PART 1 - GENERAL

1.1 RELATED REQUIREMENTS

.1 Section 01 33 00 - Submittal Procedures.

.2 Section 26 05 00 - Common Work Results – Electrical

.3 Section 26 05 21 - Wires and Cables (0 - 1000 V).

.4 Section 26 05 34 - Conduits, Conduit Fastenings and Conduit Fittings.

1.2 REFERENCE STANDARDS

.1 National Research Council Canada (NRC)
.1 National Building Code of Canada 2015 (NBC).

.2 Treasury Board of Canada Secretariat (TBS), Occupational Safety and Health (OSH)
.1 Fire Protection Standard-10.

.3 Underwriter's Laboratories of Canada (ULC)
.1 CAN/ULC-S524-06, Standard for the Installation of Fire Alarm Systems.
.2 CAN/ULC-S526-16, Visible Signal Devices for Fire Alarm Systems, Including Accessories.
.3 CAN/ULC-S527-11, Standard for Control Units for Fire Alarm Systems.
.4 CAN/ULC-S528-05, Manual Stations for Fire Alarm Systems, Including Accessories.
.5 CAN/ULC-S529-16, Smoke Detectors for Fire Alarm Systems.
.6 CAN/ULC-S530-91(R1999), Heat Actuated Fire Detectors for Fire Alarm Systems.
.7 CAN/ULC-S531-14, Standard for Smoke Alarms.
.8 CAN/ULC-S537-13, Standard for the Verification of Fire Alarm Systems.

1.3 ACTION AND INFORMATIONAL SUBMITTALS

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

.2 Product Data:
.1 Submit manufacturer's instructions, printed product literature and data sheets for multiplex fire alarm system 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 Province, Canada.
.2 Indicate on shop drawings:
.1 Details for devices.

.2 Details and performance specifications for control, annunciation and peripherals with item by item cross reference to specification for compliance.
.3 Step-by-step operating sequence, cross referenced to logic flow diagram.

1.4 CLOSEOUT SUBMITTALS

.1 Submit in accordance with Section 01 78 00 - Closeout Submittals.

.2 Operation and Maintenance Data: submit operation and maintenance data for fire alarm system for incorporation into manual.

.3 Include:
.1 Instructions for complete fire alarm system to permit effective operation and maintenance.
.2 Technical data - illustrated parts lists with parts catalogue numbers.
.3 Copy of approved shop drawings with corrections completed and marks removed except review stamps.
.4 List of recommended spare parts for system.

1.5 MAINTENANCE MATERIAL SUBMITTALS

.1 Submit maintenance materials in accordance with Section 01 78 00 - Closeout Submittals.

1.6 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: deliver materials to site in original factory packaging, labeled with manufacturer's name and address.

.3 Storage and Handling Requirements:
.1 Store materials indoors in dry location and in accordance with manufacturer's recommendations in clean, dry, well-ventilated area.
.2 Store and protect materials from nicks, scratches, and blemishes.
.3 Replace defective or damaged materials with new.

PART 2 - PRODUCTS

2.1 DESCRIPTION

.1 To extend to existing Mircom system to include new smoke, bells, and strobes as shown on drawings.

.2 System to carry out fire alarm and protection functions; including receiving alarm signals; initiating general alarm; supervising components and wiring; actuating annunciators and auxiliary functions; initiating trouble signals and signalling to remain as currently done.

.3 Zoned, single stage.

.4 Modular in design to allow for future expansion.

.5 Operation of system shall not require personnel with special computer skills.

.6 Equipment and devices: ULC listed and labelled and supplied by single manufacturer.

.7 Audible signal devices: to CAN/ULC-S524.

.8 Visual signal devices: to CAN/ULC-S526.

.9 Smoke detectors: to CAN/ULC-S529.

.10 Smoke alarms: to CAN/ULC-S531.

.11 Regulatory Requirements:
.1 To TBS Fire Protection Standard.
.2 Subject to Fire Commissioner of Canada (FC) approval.
.3 Subject to FC inspection for final acceptance.
.4 To Canadian Forces Fire Marshal approval.
.5 System components: listed by ULC and comply with applicable provisions of NBC National Building Code, and meet requirements of local authority having jurisdiction.

2.2 SYSTEM OPERATION: SINGLE STAGE - SIGNALS ONLY

.1 Actuation of any alarm initiating device to:
.1 Cause electronic latch to lock-in alarm state at central control unit.
.2 Indicate zone of alarm at central control unit.
.3 Cause audible signalling devices to sound continuously throughout building and at central control unit.
.4 Transmit signal to as it is currently completed.
.5 Cause air conditioning and ventilation fans to shut down or to function to provide required control of smoke movemen].
.6 Cause fire doors and smoke control doors, if normally held open, to close automatically.

.2 Acknowledging alarm: indicated at central control unit.

.3 Ensure that it is possible to silence signals by "alarm silence" switch at control unit, after 60 seconds period of operation.

.4 Subsequent alarm, received after previous alarm has been silenced, to re-activate signals.

.5 Actuation of supervisory devices to:

.1 Cause electronic latch to lock-in supervisory state at central control unit.
.2 Indicate respective supervisory zone at central control unit.
.3 Cause audible signal at central control unit to sound.
.4 Activate common supervisory sequence.

.6 Resetting alarm and supervisory device not to return system indications/functions back to normal until control unit has been reset.

.7 Trouble on system to:
.1 Indicate circuit in trouble at central control unit.
.2 Activate "system trouble" indication, buzzer and common trouble sequence. Acknowledging trouble condition to silence audible indication; whereas visual indication to remain until trouble is cleared and system is back to normal.

.8 Trouble on system: suppressed during course of alarm.

.9 Trouble condition on any circuit in system not to initiate alarm conditions.

2.3 CONTROL PANEL

.1 Existing Central control unit (CCU) to remain, upgrade and extend as required.

2.4 INITIATING/INPUT CIRCUITS

.1 Receiving circuits for alarm initiating devices such as manual pull stations, smoke detectors, heat detectors and water flow switches, wired in DCLA configuration to central control unit .

.2 Alarm receiving circuits (active and spare): compatible with smoke detectors and open contact devices.

.3 Actuation of alarm initiating device: cause system to operate as specified in "System Operation".

.4 Receiving circuits for supervisory, N/O devices. Devices: wired in DCLA configuration to central control unit.

.5 Actuation of supervisory initiating device: cause system to operate as specified in "System Operation".

2.5 ALARM OUTPUT CIRCUITS

.1 Alarm output circuit: connected to signals, wired in class B configuration to central control unit.
.1 Signal circuits' operation to follow system programming; capable of sounding bells continuously at 20 spm. Each signal circuit: rated at 2 A, 24 VDC; fuse-protected from overloading/overcurrent.
.2 Manual alarm silence, automatic alarm silence and alarm silence inhibit to be provided by system's

common control.

2.6 AUXILIARY CIRCUITS

.1 Auxiliary contacts for control functions.

.2 Actual status indication (positive feedback) from controlled device.

.3 Alarm or supervisory trouble on system to cause operation of programmed auxiliary output circuits.

.4 2 sets of separate contacts for elevator capture to main floor of egress and to alternate floor of egress.

.5 Upon resetting system, auxiliary contacts to return to normal or to operate as pre-programmed.

.6 Fans: stagger-started upon system reset; timing circuit to separate starting of each fan or set of fans connected to auxiliary contact on system.

.1 Timing circuit: controlled by CCU.

.7 Auxiliary circuits: rated at 2 A, 24 Vdc or 120 Vac, fuse-protected.

2.7 WIRING

.1 Multi-conductor cable assemblies with dedicated bonding wire CSA FAS105 and FT-4 rated.

.2 To initiating circuits: 18 AWG minimum, and in accordance with manufacturer's requirements.

.3 To signal circuits: 16 AWG minimum, and in accordance with manufacturer's requirements.

.4 To control circuits: 14 AWG minimum, and in accordance with manufacturer's requirements.

.5 Fire alarm cables to be run in EMT conduit unless otherwise noted.

2.8 AUTOMATIC ALARM INITIATING DEVICES

.1 Smoke detector: photo-electric type air duct type with sampling tubes with protective housing.
- .1 Twistlock Plug-in type with fixed base.
- .2 Wire-in base assembly with integral red alarm LED.

.2 Addressable smoke detector.
- .1 Photo-electric type.
- .2 Electronics to communicate detector's status to addressable module/transponder.
- .3 Detector address to be set on detector in field.

2.9 AUDIBLE SIGNAL DEVICES

.1 Bells: surface mounted, single stroke, 24 V dc, 94db.

.2 Bells: vibrating or motorized type, gongs of special alloy steel, 24 V dc, 94db.

2.10 VISUAL ALARM SIGNAL DEVICES

.1 Strobe type: flashing white, 24 V dc.

.2 Designed for surface mounting on ceiling or walls as indicated.

2.11 END-OF-LINE DEVICES

.1 End-of-line devices to control supervisory current in alarm circuits and signalling circuits, sized to ensure correct supervisory current for each circuit. Open, short or ground fault in any circuit will alter supervisory current in that circuit, producing audible and visible alarm at main control panel

2.12 AS-BUILT RISER DIAGRAM

.1 Fire alarm system riser diagram: in glazed frame on black lamicoid sheet with bevelled edges, white lettering and designations, minimum size 600 x 600 mm.

2.13 ANCILLARY DEVICES

.1 Remote relay unit to initiate fan shutdown.

PART 3 - EXECUTION

3.1 EXAMINATION

.1 Verification of Conditions: verify conditions of substrates previously installed under other Sections or Contracts are acceptable for fire alarm installation in accordance with manufacturer's written instructions.

.1 Visually inspect substrate in presence of Departmental Representative.

.2 Inform Departmental Representative of unacceptable conditions immediately upon discovery.

.3 Proceed with installation only after unacceptable conditions have been remedied and after receipt of written approval to proceed from Departmental Representative.

3.2 INSTALLATION

.1 Install systems in accordance with CAN/ULC-S524.

.2 Install manual alarm stations and connect to alarm circuit wiring.

.3 Locate and install detectors and connect to alarm circuit wiring. Mount detectors more than 1 m from air outlets. Maintain at least 600 mm radius clear space on ceiling, below and around detectors. Locate duct type detectors in straight portions of ducts.

.4 Connect alarm circuits to main control panel.

.5 Install signal, bells and visual signal devices and connect to signalling circuits.

.6 Connect signalling circuits to main control panel.

.7 Install end-of-line devices at end of alarm and signalling circuits.

.8 Install door releasing devices.

.9 Install remote relay units to control fan shut down.

.10 Room detection system.
- .1 Install detectors. Make necessary connections between room detection panel and main fire alarm panel.
- .2 Locate and install audible signals and visual alarms.
- .3 Locate and install detectors under raised floor. Fasten to steel brackets approximately 300 mm above sub-floor level to clear cables and conduits.

.11 Connect fire suppression systems to control panel.

.12 Splices are not permitted.

.13 Provide necessary raceways, cable and wiring to make interconnections to terminal boxes, annunciator equipment and CCU, as required by equipment manufacturer.

.14 Ensure that wiring is free of opens, shorts or grounds, before system testing and handing over.

.15 Identify circuits and other related wiring at central control unit, annunciators, and terminal boxes.

3.3 FIELD QUALITY CONTROL

.1 Perform tests in accordance with Section 26 05 00 - Common Work Results for Electrical and CAN/ULC-S537.

.2 Fire alarm system:

.1 Test such device and alarm circuit to ensure manual stations, thermal and smoke detectors transmit alarm to control panel and actuate first stage alarm, general alarm and ancillary devices.

.2 Check annunciator panels to ensure zones are shown correctly.

.3 Simulate grounds and breaks on alarm and signalling circuits to ensure proper operation of systems.

.4 Addressable circuits system style DCLA:

.1 Test each conductor on all DCLA addressable links for capability of providing 3 or more subsequent alarm signals on each side of single open-circuit fault condition imposed near midmost point of each link. Operate Acknowledge/Silence switch after reception of each of the 3 signals. Correct imposed fault after completion of each series of tests.

.2 Test each conductor on all DCLA addressable links for capability of providing 3 or more subsequent alarm signals during ground-fault condition imposed near midmost point of each link. Operate Acknowledge/Silence switch after reception of each of the 3 signals. Correct imposed fault after completion of each series of tests.

.3 Provide final PROM program re-burn for system Departmental Representative incorporating program changes made during construction.

3.4 CLEANING

.1 Progress Cleaning: clean in accordance with Section 01 74 11 - Cleaning.

.1 Leave Work area clean at end of each day.

.2 Final Cleaning: upon completion remove surplus materials, rubbish, tools and equipment in accordance with Section 01 74 11 - Cleaning.

3.5 PROTECTION

.1 Protect installed products and components from damage during construction.

.2 Repair damage to adjacent materials caused by fire alarm system installation.

3.6 CLOSEOUT ACTIVITIES

.1 Provide on-site lectures and demonstration by fire alarm equipment manufacturer to train operational personnel in use and maintenance of fire alarm system.

END OF SECTION