

1. GENERAL

1.1 SUBMITTALS

- .1 Submit shop drawings in accordance with Section 26 05 01 including:
 - .1 Layout of equipment.
 - .2 Complete wiring diagram, including connections to devices.

1.2 OPERATION AND MAINTENANCE DATA

- .1 Provide data for incorporation into Maintenance Manual specified in Section 26 05 01.
- .2 Operation and Maintenance Manual to include:
 - .1 Operation and maintenance instructions for complete system.
 - .2 Technical data - illustrated parts lists with parts catalogue numbers.
 - .3 Copy of reviewed shop drawings and As-Builts.

1.3 MAINTENANCE

- .1 Provide one year's free maintenance with an 11th month inspection during the first year of service. Replace or repair any defective equipment.

1.4 SERVICE

- .1 The supplier of the system must employ factory-trained technicians and maintain a service organization within Winnipeg.

1.5 WARRANTY

- .1 The system shall carry a one-year warranty parts and labour from date of acceptance by the Owner.

1.6 ON-SITE TRAINING

- .1 The system supplier shall provide a 2 hour on-site, hands on orientation and instruction seminar showing the operational techniques and procedures.
- .2 All training shall be signed off by owner's personnel.

1.7 SYSTEM DESCRIPTION

- .1 The Electrical Contractor shall furnish and install a complete and operating Closed Circuit Television System as specified and as shown on the drawings.
- .2 The new CCTV system shall be capable of the following functions:
 - .1 All equipment and materials used shall be standard components, regularly manufactured, regularly utilized in the manufacturer's system.
 - .2 All systems and components shall have been thoroughly tested and proven in actual use.
 - .3 The unit will record a minimum of two hundred and forty (240) images per second and be able to record video while archiving and allow remote access.
 - .4 The system will allow remote access to live and archived video information via a LAN, PSTN, ISDN, ADSL.
 - .5 The remote access software will allow for programming camera recording and all of the system attributes.
 - .6 The system shall have the ability of multiple levels of access, including management and supervisory along with basic viewing user access.
 - .7 The system shall have as many as thirty two (32) looping video BNC inputs, one (1) BNC video monitor and spot monitor outputs and a VGA monitor output, a minimum of eight alarm inputs, RJ-45 network connection and USB port(s) for copying and exporting archived video.
 - .8 The system shall be able to mask the output of at least one (1) camera considered to be cover in nature.
 - .9 The recorder shall provide video loss detection and a method of alerting security management of this occurrence.

- .10 The recorder will provide for individual programmable recording for each camera including time lapse, programmable internal motion detection event and pre-event recording.
- .11 The recorder shall allow for a retrospective motion search (Smart Search) where a specific area in a scene may be chosen and only archived video with movement in that zone will be assembled for review.
- .12 The recorder shall be able to export video and still images in AVI, TIFF and J-PEG format for interoperability with law enforcement digital imaging technical equipment.
- .13 The recorder shall have have an on board DVD recorder.
- .14 The system shall have the ability to control PELCO and other manufacturers Pan-Tilt-Zoom (PTZ) cameras.

2. PRODUCTS

.1 INDOOR DOME CAMERA

- .1 Camera shall be a ceiling mounted, plenum rated; vandal resistant (Nema 4 or similar) smoked dome complete with an adjustable vari-focal lens (minimum 2.8-10mm) and all required mounting hardware.
- .2 The camera shall provide a high-resolution colour picture (540 lines or better).
- .3 Manufactured by PELCO model IS21-DVW10S Camclosure 2 IS5X Series.

.2 MONITOR

- .1 Provide 19" LCD flat screen monitors quantity as indicated on drawing.
- .2 Provide appropriate mounting brackets. See drawings for desk mounted monitors or and wall mounted monitors.
- .3 1280X1024 resolution.
- .4 BNC output.
- .5 Product PMCL319A 300 Series.

.3 STAND ALONE COMPUTER FOR SECURITY STATION

- .1 Provide one standalone desktop PC (include 19" monitor, keyboard and mouse). Provide Microsoft

software to include MS word, MS excel and Internet explorer.

.4 DIGITAL VIDEO RECORDER

- .1 All recording from all cameras shall be hard-drive based.
- .2 The digital video recorder shall capture high resolution video at up to 4CIF resolution and shall record up to 30 ips at 4CIF resolution per input. The digital video recorder shall allow for programmable recording schedules for each camera.
- .3 The digital video recorder shall incorporate motion detection capability, compatible with the KBD5000 for control and operation, and it shall allow the user to configure and program via a USB keyboard. The digital video recorder shall control PTZ cameras from the front panel via Coaxitron®, Pelco P, or Pelco D protocol. The main monitor shall display multiple-screen formats and shall provide for the user interface. Programmable spot monitors shall be available for sequencing all inputs. Users shall be able to use an analog, and/or S-Video, or VGA monitor as a main monitor. The digital video recorder shall use Internet Protocol-based networking to deliver control and monitor of video recorders. All connections shall be made over a secure VPN connection, reducing the risks prevalent with public Internet-based data transfers.
- .4 The digital video recorder shall include e-mail on alarm, compact flash card operating system drive, programmable scripts, and a simplified icon based user interface. The digital video recorder shall incorporate a 10/100/1000 Mbps network port.
- .5 DVR to be linked to the internet via high speed DSL (must be IP addressable)
- .6 Minimum 2TB storage capacity and the ability of additional memory or expansion capacity.
- .7 Manufactured by PELCO model 8100, 32 channel Series

.5 POWER SUPPLIES

- .1 All cameras shall be powered from rack mounted central power supplies. Power supplies shall be suitable to provide power to the provided cameras

and associate electronics and positioning devices as recommended by the manufacturer.

- .2 Provide central power supply CCTV cameras. Number and size to suit quantity of cameras indicated on drawings.
- .3 Product must be UL listed
- .4 120v AC input, 24/28v AC output.
- .5 Acceptable product MCS16-10 allows for 16 fused outputs with total capacity of 10 Amps.

.6 UPS

- .1 Provide 1500W UPS for CCTV/DVR system.

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.8 REMOTE MONITORING LOCATIONS:

- .1 Client shall be able to view live and recorded video from remote monitoring locations for all DVRs.

.9 CABLE

- .1 All cameras to be fed from a CAT6 cable.
- .2 All cable shall be low-loss type and sized as per the electronics manufacturer recommendations.
- .3 All cable supplied shall conform to local electrical codes.

.10 NETWORKING

- .1 The closed circuit television system shall be interconnected to the Owner's network system.
- .2 Contractor shall provide all cabling and patch cords required for a complete and operational system.

3. EXECUTION

3.1 GENERAL

- .1 Locate, install, wire and connect all components and devices in accordance with the requirements of the manufacturer.

3.2 INSTALLATION OF DEVICES

- .1 Mount devices at heights as described in Section 26 05

01.

- .2 Mount equipment square with building lines. Install devices flush and square with walls.

3.3 WIRE CONNECTION OF ALL DEVICES

- .1 Terminate conductors directly to the terminals of each device.

3.4 WIRING AND CONDUIT

- .1 Install wiring in an independent conduit system.

3.5 TESTING

- .1 The complete system shall be tested in the presence of the Consultant and Owner's representative on completion of the work. Tests shall demonstrate that the CCTV system will function in an acceptable manner. This includes all recording functions, and all music input functions.

END OF SECTION

PART 1. GENERAL

1.1 RELATED WORK

- .1 General provisions of Contract, including General and Supplementary Conditions and Division 1 Specifications.
- .2 The requirements of this section apply to Fire and Life Safety Systems specified elsewhere in the specification: Coordinate with Mechanical Divisions for interface to mechanical systems.

1.2 REFERENCES

- .1 Most current adopted edition of the following:
 - .1 CAN/ULC-S524 Installation of Fire Alarm Systems.
 - .2 ULC-S525 Audible Signal Appliances, Fire Alarm.
 - .3 CAN/ULC-S527 Control Units, Fire Alarm.
 - .4 CAN/ULC-S528 Manual Pull Stations, Fire Alarm.
 - .5 CAN/ULC-S529 Smoke Detectors, Fire Alarm.
 - .6 CAN/ULC-S530 Heat Actuated Fire Detectors, Fire Alarm.
 - .7 CAN/ULC-S531 Smoke Alarms.
 - .8 CAN/ULC-S536 Inspection and Testing of Fire Alarm Systems.
 - .9 CAN/ULC-S537 Verification of Fire Alarm Systems.
 - .10 CAN/ULC-S561 Installation and Services for Fire Signal Receiving Centres and Systems.
 - .11 NBC- National Building Code of Canada.
 - .12 Manitoba Building Code

1.3 DESCRIPTION OF SYSTEM

.1 Included in this work:

- .1 Existing fire alarm c/w speaker voice communication system and protection functions including receiving alarm signals, actuating zone annunciators, initiating alarm, supervising system continuously, performing fire control functions, and initiating trouble signals.
- .2 Manual alarm stations.
- .3 Automatic alarm initiating devices.
- .4 Audible signal devices/speakers.
- .5 End of line devices.
- .6 Visual alarm signal devices.
- .7 Standby batteries.
- .8 Auxiliary control.
- .9 Event recording printer.
- .10 Compare program system software verification feature.

1.4 REQUIREMENTS OF REGULATORY AGENCIES

.1 System:

- .1 Subject to approval by local authority having jurisdiction.

1.5 SHOP DRAWINGS

.1 Submittal to include:

- .1 Data sheets on all equipment used.
- .2 Sequence of operation.
- .3 Layout of equipment.
- .4 Zoning.

- .5 Component wiring diagrams.
- .6 One line riser diagram showing all equipment and size, type and number of all required conductors.

1.6 OWNER'S MANUAL

- .1 Provide 3 copies of as-built owner's manual including the following:
 - .1 System sequence of operation.
 - .2 Operation instructions.
 - .3 Approved data sheets of all the equipment components.
 - .4 As built riser diagram.
 - .5 Hard copy of final system programming including logic functions.
 - .6 Verification report on CFAA forms as filled by CFAA certified technician.

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1.8 SEQUENCE OF OPERATION

- .1 Single Stage Operation: Operation of any alarm initiating device to:
 - .1 Cause audible signal devices and/or communication speakers to sound/announce throughout building continuously and visual signalling devices to operate.
 - .2 Transmit signal to fire department or central station.
 - .3 Cause zone of alarm device to indicate on local LCD display, remote LCD display and logging printer including time, date and device type as well as all resulting automatic events.
 - .4 Cause air conditioning and ventilating fans to

shut down or to function so as to provide required control of smoke movement.

- .5 Cause fire doors and smoke control doors, if normally held open to close automatically.

PART 2. PRODUCTS

2.1 MATERIALS

- .1 Re-using existing fire alarm system Notifier NFS2-3030 and voice speaker communication system.
- .2 Components must be matched with the Fire Alarm system and supplied by one manufacturer of established reputation and experience who must have produced similar apparatus for a period of at least five (5) years and who must be able to refer to similar installations rendering satisfactory service.
- .3 Any equipment proposed as equal to that specified herein must conform to the standards herein. In addition, the contractor must obtain the architect's or owner's approval in writing ten (10) working days prior to bidding other than as specified.
- .4 The manufacturer's name, model numbers, and three copies of working drawings and engineering data sheets shall be submitted for approval along with a cross reference listing, item by item, of the specification for compliance.
- .5 Acceptable manufacturers: Notifier, to match the existing fire alarm system
- .6 Approved manufacturers shall have in their employ factory trained employees for all sales, installation, programming, testing, verification, inspection, service, etc. Fire alarm manufacturers using outside agencies or distributors for these functions will not be accepted.

2.2 SYSTEM DESCRIPTION

- .1 Existing Notifier NFS2-3030 c/w existing voice/speaker communication system

- .2 The system addressable loops must be DCLA with loop isolation between fire compartments. The addressable loop must not have more than 48 intelligent addressable devices regardless of system capacity.
- .3 The system shall support intelligent analog smoke detection, intelligent analog heat detection, manual station, water flow, supervisory, security, and status monitoring devices. The system shall also support amplifiers, voice/visual circuits, and a firefighter's telephone system.
- .4 The panel must be capable of measuring the sensitivity of connected intelligent analog ionization and photoelectric smoke detectors.
 - .1 The measurements shall be discrete voltage readings, accurate to .01 VDC. The readings shall be dynamic, providing a constant display of voltage shifts when in the sensitivity voltage list mode.
 - .2 The control panel shall provide a display and a printed list of these sensitivity measurements as a permanent record of the required sensitivity testing.
 - .3 When programmed, any system connected, ionization or light refraction style smoke detector shall be capable of automatic sensitivity drift compensation up or down. This adjustment shall keep the relationship between the sensing chamber voltage and the programmed alarm threshold voltage constant throughout the life of the detector to prevent false indications or failure to alarm in the presence of smoke.
 - .4 The control panel shall place each detector in the system in an alarm condition, transparent to the system user, every twenty four hours as a dynamic check of the accuracy of the alarm threshold setting. Upon reception of the alarm report, the system detector shall be restored to its pretest state.

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- .5 The system shall be capable of monitoring the state of detectors and display a message when a detector is approaching the limits of adjustment as a result of contaminants. A second message shall be displayed when the detector reaches the limits of adjustment due to these contaminants.
 - .6 The system shall be capable of recognizing that a detector has been cleaned, initiating a series of tests to determine if the cleaning was successful and display a detector cleaned message, readjusting that detectors normal sensitivity setting reference.
- .5 The system shall recognize initiating of an alarm and indicate the alarm condition in a degrade mode of operation, in the event of processor failure or the loss of system communications to the circuit interface panels.
- .1 Each circuit interface panel shall be capable of operation in its own degrade mode. In this mode, the system shall receive an alarm from any intelligent analog or conventional initiating device. It shall activate local indicating appliances and remote or auxiliary connect circuits.
 - .2 The system shall indicate a trouble condition during degrade mode operation and shall give a visual indication of an alarm condition.
 - .3 Detector operation in the degrade mode shall continue at the alarm threshold previously programmed. Systems returning detectors to a common default value in degrade mode shall not be acceptable.
- .6 The detection system must remain 100% operational and capable of responding to an alarm condition while in either routine operator maintenance mode or during programming by the manufacturer.
- .7 Dynamic supervision of system electronics, wiring, detection devices and software must be provided by the control system. Failure of system hardware or wiring

must be indicated by type and location on the alphanumeric display.

- .8 The address, type of device and sensitivity setting of each addressable device must be field settable by a simple programming device and stored in the addressable device in non-volatile memory. Loss of both A/C power and batteries in the control panel will not affect the system device programming.

2.3 DEVICE PROGRAMMER/TESTER

- .1 Entire system shall be programmable via built-in keyboard and RS232 portable computer link.

2.4 DEVICES

- .1 Manual alarm stations must be pull down lever, semi-flush or surface type, bilingual single stage addressable.
- .2 Automatic Detectors - General:
- .1 All intelligent/analog and non-addressable ionization/photoelectric smoke detectors, thermal detectors and pull stations, remote zone module and programmable remote relays must be capable of being intermixed on the same addressable loop. All intelligent/analog detectors must be individually identifiable from the control panel and must be capable of being selected for environmental compensation via software. Non-addressable detectors must be identifiable by zone.
- .2 All addressable and non-addressable ionization smoke detectors, photoelectric smoke detectors and rate of compensation thermal detectors must mount in a plug-in, twist-lock base with screw terminals for field wiring. Pig-tails or in-line connectors must not be permitted. A concealed locking mechanism requiring a special unlocking tool must be available to prevent unauthorized removal.

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- .3 All intelligent/analog devices must be electronically programmed on site during installation. No mechanical means such as dipswitches, rotary dials or programming pins shall be used. All of the programmed information shall be capable of display, printout and modification from the control panel.
 - .4 Remote relays located on detector bases or double gang outlets throughout the building must be controlled in the same manner as panel mounted relays and must not require a separate address.
- .3 Heat detectors:
- .1 Fixed temperature non restorable.
 - .2 Provide rate of compensation addressable type heat detectors which mount in same bases as smoke detectors. Each to have an alarm indicating light.
- .4 Smoke detectors:
- .1 The intelligent/analog combo of ionization and photoelectric , smoke detector shall be used.
 - .2 It must be possible to furnish the intelligent detectors with a relay base whose relay may be made to follow the activation of the detector or may be programmed to follow any system function desired. The use of the relay base must not reduce the number of available addresses on the addressable loop.
- .5 Duct Mounted Smoke Detectors:
- .1 The air duct detector must operate on a cross-sectional air sampling principle to overcome stratification and the skin effect. The air duct detector must consist of a standard intelligent/analog or non-addressable detector mounted in an air duct sampling assembly and sampling tube that protrudes across the duct of the ventilating system.

.6 Intelligent Interface Modules:

- .1 Provide intelligent interface modules incorporating a custom microprocessor based integrated circuit for connection of normally open or normally closed contact type devices such as water flow switches, tamper switches and OS and Y valves. Provide one for "flow" and one for "supervisory" for each sprinkler zone, confirm with sprinkler supplier.

.7 Audible/Visual Signalling:

- .1 Speaker shall match the existng
- .2 Audible/Visual signal devices if located in refrigeration area shall be rated at minus 40 degree Celsius, minimum 110 candelas with adjustable light intensity switch.
- .3 Audible signal devices shall be in the range 100-110 decibel (110 dB) type with temporal coded feature and adjustable decibel.

.8 Power Pack/Booster/Synchronization module:

- .1 The units shall be standalone power supplies intended for powering fire alarm notification appliances via their own Notification Appliance Circuit(s) (NAC). The units shall be UL 864 Listed for power limited operation of their outputs and comply with NFPA 70 (NEC), article 760.
- .2 The power supplies shall support a full 8A of notification power even if the battery is in a degraded mode and only AC power is connected.
- .3 The power supplies shall be activated by a standard Notification Appliance Circuit (NAC) from any Fire Alarm Control Panel (FACP) or a "Dry contact" closure. The units shall be 8 ampere, 12 or 24 VDC, regulated and filtered, supervised remote power supply/chargers. The power supplies shall provide a full 8 amperes of current and shall not be battery dependent. They shall operate over the voltage range of 8 to 33 VDC or FWR. The primary application of the units shall be to expand fire alarm system capabilities for additional NAC circuits to support ADA

requirements and to provide auxiliary power to support system accessories or functions. The power supplies shall provide four Class "B", two Class "A", or two Class "B" and one Class "A" NAC circuit(s).

.4 The units shall also supply up to 200 mA of auxiliary power that is available during both non-alarm and alarm.

.5 The units shall also supply auxiliary power of not less than 3.5A at 24 VDC during non-alarm. The power supplies shall be capable of charging batteries of up to 12 ampere hours per NFPA 72 (1999). Input activation options shall be from not less than two NAC circuits or Dry Contact closures. These inputs shall have the capability of being directed to any combination of the four NAC circuit outputs. Each NAC circuit output shall be rated at 3 amperes for Class "B" applications or 3 amperes each for Class "A". The outputs shall be programmable to generate a steady or Temporal (Code 3) output and or a synchronized strobe or horn output. The power supplies shall provide independent loop supervision for either Class "A" or Class "B" FACP NAC circuits and shall have the capability to "steer" all alarm or trouble conditions to either incoming NAC circuit. The units shall have common output terminals. The power supplies shall be powered from a 120 VAC or 240 VAC source with a current consumption of 5 amperes max. The unit shall incorporate short circuit protection with auto reset.

.6 The power supply shall incorporate a built in battery charger for lead acid or gel type batteries with automatic switchover to battery backup in the event of AC power failure. The charger shall incorporate fused protection for the batteries and have the ability to report low battery and/or no battery condition(s). Standby current for battery backup shall be 100 mA max.

.9 Voice Communication:

.1 Ceiling speakers shall have an 8" (200 mm) cone, 6 oz. (170 gram) magnet and a 1" (25 mm) voice coil, and shall be equipped with a 70 volt line

matching transformer in 1 watt connection. It shall also be equipped with the necessary backbox and baffle. Power taps on transformer of .25W, 2W and 4W shall also be provided. Speakers shall provide a minimum sound pressure of 96 dB at 1 watt, at 4' (1.2 m) frequency response shall be 100 - 10,000 Hz.

- .2 After the initial alarm occurs in the building, it shall not be possible for the operator to issue voice instructions until one minute of alarm sounding has elapsed.
- .3 To issue voice instruction, after one minute, the operator shall operate the appropriate zone control. The control indicator light shall illuminate visually confirming that the relative circuitry has been activated.
- .4 The operator shall operate the "Press-to-talk" control on the paging control panel which shall automatically send out a pre-announcement tone over the selected speaker zones. After initial activation of the microphone pushbutton the pre-announce tone shall not be generated again until the microphone pushbutton has been released for more than 3 seconds. Voice instructions shall then be possible by the operator. Whenever the microphone "Press-to-talk" and/or associated control is operated, all fire alarm signals shall be silenced. After paging, alarm signaling shall be resumed except where alarm signals have been silenced by the operation of a "signal silence" control associated with the paging system.
- .5 The operator shall be able to issue voice instructions to certain selected areas and/or group of areas by operating individual zone area switches with confirming indicators relating to the area and/or areas selected. It shall also be possible for the operator to operate an "all call" control switch with confirming indicator to allow the operator to issue voice instructions to all areas in the building.
- .6 The CPU shall electronically supervise all

external wiring to the voice speakers, horns, etc., for opens, shorts or grounds. A fault condition shall sound a trouble signal, complete with common trouble lamp and indicate the appropriate zone and/or group of zones that are in fault. The master microphone shall also be supervised for faults which shall be separately indicated from the speaker zone faults.

- .7 All paging and speaker zones shall be physically correlated with the alarm zones on the central.

.10 Firefighters' Telephone System

- .1 Lifting a remote telephone handset from its cradle shall sound a pulsing call-in tone at the central alarm and control facility and cause an indicator to flash, relating to the floor area from which the call-in originated.
- .2 The operator can operate the associated telephone call-in control to establish a 2-way connection causing the "flashing" call-in indicator to illuminate "steady" confirming the call-in. The operator shall lift the master telephone from its cradle and this shall silence the call-in tone and shall permit 2-way conversation to the remote handset that has called-in.
- .3 It shall be possible for the operator to establish 2-way conversation with more than one call-in zone simultaneously by operating all associated call-in controls. All acknowledged call-in indicators shall illuminate "steady" while the unacknowledged call-in indicators shall "flash" until acknowledged.

.11 End of Line Devices:

- .1 Provide high impact plastic red end of line plates with screw terminations as required for all conventional circuits.

.12 Equipment for Fire Signal Transmitter to The Monitoring Centre:

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- .1 The fire alarm signal transmitter shall be conforming to CAN/ULC S559 - Equipment for Fire Signal Receiving Centres and Systems.
 - .2 Alarm signal transmitting and receiving shall be conforming to section 10 of CAN/ULC S561 and section 5 of CAN/ULC S559.

PART 3. EXECUTION

3.1 INSTALLATION

- .1 Install systems in accordance with CAN/ULC-S524 and according to the manufacturer's requirements.
- .2 Install main control panel(s) and connect to AC emergency power supply.
- .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 1m radius of air outlets. Maintain at least 600mm 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 booster/synchronization modules, signal and/or visual signal devices and connect to signalling circuits. Alternate circuits for adjacent audible devices.
- .7 Connect signalling circuits to main control panel.
- .8 Install end-of-line devices.
- .9 Install remote annunciator panel(s) and connect to annunciator circuit wiring.
- .10 Locate and install door releasing devices where applicable.
- .11 Locate and install remote relay units to control fan

shutdown.

- .12 Locate and install door mag lock releasing/interlocks. The releasing contact shall be centralized and located in the main fire alarm panel, local field relay module shall not be used and not acceptable for mag lock controls.
- .13 Locate and install elevator home coming controls.
- .14 Locate and install remote relay units to control fan shutdown.
- .15 Connect sprinkler system alarm and supervisory switches to control panel.
- .16 Connect Fire pump alarm and supervisory switches to control panel.
- .17 Connect Emergency Generator alarm and supervisory to control panel.
- .18 Arrange for and make connection for Central Reporting tie-in through. Local Tel lines. The interconnection wiring from the fire alarm control unit/transponder to the fire signal receiving centre shall comply with CAN/ULC-S561 and CAN/ULC-S524.

3.2 FIELD QUALITY

- .1 The manufacturer or his authorized representative must perform tests in accordance with CAN/ULC-S537-04.
- .2 The verifying technician must bear approval of CFAA (Canadian Fire Alarm Association). Where required by local Authorities, the verification of Fire Alarm System and the required documentation of the verification must be completed under the direction of a Professional Engineer (having license in the province and complete with seal), who through training and experience, is familiar with the installation and functional requirements of fire alarm system. The contractor shall arrange and pay for all Engineer Fire Alarm System Verification service charges.
- .3 Provide a complete verification report on CFAA forms.

- .4 Verification shall also include but not limited to test and report of the operations of the fire alarm interlock ancillary contacts and "downstream" ancillary devices such as mag locks, door opening/releasing devices, cooking appliance under commercial hood shutdown due to fire suppression release, air fan shutdown, etc.

END OF SECTION

FIRE ALARM VERIFICATION

The following document shall be dated, signed and forwarded to Tower Engineering by E.C. and G.C. upon final completion and verification of installed, fully operational Fire Alarm system as outlined in drawings and electrical specifications (including verifications/reports/certificate noted below).

This **Fire Alarm Verification** document must be submitted to Tower Engineering **PRIOR** to submitting request for 'Substantial Completion'.

Company Name: _____ Date: _____
(Electrical Contractor)

Printed Name: _____ Signature: _____

I hereby verify that the fire alarm system as noted above is complete and has been verified on above noted date.

Attach copy of fire alarm '**VI Inspection Report**' (including actual water flow test, fan shutdown and central reporting) and fire alarm '**certificate**' from fire alarm manufacturer.

Company Name: _____ Date: _____
(General Contractor)

Printed Name: _____ Signature: _____

I hereby verify that the fire alarm system as noted above is complete and has been verified on above noted date.

The above does not constitute a waiver of any of the contract document requirements.