

Part 1 General**1.1 Summary**

- .1 NOTIFIER is the sole source supplier for McGill fire alarm systems, whether for replacements, modifications or new designs. All following guidelines apply.
- .2 In general, follow the standards below when specifying fire alarm protection modifications or installations. All requirements outlined herein shall be reviewed with the McGill University Fire Prevention Office (FPO) in the planning stages of the project and confirmed before the commencement of any fire alarm system design, installation or modification.
- .3 The FPO shall review the completed design, plans and tender documents, and provide comments or change requests, as needed, to ensure conformity to initial design agreements. Revised design documents shall be resubmitted to FPO.
- .4 Even if not required by the Quebec construction code and/or municipal legislation, renovations shall never reduce the current level of protection.

1.2 Design Requirement

- .1 Clearly indicate item or equipment to be relocated. Indicate their actual and future location.
- .2 Indicate to protect existing items designated to remain for salvage.
- .3 The system drawings must include the wiring schematic of the alarm system.

1.3 Reference

- .1 Comply with the requirements of the last edition of:
 - .1 Quebec Construction Code (QCC)
 - .2 National Fire Code of Canada (NFCC)
 - .3 CAN/ULC-S524 current edition
 - .4 CAN/ULC-S527 current edition
 - .5 CAN/ULC-S537 current edition
 - .6 CAN/ULC-S1001 current edition
 - .7 Code de construction du Québec, S3.r4 selon l'année de construction
 - .8 Règlement 12-005 de la ville de Montréal
 - .9 CAN/ULC - S237 édition actuelle
 - .10 CSA C22 – Code de l'électricité
 - .11 Code ASME A17.1/CSA B44
 - .12 NFPA 115-20 current edition

1.4 Required Documentation

- .1 As-built drawings of the fire alarm system modifications/installations shall be provided to the FPO, and to the FMAS Project Manager.
- .2 The “fire layer” of the PDF floor plans (available from FMAS) will be prepared indicating the location, types and address of every device in the fire alarm system. Copies will be provided to the FPO.

- .3 Notification of the system's imminent completion shall be given to the McGill University representatives, from FMAS at least 5 working days in advance of the final testing for satisfactory operation (CAN/ULC-S537) and all interested parties shall be contacted, including:
 - Fire Prevention Officer
 - Electrical Trades Supervisor
 - Project Manager
- .4 A printout of all fire alarm points will be provided on paper and electronically (PDF) to FPO before the project starts. After each program has been done, a listing point report must be provided within a week.
- .5 A copy of the fire alarm system computer program will be provided with the data from the final installation for future modifications.
- .6 The installing contractor shall provide all literature and Notifier instruction manuals, in French and English, on paper and electronic version, provided by the manufacturer and describing proper operation and maintenance of any equipment and devices installed.

1.5 Restriction

- .1 Work on existing systems must be coordinated with McGill Facilities Supervisors, the Project Manager and the FPO.
- .2 To avoid disrupting university operations, the work and /or testing will have to be planned for specified periods of time with the Project Manager. For example; testing of bells is only permitted before 07h30 AM
- .3 Any unfounded alarm resulting in a response on site by the Fire Department that was caused during an installation test or accidentally, will be the responsibility of the contractor who initiated it. The McGill Project Manager will be billed for each violation at the rate established by the FPO.
- .4 Interior electromagnetic locks are restricted in use. They can be accepted in limited circumstances through consultation with Campus Public Safety as specified in the building design standards – Doors & Openings – Division 08 – Hardware – 08 71 10.
- .5 Intrusion alarms, monitoring of equipment unrelated to fire prevention or other building services monitoring should not be connected to fire alarm systems. Any exception should be reviewed by the FPO for approval.

1.6 Removal of existing equipment

- .1 All existing equipment removed during installations, upgrades and modifications shall be rendered unusable and disposed of in accordance to provincial and municipal regulations unless specified by the FPO.

Part 2 Products**2.1 Fire alarm Control Panels (FACP)**

- .1 All materials used for the project must be new.
- .2 All fire alarm system components, must be ULC listed for use on a fire alarm system.
- .3 The FACP shall be located at the main entrance of the building and shall not be located within offices, mechanical rooms or other areas that require keys to access. The same applies for the central monitoring control boxes.

- .4 The proper location of the FACP shall be verified by the FPO before the installation begins.
- .5 Only NOTIFIER equipment will be installed in McGill buildings. Models shall be selected with FPO consultation to suit the present and future building needs.
- .6 All new FACP will be fully addressable. FPO needs to be consulted if addressable devices need to be installed in a cold environment.
- .7 All panels will be provided with a “Fire Drill Switch” (key or button). This device will activate all alarm circuits, including relays to the Central Monitoring Station, but will not activate other auxiliary relays such as ventilation shut down, magnetic door release, hold open or elevator recall relays.
- .8 Provisions shall be made to allow for the bypass of some equipment for the purpose of periodic fire alarm testing with the press of a button. A code will be required to enable this function. More specifically:
 - .1 By-pass of all audible & visual devices;
 - .2 By-pass of all auxiliary functions such as elevator recall, ventilation system shut down, hold-open devices, etc.;
 - .3 By-pass of all sprinkler system and standpipe flow-switches
- .9 All panels for high-rise and large buildings, as defined by the FPO, will be equipped for mass notification system operations. FPO consultation is mandatory.
- .10 All emergency telephone cabinets will be equipped with keyless, latch doors. The thumb latch is mandatory.

2.2 Mass notification system readiness for designated FACPs with voice communication

- .1 Required when FA speakers are installed in the building.

2.3 Network system

- .1 FPO consultation is mandatory to verify which card needs to be installed in the Notifier FACP.
- .2 Two lp lines will be required:
 - .1 One with a blue wire for the connection between the fire alarm panel and the network system selected.
 - .2 One with a red wire for the connection with the alarm monitoring company.

2.4 Annunciator Panels

- .1 Remote annunciator panels shall be provided in locations identified by the FPO, as deemed necessary or required by code.
- .2 When more than one display and control center (annunciators) is installed in a building, only one panel must permit the reset and silence operation at any given time and every display and control center shall indicate which unit has the control.

2.5 Labelling/Identification

- .1 All zone and point/device labels will be verified by the FPO.
- .2 All zone and point/device labels and all panel controls shall be in French.
- .3 All devices are to be provided with external labels (*address*) in conformance with the FACP label.

- .4 All alarm system wiring shall be identified using red markers such as electrical tape every 10 feet. However, there must be a minimum of one marker on the wiring inside a room or concealed space to avoid accidental cutting of these wires during renovation/construction projects.

2.6 Power Supply

- .1 In the event of a failure of the primary power supply to the FACP, the backup power supply shall be able to provide at least 24 hrs of operation under supervisory mode followed by at least 5 minutes of operation under full alarm load conditions. If the building is a high rise building, the power supply shall maintain a continuous alarm load for at least 20 minutes after 24 hours in a supervisory mode.
- .2 The branch circuit breakers on the power supply to the FACP and the Central Monitoring Station equipment shall be painted red placed on 2 independent circuits properly labelled and provided with tamper locks.

2.7 Manual Pull Stations

- .1 Manual pull station mounting height shall conform to the McGill accessibility standard which requires a maximum height of 1200 mm.
- .2 Pull stations will be equipped with ULC listed Covers for Manual Stations where deemed necessary by the FPO as follows:
 - .1 The cover model will fit stations from 5-1/2 in to 6 ¾ in
 - .2 The model will have a spacer option for surface mounted stations
 - .3 The cover model will have an unconditional lifetime guarantee against cover breakage and damage.
 - .4 Weather stopper models permitting additional weatherproofing will be installed on stations outside a building
 - .5 “Break the glass models” are not permitted.
- .3 Pull stations will be of the outdoor type for all areas of high humidity level such as greenhouses, or where “wash downs” may be required as in parking garages.

2.8 Signalling devices

- .1 The ISO 8201 (current edition) “Acoustics-Audible emergency evacuation signal”, clause 4.2 “Temporal Tone” standard will be used for all signalling devices to indicate an alarm signal.
- .2 The contractor to ensure that all areas have a minimal sound pressure level of 15 dBA above the ambient noise level but never less than 65 dBA will verify sound output of the installed devices. At no time should sound levels exceed 95 dBA (refer to QCC, current edition).
- .3 The sound pressure level in a sleeping room from a fire alarm audible device shall not be less than 75dBA in a building of residential occupancy when any intervening door between the device and the sleeping room are closed.
- .4 When a room is separated from a corridor by two consecutive doors, a signalling device shall be installed within the room. Two closed doors would cause a significant drop in the sound pressure heard in the room.
- .5 Signalling devices shall be of the combined type (audible and visual device with a ratio of 1 on 3 in common spaces, Halls, etc.). Combined type in washrooms (toilets) and mechanical rooms. A minimum of 4 combined type in auditoriums. Combined type in staircases, at every 2 story; in this case, only the strobe will signal the alarm, but it will still be possible to use the P.A. system to voice a message, where available.

- .6 Upon renovations, additional visual signalling devices will be installed in all assembly occupancies (clubs, bars, dance halls, theatres, etc.), in all floor areas (ex: mechanical rooms) where ambient noise levels exceed 87 dBA and in areas where occupants' hearing capacity is reduced (ear protectors, audiometric booth, sound insulating enclosures).
- .7 dB Testing must be performed with closed doors.

2.9 Fire Alarm device restrictions in specific areas

- .1 The Animal Research Centre will be contacted to determine any special auditory or visual warning device settings that may be required to accommodate animal research. The sole use of visual warning devices may be authorized by the AHJ (Authority Having Jurisdiction) for certain animal research areas. Different sound frequencies may be selected for alarm notification. Contact the FPO for further information.
 - .1 The frequency hearing range of mice and rats starts at 10K Hz so we would not want sounders at this range or above. Red colored Strobes must be placed in each of the holding rooms, and alarms must sound at less than 10 Hz.

2.10 Fire detectors

- .1 When smoke or heat detectors are required, they should be intelligent 2D, 3D or 4D Multisensor type, when possible, taking into account the capacity of the FACP. Sensitivity settings and suggested application of these units will be according to the manufacturer recommendation.
- .2 Fire detectors located in elevator shafts will be designed so that the unit may be removed via the shaft wall to facilitate replacement or maintenance (see FPO for details).
- .3 Addressable fire detectors located in inaccessible areas will be provided with remote LEDs to indicate alarm and polling status (ex: elevator shafts).

2.11 Thermal detection

- .1 In areas where rapid changes of temperature are experienced and expected under normal condition, such as loading docks, autoclave rooms, kitchens, kitchenettes, etc., fix temperature detectors shall be installed.

2.12 Smoke detection

- .1 Smoke detectors will be ceiling mounted unless otherwise specified by FPO.
- .2 Smoke detectors required in stair shafts will be located over the landing area at the top of the stairs. For staircases of over 18 m in height, additional smoke detectors will be installed every 3 stories, under the above landing.
- .3 Smoke detectors located in elevator shafts will be designed so that the unit may be removed via the shaft wall to facilitate replacement or maintenance (see FPO for details).
- .4 Addressable smoke detectors located in inaccessible areas will be provided with remote LEDs to indicate alarm and polling status (ex: elevator shafts).
- .5 Smoke detectors shall be installed in server rooms and electrical room. Heat detection is not accepted.

2.13 General Options

- .1 Addressable smoke and thermal detectors shall be provided with dual (2) status LEDs. Both LEDs shall flash under normal conditions, indicating that the detector is operational and in regular communication with the FACP. Both LEDs shall be placed into steady illumination by the control

panel, indicating that an alarm condition has been detected. If required, the flashing mode operation of the detector LEDs can be programmed off via the fire control panel program.

- .2 Programming of the FACP shall be possible from the panel keypad.
- .3 All panels shall be able to read historical events (history log of alarm, trouble and reset signals) using the panel keypad (integral part of the system) without the use of special device such as a laptop computer. This feature shall be included with all panels.
- .4 “Compare Software” shall be available within the distributor to allow for verification of programming modifications to the fire alarm system.

Part 3 System acceptance

3.1 System Operational tests

- .1 Upon completion of the system installation and when subsequent modifications* are made, the Contractor shall fully test the system in the presence of an FPO Officer and the owner’s representative(s) to ensure satisfactory operation.
- .2 Those tests shall comply with CAN/ULC –S-537, current edition, and paper and electronic copies shall be provided to those mentioned in the Code.
- .3 System modifications require testing as described in the CAN/ULC-S537, current edition, which could mean, depending on the modifications done to the alarm system, the testing of all devices, existing and new, or otherwise.
- .4 When applicable, tests shall comply with CAN/ULC-S-1001, current edition and paper and electronic copies shall be provided to those mentioned in the Code.

Part 4 Monitoring of Fire Protection Equipment

4.1 Monitoring

- .1 Each individual FACP shall be monitored by McGill’s current Central Monitoring Station which shall be ULC listed.
- .2 The following signals will be received by the monitoring company, as applicable to the property being monitored:
 - .1 Fire Alarm *
 - .2 Trouble signal
 - .3 Sprinkler alarm (water flow) *
 - .4 Sprinkler Trouble (hi/low pressure, etc.)
 - .5 Control valves
 - .6 Standpipe Alarm (water flow) *
 - .7 Power off to fire pump
 - .8 Fire pump running
 - .9 Hazardous gas leak detection trouble
 - .10 Hazardous gas leak detection Alarm *
 - .11 Communication failure

Note: Items with * will cause the dispatch of the fire department by the monitoring company.

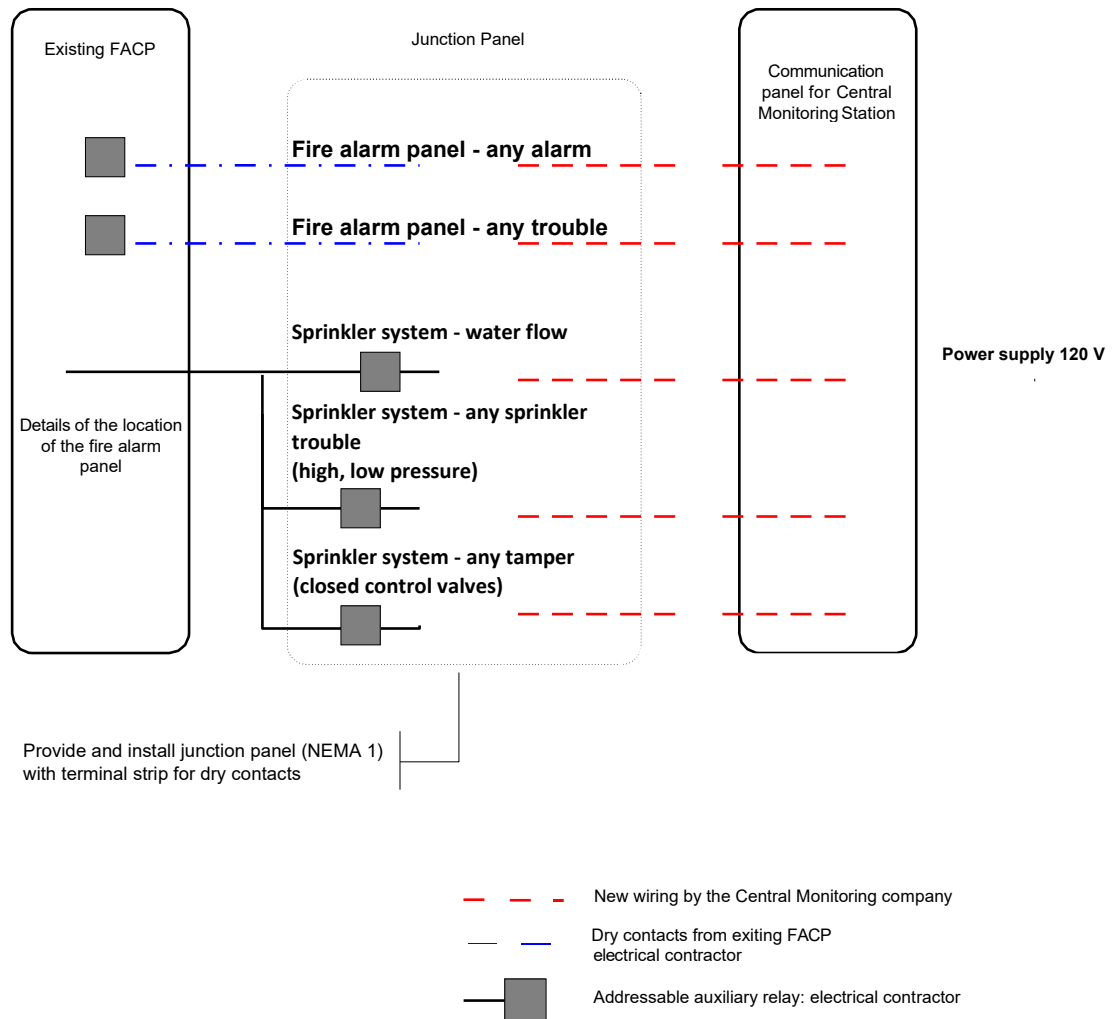
N.B. The zone numbers may be subject to changes depending on what is applicable or not to the property being monitored.

4.2 Monitoring of devices and auxiliary equipment

- .1 All control valves for sprinkler and standpipe systems and sprinkler system pressure variation sensors will be provided with electronic supervision that will cause transmission of a supervisory signal to the FACP which will then be transmitted distinctly (separate relay) to the Central Monitoring Station.
- .2 All flow switches for sprinkler and standpipe systems will be provided with electronic supervision that will cause transmission of an alarm signal to the FACP which will then be transmitted to the Central Monitoring Station. Sprinkler system water flow alarms and standpipe water flow alarms shall be distinctly (separate relay) received by the monitoring company.
- .3 Loss of power and phase reversal to any required fire pump driver will cause transmission of a trouble signal to the FACP which will then be transmitted distinctly (separate relay) to the Central Monitoring Station.
- .4 Fire pump running will cause transmission of a supervisory signal to the FACP which will then be transmitted distinctly (separate relay) to the Central Monitoring Station. With this condition alone, the building will not be evacuated; a water flow switch that will activate the general alarm is required to evacuate the building.
- .5 Offline condition of emergency power generators will cause transmission of a trouble signal to the FACP which will then be transmitted to the Central Monitoring Station.
- .6 Temperature approaching the freezing point in any dry pipe valve enclosure or water reservoir used for firefighting purposes will cause transmission of a trouble signal to the FACP which will then be transmitted to the Central Monitoring Station.
- .7 A trouble signal will be sent to the FACP only when the emergency generator is offline. No trouble signal should be received at the FACP during generator start-up. This signal should be sent to the VT-320 monitoring system, which is under constant supervision by McGill security.
- .8 All sprinkler control valves must be added to zone 50 in the programming process.
- .9 All flow switches must be added to zone 99 in the programming process.

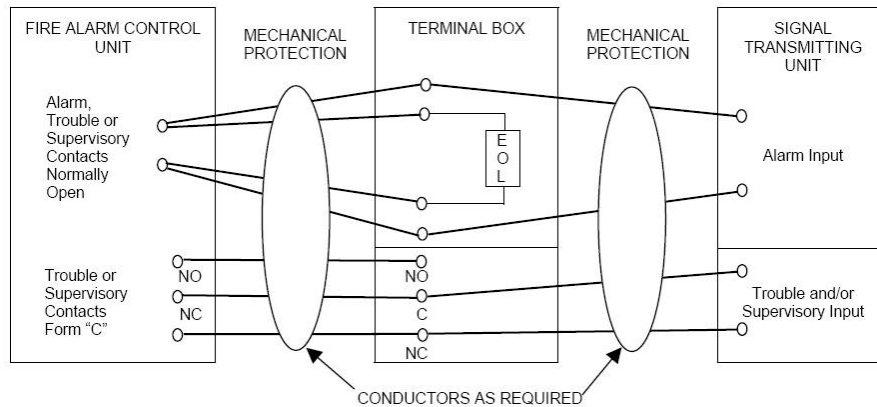
4.3 Connections for the monitoring company

- .1 A junction panel (NEMA 1) with a terminal strip for dry contacts for all the elements requiring supervision must be included in the alarm system design. The monitoring company will be asked to connect their equipment to this junction panel to avoid any work being done within the fire alarm panel by this company.
- .2 Attached sample diagram of the required set up for the monitoring of the fire alarm system and sprinkler systems. The same type of set up would be required for additional monitoring points such as fire pump running, power off to the fire pump and water flow in standpipe and hose systems as determined by the FPO.



- .3 If the contacts are not available at the fire alarm panel, additional addressable auxiliary relays will need to be requested for the FACP. The FACP will need to be programmed to activate the auxiliary relays, as indicated in the sketch, and the dry contacts wired onto the terminal strip in the new junction panel.
- .4 All auxiliary relays and dry contacts are to be clearly identified.
- .5 The wiring between the fire alarm panel and the new junction panel must be with EMT conduits.
- .6 Testing of the programming of the dry contacts must be done by initiating at least two devices that are to provide the signal. Testing will be done according to CAN/ULC-S537. The contractor shall submit a verification report.
- .7 McGill's monitoring company is to provide a communication panel that will transmit information from the fire panel. The information is provided by dry contacts located in the junction panel.
- .8 McGill's monitoring company is to wire the dry contacts from the terminal strip in the junction panel to the communication panel. All wiring must be clearly identified.
- .9 All wiring between the junction panel and the communication panel must be in EMT.

- .10 Circuits shall be protected and monitored as in the following ULC standard sketch.



Note: Provide a suitable terminal box as the point of demarcation between the fire alarm control unit and the signal transmitting unit. Alarm, trouble and supervisory contacts are extended from the fire alarm control unit to the demarcation. The fire alarm control unit technician connects in the fire alarm control unit and the junction box and tags the conductors in the terminal box.

- .11 The design must include a power supply for the monitoring panel and McGill's monitoring company is to connect the panel to it.
- .12 The exact location of the panel will be determined on site with the FPO. It will be in proximity to the fire alarm panel; probably above its location.
- .13 The monitoring company must test the programming of the panel by initiating at least one device of each type of signal to be transmitted. Testing from the junction box is insufficient. A representative from the FPO shall be present on site at the time of the acceptance test.
- .14 The monitoring company must provide an acceptance test report for each building.

Part 5 Alarm and controls for laser that present risk for fire (Class 3B & 4)**5.1 Detections**

- .1 A smoke detector must be installed in the laser room and need to be connected to the fire alarm panel & the laser automatic shutoff
- .2 The laser equipment cabinet or exhaust must be monitored by a precombustion detector
 - .1 The precombustion detector may have multiple alarm thresholds such as warnings, however, it is mandatory that one of the level controls an automatic shutdown, connected to the fire alarm panel.

5.2 Laser circuits

- .1 Laser systems utilizing materials and components that present a fire hazard must incorporate circuitry that can be used for emergency shutdown by fire detection systems, manually, or by other means.
- .2 The design of the circuit shall not permit automatic restart with restoration of power following a remote shutdown.
- .3 The design of the circuit shall not allow automatic restart until the fire detection system or manual alarm system has been reset.

5.3 Emergency preparedness

- .1 Laser laboratories presenting a risk of fire must prepare an emergency plan describing the emergency scenarios that could occur and how the laboratory has been designed to handle all the issues. It would cover SOPs that have been formulated for the users and emergency responders.

Part 6 Keys**6.1 Keys**

- .1 At least 5 sets of keys for panel access will be provided to McGill University, as well as any other keys required to operate any other functions of the fire alarm system and monitoring equipment.
- .2 Keys will be given to McGill Security Services and FPO for distribution.

Part 7 Training**7.1 Training**

- .1 Two training sessions on the operation and maintenance of the fire alarm equipment in question will be provided on-site, by the Contractor, as planned by the Project Manager, for all McGill staff requiring it.
- .2 Sessions will be provided in English unless requested otherwise by the Project Manager.

END OF SECTION