SECTION 12 6113
FIXED BLEACHERS

PART 1 GENERAL

1.01 SECTION INCLUDES

A. Fixed bleachers.
   1. Provide engineering, material, freight, installation and supervision to provide new permanent grandstand structures in accordance with the following specifications.

1.02 REFERENCE STANDARDS

A. ADA Standards - Americans with Disabilities Act (ADA) Standards for Accessible Design; 2010.

B. AWS D1.1/D1.1M - Structural Welding Code - Steel; 2020.

C. AWS D1.3/D1.3M - Structural Welding Code - Sheet Steel; 2018.

D. NFPA 102 - Standard for Grandstands, Folding and Telescopic Seating, Tents, and Membrane Structures; 2016.

1.03 SUBMITTALS

A. See Section 01 3000 - Administrative Requirements, for submittal procedures.

B. Product Data: Manufacturer's data sheets on each product to be used, including:
   1. Preparation instructions and recommendations.
   2. Storage handling and requirements.
   3. Installation methods.

C. Shop Drawings: Complete layout with dimensions, seat heights, row spacing and rise, aisle widths and locations, points of connection to substrate, assembly dimensions, and material types and finishes.
   1. Provide drawings customized to this project.
   2. Include Professional Engineer's seal on each sheet.

D. Operation and Maintenance Data: Manufacturer's operation and maintenance instructions, including annual inspection and maintenance and bi-annual inspection by a Professional Engineer or manufacturer factory service personnel.

E. Warranty: Submit manufacturer warranty and ensure that forms have been completed in Owner's name and registered with manufacturer.

1.04 QUALITY ASSURANCE

A. Manufacturer Qualifications: Company specializing in manufacturing products specified in this section, with not less than five years of documented experience.

B. Installer Qualifications: Approved by manufacturer.

1.05 DELIVERY, STORAGE, AND HANDLING

A. Store, in original packaging, under cover and elevated above grade.

1.06 WARRANTY

A. See Section 01 7800 - Closeout Submittals, for additional warranty requirements.

B. Correct defective Work within a five year period after Date of Substantial Completion. Replace parts that fail under normal use at no extra charge to Owner.

PART 2 PRODUCTS

2.01 MANUFACTURERS

A. Fixed Bleachers:
   1. Basis of Design: Dant Clayton; Alum-A-Stand (Fully Closed Decking System); www.stadiumbleachers.com.
   2. Substitutions: See Section 01 6000 - Product Requirements.

2.02 FIXED BLEACHERS

A. Fixed Bleachers: Factory assembled tiered benches with fixed seats mounted on leading edge of platforms.
   1. Provide a design certified by a licensed Professional Engineer licensed in the State in which the Project is located.
   2. Provide a design that has been in use for at least 5 years; submit documentation.
   3. Design to comply with applicable requirements of NFPA 102 and requirements of code authorities having jurisdiction; where conflicts between requirements occur, comply with whichever is more stringent.
   4. Configurations: As indicated on drawings.
   5. Wheelchair Spaces: Permanent open spaces at locations indicated on drawings in compliance with ADA Standards.

B. Design Loads: Design to withstand the following loading conditions:
   1. Live Load on Structural Supports: 100 psf, minimum, of gross horizontal projection.
   2. Live Load on Seats and Walking Surfaces: 120 pounds per linear foot.
   3. Lateral Sway Stress on Structural Supports: 24 pounds per linear foot of seat plank.
   4. Perpendicular Sway Stress on Structural Supports: 10 pounds per linear foot of seat plank.

C. Dimensions:
   1. See drawings for configurations.
      a. Main Bleachers (typical of 1): 60'-4" long, 8 rows, with (2) 4'-6" wide aisles, guardrails at ends & handicap spaces as shown. Configure to work around steel columns (verify in field).
      b. Side Bleachers (typical of 2): 27'-0" long, 3 rows.
      c. Benches (typical of 8): 12'-0" long, with backrests (clear anodized, w/ stanchion bars at 6'-0" O.C. max.)
   2. Rows: See drawings.
   3. Rise Per Row: 8 inches.
   4. Row Depth: 24 inches.
   5. Seat Height Above Tread: 17 inches.

D. Structural Supports: Aluminum tubes (2-7/8" OD) & channels (3" x 2 7/8")
   1. Welding: In accordance with AWS D1.1/D1.1M and AWS D1.3/D1.3M.
   2. Bolting: Use lock-washers or locknuts.
   3. Finish: Class 1, clear anodized finish.

2.03 SEAT AND PLATFORM COMPONENTS

A. Seats and Fascia: Extruded aluminum, with ribbed surface, 0.078 inch thick, clear anodized finish; with joint sleeve assembly of same material to maintain alignment at end-to-end junctions and end caps on each exposed end.
   1. Bench seats to be nominal 2"x10" plank w/ end caps.
   2. Riserboards to be 1"x8" plank w/ end caps.

B. Platform, Tread, and Step Structure: Extruded aluminum, with ribbed surface, with joint sleeve assembly to maintain alignment at end-to-end junctions.
   1. Extrusions: Minimum 5/8 inch deep with minimum 0.09 inch wall thickness
   2. Finish: Clear anodized finish.
   3. Nosings: Matching aluminum extrusion.
   4. Front, Rear, and Intermediate Supports: Aluminum channel or tube.
   5. Provide end caps of same material and finish on each exposed end.
   6. At aisles provide permanently attached intermediate steps of same construction and finish.

2.04 HANDRAILS AND RAILINGS

A. Provide the following railings:

1. Aisle Handrails: Removable one- or two-post railing segment mounted in center of aisle at every other row beginning at row 2.
2. End of Row Guardrails: Removable, at open ends of sections beginning at row 2.
3. Height: 42 inches above adjacent platform or tread.

B. Design handrails and railings to withstand the following loads:
1. Concentrated Load on Handrails: 200 pounds in any direction.
2. Concentrated Load on Guardrails: 200 pounds in any direction along top rail.
3. Live Load on Handrails: 100 pounds per linear foot, applied in any direction.
4. Live Load on Guardrails:
a. Horizontal: 50 pounds per linear foot, applied at the guardrail height.
b. Vertical: 100 pounds per linear foot, applied vertically to top of guardrail.

C. Railing Construction: Round aluminum pipe or tube, with formed elbows at corners and caps at ends of straight runs.
1. Aluminum: 1.66 inches minimum outside diameter; natural anodized finish.
2. Guardrail Infill: 9 gauge, 0.1144 inch diameter steel, galvanized, 2" wire woven chain link with twisted selvages, fastened to pipe panel frame.

2.05 ACCESSORIES

A. Fasteners: Provide hardware and fasteners in accordance with manufacturer's recommendations.

B. Anchorage: As indicated on drawings; provide hardware in accordance with manufacturer's recommendations.

PART 3 EXECUTION

3.01 EXAMINATION

A. Verify that field measurements are consistent with those on the shop drawings.

B. Do not begin installation until substrates have been properly prepared and area has been cleared of obstructions.

C. If substrate preparation is the responsibility of another installer, notify Architect of unsatisfactory preparation before proceeding.

3.02 PREPARATION

A. Clean surfaces thoroughly prior to installation.

B. Prepare surfaces using the methods recommended by the manufacturer for achieving the best result for the substrate under the project conditions.

3.03 INSTALLATION

A. Install in accordance with manufacturer's instructions.

B. Do not field cut or alter seats, fascia, or structural members without approval.

C. Provide manufacturer's field representative to inspect completed installation.

3.04 CLEANING

A. Clean exposed and semi-exposed assembly surfaces.

B. Touch up finishes on damaged or soiled areas.

3.05 PROTECTION

A. Protect installed products until completion of project.

B. Touch-up, repair, or replace damaged products before Date of Substantial Completion.

END OF SECTION

SECTION 28 3100
FIRE ALARM SYSTEM

PART 1 GENERAL

1.01 SECTION INCLUDES

A. Fire alarm system design and installation, including all components, wiring, and conduit.

B. Transmitters for communication with supervising station.

1.02 RELATED SECTIONS

A. Section 07 8400 - Firestopping: Materials and methods for work to be performed by this installer.

B. Section 21 3000 - Fire Pumps: Supervisory devices.

C. Section 21 1300 - Fire-Suppression Sprinkler Systems: Supervisory, alarm, and actuating devices installed in sprinkler system.

D. Section 23 3300 - Air Duct Accessories: Smoke dampers monitored and controlled by fire alarm system.

1.03 REFERENCES

A. NFPA 70 - National Electrical Code, 2020 Edition, National Fire Protection Association.

B. NFPA 72 - National Fire Alarm Code, 2019 Edition.

C. NFPA 101 - Life Safety Code, 2018 Edition with all Georgia State Modifications.

1.04 SUBMITTALS

A. See Section 26 0510 - General Electrical Requirements, for submittal procedures.

B. Shop Drawings: Submit all information required for plan review and permitting, including but not limited to floor plans, riser diagrams, and description of operation:
   1. Notify the State Fire Marshal’s Office, via SFM Form 354A, prior to beginning of installation of fire alarm system and submit three copies of complete information regarding system, in compliance with NFPA 72, National Fire Alarm and Signaling Code, 2019 Edition, Chapters 7 and 10.
   2. NFPA 72 "System Record of Completion", filled out to the extent known at the time.
   3. System zone boundaries and interfaces to fire safety systems.
   4. Location of all components, circuits, and raceways; mark components with identifiers used in control unit programming.
   5. Circuit layouts; number, size, and type of raceways and conductors; conduit fill calculations; spare capacity calculations; notification appliance circuit voltage drop calculations.
   6. List of all devices on each signaling line circuit, with spare capacity indicated.
   7. Manufacturer's detailed data sheet for each component, including wiring diagrams, installation instructions, and circuit length limitations.
   8. Description of power supplies; if secondary power is by battery include calculations demonstrating adequate battery power.
   9. Certification by either the manufacturer of the control unit or by the manufacturer of each other component that the components are compatible with the control unit.
   10. Certification by the manufacturer of the control unit that the system design complies with the contract documents.
   11. Certification by Contractor that the system design complies with the contract documents.

C. Evidence of installer qualifications.

D. Evidence of instructor qualifications; training lesson plan outline.

E. Inspection and Test Reports:
   1. Submit inspection and test plan prior to closeout demonstration.
   2. Submit documentation of satisfactory inspections and tests.

3. Submit NFPA 72 "System Record of Inspection and Testing," filled out.

F. Operating and Maintenance Data: See Section 01 7800 for additional requirements; revise and resubmit until acceptable; have one set available during closeout demonstration:
   1. Complete set of specified design documents.
   2. Additional printed set of project record documents and closeout documents, bound or filed in same manuals.
   3. Contact information for firm that will be providing contract maintenance and trouble call-back service.
   4. List of recommended spare parts, tools, and instruments for testing.
   5. Replacement parts list with current prices, and source of supply.
   6. Detailed troubleshooting guide and large scale input/output matrix.
   7. Preventive maintenance, inspection, and testing schedule complying with NFPA 72; provide printed copy and computer format acceptable to Owner.
   8. Detailed but easy to read explanation of procedures to be taken by non-technical administrative personnel in the event of system trouble, when routine testing is being conducted, for fire drills, and when entering into contracts for remodeling.

G. Project Record Documents: See Section 01 7800 for additional requirements; have one set available during closeout demonstration:
   1. Complete set of floor plans showing actual installed locations of components, conduit, and zones.
   2. "As installed" wiring and schematic diagrams, with final terminal identifications.
   3. "As programmed" operating sequences, including control events by device, updated input/output chart, and voice messages by event.

H. Closeout Documents:
   1. Certification by manufacturer that the system has been installed in compliance with his installation requirements, is complete, and is in satisfactory operating condition.
   2. NFPA 72 "System Record of Completion", filled out completely and signed by installer and authorized representative.
   3. Report on training results.

1.05 QUALITY ASSURANCE

A. Copies of Shop Drawings: Maintain at the project site for the duration of the project, bound together, an original copy of NFPA 72, the relevant portions of applicable codes, and instructions and guidelines; deliver to Owner upon completion.

B. Installer Qualifications: Firm with minimum 3 years documented experience installing fire alarm systems of the specified type and providing contract maintenance service as a regular part of their business.
   1. Authorized representative of control unit manufacturer; submit manufacturer's certification that installer is authorized; include name and title of manufacturer's representative making certification.
   2. Installer Personnel: At least 2 years of experience installing fire alarm systems.
   3. Supervisor: NICET level 3 certified fire alarm technician; furnish name and address.
   4. Contract maintenance office located within 50 miles of project site.
   5. Certified in Georgia as fire alarm installer.

C. Instructor Qualifications: Experienced in technical instruction, understanding fire alarm theory, and able to provide the required training; trained by fire alarm control unit manufacturer.

D. All components of the Fire Alarm System shall be cross-listed by Underwriter's Laboratories, Inc., for installation in a common system.

E. All control equipment shall be listed under UL category UOJZ as a single control unit.

1.06 EXTRA MATERIALS AND TOOLS

A. Provide spare parts of same manufacturer and model as those installed; deliver in original packaging, labeled in same manner as in operating and maintenance data and place in spare parts cabinet.

B. In addition to the items in quantities indicated in PART 2, provide the following:
   1. All tools, software, and documentation necessary to modify the fire alarm system using Owner's personnel; minimum modification capability to include addition and deletion of devices, circuits, and zones, and changes to system description, operation, and evacuation and instructional messages.
   2. CD-ROM copies, 2, of all software not resident in read-only-memory.
   3. Provide documentation cabinet adjacent to FACP as required per NFPA72 Paragraph 7.7.2.1.

1.07 WARRANTY

A. Provide control panel manufacturer's warranty that system components other than wire and conduit are free from defects and will remain so for 1 year after date of Substantial Completion.

B. Provide installer's warranty that the installation is free from defects and will remain so for 1 year after date of Substantial Completion.

PART 2 PRODUCTS

2.01 MANUFACTURERS

A. Fire Alarm Control Units:
   1. Edwards.
   2. ~~Honeywell.~~ **Notifier.**
   3. Simplex.

2.02 FIRE ALARM SYSTEM

A. Fire Alarm System: Provide a new automatic fire detection and alarm system:
   1. Provide all components necessary, regardless of whether shown in the contract documents or not.
   2. Protected Premises: Entire building shown on drawings.
   3. Comply with the following; where requirements conflict, order of precedence of requirements is as listed:
      a. The Americans With Disabilities Act (ADA).
      b. The requirements of the State Fire Marshall.
      c. Applicable local codes.
      d. The contract documents (drawings and specifications).
      e. NFPA 101.
      f. NFPA 72; where the word "should" is used consider that provision mandatory; where conflicts between requirements require deviation from NFPA 72, identify deviations clearly on design documents.
   4. Voice Notification: Provide emergency voice/alarm communications with multichannel capability; digital.
   5. Program notification zones and voice messages as directed by Owner.
   6. Hearing Impaired Occupants: Provide visible notification devices in all public areas and in dwelling units.

B. Supervising Stations and Fire Department Connections:
   1. Public Fire Department Notification: Provide digital encoder to notify the local Fire Department legally committed to serve the area in which the building is located when an alarm condition is initiated on the fire alarm system. Notification shall be via an approved, U.L. listed monitoring service. The encoder shall be U.L. listed; shall be approved; shall be connected to one outside telephone line to serve as the Primary means of transmission AND shall use either IP Communications or Digital Cellular (4G) technology; and shall have a line seizure function. Encoder shall be able to transmit not just Alarm, Supervisory,

and Trouble signals, but POINT ID as well, meaning the device causing the alarm is identified. All programming to do so shall be by the contractor. The contractor shall coordinate with the local Fire Department concerning who/which monitoring service to be notified in the event of the alarm condition. The secondary means of communications described above can be either integral to the DACT or through a separate interface that is NFPA approved and UL certified for this application.

C. Circuits: Provide class and style wiring as required for this type of construction and facility.

D. Spare Capacity:
   1. Initiating Device Circuits: Minimum 25 percent spare capacity.
   2. Notification Appliance Circuits: Minimum 25 percent spare capacity.
   3. Master Control Unit: Capable of handling all circuits utilized to capacity without requiring additional components other than plug-in control modules.

E. Power Sources:
   1. Primary: Dedicated branch circuits of the facility power distribution system.
   2. Secondary: Storage batteries.
   3. Capacity: Sufficient to operate entire system for period specified by NFPA 72.
   4. Each Computer System: Provide uninterruptible power supply (UPS).

F. Operation:
   1. The system alarm operation subsequent to the activation of any manual station, automatic detection device, or sprinkler flow switch shall be as follows:
      a. All audible alarm indicating devices shall sound an alarm signal until silenced by the alarm silence switch at the control panel.
      b. All visible alarm indicating devices shall flash continuously until the Alarm Silence Switch is operated.
      c. Subsequent zone alarms shall reactivate the alarm indicating devices.
      d. A supervised signal to notify the local fire department shall be activated.
      e. Supervised relays interlocked with mechanical controls shall initiate the air handling/ventilation sequence in accordance with NFPA 90 and as specified elsewhere in these specifications and as shown on the plans. Provide relays adjacent starting/control devices in separate enclosure painted red.
      f. Where smoke control dampers are installed, when the smoke detector associated with it activates, smoke dampers shall close as described in the mechanical specifications.
   2. The alarm shall be displayed on a multi-character LCD display. The characters shall identify the alarm zone and the device type. The system alarm LED shall flash on the control panel until the alarm has been acknowledged. Once acknowledged, the LED shall latch on. A subsequent alarm received from another zone shall flash the system alarm LED on the control panel. The LCD display shall show the new alarm information.
   3. An alarm tone shall occur within the control panel until the event has been acknowledged.
   4. The activation of any space type smoke detector shall initiate an Alarm Verification operation whereby the panel will reset the activated detector and wait for a second alarm activation. If, within one (1) minute after resetting, a second alarm is reported from the same or any other smoke detector, the system shall process the alarm. If no second alarm occurs within one minute the system shall resume normal operation. The Alarm Verification shall operate only on smoke detector alarms. Other activated initiating devices shall be processed immediately. Smoke detectors with analog sensitivity, adjustable from the control panel may be used in lieu of alarm verification. The activation of any duct type smoke detector shall send the entire system into a supervisory alarm and shall activate a visual and audible supervisory signal at a constantly attended location.
   5. The system shall have a function that will allow the operator to display all alarms, troubles, and supervisory service conditions including the time of each occurrence.
   6. Provisions for a future printer to record all events with corresponding times shall be provided.

G. Supervision:
   1. The incoming power to the system shall be supervised so that any power failure shall be audibly and visually indicated at the control panel. A "power on" LED shall be displayed continuously while incoming power is present.
   2. The system batteries shall be supervised so that a low battery condition or disconnection of the battery shall be audibly and visually indicated on the control panel.
   3. All devices, detectors, and all wiring within the system shall be supervised.

H. Power Requirements:
   1. The control panel shall receive 120 VAC power.
   2. The system shall be provided with sufficient battery capacity to operate the entire system upon loss of normal 120 VAC power in a normal supervisory mode for a period of twenty-four (24) hours with five (5) minutes of alarm operation at the end of this period. The system shall automatically transfer to the standby batteries upon power failure. All battery charging and recharging operations shall be automatic.

I. Peripheral Network:
   1. Communication and Addressable Devices: The system must provide communication with initiating devices individually. All of these devices will be individually annunciated at the control panel. Annunciation shall include the following conditions for each point:
      a. Alarm
      b. Trouble
      c. Open
      d. Device missing / failed
   2. All addressable devices shall have the capability of being disabled or enabled individually.
   3. The system shall have the capability to multidrop up to 400 addressable devices. Systems that require factory reprogramming to add or delete devices are unacceptable.
   4. Format: The communication format must be a digital poll/response protocol to allow t-tapping of the circuit wiring. Communication reliability shall be obtained by using parity data bit error checking routines for address codes and check sum routines for the data transmission portion of the protocol.
   5. Identification of Addressable Devices: Each addressable device must be uniquely identified by an address code. Device identification schemes that do not use unique set addresses but rely on electrical position along the communication channel are unacceptable.
   6. Wiring Type, Distances, Survivability and Configurations: Wiring types will be approved by the equipment manufacturer. Existing wiring will be utilized in retrofit applications. The system shall allow a line distance of up to 2,500 feet to the furthest addressable device on a Class B circuit. To minimize wire routing and to facilitate future additions, t-tapping of the communications channel will be utilized.

2.03 FIRE SAFETY SYSTEMS INTERFACES

A. Supervision: Provide supervisory signals in accordance with NFPA 72 for the following:
   1. Sprinkler water control valves.
   2. Fire pump(s): Trouble signals shall be generated for the following conditions (See NFPA 20, Paragraph 7-4.7, 1999 edition):
      a. Controller has operated into a motor running condition.
      b. Loss of line power on line side of motor starter in any phase.
      c. Phase reversal on line side of motor starter.
      d. Provide 3 (or number required) addressable detector bases and connect to fire pump controller contacts as required.
   3. Elevator shut-down control circuits.

B. Alarm: Provide alarm initiation in accordance with NFPA 72 for the following:
   1. Sprinkler water flow. See below for interface details.
   2. Kitchen hood suppression activation; also disconnect fuel source from cooking equipment. Provide addressable detector bases as required.

3. Elevator lobby, elevator hoistway, and elevator machine room smoke detectors.
4. Duct smoke detectors.
5. Area smoke detectors.
6. Pullstations.

C. Elevators:
1. Elevator lobby, hoistway, and machine room smoke detectors: Elevator recall for fire fighters' service.
2. Sprinkler pressure or waterflow: Shut down elevator power prior to hoistway sprinkler activation.

D. HVAC:
1. Duct Smoke Detectors: Close dampers indicated; shut down air handlers indicated.
2. Provide smoke detectors where smoke control dampers are shown on the mechanical plans. Provide duct detectors where the dampers are located in ductwork, provide area detectors in the plenum where dampers are located in return air openings. The SCDs associated with these detectors shall close as described in the mechanical specifications. Duct type smoke detectors used in this application shall be of the type that do NOT require a minimum air flow to operate.

E. Doors:
1. Smoke Barrier Door Magnetic Holders: Release upon activation of smoke detectors in smoke zone on either side of door, upon alarm from manual pull station on same floor, and upon sprinkler activation on same floor.
2. Electromagnetic Door Locks on Egress Doors: Unlock upon activation of any alarm initiating device or suppression system in smoke zone that doors serve as egress from.

F. Sprinkler System Interface:
1. Water flow switches, valve position indicator switches for sprinkler service valves, and zone control valves shall be provided under Division 23 of specifications.
2. Two separate and distinct signals shall be initiated: one indicating movement of the valve from its normal position and the other indicating restoration of the valve to its normal position.
3. The OFF-NORMAL signal shall be initiated during the first two revolutions of the hand wheel or during one-fifth of the travel distance of the valve control apparatus from its normal position.
4. The OFF-NORMAL signal shall not be restored at any valve position except normal.
5. The main sprinkler control valve(s) and each area/zone valve shall be on a separate fire alarm address.
6. Each flow switch shall be on a separate address. Provide addressable detector bases as previously described.

G. Post Indicator Valve (PIV) and Backflow Preventer (BFP):
1. Connect the PIV and BFP switches to the fire alarm system.
2. Provide waterproof flexible conduit from the switch body, through a WP condulet, to rigid conduit. Route the rigid conduit underground and up into the building, into an accessible ceiling plenum. Conduit size underground shall be minimum 3/4" RGC, coated as specified for underground conduits. Provide conduit inside building as required in other sections of this specification.
3. Provide all required interconnections to building main Fire Alarm Control Panel. Provide addressable interface devices as required for interconnection. Label each addressable device POST INDICATOR VALVE or BACKFLOW PREVENTER as appropriate.
4. Smoke Detectors for Smoke Dampers:
   a. Provide duct mounted smoke detectors within 5' (up or down stream) of the smoke dampers shown on the mechanical plans. Interlock this detector with the smoke damper such that activation of the smoke detector closes the damper, shuts down the serving air handler AND sounds the general alarm. Provide relays as required to make this sequence occur.

2.04 COMPONENTS

A. General:
   1. Provide flush mounted units where installed in finish areas; in unfinished areas, surface mounted unit are acceptable.
   2. Provide legible, permanent labels for each control device, using identification used in operation and maintenance data.

B. Fire Alarm Control Units, Initiating Devices, and Notification Appliances: Analog, addressable type; listed by Underwriters Laboratories as suitable for the purpose intended.

C. Master Control Unit:
   1. Control unit construction shall be modular with solid state, microprocessor based electronics. It shall display the controls and displays essential to operation during a fire alarm condition.
   2. A local audible device shall sound during Alarm, Trouble, or Supervisory conditions. This audible device shall sound differently during each condition to distinguish one condition from another without having to view the panel.
   3. The following controls shall be visible at the control panel:
      a. Multi-character liquid crystal display.
      b. System alarm LED.
      c. Supervisory service LED.
      d. Trouble LED.
      e. "Power on" LED.
      f. Alarm Acknowledge key/switch.
      g. Supervisory Acknowledge key/switch.
      h. Trouble Acknowledge key/switch.
      i. Alarm Silence key/switch.
      j. System reset key/switch.
   4. The following controls and LED's shall be available at the control panel:
      a. Manual evacuation (drill).
      b. Elevator bypass.
      c. Door holder release bypass.
   5. Primary Keys, LED's and LCD Display:
      a. The Control Panel shall have a multi-character liquid crystal display.
      b. The Control Panel shall have the capability of handling at least 400 alarm initiation devices.
   6. Under normal condition the panel shall display a System is Normal message and the current time and date.
   7. Should an abnormal condition be detected the appropriate LED (Alarm, Supervisory or Trouble) shall flash. The panel audible signal shall sound for alarm conditions and for trouble and supervisory conditions.
   8. The LCD shall display the following information relative to the abnormal condition of a point in the system.
      a. Specific location label.
      b. Type of device (i.e. smoke, pull station, waterflow).
      c. Point status(i.e. alarm, trouble).
   9. After all points have been acknowledged, the LEDs shall glow steady and the audible annunciator will be silenced. The total number of alarms, supervisory and trouble conditions shall be displayed along with a prompt to review each list chronologically. The end of the list shall be indicated by an end of list message.
   10. When the "Alarm Silence" button is pressed all alarm signals shall cease operation.
   11. System Reset:
      a. The SYSTEM RESET button/switch shall be used to return the system to its normal state after an alarm condition has been remedied. The LCD display shall step the

user thru the reset process with simple English language messages where multiple steps are required for reset.

b. Should an alarm condition continue to exist a message will be issued and the system will remain in an abnormal state. System control relays shall not reset. The Alarm LED will be on. The display will indicate the total number of alarms and troubles present in system.

12. History Logging: The system shall be capable of logging and storing a minimum of 50 events in an alarm log and 50 events in a trouble log. These events shall be stored in a battery protected random access memory. Each recorded event shall include the time and date of that event's occurrence.
13. Silent Walktest with History Logging:
    a. The system shall be capable of being tested by one person. While in the testing mode the alarm activation of an initiating device circuit shall be silently logged as an alarm condition in the historical data file. The panel shall automatically reset itself after logging of the alarm.
    b. Should the walktest feature be on for an inappropriate amount of time it shall revert to the normal mode automatically.
14. The fire alarm control unit shall allow for loading and editing operating instructions and sequences.
15. The control unit shall be capable of onsite programming to accommodate system expansion and facilitate changes in operation.
16. All software operations shall be stored in a non-volatile programmable memory. Loss of primary and secondary power shall not erase the instructions stored in memory.
17. The control unit shall have the capability of recalling alarms and trouble conditions in chronological order for the purpose of recreating an event history.

D. Remote Annunciators: Provide one.
1. LCD Annunciators:
    a. Provide LCD annunciator where shown on plans.
    b. Annunciator shall identify device initiating alarm or trouble signal.
    c. Provide alarm and trouble silence switches (and drill switch) in annunciator panel.

E. Initiating Devices:
1. Manual Pull Stations:
    a. Manual pull stations shall be addressable. Pull stations shall contain electronics that communicate the station's status (alarm, normal) to the transponder over two wires which also provide power to the pull station. The address shall be set on the station. The station shall mechanically latch upon operation and remain so until manually reset by opening with a key common to all system locks.
    b. The addressable manual station shall be capable of field programming of its "address" location.
    c. There shall be no limit to the number of stations, detectors or Zone Adapter modules, which may be activated or "in alarm" simultaneously.
2. Photoelectric Detector Head:
    a. The photoelectric type detector shall be a plug-in unit which mounts to a twist-lock base, and shall be UL approved.
    b. The detectors shall be of the solid state photoelectric type and shall contain no radioactive material. They will use a pulsed infrared LED light source and be sealed against rear air flow entry.
    c. There shall be no limit to the number of detectors which may be activated or "in alarm" simultaneously.
3. Addressable Photoelectric Duct Detector:
    a. The detector shall be a non-polarized 24VDC type which is compatible with the Fire Alarm Panel. Provide and install all detectors referenced in Division 23.
    b. See Photoelectric Detector Head for unit operation. Detector located in air handling unit(s) supplying operating suites within a Health Care Facility shall contain auxiliary

contacts (SPST, 3 amps, 125 volts minimum. Refer to Instruments and Controls in Division 23 for additional information.

c. Removal of the detector head shall interrupt the supervisory circuit of the fire alarm detection loop and cause a trouble signal at the control panel. Detector design shall provide compatibility with other fire alarm detection loop devices (heat detectors, pull stations, etc.)

d. For maintenance purposes, it shall be possible to clean the duct housing sampling tubes by accessing them through the duct housings front cover. Install detectors as required by NFPA 90A.

e. To minimize false alarms, voltage and RF transient suppression techniques shall be employed as well as an insect screen.

f. Provide duct detectors anywhere a smoke control damper is installed. See the mechanical plans.

g. The detector shall be of the type that does NOT require minimum air flow to operate.

4. Heat Detectors: Thermal detector heads must be UL listed. They will be a combination rate-of-rise and fixed temperature (135 F) type, automatically restorable.

5. Addressable Detector Bases: All addressable smoke detector heads as specified below will be pluggable into their bases. The base will contain electronics that communicate the detector status (normal, alarm, trouble) to the control panel over two wires. The same two wires shall also provide power to the base and detector. Upon removal of the head, a trouble signal will be transmitted to the control panel.

F. Notification Appliances:

1. Audible and/or Visual Units:

a. Provide speakers and amplifiers as required for voice evacuation where required. See plans for speaker locations.

b. Any two visual strobes placed in the same field of view shall flash in synchronization.

c. Note: Strobe lenses may not be lower than 80" AFF. This does not mean the backbox may be at 80", as this would have the strobe lens below 80". Where indicated as "at 80"", this means the bottom of the LENS, strobe lens may be no higher than 96". Strobes may be located higher than 80" AFF if intensity of strobe is increased to the point that effective intensity is the same as a 75 candela strobe placed at 80" AFF. Wall mounted strobes shall still be located minimum 6 inches below ceiling. Contractor shall submit calculations from fire alarm vendor showing no change in effective intensity for strobes mounted higher than 80" AFF.

d. Use minimum 75 candela intensity strobes. Strobes shall be xenon type or equivalent.

e. Flash rate of strobe shall be in the 1 to 2 Hz. range.

f. Maximum pulse duration of strobe shall be 0.2 seconds, with a maximum duty cycle of 40 percent.

G. Circuit Conductors: Copper or optical fiber; provide 200 feet extra; color code and label.

1. Individual conductors shall be numbered utilizing permanently attached markers at all terminations and junction boxes.

2. Detailed wiring diagrams shall be provided showing color coding and numbering of conductors.

H. Surge Protection: In accordance with IEEE C62.41 B3 combination waveform and NFPA 70; except for optical fiber conductors.

1. Provide surge protection devices at the control panel for all power, signal, and control cables/conductors leaving the control panel.

2. Equipment Connected to Alternating Current Circuits: Maximum let through voltage of 350 V(ac), line-to-neutral, and 350 V(ac), line-to-line; do not use fuses.

3. Initiating Device Circuits, Notification Appliance Circuits, and Communications Circuits: Provide surge protection at each point where circuit exits or enters a building; rated to protect applicable equipment; for 24 V(dc) maximum dc clamping voltage of 36 V(dc), line-to-ground, and 72 V(dc), line-to-line.

4. Signaling Line Circuits: Provide surge protection at each point where circuit exits or enters a building, rated to protect applicable equipment.
5. In addition to above, provide surge protection for any circuit exceeding 1000 feet in length.

I. Locks and Keys: Deliver keys to Owner.

J. Instruction Charts: Printed instruction chart for operators, showing steps to be taken when a signal is received (normal, alarm, supervisory, and trouble); easily readable from normal operator's station.
1. Frame: Stainless steel or aluminum with polycarbonate or glass cover.
2. Provide one for each control unit where operations are to be performed.
3. Obtain approval of Owner prior to mounting; mount in location acceptable to Owner.
4. Provide extra copy with operation and maintenance data submittal.

PART 3 EXECUTION

3.01 INSTALLATION

A. Install in accordance with applicable codes, NFPA 72, NFPA 70, and the contract documents.

B. All wiring shall be installed in strict compliance with all of the provisions of the NEC Article 760.

C. All fire alarm conductors shall be installed in EMT out of the wall into an accessible space. Cable must be plenum rated and routed on J hooks to the termination point. The only exception is fire alarm devices in exposed ceilings - no cabling shall be visible in exposed spaces. Use conduit painted to match the other devices in the space.

D. Conceal all wiring, conduit, boxes, and supports where installed in finished areas.

E. Obtain Owner's approval of locations of devices, before installation.

F. Install instruction cards and labels.

G. The manufacturer's authorized representative shall provide onsite supervision of installation and shall provide a Certificate prior to the Final Observation certifying proper operation of the system and all devices.

H. Elevators:
1. Provide relays and contact operations for signaling the elevator controls of initiation of any fire alarm condition and identifying the alarming device.
2. Provide a 1-inch, IMC raceway to the elevator control room.

I. Where NFPA 101 requires acceptance of "equivalent performance", the contractor shall perform all testing and shall make any changes to gain acceptance by the Georgia State Fire Marshal.

3.02 INSPECTION AND TESTING FOR COMPLETION

A. Notify Owner 7 days prior to beginning completion inspections and tests.

B. Notify the State Fire Marshal and comply with their requirements for scheduling inspections and tests and for observation by their personnel.

C. Provide the services of the installer's supervisor or person with equivalent qualifications to supervise inspection and testing, correction, and adjustments.

D. Prepare for testing by ensuring that all work is complete and correct; perform preliminary tests as required.

E. Provide all tools, software, and supplies required to accomplish inspection and testing.

F. Perform inspection and testing in accordance with NFPA 72 and requirements of local authorities; document each inspection and test.

G. Demonstrate the operation of all components of the Fire Alarm System at the final inspection. There shall be a representative from the fire alarm contractor on site for the final inspection. The Architect shall witness all tests.

H. The Contractor shall arrange for a worker to remain at the fire alarm control panel for the duration of the test to report status and reset alarms. The Contractor shall arrange for another

worker to accompany the Architect to each initiating device and to perform all tests. All items required to test the detectors, such as canned smoke, shall be provided by the Contractor. The Contractor shall also demonstrate that each audible and/or visual strobe is functioning properly.

I. Correct defective work, adjust for proper operation, and retest until entire system complies with contract documents.

3.03 PERSONNEL INSTRUCTION

A. Provide the following instruction to designated Owner personnel:
   1. Hands-On Instruction: On-site, using operational system.
   2. Classroom Instruction: Owner furnished classroom, on-site or at other local facility.
   3. Factory Instruction: At control unit manufacturer's training facility.

B. Administrative: One-hour session(s) covering issues necessary for non-technical administrative staff; classroom:
   1. Initial Training: 1 session pre-closeout.

C. Basic Operation: One-hour sessions for attendant personnel, security officers, and engineering staff; combination of classroom and hands-on:
   1. Initial Training: 1 session pre-closeout.

D. Detailed Operation: Two-hour sessions for engineering staff; assume NICET level I qualifications or equivalent; combination of classroom and hands-on:
   1. Initial Training: 1 session pre-closeout.
   2. Refresher Training: 1 session post-occupancy.

E. Maintenance Technicians: Detailed training for electrical technicians, on programming, maintaining, repairing, and modifying; factory training:
   1. Refresher Training: One 1-day session post-occupancy.

F. Furnish the services of instructors and teaching aids; have copies of operation and maintenance data available during instruction.

3.04 CLOSEOUT

A. Closeout Demonstration: Demonstrate proper operation of all functions to Owner.
   1. Be prepared to conduct any of the required tests.
   2. Have at least one copy of operation and maintenance data, preliminary copy of project record drawings, input/output matrix, and operator instruction chart(s) available during demonstration.
   3. Have authorized technical representative of control unit manufacturer present during demonstration.
   4. Demonstration may be combined with inspection and testing required by the State Fire Marshal; notify in time to schedule demonstration.
   5. Repeat demonstration until successful.

B. Substantial Completion of the project cannot be achieved until inspection and testing is successful and:
   1. Approved operating and maintenance data has been delivered.
   2. Spare parts, extra materials, and tools have been delivered.
   3. All aspects of operation have been demonstrated to Owner.
   4. Final acceptance of the fire alarm system has been given by the State Fire Marshal.
   5. Specified pre-closeout instruction is complete.

END OF SECTION