SECTION 28 3105

FIRE ALARM CONTROL PANEL

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. Drawings and general provisions of Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.

1.2 SUMMARY

A. This Section includes modifying the existing Union Station fire alarm system by replacing the fire alarm control panel utilizing components furnished by the Owner under a separate contract with provisions allow for the interconnection with the fire alarm system being installed for the MBTA platform under a separate contract. It includes requirements for system components including the following:

1. Fire alarm control panel (FACP) – Components furnished by the Owner
2. Emergency power supply.

1.3 DEFINITIONS

A. Alarm Initiating Device: A manual station, smoke detector, heat detector, flame detector, or sprinkler water flow switch.

B. Alarm Signal: Signifies a state of emergency requiring immediate action. Pertains to signals such as the operation of a manual station and the operation of a sprinkler system flow switch.

C. Multiplex System: One using signaling method characterized by the simultaneous or sequential transmission, or both, and the reception of multiple signals in a communication channel, including means for positively identifying each signal.

D. Supervisory Signal: Indicates need for action regarding fire suppression or other protective system.

E. Trouble Signal: Indicates that a fault, such as an open circuit or ground, has occurred in the system.

F. Zone: Initiating device or combination of devices connected to a single alarm initiating device circuit.

1.4 SYSTEM DESCRIPTION

A. General: Zoned, noncoded, addressable, microprocessor based type system with manual and automatic alarm initiation.

B. Signal Transmission: Existing 8 zone radio master box to be reconnected to the new fire alarm control panel.

C. Audible Alarm Indication: By pre-recorded voice alarm messages and tone signals on loudspeakers with capability of live voice override.

D. System connections for alarm initiation and alarm indicating circuits: Class A wiring.

E. Functional Description: The new fire alarm control panel shall:

1. Retain/re-install existing Mapnet cards to monitor the existing fire alarm devices in the building. New IDNet cards shall be installed in the fire alarm control panel under a separate contract after the Mapnet fire devices are replaced with IDNet fire devices under that separate contract.

2. Includes new fiber optic interface for interconnection with MBTA fire alarm control panel provided under separate contract.

3. Be programmed to maintain the existing input and output functions of the existing fire alarm control panel including the following functions and operating features:

4. Priority of Signals: Automatic response functions shall be accomplished by the first zone initiated. Alarm functions resulting from initiation by the first zone shall not be altered by subsequent alarms. An alarm signal shall be the highest priority. Supervisory or trouble signals shall have second- and third-level priority. Signals of a higher level priority shall take precedence over signals of lower priority even though the lower priority condition occurred first. Annunciate all alarm signals regardless of priority or order received.

5. Noninterfering: Provide zoned, powered, wired, and supervised system so a signal on one zone does not prevent the receipt of signals from any other zone. All zones shall be manually resettable from the FACP after the initiating device or devices have been restored to normal. Systems that require the use of batteries or battery backup for the programming function are not acceptable.

6. Signal Initiation: The manual or automatic operation of an alarm initiating or supervisory operating device shall cause the FACP to transmit an appropriate signal including:

    a. General alarm.
    b. Hood Fire suppression system operation alarm.
    c. Smoke detector alarm.
    d. Flow switch alarm.
    e. Valve tamper supervisory.
    f. Carbon Monoxide supervisory alarm.
    g. Door release.
    h. Elevator recall.
    i. System trouble.
    j. Fan shutdown.

F. Transmission to Worcester Fire Department: Alarm signals shall be automatically routed in a listed and approved manner to an existing 8 channel radio master box per the Worcester Fire Department channel requirements.

G. Silencing at FACP: Switches shall provide capability for acknowledgment of alarm; supervisory, trouble, and other specified signals at the FACP; and capability to silence the local audible signal and light an LED (light emitting diode). Subsequent zone alarms shall cause the audible signal to sound again until silenced in turn by switch operation. Restoration to normal of alarm, supervisory, and trouble conditions shall extinguish the associated LED and cause the audible signal to sound again until the restoration is acknowledged by switch operation.

H. Power Loss Indication: Sound trouble signal at the FACP upon loss of primary power at the FACP and the annunciator. Illuminate the emergency power light at both locations when the system is operating on an alternate power supply.

I. Annunciation: Annunciate manual or automatic operation of any alarm or supervisory initiating device both on the FACP and on the annunciator indicating the location and type device.

J. FACP Alphanumeric Display: Alphanumeric display.

K. General Alarm: A system general alarm includes:

1. Indicating the general alarm condition at the FACP and the system annunciator.

2. Identifying the device that is the source of the alarm at the FACP and the system annunciator.

3. Initiating audible and visible alarm signals throughout the building.

4. Closing fire and smoke doors normally held open by magnetic door holders.

5. Unlocking designated doors.

6. Disabling Great hall sound system.

7. Initiating transmission of alarm signal to the Worcester Fire Department (Zone 1).

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L. Manual station alarm operation initiates a general alarm.

M. Water flow alarm switch operation:

1. Initiates a general alarm.

2. Causes the device location indicating lamp of the device that has operated to flash.

3. Transmit water flow alarm to the Worcester Fire Department (Zone 2).

N. Smoke detection initiates a general alarm.

O. Sprinkler valve tamper switch operation:

1. Causes a supervisory audible and visible "valve tamper" signal indication at FACP and annunciator.

2. Causes location indicating light to flash for the device that has operated.

3. Initiates transmission of sprinkler supervisory signal to the Worcester Fire Department (Zone 3).

P. Carbon Monoxide Detector Operation:

1. Causes a supervisory audible and visible "Carbon Monoxide Detection"

signal to be indication at FACP and annunciator.

2. Initiates transmission of Carbon Monoxide alarm signal to the Worcester Fire Department (Zone 4).

Q. Duct smoke detector operation:

1. Causes a supervisory audible and visible "duct smoke detection" signal indication at FACP and annunciator.

2. Causes location indicating light to flash for the device that has operated.

3. Causes the associated fan to shut down.

4. Initiates transmission of general supervisory signal to the Worcester Fire Department (Zone 7).

R. Independent System Monitoring: Supervise each independent smoke detection system, duct detector, and elevator smoke detection system for both normal operation and trouble.

1. Circuit Supervision: Indicate circuit faults with both a zone and a trouble signal at the FACP. Provide a distinctive indicating audible tone and (LED) indicating light. The maximum elapsed time between the occurrence of the trouble condition and its indication at the FACP is 200 seconds.

2. Smoke detectors in elevator lobbies shall also recall elevator to the programmed level.

3. Smoke detectors in elevator machine rooms shall also recall elevator to the programmed level and shall cause the associated fire fighter helmet signal to flash.

1.5 SUBMITTALS

A. General: Submit the following in accordance with Conditions of Contract and Division 1 Specification Sections.

B. Operation and maintenance data for inclusion in Operating and Maintenance Manual specified in Division 1 and in Division 26 Section "Basic Electrical Requirements." Operation and maintenance data shall cover each type of product, including all features and operating sequences, both automatic and manual. Provide spare parts data. Provide the name, addresses, and telephone numbers of service organizations that carry stock of repair parts for the system to be furnished.

C. Operating and instruction manuals shall be submitted prior to testing of the system, five (5) complete sets of operating and instruction manuals, four (4) shall be delivered to the Owner upon completion, and one (1) to the fire department prior to final acceptance.

D. Complete, simple, comprehensive, step-by-step, testing instructions giving recommended and required testing frequency of all equipment, methods for testing each individual piece of equipment, and a complete trouble-shooting manual explaining what might be wrong if a certain malfunction occurs and explaining how to test the primary internal parts of each piece of equipment, shall be delivered to the Owner upon completion of the system.

E. Maintenance instructions shall be complete, easy to read, understandable, and shall provide the following information:

1. Instructions on replacing any components of the system, including internal parts.

2. Instructions on periodic cleaning and adjustment of equipment with a schedule of these functions.

3. A complete list of all equipment and components with information as to the address and phone number of both the manufacturer and local supplier of each item.

4. User operating instructions shall be provided, prominently displayed on the cabinet front or on a separate sheet located next to the control unit in accordance with U.L. #864.

F. Product certification signed by the manufacturer of the fire alarm system components certifying that their products comply with the referenced standards.

G. Submission to Authority Having Jurisdiction: In addition to routine submission of the above material, make a simultaneous identical submission to the Worcester Fire Department. Include copies of annotated Contract Drawings as required to depict component locations to facilitate review. Upon receipt of comments from the authority, submit a copy of the marked-up submittal for review. Make resubmissions to the authority if required to make clarifications or revisions to obtain approval.

1.6 QUALITY ASSURANCE

A. Installer Qualifications: Engage an experienced Installer who is a factory-authorized service representative to perform the Work of this Section.

B. Compliance With Local Requirements: Comply with the applicable building code, local ordinances, and regulations and the requirements of the authority having jurisdiction.

C. Electrical Component Standard: Components and installation shall comply with NFPA 70 "National Electrical Code."

D. NFPA Compliance: Provide fire alarm and detection systems conforming to the requirements of the following publications:

1. NFPA 72A, "Installation, Maintenance, and Use of Local Protective Signaling Systems for Guard's Tour, Fire Alarm, and Supervisory Service."

2. NFPA 72E, "Automatic Fire Detectors."

3. NFPA 72F, "Installation, Maintenance, and Use of Emergency Voice/Alarm Communication Systems."

4. NFPA 72G, "Guide for the Installation, Maintenance and Use of Notification Appliances for Protective Signaling Systems."

E. UL Listing and Labeling: Provide system and components specified in this Section that are listed and labeled by UL.

F. Single-Source Responsibility: Obtain fire alarm components from a single source who assumes responsibility for compatibility for system components furnished.

1.7 MAINTENANCE SERVICE

A. Maintenance Service Contract: Provide maintenance of fire alarm control panel and associated system modifications and equipment for a period of 12 months commencing with Substantial Completion, using factory-authorized service representatives.

1. Basic services: Systematic, routine maintenance visits on a monthly basis at times coordinated with the Owner. In addition, respond to service calls within 24 hours of notification of system trouble. Adjust and replace defective parts and components with original manufacturer's replacement parts, components, and supplies.

2. Additional Services: Perform services within the above 12-month period not classified as routine maintenance or as warranty work as described in Division 1 Section "Warranties and Bonds" when authorized in writing. Compensation for additional services must be agreed upon in writing prior to performing services.

3. Renewal of Maintenance Service Contract: No later than 60 days prior to the expiration of the maintenance services contract, deliver to the Owner a proposal to provide contract maintenance and repair services for an additional one-year term. Owner will be under no obligation to accept maintenance service contract renewal proposal.

PART 2 - PRODUCTS

2.1 MANUFACTURERS

A. Manufacturers: Subject to compliance with requirements, provide products and manufacturer services by JCI (Simplex Time Recorder Co.).

2.2 FIRE ALARM CONTROL PANEL (FACP) – Components furnished by Owner.

A. General: Comply with UL 864, "Control Units for Fire Protective Signaling Systems."

1. Model: 4100ES.

B. System Operation:

1. System shall be installed to sound four rounds of alarm tone, followed by recorded voice message.

2. System shall be installed for three separate live voice zone control:

   a. Zone 1: All call (Entire System).
   b. Zone 2: Union Station.
   c. Zone 3: MBTA Platform and East Facility.

3. Under normal system operation, actuation of any manual station, smoke detector, heat detector, water flow or tamper switch shall cause the following operation to occur:

   a. Operate the audible and visual alarm signals.

   b. Release all magnetic door holders.

   c. Return all elevators to appropriate floor level per ANSI/ASME A17.1-1981.

   d. Shut down all air handling units.

4. The above operation shall continue until the operated device is returned to normal and the control panel is manually reset except that the alarms may be silenced as described elsewhere in these specifications. An alarm may be silenced by a switch on the zone card in the control panel. When silenced, this shall not prevent the resounding of subsequent alarms if another zone should alarm, (ring back feature).

5. When alarms are silenced: The zone indicating red LED's on the control panel and the remote annunciator shall remain on until the operated device is returned to normal and the control panel is manually reset.

6. A green pilot LED shall normally be on, indicating that the system is receiving normal 120VAC power. A failure of normal power shall cause the LED to extinguish.

7. An amber trouble LED and sonalert, operating together, shall signal any trouble condition. Failure of normal power, opens, or short circuits on the indicating circuits, disarrangements in the system wiring, or ground faults shall cause the trouble LED to light and sonalert to sound. A trouble silencing switch shall be provided to silence the sonalert which shall be so arranged that the trouble LED will remain lit until the system is restored to normal, the sonalert shall respond to remind service personnel to return the silencing switch to the normal position,(ring-back feature).

8. All alarm signals shall be automatically "locked in" at the control panel until the operated device is returned to its normal condition, and the control panel is manually reset. A switch shall be provided on each zone

card in the control panel for silencing the alarm devices by zone and allowing the masterbox to be reset. Once silenced, it will not prevent the resounding of all alarm signals or reactivation of the masterbox (or other city connection), if an alarm condition should occur in another zone elsewhere in the building, (resound feature).

9. Each initiating circuit shall be represented on the zone cards in the control panel by an amber trouble LED and a red alarm LED. The LED's for each zone shall be identified on the control panel by lamicoid engraved lettered nameplates showing the zone designation. In no case will numbered only zones be acceptable. Circuit trouble shall be indicated by the amber LED lighting. Control panels with incandescent lamps or control panels without supervised alarm lamps will not be accepted.

10. Each initiating and indicating circuit shall be electrically supervised for opens and ground faults in the wiring, and for short circuit faults on the indicating circuit wiring, and shall be so arranged that a fault condition in any circuit or groups of circuits, will not cause an alarm to be sounded. The occurrence of any fault will light a trouble LED and sound the sonalert, but will not interfere with the proper operation of any circuit which does not have a fault condition.

11. Cabinet: Existing lockable steel enclosure with new glass doors. Arrange panel so all operations required for testing or for normal care and maintenance of the system are performed from the front of the enclosure. If more than a single unit is required to form a complete control panel, provide exactly matching modular unit enclosures. Provide cabinets large enough to accommodate all components and to allow ample gutter space for interconnection of panels as well as field wiring. Identify each enclosure and each component by an engraved red laminated phenolic resin nameplate. Lettering on the enclosure nameplate shall not be less than 1 inch high. Identify individual components and modules within the cabinets by engraved laminated phenolic resin nameplates.

12. Systems: Provide for separate and independent alarm and supervisory systems in the FACP. The alarm initiating zone boards in the FACP shall consist of plug-in cards. Construction requiring removal of field wiring for module removal is not acceptable.

13. Control Modules: Types and capacities to perform all functions of the fire alarm system. Provide local, visible, and audible signals to notify of any alarm, supervisory, and trouble condition. Provide each type of audible alarm with a distinctly different sound.

14. Resetting: Provide the necessary controls to prevent the resetting of any alarm, supervisory, or trouble signal while the alarm or trouble condition

on the system still exists.

15. Additional Control Panel Features:

16. All printed circuit boards shall be of the plug-in type and shall be electrically supervised for position. All groups of circuits or common equipment shall be clearly marked, and shall be expandable by inserting interchangeable plug-in units. Control panels that have plug-in modules that can be removed without causing a trouble condition will not be accepted.

    a. Circuitry shall be provided in the control panel to permit transmission of trouble and alarm signals over leased or privately owned telephone cables to a remote receiving panel. A reverse polarity transmitter and/or a masterbox circuit as required shall be provided in the control panel. There shall be a supervised disconnect switch to allow testing of the fire alarm system without transmitting an alarm signal to the central station or fire department.

17. The control panel shall include the following additional features:

    a. Auxillary SPDT contacts in the control panel per zone and one set of SPDT contacts which will operate on general alarm.

    b. Auxillary circuitry in the control panel to operate remote relays to control air handlers, exhaust fans, etc. as shown on the drawings.

    c. 24 hours of battery standby using rechargeable batteries with automatic hi-low rate charger to maintain standby batteries in a fully charged condition plus 5 minutes of alarm activation. There shall be a low/no battery trouble indicator that shall also operate the general trouble devices as specified herein but shall not cause an alarm to be sounded.

    d. A power transfer circuit that will switch to battery standby power automatically and instantaneously if normal power fails. This circuit shall not be an integral part of the power supply, but a part of the basic fire card to allow operation of the complete fire alarm system on the secondary source of power, with the primary power supply removed.

    e. A milliammeter to measure current (DC).

    f. A voltmeter to measure the voltage (DC).

g. Ground fault detector to detect positive or negative grounds on the initiating circuits, indicating circuits, power circuits, and telephone line circuit. The ground fault detector shall have an individual LED for visual indication of either a positive or negative ground fault and operate the general trouble devices as specified herein, but shall not cause an alarm to be sounded.

h. A short circuit LED shall be a standard feature of the fire alarm control panel. This circuit shall monitor the indicating circuits for short circuits and shall have an individual LED for visual indication of circuits as well as operating trouble devices as specified herein, but shall not cause an alarm to be sounded.

i. All relays on printed circuit boards shall be plug-in type with dustproof protecting covers and shall be electrically supervised.

j. All transistors on common control and individual zone printed circuit boards shall be of the same exact type and shall be of the plug-in type.

k. Lightning surge protectors shall be a standard feature of the fire alarm control panel and shall be incorporated in the power supply circuit, common control circuits, indicating circuits, smoke detector power circuits, and telephone line circuit.

l. Individual circuit fuses shall be provided for the following: smoke detector power, main power supply, indicating circuit #1, indicating circuit #2, battery standby power and external output.

m. A battery test switch shall be a standard feature of the fire alarm control panel. It shall disconnect the power supply and operate all alarm devices from standby batteries, without sending a signal to the fire department or central station.

n. A lamp test switch shall be a standard feature of the fire alarm control panel and shall test all supervised alarm red LED's and yellow trouble LED's per zone.

o. An overvoltage sensing circuit shall cause an amber LED to light and operate the system trouble devices should a fault occur within the power supply causing too high a voltage being supplied to the system.

p. Provisions for remote reset.

q. Provisions for remote drill switch.

r. Provisions for a remote trouble indication.

18. Alphanumeric Display and System Controls: Arrange to provide the basic interface between human operator at FACP and addressable system components, including annunciation, supervision, and control. Provide a display with a minimum of 32 characters, arranged to display alarm, supervisory, and component status messages and indicate control commands to be entered into the system for control of smoke detector sensitivity and other parameters. Provide with voice microphone and three zone live voice control.

19. Voice Alarm: An integrated, UL listed, life safety, and emergency communication system, complying with the requirements of NFPA 72, "Installation, Maintenance and Use of Emergency Voice/Alarm Communications Systems." FACP shall include central voice alarm system components complete with all necessary microphones, pre-amplifiers, amplifiers, and tone generators. Features shall include:

a. Amplifiers: Comply with UL 1711, "Amplifiers for Fire Protective Signalling Systems."

b. Alarm Channels: Two channels to permit simultaneous transmission of different voice evacuation announcements to specific zones or floors as well as emergency public address announcements to specific areas via the central control microphone. All announcements shall be made over dedicated, supervised communication lines.

2.3 INTEGRAL ANNUNCIATORS

A. The control panel shall be provided with manufacturer's standard construction annunciators of the following type:

1. The annunciator shall be an integral part of the control unit and shall indicate both alarms and trouble by zone. Provisions shall be provided for a supervised LED remote zone annunciator. All zones shall be properly and permanently labeled with custom lettering for ease of identification.

2.4 BATTERY BACK-UP POWER SUPPLY

A. General: Components include battery, charger, and an automatic transfer switch.

B. Battery: Sealed lead-acid or nickel cadmium type. Provide sufficient capacity to operate the complete alarm system in normal or supervisory (nonalarm) mode for a period of 24 hours. Following this period of operation on battery power, the

batteries shall have sufficient capacity to operate all components of the system, including all alarm indicating devices in alarm or supervisory mode for a period of 15 minutes.

1. The 120VAC main power shall be converted to 24VDC, rectified and regulated for system operation. The entire system shall operate on 24 VDC.

2. The rated current available from the power supply shall be 4 amps of filtered and regulated DC and shall comply with the latest issue of U.L. Standard #864.

C. Magnetic door holders shall not be served by emergency power. Magnetic door holders shall be released on the failure of primary power.

D. Automatic Transfer Switch: Transfer the load to the battery without loss of signals or status indications in the event of the failure of primary power.

E. Battery Charger: Solid-state, fully automatic, variable- charging-rate type. Provide for 150 percent of the connected system load while maintaining the batteries at full charge. In the event batteries are fully discharged, the charger shall recharge them fully within four hours. Charger output shall be supervised as part of system power supply supervision.

2.5 OPTIONAL SYSTEM FEATURES

A. Fan Shutdown:

1. Designated HVAC units shall be shut down through auxillary contacts of the duct type smoke detectors or heat detectors as shown on the Drawings.

2. Auxiliary systems, shunt and local energy.

3. Control of auxilliary services:

4. Fan shut down relays.

B. Magnetic door release.

2.6 WIRE

A. Line-Voltage and Low-Voltage Circuits: Solid copper conductors with 600-V rated insulation.

1. Provide Class 1 initiating and alarm circuits with electrical supervision for shorts and open conditions.

2. Install diodes or resistors in fire alarm control cabinet.

3. Fire alarm system wiring shall be a power limited fire protection signaling circuit multi-conductor cable, 105 degree Celsius, Type FAPL, 300 volt rated, red jacket.

4. Signal circuit wiring shall be minimum No. 14 AWG copper, solid.

5. Initiation circuit wiring shall be minimum No. 16 AWG copper, solid.

2.7 TAGS

A. Tags For Identifying Tested Components: Comply with NFPA 72H.

2.8 FIRE ALARM CONTROL PANEL BILL OF MATERIALS FURNISHED BY THE OWNER UNDER SEPARATE CONTRACT

A. The following is a list of Bill of Materials that the Owner is furnishing under separate contract to be installed as a complete and operational system under this contract:

1. 4100ES Upgrade:

QTY	MODEL NUMBER	DESCRIPTION
1	4100-9701	ES-PS MSTR CTRLR 2X40
1	41002152	2Bay Glass Dr Pkg Factory Only
1	41007905	FACTORY BUILT-MAIN CONFIGURED
1	41002162	INDICATOR ONLY 2 BAY SOLID
2	4100-2300	EXPANSION BAY (PHASE 10 ONLY)
1	4100-5402	ES-XPS POWER SUPPLY
1	4100-2504	CS GATEWAY W/IP COM 4100 SIDE
1	4100-6104	ESNET NTWK INTERFACE CARD SLOT
1	4100-0632	UTILITY BLOC, 16 TERMINALS
1	4100-6308	ES NET SM FIBER MEDIA CARD
1	4100-3117	MSTR CTLR IDNET2, FACTORY ONLY
1	4100-3112	4 LOOP EPS MSTR CNTLR OPTION
2	4100-5450	NAC CARD
1	4100-5013	8 POINT ZONE/RELAY MODULE
4	4100-0644	120V ES-PS PDM HARNESS
2	4100-0634	POWER DISTRIBUTION MODULE 120V

1	4100-1294	LED/SWITCH SLIDE-IN LABEL KIT
2	4100-5131	ES-PS FAN MODULE
2	4100-5401	ES-PS POWER SUPPLY
1	4100-1412	ES NET BASIC AUDIO W/MIC
1	4100-1255	AUDIO IF 3-8 CHANNEL
4	4100-1280	8 SWITCH, 8 RED LED MODULE
1	4100-1288	64/64 LED/SWITCH CONTROLLER
2	4100-0011	FACTORY USE ONLY-AUDIO SHIPKIT
1	4100-1279	2 BLANK DISPLAY MODULE
1	4100-2320	AUDIO EXPANSION BAY
2	4100-1326	FLEX 50W AMP W/3 NACS - 25V
2	4100-1246	FLEX 50 CLASS A ADAPTER
1	4100-0637	AUDIO BOX TO BOX HARNESS KIT
2	4100-5128	BATTERY DIST TERM MODULE

2. Transponder:

QTY	MODEL NUMBER	DESCRIPTION
1	4100-9600	BASIC TRANSPONDER
1	41002163	INDICATOR ONLY 3 BAY SOLID
1	41007905	FACTORY BUILT-MAIN CONFIGURED
1	4100-2300	EXPANSION BAY (PHASE 10 ONLY)
2	4100-5401	ES-PS POWER SUPPLY
1	4100-5402	ES-XPS POWER SUPPLY
1	4100-0622	DIGITAL AUDIO RISER MODULE
1	4100-0632	UTILITY BLOC, 16 TERMINALS
2	4100-5450	NAC CARD
1	4100-3110	IDNET2+2 250 POINT 4 LOOP MOD
1	4100-3207	4 PT 2A AUX RELAY CARD W-FB
3	4100-0644	120V ES-PS PDM HARNESS
1	4100-0634	POWER DISTRIBUTION MODULE 120V
2	4100-5131	ES-PS FAN MODULE
1	4100-2320	AUDIO EXPANSION BAY
2	4100-1326	FLEX 50W AMP W/3 NACS - 25V

3. Panel Accessories:

QTY	MODEL NUMBER	DESCRIPTION
1	4100-9921	4100ES RETROKT 2 BAY BGE GLS D
2	4100-9925	4100ES RETROKT 2 BAY BGE SLD D

2	2081-9279	BATTERY 110AH
1	2081-9280	BATT CAB ONLY F/2081-9279
1	4603-9101	LCD ANNUNCIATOR
1	4100-0650	BATTERY SHELF
2	2081-9296	BATTERY 50AH

B. As part of the fire alarm control panel replacement, the existing fire alarm cabling, panel back boxes, field devices, and remote power supplies are intended to remain and be re-used.

PART 3 - EXECUTION

3.1 INSTALLATION, GENERAL

A. Install system in accordance with NFPA Standards referenced in Parts 1 and 2 of this Section.

B. Existing Fire Alarm Power Supply Disconnect: Paint red and label "FIRE ALARM." Provide with lockable handle or cover.

3.2 EQUIPMENT INSTALLATION

A. Existing Fire Alarm Equipment: Maintain fully operational to the extent possible until the new equipment has been tested and accepted.

B. Equipment Removal: After acceptance of the new fire alarm system, remove existing, disconnected fire alarm equipment made obsolete and restore damaged surfaces. Remove from the site and legally disposed of existing material made obsolete.

3.3 WIRING INSTALLATION

A. Wiring Method: Install wiring in metal raceway. Conceal raceway except in unfinished spaces and as indicated.

B. Install wires and cables without splices. Make connections at terminal strips in cabinets or at equipment terminals. Make soldered splices in electronic circuits in control cabinets.

C. System shall be free from grounds, shorts and open circuits.

D. All wire terminations at control panel shall be properly tagged showing zone and/or circuit identification.

E. Power shall not be applied to the new system control panel until the system has been completely checked for grounds, shorts and open circuits, by an authorized representative of the manufacturer.

F. Raceways containing conductors identified as "Fire Protective Alarm System" conductors shall not contain any other conductors, and A.C. current carrying conductors will not be allowed in the same raceway with the D.C. fire alarm detection and signaling conductors.

G. The Installer shall coordinate the installation of the fire alarm equipment with the manufacturer or his authorized distributor. All conductor and wiring shall be installed per the manufacturer's recommendations. It shall be the Installer's responsibility to coordinate with the supplier the correct wiring procedures prior to installing any conduits or conductors.

H. Pigtail connections between circuit wires and detector terminals are not acceptable. Devices shall be connected directly to the circuit line wires.

I. Wiring Within Enclosures: Install conductors parallel with or at right angles to the sides and back of the enclosure. Bundle, lace, and train the conductors to terminal points with no excess. Connect conductors that are terminated, spliced, or interrupted in any enclosure associated with the fire alarm system to terminal blocks. Mark each terminal in accordance with the wiring diagrams of the system. Make all connections with approved crimp-on terminal spade lugs, pressure-type terminal blocks, or plug connectors.

J. Cable Taps: Use numbered terminal strips in junction, pull or outlet boxes, cabinets, or equipment enclosures where any circuit tap is made.

K. Alarm Wiring: For the low-voltage portion of the fire alarm system, install No. 16 AWG conductors and 75-deg C insulation in wet, damp, or dry locations. Provide wiring operating at line voltage as minimum No. 12 AWG size having similar insulation.

L. Color Coding: Color code all fire alarm conductors differently from the normal building power wiring. Provide one color code for alarm circuits wiring and a different color code for supervisory circuits. Provide a color code for audible alarm indicating circuits different from alarm initiating circuits. Use different colors for visual alarm indicating devices. Paint fire alarm system junction boxes and covers red.

3.4 GROUNDING

A. Ground equipment and conductor and cable shields. For audio circuits, minimize to the greatest extent possible ground loops, common mode returns, noise pickup, cross talk, and other impairments. Provide 5-ohm ground at main equipment

location. Measure, record, and report ground resistance.

3.5 FIELD QUALITY CONTROL

A. Manufacturer's Field Services: Provide services of a factory-authorized service representative to supervise the field assembly and connection of components and the pretesting, testing, and adjustment of the system.

B. Pretesting: Upon completing installation of the system, align, adjust, and balance the system and perform complete pretesting. Determine, through pretesting, the conformance of the system to the requirements of the Drawings and Specifications. Correct deficiencies observed in pretesting. Replace malfunctioning or damaged items with new and retest until satisfactory performance and conditions are achieved. Prepare forms for systematic recording of acceptance test results.

C. Report of Pretesting: After pretesting is complete, provide a letter certifying the installation is complete and fully operable. The letter shall include the names and titles of the witnesses to the preliminary tests.

D. Minimum Final System Tests: Test the system in accordance with the procedures outlined in NFPA 72H, Chapters 2 and 4 and NFPA 72E, Chapter 8. Minimum required tests are as follows:

1. Verify the absence of unwanted voltages between circuit conductors and ground.

2. Megger test all conductors other than those intentionally and permanently grounded with electronic components disconnected. Test for resistance to ground. Report readings less than 1-megohm for evaluation.

3. Test all conductors for short circuits utilizing an insulation testing device.

4. With each circuit pair, short circuit at the far end of the circuit and measure the circuit resistance with an ohmmeter. Record the circuit resistance of each circuit on the record drawings.

5. Verify the control unit is in the normal condition as detailed in the manufacturer's operating and maintenance manual.

6. Test initiating and indicating circuits for proper signal transmission under open circuit conditions. One connection each should be opened at not less than 10 percent of the initiating and indicating devices. Proper signal transmission in accordance with class of wiring used shall be observed.

7. Test each initiating and indicating device for alarm operating and proper

response at the control unit. Test smoke detectors with actual products of combustion.

8. Test the system for all specified functions in accordance with the manufacturer's operating and maintenance manual. Systematically initiate specified functional performance items at each station including making all possible alarm and monitoring initiations and using all communications options. For each item, observe related performance at all devices required to be affected by the item under all system sequences. Observe indicating lights, displays, signal tones, and annunciator indications. Observe all voice audio for routing, clarity, quality, freedom from noise and distortion, and proper volume level.

9. Test both primary power and secondary power. Verify, by test, the secondary power system is capable of operating the system for the period and in the manner specified.

E. Retesting: Rectify deficiencies indicated by tests and completely retest work affected by such deficiencies at Contractor's expense. Verify by the system test that the total system meets the Specifications and complies with applicable standards.

F. Report of Tests and Inspections: Provide a written record of inspections, tests, and detailed test results in the form of a test log. Submit log upon the satisfactory completion of tests.

G. Tag all equipment and stations and other components at which tests have been satisfactorily completed. Place tags upon completion of tests.

3.6 COMMISSIONING

A. Provide the services of a factory-authorized service representative to demonstrate and train Owner's maintenance personnel as specified below.

1. Train Owner's maintenance personnel in the procedures and schedules involved in operating, troubleshooting, servicing, and preventive maintaining of the system. Provide a minimum of 4 hours' training.

2. Schedule training with the Owner at least seven days in advance.

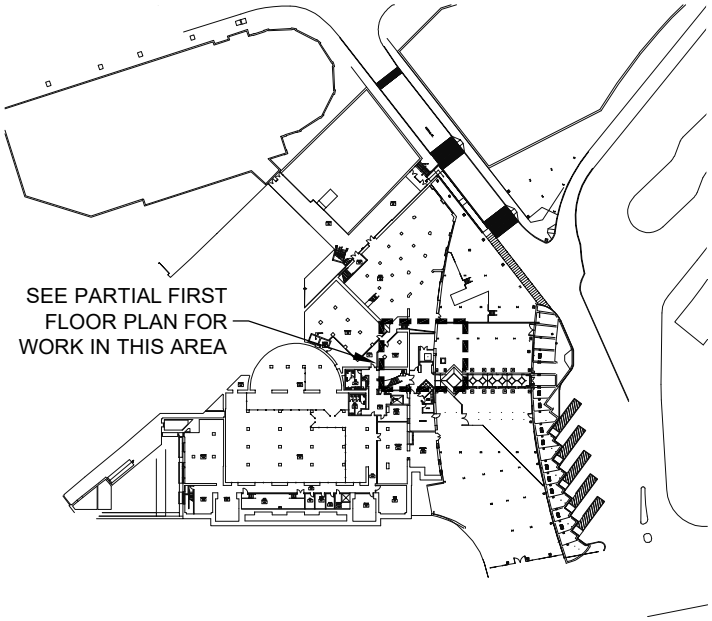
3. Due to the new control panel being installed and reconnected to existing field devices and utilizing existing Mapnet cards, include allowance for troubleshooting the existing infrastructure if troubles or faults become known due to the new work being performed.

B. Provide complete maintenance and inspection service for the fire alarm system, by a factory-trained authorized representative of the manufacturer, for a period of one year after final inspection and tests.

C. Prior to final acceptance of system, manufacturer of system shall, in presence of Contractor, Owner's Representative and Architect's/Engineer's representative, test each sensing or detection and alarm device.

D. Submit copy of test results in duplicate after signed by Owner's Representative to Architect/Engineer, Owner, Owner's Insurance Company and local Fire Protection Authority. Mount copy of inspection record in lexan enclosed frame assembly on control panel.

END OF SECTION



GENERAL NOTES:

A. THE PROJECT SCOPE IS TO REPLACE THE FIRE ALARM CONTROL PANEL AND TRANSPONDER WITH NEW INTERIOR COMPONENTS TO BE INSTALLED IN BACK BOXES.

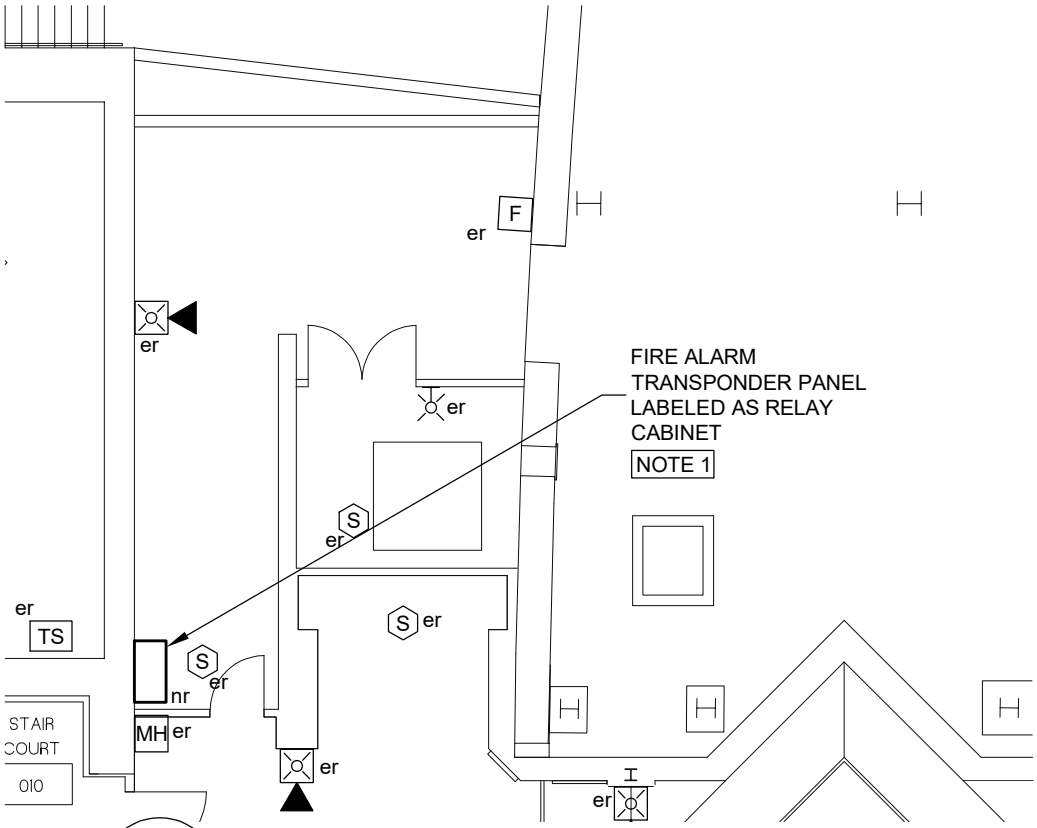
KEYED NOTES:

1. EXSTING FIRE ALARM TRANSPONDER PANEL ENCLOSURE TO REMAIN WITH THE INTERIOR COMPONENTS TO BE REPLACED. THE EXISITNG MAPNET CARDS TO BE RETAINED AND RE-USED WITH THE NEW FIRE ALARM CONTROL PANEL COMPONENTS. THE FIRE ALARM COMPONENTS TO BE PROVIDED BY THE CITY OF WORCESTER UNDER A SEPARATE CONTRACT FOR INSTALLATION UNDER THIS PROJECT. CONTRACTOR TO OBTAIN THE SERVICES OF JCI FOR THE INTERNAL MOUNTING AND WIRING OF THE COMPONENTS.

1
SKFA-01

BUILDING KEY PLAN

NOT TO SCALE



2
SKFA-01

PARTIAL BASEMENT PLAN

SCALE: 3/32"=1'-0"

WORCESTER UNION STATION FIRE ALARM CONTROL PANEL REPLACEMENT	DATE: 02/29/24	SKETCH NO.
	SCALE: AS NOTED	
BASEMENT PLANS	DRAWN: MWF	SKFA-01
	CHECK: MWF	
	PROJ. NO. 23343.000	

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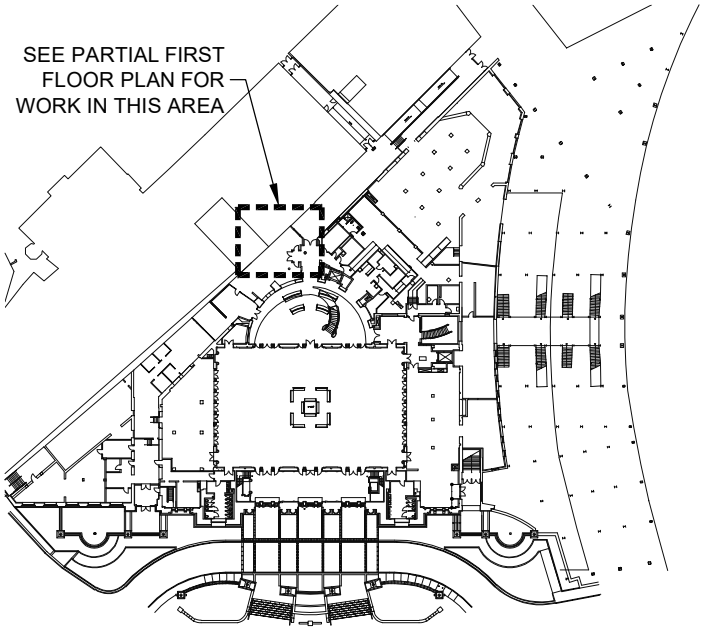


1 SKFA-02

BUILDING KEY PLAN

NOT TO SCALE

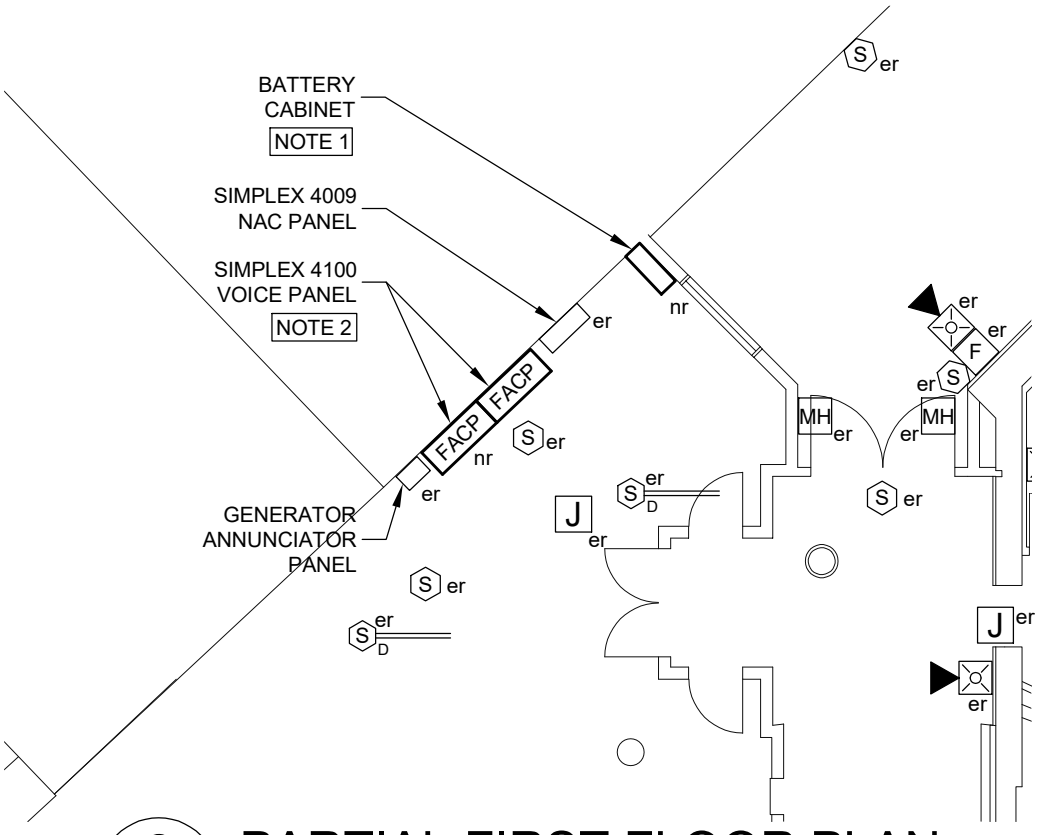
GENERAL NOTES:

A. THE PROJECT SCOPE IS TO REPLACE THE FIRE ALARM CONTROL PANEL WITH NEW INTERIOR COMPONENTS TO BE INSTALLED IN THE TWO EXISTING CABINETS.

KEYED NOTES:

1. EXISTING BATTERY CABINET TO BE REPLACED WITH NEW BATTERY CABINET. RE-USE EXISTING BATTERY CONDUCTORS IN CONDUIT TO FIRE ALARM CONTROL PANEL.

2. EXSTING FIRE ALARM CONTROL PANEL ENCLOSURES TO REMAIN WITH THE INTERIOR COMPONENTS TO BE REPLACED. THE EXISITNG MAPNET CARDS TO BE RETAINED AND RE-USED WITH THE NEW FIRE ALARM CONTROL PANEL COMPONENTS. THE FIRE ALARM COMPONENTS TO BE PROVIDED BY THE CITY OF WORCESTER UNDER A SEPARATE CONTRACT FOR INSTALLATION UNDER THIS PROJECT. CONTRACTOR TO OBTAIN THE SERVICES OF JCI FOR THE INTERNAL MOUNTING AND WIRING OF THE COMPONENTS.



2 SKFA-02

PARTIAL FIRST FLOOR PLAN

SCALE: 3/32"=1'-0"

WORCESTER UNION STATION FIRE ALARM CONTROL PANEL REPLACEMENT	DATE: 02/29/24	SKETCH NO.
	SCALE: AS NOTED	
FIRST FLOOR PLANS	DRAWN: MWF	SKFA-02
	CHECK: MWF	
	PROJ. NO. 23343.000	

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