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Part 1 SUMMARY OF WORK

- 1.1** Replace the existing fire alarm initiating and signalling devices only, including end-of-line resistors. The existing fire alarm control head unit, the existing wiring and conduit, and the existing sprinkler monitoring devices shall be excluded from the scope of Work. The contractor shall review the most up-to-date annual fire alarm testing report to acquire the final device count. Provide a final verification report to S-537 standards.
- 1.2** Allendale Long Term Care Home is located at 185 Ontario St South, Milton, Ontario. The building has 2 storeys above grade and one storey below grade, which comes with 200 resident rooms.
- 1.3** All Work shall be done in such a manner as to pose the least possible disruption to the residents and day-to-day operation of the facilities.
- 1.4** Provide all labour, material and equipment necessary to complete the Work detailed in the Contract Documents (Specifications, Drawings).

Part 2 WORK RESTRICTIONS

- 2.1** Schedule, Working Hours, Access, Screening, PPE & IPAC
- .1 The Contractor to submit a detailed schedule within 10 working days of award outlining dates and Work hours. This schedule must be approved by the Region prior to commencing Work.
 - .2 Access to resident units must be coordinated a minimum of 48 hours ahead of the time of access, so resident notice can be properly provided.
 - .3 Work hours are between 8 a.m. and 5 p.m. Monday to Friday. Any Work necessary outside of this timeframe shall have to be approved by Halton Region. The facility will be in use and is the residents' home, thus consideration should be given to flexibility in the delivery of the project. As this is a long-term care facility, there is the possibility of shutdowns due to outbreaks.
 - .4 Workers may be screened before entering the building and a rapid test may be performed up to 3x per week. Workers may be required to use face masks as required by the site.
 - .5 Follow Ministry of Long-Term Care (MoLTC) and CSA Z317.13:22 standards for Infection Prevention and Control (IPAC), including using drop sheets under the Work area, and ensuring any debris is cleaned prior to moving to the next location, especially within patient rooms. Residents will be relocated while Work is completed within their room.
- 2.2** Use of Site
- .1 If a staging area is required, the Contractor will propose a location for Region review & approval.
 - .2 Facility washrooms are available for Contractor use. Contractor to ensure washrooms are maintained in a clean condition after use.
 - .3 Parking spots on-site are in use by tenants of the building. Contractor to coordinate with Region for approved staging/parking areas.

2.3 Designated Substances

- .1** Pre-Renovation Designated Substances and Hazardous Materials Survey report, prepared by ECOH, dated March 10, 2023 is included in the Tender package and must be considered when submitting your bid.

Part 3 **COMMUNICATIONS AND CONTRACT ADMINISTRATION.**

- 3.1** All communication is to be conducted through the Regional Representative.
- 3.2** Request for Information (RFI) should be issued to the Prime Consultant and copied to the Regional Representative.
- 3.3** Any changes will be issued by the Prime Consultant and/or the Regional Representative in writing.
- 3.4** Project stakeholder meetings, including the Region Project Manager, Contractor and Consultant, as well as other stakeholders as required, will be conducted at the conclusion of each of the four phases of construction.
- 3.5** Invoices are to be submitted to the Regional Representative and copied to the Prime Consultant.
- 3.6** Contractor to take meeting minutes at bi-weekly meetings and distribute to the project team following the bi-weekly construction meetings.

END OF SECTION

Part 1 General

1.1 RELATED REQUIREMENTS

- .1 CCDC 2 (2020) Stipulated Price Contract - General Conditions and Supplementary Conditions

1.2 ADMINISTRATIVE

- .1 Schedule and administer meetings throughout the project as required..
- .2 Prepare agenda for meetings.
- .3 Distribute written notice of each meeting 7 days in advance of meeting date to Consultant.
- .4 Provide physical space and make arrangements for meetings.
- .5 Preside at meetings.
- .6 Record the meeting minutes. Include significant proceedings and decisions. Identify actions by parties.
- .7 Reproduce and distribute copies of minutes within 3 days after meetings and transmit to meeting participants and, affected parties not in attendance.
- .8 Representative of Contractor, Subcontractor and suppliers attending meetings will be qualified and authorized to act on behalf of party each represents.

1.3 PRECONSTRUCTION MEETING

- .1 Within 15 days after award of Contract, request a meeting of parties in contract to discuss and resolve administrative procedures and responsibilities.
- .2 Consultant, Contractor, major Subcontractors, field inspectors and supervisors will be in attendance.
- .3 This meeting will include identification of project personnel, including roles and responsibilities.
- .4 Agenda to include:
 - .1 Appointment of official representative of participants in the Work.
 - .2 Schedule of Work: in accordance with CCDC 2 (2020) Stipulated Price Contract - GC 3.4 CONSTRUCTION SCHEDULE as amended by the Supplementary Conditions.
 - .3 Schedule of submission of Shop Drawings, samples, colour chips. Submit submittals in accordance with Section 01 33 00 - Submittal Procedures.
 - .4 Health and Safety
- .5 The following items must be conducted in accordance with CCDC 2 (2020) Stipulated Price Contract - General Conditions and Supplementary Conditions, where amended:
 - .1 Site Security (Halton Region to provide security guards for Fire Watch.)
 - .2 Proposed changes, Change Orders, Change Directives, procedures, approvals required, mark-up percentages permitted, time extensions, overtime, administrative requirements.
 - .3 Owner provided products.
 - .4 Record drawings in accordance with Section 01 33 00 - Submittal Procedures.

- .5 Maintenance manuals in accordance with Section 01 78 00 - Closeout Submittals.
- .6 Take-over procedures, acceptance, warranties in accordance with Section 01 78 00 - Closeout Submittals.
- .7 Monthly progress claims, administrative procedures, photographs, hold backs.
- .8 Appointment of inspection and testing agencies or firms.
- .9 Insurances, transcript of policies.

1.4 PROGRESS MEETINGS

- .1 During course of Work and 2 weeks prior to project completion, schedule progress meetings monthly.
- .2 Contractor, major Subcontractors involved in Work and Consultant are to be in attendance.
- .3 Notify parties minimum 7 days prior to meetings.
- .4 Record minutes of meetings and circulate to attending parties and affected parties not in attendance within 3 days after meeting.
- .5 Agenda to include the following:
 - .1 Review, approval of minutes of previous meeting.
 - .2 Review of Work progress since previous meeting.
 - .3 Field observations, problems, conflicts.
 - .4 Problems which impede construction schedule.
 - .5 Review of off-site fabrication delivery schedules.
 - .6 Corrective measures and procedures to regain projected schedule.
 - .7 Revision to construction schedule.
 - .8 Progress schedule, during succeeding Work period.
 - .9 Review submittal schedules: expedite as required.
 - .10 Maintenance of quality standards.
 - .11 Review proposed changes for affect on construction schedule and on completion date.
 - .12 Health and Safety
 - .13 Other business.

Part 2 Products

- 2.1 NOT USED**
 - .1 Not Used.

Part 3 Execution

- 3.1 NOT USED**
 - .1 Not Used.

END OF SECTION

Part 1 General

1.1 ADMINISTRATIVE

- .1 Submit to Consultant submittals listed for review. Submit promptly and in orderly sequence to not cause delay in Work. Failure to submit in ample time is not considered sufficient reason for extension of Contract Time and no claim for extension by reason of such default will be allowed.
- .2 Do not proceed with Work affected by submittal until review is complete.
- .3 Present Shop Drawings, product data, samples and mock-ups in SI Metric units.
- .4 Where items or information is not produced in SI Metric units converted values are acceptable.
- .5 Review submittals prior to submission to Consultant. This review represents that necessary requirements have been determined and verified, or will be, and that each submittal has been checked and co-ordinated with requirements of Work and Contract Documents. Submittals not stamped, signed, dated and identified as to specific project will be returned without being examined and considered rejected.
- .6 Notify the Consultant, in writing at time of submission, identifying deviations from requirements of Contract Documents stating reasons for deviations.
- .7 Verify field measurements and affected adjacent Work are co-ordinated.
- .8 Contractor's responsibility for errors and omissions in submission is not relieved by Consultant's review of submittals.
- .9 Contractor's responsibility for deviations in submission from requirements of Contract Documents is not relieved by Consultant review.
- .10 Keep one reviewed copy of each submission on site.

1.2 SHOP DRAWINGS AND PRODUCT DATA

- .1 Refer to GC 3.8 from CCDC 2 (2020) Stipulated Price Contract - General Conditions as amended by the Supplementary Conditions.
- .2 The term "Shop Drawings" means drawings, diagrams, illustrations, schedules, performance charts, brochures and other data which are to be provided by Contractor to illustrate details of a portion of Work.
- .3 Submit drawings stamped and signed by professional engineer registered or licensed in Ontario, Canada.
- .4 Indicate materials, methods of construction and attachment or anchorage, erection diagrams, connections, explanatory notes and other information necessary for completion of Work. Where articles or equipment attach or connect to other articles or equipment, indicate that such items have been co-ordinated, regardless of Section under which adjacent items will be supplied and installed. Indicate cross references to design Drawings and Specifications.
- .5 Allow 7 days for Consultant's review of each submission.
- .6 Adjustments made on Shop Drawings by Consultant are not intended to change Contract Price. If adjustments affect value of Work, state such in writing to Consultant prior to proceeding with Work.

- .7 Make changes in Shop Drawings as Consultant may require, consistent with Contract Documents. When resubmitting, notify Consultant in writing of revisions other than those requested.
- .8 Accompany submissions with transmittal letter, in duplicate, containing:
 - .1 Date.
 - .2 Project title and number.
 - .3 Contractor's name and address.
 - .4 Identification and quantity of each Shop Drawing, product data and sample.
 - .5 Other pertinent data.
- .9 Submissions include:
 - .1 Date and revision dates.
 - .2 Project title and number.
 - .3 Name and address of:
 - .1 Subcontractor.
 - .2 Supplier.
 - .3 Manufacturer.
 - .4 Contractor's stamp, signed by Contractor's authorized representative certifying approval of submissions, verification of field measurements and compliance with Contract Documents.
 - .5 Details of appropriate portions of Work as applicable:
 - .1 Fabrication.
 - .2 Layout, showing dimensions, including identified field dimensions, and clearances.
 - .3 Setting or erection details.
 - .4 Capacities.
 - .5 Performance characteristics.
 - .6 Standards.
 - .7 Operating weight.
 - .8 Wiring diagrams.
 - .9 Single line and schematic diagrams.
 - .10 Relationship to adjacent Work.
- .10 After Consultant's review, distribute copies.
- .11 Submit electronic copy of Shop Drawings for each requirement requested in Specification Sections and as Consultant may reasonably request.
- .12 Submit 1 electronic copy of product data sheets or brochures for requirements requested in Specification Sections and as requested by Consultant where Shop Drawings will not be prepared due to standardized manufacture of product.
- .13 Submit 1 electronic copy of test reports for requirements requested in Specification Sections and as requested by Consultant.

- .1 Report signed by authorized official of testing laboratory that material, product or system identical to material, product or system to be provided has been tested in accord with specified requirements.
- .2 Testing must have been within 3 years of date of Contract Award for project.
- .14 Submit 1 electronic copy of certificates for requirements requested in Specification Sections and as requested by Consultant.
 - .1 Statements printed on manufacturer's letterhead and signed by responsible officials of manufacturer of product, system or material attesting that product, system or material meets specification requirements.
 - .2 Certificates must be dated after award of project Contract complete with project name.
- .15 Submit 1 electronic copy of manufacturers instructions for requirements requested in Specification Sections and as requested by Consultant.
 - .1 Pre-printed material describing installation of product, system or material, including special notices and Safety Data Sheets concerning impedances, hazards and safety precautions.
- .16 Submit 1 electronic copy of Manufacturer's Field Reports for requirements requested in Specification Sections and as requested by Consultant.
- .17 Documentation of the testing and verification actions taken by manufacturer's representative to confirm compliance with manufacturer's standards or instructions.
- .18 Submit 1 electronic copy of Operation and Maintenance Data for requirements requested in Specification Sections and as requested by Consultant.
- .19 Delete information not applicable to project.
- .20 Supplement standard information to provide details applicable to project.
- .21 If upon review by Consultant, no errors or omissions are discovered or if only minor corrections are made, transparency copies will be returned and fabrication and installation of Work may proceed. If Shop Drawings are rejected, noted copy will be returned and resubmission of corrected Shop Drawings, through same procedure indicated above, must be performed before fabrication and installation of Work may proceed.
- .22 Submit WSIB certificate within ten (10) calendar days of the date of receipt of the Letter of Intent.
- .23 Submit transcription of insurance within ten (10) calendar days of the date of receipt of the Letter of Intent.

Part 2 Products

- 2.1 NOT USED**
 - .1 Not Used.

Part 3 Execution

- 3.1 NOT USED**
 - .1 Not Used.

END OF SECTION

Part 1 General

1.1 REFERENCE STANDARDS

- .1 CCDC 2 (2020) Stipulated Price Contract - General Conditions and Supplementary Conditions
- .2 Within text of each Specifications Section, reference may be made to reference standards.
- .3 Conform to these reference standards, in whole or in part as specifically requested in Specifications.
- .4 If there is question as to whether products or systems are in conformance with applicable standards, Consultant reserves right to have such products or systems tested to prove or disprove conformance.

1.2 QUALITY

- .1 Refer to CCDC 2 (2020) Stipulated Price Contract - General Conditions and Supplementary Conditions.
- .2 Products, materials, equipment and articles incorporated in Work shall be new, not damaged or defective, and of best quality for purpose intended. If requested, furnish evidence as to type, source and quality of products provided.
- .3 Procurement policy is to acquire, in cost effective manner, items containing highest percentage of recycled and recovered materials practicable consistent with maintaining satisfactory levels of competition. Make reasonable efforts to use recycled and recovered materials and in otherwise utilizing recycled and recovered materials in execution of Work.
- .4 Defective products, whenever identified prior to completion of Work, will be rejected, regardless of previous inspections. Inspection does not relieve responsibility, but is precaution against oversight or error. Remove and replace defective products at own expense and be responsible for delays and expenses caused by rejection.
- .5 Should disputes arise as to quality or fitness of products, decision rests strictly with Consultant based upon requirements of Contract Documents.
- .6 Unless otherwise indicated in Specifications, maintain uniformity of manufacture for any particular or like item throughout building.
- .7 Permanent labels, trademarks and nameplates on products are not acceptable in prominent locations, except where required for operating instructions, or when located in mechanical or electrical rooms.

1.3 AVAILABILITY

- .1 Immediately upon award of the Contract, review product delivery requirements and anticipate foreseeable supply delays for items. If delays in supply of products are foreseeable, notify Consultant of such, in order that substitutions or other remedial action may be authorized in ample time to prevent delay in performance of Work.

- .2 In event of failure to notify Consultant at commencement of Work and should it subsequently appear that Work may be delayed for such reason, Consultant reserves right to substitute more readily available products of similar character, at no increase in Contract Price or Contract Time.

1.4 STORAGE, HANDLING AND PROTECTION

- .1 Handle and store products in manner to prevent damage, adulteration, deterioration and soiling and in accordance with manufacturer's instructions when applicable.
- .2 Store packaged or bundled products in original and undamaged condition with manufacturer's seal and labels intact. Do not remove from packaging or bundling until required in Work.
- .3 Store products subject to damage from weather in weatherproof enclosures.
- .4 Store cementitious products clear of earth or concrete floors, and away from walls.
- .5 Keep sand, when used for grout or mortar materials, clean and dry. Store sand on wooden platforms and cover with waterproof tarpaulins during inclement weather.
- .6 Store sheet materials, lumber on flat, solid supports and keep clear of ground. Slope to shed moisture.
- .7 Store and mix paints in heated and ventilated room. Remove oily rags and other combustible debris from site daily. Take every precaution necessary to prevent spontaneous combustion.
- .8 Remove and replace damaged products at own expense and to satisfaction of Consultant.
- .9 Touch-up damaged factory finished surfaces to Consultant's satisfaction. Use touch-up materials to match original. Do not paint over name plates.

1.5 TRANSPORTATION

- .1 Pay costs of transportation of products required in performance of Work.

1.6 MANUFACTURER'S INSTRUCTIONS

- .1 Unless otherwise indicated in Specifications, install or erect products in accordance with manufacturer's instructions. Do not rely on labels or enclosures provided with products. Obtain written instructions directly from manufacturers.
- .2 Notify Consultant in writing, of conflicts between Specifications and manufacturer's instructions, so that Consultant will establish course of action.
- .3 Improper installation or erection of products, due to failure in complying with these requirements, authorizes Consultant to require removal and re-installation at no increase in Contract Price or Contract Time.

1.7 QUALITY OF WORK

- .1 Ensure Quality of Work is of highest standard, executed by workers experienced and skilled in respective duties for which they are employed. Immediately notify Consultant if required Work is such as to make it impractical to produce required results.

- .2 Do not employ anyone unskilled in their required duties. Consultant reserves right to require dismissal from site, workers deemed incompetent or careless.
- .3 Decisions as to standard or fitness of Quality of Work in cases of dispute rest solely with Consultant, whose decision is final.

1.8 CO-ORDINATION

- .1 Ensure co-operation of workers in laying out Work. Maintain efficient and continuous supervision.
- .2 Be responsible for coordination and placement of openings, sleeves and accessories.

1.9 CONCEALMENT

- .1 In finished areas conceal pipes, ducts and wiring in floors, walls and ceilings, except where indicated otherwise.
- .2 Before installation inform Consultant if there is interference. Install as directed by Consultant.

1.10 REMEDIAL WORK

- .1 Refer to CCDC 2 (2020) Stipulated Price Contract - General Conditions and Supplementary Conditions.
- .2 Perform remedial Work required to repair or replace parts or portions of Work identified as defective or unacceptable. Co-ordinate adjacent affected Work as required.
- .3 Perform remedial Work by specialists familiar with materials affected. Perform in a manner to neither damage nor put at risk any portion of Work.

1.11 LOCATION OF FIXTURES

- .1 Consider location of fixtures, outlets, and mechanical and electrical items indicated as approximate.
- .2 Inform Consultant of conflicting installation. Install as directed.

1.12 FASTENINGS

- .1 Provide metal fastenings and accessories in same texture, colour and finish as adjacent materials, unless indicated otherwise.
- .2 Prevent electrolytic action between dissimilar metals and materials.
- .3 Use non-corrosive hot dip galvanized steel fasteners and anchors for securing exterior Work, unless stainless steel or other material is specifically requested in affected Specification Section.
- .4 Space anchors within individual load limit or shear capacity and ensure they provide positive permanent anchorage. Wood, or any other organic material plugs are not acceptable.
- .5 Keep exposed fastenings to a minimum, space evenly and install neatly.
- .6 Fastenings which cause spalling or cracking of material to which anchorage is made are not acceptable.

1.13 FASTENINGS - EQUIPMENT

- .1 Use fastenings of standard commercial sizes and patterns with material and finish suitable for service.
- .2 Use heavy hexagon heads, semi-finished unless otherwise specified. Use No. 304 stainless steel for exterior areas.
- .3 Bolts may not project more than one diameter beyond nuts.
- .4 Use plain type washers on equipment, sheet metal and soft gasket lock type washers where vibrations occur. Use resilient washers with stainless steel.

1.14 PROTECTION OF WORK IN PROGRESS

- .1 Prevent overloading of parts of building. Do not cut, drill or sleeve load bearing structural member, unless specifically indicated without written approval of Consultant.

1.15 EXISTING UTILITIES

- .1 When breaking into or connecting to existing services or utilities, execute Work at times directed by local governing authorities, with minimum of disturbance to Work, and/or building occupants.
- .2 Protect, relocate or maintain existing active services. When services are encountered, cap off in manner approved by authority having jurisdiction. Stake and record location of capped service.

Part 2 Products

2.1 NOT USED

- .1 Not Used.

Part 3 Execution

3.1 NOT USED

- .1 Not Used.

END OF SECTION

Part 1 General

1.1 REFERENCE STANDARDS

- .1 CCDC 2 (2020) Stipulated Price Contract - General Conditions and Supplementary Conditions

1.2 PROJECT CLEANLINESS

- .1 Maintain Work in tidy condition, free from accumulation of waste products and debris, other than that caused by Owner or other contractors.
- .2 Remove waste materials from site at daily regularly scheduled times or dispose of as directed by Consultant. Do not burn waste materials on site, unless approved by Consultant.
- .3 Make arrangements with and obtain permits from authorities having jurisdiction for disposal of waste and debris.
- .4 Provide on-site containers for collection of waste materials and debris.
- .5 Clean interior areas prior to start of finishing Work, and maintain areas free of dust and other contaminants during finishing operations.
- .6 Store volatile waste in covered metal containers, and remove from premises at end of each working day.
- .7 Provide adequate ventilation during use of volatile or noxious substances. Use of building ventilation systems is not permitted for this purpose.
- .8 Use only cleaning materials recommended by manufacturer of surface to be cleaned, and as recommended by cleaning material manufacturer.
- .9 Schedule cleaning operations so that resulting dust, debris and other contaminants will not fall on wet, newly painted surfaces nor contaminate building systems.

1.3 FINAL CLEANING

- .1 Refer to GC 12.1 from CCDC 2 (2020) Stipulated Price Contract - General Conditions and Supplementary Conditions, where amended.
- .2 When Work is Substantially Performed remove surplus products, tools, construction machinery and equipment not required for performance of remaining Work.
- .3 Remove waste products and debris other than that caused by others, and leave Work clean and suitable for occupancy.
- .4 Prior to final review remove surplus products, tools, construction machinery and equipment.
- .5 Remove waste products and debris other than that caused by Owner or other contractors.
- .6 Remove waste materials from site at regularly scheduled times or dispose of as directed by Consultant. Do not burn waste materials on site, unless approved by Consultant.
- .7 Make arrangements with and obtain permits from authorities having jurisdiction for disposal of waste and debris.

- .8 The contractor is liable for all damages to the building in which he/she may cause during construction. It is the contractor's responsibility to report the incident and repair the damage in a timely manner.

Part 2 Products

2.1 NOT USED

- .1 Not Used.

Part 3 Execution

3.1 NOT USED

- .1 Not Used.

END OF SECTION

Part 1 General

1.1 ADMINISTRATIVE REQUIREMENTS

- .1 Pre-warranty Meeting:
 - .1 Convene meeting one week prior to Contract completion with contractor's representative in accordance with Section 01 31 19 - Project Meetings to:
 - .1 Verify Project requirements.
 - .2 Review manufacturer's installation instructions and warranty requirements.
 - .2 Consultant to establish communication procedures for:
 - .1 Notifying construction warranty defects.
 - .2 Determine priorities for type of defects.
 - .3 Determine reasonable response time.
 - .3 Contact information for bonded and licensed company for warranty Work action: provide name, telephone number and address of company authorized for construction warranty Work action.
 - .4 Ensure contact is located within local service area of warranted construction, is continuously available, and is responsive to inquiries for warranty Work action.

1.2 FORMAT

- .1 Organize data as instructional manual.
- .2 Binders: vinyl, hard covered, 3 'D' ring, with spine and face pockets.
- .3 When multiple binders are used correlate data into related consistent groupings.
 - .1 Identify contents of each binder on spine.
- .4 Cover: identify each binder with type or printed title 'Project Record Documents'; list title of project and identify subject matter of contents.
- .5 Arrange content by systems, under Section numbers and sequence of Table of Contents.
- .6 Provide tabbed fly leaf for each separate product and system, with typed description of product and major component parts of equipment.
- .7 Text: manufacturer's printed data, or typewritten data.
- .8 Drawings: provide with reinforced punched binder tab.
 - .1 Bind in with text; fold larger drawings to size of text pages.
- .9 Provide scaled CAD files in dwg format on USB drive.

1.3 CONTENTS - PROJECT RECORD DOCUMENTS

- .1 Table of Contents for Each Volume: provide title of project;
 - .1 Date of submission; names.
 - .2 Addresses, and telephone numbers of Consultant and Contractor with name of responsible parties.

- .3 Schedule of products and systems, indexed to content of volume.
- .2 For each product or system:
 - .1 List names, addresses and telephone numbers of subcontractors and suppliers, including local source of supplies and replacement parts.
- .3 Product Data: mark each sheet to identify specific products and component parts, and data applicable to installation; delete inapplicable information.
- .4 Drawings: supplement product data to illustrate relations of component parts of equipment and systems, to show control and flow diagrams.

1.4 AS -BUILT DOCUMENTS AND SAMPLES

- .1 Maintain, in addition to requirements in General Conditions and Supplementary Conditions, at site for the Owner one record copy of:
 - .1 Contract Drawings.
 - .2 Specifications.
 - .3 Addenda.
 - .4 Change Orders and other modifications to Contract.
 - .5 Reviewed Shop Drawings, product data, and samples.
 - .6 Field test records.
 - .7 Inspection certificates.
 - .8 Manufacturer's certificates.
- .2 Store record documents and samples in field office apart from documents used for construction.
 - .1 Provide files, racks, and secure storage.
- .3 Label record documents and file in accordance with Section number listings in List of Contents of this Project Manual.
 - .1 Label each document "PROJECT RECORD" in neat, large, printed letters.
- .4 Maintain record documents in clean, dry and legible condition.
 - .1 Do not use record documents for construction purposes.

1.5 RECORDING INFORMATION ON PROJECT RECORD DOCUMENTS

- .1 Record information on set of blue line opaque drawings, and in copy of Project Manual, provided by Consultant.
- .2 Use felt tip marking pens, maintaining separate colours for each major system, for recording information.
- .3 Record information concurrently with construction progress.
 - .1 Do not conceal Work until required information is recorded.
- .4 Contract Drawings and Shop Drawings: mark each item to record actual construction, including:
 - .1 Measured depths of elements of foundation in relation to finish first floor datum.

- .2 Measured horizontal and vertical locations of underground utilities and appurtenances, referenced to permanent surface improvements.
- .3 Measured locations of internal utilities and appurtenances, referenced to visible and accessible features of construction.
- .4 Field changes of dimension and detail.
- .5 Changes made by Change Orders.
- .6 Details not on original Contract Drawings.
- .7 Referenced Standards to related Shop Drawings and modifications.
- .5 Specifications: mark each item to record actual construction, including:
 - .1 Manufacturer, trade name, and catalogue number of each product actually installed, particularly optional items and substitute items.
 - .2 Changes made by Addenda and Change Orders.
- .6 Other Documents: maintain manufacturer's certifications, inspection certifications, field test records, required by individual Specifications Sections.
- .7 Provide digital photos, if requested, for site records.

1.6 EQUIPMENT AND SYSTEMS

- .1 For each item of equipment and each system include description of unit or system, and component parts.
 - .1 Give function, normal operation characteristics and limiting conditions.
 - .2 Include performance curves, with engineering data and tests, and complete nomenclature and commercial number of replaceable parts.
- .2 Panel board circuit directories: provide electrical service characteristics, controls, and communications.
- .3 Include installed colour coded wiring diagrams.
- .4 Operating Procedures: include start-up, break-in, and routine normal operating instructions and sequences.
 - .1 Include regulation, control, stopping, shut-down, and emergency instructions.
 - .2 Include summer, winter, and any special operating instructions.
- .5 Maintenance Requirements: include routine procedures and guide for trouble-shooting; disassembly, repair, and reassembly instructions; and alignment, adjusting, balancing, and checking instructions.
- .6 Provide servicing and lubrication schedule, and list of lubricants required.
- .7 Include manufacturer's printed operation and maintenance instructions.
- .8 Include sequence of operation by controls manufacturer.
- .9 Provide original manufacturer's parts list, illustrations, assembly drawings, and diagrams required for maintenance.
- .10 Provide installed control diagrams by controls manufacturer.
- .11 Provide charts of valve tag numbers, with location and function of each valve, keyed to flow and control diagrams.

- .12 Provide list of original manufacturer's spare parts, current prices, and recommended quantities to be maintained in storage.
- .13 Additional requirements: as specified in individual Specification Sections.

1.7 MATERIALS AND FINISHES

- .1 Building products, applied materials, and finishes: include product data, with catalogue number, size, composition, and colour and texture designations.
- .2 Instructions for cleaning agents and methods, precautions against detrimental agents and methods, and recommended schedule for cleaning and maintenance.
- .3 Moisture-protection and weather-exposed products: include manufacturer's recommendations for cleaning agents and methods, precautions against detrimental agents and methods, and recommended schedule for cleaning and maintenance.
- .4 Additional requirements: as specified in individual Specifications Sections.

1.8 WARRANTIES

- .1 Assemble approved information in binder, submit upon acceptance of Work and organize binder as follows:
 - .1 Separate each warranty or bond with index tab sheets keyed to Table of Contents listing.
 - .2 List subcontractor, supplier, and manufacturer, with name, address, and telephone number of responsible principal.
 - .3 Obtain warranties, executed in duplicate by subcontractors, suppliers, and manufacturers, within ten days after completion of applicable item of Work.
 - .4 Verify that documents are in proper form, contain full information, and are notarized.
 - .5 Co-execute submittals when required.
 - .6 Retain warranties until time specified for submittal.
- .2 Except for items put into use with Owner's permission, leave date of beginning of time of warranty until Date of Substantial Performance is determined.
- .3 Conduct joint 4 month and 9 month warranty inspection, measured from time of acceptance, by Consultant.
- .4 Include information contained in warranty management plan as follows:
 - .1 Roles and responsibilities of personnel associated with warranty process, including points of contact and telephone numbers within the organizations of Contractors, subcontractors, manufacturers or suppliers involved.
 - .2 Listing and status of delivery of Certificates of Warranty for extended warranty items, to include commissioned systems such as alarm systems.
 - .3 Provide list for each warranted equipment, item, feature of construction or system indicating:
 - .1 Name of item.
 - .2 Model and serial numbers.
 - .3 Location where installed.

- .4 Name and phone numbers of manufacturers or suppliers.
- .5 Names, addresses and telephone numbers of sources of spare parts.
- .6 Warranties and terms of warranty: include one-year overall warranty of construction. Indicate items that have extended warranties and show separate warranty expiration dates.
- .7 Cross-reference to warranty certificates as applicable.
- .8 Starting point and duration of warranty period.
- .9 Summary of maintenance procedures required to continue warranty in force.
- .10 Cross-Reference to specific pertinent Operation and Maintenance manuals.
- .11 Organization, names and phone numbers of persons to call for warranty service.
- .12 Typical response time and repair time expected for various warranted equipment.
- .4 Contractor's plans for attendance at 4 and 9 month post-construction warranty inspections.
- .5 Procedure and status of tagging of equipment covered by extended warranties.
- .6 Post copies of instructions near selected pieces of equipment where operation is critical for warranty and/or safety reasons.
- .5 Respond in timely manner to oral or written notification of required construction warranty repair Work.
- .6 Written verification to follow oral instructions.
 - .1 Failure to respond will be cause for the Consultant to proceed with action against Contractor.

1.9 WARRANTY TAGS

- .1 Tag, at time of installation, each warranted item. Provide durable, oil and water resistant tag approved by Consultant.
- .2 Attach tags with copper wire and spray with waterproof silicone coating.
- .3 Leave date of acceptance until project is accepted for occupancy.
- .4 Indicate following information on tag:
 - .1 Type of product/material.
 - .2 Model number.
 - .3 Serial number.
 - .4 Contract number.
 - .5 Warranty period.
 - .6 Inspector's signature.
 - .7 Construction Contractor.

Part 2 Products

2.1 NOT USED

.1 Not Used.

Part 3 Execution

3.1 NOT USED

.1 Not Used.

END OF SECTION

Part 1 General

1.1 REFERENCE STANDARDS

- .1 CSA Group
CSA C22.1- latest, Canadian Electrical Code, Part 1, Safety Standard for Electrical Installations

1.2 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 and include product characteristics, performance criteria, physical size, finish and limitations.
- .3 Submit for review fire alarm riser diagram, plan and zoning of building under plexiglass in glazed frames at fire alarm control panel and annunciator.
- .4 Shop Drawings:
 - .1 Submit drawings stamped and signed by professional engineer registered or licensed in Canada.
 - .2 Submit wiring diagrams and installation details of equipment indicating proposed location, layout and arrangement, control panels, accessories, piping, ductwork, and other items that must be shown to ensure co-ordinated installation.
 - .3 Identify on wiring diagrams circuit terminals and indicate internal wiring for each item of equipment and interconnection between each item of equipment.
 - .4 Indicate on drawings clearances for operation, maintenance, and replacement of operating equipment devices.
 - .5 Submit 1 copy of 600 x 600 mm minimum size drawings and product data to authority having jurisdiction.
 - .6 If changes are required, notify Consultant of these changes before they are made.
- .5 Certificates:
 - .1 Provide CSA certified equipment.
 - .2 Where CSA certified equipment is not available, submit such equipment to authority having jurisdiction for special approval before delivery to site.
 - .3 Submit test results of installed electrical systems and instrumentation.
 - .4 Permits and fees: in accordance with General Conditions and Supplementary Conditions of Contract.
 - .5 Submit certificate of acceptance from authority having jurisdiction upon completion of Work to Consultant.
- .6 Manufacturer's Field Reports: submit to Consultant manufacturer's written report, within 3 days of review, verifying compliance of Work and electrical system and instrumentation testing

1.3 CLOSEOUT SUBMITTALS

- .1 Submit in accordance with Section 01 78 00 - Closeout Submittals.
- .2 Operation and Maintenance Data: submit operation and maintenance data for incorporation into manual.
 - .1 Provide for each system and principal item of equipment as specified in technical sections for use by operation and maintenance personnel.
 - .2 Operating instructions to include following:
 - .1 Wiring diagrams, control diagrams, and control sequence for each principal system and item of equipment.
 - .2 Start up, proper adjustment, operating, lubrication, and shutdown procedures.
 - .3 Safety precautions.
 - .4 Procedures to be followed in event of equipment failure.
 - .5 Other items of instruction as recommended by manufacturer of each system or item of equipment.
 - .3 Print or engrave operating instructions and frame under glass or in approved laminated plastic.
 - .4 Post instructions where directed.
 - .5 For operating instructions exposed to weather, provide weather-resistant materials or weatherproof enclosures.
 - .6 Ensure operating instructions will not fade when exposed to sunlight and are secured to prevent easy removal or peeling.

1.4 DELIVERY, STORAGE AND HANDLING

- .1 Deliver, store and handle materials in accordance with Section 01 61 00 - Common Product Requirements
- .2 Delivery and Acceptance Requirements: deliver materials to site in original factory packaging, labelled 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 from nicks, scratches, and blemishes.
 - .3 Replace defective or damaged materials with new.

Part 2 Products

2.1 DESIGN REQUIREMENTS

- .1 Operating voltages: to CAN3-C235.
- .2 Motors, electric heating, control and distribution devices and equipment to operate satisfactorily at 60 Hz within normal operating limits established by above standard.

- .1 Equipment to operate in extreme operating conditions established in above standard without damage to equipment.
- .3 Language operating requirements: provide identification labels for control items in English.

2.2 MATERIALS AND EQUIPMENT

- .1 Provide material and equipment in accordance with Section 01 61 00 - Common Product Requirement.
- .2 Material and equipment to be CSA certified. Where CSA certified material and equipment are not available, obtain special approval from authority having jurisdiction before delivery to site and submit such approval.
- .3 Factory assemble control panels and component assemblies.

2.3 WARNING SIGNS

- .1 Warning Signs: in accordance with requirements of authority having jurisdiction.
- .2 Decal signs, minimum size 175 x 250 mm.

2.4 WIRING TERMINATIONS

- .1 Ensure lugs, terminals, screws used for termination of wiring are suitable for either copper or aluminum conductors.

2.5 EQUIPMENT IDENTIFICATION

- .1 Identify electrical equipment with nameplates and labels as follows:
 - .1 Nameplates: lamicoid 3 mm black face, white core, lettering accurately aligned and engraved into core.
 - .2 Sizes as follows:

NAMEPLATE SIZES			
Size 1	10 x 50 mm	1 line	3 mm high letters
Size 2	12 x 70 mm	1 line	5 mm high letters
Size 3	12 x 70 mm	2 lines	3 mm high letters
Size 4	20 x 90 mm	1 line	8 mm high letters
Size 5	20 x 90 mm	2 lines	5 mm high letters
Size 6	25 x 100 mm	1 line	12 mm high letters
Size 7	25 x 100 mm	2 lines	6 mm high letters

- .2 Labels: embossed plastic labels with [6] mm high letters unless specified otherwise.
- .3 Allow for minimum of twenty-five (25) letters per [nameplate] [and] [label].
- .4 Nameplates for terminal cabinets and junction boxes to indicate system and/or voltage characteristics.
- .5 Disconnects, starters and contactors: indicate equipment being controlled and voltage.
- .6 Terminal cabinets and pull boxes: indicate system and voltage.
- .7 Transformers: indicate capacity, primary and secondary voltages.

2.6 WIRING IDENTIFICATION

- .1 Identify wiring with permanent indelible identifying markings, [numbered] [coloured plastic tapes], on both ends of phase conductors of feeders and branch circuit wiring.
- .2 Maintain phase sequence and colour coding throughout.
- .3 Colour coding: to CSA C22.1.
- .4 Use colour coded wires in communication cables, matched throughout system.

2.7 CONDUIT AND CABLE IDENTIFICATION

- .1 Colour code conduits, boxes and metallic sheathed cables.
- .2 Code with plastic tape or paint at points where conduit or cable enters wall, ceiling, or floor, and at [15] m intervals.
- .3 Colours: [25] mm wide prime colour and [20] mm wide auxiliary colour.

Type	Prime	Auxiliary
up to 250 V	Yellow	
up to 600 V	Yellow	Green
up to 5 kV	Yellow	Blue
up to 15 kV	Yellow	Red
Telephone	Green	
Other Communication Systems	Green	Blue
Fire Alarm	Red	
Emergency Voice	Red	Blue
Other Security Systems	Red	Yellow

2.8 FINISHES

- .1 Shop finish metal enclosure surfaces by application of rust resistant primer inside and outside, and at least two coats of finish enamel.

Part 3 Execution

3.1 EXAMINATION

- .1 Verification of Conditions: verify that conditions of substrate previously installed under other Sections or Contracts are acceptable for installation in accordance with manufacturer's written instructions.
 - .1 Visually inspect substrate in presence of Consultant.
 - .2 Inform Consultant 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 Consultant.

3.2 INSTALLATION

- .1 Do complete installation in accordance with CSA C22.1 except where specified otherwise.

3.3 NAMEPLATES AND LABELS

- .1 Ensure manufacturer's nameplates, CSA labels and identification nameplates are visible and legible after equipment is installed.

3.4 CONDUIT AND CABLE INSTALLATION

- .1 If plastic sleeves are used in fire rated walls or floors, remove before conduit installation.
- .2 Install cables, conduits and fittings embedded or plastered over, close to building structure so furring can be kept to minimum.

3.5 MOUNTING HEIGHTS

- .1 Mounting height of equipment is from finished floor to centreline of equipment unless specified or indicated otherwise.
- .2 If mounting height of equipment is not specified or indicated, verify before proceeding with installation.
- .3 Install electrical equipment at following heights unless indicated otherwise.
 - .1 Local switches: 1400 mm.
 - .2 Wall receptacles:
 - .1 General: 300 mm.
 - .2 Above top of continuous baseboard heater: 200 mm.
 - .3 Above top of counters or counter splash backs: 175 mm.
 - .4 In mechanical rooms: 1400 mm.
 - .3 Panelboards: as required by Code or as indicated.
 - .4 Telephone and interphone outlets: 300 mm.
 - .5 Wall mounted telephone and interphone outlets: 1500 mm.
 - .6 Fire alarm stations: 1500 mm.
 - .7 Fire alarm bells: 2100 mm.
 - .8 Television outlets: 300 mm.
 - .9 Wall mounted speakers: 2100 mm.
 - .10 Clocks: 2100 mm.
 - .11 Door bell pushbuttons: 1500 mm.

3.6 CO-ORDINATION OF PROTECTIVE DEVICES

- .1 Ensure circuit protective devices such as overcurrent trips, relays and fuses are installed to required values and settings.

3.7 SYSTEM STARTUP

- .1 Arrange and pay for services of manufacturer's factory service engineer to supervise start-up of installation, check, adjust, balance and calibrate components and instruct operating personnel.

- .2 Provide these services for such period, and for as many visits as necessary to put equipment in operation, and ensure that operating personnel are conversant with aspects of its care and operation.

3.8 CLEANING

- .1 Progress Cleaning: clean in accordance with Section 01 74 00 - 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 00 - Cleaning.

END OF SECTION

Part 1 General

1.1 SUMMARY

- .1 Section Includes:
 - .1 Materials and installation for fire alarm systems.
 - .2 Control panel to carry out fire alarm and protection functions including receiving alarm signals, initiating general alarm, supervising system continuously, actuating zone annunciators, and initiating trouble signals.
 - .3 Trouble signal devices.
 - .4 Power supply facilities.
 - .5 Manual alarm stations.
 - .6 Automatic alarm initiating devices.
 - .7 Audible signal devices.
 - .8 End-of-line devices.
 - .9 Annunciators.
 - .10 Visual alarm signal devices.
 - .11 Ancillary devices.

1.2 REFERENCE STANDARDS

- .1 National Fire Protection Agency
 - .1 NFPA 72-latest, National Fire Alarm Code.
 - .2 NFPA 90A-latest, Installation of Air Conditioning and Ventilating Systems.
- .2 Underwriter's Laboratories of Canada (ULC)
 - .1 CAN/ULC-S524- latest, Standard for the Installation of Fire Alarm Systems.
 - .2 CAN/ULC-S525- latest, Audible Signal Device for Fire Alarm Systems.
 - .3 CAN/ULC-S526- latest, Visual Signal Devices for Fire Alarm Systems.
 - .4 CAN/ULC-S527- latest, Control Units.
 - .5 CAN/ULC-S528- latest, Manual Pull Stations for Fire Alarm Systems.
 - .6 CAN/ULC-S529- latest, Smoke Detectors for Fire Alarm Systems.
 - .7 CAN/ULC-S530- latest, Heat Actuated Fire Detectors for Fire Alarm Systems.
 - .8 CAN/ULC-S531- latest, Standard for Smoke Alarms.
 - .9 CAN/ULC-S536-S537- latest, Burglar and Fire Alarm Systems and Components.

1.3 ACTION AND INFORMATIONAL SUBMITTALS

- .1 Product Data:
 - .1 Submit manufacturer's printed product literature, specifications and datasheet in accordance with Section 01 33 00 - Submittal Procedures.
- .2 Shop Drawings:

- .1 Submit Shop Drawings in accordance with Section 01 33 00 - Submittal Procedures.
- .2 Include:
 - .1 Layout of equipment.
 - .2 Zoning.
 - .3 Complete wiring diagram, including schematics of modules.
- .3 Quality assurance submittals: submit following in accordance with Section 01 33 00 - Submittal Procedures.
 - .1 Certificates: submit certificates signed by manufacturer certifying that materials comply with specified performance characteristics and physical properties.
 - .2 Instructions: submit manufacturer's installation instructions.
 - .3 Manufacturer's Field Reports: manufacturer's field reports specified.
- .4 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.
 - .2 Authority of Jurisdiction will delegate authority for review and approval of submittals required by this Section.
 - .3 Submit to Authority of Jurisdiction 2 sets of approved submittals and drawings immediately after approval but no later than 15 working days to prior to final inspection.
 - .4 Submit following:
 - .1 Manufacturer's Data for:
 - .2 System wiring diagrams:
 - .3 Design data: Power Calculations:
 - .4 Instructions for operation:
 - .5 Schedules:
 - .6 Test Reports:

1.4 QUALITY ASSURANCE

- .1 Qualifications:
 - .1 Installer: company or person specializing in fire alarm system installations approved by manufacturer.
- .2 Provide services of representative or technician from manufacturer of system, experienced in installation and operation of type of system being provided, to supervise installation, adjustment, preliminary testing, and final testing of system and to provide instruction to project personnel.
- .3 System:
 - .1 Subject to FC inspection for final acceptance.
- .4 Extra Materials:
 - .1 Provide maintenance materials in accordance with Section 01 78 00 - Closeout Submittals.

- .5 Maintenance Service:
 - .1 Provide one year's free maintenance with two inspections by manufacturer during warranty period. Inspection tests to conform to CAN/ULC-S536. Submit inspection report to the Consultant.

1.5 DELIVERY, STORAGE, AND HANDLING

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

1.6 ACCEPTABLE MANUFACTURERS

- .1 Simplex only

Part 2 Products

2.1 MATERIALS

- .1 Equipment and devices: ULC listed and labelled and supplied by single manufacturer.
- .2 Power supply: to CAN/ULC-S524.
- .3 Audible signal devices: to CAN/ULC-S525.
- .4 Visual signal devices: to CAN/ULC-S526.
- .5 Control unit: to CAN/ULC-S527.
- .6 Manual pull stations: to CAN/ULC-S528.
- .7 Thermal detectors: to CAN/ULC-S530.
- .8 Smoke detectors: to CAN/ULC-S529.
- .9 Smoke alarms: to CAN/ULC-S531.

2.2 SYSTEM OPERATION

- .1 Provide complete, electrically supervised, code 3 temporal common coded, manual and automatic, zoned, annunciated, fire alarm system.
- .2 Provide separate circuits from control panel to each zone of initiating devices. Transmission of signals from more than one zone over common circuit to control panel is prohibited.
- .3 Single stage operation. Operation to actuation following:
 - .1 Manual station.
 - .2 Heat detector.
 - .3 Smoke detector.
 - .4 Carbon monoxide detector.
 - .5 Door hold open.

- .6 Automatic fire sprinkler system.
- .7 Fire extinguishing system.
- .8 Fire standpipe system.
- .4 Actuation of single operation device to initiate following:
 - .1 Building evacuation alarm devices to operate continuously.
 - .2 Transmit signal to fire department via monitoring station.
 - .3 Zone of alarm device to be indicated on control panel and remote annunciator.
 - .4 Air conditioning and ventilating fans to shut down or to function so as to provide required control of smoke movement.
 - .5 Fire doors and smoke control doors if normally held open, to close automatically.
 - .6 Electro-magnetic door holders to de-energize.
 - .7 Operations to remain in alarm mode (except alarm notification appliances if manually silenced) until system is manually restored to normal.

2.3 MANUAL ALARM STATIONS

- .1 Provide non-coded single action type with mechanical reset features.
 - .1 Non-coded single pole normally open contact for single stage.
- .2 Stations: semi-flush mounted and interior type as indicated.
 - .1 For surface mounting provide station manufacturer's approved back box.
 - .2 Back box finish to match station finish.
- .3 Equip each station with terminal strip with contacts of proper number and type to perform functions required.
- .4 Stations: type not subject to operation by jarring or vibration.
 - .1 Break-glass-front stations are not permitted; pull-lever is acceptable provided presence of rod is not required to reset station.
- .5 Station colour: red.
- .6 Provide station with visible indication of operation.
- .7 Restoration to require use of key.
 - .1 Keys: identical throughout system for stations and control panel(s).
- .8 Mount stations with operating lever not more than 1.2 m above finished floor.
- .9 Where weatherproof stations are required, provide stations with cast metal, weatherproof housings with hinged access doors.
 - .1 Finish housings with red enamel paint and provide permanently affixed, raised-letter plastic, English and French signage indicating "FIRE ALARM" with white letters of 19 mm high.

2.4 AUTOMATIC ALARM INITIATING DEVICES

- .1 Heat detectors: provide heat detectors designed for detection of fire by combination fixed temperature rate-of-rise principle.

- .2 Combination Fixed Temperature Rate-Of-Rise Detectors (Spot Type): designed for semi-flush outlet box mounting and supported independently of conduit, tubing or wiring connections.
 - .1 Contacts: self-resetting after response to rate-of-rise actuation
 - .2 Operation under fixed temperature actuation to result in external indication.
 - .3 Detector units located in boiler rooms, showers, or other areas subject to abnormal temperature changes to operate on fixed temperature principle only.
- .3 Rate Compensating Detector (Spot Type): designed for surface outlet box mounting and supported independently of conduit, tubing or wiring connections.
 - .1 Detectors: hermetically sealed and automatically resetting type which will operate when ambient air temperature reaches detector setting regardless of rate of temperature rise.
 - .2 Detector operation: not be subject to thermal time lag.
- .4 Open-Area Smoke Detectors: provide detectors designed for detection of abnormal smoke densities by photoelectric principle.
 - .1 Detectors: 2-wire type.
 - .2 Provide necessary control and power modules required for operation integral with control panel.
 - .3 Detectors and associated modules: compatible with control panel and suitable for use in supervised circuit.
 - .4 Malfunction of electrical circuits to detector or its control or power units to result in operation of system trouble signals.
 - .5 Equip each detector with visible indicator lamp that will flash when detector is in normal standby mode and glow continuously when detector is activated.
 - .6 Each detector: plug-in type with tab-lock or twist-lock, quick disconnect head and separate base in which detector base contains screw terminals for making wiring connections.
 - .7 Detector head: removable from its base without disconnecting wires. Removal of detector head from its base to cause activation of system trouble signals.
 - .8 Screen each detector to prevent entrance of insects into detection chamber(s).
- .5 2-Wire Smoke Detectors: detector circuits of 2-wire type capable of transmitting detector operating power over initiating circuit are permitted, provided detectors used are approved by control panel manufacturer for use with control panel provided and are ULC listed as being compatible with control panel.
 - .1 Total number of detectors on any detection circuit: not exceed [80]% of maximum number of detectors allowed by control panel manufacturer for that circuit. Provide additional zones if required to meet this requirement.
- .6 Photoelectric Detectors: operate on light scattering principle using LED light source.
 - .1 Detector: respond to both flaming and smoldering fires.
- .7 Locate detectors in accordance with their listing by ULC and the requirements of NFPA 72, except provide at least 2 detectors in rooms of 54 square meters or larger in area.
- .8 Mount detectors at underside of ceiling or deck above unless otherwise indicated.

- .1 For mounting heights greater than 3 m above floor level, reduce actual detector linear spacing from listed spacing as required by NFPA 72.
- .2 For heights greater than 9 m space detectors no farther apart than 34% of their listed spacing.
- .9 Temperature rating of detectors: in accordance with NFPA 72.
- .10 Locate detectors minimum 300 mm to lighting fixtures and not closer than 600 mm to air supply or return diffuser.
- .11 Ensure detectors, located in areas subject to moisture or exterior atmospheric conditions or hazardous locations as defined by NFPA 70, are approved for such locations.
- .12 Provide detectors with terminal screw type connections.
- .13 Removal of detector head from its base to cause activation of system trouble signals if detectors are provided with separable heads and bases.

2.5 ALARM INITIATING DEVICE SPACING AND LOCATION

- .1 Detector spacing and location: in accordance with manufacturer's recommendations and requirements of NFPA 72. Replace like-for-like using pre-established spacing and locations
- .2 Provide at least 2 detectors in rooms of 54 square meters or larger.
- .3 Spacing: not to exceed 9 m by 9 m per detector, and 9 linear m per detector along corridors.
- .4 Locate detectors minimum 1.5 m from air discharge or return grille, and not closer than 300 mm to lighting fixtures.
- .5 In areas without finished ceilings, mount detectors at underside of deck above unless otherwise indicated.

2.6 DUCT SMOKE DETECTORS

- .1 Provide detectors installed in ducts of photoelectric type and listed by ULC duct installation.
- .2 Provide integral control and power modules required for operation with main control panel.
- .3 Ensure detectors and associated modules are compatible with main control panel and suitable for use in supervised circuit.
- .4 Detector circuits: 4-wire type where detector operating power is transmitted over conductors separate from initiating circuit. Malfunction of electrical circuits to detector or its control or power modules to cause operation of system trouble signals.
- .5 Provide a separate, fused power circuit for each smoke detection initiating circuit.
- .6 Failure of power circuit: indicated as a trouble condition on corresponding initiating circuit.
- .7 Provide duct detectors in accordance with NFPA 90A.
- .8 Provide duct detectors with approved duct housing, mounted exterior to duct, with perforated sampling tubes extending across width of duct.

- .9 Activation of duct detectors to cause shutdown of associated air handling unit annunciation at control panel and tripping of transmitter and sounding of building evacuation alarms.
- .10 Provide detectors with visible indicator lamp that flashes when detector is in normal standby mode and glows continuously when detector is activated.
- .11 Provide remote indicator lamp for each detector.
- .12 Permanently label remote indicator with description and number of associated air handling unit(s).
- .13 Provide each detector with remote test switch. Mount switch not more than 1.8 m above finished floor.
- .14 Permanently label test switch with [description] [number] of associated air handling unit(s).

2.7 PROJECTED BEAM SMOKE DETECTOR

- .1 Provide projected beam smoke detectors to protect spaces.
- .2 Provide detectors and associated controls compatible with main control panel and suitable for use in supervised circuit.
- .3 Detector circuits: 4-wire type, where detector operating power is transmitted over conductors separate from initiating circuit.
- .4 Provide separate, fused power circuit for each smoke detection initiating circuit.
- .5 Failure of the power circuit: indicated as trouble condition on initiating circuit.
- .6 Malfunction of detector or its control unit or blockage of projected beam to cause operation of system trouble signals.
- .7 Install detectors in accordance with: NFPA 72, manufacturer's instructions, and ULC listing, with project beams parallel to ceilings.
- .8 Beam length and distance between adjacent beams, and distance between beams and walls, not exceed maximum permitted by equipment listing.
- .9 Do not use mirrors to alter direction of projected beam.

2.8 AUDIBLE SIGNAL DEVICES

- .1 Provide remote system trouble buzzer arranged to operate in conjunction with panel's integral trouble signal.
- .2 Locate remote trouble buzzer as indicated.
 - .1 Provide external trouble buzzer at control panel arranged to operate in conjunction with panel's integral trouble signal.
 - .2 Provide trouble buzzer with rigid plastic white on red engraved identification sign which reads "FIRE ALARM SYSTEM TROUBLE".
 - .3 Lettering on identification sign: minimum 25 mm high.
- .3 Audible device(s):
 - .1 Horns: existing db, existing mounting, 24 V dc.

- .2 Mini-horns: existing db, existing mounting, red colour, 24 V dc.
- .4 Do not exceed 80 percent of listed rating in amperes of notification appliance circuit. Provide additional circuits above those shown if required to meet this requirement.
- .5 Provide appliances specifically listed for outdoor use in locations exposed to weather.
- .6 Finish appliances in red enamel.
- .7 For surface mounting provide appliance manufacturer's approved back box. Back box finish to match appliance finish.

2.9 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 and remotely as indicated.

2.10 VISUAL ALARM SIGNAL DEVICES

- .1 Existing-mounted assembly of stroboscopic type suitable for use in electrically supervised circuit and powered from notification appliance circuits.
- .2 Appliances: minimum of 30 candela measured as approved by ULC, but not less than effective intensity required by National Building Code of Canada for appliance spacing and location shown.
- .3 Protect lamps with thermoplastic lens and labelled "FIRE" in letters at least 12 mm high.
- .4 Provide visible appliances within 300 mm of each audible appliance as indicated.
- .5 Visible appliances may be part of audio-visual assembly, where more than two appliances are located in same room or corridor.

2.11 ELECTRO-MAGNETIC DOOR HOLDER-RELEASES

- .1 Provide as indicated shown.
- .2 Mount armature portion on door. Armature complete with adjusting screw for setting angle of contact plate.
- .3 Mount electro-magnetic release on wall or in wall recess behind door.
- .4 Activation of fire alarm system, smoke detector designated for door release service to release doors on circuit to close.
- .5 Total projection of door holder-release not to exceed 100 mm.
- .6 Door holders: not require battery backup power.

2.12 VALVE TAMPER SWITCHES

- .1 Provide switches to monitor open position of valves controlling water supply to sprinkler systems.
- .2 Switch contacts to transfer from normal position to off-normal position during first two revolutions of hand wheel or when stem of valve has moved not more than one-fifth of distance from its normal position.

- .3 Provide switch with tamper resistant cover.
- .4 Removal of the cover to cause switch to operate into off-normal position.

2.13 CONDUIT

- .1 Rigid Steel Conduit:
 - .1 Zinc-Coated.
- .2 Intermediate Metal Conduit (IMC):
 - .1 Zinc-coated steel only.
- .3 Electrical Metallic Tubing (EMT).
- .4 Surface Metal Raceway and Fittings:
 - .1 Two-piece painted steel.
 - .2 Totally enclosed snap-cover type.

2.14 WIRING

- .1 Wire for 120 V circuits: No. 12 AWG minimum solid copper conductor.
- .2 Wire for low voltage DC circuits: No. 14 AWG minimum solid copper conductor
- .3 Wire to remote annunciators: No. 18 AWG minimum solid copper conductor.
- .4 Wire for connection to base telegraphic alarm loop: No. 12 AWG minimum solid copper conductor.
- .5 Insulation 75 degrees C minimum with nylon jacket.
- .6 Colour code wiring.

2.15 SURGE SUPPRESSION

- .1 Provide line voltage surge suppression devices to suppress voltage transients which might damage control panel and transmitter components.
- .2 Mount suppressors in separate enclosure(s) adjacent to control panel and transmitter unless suppressors are specifically UL approved for mounting inside control panel and transmitter provided and approved for such use by control panel and transmitter manufacturers.

2.16 AS-BUILT RISER DIAGRAM

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

2.17 ANCILLARY DEVICES

- .1 Remote relay unit to initiate fan shutdown.

Part 3 Execution

3.1 MANUFACTURER'S INSTRUCTIONS

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

3.2 INSTALLATION

- .1 Install systems in accordance with CAN/ULC-S524.
- .2 Install main control panel and connect to ac power supply, dc standby power.
- .3 Locate and install manual alarm stations and connect to alarm circuit wiring.
- .4 Locate and install detectors and connect to alarm circuit wiring. Do not mount detectors within 1 m of 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.
- .5 Connect alarm circuits to main control panel.
- .6 Locate and install horns and visual signal devices and connect to signalling circuits.
- .7 Connect signalling circuits to main control panel.
- .8 Install end-of-line devices at end of alarm and signalling circuits.
- .9 Install remote annunciator panels and connect to annunciator circuit wiring.
- .10 Locate and install door releasing devices.
- .11 Locate and install remote relay units to control fan shut down.
- .12 Sprinkler system: wire alarm and supervisory switches and connect to control panel.

3.3 FIELD QUALITY CONTROL

- .1 Site Tests:
 - .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 each device and alarm circuit to ensure manual stations, thermal and, smoke detectors, sprinkler system, transmit alarm to control panel and actuate general alarm.
 - .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 system.
 - .4 Class B circuits.
- .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.
 - .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 GC2.3 Review and Inspection of the Work, and as amended by the Supplementary Conditions.

3.4 TRAINING

- .1 Arrange and pay for on-site lectures and demonstrations by fire alarm equipment manufacturer to train operational personnel in use and maintenance of fire alarm system.

3.5 CLEANING

- .1 Proceed in accordance with Section 01 74 00 - Cleaning.
- .2 Upon completion and verification of performance of installation, remove surplus materials, excess materials, rubbish, tools and equipment.

END OF SECTION