

**Pleasant Hill R-III School District
High School Fire Panel Replacement
RFP**

The Pleasant Hill R-III School District in Pleasant Hill, MO is seeking proposals from qualified contractors to remove and replace main fire panel and all of its components with an Addressable Fire Alarm System as specified below.

The purpose of this proposal is to address the old, original fire panel at the Pleasant Hill High School.

General Conditions

1. The Pleasant Hill R-III School District will receive sealed bids from qualified installers. Sealed bids can be mailed or delivered to:
Central Office - ATTN David Taylor
Pleasant Hill R-III School District
318 Cedar St
Pleasant Hill, MO 64080
2. Sealed bids will be received until 10:00 AM, CST, on April 10th, 2019, and will be opened at that time. Bid acceptance and approval will be April 16th at the district school board meeting.
3. The Pleasant Hill R-III School District reserves the right to reject any and all bids.
4. Awarded contractor will be required to submit a completed vendor agreement which includes E-Verification, all applicable licenses, and insurance.
5. Contractor will be responsible for any permits that may be required by the City of Pleasant Hill.
6. Prevailing Wage is no longer a requirement in Missouri for projects under \$75,000.
7. All questions should be submitted to David Taylor via email: dtaylor@pleasanthillschools.com, no later than April 5th, 2019.

BIDS TO INCLUDE

- Removal of existing fire alarm equipment
- Installation of new equipment as specified below
- Testing of all equipment

Site visits are required. There will be a non mandatory Pre-Bid walk through scheduled for Wednesday, April 3rd, at 10:00 AM. Additional site visits may be scheduled by emailing David Taylor at dtaylor@pleasanthillschools.com, or calling the office at 816-540-3161.

Addressable Fire Alarm Life Safety System

1. Part 1 - General

1.2. Summary

1.2.1. iO1000 Summary - Fire

Provide all permits, labor, equipment, materials and services to furnish and install a fully tested functional, UL Listed, code compliant, intelligent addressable fire alarm system including but not limited to all initiation and notification appliances, all raceways and wiring, connection to a central monitoring station.

The system supplied under this specification shall utilize modular low voltage. The system shall utilize up to 1,000 (one thousand) independently addressed fire detection devices and input/output control modules and traditional notification appliances as described in this specification. Panels shall contain the required user interfaces for all functions. All equipment shall be new and the current products of a single manufacturer, actively engaged in the manufacturing and sale of digital fire detection devices for over ten years.

Also included are system wiring, raceways, pull boxes, terminal cabinets, mounting boxes, and any accessories and miscellaneous items required for a code compliant system.

The system drawings show the intended of coverage and suggested device locations. Final device quantity, location, and AHJ approval are the responsibility of the contractor.

The final system shall be complete, tested, and ready for operation as described elsewhere in this specification, before owner acceptance.

Strict conformance to this specification is required to ensure that the installed and programmed system will function as designed, is compatible with existing systems, and will accommodate the future requirements and operations of the building owner. All specified operational features must be met without exception.

1.2.2. Related Work - Fire

- A. The Contractor shall coordinate work in this Section with all related trades. Work and/or equipment provided in other Sections and related to the fire alarm system shall include, but not be limited to:
 2. Duct smoke detectors shall be furnished, wired and connected by the electrical contractor. The HVAC contractor shall furnish necessary duct opening to install the duct smoke detectors.
 3. New air handling and smoke exhaust system fan control circuits and status contacts to be furnished by the HVAC control equipment.
 4. Elevator recall control circuits to be provided by the elevator control equipment. Modifications to the existing elevator controls to accommodate ANSI A17.1 shunt trip activation shall be provided by the elevator controls contractor. Any shunt trip circuit breakers and related wiring required for ANSI A17.1 compliance shall be provided by the electrical contractor (see power riser for more details).
 5. Kitchen hood extinguishing systems status monitoring.
 6. Existing IP network interface
 - a. Coordinate with the owner's IT department for interconnection between the owner's existing TCP/IP network and the TCP/IP network equipment supplied under this contract.

1.3. References

1.3.1. Codes-General

All work and materials shall conform to all applicable federal, state and local codes and regulations governing the installation. If there is a conflict between the referenced standards, federal, state or local codes, and this specification, it is the bidder's responsibility to immediately bring the conflict to the attention of the engineer for resolution. National standards shall prevail unless local codes are more stringent.

The bidder shall not attempt to resolve conflicts directly with the local authorities unless specifically authorized by the engineer.

1.3.2. Definitions and Abbreviations

ACU: Autonomous Control Unit.

ADA: Americans with Disabilities Act.

AFF: Above Finished Floor.

AHJ: Authority Having Jurisdiction.

Approved: Unless otherwise stated, materials, equipment or submittals approved by the Authority or AHJ.

Circuit: Wire path from a group of devices or appliances to a control panel or transponder.

CCS: Central Control Station.

CPU: The central computer of a multiplex fire alarm or voice command control system.

ECS: Emergency Communication System.

FACP: Fire Alarm Control Panel.

FCC: Fire Command Center.

FM: FM Global (Factory Mutual)

FSCP: Firefighter's Smoke Control Panel.

HPSA: High Power Speaker Array.

HVAC: Heating Ventilating and Air Conditioning.

IDC: Initiating Device Circuit.

LCD: Liquid Crystal Display.

LED: Light Emitting Diode.

LOC: Local Operating Console.

MN: Mass Notification.

MNEC: Mass Notification Emergency Communications.

NAC: Notification Appliance Circuit.

NFPA: National Fire Protection Association.

NICET: National Institute for Certification in Engineering Technologies

NRTL: Nationally Recognized Testing Laboratory

PTR: Printer.

RCP: Remote Control Panel

SLC: Signaling Line Circuit.

Style 1: As defined by NFPA 72, Class B.

Style 4: As defined by NFPA 72, Class B.

Style 6: As defined by NFPA 72, Class A.

Style 7: As defined by NFPA 72, Class A.

Style B: As defined in NFPA 72, Class B.

Style D: As defined in NFPA 72, Class A.

Style Y: As defined in NFPA 72, Class B.

UL or ULI: Underwriters Laboratories, Inc.

UL Listed: Materials or equipment listed and included in the most recent edition of the UL Fire Protection Equipment Directory.

Zone: Combination of one or more circuits or devices in a defined building area, i.e. 3 speaker circuits on a floor combined to form a single zone.

1.4. System Description - Fire

1.4.1. Fire Alarm Performance

1.4.1.1. General Requirements

- A. Comply with the provisions of NFPA 72 and the operational requirements of this specification.
- B. The system shall identify all off normal conditions and log each condition into the system as an event.
 - 1. The system shall automatically display on the control panel Liquid Crystal Display (LCD) the first (oldest) event of the highest priority. The event priority shall be alarm, supervisory, trouble, and monitor.
 - 2. Labeled, color coded indicators shall be provided for each type of event: alarm - red, supervisory - yellow, trouble - yellow, monitor - yellow. When an unseen event exists for a given type, the indicator shall be lit.
 - 3. For each event, the display shall include the number of active and disabled points, the type of event, the time the event occurred and up to a 40-character custom user description.
 - 4. The user shall be able to review the event queue by using the scrolling keys (up-down).
 - 5. New alarm, supervisory, or trouble events shall sound a distinct, silence able audible signal at the control panel.

6. The LCD shall show the system time and the number of active and disabled points in the system.
 7. **Specific input/output devices shall operate in accordance with the alarm, supervisory, trouble, monitor sections that follow and the input/output matrix.**
- C. All critical systems, sub-systems and circuits shall be monitored for integrity. System faults shall be annunciated.
 - D. Strobes shall be synchronized on each floor.
 - E. Batteries shall be sized to support the system for 24 Hrs. of standby operation followed by 5 minutes of alarm operation at the end of the 24 Hour period.
 - F. Off premises reporting of the loss of AC mains power to any system component shall be automatically delayed for a period of time acceptable to the AHJ to reduce traffic at the central monitoring station due to wide-area power failures.
 - G. The system shall provide "one man" testing of the system. Both silent and audible modes shall be available. Zones not under test shall go directly into alarm if activated.
 - H. Event processing and display shall be prioritized as follows:
 1. Fire alarms
 2. Supervisory events
 3. Trouble events
 4. Monitor events

1.4.1.2. Alarm Operation

Upon the **alarm activation** of any area smoke detector, heat detector, manual pull station, duct smoke detector, the following functions shall automatically occur:

The system shall remain in the alarm mode until all initiating devices are reset and the fire alarm panel is manually reset and restored to normal.

The internal audible device shall sound at the control panel or command center.

Display the alarm event on the graphical workstation.

The LCD display shall indicate all applicable information associated with the alarm condition including; zone, device type, device location and time/date.

All system activity/events shall be documented on the system printer and logged into system history.

Any remote or local annunciator LCD/LED's associated with the alarm zone shall be illuminated.

The visual strobe shall continue to flash until the system has been reset. The visual strobe shall stop operating when the "Alarm Silence" is pressed.

Or

Sound the ANSI 117-1 signal with synchronized audibles and synchronized strobes throughout the

facility.

Audible alarm signals shall be silenced from the fire alarm control panel by an alarm silence switch.

Visual signals shall be programmable to flash until system reset or alarm silencing, as required.

Transmit signal to the building automation system.

Transmit signal to the central monitoring station with point identification.

All automatic events programmed to the alarm point shall be executed and the associated outputs activated.

1. Activation of elevator lobby or elevator equipment room smoke detectors shall initiate recall of the bank of elevators to the 1st floor and lockout the elevator controls. Activation of the first floor elevator lobby smoke detector shall recall shall be to an alternate floor, and lockout the elevator controls.
2. Activation of heat detectors in elevator shafts and machine rooms shall activate the elevator power shunt trip circuit breaker.

All stairwell/exit doors shall unlock throughout the building.

All self-closing fire/smoke doors held open shall be released.

Transmit alarm text messages to "alpha-numerical" display pagers.

1.4.1.3. Supervisory Operation

Upon **supervisory activation** of any, duct smoke detector, elevator shunt trip supervision, the following functions shall automatically occur:

The internal supervisory event audible device shall sound at the control panel.

The LCD display shall indicate all applicable information associated with the supervisory condition including; zone, device type, device location and time/date.

All system activity/events shall be documented on the system printer and logged to system history.

Transmit signal to the central monitoring station with point identification.

1.4.1.4. Trouble Operation

Upon activation of a **trouble condition** or signal from any device or internal system integrity monitoring function on the system, the following functions shall automatically occur:

The internal panel audible device shall sound at the control panel.

Display the event on the graphical workstation and display a pictorial image.

The LCD keypad display shall indicate all applicable information associated with the trouble condition including; zone, device type, device location and time/date.

Trouble conditions that have been restored to normal shall be automatically removed from the trouble display queue and not require operator intervention. This feature shall be software selectable and shall not prevent the logging of trouble events to the historical file.

All system activity/events shall be documented on the system printer and logged to system history.

Transmit a trouble signal to the central monitoring station with point identification.

1.4.1.5. Monitor Operation

Upon activation of any device connected to a **monitor circuit**, the following functions shall automatically occur:

The internal panel audible device shall sound at the control panel.

Display the event on the graphical workstation and display a pictorial image.

The LCD display shall indicate all applicable information associated with the status condition including; zone, device type, device location and time/date.

All system activity/events shall be documented on the system printer and logged to system history.

1.5. Submittals

1.5.1. Submittal General

- A. The contractor shall not purchase any equipment for the specified system until the owner has approved the project submittals in their entirety and has returned them to the contractor.
- B. Approved submittals allow the contractor to proceed with the installation and shall not be construed to mean that the contractor has satisfied the requirements of these specifications.
- C. Each submittal shall include a detailed list of variations that the submittal may have from the requirements of the contract documents.
- D. The contractor shall provide specific notation on each shop drawing, sample, data sheet, installation manual, etc. submitted for review and approval, of each variation.
- E. Any conflicts in the contract documents and/or with Authority Having Jurisdiction (AHJ) requirements shall be submitted to the owner in writing 7 days prior to bid.

- F. Submittals shall be approved by authorities having jurisdiction prior to submitting them to the Architect.**

1.5.2. Submittal PDF's

Submit for approval PDF copies of a submittal to the consulting engineer for review and comment.

Submittal books shall meet the following requirements:

1. Shall be a Digital PDF with a cover that shows the project address, system type, and contractor.
2. Shall include:
 - a. Cover sheet
 - b. Table of contents
 - i. Provide a list of all types of equipment and components provided. This shall be incorporated as part of a table of contents, which will also indicate the manufacturer's part number, the description of the part, and the part number of the manufacturer's product datasheet on which the information can be found.
 - c. Product data sheets, as detailed elsewhere in this specification
 - d. Provide description of operation of the system (sequence of operation), similar to that provided in Part 2 of this section of the specifications. The description shall be specific to this project, and shall provide individual sequences for every type of alarm, supervisory, or trouble condition, which may occur as part of normal or off-normal system use.
 - e. B-size (black line) reduced shop drawings, as detailed elsewhere in this specification.
 - f. System calculations, as detailed elsewhere in this specification.
 - g. Installation instructions.
 - h. Provide samples of various items when requested.
 - i. Copies of all licenses, documents and certifications, as detailed elsewhere in this specification.

Additional copies may be required at no additional cost to the project.

1.5.3. Product Data

System components proposed in this specification shall be UL listed to operate together as a system. The supplier shall provide evidence, with his submittal, of listings of all proposed equipment and combinations of equipment.

For each product submitted provide the following information:

1. Manufacturer's catalog data, to include material description, agency approvals, operating characteristics, electrical characteristics, dimensions, mounting requirements and accessories.

Product data sheets for system components shall be highlighted to indicate the specific products, features, or functions required to meet this specification.

Alternate or as-equal products submitted under this contract shall provide a detailed line-by-line

comparison of how the submitted product meets, exceeds, or does not comply with this specification.

2. Manufacturer's product installation sheets: A copy of the documentation that is required to be shipped with all listed products by UL.

1.5.4. Design Calculations

Battery Capacity

Provide battery capacity calculations for each power supply that uses batteries for secondary power. Identify all loads. Identify any loads shed during alarm operation. Use the manufacturer's recommended methods and/or forms.

24 VDC Notification Appliance Circuits

For each 24VDC NAC, provide worst case voltage drop calculations. The load shall be treated as a lump sum at the end of the circuit. *Worst case power supply terminal voltage shall include all applicable internal power supply losses.* Using 85% of nominal circuit voltage (20.4VDC) shall not be accepted as lowest terminal voltage without manufacturer's published documentation stating there are no internal losses in the power supply.

Audio (Speaker) Notification Appliance Circuits - Interior

The system shall be designed for interior building audibility level of 15 dBA-fast over ambient condition and intelligibility. Intelligibility shall be designed to maintain Common Intelligibility Standard (CIS) rating of 0.7 or Sound Transmission Index of 0.5 in all areas designated on the drawings to have intelligible audio.

Provide dB loss calculations for all audio (speaker) notification appliance circuits. Circuits shall be designed for no more than 0.5 db loss based on lump-sum load method.

All areas required to meet intelligibility requirements shall be modeled in a recognized computer modeling program such as EASE by Renkus-Hienz. All modeling output data shall be part of the submittal.

High Power Speaker Arrays - Exterior

HPSAs shall be designed for an audibility level of 15 dBA-fast over ambient condition and intelligibility. Intelligibility shall be designed to maintain Common Intelligibility Standard (CIS) rating of 0.7 or Sound Transmission Index of 0.5 in outdoor areas during normal weather conditions. Intelligibility may be less than 0.7 CIS in areas of the zone if it can be determined that a voice signal is being broadcast and an individual could walk less than 164 feet to find a location in the zone with at least 0.7 CIS. Values of 0.65 through 0.74 shall be rounded to 0.7.

1.5.5. Shop Drawings

Submit for approval three (3) sets of shop drawings to the consulting engineer for review and comment. Drawings shall be either D-size or E-size blue line drawings and of a sufficient resolution to be completely read. Drawing sets shall be bound. Additional copies may be required at no additional cost to the project.

Contained in the title block of each drawing shall be symbol legends with device counts, wire tag legends, circuit schedules for all addressable and notification appliance circuits, the project name/address, and a drawing description which corresponds to that indicated in the drawing index on the coversheet drawing. A section of each drawing title block shall be reserved for revision numbers and notes.

Shop drawings shall meet the following requirements:

1. Shop drawings shall be prepared by persons with the following qualifications:
 - a. Trained and certified by the manufacturer of the submitted equipment in fire-alarm system design.
 - b. **NICET-certified fire-alarm technician, Level IV minimum.**
2. **Coversheet** with project name, address and drawing index.
3. **General notes** drawing with peripheral device back box size information, part numbers, device mounting height information, and the names, addresses, point of contact, and telephone numbers of all contract project team members.
4. Provide device **floor plans** for all areas served by the fire alarm system. Utilize the CAD Files provided by the consulting engineer in the preparation of the floor plans. Floor plans shall indicate accurate locations for all control and peripheral devices. Drawings shall be **NO LESS THAN 1/8-INCH SCALE**. If individual floors need to be segmented to accommodate the 1/8" scale requirements, **KEY PLANS** and **BREAK-LINES** shall be provided on the plans in an orderly and professional manner.
 - All addressable devices shall be shown. Coordinate the device address with the same device shown on the riser diagram.
 - Identify all notification appliances with a circuit and item number. Coordinate the circuit and item number with the same device shown on the riser diagram.
 - Show all raceways, marked for size, conductor count with type and size, showing the percentage of allowable National Electric Code fill used.
 - Areas required to meet intelligibility requirements shall be clearly identified. Wide area mass notification system plot drawings shall identify all project areas that must meet intelligibility requirements as well as environmentally sensitive areas on or off of the project site where system output shall be minimized.
5. Device **riser diagram**, which individually depict all control panels, annunciators, addressable devices, and notification appliances. Shall include a specific, proposed device description above each addressable device. Shall include a specific, discrete device address that corresponds to

addresses shown on the floor plans. Drawings shall provide wire specifications, and wire identification for all conductors depicted on the riser diagram. All circuits shall have identifiers that shall correspond with those required on the control panel and floor plan drawings. End-of-line resistors (and values) shall be depicted.

6. **Control panel drawing(s)** shall show internal component placement and all internal and field terminations. Provide details indicating where conduit connections shall be made to avoid conflicts with internally mounted batteries. For each additional fire alarm panel, a separate drawing which clearly indicated the panel designation, service and location of the control enclosure.
7. Provide typical **device wiring diagrams** that show all system components, and the respective field wiring. Wire type, gauge, and jacket shall be indicated. When an addressable module is used in multiple configurations for monitoring or controlling equipment, provide a drawing for each application. End-of-line resistors (and values) shall be shown.
8. Provide a fire alarm system **function matrix** that illustrates alarm input/out events in association with initiation devices. Matrix summary shall include system supervisory and trouble output functions.
9. **System Calculations** as detailed elsewhere in this specification.

Upon receipt of approved drawings from the Authority Having Jurisdiction, the supplier shall immediately forward two sets of drawings to the owner. These drawings shall either be stamped approved or a copy of the letter stating approval shall be included.

1.5.6. Closeout

Two (2) copies of the following documents shall be delivered to the building owner's representative at the time of system acceptance.

Project specific operating and maintenance manuals covering the system as installed. The manuals shall contain a description of the system architecture, inputs, notification signaling, auxiliary functions, annunciation, sequence of operations, expansion capability, application considerations and limitations. A generic instruction and operation manual shall not be acceptable.

Technical literature (manufacturer's data sheets and installation manuals/instructions) for all parts of the system, including control panels, smoke detectors, batteries, manual stations, alarm notification appliances, power supplies, and remote alarm transmission means.

Software and Firmware Operational Documentation:

THE END-USER SHALL RETAIN COMPLETE RIGHTS AND OWNERSHIP TO ALL SITE-SPECIFIC SOFTWARE RUNNING IN THE SYSTEM. The fire alarm equipment supplier shall provide hard and soft copies of the software database to the end-user at the end of the warranty

period. The database provided shall be useable by any authorized and certified distributor of the product line, and shall include all applicable passwords necessary for total and unrestricted use and modification of the database.

Drawings

Provide "As Built" drawings of record of all the shop drawings used in the installation of the system.

Refer to the Submittals - Shop Drawings section of this specification for drawing requirements.

Record of Completion

System supplier and contractor shall provide a certified test report to verify that the system and all components functioned properly and as intended.

A filled out Record of Completion similar to NFPA 72, 2007 edition figure 4.5.2.1 shall be provided.

Warranty

Provide copies of the warranty documentation as detailed in the Warranty section of this specification.

Service Organization

Provide the name, address and telephone of the authorized factory representative.

Training

Conduct the required training as detailed in the Startup and Commissioning - Training section of this specification.

1.6. Quality Assurance

1.6.1. Qualifications of Supplier

The system supplier shall have a minimum of 10 years of experience in distribution and service of the proposed equipment brand.

The supplier shall have successfully designed and installed similar system fire detection and visual signaling control components on a previous project of comparable scope, size and complexity.

The supplier shall have in-house engineering and project management capability consistent with the

requirements of this project. The project shall be supervised by personnel certified by NICET as fire alarm Level IV technicians.

The supplier shall employ qualified and manufacturer certified system designers to perform the detailed engineering design, system calculations, for all the system equipment and programming.

The supplier shall produce all panel and equipment drawings, submittals, and operating manuals, as detailed elsewhere in this specification.

The supplier shall be responsible for providing qualified on site representative(s) for coordination of system installation, and final system testing and commissioning in accordance with these specifications.

1.6.2. Qualifications of Installer

Before commencing work, submit evidence showing that the equipment installer has successfully installed systems of the similar scope, type and design as specified.

The contractor/installer shall submit copies of all required Licenses and Bonds as required in the State having jurisdiction.

The contractor/installer shall be responsible for retaining qualified and authorized representative(s) of the system manufacturer (The Supplier) specified for detailed system design and documentation, coordination of system installation requirements, and final system testing and commissioning in accordance with these specifications.

The contractor/installer shall employ on staff a minimum of one NICET level III technician or a professional engineer, registered in the State of the installation.

Contractors unable to comply with the provisions of Qualification of Installers shall present proof of engaging the services of a subcontractor qualified to furnish the required services.

1.7. Handling

1.7.1. Delivery and Storage

Receiving

The Contractor shall be responsible for all receiving, handling, and storage of his materials at the job site.

Overnight storage of materials is limited to the assigned storage area. Materials brought to the work area shall be installed the same day, or returned to the assigned storage area unless previously approved by the Owner.

The Contractor shall remove rubbish and debris resulting from his work on a daily basis. Rubbish not removed by the Contractor will be removed by the Owner and back-charged to the Contractor.

1.8. Project Conditions

1.8.1. Responsibility

It shall be the contractor's responsibility to inspect the job site and become familiar with the conditions under which the work will be performed.

All work may be conducted during normal working hours, 8:00 a.m. to 5:00 p.m., Monday through Friday.

1.9. Warranty

1.9.1. Installation Workmanship and Parts

The contractor shall warranty the installation and workmanship for one (1) year and all parts for Forty-Eight (48) months from date of final acceptance. A copy of the manufacturer's warranty shall

be provided with closeout documentation and included with the operation and installation manuals. The full cost of maintenance, labor and materials required to correct any defect during the warranty period shall be included in the submittal bid.

During the warranty period, each year the contractor shall perform detector sensitivity testing and provide a report to the owner. If the system is UL Listed to perform automatic detector sensitivity testing without manual intervention, and if a detector falls outside of sensitivity window the system automatically indicates a devices trouble, then this requirement shall be waived. Documentation from UL shall be provided as proof of automatic sensitivity testing operation.

The system supplier shall maintain a service organization with adequate spare parts stock within 50 miles of the installation. Provide a telephone response to owner's questions within 4 hours and on-site assistance within 24 hours.

Permit the owner's fire alarm technicians to perform temporary bypasses and emergency repairs on the system without voiding the warranty.

1.10. Startup and Commissioning

1.10.1. Training

The system supplier shall schedule and present a minimum of eight (8) hours of formal site specific instruction for the building owner, detailing the proper operation and maintenance of the installed system.

The instruction shall be presented in an organized and professional manner by a person factory trained in the operation and maintenance of the equipment and who is also thoroughly familiar with the installation.

The instruction shall cover the schedule of maintenance required by NFPA 72 and any additional maintenance recommended by the system manufacturer.

Copies of all training aids, presentations, etc. shall be left with the owner.

1.10.2. Test and Inspection - Fire

A. Testing, general

1. In addition to tests required in this section, the contractor shall perform all electrical and mechanical tests required by the equipment manufacturer, the architect and the authority having jurisdiction.
2. The contractor shall perform all testing in occupied facilities at times of day that present the lowest impact and disruption to business and activities. Coordinate all testing in occupied buildings with the building owner's representative to assure that fire alarm system testing does not interrupt operations.
3. All equipment, instruments, tools and labor required to conduct the system tests shall be provided by the installing contractor. At a minimum, the following equipment shall be made available testing:
 - a. Ladders and scaffolds as required to reach all installed equipment.
 - b. Meters for reading voltage, current and resistance.
 - c. Two-way communication devices
 - d. Simulated smoke, heat-producing devices for heat detectors, extension poles for introducing smoke into detectors, as needed.
 - e. Manufacturer's instruments to measure air flow through duct smoke detectors.
 - f. Decibel meter.
 - g. Status and diagnostic software and PC.

B. All testing shall utilize a written acceptance test plan for testing the system components and operation in accordance with NFPA 72 and this specification. The contractor shall be responsible for the performance of the acceptance test plan, demonstrating the function of the system and verifying the correct operation of all system components, circuits, and system programming.

1. The systems operation matrix created by the equipment supplier shall be used to identify each alarm input and verify all associated output functions.

C. The system test plan shall include but not be limited to the following:

1. Visually inspect all wiring.
2. Verify the absence of unwanted voltages between circuit conductors and ground. The tests shall be accomplished at the preliminary test with results available at the final acceptance test.
3. System wiring shall be tested to demonstrate correct system response for the following conditions:
 - a. Open, shorted and grounded signal line circuits.
 - b. Open, shorted and grounded notification appliance circuits.

D. System indications shall be demonstrated as follows:

1. Correct message content for each alarm input at all system displays.
2. Correct annunciator light for each alarm input at each graphic display.
3. Correct history logging for all system activity.
4. Correct sensitivity for all smoke detection devices. The use of system generated sensitivity

reports is acceptable in meeting this requirement.

- a. Correct signals sent to the Central Monitoring Station.
5. Notification appliances shall be demonstrated as follows:
 - a. All alarm notification appliances actuate as programmed
 - b. Audibility and visibility at required levels. Measure sound levels at 5 ft. above finished floor with the room doors closed.
 - c. For 24VDC NACS, measure and record the voltage at the most remote appliance on each notification appliance circuit, while operating.
6. System control functions shall be demonstrated as follows:
 - a. In accordance with the system operation matrix.
7. System off premises reporting functions shall be demonstrated as follows:
 - a. Correct information received for each alarm and trouble event
8. Secondary power supply (battery) capacity capabilities shall be demonstrated as follows:
 - a. System battery voltages and charging currents shall be measured and recorded at the fire alarm control panels.
 - b. System primary power shall be disconnected for 24 hours. At the end of that period, an alarm condition shall be created and the system shall perform as specified for a period of 5 minutes.
 - c. System primary power shall be restored for forty-eight (48) hours.
 - d. System battery voltages and charging currents shall again be measured and recorded at the fire alarm control panels.
9. Verify the "As Built" record drawings are accurate.

Preliminary Testing

Conduct preliminary tests to ensure that all devices and circuits are functioning properly. Tests shall meet the requirements of the written test plan. Correct any deficiencies, omissions or anomalies and retest the affected devices to assure proper function per the specification.

Acceptance Testing

1. A final acceptance test shall not be scheduled until the system manuals are provided to and approved by the owner and the following are provided at the job site:
 - (1) "As Built" record drawings of the system as actually installed
 - (2) A copy of the system operation matrix.
2. The acceptance inspector shall use the system "As Built" record drawings in combination with the system operation matrix and the written acceptance test plan during the testing to verify system operation.
3. Should the system not perform to the above criteria it shall not be accepted and the contractor shall correct all deficiencies and shall re-test the system at contractor's expense in the presence of the architect using the same test criteria.

4. The building owner's representative shall witness the final tests.
5. The central monitoring station and/or fire department shall be notified before final test in accordance with local requirements.
6. Operate every installed device to verify proper operation and correct annunciation at control panel.
7. Open signaling line circuits and notification appliance circuits in at least 2 locations to verify presence of supervision.

Test Reports

A "Fire Alarm System Record of Completion" per the "Documentation" Section of the "Fundamentals of Fire Alarm Systems" Chapter in NFPA72 and the "Inspection and Testing Form" in the "Records" Section of the "Inspection, Testing and Maintenance" Chapter in shall be prepared by the Contractor. Submit three (3) copies to the Architect. The report shall include, but not be limited to:

A list of all equipment installed and wired.

Certification that all equipment is properly installed and functions and conforms with these specifications.

Sensitivity settings for each ionization and photoelectric detector as measured in place with the HVAC system operating.

Technician's name, certificate number and date.

1.11. Maintenance

1.11.1. Spare Parts

The contractor shall furnish the following extra material that matches the products installed. Spares shall be packaged with protective covering for storage and identified with labels describing contents.

Automatic detection devices - Two (2) percent of the installed quantity of each type, no less than one piece.

Manual fire alarm stations - Two (2) percent of the installed quantity of each type, no less than one piece.

Glass rods or panels for break glass manual fire alarm stations (if used) - 5 percent of the installed quantity, but no

less than two devices.

Audible and visible devices - One (1) percent of the installed quantity of each type, but no less than two (2) devices.

Keys - A minimum of three (3) sets of keys shall be provided and appropriately identified.

1.11.2. Maintenance Contract

The supplier shall offer for the owner's consideration at the time of system submittal a priced inspection, test, maintenance and repair agreement for the installed system in compliance with the inspection and maintenance requirements of NFPA 72 for a period of 12 months, to commence after the expiration of the maintenance agreement included in this contract,

The owner shall have the option of renewing the agreement at the price quoted, in yearly increments up to a maximum of five (5) years.

2. Part 2 - Products

2.1. Acceptable Manufacturers

- A. The manufacturer of the system equipment shall be regularly involved in the design, manufacture, and distribution of the products specified in this document. These processes shall be monitored under a quality assurance program that meets ISO 9000/9001 requirements.
- B. The catalog numbers used are those of EDWARDS, a UTC Company or equal, and constitute the type and quality of equipment to be furnished. For a list of EDWARDS authorized fire alarm vendors, contact: edwardsmarketing@fs.utc.com.
- C. If equipment of another manufacturer is to be submitted for approval as equal, the contractor shall, at the time of bid, list all exceptions taken to these specifications, all variances from these Specifications and all substitutions of operating capabilities or equipment called for in these specifications and forward said list to the engineer. Any such exceptions, variances or substitutions not listed at the time of bid and are subsequently identified in the submittal, shall be grounds for immediate disapproval without comment. Final determination of compliance with these specifications shall rest with the engineer, who, at his discretion, may require proof of performance.

- D. Approved Products: All panels and peripheral devices shall be of the standard product of single manufacturer and shall display the manufacturer's name of each component. The catalog numbers specified under this section are those of EDWARDS, a UTC Company, and shall constitute the type, product quality, material and desired operating features.

2.2. Fire Alarm Panel

2.2.1. General - FireiO1000

Overview

All materials, equipment, accessories, devices and other facilities and appurtenances covered by these specifications or noted on the drawings shall be new, best suited for the intended use and shall conform to applicable and recognized standards for their use, and supplied by a single manufacturer. Should any equipment provided under this specification be supplied by a different manufacturer, that equipment shall be recognized compatible by BOTH manufacturers and listed as such as required by Underwriters' Laboratories.

The fire alarm control panel shall be a microprocessor based system designed specifically for fire and smoke detection. The control panel shall be listed and approved for the application standard(s) as listed in the References section of this specification.

The control panel shall include all required hardware, software and site specific system programming to provide a complete and operational system. The control panel shall be designed such that interactions between any applications can be configured, and modified through the front panel or by using software provided by the manufacturer. The control panel operational priority shall assure that life safety takes precedence among the activities coordinated by the control panel.

The operating controls shall be located in a steel enclosure behind a locked door with viewing window. All control modules shall be labeled, and all zone locations shall be identified. All panel modules shall be placement supervised for and signal a trouble if damaged or removed.

System Features

Each control panel shall include the following capabilities:

- Supervision of the system electronics, wiring, detection devices and software
- Up to 1000 analog/addressable input/output points
- Support a dialer (DACT) connection to a central monitoring station.
- An RS-232 serial communication port.

An internal audible signal with different patterns to distinguish between alarm, supervisory, trouble and monitor events

Provide four class B 24 VDC NACs. Provide two class A 24 VDC NACs.

Two user configurable switch-LEDs to support auxiliary functions

Log up to 1000 chronological events

A real-time clock for time stamps and timed event control

Electronic addressing of intelligent addressable devices

Provide an independent hardware watchdog to supervise software and CPU operation

“Dry” alarm, trouble and supervisory relay contacts.

Field wiring shall be rated for 12 to 18 AWG conductors.

User Oriented Features

Each control panel shall include the following user oriented features:

An LCD user interface control/display that shall annunciate and control system functions.

Provide discreet system control switches for reset, alarm silence, ACK/panel silence, drill switch, remote disconnect and two user configurable switches. Provide a 10-Digit Keypad with # and Backspace switches, a menu switch and Four cursor scroll switches with Enter switch.

A “lamp test” feature shall verify operation of all visual indicators on the panel.

An authorized user shall have the ability to operate or modify system functions including system time, date, passwords, restart the system and clear control panel event history file.

An authorized user shall have the ability to disable/enable devices, inputs, outputs, and timers.

An authorized user shall have the ability to activate/restore outputs, and simulate detector smoke levels.

An authorized user shall have the ability to enter time and date, reconfigure the communications port for download programming, initiate programming and change passwords.

An authorized user shall have the ability to test the functions of the installed system, including silent and audible one-man walk tests. Devices not under test shall process all events normally.

Provide internal system diagnostics and maintenance user interface controls to display/report the power, communication, and general status of specific panel components, detectors, and modules.

SLC loop controller diagnostics shall identify common alarm, trouble, ground fault, Class A fault, and map faults. Map faults include wire changes, device type changes by location, device additions/deletions and conventional open, short, and ground conditions. Ground faults on the supervised circuit wiring of remote addressable modules shall be identified by device address.

An authorized user shall have the ability to generate a report history for alarm, supervisory, monitor, trouble, smoke verification, watchdog, and restore activity. correlation groups

System reports shall provide detailed description of the status of system parameters for corrective action or for preventative maintenance programs. Reports shall be displayed by the operator interface or capable of being printed on a printer.

An authorized user shall have the ability to display/report the condition of addressable analog detectors. Reports shall include device address, device type, percent obscuration, and maintenance indication. The maintenance indication shall provide the user with a measure of contamination of a device upon which cleaning decisions can be made.

Programmability

The panel shall have the ability to auto program itself by identifying all connected devices, resulting in a general alarm fire system. It shall be possible to create or modify the panel's site-specific programming through the front panel controls.

A Windows[®]-based Configuration Utility (CU) shall be available to create or modify the site-specific system programming. The utility shall facilitate programming of any input point to any output point. The utility shall allow customization of fundamental system operations using initiating events to start actions, timers, and logical sequences.

- Zoning of initiation devices.
- Initiation of events using OR, AND and counting functions.
- Prioritizing system events.
- Programmable activation of detector sounder bases by detector or in groups of bases.
- Detector sensitivity selection by time of day
- Support of two central monitoring stations.

The configuration utility shall time and date stamp all changes to the site-specific program, and shall facilitate program versioning and shall store all previous program version data. The utility shall provide a compare feature to identify the differences between different versions of the site-specific program.

The configuration utility shall be capable of generating reports which detail the configurations of all fire alarm panels, addressable devices and their configuration settings including generating electrical maps of the addressable device SLCs.

The configuration utility shall support the use of bar code readers to expedite electronic addressing and custom programming functions.

Please refer to the *General, System Description Section* for this project's site-specific system operating requirements.

The fire alarm control panel shall be an EDWARDS iO1000 series.

2.2.2. Power Supply

System power supply(s) shall be a high efficiency switched mode design providing four (4) supervised power limited 24 VDC output circuits as required by the panel and external loads fed by the panel. Initial power supply loading shall not exceed 80% of power supply capacity in order to allow for future system expansion.

The system power supply shall be supervised. Power supply trouble signals shall identify the specific supply and the nature of the trouble condition.

Upon failure of normal (AC) power, the affected portion(s) of the system shall automatically switch over to secondary power without losing any system functionality.

All system power supplies shall be capable of recharging their associated batteries, from a fully discharged condition to a capacity sufficient to allow the system to perform consistent with the requirements of this section, in 48 hours' maximum.

All standby batteries shall be continuously monitored by the power supply. The power supply shall be able to perform an automatic test of batteries and indicate a trouble condition if the batteries fall outside a predetermined range. Power supplies shall incorporate the ability to adjust the charge rate of batteries based on ambient temperatures. The power supply shall automatically disconnect the battery before low voltage damages the battery. Low battery and disconnection of battery power supply conditions shall immediately be annunciated as battery trouble.

Batteries shall utilize sealed lead acid chemistry. Initial battery capacity shall provide 125% of calculated capacity requirements in order to allow for future system expansion.

All AC power connections shall be to the building's designated emergency electrical power circuit and shall meet the requirements of NFPA 70 and NFPA 72. The power circuit disconnect means shall be clearly labeled FIRE ALARM CIRCUIT CONTROL and shall have a red marking. The location of the circuit disconnect shall be labeled permanently inside the each control panel the disconnect serves.

2.2.3. User Interface

2.2.3.1. Panel LCD and Common Controls

The system shall be designed and equipped to receive, monitor, and annunciate signals from devices and circuits installed throughout the facility.

The fire alarm control panel shall provide a backlit LCD display. The display shall show the status of all alarm, supervisory, trouble, or monitor event messages on the panel.

Receipt of alarm, trouble, and supervisory signals shall activate integral audible devices at the control

panel and at each remote annunciation device. The integral audible devices shall produce a sound output upon activation of not less than 85 dBA at 10 feet.

The LCD display shall contain the following system status indicators:

- System Power Indicator
- System Test Indicator
- Ground Fault Indicator
- Disabled Points Indicator
- System Common Alarm Indicator
- System Common Trouble Indicator
- System Common Supervisory Indicator
- System Common Monitor Event Indicator
- Service Detector Indicator

The LCD display shall contain the following system switch/indicators:

- System Reset Switch with Indicator
- System Alarm Silence Switch with Indicator
- ACK/Panel Silence Switch with Indicator
- Drill Switch with Indicator
- Remote Disconnect Switch with Indicator
- Two user configured Switches with Indicators

The LCD display shall contain the following system function switches:

- Four cursor scroll switches with Enter switch.
- Menu Switch
- 10-Digit Keypad with # and Backspace switches

40 Character Backlit Liquid Crystal Text Display

The user interface shall provide a backlit LCD that will allow custom event messages of up to 40 characters. The interface shall provide a minimum of four lines by 20 characters and provide the emergency user hands free viewing of the last highest priority event. The last highest priority event shall always display and update automatically. It shall be possible to scroll through and view specific alarm, trouble, supervisory and monitor events. The total number of active and disabled events by type shall be displayed. Visual indication shall be provided of any event type that has not been acknowledged or viewed.

2.2.3.2. System Printer

The event and status printer shall be a 9-pin, impact, dot matrix printer with a minimum print speed of 232 characters per second. The printer shall be capable of serial or parallel communications protocol. The communications speed for RS-232 communications protocol shall be adjustable from 300 to 9600 Baud.

The printer output shall include the type of event, the circuit or device reporting including address, date, and event time. Event restoral conditions shall also be printed, including address, date, and event time.

In the event that the printer is off-line when an event is received, a panel buffer shall retain the data and it

shall be printed when the printer is restored to service.

The system printer shall be an EDWARDS PT-1S.

2.2.3.3. Reports

The system shall provide the operator with system reports that give detailed description of the status of system parameters for corrective action, or for preventative maintenance programs. The system shall provide these reports via the main LCD, and shall be capable of being printed on any system printer.

The system shall provide a report that gives a sensitivity listing of all detectors that have less than 80% environmental compensation remaining. The system shall provide a report that provides a sensitivity (% Obscuration per foot) listing of any particular detector.

When addressable CO detectors are installed, performing a “sensitivity” check from the panel shall report the approximate number months of sensor life remaining.

The system shall provide a report that gives a listing of the sensitivity of all of the detectors on any given panel in the system, or any given analog/addressable device loop within any given panel.

The system shall provide a report that gives a chronological listing of at least the last 1000 system events.

The system shall provide a listing of all of the firmware revision listings for all of the installed components in the system.

2.2.4. Signaling Line Circuits

2.2.4.1. iO System

The signaling line circuit connecting panels to intelligent addressable devices including, detectors, monitor modules, control modules, isolation modules, intrusion detection modules and notification circuit modules shall be Class A (style 6 or 7). All signaling line circuits shall be supervised and power limited.

When the addressable devices on a signaling line circuit cover more than one designated fire/smoke compartment, a wire-to-wire short on the circuit shall not affect the operation of the addressable devices in other fire/smoke compartments.

The system control panel cabinet shall have room for up to two addressable device SLC modules in any combination of single or dual loops, each supporting 125 addressable detector addresses and 125 module addresses.

The supplied SLC shall support 125 addressable detector addresses and 125 module addresses. The system shall also be able to support up to two dual-circuit SLC modules with a total capacity of 500 detector addresses and 500 module addresses, for a total capacity of 1,000 points.

The SLC shall support 100% of all addressable devices in alarm and provide support for a 100% compliment of detector isolator bases. Initial circuit loading shall not exceed 80% in order to allow for future system expansion.

T-taps (branching) shall be permitted on Class B circuits. Where possible, the devices installed at the end of each branch should be easily accessible for troubleshooting, e.g. a pull station at normal mounting height.

The addressable device SLC module shall be UL Listed for use with code compliant, electrically sound existing wiring.

Each intelligent addressable device shall transmit information about its location with respect to other devices on the circuit. This information shall be used to create an "As-Built" wiring diagram as well as provide enhanced supervision of a device's physical location. The device message and programmed system output function shall be associated with the device's location on the SLC circuit location and not a device address.

The SLC module shall allow replacement of "same type" devices without the need to address and reload the "location" parameters on replacement device.

The SLC/Panels shall notify the user when programmed devices are detected on the SLC circuit. The SLC/Panels shall notify the user when the wrong device type is installed at a location configured for a different device type on the SLC circuit.

2.3. Remote Booster Power Supply

2.3.1. Remote Booster Power Supply

Install Remote NAC Power Supplies (boosters) at the locations shown on the drawings, as required, to minimize NAC voltage drops. Remote NAC power supplies shall be treated as peripheral NAC devices and shall not be considered fire alarm control units.

The NAC power supplies shall be fully enclosed in a surface mounted steel enclosure with hinged door and cylinder lock, and finished in red enamel. Door keys shall be the identical to FACP enclosure keys. The enclosure shall have factory installed mounting brackets for additional UL listed fire alarm equipment within its cabinet. Enclosures shall be sized to allow ample space for interconnection of all components and field wiring, and up to 10AH batteries. The enclosure shall have provisions for an optional tamper switch. All FACP addressable control modules required to initiate the required NAC power supply output functions shall be installed within the NAC power supply enclosure

Remote NAC power supply *input* circuits shall be configurable as Class B supervised inputs or for connection to any 6 to 45 VDC initiation source.

Remote booster power supplies shall provide four (4) synchronized Class B supervised or two (2) Class A, power limited, 24VDC filtered and regulated Notification Appliance Circuits (NACs). Each NAC output shall be configurable as a continuous 24Vdc auxiliary power output circuit. The booster power supply shall be capable of a total output of <6> 10 amps.

The power supply NACs shall be configurable to operate independently at any one of the following rates: continuous synchronized, or 3-3-3 temporal. It shall be possible to configure the NACs to follow the main FACP NAC or activate from intelligent addressable synchronized modules. All visible <audible> NACs within the facility shall be synchronized.

Upon failure of primary AC power, the remote power supply shall automatically switch over to secondary battery power without losing any system functions. It shall be possible to delay reporting of an AC power failure for up to 6 hours. All standby batteries shall be continuously monitored by the power supply. Low battery and disconnection of battery power supply conditions shall immediately be annunciated as locally as battery trouble. All power supply trouble conditions (DC power failure, ground faults, low batteries, and IDC/NAC circuit faults) shall identify the specific remote power supply affected at the main FACP. All power supply trouble conditions except loss of AC power shall report immediately. Interconnecting NAC Booster power supplies in a manner which prevents identification of an individual power supply trouble shall not be considered as an equal.

The remote booster power supply shall be capable of recharging up to 24AH batteries to 70% capacity in 24 hours' maximum. Batteries provided shall be sized to meet the same power supply performance requirements as the main FACP, as detailed elsewhere in this specification.

All AC power connections shall be to the building's designated dedicated emergency electrical power circuit. The power circuit disconnect means shall be clearly labeled FIRE ALARM CIRCUIT CONTROL

and shall have a red marking. The location of the circuit disconnect shall be labeled permanently inside each remote NAC power supply the disconnect serves.

The remote NAC power supplies shall be EDWARDS model BPS/APS series devices.

2.4. Peripheral Components

2.4.1. Addressable

2.4.1.1. Detectors

2.4.1.1.1. General

General Requirements for Intelligent Addressable Heat, Smoke and CO Detectors

Each detector shall contain an integral microprocessor which shall determine if the device is normal, in alarm, or has an internal trouble. The microprocessor's non-volatile memory shall permanently store the detector's serial number, device type and system address. It shall be possible to address each intelligent device without the use of switches. Devices requiring switches for addressing shall not be considered as equal. Memory shall automatically be updated with the hours of operation, last maintenance date, number of alarms and troubles, time of last alarm, and analog signal patterns for each sensing element just before the last alarm.

Each detector shall be capable of identifying up to 32 diagnostic codes. This information shall be available for system maintenance. The diagnostic code shall be stored at the detector.

Each addressable detector on the Signaling Line Circuit (SLC) shall transmit information regarding its location with respect to other intelligent devices on the signaling line circuit to the control panel, creating an “As-Built” circuit map. The circuit mapping function shall provide location supervision of all intelligent devices on the signaling line circuit. An intelligent detector’s programmed system response functions shall be associated with the detector’s actual *location* on the signaling line circuit and *not with the detector’s address*. After system commissioning, detectors improperly installed in the wrong location shall function according to the mapped programmed response for its *location* on the circuit, not its detector’s address.

A status indicator shall be provided on each detector. Flashing green shall indicate normal operation; flashing RED shall indicate the alarm state. The indicator shall be visible from any direction.

The system shall allow for changing of detector types for service replacement purposes without the need to reprogram the system. The replacement detector type shall automatically continue to operate with the same programmed sensitivity levels and functions as the detector it replaced, without the need for reprogramming. System shall display an off-normal condition until the proper detector type is installed or a change in the device type profile has been made.

Detectors shall be rated for operation in the following environment unless specifically noted:

- Temperature: 32°F to 120°F (0°C to 49°C)
- Humidity: 0-93% RH, non-condensing

Detectors with addressing components in the base shall not be considered as equal.

The intelligent detectors shall be EDWARDS Signature Series devices.

Please refer to the *General, System Description* Section for site-specific detector operating requirements.

2.4.1.3.1. General

Intelligent addressable multifunction modules shall be provided at the locations shown on the drawings to provide the specific system input and output functions described by the operation section and functional matrix found elsewhere in this specification.

The operation of multifunction modules shall be software configurable at the site to meet operational conditions, and may be changed at any time by download changes from the control panel. The intelligent multifunction modules shall utilize electronic addressing. Modules using rotary or DIP switches, memory chips and / or jumpers for addressing shall not be considered as equal.

Each intelligent multifunction module on the Signaling Line Circuit (SLC) shall transmit information regarding its location with respect to other intelligent devices on the signaling line circuit to the control panel, creating an “As-Built” circuit map. The circuit mapping function shall provide location supervision of all intelligent devices on the signaling line circuit. An intelligent device’s programmed system response functions shall be associated with the device’s actual *location* on the signaling line circuit and *not with the device’s address*. After system commissioning, devices improperly installed in the wrong location shall

function according to the mapped programmed response for its *location* on the circuit, not its device address.

All input /output status decisions shall be made by the microprocessor within the module. Communications with a control panel shall not be required in order for the module to identify off-normal input/output conditions. Modules with supervised input or output circuits shall be capable of identifying ground fault conditions down to the module address level.

Each module shall be equipped with two (2) diagnostic indicators; a green LED to confirm communications and a red LED to display active status. LEDs shall be visible through the finished cover plate. The module shall be capable of storing a unique serial number and up to 24 diagnostic codes, hours of operation, number of alarms and troubles, and time of last alarm in its memory which can be retrieved for troubleshooting.

Modules shall be rated for operation in the following environment:

- Temperature: 32°F to 120°F (0°C to 49°C)
- Humidity: 0-93% RH, non-condensing

Where multiple modules are mounted in close proximity to each other, plug-in modular versions of the modules and motherboards shall be available to minimize field wiring and facilitate troubleshooting.

The addressable multifunction modules shall EDWARDS Signature Series devices.

Please refer to the *General, System Description Section* for site-specific module operating requirements.

2.4.1.3.2. One Input Monitor

Provide addressable single input multifunction modules at the locations shown on the drawings.

The module shall be suitable for mounting on North American 2½” (64mm) deep 1-gang boxes and 1½” (38mm) deep 4” square boxes with 1-gang covers.

Each module shall provide one (1) supervised Class B input circuit configurable as one of the following “personalities.”

1. Normally-Open Alarm Latching (for alarm initiation applications)
2. Normally-Open Alarm Delayed Latching (for waterflow switch applications)
3. Normally-Open Active Non-Latching (for limit switch and monitor applications)
4. Normally-Open Active Latching (for tamper switch and supervisory applications)

Each module shall identify and report by device address, ground faults and opens associated with its initiating device circuit, to the control panel. Single function modules or without individual ground fault detection identification capability shall not be considered as equal.

The Intelligent Single Input Module shall be an EDWARDS SIGA-CT1.

2.4.1.3.3. Two Input Monitor

Provide addressable dual input multifunction modules at the locations shown on the drawings.

The module shall be suitable for mounting on North American 2½” (64mm) deep 1-gang boxes and 1½” (38mm) deep 4” square boxes with 1-gang covers.

Each module shall provide two (2) supervised Class B input circuit configurable as one of the following “personalities.”

1. Normally-Open Alarm Latching (for alarm initiation applications)
2. Normally-Open Alarm Delayed Latching (for waterflow switch applications)
3. Normally-Open Active Non-Latching (for limit switch and monitor applications)
4. Normally-Open Active Latching (for tamper switch and supervisory applications)

Each module shall identify and report by device address, ground faults and opens associated with its initiating device circuits, to the control panel. Single function modules or without individual ground fault detection identification capability shall not be considered as equal.

The Addressable Dual Input Module shall be an EDWARDS SIGA-CT2.

2.4.1.3.4. Notification Circuit

Provide addressable notification appliance circuit modules at the locations shown on the drawings.

The module shall be suitable for mounting in North American 2½” (64mm) deep 2-gang boxes and 1½” (38mm) deep 4” square boxes with 2-gang covers, or European 100mm square boxes.

The addressable NAC module shall provide one (1) supervised Class B notification appliance circuit.

The NAC control module shall be configurable for the following operations:

- 24 VDC synchronized NAC circuit, 2 amps @ 24 VDC.
- Audio notification circuit 25Vrms @ 50 watts or 70 Vrms @ 35 watts
- Firefighter’s Telephone control with ring tone

The addressable notification appliance circuit module shall be an EDWARDS SIGA-CC1(S) or MCC1(S)

2.4.1.3.5. Relay

Provide addressable control relay modules at the locations shown on the drawings.

The module shall be suitable for mounting on a North American 2½” (64mm) deep 1-gang box or 1½” (38mm) deep 4” square box with 1-gang covers.

The module shall provide one (1) form C dry relay contacts rated at 24Vdc @ 2 amps (pilot duty) to control external appliances or equipment. The position of the relay contact shall be confirmed by the system firmware. The relay coil shall be magnetically latched to reduce wiring and ensure 100% of the relays on the SLC can be energized at same time.

The addressable control relay module shall be an EDWARDS SIGA-CR or MCR.

2.4.1.3.6. Isolation Module

Provide addressable isolator modules at the locations shown on the drawings.

The module shall be suitable for mounting on North American 2½” (64mm) deep 1-gang boxes and 1½” (38mm) deep 4” square boxes with 1-gang covers.

In the event the Class A signaling line circuit on which the intelligent isolator module is installed is shorted, each module shall open the SLC. Isolator modules shall then sequentially reconnect the isolated circuit segments until only the segment with the short is left out of the circuit, leaving the balance of the circuit operational.

<SLC isolation shall be provided for each floor or protection zone of building.>

The addressable Isolator Module shall be an EDWARDS SIGA-IM.

2.4.1.3.7. Universal Modules

Provide intelligent universal Class A/B multifunction modules at the locations shown on the drawings.

The module shall be suitable for mounting on North American 2½” (64mm) deep 2-gang boxes and 1½” (38mm) deep 4” square boxes with 2-gang covers.

Each universal module shall be configurable as one of the following “personalities.”

1. Two (2) supervised Class B Normally-Open Alarm Latching. (for alarm initiation applications)
2. Two (2) supervised Class B Normally-Open Alarm Delayed Latching. (for waterflow switch applications)
3. Two (2) supervised Class B Normally-Open Active Non-Latching. (for limit switch and monitor applications)
4. Two (2) supervised Class B Normally-Open Active Latching. (for tamper switch and supervisory applications)
5. One (1) form “C” dry relay contact rated at 2 amps @ 24 Vdc. (for circuit control applications)
6. One (1) supervised Class A Normally-Open Alarm Latching. . (for alarm initiation applications)
7. One (1) supervised Class A Normally-Open Alarm Delayed Latching. . (for waterflow switch applications)
8. One (1) supervised Class A Normally-Open Active Non-Latching. (for limit switch and monitor applications)

9. One (1) supervised Class A Normally-Open Active Latching. . (for tamper switch and supervisory applications)
10. One (1) supervised Class A 2-wire Smoke Alarm Non-Verified. (for alarm initiation applications)
11. One (1) supervised Class B 2-wire Smoke Alarm Non-Verified. (for alarm initiation applications)
12. One (1) supervised Class A 2-wire Smoke Alarm Verified (for alarm initiation applications)
13. One (1) supervised Class B 2-wire Smoke Alarm Verified(for alarm initiation applications)
14. One (1) supervised Class A Signal Circuit, 24Vdc @ 2A.(for occupant notification applications)
15. One (1) supervised Class B Signal Circuit, 24Vdc @ 2A. .(for occupant notification applications)

Each module shall identify and report ground faults, opens and shorts associated with its supervised input / output circuits, by device address, to the control panel. Single function modules or without individual ground fault detection identification capability shall not be considered as equal.

The Universal Class A/B Module shall an EDWARDS SIGA-UM.

2.4.2. Conventional

2.4.2.1. Detectors

2.4.2.1.1. Heat-Low Profile

Provide low profile combination fixed temperature/rate-of-rise or fixed temperature heat detectors at the locations shown on the drawings.

Detectors shall be rated for a maximum smooth ceiling rating of 2,500 sq. ft. The detector shall have a white finish and positive identification for the operation of the fixed temperature element. The detectors shall be rated at <135°F> <194°F> fixed temperature and 15°F per minute temperature rise.

The low profile heat detectors shall be an EDWARDS 28x-B-PL series.

2.4.2.2. Manual Stations

2.4.2.2.1. Double Action Single Stage

Provide double action, single stage fire alarm stations at the locations shown on the drawings.

The manual station shall be suitable for mounting on North American 2 ½ (64mm) deep 1-gang boxes and 1 ½ (38mm) deep 4 square boxes with 1-gang covers. If indicated as surface mounted, provide manufacturer's surface back box.

The fire alarm station shall utilize red polycarbonate construction with molded, raised-letter operating instructions in a contrasting color; shall show visible indication of operation and incorporate an internal toggle switch.

The station reset key shall match the control panel key.

Manual pull stations that initiated an alarm condition when opening the unit are not acceptable.

The double action, single stage manual fire alarm station shall be an EDWARDS 278B series.

2.4.3. Notification Appliances

2.4.3.1. Low Profile

2.4.3.1.1. Horns

Provide low profile wall mounted horns at the locations shown on the drawings.

Low profile horns shall mount in a North American 1-gang box, and protrude less than 1" from the

finished wall. The word FIRE shall be prominently displayed on the housing.

The horns shall provide an audible output of 85 dBA at 10 ft. when measured in reverberation room per UL-464, and have a selectable steady or synchronized temporal (3-3-3) output pattern.

Horn power, horn silencing, and strobe synchronization shall be accomplished over a single pair of wires. In and out screw terminals shall accommodate 18AWG to 12 AWG wiring and have captive hardware.

The horns shall be EDWARDS Genesis G1 Series.

2.4.3.1.2. Horns-Weatherproof

Provide low profile weatherproof horns at the locations shown on the drawings.

The weatherproof horns shall mount in a North American 4" square 1 1/2" deep electrical box for indoor applications and a factory supplied back box for weatherproof applications.

The horns shall be suitable for wall or ceiling mount and operate in temperatures from -40 to 151 degrees F. The word FIRE shall be prominently displayed on the housing.

The horn shall provide a user configurable high/low audible output of 89.7/85.4 dBA @ 10' for a steady output and an 84.2/81.7 dBA @ 10' for a temporal (3-3-3) output when measured in reverberation room per UL-464.

Horn and strobe power, horn silencing, and strobe synchronization shall be accomplished over a single pair of wires. In and out screw terminals shall accommodate 18AWG to 12 AWG wiring and have captive hardware.

The weatherproof horns shall be EDWARDS Genesis WG4 Series.

2.4.3.1.3. Low Frequency Audible Signals

The low-profile wall-mounted low frequency audible/strobe shall be listed to UL 1971 and UL 464 and for fire protective signaling service. The low frequency audible/strobe shall serve as a primary-signaling notification appliance and comply with the Americans with Disabilities Act requirements for visible signaling appliances, flashing at 1Hz over the strobe lights entire operating voltage range. The strobe light shall have field-selectable candela settings including 15, 30, 75 and 110. The strobe light shall consist of a xenon flash tube.

The low frequency audible shall comply with UL 464, Section 24.3 for Low Frequency Audible Output. Appliances shall have an option to switch between a temporal three-pattern and a non-temporal (continuous) pattern at standard or low audible output levels. The low frequency audible on low frequency audible-only appliances shall be capable of operating on a coded notification appliance circuit.

The low frequency strobe shall operate between 32°F and 120°F and be listed to operate on

filtered/regulated as well as full-wave rectified EDWARDS Genesis compatible notification appliance circuits.

Audibles, strobes and Audible/strobes shall all function on one pair of wires. Appliances that require separate wires for strobes and separate wires for audible are not acceptable.

All audible and visible signals on the same notification appliance circuit and in the same operating zone shall be fully synchronized to within 10 milliseconds.

The low frequency Audible strobe shall mount to a standard $4 \times 4 \times 1\frac{1}{2}$ -inch back box or appliance manufacturer provided surface-mount back box.

All notification appliances shall be 100 per cent compatible with EDWARDS Genesis communication and synchronization protocols. The low frequency Audible/strobe appliances shall be EDWARDS G4LF Series.

2.4.3.1.4. Strobes

Provide low profile wall mounted strobes at the locations shown on the drawings.

Low profile strobes shall mount in a North American 1-gang box, and protrude less than 1" from the finished wall. The word FIRE <ALERT> shall be prominently displayed on the housing.

The strobe output shall be switch selectable as required by its application from the following available settings: 15cd, 30cd, 75cd & 110cd. Selected strobe rating shall be visible when the strobe is in its installed position. Amber lens strobes shall be available with outputs of 12/24/60/88cd. Light shall be evenly distributed throughout the required volume using cavity and mask "FullLight" technology to prevent hot spots. Strobes using specular reflectors shall not be considered as equal.

When multiple strobes are installed within view of each other, their outputs shall be synchronized within ten (10) milliseconds of each other for an indefinite period without the need for separate synchronization modules.

Horn and strobe power, horn silencing, and strobe synchronization shall be accomplished over a single pair of wires. In and out screw terminals shall accommodate 18AWG to 12 AWG wiring and have captive hardware.

The strobes shall be EDWARDS Genesis G1 Series.

2.4.3.1.5. Strobes-Weatherproof

Provide low profile weatherproof strobes at the locations shown on the drawings.

The weatherproof strobes shall mount in a North American 4” square 1 ½” deep electrical box for indoor applications and a factory supplied back box for weatherproof applications.

The strobe shall be suitable for wall or ceiling mount and operate in temperatures from -40 to 151 degrees F. The word FIRE shall be prominently displayed on the housing.

The strobe output shall be switch selectable as required by its application from the following available settings:

		Standard Candela Output Strobes				High Candela Output Strobes			
		Strobe Switch Position							
Listing	Location	D	C	B	A	D	C	B	A
UL 1971	Indoor	15 cd	29 cd	70 cd	87 cd	102 cd	123 cd	147 cd	161 cd
UL 1638	Outdoor (-35C)	6 cd	12 cd	28 cd	35 cd	41 cd	50 cd	60 cd	65 cd

Selected strobe rating shall be visible when the speaker-strobe is in its installed position

When multiple strobes are installed within view of each other, their outputs shall be synchronized within ten (10) milliseconds of each other for an indefinite period without the need for separate synchronization modules.

Horn and strobe power, horn silencing, and strobe synchronization shall be accomplished over a single pair of wires. In and out screw terminals shall accommodate 18AWG to 12 AWG wiring and have captive hardware.

The weatherproof strobes shall be EDWARDS Genesis WG4 Series.

2.4.3.1.6. Horn-Strobes

Provide low profile wall mounted horn-strobes at the locations shown on the drawings.

Low profile horn-strobes shall mount in a North American 1-gang box, and protrude less than 1” from the finished wall. The word FIRE shall be prominently displayed on the housing. The word FIRE <ALERT> shall be prominently displayed on the housing.

The horn-strobe shall provide an audible output of 85 dBA at 10 ft. when measured in reverberation room per UL-464, and have a selectable steady or synchronized temporal (3-3-3) output pattern.

The strobe output shall be switch selectable as required by its application from the following available settings: 15cd, 30cd, 75cd & 110cd. Selected strobe rating shall be visible when the horn-strobe is in its installed position. Amber lens strobes shall be available with outputs of 12/24/60/88cd. Light shall be

evenly distributed throughout the required volume using cavity and mask “FullLight” technology to prevent hot spots. Strobes using specular reflectors shall not be considered as equal.

When multiple strobes are installed within view of each other, their outputs shall be synchronized within ten (10) milliseconds of each other for an indefinite period without the need for separate synchronization modules.

Horn and strobe power, horn silencing, and strobe synchronization shall be accomplished over a single pair of wires. In and out screw terminals shall accommodate 18AWG to 12 AWG wiring and have captive hardware.

The horn-strobes shall be EDWARDS Genesis G1 Series.

2.4.3.1.7. Horn-Strobes-Weatherproof

Provide low profile weatherproof horn-strobes at the locations shown on the drawings.

The weatherproof horn-strobes shall mount in a North American 4” square 1 ½” deep electrical box for indoor applications and a factory supplied back box for weatherproof applications.

The horn-strobe shall be suitable for wall or ceiling mount and operate in temperatures from -40 to 151 degrees F. The word FIRE shall be prominently displayed on the housing.

The horn-strobe shall provide a user configurable high/low audible output of 89.7/85.4 dBA @ 10’ for a steady output and an 84.2/81.7 4 dBA @ 10’ for a temporal (3-3-3) output when measured in reverberation room per UL-464.

The strobe output shall be switch selectable as required by its application from the following available settings:

		Standard Candela Output Horn-Strobes				High Candela Output Horn-Strobes			
		Strobe Switch Position							
Listing	Location	D	C	B	A	D	C	B	A
UL 1971	Indoor	15 cd	29 cd	70 cd	87 cd	102 cd	123 cd	147 cd	161 cd
UL 1638	Outdoor (-35C)	6 cd	12 cd	28 cd	35 cd	41 cd	50 cd	60 cd	65 cd

Selected strobe rating shall be visible when the speaker-strobe is in its installed position

When multiple strobes are installed within view of each other, their outputs shall be synchronized within ten (10) milliseconds of each other for an indefinite period without the need for separate synchronization modules.

Horn and strobe power, horn silencing, and strobe synchronization shall be accomplished over a single

pair of wires. In and out screw terminals shall accommodate 18AWG to 12 AWG wiring and have captive hardware.

The weatherproof horn-strobes shall be EDWARDS Genesis WG4 Series.

2.4.4. Accessories

2.4.4.1. Magnetic Door Holders

Provide wall mounted fail safe electromagnetic door holders as shown on the drawings.

Holders shall provide approximately 25-lbf nominal holding force when energized. The units shall have an aluminized finish and contain no moving parts. The contact plate shall have an integral nylon swivel to absorb shock and adjust to any door angle.

Flush and semi-flush models shall be designed for concealed wiring applications and shall mount on standard 1-gang electrical box. Floor mounted electromagnet units shall consist of a floor plate, gaskets, and housing. Incoming conduit shall connect directly into floor plate. The housing and gaskets shall mount on the floor plate to form a weatherproof junction box. Door holders shall be listed to UL-228.

All holders shall be normally be energized, and a release shall be accomplished by interrupting the circuit.

The electromagnetic door holders shall be EDWARDS 1500 series.

2.4.4.2. Surge Suppression Devices

The system shall utilize the following electrical surge protection devices to prevent damage and nuisance alarms caused by nearby lightning strikes, stray currents, or voltage transients.

On the AC Input of all fire alarm panels, remote power supplies and HPSA sites: Transtector ACO100BWN3, Leviton OEM-120EFI, EFI HWM-120, Ditek DTK-120HW or DTK-120/240 CM. ***AC Surge protectors shall be installed at the electrical panel board feeding the fire alarm equipment.*** Excess lead length shall be trimmed. The branch circuit conductor shall be formed into a 5-10 turn 1" diameter tie-wrapped coil just downstream of the suppressor connection.

On each DC fire alarm circuit entering or leaving the building: Transtector TSP8601, Citel American B280 -24V, Edco P264 and P642, Ditek DTKxLVL series, or equal.

DC Surge protectors shall be installed on each required circuit at the point of entry into the building.

2.4.4.3. Inspection Bar Codes

- A. Inspection bar codes shall be installed on all initiating devices, addressable modules, annunciators, control panels and power supplies.
- B. Inspection bar codes used by the system must utilize Code 3 of 9 or other approved format, and contain a minimum of eight (8) digits that comprise a unique serial identifier within the Web-based Reporting System. There shall be no duplication of device ID numbers. The ID number shall be printed below the bar code for identification purposes.
- C. Inspection bar codes shall be limited in size to no more than 2” (5cm) in width, and 3/8” (2 cm), in height and shall include a Mylar[®] or other protective coating to protect the bar code from fading due to sunlight or exposure.
- D. Inspection bar codes shall be installed on each device in such a manner as to require that scanning of the bar code take place no further than 12” from the device during inspection.

3. Part 3 - Execution

3.1. Installation

3.1.1. General

General

- A. The entire system shall be installed in a skillful manner in accordance with approved manufacturer's installation manuals, shop drawings and wiring diagrams.
- B. All work shall be performed in accordance with the requirements of NFPA 70 and NFPA 72.
- C. Coordinate locations of all devices with all other divisions' drawings and specifications.
- D. All fire alarm devices shall be accessible for periodic maintenance. Should a device location indicated on the contract drawings not meet this requirement, it shall be the responsibility of the installing contractor to bring it, in writing, to the attention of the Project Engineer.
- E. Fasten equipment to structural members of building or metal supports attached to structure, or to concrete surfaces.
- F. All systems and system components listed to UL864 Control Units for Fire Protective Signaling Systems maybe installed within a common conduit raceway system, in accordance with the manufacture's recommendations. System(s) or system components not listed to the UL864 standard shall utilize a separate conduit raceway system for each of the sub-systems.
- G. No wiring except life safety system circuits and system power supply circuits shall be permitted in the control panel enclosures.
- H. Any low-voltage copper wiring that leaves the protection of a building shall be provided with a compatible UL 497B listed transient protection devices where the circuit leaves the building and where it enters the next building.
- I. Devices containing end-of-line resistors shall be appropriately labeled. Devices should be labeled such that removal of the device is not required to identify the EOL device.
- J. Fiber Optic Cable
 - 1. Only glass filament cable permitted. Plastic filament fiber optic cables are not acceptable.
 - 2. ST connectors shall be used at all equipment terminations.
- K. Concrete floors shall be X-rayed prior to core drilling on post tension slabs. Verify with engineer on type of slab prior to bid.

3.1.2. Electrical

Electrical

1.01 BOXES, ENCLOSURES AND WIRING DEVICES

- A. Boxes shall be installed plumb and firmly in position.
- B. Extension rings with blank covers shall be installed on junction boxes where required.
- C. Junction boxes served by concealed conduit shall be flush mounted.
- D. Fire alarm system junction box covers shall be painted red.
- E. Wiring within cabinets, enclosures, boxes, junction boxes and fittings shall be installed in a neat and workmanlike manner, installed parallel with or at right angles to the sides and back of any box, enclosure or cabinet, and routed to allow access for maintenance. All conductors that are terminated, spliced, or otherwise interrupted in any enclosure, cabinet, mounting or junction box shall be connected to terminal blocks. Mark each terminal in accordance with the wiring diagrams of the system. Make all connections with approved pressure type terminal blocks, which are securely mounted. All terminal block screws shall have pressure wire connectors of the self-lifting or box lug type. No more than two conductors shall be installed under one connection. Wire nuts, crimp splices and similar devices shall not be used.

1.02 CONDUCTORS

- A. Each conductor shall be identified as shown on the drawings at terminal points. Permanent wire markers shall be located within 2 inches of the wire termination. Marker text shall be visible with protective doors or covers removed.
- B. Maintain a consistent color code for fire alarm system conductor functions throughout the installation.
- C. All wiring shall be installed in compliance with the National Electric Code, NFPA 70, and the equipment manufacturer's requirements.

Wiring for Signaling Line Circuit and Initiating Device Circuit field wiring shall be solid copper, No. 18 AWG twisted pair conductors at a minimum. Speaker circuits; 16 AWG twisted pair at a minimum. Telephone circuits shall be 18 AWG twisted-shielded pair at a minimum. 24VDC visual and audible Notification Appliance Circuits shall be solid copper No. 14 AWG size conductors at a minimum. The wiring sizes listed herein are minimum sizes. Use larger wire sizes when recommended by the manufacturer, based on system configuration and project specific calculations.

Where shielded wiring is used, the shield shall be grounded at only one point, which shall be in or adjacent to the FACP or other control equipment. Shields shall be continuous, treated as a third conductor, and insulated from ground except as noted.

T-taps (branches) are permitted in Style 4 SLC circuits with interconnections occurring on terminal strips.

Circuits to third-party systems (HVAC, Elevators, fire pumps, etc.) shall terminate in terminal cabinets within three (3) feet of the controllers for those systems.

AC power wiring shall be No. 12 AWG solid copper having insulation rated for 600 volts.

Crimp type spade lugs shall be used for terminations of stranded conductors to binder screws or stud type terminals.

- D. All wiring shall be checked and tested to insure that there are no grounds, opens or shorts.

1.03 DEVICES

- A. All devices and appliances shall be mounted to or in an approved electrical box.

1.04 Raceways

- A. Conduits shall be sized according to the conductors contained therein. Cross sectional area percentage fill for system conduits shall not exceed 40%.
- B. Install all conductors in rigid metal conduit or electro-metallic tubing, utilizing compression type fittings and couplings, with a minimum diameter 3/4". The use of flexible metal conduit not exceeding a six (6) foot length shall be permitted for initiating device circuits.
- C. All fire alarm conduit systems shall be routed and installed to minimize the potential for physical, mechanical or fire damage, and shall not to interfere with existing building systems, facilities or equipment.
- D. Run conduit or tubing concealed in finished areas unless specifically shown otherwise on the drawings. Conduit may be exposed in unfinished mechanical/electrical rooms, and basement levels.
- E. All system conduits, junction boxes, pull boxes, terminal cabinets, electrical enclosures and device back box locations shall be readily accessible for inspection, testing, service and maintenance.

1.05 Open cable

- A. Power Limited cable, when not installed in UL listed metal conduit or raceway, shall be mechanically protected by building construction features par NFPA 70, Article 760.
 - 1. Installation shall be in areas not subjected to mechanical injury.
 - 2. All circuits shall be supported by the building structure. Cable shall be attached by straps or bridal rings to the building structure at intervals not greater than 10 feet. The use of staples is prohibited. Fire alarm wiring shall not be bundled or strapped to existing conduit, pipe or wire in the facility.
 - 3. Where wiring is installed above drop ceilings, cable shall not be laid on ceiling tiles.
 - 4. Cable shall not be fastened in a manner that puts tension on the cable.
- B. Power Limited Cable shall be FPLP, FPLR or FPL, or permitted substitute.

3.1.3. FA Components

FA Components

1.01 DEVICES

- 1. All devices and appliances shall be mounted to or in an approved electrical box.

2. All wall mounted *control equipment* shall comply with requirements defined by the International Building Code and Acceptance Criteria for Seismic Qualification by Shake-Table Testing of Nonstructural Components and Systems (AC-156) using a seismic component importance factor of 1.5.
 - A. Fire Alarm Control Panels
 - a. Mount the enclosure with the top of the cabinet 72" above the finished floor or center the cabinet at 63", whichever is lower.
 - b. Label the fire alarm panels with the room number, electrical panel number and circuit breaker number feeding them.
 - c. Paint the handles of the dedicated circuit breakers feeding fire alarm panels red, and install handle locks.
 - d. Within the panel, all non-power limited wiring must be properly separated from power limited circuits.
 - e. Grounds shall comply with IEEE 1100. Install a ground wire from main service ground to fire-alarm control unit.
 - B. Remote power supplies and auxiliary fire alarm panels
 - a. Locate the panel or cabinet with the top of the panel 72" above the finished floor or center the panel at 63", whichever is lower.
 - b. Do not locate these panels above ceilings or where inaccessible by a person standing on the finished floor of the space.
 - c. Label the power supplies and auxiliary FACPs with the room number, electrical panel number and circuit breaker number feeding them.
 - d. Paint the handles of the dedicated circuit breakers feeding fire alarm panels red, and install handle locks.
 - e. Within the panel, all non-power limited wiring must be properly separated from power limited circuits.
 - C. Manual Pull Stations
 - a. Mount stations so that their operating handles are between 42" and 48" above the finished floor.
 - D. Notification Appliances: Mount assemblies as follows:
 - a. All wall mounted audio/visual devices shall be mounted so the entire lens is between 80" and 96" above the finished floor. Where low ceilings exist, devices shall be mounted within 6" of the ceiling.
 - b. Each speaker's (horn) output shall be set to the wattage value indicated for its specific location as shown on the drawings.
 - c. Each strobe's output shall be set to the candela value indicated for its specific location as shown on the drawings.
 - d. Each speaker (horn)-strobe's outputs shall be set to the wattage/candela value indicated for its specific location as shown on the drawings.
 - e. Where ceiling height exceeds 30 feet, appliances shall be suspended from the ceiling to a height of 30 feet maximum above the finished floor.
 - f. Appliances installed outdoors shall be UL listed for outdoor use.
 - E. Smoke Detectors:
 - b. Smoke and heat detector **heads** shall not be installed until after construction clean-up is completed. Detector **heads** installed prior to construction clean-up shall be cleaned by the manufacturer or replaced.

- c. Detectors located on the wall shall have the top of the detector at least 4" and not more than 12" below the ceiling.
 - d. On smooth ceilings, detectors shall not be installed over 30 ft. apart in any direction.
 - e. Install smoke detectors no closer than 3 ft. from air handling supply air diffusers or return air openings.
 - f. Locate detectors no closer than 12" from any part of a lighting fixture.
- F. Duct Smoke Detectors:
- a. Install sampling tubes so they extend the full width of ducts exceeding 36".
 - b. Detectors shall be located to facilitate ease of maintenance.
 - c. All penetrations near detectors located on/in return ducts shall be sealed to prevent air entry.
- G. End-of-Line Resistors
- a. Devices containing end-of-line resistors shall be appropriately labeled.
- H. Remote Status and Alarm Indicators:
- a. Install near each smoke detector and each sprinkler water-flow switch and valve-tamper switch that is not readily visible from normal viewing position.
- I. CO Detectors
- a. Ceiling mounted CO detectors should be kept 12" from sidewalls.
 - b. Wall mounted CO detectors should be at least 48" above the finished floor, but less than 6" from the ceiling.
 - c. Locate at least 60" from fuel burning appliances.
 - d. Install CO detectors no closer than 3 ft. from air handling supply air diffusers or return air openings.
- J. Heat Detectors
- a. Heat detectors shall be installed in strict accordance with their UL listing and the requirements of NFPA 72.
 - b. Heat detectors installed in the elevator machinery room to meet ANSI A17.1 requirement for elevator power disconnect, shall be located adjacent to each sprinkler head. Coordinate temperature rating and location with sprinkler rating and location.
- K. Addressable Control (relay) Modules
- a. Install the module less than 3 feet from the device controlled.
 - b. Orient the device mounting for best maintenance access.
 - c. Label all addressable control modules as to their function.
 - d. Provide a dedicated 24VDC circuit to feed all auxiliary relays required for inductive loads (auxiliary relays, door holders). Circuits shall be supervised via an end-of-line relay and addressable input module. Auxiliary relays shall not derive their power from the starter or load being controlled.



Pleasant Hill R-III School District

318 Cedar Street, Pleasant Hill, MO 64080
Phone: 816-540-3161 / Fax: 816-540-5135

Excitement in Learning Enrichment in Living

Standard Vendor Agreement

By signing this Agreement ("Agreement"), the below-named vendor of products or services to the District ("Vendor") agrees to each term of the Standard Vendor Agreement of Pleasant Hill R-III School District ("District") from the date of the signature below until terminated under the terms of the Agreement.

Vendor (legal entity name): _____

Vendor Type: _____

Vendor Name as Shown on Invoice (DBA): _____

Vendor Taxpayer Identification Number (EIN/SSN): _____

Vendor Contact Name and Title: _____

Vendor Contact Information: *Street* _____

City/State/Zip Code _____

Phone _____

Mobile Phone _____

Email or Fax _____

I am authorized to contract for Vendor and Vendor understands and agrees to comply with the District's Standard Vendor Agreement Terms until terminated.

Name _____

Signature _____

Title _____

Date _____

1. **Scope.** This agreement applies to transactions between Pleasant Hill R-III School District (“District”) and vendors of products or services (“Vendors”). This Agreement is effective from the date accepted by Vendor until termination under its terms. Vendor agrees to each term of the Agreement in exchange for the opportunity to offer goods or services for sale to the District. The District reserves the right to accept or reject any offer of sale. The District may modify this Agreement upon notice to Vendors and such changes are binding upon notice.
2. **Purchase orders.** The District will incur no liability for additional costs over the amount identified in a purchase order, including taxes, shipping, insurance, penalties, termination payments, attorney fees, liquidated damages, or other fees and costs. Product Vendors will replace any item received in damaged condition at no cost to the District, including all shipping costs for returning non-functional items to the Vendor for replacement.
3. **Sales Tax Exemption.** Vendor will not bill taxes. Federal and state law exempts the District from Federal excise taxes and state sales taxes.
4. **District Policies.** Vendor will comply with all applicable District policies, regulations, and procedures, including Policies regarding background checks, confidentiality of student information, anti-discrimination, and conflicts of interest.
5. **Conflict of Interest.** Vendor will notify District of any professional, business, or familial relationship with any administrator or current member of the Board of Education of the District.
6. **E-Verify (§ 285.530 RSMo).** Vendors for transactions that exceed \$5,000 agree to annually provide District a sworn affidavit and other sufficient documentation to affirm its enrollment and participation in a federal work authorization program with respect to the employees working in connection with this Contract and to affirm that it does not knowingly employ any person who is an unauthorized alien in connection with the contracted services.
7. **Sovereign Immunity.** The District preserves all immunities recognized at law. Nothing in this Agreement or any transactions under this agreement is a waiver of Sovereign Immunity or Governmental Immunity by whatever name as set forth in Mo. Rev. Stat. § 537.600 et seq. Any insurance required by this Agreement or any transactions under this agreement waives no defense or immunity available to the District or its employees by statute or at common law.
8. **10-Hour construction safety program for public works projects (§ 292.675 RSMo).** Vendors for construction, reconstruction, demolition, painting and decorating, or major repair for public works projects will provide its on-site employees a 10-hour Occupational Safety and Health Administration (OSHA) Construction Safety Program as mandated by § 292.675 RSMo, including a course in construction safety and health approved by OSHA or a similar program approved by the Missouri Department of Labor and Industrial Relations.
9. **Prevailing Wage.** Vendors agree that in the instances their services consist of, wholly or in part, construction, reconstruction, demolition, painting and decorating, or major repair for public works projects: A wage of no less than the prevailing hourly rates of wages for work of a similar character in the locality in which the work is performed shall be paid to all workmen employed by or on behalf of any public body engaged in public works exclusive of maintenance work (§ 290.220 RSMo); Not less than the prevailing hourly rate of wages specified in wage determination as requested from the State shall be paid to all workers performing work under this contract (§ 290.250 RSMo); The vendor

shall forfeit as a penalty to the State, County, City, and County, City, Town, District or other political sub-division on whose behalf the contract is made or awarded Ten (\$10.00) Dollars for each worker employed, for each calendar day, or portion thereof such worker is paid less than the said stipulated rates for any work done under this contract by him or by any sub-contractor under him (§ 290.250 RSMo). Vendor is required to comply with prevailing wage requirements and will indemnify and defend the District for any violations of prevailing wage requirements.

- 10. Excessive Unemployment.** When the Missouri Department of Labor and Industrial Relations determines that a period of "Excessive Unemployment" remains in effect and will remain in effect if the unemployment rate exceeds 5% in the state of Missouri, Vendors for construction, reconstruction, demolition, painting and decorating, or major repair for public works projects agree to employ only Missouri laborers and laborers from nonrestrictive states on the public works projects. (§§ 290.550 through 290.580 RSMo).
- 11. Lead Paint Guidelines.** Vendors for construction, reconstruction, demolition, painting and decorating, or major repair for public works projects working in pre-1978 school buildings that are child occupied and residential properties will obtain their Renovator Certification by an accredited EPA Training Provider.
- 12. AHERA Notification.** The District has completed the removal of friable asbestos in all District school buildings. In addition, all facilities have now been inspected by a certified asbestos inspector as required under the ASBESTOS HAZARD EMERGENCY RESPONSE ACT OF 1986 (AHERA). A copy of the AHERA Plan is on file with each building administrator. The AHERA Plan is available for inspection during regular school hours.
- 13. A-133 Compliance Supplement.** Vendor warrants that it and its principals are not debarred, suspended, proposed for debarment, declared ineligible or voluntarily excluded from covered transactions by any Federal Department or Agency. Vendor will notify the District immediately if suspended or debarred.
- 14. Permits.** Vendor will obtain all permits required by law for transactions under this Agreement.
- 15. Insurance.** Vendor will maintain all insurance required by law.
- 16. Termination.** Vendor may terminate Agreement by providing the District notice in writing as required by this Agreement within 90 days of the termination date in the notice, after completion of all transaction entered under this Agreement and upon reasonable notice to the District and opportunity to cure any alleged breaches of this Agreement or transactions entered into under this Agreement. District may terminate this Agreement upon written notice at any time for any reason.
- 17. Compliance with Non-Discrimination Law.** Vendor will comply with the Fair Labor Standards Act, Fair Employment Practices, Equal Opportunity Employment Act, Missouri Human Rights Act and all other applicable Federal and State laws and District Policy.
- 18. Americans with Disabilities Act of 1990 (ADA).** Vendor warrants that all goods or services provided under this Agreement will meet or exceed all applicable Federal, State, and Local Statutes, Ordinances and Codes including but not limited to the Americans with Disabilities Act of 1990.
- 19. Performance and Payment Bonds.** For public works projects with a transaction cost of \$25,000 or more, Vendor will procure and maintain performance and payment bonds for the benefit of the

District as required by the laws of the State of Missouri in an amount not less than 100% of the aggregate amount of Contract entered under this Agreement. The Bond shall serve as security for the faithful performance of public works projects entered under this Agreement, including maintenance provisions, and for the payments of all persons performing labor and furnishing materials in connection with public works projects entered under this Agreement. Vendor will pay premiums on the bonds. The bonds shall remain in full force and effect during public works projects entered under this Agreement.

- 20. Confidentiality.** Vendor will comply with all confidentiality laws, including the Family Educational Rights and Privacy Act (FERPA), 20 U.S.C. § 1232g, and will indemnify the District for any damages suffered by it by reason of Vendor's failure to do so.
- 21. Background checks.** Vendor will ensure that all its employees, staff members, volunteers and adults who may have contact with students complete fingerprinting and criminal background checks in accordance with § 168.133 RSMo and the requirements of the Missouri Department of Elementary and Secondary Education, including a criminal background check through the Missouri State Highway Patrol and a child abuse and neglect background check through the Missouri Children's Division. Vendor will provide District reports of background checks.
- 22. Indemnification.** The District will not agree to indemnify any Vendor for its own negligence (including product liability), for injuries or damages that do not arise from acts or omission of the District, or for injuries or damages for which the District has sovereign immunity. Product vendors shall be responsible for all personal injury (including death) or property damage as a result of the Vendor's negligence involving any product provided under transactions under this Agreement and, in addition, agree to hold the District, including its Board and employees, harmless from every expense, liability, or payment arising out of such negligent act or defective product.
- 23. Applicable Law.** The laws of the State of Missouri govern this agreement. For any legal action arising from this Agreement or any transaction entered under this agreement. Vendor expressly agrees to the jurisdiction and venue of the Circuit Court of Cass County, Missouri, or the United States District Court for the Western District of Missouri, as appropriate.
- 24. Provisions required by law.** Every provision of law and clause required by law to be inserted in this Agreement will be deemed to be inserted and the Agreement will be read and enforced as though it were included herein.
- 25. Dispute.** Vendor will provide District notice of and an opportunity to cure any dispute arising from this Agreement or any transaction under this Agreement before filing a legal action arising from the dispute. Vendor will pay District's reasonable legal fees, expenses, and costs for any legal action arise from such dispute.
- 26. Notice.** All notices provided under this contract must be in writing and delivered in a form that provides the date of delivery.
- 27. Independent Contractor.** The relationship of the District and the Vendor is one of District and independent contractor and not master and servant or joint venturers. Except as specifically provided herein, Vendor has no authority to act for or on behalf of the District.

ANNUAL FEDERAL WORK AUTHORIZATION PROGRAM AFFIDAVIT

I, _____, being of legal age and having been duly sworn upon my oath, state the following facts are true:

1. I am over twenty-one years of age; and know of the matters set forth.
2. I am employed by _____("Company") and have authority to issue this affidavit on its behalf.
3. Company is enrolled in and participating in the United States E-Verify federal work authorization program regarding Company's employees working in connection with the services Company is providing to, or will provide to, the District, to the extent allowed by E-Verify.
4. Company does not knowingly employ any person who is an unauthorized alien in connection with the services the Company is providing to, or will provide to, the District.

FURTHER AFFIANT SAYETH NOT.

By: _____
(individual signature)

For _____
(company name)

Title: _____

Subscribed and sworn to before me on this ____ day of _____, 201_ .

NOTARY PUBLIC

My commission expires: _____

Vendor (legal entity name):

The above Vendor offers the following goods or services for procurement by the Pleasant Hill R-III School District. All procurement is subject the requirements of District Policy and Missouri Law.

Appliances

- _____ a. Equipment
- _____ b. Supplies
- _____ c. Services

Art Supplies

- _____ a. Equipment
- _____ b. Supplies

Athletic

- _____ a. Equipment
- _____ b. Trainer Supplies
- _____ c. Supplies
- _____ d. Sports uniforms

Audio/Visual

- _____ a. Equipment
- _____ b. Repairs
- _____ c. Sound systems
- _____ d. Supplies

Automotive

- _____ a. Parts
- _____ b. Gas
- _____ c. Oil/Lubricants
- _____ d. Tires
- _____ e. Purchases – New & Used

Batteries

- _____ a. Office/Electronics
- _____ b. Vehicle

Building

- _____ a. Acoustical tiles
- _____ b. Glass & Glazing
- _____ c. Locking Hardware & Keys
- _____ d. Lumber

Calculators

- _____ a. Equipment

- _____ b. Service/Repairs
- _____ c. Supplies

Carpenter Shop

- _____ a. Supplies
- _____ b. Parts
- _____ c. Lumber
- _____ d. Services

Computers

- _____ a. Hardware
- _____ b. Software

Consultant/ Professional Services

- _____ a. Architect
- _____ b. Employee Assistance
- _____ c. Energy Services
- _____ d. Engineering

Contractor

- _____ a. Asphalt/Seal Coating
- _____ b. Bleachers
- _____ c. Carpeting
- _____ d. Concrete
- _____ e. Demolition/Excavating
- _____ f. Electrical
- _____ g. Elevators
- _____ h. Environmental
- _____ i. Fencing
- _____ j. Fire Sprinklers
- _____ k. Floor Covering
- _____ l. General Construction
- _____ m. Heating/Cooling
- _____ n. Landscaping
- _____ o. Masonry
- _____ p. Painting
- _____ q. Plumbing
- _____ r. Roofing

- _____ u. Sprinkler Systems
- _____ v. Welding

Coolers/Boilers

- _____ a. Compressors
- _____ b. Cooler Pads
- _____ c. Equipment
- _____ d. Supplies

Copiers

- _____ a. Equipment
- _____ b. High Volume Copiers
- _____ c. Supplies
- _____ d. Service

Custodial

- _____ a. Laundry Service
- _____ b. Chemicals
- _____ c. Supplies

Drafting

- _____ a. Equipment
- _____ b. Supplies

Draperies/Stage Curtains

- _____ a. Blinds
- _____ b. Drapes
- _____ c. Curtains
- _____ d. Stage Flooring/Repair

Electric

- _____ a. Equipment
- _____ b. Lamps
- _____ c. Supplies

Elevators

- _____ a. Equipment
- _____ b. Supplies/Parts

- _____ c. Services/Repairs
- _____ d. Inspection

Extermination

- _____ a. Pest Control Services

Fax Machines

- _____ a. Equipment
- _____ b. Service

Fencing

- _____ a. Materials

Fertilizer/ Seeds

- _____ a. Supplies

Fire

- _____ a. Extinguishers
- _____ b. Fire Maintenance
- _____ c. Equipment
- _____ d. Inspections

Flags

- _____ a. Flags
- _____ b. Accessories
- _____ c. Banners

Flooring

- _____ a. Carpet
- _____ b. Tile
- _____ c. Finishing

Fuel

- _____ a. Unleaded Fuel
 - _____ b. Diesel Fuel
 - _____ c. Tank /Pump
- Service/Supply

Furniture

- _____ a. Auditorium
- _____ b. Cafeteria
- _____ c. Classroom
- _____ d. Computer
- _____ e. Library
- _____ f. Lounge
- _____ g. Office

Grease Trap Cleaning

- _____ a. Services

Grounds

- _____ a. Equipment
- _____ b. Supplies
- _____ c. Weed Control
- _____ d. Landscaping

Hardware/Lumber

- _____ a. Equipment
- _____ b. Nuts & Bolts
- _____ c. Tools
- _____ d. Lumber

Heating/Cooling

- _____ a. Equipment
- _____ b. HVAC Filters
- _____ c. Services/Repairs
- _____ d. Supplies

Industrial Arts

- _____ a. Equipment
- _____ b. Supplies

Instructional

- _____ a. Equipment
- _____ b. Student Planners
- _____ c. Supplies

Insurance

- _____ a. Dental
- _____ b. Health
- _____ c. Life
- _____ d. Property

Laundry/Dry-clean Service

- _____ a. Band/Choir Uniforms

Lease/Purchase

- _____ a. Equipment
- _____ b. Vehicles
- _____ c. Land

Library

- _____ a. Book Binding
- _____ b. Books
- _____ c. Equipment
- _____ d. Supplies
- _____ e. Furniture

Lighting

- _____ a. Supplies

Locker/Parts

- _____ a. Hall
- _____ b. P.E.

Machine Shop

- _____ a. Equipment
- _____ b. Supplies

Mailroom

- _____ a. Equipment
- _____ b. Supplies

Office

- _____ a. Supplies
- _____ b. Furniture
- _____ c. Equipment

Paint

- _____ a. Supplies
- _____ b. Equipment

Paper Products

- _____ a. Office/copy paper
- _____ b. Colored Copy Paper
- _____ c. Disposable (plates, cups, napkins, etc.)

Plumbing

- _____ a. Equipment
- _____ b. Supplies
- _____ c. Water Fountains

Printing

- _____ a. Equipment
- _____ b. Service
- _____ c. Supplies

Roof

- _____ a. Materials
- _____ b. Supplies

Safety Equipment

- _____ a. Fire Alarm System
- _____ b. Fire Extinguishers
- _____ c. **Maintenance/Services**
- _____ d. Supplies

Security

- _____ a. Equipment
- _____ b. Fire Alarm Systems
- _____ c. Intercoms
- _____ d. Services/Repairs
- _____ e. Supplies

Special Education

- _____ a. Equipment
- _____ b. Supplies
- _____ c. Services

Sprinklers

- _____ a. Equipment
- _____ b. Parts
- _____ c. Supplies
- _____ d. Service/Repairs

Tractors

- _____ a. Equipment

- _____ b. Parts
- _____ c. Supplies
- _____ d. **Maintenance/Repairs**
- _____ e. Tires

Trophies/Awards

- _____ a. Trophies
- _____ b. Awards

Two Way Radios

- _____ a. Equipment
- _____ b. Supplies
- _____ c. Parts
- _____ d. Service/Repairs

Water Treatment

- _____ a. Water Treatment
- _____ b. Services

Welding

- _____ a. Equipment
- _____ b. Supplies
- _____ c. Service

Other