

DIVISION 28 ELECTRONIC SAFETY AND SECURITY

Section 28 00 00 Electronic Safety and Security - General

1. Equipment shall not carry any logos or text which identifies the equipment manufacturer / supplier; exception: equipment located in service spaces.
2. Electronic security systems may include intrusion alarm, access control, and video surveillance systems. Provide a riser diagram for each individual system on the drawings.
3. Security system wiring shall be installed in conduit/enclosed raceway in its entirety.
4. ULC certification is required on all security system components.
5. Intrusion Alarm/Access Control
 - 5.1 Intrusion alarm/access control system zones are to match the architectural zoning. Ensure specific public areas can be secured.
 - 5.2 Intrusion alarm initiating devices are to be of the addressable type.
 - 5.3 Provide a complete intrusion alarm/access control system, including coverage to all areas of the building containing exterior windows and/or doors as per the following:
 - 5.3.1 Door contacts for exterior doors.
 - 5.3.2 Door strikes.
 - 5.3.3 Magnetic locks are not to be used without prior approval of the Minister's Representative.
 - 5.3.4 Card readers.
 - 5.3.5 Motion sensors.
 - 5.3.5.1 Motion sensors are to always be located in ceilings. Where motion sensors are installed in t-bar ceilings, the motion sensor shall be securely mounted by the following method: a 100mm (4") square box shall be supported by the grid system using a bar hanger, a single gang round tile ring, sized accordingly, shall be mounted to the box flush to the underside (room interior) of the ceiling; mount the security system motion detector to the tile ring. Approval for wall mounted motion detectors must be obtained from the Minister's Representative before proceeding.
 - 5.3.5.2 Motion detectors are to be provided up to and including one level above

ground level.

- 5.3.6 Control panel.
 - 5.3.7 Digital keypads.
 - 5.3.8 Battery back-up power supply to have a minimum rating of not less than 48 hours duration.
 - 5.3.9 Horns.
 - 5.3.10 I.P. compatible network card; provide a dedicated data outlet adjacent to the control panel for connection to the network card.
- 5.4 Intrusion alarm/access control system wiring shall incorporate as a minimum, CMR (FT-4) rated insulated copper conductors c/w “RED” coloured PVC outer jacket. Maximum length of cable drop between flush installed ceiling device box and associated junction box within same ceiling space, is not to be greater than 1520mm (5') unless specifically indicated otherwise. Minimum size 16mm (1/2") flexible metal conduit is permitted for drops (from above T- Bar ceilings) to various fire alarm devices installed upon flush mounted outlet boxes in finish ceiling tiles, etc. Maximum length of flexible conduit drop is not to exceed 4570mm (15') in total unless specifically indicated otherwise.
- 5.5 Provide digital keypads or card readers as required with adequate zones for bypass operation at each entrance.
- 5.6 Provide all equipment as required to monitor the intrusion alarm/access control system from an approved monitoring firm. Include the cost of monitoring for one year in the construction contract. The monitoring company shall be approved by the Minister's Representative before proceeding.
- 5.7 All intrusion alarm/access control panels are to be c/w tamper switch, lock and keys.
- 5.8 Intrusion alarm panel documentation to include all programming / contractor codes and passwords required for future modifications to the system.
- 5.9 Where the lighting control system permits, provide a latching output from the intrusion alarm system to activate general area lighting on alarm. This output is to unlatch when the intrusion alarm system is reset.
6. Video Surveillance (CCTV)
- 6.1 Provide a complete video surveillance system, including interior/exterior coverage of all entrances and circulation spaces as per the following:
 - 6.1.1 Signage is to be posted at all building entrances and driveway entrance(s) indicating

that the premises are under video surveillance. The signage shall read:

**Video Surveillance is in operation in this facility
Images are being recorded for the purposes of maintaining the security of the premises, the prevention and investigation of crime, health and safety of staff, visitors [students] and in the interest of good property management.
The video surveillance system is managed by [insert Department name here]**

- 6.1.2 Provide on-line, double conversion, solid state, rack mounted UPS to feed all CCTV head end equipment and POE switches. UPS to be complete with surge suppression, power factor correction, rectifier, charger, inverter, batteries, and internal bypass. UPS shall operate during power outage for a minimum of 30 minutes. Minimum capacity to be 1800VA/1440W.
- 6.2 The basic system will consist of a complete functioning digital IP based security video system including:
- 6.2.1 Cameras shall be (as a minimum) high-grade, commercial quality, fixed direction, color, high definition, progressive scan, 1.3 Megapixel, network enabled, compact dome type. Cameras shall include rugged, high impact, vandal resistant, puncture proof domes and tamper resistant hardware. Key features, at a minimum shall include:
- 6.2.1.1 Image Sensor - 1/3.8 inch CMOS.
 - 6.2.1.2 Active Pixels - 1280 (H), 720 (V).
 - 6.2.1.3 Image Format - 720P HD
 - 6.2.1.4 Minimum illumination 5 Lux.
 - 6.2.1.5 Dynamic Range >50 dB.
 - 6.2.1.6 Image Compression Method - MPEG-4 Part 10 H.264.
 - 6.2.1.7 Image Rate - 30 fps at full resolution.
 - 6.2.1.8 Motion detection - Selectable sensitivity and threshold.
 - 6.2.1.9 Communications Standards Compliance - Open Network Video Interface Forum (ONVIF) Conformant, the camera shall support Profile S, Profile G, Profile Q and all other relevant profiles and specifications as published by the ONVIF organization.
 - 6.2.1.10 Network interface 10/100 Base-T auto sensing half / full duplex via 8P8C modular jack.

- 6.2.1.11 Lens - Varifocal, auto iris. The variable focal length of the lens shall be coordinated with the active pixel size to provide a video resolution per the following as a minimum: License Plate Recognition requires 5 pixels/in. or 60 pixels/foot; Facial Recognition (visible and software based) requires 10 pixels/in. or 120 pixels/foot.
- 6.2.1.12 Cameras are to be capable of being remotely focused via software installed at the head end equipment location.
- 6.2.1.13 Power Supply: POE IEEE 802.3af compliant, 24 VDC
- 6.2.1.14 Vandal resistant dome enclosure. Camera mounting brackets at designated locations.
- 6.2.2 Provide Layer 2 and Layer 3 (as required), optical fibre (OM4) capable POE switches to IEEE standard 802.3af in each communications room servicing the area where video surveillance cameras are located. Switches shall be provided and installed in non-dedicated rack(s),
- 6.2.3 Embedded network recorder / server with built-in software to ensure compatibility with the camera system, and to maintain a minimum of a 14 day record of all cameras at a recording rate of 12IPS (per camera) in the base and future allocation of cameras.
- 6.2.4 The network recorder shall accept all Open Network Video Interface Forum (ONVIF) conformant cameras.
- 6.2.5 The network recorder software shall be capable of the following as a minimum: motion detection, remote camera focus, and object masking.
- 6.2.6 Provide licenses for all installed and future cameras in the design.
- 6.2.7 Provide 5 licenses for remote viewing software to be installed and configured on owner supplied workstations.
- 6.3 The system will provide an external high level of clarity. The network recorder will allow copying of any video recording to a USB Memory stick, external hard drive or CD/DVD. Where cameras are located to provide identification of the subject, ensure the camera mounting height and location will provide the required field of view.
- 6.4 The network recorder / server for the video surveillance system will be located in a secure room, usually the main communications room.
- 6.5 Wiring:
 - 6.5.1 All wiring shall be to the latest NS Government Structured Cabling Guidelines

approved cabling, run to dedicated patch panels in the appropriate Communications room. Wiring shall be provided under the base building for the cameras installed, with a dual data outlet mounted in the accessible ceiling above each camera. A power source shall be provided in the accessible ceiling space at each exterior camera location.

- 6.5.2 All cables shall be tested to the latest NS Government Structured Cabling Guidelines requirements, provide a verification report.
- 6.6 Verify correct operation of the system and provide manuals for all equipment.
- 6.7 Provide at least four hours instruction on use of the system upon completion and acceptance of the system. In addition, within 3 months of substantial completion, return to the site upon request of the Minister's Representative and readjust the aiming of the cameras as required and provide an additional 2 hours instruction in use of the system.
- 6.8 All video surveillance system component manufacturer default password(s) (cameras, servers etc.) are to be changed and the new password information is to be included in the O&M manuals. These new passwords are to follow US Department of Commerce's National Institute of Standards and Technology (NIST) guidance on password best practices.
- 6.9 Video surveillance systems shall be equipped with user and host authentication functionality. It is to be confirmed in writing and included in the O&M manuals that this functionality has been configured.
- 6.10 All video surveillance system network configuration information (camera, server IP addresses etc.) is to be tabulated and included in the O&M manuals.

Section 28 31 00 Fire Detection and Alarm

1. Provide a complete fire alarm system as required by the Provincial Building Code as a minimum. Provide floor plans and a riser diagram on the drawings as required by CAN/ULC S-524.
2. All fire alarm systems are to be of the addressable type.
3. System shall include, but not necessarily be limited to the following:
 - 3.1 Fire Alarm Control Panel (FACP)
 - 3.1.1 Installed in a separate enclosure c/w an integrated (built-in) TVSS protected point for power source termination.
 - 3.1.2 Power supplies.

- 3.1.3 LCD annunciator.
- 3.1.4 Stand-by batteries.
- 3.1.5 Central processor c/w microprocessor and logic interface.
- 3.1.6 Main system memory.
- 3.1.7 Input-output interfaces for alarm receiving, annunciation/display, and program
- 3.1.8 control/signaling.
 - 3.1.8.1 Initiating/input circuits.
 - 3.1.8.2 Output circuits.
 - 3.1.8.3 Auxiliary circuits.
 - 3.1.8.4 Lamicoid nameplate is to be installed (with pop-rivets) on Control Cabinet cover indicating its designated power source c/w branch circuit breaker number (white lettering on red core).
 - 3.1.8.5 The fire alarm system control panel shall be capable of testing remote equipment (smoke and heat detection etc.) sensitivity at the control panel.
- 3.2 Wiring:
 - 3.2.1 All wiring shall be in EMT conduit.
 - 3.2.2 Red armoured cable (bright red jacket over the exterior armour) shall be permitted for use in renovated areas.
 - 3.2.3 Minimum size 16mm (1/2") flexible metal conduit is permitted for drops (from above T-Bar ceilings) to various fire alarm devices installed upon flush mounted outlet boxes in finish ceiling tiles, etc. Maximum length of flexible conduit drop is not to exceed 4570mm (15') in total.
 - 3.2.4 Initiating circuit wiring and notification appliance wiring are to be segregated into separate raceway systems.
- 3.3 Manual and automatic initiating devices.
- 3.4 Audible signalling devices.
- 3.5 Visual signalling devices.

- 3.6 Locate the FACP in the main communications room and provide a remote active graphic annunciator at the fire fighters entrance.
- 3.7 Fire Door Holders are to be of the magnetic type, installed on walls behind doors at 450mm (18") A.F.F., and are to be supplied by the fire alarm system manufacturer.
- 3.8 End-of-line resistors where required.
- 3.9 LCD annunciator and active LED Graphic Annunciator at fire fighters entrance. The active LED Graphic Annunciator shall be comprised of (but not limited to) the following:
 - 3.9.1 Active graphic display(s) shall be printed on white photo bond paper in metal frame(s) with polycarbonate or Plexiglas glazing; the photo bond paper shall be mounted in such a manner as to be wrinkle and distortion free and be backed with polycarbonate or Plexiglas panels. The active graphic(s) shall be designed and fabricated and installed in a manner to render them easily modified, as well as damage and tamper resistant.
 - 3.9.1.1 The labeling on the graphic must closely correspond to the displays on the fire alarm annunciator LCD display. The floor plan drawing is to indicate:
 - 3.9.1.1.1 The building outline showing all exterior doors.
 - 3.9.1.1.2 The building's corridors, stairways and elevators.
 - 3.9.1.1.3 The location of, and divisions between, the fire alarm zones.
 - 3.9.1.1.4 The location of the main fire alarm panel (and annunciators where relevant).
 - 3.9.1.1.5 The location of the main sprinkler system valve and the supervised valve for each sprinkler zone. (Use of a legend and symbols is recommended). The initiating device locations and zone numbers, where relevant. (Use of a legend and symbols is recommended).
 - 3.9.1.1.6 Kitchen fire suppression system, where relevant.
 - 3.9.1.1.7 An accurate "You are here" indicator.
 - 3.9.2 The active graphic display must be oriented to match the direction of the location at which it is to be posted, i.e; oriented to the direction in which the person viewing the display is facing.
 - 3.9.3 Solid state components, high intensity LEDs, provide one red led for each initiation

device, and one amber LED for each trouble / supervisory alarm device.

- 3.10 ULC monitoring service connection.
- 3.11 Splices and T-taps shall not be permitted in the fire alarm system wiring, all wiring is to be run unbroken from device to device. Identify the incoming and outgoing conductors with self adhesive labels per 26 00 00.
4. Gas supplied equipment and air handling systems not involved in smoke control are to be shut down upon activation of a fire alarm. Air handlers are to automatically restart on fire alarm reset.
 - 4.1 Air handler shut down shall be accomplished by wiring an addressable fire alarm relay into the control circuit in such a manner that this air handler shutdown cannot be bypassed. Using the BAS as a means of shutting down the air handling systems is not acceptable.
5. New construction shall utilize combination horn/strobe signaling devices with a configurable "high" and "low" output. In addition, provide single strobes where conditions dictate their use. Combination horns and strobes, and/or single units of each, are to be located on finish "ceilings" unless a particular situation, i.e. high ceiling, open ceiling, etc., should dictate otherwise.
 - 5.1 Ceiling device boxes are to be supported directly from structure, and not under any circumstances to derive their support from T-Bar grid system.
 - 5.2 Ceiling device boxes are to be supported directly from auxiliary or intermediate pieces of dry-wall metal channels where installed in dry-wall type ceilings.
6. Provide a dedicated UL listed Fire Control Communicator (FCC) in order to allow remote monitoring from a ULC approved monitoring agency. Include the cost of monitoring for one year in the construction contract.
7. In addition to the latest edition NBC requirements, provide:
 - 7.1 Separately zoned thermal detectors in boiler rooms.
 - 7.2 Separately zoned smoke detectors in "all" electrical rooms and/or closets where panelboards are present.
 - 7.3 Separately zoned smoke detectors in elevator shafts.

8. If a deluge system is present, the fire alarm system shall be programmed so that it will only activate the deluge system when the associated smoke detectors are activated. NOTHING ELSE SHOULD BE CAPABLE OF ACTIVATING THE DELUGE SYSTEM.
9. The fire alarm system is to be verified to meet the requirements of CAN / ULC-S537 "Verification of Fire Alarm Systems". All associated, integrated systems are to be commissioned "as a whole", as part of the construction contract, in accordance with CAN/ULC-S1001, "Integrated Systems Testing of Fire Protection and Life Safety Systems," to ensure the proper operation and inter-relationship between the systems.

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