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PART 1 - GENERAL

1.1. WORK INCLUDED

- .1 Comply with all documents referred to therein.
- .2 Furnish all materials, labour, equipment required for the installation, testing and putting into operation of new supervised sprinkler and standpipe systems.
- .3 Supply and install complete preaction system as per tender documents. Sprinkler contractor to provide all equipment and detection and controls devices necessary to make preaction system operational. Area to be protected with preaction system:
 - .1 P101 switch gear room
 - .2 P131 commercial electrical room
 - .3 P132 east electrical room
 - .4 P218 Parks electrical room
 - .5 Ground floor artscape electrical room
 - .6 1M18 Retail electrical room
- .4 Perform sprinkler work & standpipe work in accordance with this section. No modification to this section will be accepted without the express written approval of the Client's representative. The local requirements of the authority having jurisdiction supersede the requirements herein and must be complied with.
- .5 Sprinkler head & pipe locations are approximate and must be adjusted to accommodate building equipment and interferences. Documents do not indicate fittings necessary to accommodate interferences or elevation changes.
- .6 Provide temporary standpipe fire protection system operational at all times during construction. The system shall be as per local authorities requirements and shall be installed in each storey and maintained until the permanent standpipe system is in operation.
- .7 Supply and install 1.5" x 3" lamacoid labels for all sprinkler and standpipe valves

1.2. RELATED WORK

- .1 Fire alarm and detection system - Division 16
- .2 Fire stopping of fire separations - Division 1 and 15
- .3 Sleeving – Division 15050
- .4 Site services - Division 2
- .5 Cleaning - Division 1
- .6 Project Control - Division 1

1.3. SUBMITTALS

- .1 Submit the Contractor's Material and Test Certificate.
- .2 Fire pump and standpipe tests.
- .3 Submit record drawings.
- .4 Submit samples of sprinkler head types in each finish and a list of where each type and finish specified will be installed.
- .5 Submit manufacturer's data sheets showing the type and model of equipment or material proposed, including, but not limited to:
 - a) Type of pipe
 - b) Hangers
 - c) Valves
 - d) Pipe fittings/joining methods
 - e) Sprinklers
 - f) Water flow devices
 - g) Supervisory devices
 - h) Fire department connection
 - i) Hose stations, hose and extinguishers
 - k) Fire, Jockey and Excess Pressure Pumps
 - l) Fire pump assembly c/w transfer switch.
 - m) Pressure reducing and restricting valve settings
 - n) Compressor
 - o) Pre-action system
- .6 Submit copies of maintenance manuals including NFPA Standard #25 which is to be left in the mechanical room.
- .7 Resubmittals: It is accepted and agreed that there may be occasional minor errors or omissions in any initial submittal. The contractor shall correct these if so instructed and submit the revised submittal for review. Any required third or subsequent reviews of the same re-revised submittal or substitutions shall be at the cost of the contractor. The owner's reasonable costs for any third or subsequent additional reviews, including consultant's fees and direct expenses may be deducted by the owner directly from the monies due to the contractor under this contract by way of a contract change.

1.4. REFERENCE STANDARDS

- .1 Provide ULC approved, FM approved, sprinkler fire protection systems and equipment.
- .2 Supply, install, and test sprinkler fire protection systems and equipment in accordance with the applicable requirements of the current versions of:
 - .1 Provincial Building Code.

- .2 Provincial Fire Code.
 - .3 NFPA 13— Standard for the Installation of Sprinkler Systems
 - .4 NFPA 14 - Standard for the Installation of Standpipe and Hose Systems.
 - .5 NFPA 20 - Standard for the Installation of Fire pumps.
 - .3 Canadian Electrical Code
 - .4 Municipal authorities having jurisdiction, including the Building Department and the Fire Department.
 - .5 Where conflicts occur, the most stringent requirement shall apply.
- 1.5. GOVERNING AUTHORITY APPROVAL
- .1 Perform tests and provide certification as required by authorities having jurisdiction.
 - .2 Organize inspections.
- 1.6. QUALITY ASSURANCE
- .1 Sprinkler contractor to have minimum 10 years experience; Blazemaster training certificate.
 - .2 Ensure all products which come into contact with Blazemaster CPVC pipe are chemically compatible as per Blazemaster compatible program.
 - .3 Welding: quality processes and operators according to ASME boiler and pressure vessel code. Welding on site is not permitted.
- 1.7. COORDINATION
- .5 Coordinate locations of sprinkler heads and piping with lighting and other ceiling mounted components.
 - .6 **Pay particular attention to bulk heads exceeding 8" wide and/or 12" deep in suites. If contractor finds that additional sprinkler heads are required to meet Code requirements, he shall proceed with the additional heads at no additional cost to the owner.**
- 1.8. UNIT/ALTERNATE PRICES
- .1 Subcontractor shall list the following unit prices in bid proposal which shall include the complete installation (labor and materials) for each items:
 - .1 Cost for addition/elimination of sprinkler head (all types).
 - .2 Cost for addition/elimination of 2½" pressure reducing sprinkler floor control valve.

- .2 Above prices shall include piping, connection, sprinkler heads, fittings, hangers, labor, drawing involvement, and any other associated costs for the addition or deletion of a sprinkler head.

PART 2 - PRODUCTS

2.3. GENERAL

- .1 Select, install and test all sprinkler system materials and products in compliance with NFPA 13 and the requirements of all authorities having jurisdiction.
- .2 All products shall be ULC listed, FM approved., including but not limited to valves, fittings, sprinkler heads, hangers, all components of proprietary piping systems, couplings, pressure switches, flow switches, alarms, flow alarm valves, excess pressure pumps, backflow preventers, test and drain assemblies.
- .3 All materials shall meet current applicable ANSI and ASTM standards.

2.4. PIPE AND FITTINGS

- .1 Meet NFPA 13 and requirements specified herein.
- .2 Pipe and fittings:
 - .1 ALL PIPES TO BE DOMESTIC MADE.
 - .2 Pipe, joints and fittings shall meet or exceed ASTM/ANSI standards listed in the National Fire Codes and specifically in NFPA-13.
 - .3 Risers, cross mains and feed mains shall be ASTM A795 schedule 10 pipe: black or galvanized finish; ends grooved for grooved mechanical connections.
 - .4 Branch line piping shall be ASTM A53 schedule 40 pipe: black or galvanized finish. Ends threaded for screwed connections. Unions are not allowed.
 - .5 Cross mains located in corridors serving residential suites and branch line piping located in residential suites are permitted to be Blazemaster CPVC pipe. Installation to be in strict conformance with Ontario Building Code and manufacturers recommendations.
- .3 Connections and fittings: threaded, flanged, grooved or welded. Grooveless clamp or saddle fittings are not acceptable. **Welding is not allowed on site.** Field fabricated fittings will not be acceptable.
- .4 Hangers and supports: Provide pipe hangers and supports to meet NFPA 13. System piping shall be substantially supported to the building structure. The installation of hangers and supports shall adhere to the requirements set forth in N.F.P.A. 13, Standard for Installation of Sprinkler Systems. Materials used in the installation or construction of hangers and supports shall be listed and approved for such application.

2.5. LISTED FIRE PROTECTION VALVES

- .1 Valves shall be approved with 175-psig minimum pressure rating. Valves shall have 300-psig rating pressure rating if valves are components of high pressure piping system.
- .2 Provide Jenkins, Crane, or CheckRite valves for sprinkler system according to the following schedules:
 - .1 Above Ground Gate Valves:
 - .1 2" and smaller - 200 psi w.o.g. Jenkins 820, bronze screwed 175 psig cold water, OS&Y, Underwriters pattern.
 - .2 2-1/2" and larger - Grinnell listed gear operated butterfly valves, steel flanged, 175 psig cold water with downstream flange removed.
 - .3 Where Victaulic piping systems are used, provide Victaulic Fireball Series 708 or 727 valves with built-in supervisory switch and Victaulic No. 710/714 check valves. All components shall be ULC and FM labeled.
 - .2 Above Ground Check Valves:
 - .3 Check valves shall be approved pattern, 175 psi, approved for use on fire protection systems. Check valves shall be constructed of a ductile iron body with a brass seat and a rubber faced clapper assembly hinged to a removable access cover. Check valves shall be equipped with a removable access cover for periodic inspection as required in N.F.P.A. 25, Standard for Inspection, Testing and Maintenance of Water-Based Fire Protection Systems.
- .3 Provide Potter OSYS-UA1 tamper-proof supervisory alarm contact switch for each valve. Refer to Division 16 for alarm wiring and connection to annunciator panel.

2.6. ALARM VALVES

- .1 Provide alarm check valves for sprinkler system as shown on Drawings. The alarm valve shall be equipped with a removable cover assembly; listed for installation in the vertical or horizontal position; equipped with gauge connections on the system side and supply side of the valve clapper; equipped with an external bypass to eliminate false water flow alarms. The alarm valve trim piping shall be externally galvanized.
- .2 Provide valves with supervised approved gate valve, pressure switches and electric alarm bells, water motor gong.

2.7. SIGNALLING DEVICES

.1 WATERFLOW DETECTORS (WFD)

- .1 Provide, where shown on drawings.
- .2 Potter VSR-F with retard and two sets of SPDT contacts.
- .3 Water Pressure switches to be Potter PS 10-2A with two sets of SPDT contacts.

.2 Tamper switches to be as follows:

- .1 Potter OSYSU-2 with two sets of SPDT contacts for installation on OS&Y valves.
- .2 Potter PCVS-2 with two sets of SPDT contacts for installation on Butterfly valves.
- .3 Milwaukee BB-SCK02 with two sets of SPDT contacts for installation on built-in tamper switches for butterfly valves

2.8. FIRE PUMP

- .1 Horizontal split case – 750Usqpm at 80 psi.c/w controller and transfer switch

2.9. EXCESS PRESSURE PUMP

- .1 10 usqpm at 90 psi c/w controller;autostart.

2.10. SPRINKLER HEADS

- .1 Submit samples for approval. See contract drawings.
- .2 Sprinklers in suites and residential corridors to be residential concealed type.
- .3 Sprinklers to be concealed pendent type in all finished ceiling areas.
- .4 Use high temperature heads where required to suit the governing authority, and where located in elevator machine rooms, in electrical rooms and near heat producing equipment.

2.11. CABINETS

- .1 Provide metal cabinet containing the required number of spare sprinklers of each type and of each melting point temperature and the tools required to replace heads.
- .2 Install accessory cabinet where indicated by Owner on site.
- .3 Fire Hose cabinets to be complete with frosted glass. Acronym, FHC to be sand blasted into glass. Provide 1.6 mm baked enamel finished; rigidly mounted fire hose cabinets equipped with fire hose with approved nozzle (if applicable) and

with multi-purpose 2.27 kg fire extinguishers. In garages and other high risk areas provide a 4.54 kg pressurized ABC multi-purpose type chemical extinguisher in the cabinet. All fire hose cabinets shall be equal to National Fire Equipment Model. Cabinets to be surface mounted in parking areas and recessed in finished floor areas as indicated on drawings. Where applicable provide with each cabinet, U.L.C. approved National Fire Equipment model RU-300 swing out hose rack for 30m of 40mm lined hose, a model A156 forged brass 40mm restricting valve, a model A56 forged brass 65mm valve complete with forged brass cap, and one 40mm combination fog nozzle

2.12. PROVISION FOR FUTURE SPRINKLER HEADS

- .1 Provide minimum 1" outlets at each head location on branch lines and shown by contract drawings.

2.13. INSPECTOR'S TEST CONNECTION

- .1 Provide permanent piping from test valve to floor drain 1" orifice with 1" site glass assembly, or alternate approved by Engineer prior to installation.
- .2 Provide "butterball" type valve for wet system.
- .3 Valve and water gauge to be secured in lockable metal cabinet (painted red). Cabinet to be a minimum of 16 galvanized steel complete with hinged door. Provide three spare keys in total.

2.14. WATER PRESSURE GAGES

- .1 Ability to record pressures of 300 PSI (21 BAR) where supply pressures are no greater than 150 PSI. Gauges shall have an Acrylonitrile Butadiene Styrene case with a Polycarbonate window. The dial shall have black figures on a white background. Gauges shall have a 1/4" brass NPT inlet. Gauges shall be a Viking Corporation pressure gauge part number 01934A.

2.15. SLEEVES AND ESCUTCHEONS

- .1 Sleeves: Provide and install sleeves for all pipes passing through slabs, fire rated walls and ceilings. Sleeve material to be coordinated with fire stopping material.
- .2 Escutcheons: Provide and install prime coated steel set-screw type escutcheons on all exposed pipes passing through walls, floors ceilings and partitions.

2.16. PRESSURE REGULATING VALVES

- .1 Provide dual pressure regulating device to feed lower level sprinkler zones.
- .2 Provide sprinkler floor pressure regulating valves on all floors.
- .3 Provide 1 1/2 standpipe pressure restricting valves where static pressures exceed 100 psi but less than 175 psi.
- .4 Provide 1 1/2 and 2 1/2 standpipe pressure regulating valves where static pressures are 175 psi or greater.

2.17. PREACTION SPRINKLER SYSTEM

- .1 System description
 - .1 Supply and install a self-contained integrated fire protection system, preaction type as indicated, including:
 - .1 Preacton cabinet complete with panel to be Total Pac2 manufactured by Fireflex or equivalent.
 - .2 Automatic sprinkler system
 - .3 Fire detection and control system.
 - .2 Double interlocked, electric/pneumatic, and automatically controlled preaction type sprinkler system.
 - .3 The integrated unit shall be c-UL-us Listed and FM Approved as an assembled unit. All system components shall be "compatible", UL/ULC listed or FM approved.
- .2 System shall be complete with:
 - .1 Self-contained preaction cabinet double interlocked with electric pneumatic release and control panel containing all hydraulic and electrical components required for the control of a preaction system.
 - .2 Provide local wiring at deluge valve and air compressor.
 - .3 Preacton valve and trim components to be located as shown on document drawings.
 - .4 Provide a Listed and Approved isolation butterfly valve installed on the system riser inside the cabinet for full flow test purposes. The valve shall be supervised by the same supervisory circuit as the system main water supply valve tamper and wired at the factory. An integrated sight glass shall be part of this arrangement for visually confirming water flow through the main drain upon system actuation. A detailed instructions placard must be provided inside the cabinet door for easy reference.
- .3 Integrated control panel
 - .1 The release control panel must be fully integrated to the cabinet and installed in its own enclosure, mounted at the factory on top of the trim enclosure. Standard wall enclosure normally provided with control panels shall not be used and this arrangement shall be fully Listed & Approved as part of the integrated unit. Panels provided with their regular wall mounted enclosure fitted in the front door of the cabinet will not be considered as fully integrated and shall not be acceptable.
 - .2 The control panel shall be FM Approved and cULus listed to the new UL 864-9 standard. Panel shall include four programmable Class B, Style B

initiating zones, two class B supervisory zones, and four programmable output circuits. Onboard, menu-driven programming with twelve pre-installed programs for ease of set-up must also be provided and the specific program pre-set at the factory. The panel must be compatible with many different initiating devices including linear heat detection, smoke and heat detectors, water flow indicators, low air pressure switches, and manual pull stations.

- .3 The control panel should include both an LCD Annunciator describing all system conditions (16 characters on 2 lines) and a set of red & yellow LED lamps identifying each separate alarm and trouble conditions. Easy to operate control buttons shall also be included for the operation of the panel various functions.
- .4 The control panel should be pre-wired at the factory to a set of industrial grade wiring terminals used for power feed, separate from the terminals used to power the optional air compressor. External wiring to field devices (outside the cabinet) should be wired directly to the control panel module by the installing contractor.
- .5 A set of emergency batteries should be provided with the control panel. Batteries should be calculated to provide emergency power for a specific duration after which they shall be able to provide 10 minutes of alarm and activation of the solenoid valve(s).

.4 System Operation

- .1 Single zone operation: The activation of EITHER detection zone 1 or 2 will activate the solenoid valve, sound an alarm and activate alarm contacts for auxiliary functions but will not cause the system to fill with water.
- .2 The opening of an automatic sprinkler OR damage to system piping without the detection condition satisfied will activate the pneumatic actuator, sound a supervision signal and activate dry contacts for auxiliary functions but will not cause the system to fill with water.
- .3 Activation of BOTH the detection condition AND the opening of an automatic sprinkler will activate both the solenoid valve and pneumatic actuator, open deluge valve and sound an alarm. This will activate alarm and water flow contacts connected to the remote control panel.
- .4 Pressure loss on the sprinkler system will activate supervisory condition and auxiliary contact indicating the condition.
- .5 Operation of the emergency manual release will drain the priming chamber of the deluge valve, causing the system to immediately fill the piping network with water, and activate alarm and water flow contacts connected to the building fire alarm panel.

- .5 Air Supply
 - .1 Air compressor and supervisory trim shall be provided inside the cabinet and its pressure factory adjusted for the selected configuration.
- .6 System drain
 - .1 The drain system shall be connected to an open drain (open end pipe with an air gap around the drain pipe or equivalent). The drain piping shall not be restricted or reduced and shall be of the same diameter as the drain collector. It shall also be arranged to avoid back-pressurizing the drain trim.

PART 3 - EXECUTION

3.3. INSTALLATION

- .1 Comply with NFPA-13 requirements, Insurance requirements and manufacturer's recommendations.
- .2 Verification Dimensions: The contractor shall become familiar with all details of the work, verify all dimensions in the field, and shall confer with the consultant about any discrepancy before performing the work. The consultant's approval will not relieve the sprinkler contractor from his responsibilities to perform all work in accordance with the specification and contract terms..
- .3 Co-ordination and Fit: It is the Sprinkler contractors responsibility to co-ordinate his work with that of other trades, provide offsets and additional sprinklers as necessary and at no additional cost to the owner, to insure "fitting" of all components within the available space while maintaining code compliance and design intent. Do not cut building structural members, beams, joists, etc, for routing of sprinkler piping.
- .4 Standpipes are to be protected by a degree of fire resistance equal to that required for the building enclosed exit stairways..

3.4. TESTING

- .1 Test sprinkler and standpipe systems in accordance to NFPA-13, NFPA -14 and NFPA 20 requirements. Carry out any additional tests as required by the authorities having jurisdiction.
- .2 Perform tests in the presence of each governing authority's authorized inspector.
- .3 Submit certification that systems have been installed in accordance with local requirements.
- .4 Perform pressure tests before piping is concealed.
- .5 Remove all components which will not withstand test pressure, and replace after tests.

- .6 Eliminate leaks, or remove and refit defective parts. Caulking of threaded or welded joints will not be permitted.
- .7 Repeat tests as often as necessary to obtain certification.

3.5. SPRINKLER DRAINS AND TEST CONNECTIONS

- .1 Provide test and drain connections to meet NFPA-13. Provide Victaulic, Style 718 Testmaster alarm test on each test connection, meeting ULC and FM approval requirements.
- .2 Pipe discharge lines to floor drain. Do not discharge to the building exterior.

3.6. SPRINKLER HEAD INSTALLATION

- .1 Install sprinkler heads symmetrically in ceiling tiles, unless otherwise directed by the Consultant.

3.7. PROTECTION

- .1 Provide guards for sprinkler heads in elevator machine rooms, garbage room, mechanical rooms, storage rooms and where indicated on Drawings.
- .2 Assume full responsibility for protecting sprinkler heads during painting. Replace damaged and painted components.

3.8. AS-BUILT REQUIREMENTS

- .1 Be responsible for necessary modifications to the installation in the event the as-built hydraulic calculations do not meet the design criteria.

3.9. WARRANTY

- .1 Provide emergency and non-emergency repair service for the Work at no additional cost (parts and labour) to the Owner, within four hours of a request for such service by the Owner's Designee during both the installation and the warranty periods. This service shall be provided on a twenty-four (24) hour per day, 7 (seven) days per week.
- .2 Warranty period for the Work shall be twelve (12) months starting after Total Performance of the project has been achieved.

END OF SECTION