1 GENERAL

1.01 SUBMITTALS

.1 Submittals: in accordance with Section 01 33 00 - Submittal Procedures.

.2 Shop drawings; submit drawings stamped and signed by professional engineer registered or licensed in Province of Prince Edward Island, Canada, where indicated.

.3 Shop drawings to show:
- .1 Mounting arrangements.
- .2 Operating and maintenance clearances.

.4 Shop drawings and product data accompanied by:
- .1 Detailed drawings of bases, supports, and anchor bolts.
- .2 Acoustical sound power data, where applicable.
- .3 Points of operation on performance curves.
- .4 Manufacturer to certify current model production.
- .5 Certification of compliance to applicable codes.

.5 In addition to transmittal letter referred to in Section 01 33 00 - Submittal Procedures: use MCAC "Shop Drawing Submittal Title Sheet". Identify section and paragraph number.

.6 Closeout Submittals:
- .1 Provide operation and maintenance data for incorporation into manual specified in Section 01 78 00 - Closeout Submittals.
- .2 Operation and maintenance manual approved by, and final copies deposited with, the Departmental Representative before final inspection.
- .3 Operation data to include:
  - .1 Control schematics for systems including environmental controls.
  - .2 Description of systems and their controls.
  - .3 Description of operation of systems at various loads together with reset schedules and seasonal variances.
  - .4 Operation instruction for systems and component.
  - .5 Description of actions to be taken in event of equipment failure.
  - .6 Valves schedule and flow diagram.
  - .7 Colour coding chart.
- .4 Maintenance data to include:
  - .1 Servicing, maintenance, operation and trouble-shooting instructions for each item of equipment.
  - .2 Data to include schedules of tasks, frequency, tools required and task time.

.5 Performance data to include:
  .1 Equipment manufacturer's performance datasheets with point of operation as left after commissioning is complete.
  .2 Equipment performance verification test results.
  .3 Special performance data as specified.
.6 Approvals:
  .1 Submit two (2) copies of draft Operation and Maintenance Manual to Departmental Representative for approval. Submission of individual data will not be accepted unless directed by Departmental Representative.
  .2 Make changes as required and re-submit as directed by Departmental Representative.
.7 Additional data:
  .1 Prepare and insert into operation and maintenance manual additional data when need for it becomes apparent during specified demonstrations and instructions.
.8 Site records:
  .1 Departmental Representative will provide one (1) set of reproducible mechanical drawings. Provide sets of white prints as required for each phase of work. Mark changes as work progresses and as changes occur.
  .2 Transfer information weekly to reproducibles, revising reproducibles to show work as actually installed.
  .3 Use different colour waterproof ink for each service.
  .4 Make available for reference purposes and inspection.
.9 As-built drawings:
  .1 Prior to start of Testing, Adjusting and Balancing for HVAC, finalize production of as-built drawings.
  .2 Identify each drawing in lower right hand corner in letters at least 12 mm high as follows: - "AS BUILT DRAWINGS: THIS DRAWING HAS BEEN REVISED TO SHOW MECHANICAL SYSTEMS AS INSTALLED" (Signature of Contractor) (Date).
  .3 Submit to Departmental Representative for approval and make corrections as directed.
  .4 Perform testing, adjusting and balancing for HVAC using as-built drawings.
  .5 Submit completed reproducible as-built drawings with Operating and Maintenance Manuals.
.10 Submit copies of as-built drawings for inclusion in final TAB report.

1.02 QUALITY ASSURANCE

.1 Quality Assurance: in accordance with Section 01 45 00 - Quality Control.

.2 Health and Safety Requirements: do construction occupational health and safety in accordance with Section 01 35 29.06 – Health and Safety Requirements.

1.03 MAINTENANCE

.1 Furnish spare parts in accordance with Section 01 78 00 - Closeout Submittals as follows:
- .1 One (1) set of packing for each pump.
- .2 One (1) casing joint gasket for each size pump.
- .3 One (1) head gasket set for each heat exchanger.
- .4 One (1) glass for each gauge glass.
- .5 One (1) filter cartridge or set of filter media for each filter or filter bank in addition to final operating set.

.2 Provide one (1) set of special tools required to service equipment as recommended by manufacturers and in accordance with Section 01 78 00 - Closeout Submittals.

.3 Furnish one (1) commercial quality grease gun, grease and adapters to suit different types of grease and grease fittings.

1.04 DELIVERY, STORAGE, AND HANDLING

.1 Waste Management and Disposal:
- .1 Construction Waste Management and Disposal: separate waste materials for reuse and recycling in accordance with Section 01 74 21 - Construction Waste Management and Disposal.

2 PRODUCTS

2.01 NOT USED

.1 Not applicable.

3 EXECUTION

3.01 PAINTING REPAIRS AND RESTORATION

.1 Prime and touch up marred finished paintwork to match original.

.2 Restore to new condition, finishes which have been damaged.

.3 All paint products, sealants and adhesives shall be low VOC emitting.

3.02 CLEANING

.1 Clean interior and exterior of all systems including strainers. Vacuum interior of ductwork and air handling units.

3.03 FIELD QUALITY CONTROL

.1 Site Tests: conduct following tests in accordance with Section 01 45 00 - Quality Control and submit report as described in PART 1 - SUBMITTALS.

.2 Manufacturer's Field Services:
- .1 Obtain written report from manufacturer verifying compliance of Work, in handling, installing, applying, protecting and cleaning of product and submit Manufacturer's Field Reports as described in PART 1 - SUBMITTALS.
- .2 Provide manufacturer's field services consisting of product use recommendations and periodic site visits for inspection of product installation in accordance with manufacturer's instructions.
- .3 Schedule site visits, to review Work, as directed in PART 1 - QUALITY ASSURANCE.

3.04 DEMONSTRATION

.1 Supply tools, equipment and personnel to demonstrate and instruct operating and maintenance personnel in operating, controlling, adjusting, trouble-shooting and servicing of all systems and equipment during regular work hours, prior to acceptance.

.2 Use operation and maintenance manual, as-built drawings, and audio visual aids as part of instruction materials.

.3 Departmental Representative may record these demonstrations on video tape for future reference.

3.05 PROTECTION

.1 Protect equipment and systems openings from dirt, dust, and other foreign materials with materials appropriate to system.

.2 Have the mechanical subcontractor(s) coordinate with the firestopping subcontractor and make any openings they are responsible for suitable for firestopping.

3.06 FIRESTOPPING

.1 Firestopping, other than special duct construction, fire dampers, etc. will not be the responsibility of the Mechanical Contractor(s).

END OF SECTION

1 GENERAL

1.01 REFERENCES

.1 National Fire Prevention Association (NFPA)
- .1 NFPA 13-2019, Standard for the Installation of Sprinkler Systems.
- .2 NFPA 20-2019, Standard for the Installation of Stationary Pumps for Fire Protection.
- .3 NFPA 25-2017, Standard for the Inspection, Testing, and Maintenance of Water-Based Fire Protection Systems.

1.02 ACTION AND INFORMATIONAL SUBMITTALS

.1 Provide submittals in accordance with Section 01 33 00 - Submittal Procedures.

.2 Product Data:
- .1 Provide manufacturer's printed product literature and data sheets, and include product characteristics, performance criteria, physical size, finish and limitations.

.3 Shop Drawings:
- .1 Submit drawings stamped and signed by professional engineer registered or licensed in the Province of Prince Edward Island, Canada.
- .2 Indicate:
  - .1 Materials.
  - .2 Finishes.
  - .3 Method of anchorage
  - .4 Number of anchors.
  - .5 Supports.
  - .6 Reinforcement.
  - .7 Assembly details.
  - .8 Accessories.

.4 Test reports:
- .1 Submit certified test reports for wet pipe fire protection sprinkler systems from approved independent testing laboratories, indicating compliance with specifications for specified performance characteristics and physical properties.

.5 Certificates:
- .1 Submit certificates signed by manufacturer certifying that materials comply with specified performance characteristics and physical properties.

.6 Manufacturers' Instructions:

.1 Provide manufacturer's installation instructions.

.7 Field Quality Control Submittals:
.1 Manufacturer's Field Reports: manufacturer's field reports specified.

1.03 CLOSEOUT SUBMITTALS

.1 Provide operation, maintenance and engineering data for incorporation into manual specified in Section 01 78 00 - Closeout Submittals in accordance with ANSI/NFPA 20.

.2 Manufacturer's Catalog Data, including specific model, type, and size for:
.1 Pipe and fittings.
.2 Valves, including gate, check, and globe.
.3 Pipe hangers and supports.
.4 Mechanical couplings.

.3 Drawings:
.1 Piping system layout:
.1 Prepare 760 mm by 1050 mm detail working drawings of system layout in accordance with NFPA 13, "Working Drawings (Plans)".
.2 Show data essential for proper installation of each system.
.3 Show details, plan view, elevations, and sections of systems supply and piping.
.4 Show piping schematic of systems supply, devices, valves, pipe, and fittings. Show point to point electrical wiring diagrams.
.2 Electrical wiring diagrams.

.4 Design Data:
.1 Calculations of sprinkler system design.
.2 Indicate type and design of each system and certify that each system has performed satisfactorily in the manner intended for not less than 18 months.

.5 Field Test Reports:
.1 Preliminary tests on piping system.

.6 Records:
.1 As-built drawings of each system.
.1 After completion, but before final acceptance, submit complete set of as-built drawings of each system for record purposes.
.2 Submit 760 mm by 1050 mm drawings on reproducible Mylar film with title block similar to full size contract drawings.

.7 Operation and Maintenance Manuals:
.1 Provide detailed hydraulic calculations including summary sheet, and Contractors Material and Test Certificate for aboveground piping and other documentation for incorporation into manual in accordance with NFPA 13.

.8 Certificates:
.1 Contractor to provide certificates for all above ground piping and underground piping when this work is completed. Generic copies of these certificated can be obtained at fire hall.

1.04 QUALITY ASSURANCE

.1 Qualifications:
.1 Installer: company or person specializing in wet sprinkler systems with documented experience and approved by manufacturer.

.2 Supply grooved joint couplings, fittings, valves, grooving tools and specialties from a single manufacturer. Use date stamped castings for coupling housings, fittings, valve bodies, for quality assurance and traceability.

1.05 MAINTENANCE MATERIAL SUBMITTALS

.1 Extra Materials:
.1 Provide maintenance materials in accordance with Section 01 78 00 - Closeout Submittals.
.2 Provide spare sprinklers and tools in accordance with NFPA 13.

1.06 DELIVERY, STORAGE AND HANDLING

.1 Deliver, store and handle materials in accordance with Section 01 61 00 - Common Product Requirements and with manufacturer's written instructions.

.2 Delivery and Acceptance Requirements:
.1 Deliver materials to site in original factory packaging, labelled with manufacturer's name, address.

.3 Storage and Protection:
.1 Store materials indoors in dry location.
.2 Store and protect materials from exposure to harmful weather conditions and at temperature and humidity conditions recommended by manufacturer.

2 PRODUCTS

2.01 DESIGN REQUIREMENTS

.1 Include with each system materials, accessories, and equipment inside and outside building to provide each system complete and ready for use.

.2 Devices and equipment for fire protection service: ULC approved for use in wet pipe sprinkler systems.

.3 Friction Losses:
  .1 Calculate losses in piping in accordance with Hazen-Williams formula with 'C' value of 120 for steel piping, 150 for copper tubing, and 140 for cement-lined ductile-iron piping.

.4 Water Supply:
  .1 Base hydraulic calculations on fire pump performance.

2.02 SUSTAINABLE REQUIREMENTS

.1 Grooved couplings and fittings made from minimum 90% recycled metal.

2.03 ABOVE GROUND PIPING SYSTEMS

.1 Provide fittings for changes in direction of piping and for connections.
  .1 Make changes in piping sizes through tapered reducing pipe fittings, bushings will not be permitted.

.2 Perform welding in shop; field welding will not be permitted.

2.04 PIPE, FITTINGS AND VALVES

.1 Pipe:
  .1 Ferrous: to NFPA 13.
  .2 Non-metallic: CPVC to NFPA 13.

.2 Fittings and joints to NFPA 13:
  .1 Ferrous: screwed, welded, flanged or roll grooved.
    .1 Grooved joints designed with two ductile iron housing segments, pressure responsive gasket, and zinc-electroplated steel bolts and nuts. Cast with offsetting angle-pattern bolt pads for rigidity and visual pad-to-pad offset contact.
    .2 Non-metallic: solvent cement.

.3 Plain-end fittings with mechanical couplings and fittings which use steel gripping devices to bite into pipe when pressure is applied will not be permitted.
.4 Rubber gasketted grooved-end pipe and fittings with mechanical couplings are permitted in pipe sizes 38 mm and larger.
.5 Fittings: ULC approved for use in wet pipe sprinkler systems.
.6 Supply fittings, mechanical couplings, and rubber gaskets from a single manufacturer throughout the Work.
.7 Side outlet tees using rubber gasketted fittings are permitted.
.8 Sprinkler pipe and fittings: metal in heated space, CPVC in cistern.

.3 Valves:
.1 ULC listed for fire protection service.
.2 Gate valves: open by counter clockwise rotation.
.3 Check valves: flanged clear opening swing check type with flanged inspection and access cover plate for sizes 10 cm and larger.

.4 Pipe hangers:
.1 ULC listed for fire protection services in accordance with NFPA.

2.05 PRESSURE GAUGES

.1 ULC listed and to Section 23 05 19.01 - Thermometers and Pressure Gauges - Piping Systems.

.2 Maximum limit of not less than twice normal working pressure at point where installed.

2.06 PIPE SLEEVES

.1 Provide pipe sleeves where piping passes through walls and floors.

.2 Secure sleeves in position and location during construction.

.3 Provide sleeves of sufficient length to pass through entire thickness of walls and floors.

.4 Provide 2.5 cm minimum clearance between exterior of piping and interior of sleeve or core-drilled hole.
.1 Firmly pack space with mineral wool insulation.
.2 Seal space at both ends of sleeve or core-drilled hole with plastic waterproof cement which will dry to firm but pliable mass.

.3 In fire walls and fire floors, seal both ends of pipe sleeves or core-drilled holes with ULC listed fill, void, or cavity material.

.5 Sleeves in Masonry and Concrete Walls and Floors:
.1 Provide hot-dip galvanized steel.
.2 Core drilling of masonry and concrete may be provided in lieu of pipe sleeves when cavities in core-drilled hole are completely grouted smooth.

.6 Sleeves in Other Than Masonry and Concrete Walls and Floors:
.1 Provide 0.61 mm thick galvanized steel sheet.

3 EXECUTION

3.01 MANUFACTURER'S INSTRUCTIONS

.1 Compliance: comply with manufacturer's written recommendations or specifications, including product technical bulletins, handling, storage and installation instructions, and datasheet.

3.02 INSTALLATION

.1 Install, inspect and test to acceptance in accordance with ANSI/NFPA 13 and ANSI/NFPA 25.

3.03 PIPE INSTALLATION

.1 Install piping straight and true to bear evenly on hangers and supports. Do not hang piping from plaster ceilings.

.2 Keep interior and ends of new piping and existing piping thoroughly cleaned of water and foreign matter.

.3 Keep piping systems clean during installation by means of plugs or other approved methods. When work is not in progress, securely close open ends of piping to prevent entry of water and foreign matter.

.4 Inspect piping before placing into position.

3.04 ELECTRICAL CONNECTIONS

.1 Provide electrical work associated with this section under Section 26 05 00 - Common Work Results for Electrical.

.2 Provide control and fire alarm wiring, including connections to fire alarm systems, in accordance with National Electrical Code.

.3 Provide wiring in rigid metal conduit or intermediate metal conduit.

3.05 FIELD QUALITY CONTROL

.1 Site Test, Inspection:
- .1 Perform test to determine compliance with specified requirements in presence of Departmental Representative.
- .2 Test, inspect, and approve piping before covering or concealing.
- .3 Preliminary Tests:
  - .1 Hydrostatically test each system at 200 psig for a 2 hour period with no leakage or reduction in pressure.
  - .2 Flush piping with potable water in accordance with NFPA 13.
  - .3 Test alarms and other devices.
- .4 Formal Tests and Inspections:
  - .1 Do not submit request for formal test and inspection until preliminary test and corrections are completed and approved.
  - .2 Submit written request for formal inspection at least 15 days prior to inspection date.
  - .3 Repeat required tests as directed.
  - .4 Correct defects and make additional tests until systems comply with contract requirements.
  - .5 Furnish equipment, instruments, connecting devices, and personnel for tests.
  - .6 Authority of Jurisdiction, will witness formal tests and approve systems before they are accepted.
- .5 Contractor to test and certify existing sprinkler systems in the Visitor Centre and Green Gables House when placed on the new fire water supply system:
  - .1 Visitor Centre: This facility is provided with new sprinkler systems that have not been charged since recent building construction. Shop drawings (including hydraulic calculations and drawings) of these systems are available to the sprinkler contractor.
  - .2 Green Gables House: Sprinkler systems in this building are existing and currently in service. No documentation is available for these systems.

3.06 CLEANING

.1 Clean in accordance with Section 01 74 11 - Cleaning.
- .1 Upon completion and verification of performance of insulation, remove surplus materials, excess materials, rubbish, tools and equipment.

END OF SECTION

1 GENERAL

1.01 REFERENCES

.1 National Fire Protection Association (NFPA)
- .1 NFPA 13-2019, Standard for the Installation of Sprinkler Systems.
- .2 NFPA 20-2019, Standard for the Installation of Stationary Pumps for Fire Protection.
- .3 NFPA 25-2017, Standard for the Inspection, Testing, and Maintenance of Water-Based Fire Protection Systems.

.2 Underwriter's Laboratories of Canada (ULC)
- .1 CAN4 S543-Latest Edition, Standard for Internal Lug Quick Connect Coupling for Fire Hose.

1.02 ACTION AND INFORMATIONAL SUBMITTALS

.1 Provide submittals in accordance with Section 01 33 00 - Submittal Procedures.

.2 Product Data:
- .1 Provide manufacturer's printed product literature and data sheets for equipment and systems, applicable series designation or style and include product characteristics, performance criteria, physical size, finish and limitations.

.3 Shop Drawings:
- .1 Submit drawings stamped and signed by professional engineer registered or licensed in the Province of Prince Edward Island, Canada.

.4 Manufacturers' Instructions:
- .1 Instructions: provide manufacturer's installation instructions.

1.03 CLOSEOUT SUBMITTALS

.1 Provide maintenance data for incorporation into manual specified in Section 01 78 00 - Closeout Submittals.

.2 Provide detailed hydraulic calculations including: summary sheet, Contractor's Material and Test Certificate for aboveground piping, as well as other deliverables for incorporation into manual specified in Section 01 78 00 - Closeout Submittals, in accordance with NFPA 13.

1.04 QUALITY ASSURANCE

.1 Qualifications:
- .1 Installer: company or person specializing in dry sprinkler systems with documented experience and approved by manufacturer.

.2 Supply grooved joint couplings, fittings, valves, grooving tools and specialties from a single manufacturer. Use date stamped castings for coupling housings, fittings, valve bodies, for quality assurance and traceability.

1.05 MAINTENANCE MATERIAL SUBMITTALS

.1 Extra Materials:
- .1 Provide maintenance materials in accordance with Section 01 78 00 - Closeout Submittals.
- .2 Provide spare sprinklers and tools in accordance with NFPA 13.

1.06 DELIVERY, STORAGE AND HANDLING

.1 Deliver, store and handle materials in accordance with Section 01 61 00 - Common Product Requirements and with manufacturer's written instructions.

.2 Delivery and Acceptance Requirements:
- .1 Deliver materials to site in original factory packaging, labelled with manufacturer's name, address.

.3 Packaging Waste Management: remove for reuse of pallets, crates, padding, and packaging materials in accordance with Section 01 74 21 - Construction/Demolition Waste Management and Disposal.

2 PRODUCTS

2.01 ENGINEERING DESIGN CRITERIA

.1 Design system in accordance with NFPA 13, using following parameters:
- .1 Hazard:
  - .1 To suit occupancy as indicated.
- .2 Pipe size and layout:
  - .1 Hydraulic design.
  - .2 Sprinkler head layout: to NFPA 13.
- .3 Water supply:

.1 Conduct flow and pressure test of water supply in vicinity of project to confirm criteria for bases of design in accordance with NFPA 13.
.2 Base design on fire pump performance.

.4 Zoning:
.1 System zoning as indicated.

2.02 SUSTAINABLE REQUIREMENTS

.1 Grooved couplings and fittings made from minimum 90% recycled metal.

2.03 PIPE, FITTINGS AND VALVES

.1 Pipe:
.1 Galvanized steel or stainless steel: to NFPA 13.

.2 Fittings and joints to NFPA 13:
.1 Galvanized steel or stainless steel: screwed, welded, flanged or roll grooved.
.1 Grooved joints designed with two ductile iron housing segments, flush seal gasket for dry service, and zinc-electroplated steel bolts and nuts. Cast with offsetting angle-pattern bolt pads for rigidity and visual pad-to-pad offset contact.

.3 Auxiliary valves:
.1 ULC listed for fire protection service.
.2 Up to NPS 2: bronze, screwed ends, grooved, OS & Y gate.
.3 NPS 2 1/2 and over: cast or ductile iron, flanged or roll grooved ends, indicating butterfly valve.
.4 Swing or spring-actuated check valves.
.5 Ball drip.
.6 Tamper devices wired back to fire alarm panel.

.4 Pipe hangers:
.1 ULC listed for fire protection services.

2.04 SPRINKLER HEADS

.1 General: to NFPA 13 and ULC listed for fire services.

2.05 SPRINKLER HEAD TYPE A

.1 Upright bronze.

2.06 AUXILIARY SUPERVISORY SWITCHES

.1 General: to NFPA 13 and ULC listed for fire service.

.2 Valves:
- .1 Mechanically attached to valve body, with normally open and normally closed contacts and supervisory capability.

.3 Flow switch type:
- .1 With normally open and normally closed contacts and supervisory capability.

.4 Pressure alarm switch:
- .1 With normally open and normally closed contacts and supervisory capability.

2.07 DRY PIPE VALVE

.1 ULC listed.

.2 Cast or ductile iron, flanged or grooved end type, sized to suit water main.

.3 Components:
- .1 Accelerator.
- .2 Air maintenance device with low pressure alarm.
- .3 Alarm pressure switch with supervisory capability.
- .4 Pressure gauges.
- .5 Drain valve.
- .6 Test valve with associated piping.
- .7 Shut off valve - OS & Y with tamper-proof device wired back to fire alarm panel.
- .8 Required air pressure 90 kPa (13 psi).

.4 Provide valve complete with internal components that are replaceable without removing valve from installed position.

2.08 COMPRESSED AIR SUPPLY

.1 Automatic Air Compressor.

.2 ULC listed.

.3 Capacity:
- .1 To restore normal air pressure in system within 30 minutes.

.2 To provide air pressure in accordance with instruction sheet furnished with dry pipe valve.

.4 Piping: ferrous, NPS 3/4 screwed joints and fittings, to NFPA 13.

2.09 PRESSURE GAUGES

.1 ULC listed and to Section 23 05 19.01 - Thermometers and Pressure Gauges - Piping Systems.

.2 Maximum limit of not less than twice normal working pressure at point where installed.

2.10 SPARE PARTS CABINET

.1 For storage of maintenance materials, spare sprinkler heads and special tools.

.2 Construct to sprinkler head manufacturers standard.

2.11 ESCUTCHEON PLATES

.1 Provide one piece type metal plates for piping passing through walls, floors, and ceilings in exposed spaces.

.2 Provide polished stainless steel plates in finished spaces.

.3 Provide paint finish on metal plates in unfinished spaces.

2.12 INSPECTOR'S TEST CONNECTION

.1 Locate inspector's test connection at hydraulically most remote part of each system, provide test connections approximately 2 m above floor for each sprinkler system or portion of each sprinkler system equipped with alarm device.

.2 Provide test connection piping to location where discharge will be readily visible and where water may be discharged without property damage.

.3 Provide discharge orifice of same size as corresponding sprinkler orifice.

2.13 SIGNS

.1 Attach properly lettered and approved metal signs to each valve and alarm device to NFPA 13.

.2 Permanently fix hydraulic design data nameplates to riser of each system.

2.14 SPARE PARTS CABINET

.1 Provide metal cabinet with extra sprinkler heads and sprinkler head wrench adjacent to each alarm valve. Number and types of extra sprinkler heads as specified in NFPA 13.

3 EXECUTION

3.01 MANUFACTURER'S INSTRUCTIONS

.1 Compliance: comply with manufacturer's written recommendations or specifications, including product technical bulletins, handling, storage and installation instructions, and datasheet.

3.02 INSTALLATION

.1 Install, inspect and test to acceptance in accordance with NFPA 13 and NFPA 25.

.2 Testing to be witnessed by the Departmental Representative.

.3 Install spare parts cabinet as indicated.

.4 Pressure gauges:

- .1 Location:
  - .1 On water side and air side of dry pipe valve.
  - .2 At air receiver.
  - .3 In each independent pipe from air supply to dry pipe valve.
  - .4 At exhausters and accelerators.
- .2 Install to permit removal.
- .3 Locate so as not subjected to freezing.

.5 Valve identification:

- .1 Identify drain valve, by-pass valves and main shut-off valve and all auxiliary valves.

.6 Pipe dry system main drain to building exterior as indicated. Locate drain valve in heated fire pump building and slope drain pipe to outside. Auxiliary drain can be piped to outside.

.7 Provide auxiliary drains in system if system cannot be graded back to sprinkler header.

.8 All sprinkler pipes that penetrate fire separations must be fire stopped.

3.03 CLEANING

.1 Clean in accordance with Section 01 74 11 - Cleaning.

.1 Remove surplus materials, excess materials, rubbish, tools and equipment.

.2 Waste Management: separate waste materials for reuse in accordance with Section 01 74 21 - Construction/Demolition Waste Management and Disposal.

END OF SECTION

1 GENERAL

1.01 REFERENCE STANDARDS

.1 National Fire Protection Association (ANSI/NFPA)
  .1 NFPA 20-2019, Standard for the Installation of Stationary Fire Protection.

.2 Underwriters' Laboratories of Canada (ULC)
  .1 Can/ULC S601-14, Standard for Shop Fabricated Steel Aboveground Horizontal Tanks for Flammable and Combustible Liquids

1.02 ACTION AND INFORMATIONAL SUBMITTALS

.1 Provide submittals in accordance with Section 01 33 00 - Submittal Procedures.

.2 Product Data:
  .1 Submit manufacturer's printed product literature, specifications and datasheet for fire pump control and include product characteristics, performance criteria, physical size, finish and limitations.

.3 Shop Drawings:
  .1 Submit drawings for fire pump skid.
  .2 Indicate:
    .1 Method of anchorage
    .2 Number of anchors.
    .3 Supports.
    .4 Reinforcement.
    .5 Assembly details.
    .6 Accessories.
    .7 Indicate hydraulic and electrical characteristics including Net Positive Suction Head (NPSH) required, make and model number.
  .3 Provide power and control diagrams.
  .4 Shop drawings shall be stamped and signed by professional engineer registered or licensed in the Province of Prince Edward Island, Canada.

1.03 CLOSEOUT SUBMITTALS

.1 Submit maintenance and engineering data for incorporation into manual specified in Section 01 78 00 - Closeout Submittals in accordance with ANSI/NFPA 20.

1.04 EXTRA MATERIALS

.1 Extra Materials:
  .1 Furnish spare parts for each pump in accordance with Section 01 78 00 - Closeout Submittals and as follows:
    .1 One (1) set of packing.
    .2 One (1) casing joint gasket.

1.05 QUALITY ASSURANCE

.1 Quality Assurance: in accordance with Section 01 45 00 - Quality Control.
  .1 Test reports:
    .1 Submit certified test reports for packaged fire pumps from approved independent testing laboratories, indicating compliance with specifications for specified performance characteristics and physical properties.
    .2 Test hydrostatically to meet requirements of fire protection system to which it will be connected.
  .2 Certificates: submit certificates signed by manufacturer certifying that materials comply with specified performance characteristics and physical properties.
  .3 Instructions: submit manufacturer's installation instructions.
  .4 Manufacturer's Field Reports: manufacturer's field reports specified.

.2 Qualifications:
  .1 Installer: company or person specializing in packaged fire pump installations with documented experience and approved by manufacturer.

1.06 DELIVERY, STORAGE, AND HANDLING

.1 Deliver, store and handle in accordance with Section 01 61 00 - Common Product Requirements.

.2 Deliver materials to site in original factory packaging, labelled with manufacturer's name, address.

.3 Packaging Waste Management: remove for reuse and return by manufacturer of pallets crates padding and packaging materials in accordance with Section 01 74 21 - Construction Waste Management and Disposal.

2 PRODUCTS

2.01 SYSTEM DESCRIPTION

.1 Design Requirements:
- .1 Select fire pump to satisfy fire protection system requirements and NFPA 20.
- .2 Refer to drawings for water supply conditions. In addition to protection of the fire pump building, the new system will feed the recently constructed Visitor Centre and the existing Green Gables House. The system shall have adequate capacity to provide the required fire water supplies to these two buildings.

2.02 FIRE PUMP

.1 Packaged, ULC, CSA listed and labelled vertical turbine electric driven fire pump and controller.

.2 Driver: electric, weather protected, 208V, 3 phase.

.3 Mounting: install pump and driver on common base.

.4 Materials and construction: to NFPA 20.

.5 Capacity: to satisfy fire protection system requirements and NFPA:
- .1 Flow rate: 2,310 LPM
- .2 Pressure: 690 kPa.
- .3 Speed: 1770 RPM
- .4 Final performance to be selected based on sprinkler system requirements in Visitor Centre and fire water conveyance system to buildings.

.6 Accessories to NFPA 20 requirements and in addition:
- .1 Automatic air release valve.
- .2 Fire pump controller.
- .3 Gauges.
- .4 Pressure sensing line.
- .5 Flow Meter.
- .6 Test header.

.7 Anchor bolts and templates:
- .1 Supply for installation by others.
- .2 Size anchor bolts to withstand seismic zone 4 acceleration and velocity forces.

2.03 FIRE PUMP CONTROLLER

.1 To NFPA 20 for electric driven pump, full service reduced voltage soft start soft stop with automatic power transfer switch microprocessor controls, disconnects, pressure and event recorder, visual and audible alarms, phase reversal, phase unbalance, over current, under current, under voltage, low water level, low pump room temperature contact, test button, configurable inputs/outputs. FM approved, ULC listed.

2.04 PRESSURE MAINTENANCE (JOCKEY) PUMP

.1 General: electrically driven submersible, stainless steel construction, discharge head check valve.

.2 Capacity: to satisfy fire protection system requirements and NFPA.
- .1 Flow rate: 18.9 LPM.
- .2 Pressure: to NFPA 20.
- .3 Speed: 3450 RPM

.3 Accessories: to NFPA 20 including jockey pump controller, torque arrestor, and flow sleeve.

3 EXECUTION

3.01 APPLICATION

.1 Manufacturer's Instructions: comply with manufacturer's written recommendations, including product technical bulletins, handling, storage and installation instructions, and datasheets.

3.02 INSTALLATION

.1 Install in accordance with ULC listing, NFPA 20, manufacturer's instructions and reviewed shop drawings.

.2 Align pump and motor shafts to within manufacturer's recommended clearances prior to start-up.

.3 Install wiring in accordance with manufacturer's instructions and applicable codes.

.4 Anchor unit to floor.

.5 Install test piping, flow meter, and test header, as indicated.

3.03 FIELD QUALITY CONTROL

.1 Manufacturer's Field Services:
- .1 Obtain written report from authorized manufacturer representative verifying compliance of Work, in handling, installing, applying, protecting and cleaning of product and submit Manufacturer's Field Reports as described in PART 1 - SUBMITTALS.
- .2 Provide manufacturer's representative field services consisting of product use recommendations and periodic site visits for inspection of product installation in accordance with manufacturer's instructions.
- .3 Schedule site visits, to review Work, as directed in PART 1 - QUALITY ASSURANCE.

.2 Site Tests:
- .1 Field test each fire pump, driver and controllers in accordance with NFPA 20. Testing to include:
  - .1 Verification of proper installation, system initiation adjustment, and fine tuning.
- .2 Verification of the sequence of operations and alarm systems.
- .3 Testing to be witnessed by the Departmental Representative.
- .4 Develop, with the Departmental Representative assistance, detailed instructions for O & M installation.

3.04 CLEANING

.1 Clean in accordance with Section 01 74 11 - Cleaning.

.2 Clean installed products in accordance to manufacturer's recommendation.

.3 Waste Management: separate waste materials for reuse and recycling in accordance with Section 01 74 21 - Construction Waste Management and Disposal.

END OF SECTION