testing or cleaning operations. Dispose of waste in an approved manner and location.

3.2 Layout

.1 Stake the proposed location of all sprinkler heads, valves, piping, principal fittings, and controllers for approval by the CA, prior to any trenching or installation.

.1 Notify CA not less than three [3] days in advance of planned staking review. Required modifications or changes will be identified by the CA at this review and confirmed in writing.

.2 As staking progresses, all changes to piping and equipment locations shall be recorded on a copy of the Contract Drawings, from which the Record Drawings will be prepared.

.3 All staking and measurements shall be dimensioned from designated permanent features, [i.e. buildings, survey benchmarks, curbs, or catch basins] and not from features which are subject to change, such as trees or turf boundaries.

3.3 Point of Connection

.1 Connect to main supply at location designated by CA.

.2 Inspect existing isolation shut-off valve and double check-valve assembly (DCVA) to determine condition and serviceability for new system prior to submitting quotation. Consult with CA as to whether new or repaired components are required.

.3 Consult with CA as to whether main connection and DCVA are to be secured in a below-grade vault or above-grade lockable steel cage. Provide appropriate allowance in quotation.

3.4 Winterization Fittings

.1 Install fittings as required, housed in a valve box or other approved containment, to allow for winterization of the entire irrigation system by compressed air blow-out.

3.5 Excavation and Trenching

.1 All new irrigation lines are to be trenched. Ploughing or pulling of lines will not be permitted.

.2 Excavations and trenches shall be kept free of water.

.3 Bury depth of sleeves and irrigation piping shall conform to Town of Canmore engineering department requirements, unless otherwise directed by CA.

.4 Bedding pipe in trenches: Refer to 3:15 - Backfilling.

.5 Trenching, laying of pipe and backfilling shall be continuous, so that the amount of open trench at the end of each workday is minimized.

.1 Open trenches or other excavations shall be fenced or barricaded and marked with high-visibility flagging tape and warning signs.

.6 The Contractor shall be responsible for levelling and restoration of any settlement of irrigation trenches during the warranty period.

3.6 Assembling Pipe and Fittings

.1 General:

.1 Keep pipe free from dirt, debris, or any contamination, during assembly.

.2 Cut pipe ends square, de-bur and clean as recommended by pipe manufacturer.

.3 Cap ends of assembled pipe. Remove caps only when necessary to continue assembly.

.2 PVC Solvent-Weld Pipe and Fittings

.1 Use primer and solvent cement recommended by pipe manufacturer.

.2 Join pipe as recommended by pipe and fitting manufacturers, in accordance with accepted industry practice, with particular attention to protection from contamination, air temperature, moisture and curing time.

.3 Immediately remove excess cement from all joints.

.4 Cure not less than thirty [30] minutes before handling and not less than twenty-four [24] hours prior to pressurizing.

.3 PVC Threaded Connections

.1 Use only factory-formed threaded fittings and connections. Field-threading is not permitted.

.2 Apply thread sealant as recommended by component, pipe, and sealant manufacturers, and in accordance with accepted industry practice.

.4 Dripline Tubing and Fittings

.1 Use only Rain Bird XF-Series Insert Fittings or Rain Bird Easy Fit Compression Fittings for Rain Bird XF-Series dripline tubing connections or transitions, as recommended by the Manufacturer's representative for specific site and system conditions.

.2 Dripline Insert Fittings:

.1 Install dripline tubing and fittings according to manufacturer's recommendations and in accordance with accepted industry practice.

.3 Dripline Compression Fittings:

.1 Install dripline tubing and fittings according to manufacturer's recommendations and in accordance with accepted industry practice.

3.7 Pipe Laying

.1 Mainline piping shall be installed at a minimum depths conforming to municipal bylaws and engineering standards..

.2 Install piping in sleeves where lines cross under walks, driveways, parking, other hard surfaces, or cross existing shallow buried utilities.

.3 Sleeves shall be installed at bury depths to suit site conditions and features under which the sleeves are required, not less than that required for irrigation piping.

.4 Sleeves shall extend minimum 600 mm beyond the edge of the hard surface or on both sides of utility lines. Temporarily cap or tape ends to ensure that dirt and debris does not enter the exposed ends of pipe.

.5 Do not run irrigation lines and electrical control wiring in same sleeve. Use separate sleeves.

.6 At the time of installation of electrical conduit or irrigation piping in sleeves, stuff open ends of sleeves tightly with fiber insulation to prevent movement friction between pipes or wiring.

.7 Location and size of sleeves shall be noted on the Record Drawings.

.8 Lay irrigation pipe in straight lines between fittings. Place on firm bearing at all points in the trench. Snake pipe from side to side in trenches.

.9 Thrust blocks, if required, shall support the fitting only, and not the pipe.

3.8 Battery-Operated Controllers

.1 Controller modules to be located to suit Owner’s requirements. Consult CA for preferred locations and mounting particulars.

.2 Mount controller modules plumb and square, convenient for ease of operation, clear of any obstructions, and in accordance with manufacturer’s recommendations.

.3 Install controller modules in accordance with manufacturer’s written instructions.

.4 Controller shall be programmable from the Rainbird Smartphone App™.

.5 Programs and manual operations shall be communicated to the controller from a Smartphone via Bluetooth technology.

.6 Controller shall be a module type which may be mounted in a valve box blow grade.

.7 Controller station output shall drive one single potted latching solenoid fitted to any Rainbird DV, DVF, ASVF,PGA,PEB, PESB, EFB-CP, or BOE or PPES series valves.

3.9 RSD-BEx Rain Sensor Device

.1 Install Rain Sensor Device in accordance with manufacturer's written instructions.

.2 Mount plumb and level and correctly aligned on building or secure structure that will provide no obstructions to normal rainfall.

.3 Adjust vent ring to provide optimal drying conditions.

.4 Adjust rainfall setting to required setting.

3.10 TBOS-BT/LT Rain Shutoff Device

.1 Rain Shutoff Device will function correctly only when buried under 5 cm [2"] of sand. The device will be factory pre-set and will not be adjustable.

.2 The Shutoff Device will only function with a DC control system.

.3 The Device will have a bypass switch.

.4 Install Rain Shutoff Device in accordance with manufacturer's written instructions.

3.11 Valves and Valve Boxes

.1 Valves shall be installed vertically and centered in the box, so as to be easily accessible for servicing.

.2 Valve boxes shall be installed flush with final grade. Locate boxes no less than 500 mm from road or walk edges.

.3 Valve boxes shall be installed with adequate clearance above the pipe, and on a firm base to avoid contact with pipe due to settlement or upon being depressed.

.4 Quick coupler valves and control valves shall be installed with a rebar support and washed gravel base in a #910 valve box..

3.12 Irrigation Wiring

.1 All irrigation wiring shall be installed in accordance with Federal, Provincial, and local electrical codes.

.2 Provide sufficient wire slack in trenches, conduit, and sleeves to accommodate backfilling. Provide minimum 600 mm coiled loops of wire at all control valves and changes of direction.

.3 All wire splices shall be made in valve boxes. Allow one [1] metre of extra wire at splice locations to permit wire to be brought above grade for ease of access.

.4 Provide one (1) spare #12 AWG control wire for every four [4] electric control valves on a mainline branch. Provide one [1] spare #10 AWG common wire for every five [5] electric control valves on a mainline branch.

.5 Connect one [1] #12 AWG control wire to each electric control valve. Connect four [4] electric control valves to one (1) #10 AWG common wire.

.6 Install vinyl electrical hazard warning tape in all trenches containing direct-burial control wiring or power supply cable, not less than 300 mm above wiring.

3.13 Flushing and Testing

.1 Inspection and testing of the system shall be scheduled and conducted in the presence of the CA and Owner's Representative. The Contractor shall provide not less than three [3] days notice prior to scheduled tests or requested inspections.

.2 All main lines and lateral lines shall be flushed prior to testing.

.3 Provide labour, fittings, and equipment necessary to conduct line flushing and required testing procedures.

.4 Contractor shall be responsible for supply and cost of water for testing. Building domestic water may be used, with approval of the CA.

3.14 Pressure and Leakage Testing

.1 Test main lines in isolation, prior to connection of any lateral lines and prior to backfilling.

.2 Unless directed otherwise, subject irrigation pipe to hydrostatic pressure of not less than 13.8 bar (200 psi), after the irrigation line has been filled with water and air expelled, for a minimum period of twenty-four [24)]ours.

.3 Test for one [1] hour.

.4 Leakage test will include visual inspection and monitoring of pressure gauges to record drop from initial test pressure in one [1] hour.

.5 Pipe installation will not be accepted when pressure drop is greater than five percent [5%] of initial test pressure.

.6 Main line or lateral line sections which are defective or not accepted shall be replaced by the Contractor, at the Contractor's expense, and retested prior to further additions to the line, installation of irrigation heads, or backfilling.

.7 Ensure that water lines do not freeze during testing operation. In cold weather, blow out lines immediately following testing operation.

.8 Ensure no disruption to municipal or cemetery water supply during testing operation.

.9 After all sections of the irrigation system have been tested individually, charge and activate the entire system.

.10 The CA will visually observe operation, water application patterns, and leakage.

.1 Replace or adjust defective valves, fittings, or pipe segment(s) necessary to correct operational and/or coverage uniformity deficiencies.

.2 Repeat test(s) until each irrigation line, passes testing procedures. Repeat tests, replace components, and correct deficiencies at no additional cost to Owner.

.11 Depending on the season and weather at the time of completion, either program the system for regular operation for the remainder of the growing season, or deactivate and winterize the system, as directed.

3.15 Backfilling

.1 Excavated native material will generally be acceptable for backfill unless directed otherwise by CA. Only use backfill free from rubbish, vegetable matter, frozen materials, and stones greater than 50 mm (2") in any dimension. Remove and dispose of any material unsuitable for backfill. Use only backfill that is free of sharp edges next to pipe.

.2 Backfill in 150 mm lifts, placing and compacting with an approved compaction device to minimum 85% Standard Proctor Density (SPD), until 150 mm below finish grade. Compaction of trenches with vehicles or heavy equipment is not acceptable.

.3 Install electrical hazard warning tape on top of subgrade prior to placing topsoil or planting medium.

.4 Install topsoil or specified planting medium for final 150 mm lift to finish grade elevations and ensure minimum depth of planting medium conforms to project specifications.

.5 Ensure that subgrade material and finish grade planting medium are not mixed in excavation or backfilling operations.

.6 Dress backfilled areas to original grade. Incorporate excess backfill into existing site grades or dispose of offsite to approval.

.7 Consult CA for possible trench depth adjustments where underground utilities conflict with planned irrigation trenching and pipe work.

3.16 Cleaning

.1 Work sites shall be kept neat, clean, and orderly at all times during construction and installation of the irrigation system.

.2 All excess and waste materials shall be regularly removed from the site and disposed of in an authorized manner and location.

.1 Clean up, organize work areas, and remove waste to disposal or onsite waste containers at the end of each workday.

.2 Do not bury waste or any foreign material in trenches or elsewhere on the worksite..

.3 Upon completion of the irrigation system installation, and prior to inspection for Construction Completion, all areas of the Work shall be groomed, raked smooth, broom-cleaned or hosed down, as needed.

.4 Fill and repair all depressions, restore landscaping, walks, roadways, utilities, structures, and site features damaged or affected by settlement of irrigation trenches or excavations.

3.17 Acceptance

.1 The complete irrigation system will be inspected by the CA upon completion of the work, for Construction Completion, and by

and by the Owner and/or CA upon completion of the one-year Warranty Period.

.2 As-constructed Record Drawings shall be finalized and submitted to the CA prior to inspection for acceptance.

.3 Operation and Maintenance Manual, as specified in 1.6, shall be assembled and submitted to CA prior to inspection for acceptance.

.4 If determined, during the warranty period, that any elements of the irrigation system have failed, issuance of the Certificate of Final Acceptance may be withheld, or the guaranty period may be extended, or made conditional upon completion of specific repairs or improvements, at the discretion of the Owner.

3.18 Warranty Maintenance

.1 Contractor shall regularly monitor operation of the irrigation system and provide any necessary maintenance for duration of the one-year warranty period, or for one complete operating season, whichever is greater.

.1 Provide any required repair of system components that result from failure of equipment, materials, or unacceptable workmanship, at no cost to Owner.

.1 Notify Owner in advance of undertaking repair work.

.2 Provide required repair resulting from vandalism or actions of Owner, at Owner’s cost for time and materials.

.1 Consult with Owner concerning extent of required repairs, prior to commencing repair work.

.2 Maintain a written log of all repair and maintenance operations provided during the one-year warranty period in a suitable hardcover binder kept on-site.

.3 Make log available to Owner upon request. Deliver completed log to Owner upon completion of the maintenance period and prior to issuance of Certificate of Final Acceptance.

.4 Contractor shall perform a blow out in the first year and charge up in the following spring.

END OF SECTION