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**PART 1 GENERAL****1.1 RELATED DOCUMENTS**

- A. The requirements of the General Conditions, Supplementary Conditions and the following specification sections apply to all Work herein:
1. Section 28 31 10 - FDAC General Requirements
  2. Section 28 31 20 - FDAC Scope of Work
  3. Section 26 05 19 - Electrical Conductors-600 Volt
  4. Section 26 05 26 - Grounding
  5. Section 26 29 13 - Individual Motor Controllers
  6. Section 28 31 40 - FDAC Testing

**1.2 SUMMARY**

- A. The FDAC Subcontractor shall furnish, install and place in operating condition a complete microprocessor based 24 Volts DC, electrically supervised, addressable fire detection, alarm and communication ("FDAC") system as specified herein and indicated on the Drawings. The system shall include, but not be limited to, all central control equipment, networked connected remote control panels, power supplies, dual channel communications, amplifiers, initiating and signaling devices, graphic panels, override control panels, remote annunciator panels, printers, wire, fittings and all other accessories required to provide a complete and operable system.
- B. The system shall operate as a noncoded, continuous sounding system, which will sound alarm devices until manually silenced, as herein specified.
- C. The system shall be wired as a Class A, style 7 system for the system networked communication loop and as a Class B system for all other SLC, IDC, and NAC circuits.

**1.3 REFERENCE STANDARDS**

- A. The complete FDAC system and all components shall be designed, manufactured and tested in accordance with the Underwriters Laboratories, Inc. requirements and listing for use in Fire Protective Signaling Systems and the latest applicable industry standards including the following:
1. UL Standard 38 - Manual Alarm Stations
  2. UL Standard 217 - Smoke Detectors - Single/Multiple Station
  3. UL Standard 228 - Door Holders - Closers
  4. UL Standard 268 - Smoke Detectors - Systems
  5. UL Standard 268A - Duct Smoke Detectors
  6. UL Standard 464 - Audible Signaling Appliances
  7. UL Standard 521 - Heat Detectors
  8. UL Standard 864 - Control Panels
  9. UL Standard 1971 - Visual Signaling Appliances
  10. UL Standard UUKL - Smoke Control
  11. Americans with Disabilities Act of 1990 (ADA)
  12. NFPA 13 - Sprinkler Systems
  13. NFPA 70 - National Electrical Code (NEC)
  14. NFPA 72 - Protective Signaling Systems
  15. NFPA 90A - Air Conditioning Systems
  16. NFPA 101 - Life Safety Code
- B. All equipment and material to be furnished and installed on this Project shall be UL or ETL listed, in accordance with the requirements of the authorities having jurisdiction, and suitable for its intended use on this Project.

**1.4 QUALITY ASSURANCE**

- A. The installing Subcontractor shall be an authorized representative of the fire alarm manufacturer to sell, install and service the proposed manufacturer's equipment. The installing Subcontractor shall have

- represented the fire alarm manufacturer's product and been actively engaged in the business of selling, installing and servicing fire alarm systems for at least ten (10) years.
- B. The installing Subcontractor shall be licensed by the State Fire Marshall to sell, install and service fire alarm systems as required by the State of California Insurance Code.
  - C. The installing Subcontractor shall have on his staff a licensed fire alarm technician or a fire alarm planning superintendent licensed by the State Fire Marshall's office for such purpose and under whose supervision installation, final connections and check out will take place as required by the State of California Insurance Code.
  - D. The installing Subcontractor or equipment supplier shall have on staff a minimum of one (1) state licensed fire alarm planner under whose supervision system design shall take place.
  - E. The installing Subcontractor shall provide twenty-four (24) hour, three hundred and sixty-five (365) days per year emergency service with factory trained, state licensed service technicians.

### 1.5 SUBMITTALS AND PROPOSALS

- A. The following submittal data shall be furnished according to the General Conditions and Section 28 31 10 and shall include, but not be limited to:
  - 1. Fire Detection, Alarm and Communication System\* including:
    - a. Control panel wiring and interconnection schematics.
    - b. Complete point to point wiring diagrams, including Composite Wiring Diagrams as specified in Section 28 31 10 for all equipment where there is joint responsibility for monitoring and/or control by other trades.
    - c. Riser diagrams showing devices, equipment, and interconnecting conduit and wire. Indicate points of connection to other equipment such as motor controllers, damper actuators, fire pump controllers, pre-action fire protection systems, elevator machine rooms and shafts, electric door locking hardware, fire door releases, magnetic door holders, and other related devices and equipment.
    - d. Complete 1/8" = 1'-0" scale floor plan drawings locating all system devices and 1/4" = 1'-0" scale plan and elevation drawings of all equipment in the Fire Command Center.
    - e. Factory data sheets on each piece of equipment proposed.
    - f. Detailed system operational description. Any Specification differences and deviations shall be clearly noted and marked.
    - g. Complete system bill of material.
    - h. Scaled detail drawings of FACP, FARA, FARPs, FCIP, and VCS panel fronts.
    - i. Wiring diagram for each device. Include connection details to auxiliary equipment.
    - j. Control and wiring diagrams for smoke control sequences.
    - k. Complete narrative of the sequence of operation.
    - l. Sequence of operation matrix table including a complete line-by-line listing of fire alarm initiating devices, corresponding device address, and input/output matrix.
  - 2. All submittal data will be in bound form with the Electrical Subcontractor's name, supplier's name, Project name and the State of California Fire Alarm Certificate of Registration number adequately identified.
  - 3. Only basic equipment devices have been shown on the Contract Documents. Specific wiring between equipment/devices may not be shown. It is the FDAC Subcontractor's responsibility to submit for approval the complete engineered system configuration and layout showing all devices, wiring, Voltage drop calculations., Battery sizing calculations, VCS amplification sizing calculations, Visual alarm power supply sizing calculations, Wire identification schedule, All drawings must be stamped and signed for approval by the Fire Marshal, and locations along with other required information as specified herein to provide a complete operational system as specified.
  - 4. Fire detection, alarm and communication system, including sequence, equipment and function shall be supplied without exception. No matter how minor, any deviations from these Specifications shall be submitted in written form with the FDAC Subcontractor bid proposal to the Owner for review by the Engineer. Complete Drawings and itemizations of deviations shall be included with the proposal.
  - 5. All drawings must be stamped and signed for approval by the FDAC Subcontractor registered as a professional engineer in the State of California.

- B. The Subcontractor shall include a Specification Compliance Review as described in Section 28 31 20 with his bid proposal. The Compliance Review will be a paragraph-by-paragraph review of the Specifications with the following designations "C", "D", or "N/A" marked in the margin beside each paragraph.
- C. All items or equipment listed above with asterisks (\*) shall be certified by the manufacturer using Manufacturer Certification "MCA" as set forth in Section 28 31 10. See Section 28 31 10 for certification requirements.
- D. Coordination: It shall be the responsibility of the installing FDAC Subcontractor to coordinate all requirements surrounding installation of the fire alarm system with all other trades. In accordance with the Subcontractor Scheduling Procedures in Section 28 31 20 titled "FDAC Systems Scope of Work", the Subcontractor shall submit a complete and detailed point schedule Shop Drawing to the Engineer and the Division 25 Subcontractor for review. The point schedule shall include the location of points, quantity of points, function, contact closure type, etc. In accordance with the Subcontractor Scheduling Procedures in Section 28 31 20 titled "FDAC Systems Scope of Work", all Shop Drawings and Product Data shall be complete and submitted to the Engineer for review.
- E. Minutes of fire management system Contractor's meeting with Fire Department.

#### 1.6 WARRANTY AND MAINTENANCE

- A. Comply with the requirements of the General Conditions and Section 28 31 10.
- B. As part of the alternates associated with the FDAC system, provide separate pricing for two (2) years of system maintenance and service herein called the "MS Package", in addition to (and during) the two (2) year warranty period for the entire fire detection, alarm and communication system. Provide a separate price for this package as part of the bid proposal. The MS Package is to include complete testing of the system in accordance with NFPA requirements, all service calls required to correct nuisance trips and all emergency repairs required for the system. The MS Package is to include any changes required to the central fire alarm control panel(s), any remote fire alarm control panels, alarm and communication panels, and networked communication wiring due to the addition of Tenant area devices (detectors, strobes, speakers, etc.) and shall include, but is not limited to, alarm and voice communication amplifiers and visual strobe power supplies. Tenant Improvement devices not shown on the Drawings, such as speakers, strobes and smoke detectors are part of Tenant improvement Work and are not included in this MS Package. All riser wiring and control panel changes required for Tenant Improvement Work are to be included at no additional cost to the Owner in the MS Package.

### PART 2 PRODUCTS

#### 2.1 ACCEPTABLE MANUFACTURERS

- A. If it complies with these Specifications, fire detection, alarm and communication systems manufactured by one of the following manufacturers will be acceptable:
  - 1. EST (Alternate FDAC-1).
    - a. EST MS Package (Alternate FDAC-1A).
  - 2. Notifier (Alternate FDAC-2).
    - a. Notifier MS Package (Alternate FDAC-2A).
  - 3. Siemens (Alternate FDAC-3).
    - a. Siemens MS Package (Alternate FDAC-3A).
  - 4. Simplex (Alternate FDAC-4).
    - a. Simplex MS Package (Alternate FDAC-4A).
- B. All equipment, materials, accessories, devices, etc. covered by the Specifications and/or noted on the Contract Documents shall be new and unused and be UL listed for their intended use.
- C. Equipment of other manufacturer's may be considered as equal to that specified provided that the following information is provided to the Architect/Engineer for approval ten (10) days prior to the bid date.
  - 1. Specification sheets for each piece of equipment proposed.
  - 2. Line-by-line Specification Compliance Review stating compliance or deviation and explanation of each deviation. See Section 28 31 10.

3. A reference list of ten (10) similar systems installed by the licensed fire alarm Subcontractor including contacts and telephone numbers.
- D. Refer to Section 28 31 10 for requirements associated with prohibited manufacturer markings all on equipment and/or devices located in public areas, tenant areas and similar locations.

## 2.2 FIRE COMMAND CENTER

- A. The fire alarm control panel and communications panel shall be provided and located where indicated. The fire alarm and communications panels shall be surface mounted and provide detection, amplification, control, signal transmission and supervision as herein specified. The fire command center shall include:
  1. Fire alarm control panels and alarm printer.
  2. Communication panels.
  3. Firefighter's override control and indicating (FCIP) panel for controlling smoke exhaust fans pressurization fans, air handling units, ventilating fans and dampers in accordance with the local authorities having jurisdiction.
  4. Generator remote alarm and status indication (Division 26 Subcontractor). Refer to Section 26 32 13 titled "Engine Generators".
  5. Fire pump alarms and status indication. Refer to Division 21 Section 21 30 00 titled "Fire Pumps and Controllers" (interlock contacts by Division 21 Subcontractor and alarms and status indication to be provided and connected by FDAC Subcontractor).
  6. Elevator monitor and status panel (Division 14 Subcontractor).
  7. Door unlocking systems controls. Coordinate requirements with Division 28 Building Security Systems Subcontractor and door hardware supplier.
  8. Public telephone (by Owner).

## 2.3 SYSTEM OPERATION

- A. Normal Operation:
  1. Under normal supervisory conditions the Fire Alarm Control Panel shall be silent and display the time, day-of-week and date on the top line of the visual display. Loss of operating power shall result in an audible trouble signal, which shall be silenceable. Alarm notification shall be as specified herein.
- B. System Alarm Detection:
  1. The operation of an automatic or manual alarm initiating device shall cause the following functions to occur. Refer to the "Sequence of Operation" hereinafter for additional requirements.
    - a. The internal audible device shall sound. Acknowledging the alarm condition shall silence only the internal audible device.
    - b. A minimum 160 character backlit LCD Display shall indicate all applicable information associated with the alarm condition including device type, device location, date and time.
    - c. Change of state information shall be transmitted to the system printer.
    - d. Any remote or local annunciator LCD display shall indicate all applicable information associated with the alarm condition including device type, location, date and time.
    - e. A remote signaling circuit shall be activated relaying the alarm signal to remote annunciator at the Building Security Desk, the Engineer's Office, and the Building Manager's Office.
    - f. All automatic events programmed to the alarm point shall be executed and the associated indicating devices and/or outputs activated.
    - g. Alarm tones associated with the alarm zone shall sound. After a predetermined time the alarm tones will stop and a digitized voice message shall be automatically transmitted throughout the facility.
    - h. Flash strobe lights.
    - i. Deactivate HVAC systems over 2,000 CFM.
    - j. Activation of duct smoke detectors associated with outside air fans shall shutdown their respective units.
    - k. Unlock designated doors.
    - l. Recall elevators as specified hereinafter and in Division 14.

- C. System Trouble Detection:
  - 1. When a trouble condition is detected the following functions shall immediately occur.
    - a. The system internal audible device shall sound. Acknowledgment of the trouble condition shall silence only the internal audible device.
    - b. The 160 character alphanumeric LCD annunciator shall display all applicable information associated with the respective trouble condition and its location.
    - c. Change of state information shall be transmitted to the system printer.
    - d. The system common trouble indicator on associated remote annunciators shall be illuminated as specified herein.
- D. Elevator Recall:
  - 1. Upon activation of the cross zoned detectors associated with an elevator lobby, machine room, or hoistway, that elevator bank shall be automatically recalled as specified in Division 14.
- E. Auxiliary Control Functions:
  - 1. All designated "nonsilenceable" auxiliary control functions shall remain in operation (even upon silencing of audible alarms) until such time as the control panel is cleared and reset manually (i.e. fan control outputs, central station interface, elevator recall interface, etc.).

## 2.4 SYSTEM ARCHITECTURE

- A. The system shall utilize central and remote networked control panels for distributed monitoring, voice communications, alarm and strobe circuits, addressable initiating circuits and auxiliary control output circuits. Remote control panels shall communicate with the central control panel via a Class A, style 7 wired network data loop. A minimum of one (1) networked, stand alone, fully functional control panel shall be provided for every eight (8) levels within the building. Additional control panels shall be provided for each garage area.
- B. The system shall employ intelligent smoke detectors and intelligent interface devices capable of being recognized and annunciated at the main control panel and all remote networked control panels on an individual basis. All zoning/device location information shall be totally field programmable to exact job requirements as approved by the Architect/Engineer and as required by the local authorities.

## 2.5 FIRE ALARM SYSTEM COMPONENTS, ZONING, AND SEQUENCES

- A. The fire alarm control panels shall be modular in design utilizing solid state microprocessors and be capable of future expansion. The microprocessor based CPU's (master logic module) shall be completely field programmable. All circuitry shall be UL listed for power limited application.
- B. The alarm control panels shall be one of the following with all necessary components for a complete and operating system:
  - 1. EST-3.
  - 2. NOTIFIER – NFS2-3030.
  - 3. SIEMENS – XLS.
  - 4. SIMPLEX – 4100U.
- C. All programs shall be held in nonvolatile memory and shall not be lost even if both system primary and secondary power failure occurs. The alphanumeric visual display shall show the time-of-day, day-of-week, month, and year. Upon operator request, the normal visual display shall be replaced with the status of any system point or system trouble called up. All incoming signals shall be displayed for acknowledgment and all operator entries made through the keyboard shall be displayed.
- D. When displaying system information or requesting data for display or print, the visual display shall prompt the operator. The prompt messages shall appear on the visual display. The panel audible shall emit several types of signals depending upon the signal being displayed for acknowledgment.
- E. The operator control keypad shall permit the operator to perform various functions within four (4) or more different levels of access.

- F. The control panel shall have the capability to perform the following actions from the system keypad. Each operator action listed below shall be initiated by a dedicated, labeled action switch.
1. ACKNOWLEDGE
  2. ALARM SILENCE
  3. SYSTEM RESET
- G. The control panel will be so arranged that maintenance personnel will have the capability of modifying system operating parameters or displaying data at any remote fire alarm control panel independent of the operator's display at the Fire Command Center.
- H. Automatic Detector Test:
1. Detectors will be continually supervised for placement and operational parameters. Device failures including loss of communication, incorrect device type, and maintenance indications shall be reported to the fire alarm controller within 30 seconds.
- I. Special System Reports:
1. The system shall have the ability to generate and print, upon command, system reports.
- J. Field Programming:
1. The system shall be one hundred (100%) percent field programmable without the need for PROM programmers and shall not require replacement of memory ICs. Systems requiring factory programming/reprogramming or replacement of memory IC Chips shall not be acceptable. All programs shall be stored in nonvolatile memory. System programming shall not require the system to be taken offline nor prohibit the system from performing its normal operations and routines. The system shall be capable of revising/changing programmed functions at anytime as described herein without factory modifications or factory programming. Programming shall be accomplished only after entering the appropriate password.
- K. Event History:
1. The main fire alarm panel shall have the resident ability to store a minimum of six hundred (600) system events, three hundred (300) alarms and three hundred (300) troubles, in chronological order of occurrence. Event history shall include all system alarms, troubles and major component failures. Events shall be time and date stamped. Events shall be stored in nonvolatile buffer memory. Access to history buffer shall be secured via a four (4) digit password security code.
- L. Power Supply:
1. The power supplies shall provide all control panel and peripheral power needs with filtered power. The audiovisual power shall be increased as needed by adding additional modular expansion power supplies. All power supplies shall be designed to meet UL and NFPA requirements for power limited operation on all external signaling lines, including initiating circuits and indicating circuits. The power supplies shall include a brownout feature as defined by UL. The system shall automatically switch to battery power.
- M. Operating Power:
1. Operating power shall be 120 Volts, 60 Hertz, AC, conforming to the requirements of NFPA 72 with supervising power to indicate a power failure. Standby battery and charger shall be furnished to register a trouble condition in the event of brownout or loss of 120 Volts AC power. While on battery power, the control unit shall continue to supervise all installation wires. The batteries shall be supervised for low battery and no battery. The entire FDAC system shall operate satisfactorily without any degradation in performance when applied and connected to the building electrical power distribution system that has disturbance levels up to the maximum allowed in IEEE Standard 519-1992, Table 10.2, for General Systems (480 Volts) applications. An external power conditioner shall be provided to guard against transient voltage spikes, notching and harmonics. A voltage regulator shall be installed between the normal power source and the fire detection, alarm and communication control panels as required.
- N. Standby Power:
1. The system shall be designed to operate on a standby power source. A standby backup battery source (sealed lead acid or electrolyte gel batteries), upon failure of the normal power source, shall automatically and instantly provide power to the fire alarm and detection systems. This standby battery

source shall be sufficient to provide a minimum of twenty-four (24) hours of complete system standby operation. When the normal power source is restored, the system shall automatically switch from battery power to normal power. At the end of this twenty-four (24) hour standby period, the standby battery power source shall be able to provide sufficient power for fifteen (15) minutes of continuous operation in the alarm mode with all systems fully operational and in use. Amplifiers shall be assumed to be operating at their full power condition. The standby batteries shall be furnished with an automatic battery charger with capacity to recharge fully discharged batteries to eighty percent (80%) minimum recharge within twenty-four (24) hours. The normal power source shall be defined as the building power from the outside utility or the standby electrical generation system within the building.

O. Wiring:

1. The FDAC Subcontractor shall furnish and install all wiring as required for a complete and functioning fire detection, alarm and communication system, and as required to connect other devices furnished under Divisions 21, 22, 23, 25, and 26. See Section 26 05 19 titled "Electrical Conductors-600 Volt" for wiring requirements including permissible uses of plenum rated wiring in lieu of conduit for individual devices.
2. The FDAC Subcontractor shall furnish and install all necessary wiring and terminal strips as required to each elevator machine room to connect alarm speakers and firefighter's phone handsets located in each elevator cab. The handset location shall be indicated by the Architect. The elevator Subcontractor will provide all traveling cable in the hoistway and wiring from the terminal strips to the traveling cable and from the traveling cable to the cabs.
3. All wiring for interface with equipment normally controlled by Division 25 shall be terminated on terminal strips within the FDAC system control panels or termination cabinets. FDAC control panels and termination cabinets shall be located in the space indicated on the Drawings.
4. Vertical conduit risers for the FDAC system shall be installed inside a two (2) hour fire rated enclosure provided by the Contractor. Horizontal offsets shall utilize circuit integrity (CI) two (2) hour fire rated cable assemblies or other means as approved by the local authorities having jurisdiction to achieve two (2) hour fire rating.
5. All wiring, materials and installation shall be as specified herein and in Section 26 05 19 titled "Electrical Conductors-600 Volt" and Section 26 05 33 titled "Raceways and Boxes".
6. The FDAC Subcontractor shall furnish and install signal wiring in each mechanical room or as required, to provide the following signals necessary to the operation of the equipment specified hereinafter in the "Fire Safety Sequences".
  - a. A separate signal to each floor in the mechanical room to indicate to the Division 25 BMCS a general fire alarm condition in the building and that this floor is a nonfire floor.
  - b. A separate signal to each floor in the mechanical room to indicate to the Division 25 BMCS a general fire alarm condition in the building and that this floor is the fire floor of incidence.

The FDAC Subcontractor shall furnish and install signal wiring to all automatic fire, smoke and/or combination fire/smoke dampers as necessary to provide the operation of the equipment specified hereinafter in the "Fire Safety Sequences".

The Division 26 Subcontractor shall provide the power wiring from the standby power system to the fire, smoke and/or combination fire/smoke damper actuators.

Coordinate signal requirements with the systems specified in Division 25. The shop drawing point-to-point wiring diagrams specified herein shall clearly indicate all interface requirements.

P. Audio/Visual Communications:

1. The voice/tone/strobe communications panel shall offer dual channel communications, be modular in design, and be provided with means to selectively and simultaneously activate voice, tones, strobes or digitized messages to any or all zones in the system automatically or via switch controls. In addition, visual indication by zone will be provided. The voice/tone/strobe panel shall incorporate the following controls and indicators:
  - a. Allcall.
  - b. Dynamic paging microphone.
  - c. Manual control.
  - d. Alarm/paging zone select switches.
  - e. Firefighter's Telephone System.
2. Each audio/speaker and visual/strobe circuit will be totally supervised for opens, shorts or grounds. All circuits shall be power limited. Each zone shall be provided with a "trouble" LED on the auto zone select module for circuit trouble conditions and an "active/on" LED indicator with the associated control switch.

3. Alarm/Paging zones shall be provided as follows:  
Each floor of the building shall have a separate zone (horizontal zones) served from local floor panels and/or vertical conduit risers located in a fire rated enclosure. Each floor shall have the quantity of speaker horns and strobes as required herein and as shown on the Drawings. In addition, provide the following zones:
    - a. Penthouse mechanical areas (one zone).
    - b. Central plant (one zone).
    - c. Building engineer's office (one zone).
    - d. Exit stairways (one vertical zone each stairway).
    - e. Each bank of elevators in a rise (one vertical zone each bank).
    - f. Main switchgear room (one zone).
    - g. Garage parking areas (one zone per level).
    - h. Provisions for ten (10) additional future separate zones.
    - i. Standby generator and emergency switchgear room (1 zone).
    - j. Public lobby (1 zone).
  4. Tenant Improvement Capacity: System shall have the amplifier and power supply capacity, including circuit quantity, as necessary to accommodate the following tenant area device additions:
    - a. Twenty (20) speakers (tapped at 2 watts) per typical office floor.
    - b. Twenty-five (25) visual strobes (75 candela) per typical office floor.
  5. Provide a single "all call" switch or pushbutton for either voice communication or alarm signals into all zones at one time. Provide an additional "all call" switch or pushbutton for either voice communication or alarm signals only into all stairways and elevator cabs at one time.
  6. The audio/visual communication zones shall be designated by floor level wherever possible.
  7. The voice/tone/strobe communication system shall be a microprocessor based, supervised control unit. Each subcircuit of the communications center shall be fully supervised and failure of any tone oscillator or amplifier shall revert the system to the default standby circuits. The communication shall be either EST-3, NOTIFIER DVC, SIEMENS - XLSV or SIMPLEX SERIES 4100 VOICE COMMUNICATION SYSTEM.
  8. The system shall have the ability to provide any combination of custom field programmable digitized messages and/or alarm tones. Mechanical tape decks/drives shall be deemed unacceptable.
  9. The system shall provide dual channel communications and distributed amplification. The system shall be capable of amplifier capacity and expansion as required. Each amplifier shall be continuously monitored electronically for proper output level. Each amplifier shall provide up to a maximum of 180 watts of 70 Volts rms power. Each unit shall be equipped with its own amplifier "trouble/fail" indication. The system shall provide automatic standby amplification for every amplifier in the system. Up to three (3) amplifiers shall be backed up by one (1) secondary amplifier. Transfer from any faulty amplifier to the standby unit shall be fully automatic. Amplifiers shall be sized for 1 watt speaker settings.
  10. The fire alarm alert tone shall be a slow whoop tone in the Code 3 temporal pattern with standby default temporal tone in the event the primary audio source fails. Transfer to fire alert tone shall be automatic upon failure of any digitized voice message.
- Q. Remote Networked Control Panels (FARP):
1. Remote fire alarm control panels shall be distributed throughout the facility as specified herein and where needed by the specific system manufacturer in areas designated by the Drawings. Remote control panels shall be self-sufficient and provide input/output interface between all field devices/equipment and the central fire alarm control panel. The remote control panels shall operate in a peer-to-peer topology over the network communications cabling. Each unit shall be provided with an operator control keypad and LCD annunciator and capable of operating independently and performing its normal sequence of operation should communication with the central fire alarm control panel be disrupted.
- R. Field Devices:
1. Intelligent Photoelectric Smoke Detectors:  
Intelligent photoelectric smoke detectors with bases shall be provided where indicated on the Drawings. Photoelectric smoke detectors shall be either:
    - a. SIEMENS HFP-11 SERIES.
    - b. EST SIGA2-PS.
    - c. NOTIFIER MODEL FSP-851.
    - d. SIMPLEX 4098-9714/4098-9792.



2. Intelligent Duct Mounted Smoke Detectors:  
Intelligent duct mounted smoke detectors shall be provided by the Division 28 FDAC Subcontractor for installation by Division 23 in the supply and/or return air ductwork of air handling units where indicated on the Drawings and as required by the local authorities. Duct mounted smoke detectors shall be either:
  - a. SIEMENS AD2-P/HFP-11.
  - b. EST SIGA-SD.
  - c. NOTIFIER MODEL DNR/FSP-851.
  - d. SIMPLEX 4098-9756.
3. Thermal Detectors:  
Thermal detectors shall be provided where indicated on the Drawings. Automatic heat detectors will be combination rate-of-rise and fixed temperature type. Thermal detectors shall be either:
  - a. SIEMENS HFPT-11 SERIES.
  - b. EST SIGA-HRS.
  - c. NOTIFIER MODEL FST-851.
  - d. SIMPLEX 4098-9733/4098-9792.
4. Manual Fire Alarm Stations:  
Manual fire alarm stations shall be provided where indicated on the Drawings and as required by the local authorities. Manual fire alarm stations shall be addressable dual action type and shall have an integral transmitter. Manual pull stations shall be provided without the manufacturer's logo visible from the front of the device. Fire alarm stations shall be either:
  - a. SIEMENS HMS-D.
  - b. EST SIGA-278.
  - c. NOTIFIER MODEL NBG-12LX.
  - d. SIMPLEX 4099-9012.
5. Addressable Transmitters/Monitor Modules:  
Addressable transmitters/monitor modules shall be provided where required to interface with contact alarm devices. Transmitters/monitor modules shall be either:
  - a. SIEMENS HTRI-S SERIES.
  - b. EST SIGA CT SERIES.
  - c. NOTIFIER MODEL FMM-1 MONITOR MODULE.
  - d. SIMPLEX 2190 ZONE ADAPTER MODULE.
6. Addressable Relay Modules:  
Addressable relay modules shall be provided where required to provide audible alarm interface and/or relay control interface. Relay modules shall be either:
  - a. SIEMENS HTRI-R SERIES.
  - b. EST SIGA CR SERIES.
  - c. NOTIFIER MODEL FRM-1.
  - d. SIMPLEX 2190 CONTROL ZONE ADAPTER MODULE.
7. Printer:  
A high impact dot matrix printer(s) shall be provided. The printer shall provide hard copy printout of all changes in status of the system and shall time stamp such printouts with the current time-of-day and date. The printer shall be standard carriage with eighty (80) characters per line and shall use standard pin feed paper. The printer shall communicate with the control panel using a fully supervised interface. Power to the printer shall be 120 Vac. The printer shall print all status information including status, zone, device/point and programmed custom ID messages. The printer shall be either:
  - a. SIEMENS PAL-1.
  - b. EST EST-PT-1S.
  - c. NOTIFIER PRN-6.
  - d. SIMPLEX 4190-9007.
8. Remote LCD Annunciator:  
Provide where indicated on the Drawings and as specified herein a supervised remote LCD annunciator. Annunciators shall be field programmable to annunciate alarm or trouble indication at selected given points and/or zones. Annunciators shall be either:
  - a. SIEMENS SSD.
  - b. EST 3-6ANN.
  - c. NOTIFIER NCA-2.
  - d. SIMPLEX 4603-9101.
9. Audible Alarm Horns:  
Audible alarm horns shall be listed under UL Standard 464 and meet all specifications of the NFPA 101 Life Safety Code. Horns shall provide a selectable continuous horn tone or a temporal pattern (code 3)

tone with two dB settings (minimum 91 dBA at low setting with a minimum increase of 4 dBA at high setting – anechoic at 10'). Horns shall be provided with screw terminal connection points. Where two or more horns are within hearing distance, a synchronization module shall be provided to ensure a distinct tone pattern within the space.

Horns installed in conditioned spaces shall be wall mounted semi-flush with red finish. Horns shall be provided as indicated on the Drawings and as required for proper coverage. If the horns comply with these specifications, they shall be either:

- a. SIEMENS U-MMT SERIES.
- b. EST GENESIS SERIES.
- c. SPECTRALERT SERIES (System Sensor).
- d. WHEELock NH SERIES.

Horns installed in un-conditioned spaces, exterior locations, or in parking decks shall be wall or surface mounted, red finish, weatherproof devices, suitable for an ambient temperature range of -31 F to 150 F. Devices shall be mounted to a surface mounted weatherproof backbox. Speakers shall be provided as indicated on the Drawings and as required for proper coverage. If the horns comply with these specifications, they shall be either:

- e. SIEMENS Z SERIES.
- f. EST GENESIS WG4 SERIES.
- g. SPECTRALERT WEATHERPROOF SERIES (System Sensor).
- h. WHEELock AHWP SERIES.

10. Audible Alarm Speakers:

Audible alarm speakers shall be listed under UL Standard 1480, meet all specifications of the NFPA 101 Life Safety Code and be capable of reproducing both tone alerts and voice communication instructions. Speakers shall have built in matching transformer, field selectable multiple power taps and circuitry for speaker/line supervision. Speaker shall be provided with screw terminal connection points. Speakers shall be provided without manufacturer's logos.

Speakers shall be round with textured white decorative metal grill. Speakers shall be tapped to produce a minimum sound pressure level of 86 dBA at 10'.

Speakers installed in conditioned spaces shall be ceiling mounted and provided as indicated on the Drawings and as required for proper coverage. If the speakers comply with these specifications, they shall be either:

- a. SIEMENS SEF SERIES.
- b. EST GENESIS SERIES.
- c. SPECTRALERT SPR SERIES (System Sensor).
- d. SIMPLEX SERIES 4902.
- e. WHEELock ET 90 SERIES.

Speakers installed in un-conditioned spaces, exterior locations, or in parking decks shall be wall or surface mounted, red finish, weatherproof devices, suitable for an ambient temperature range of -31 F to 150 F. Devices shall be mounted to a surface mounted weatherproof backbox. Speakers shall be provided as indicated on the Drawings and as required for proper coverage. If the speakers comply with these specifications, they shall be either:

- f. EST GENESIS WP4 SERIES.
- g. SPECTRALERT SPR WEATHERPROOF SERIES (System Sensor).
- h. WHEELock ET 1010-R SERIES.

11. High Intensity Visual Signals:

High intensity visual signals shall be provided where shown on the Drawings and as may be required by the Americans with Disabilities Act (ADA, Public Law 101-336).

High intensity visual signals shall be xenon strobe type producing the minimum candela rating as defined by the ADA and NFPA 72 for the space being covered or as shown on the Drawings, whichever is greater. All strobes visible in any one area shall be synchronized. Strobes shall operate in unison with audible alarm appliances. High intensity visual signals shall be of solid state low current design and listed to UL Standard 1971. Signal devices shall be wall mounted at 80" above the highest floor level within the space or 6" below the ceiling, whichever is lower. High intensity visual signals shall be provided without manufacturer's logo.

High intensity visual signals installed in conditioned spaces shall be white finish, low profile type. If the visual signals comply with these specifications, they shall be either:

- a. SIEMENS ZR SERIES.
- b. EST GENESIS SERIES.
- c. SPECTRALERT SERIES (System Sensor).

- d. SIMPLEX SERIES 4903 TRUEALERT.
- e. WHEELock RSS SERIES.

High intensity visual signals installed in un-conditioned spaces, exterior locations, or in parking decks shall be wall or surface mounted, red finish, weatherproof devices, suitable for an ambient temperature range of -31 F to 150 F. Devices shall be mounted to a surface mounted weatherproof backbox. If the visual signals comply with these specifications, they shall be either:

- f. SIEMENS ST\_WP SERIES.
  - g. EST GENESIS WP4 SERIES.
  - h. SPECTRALERT WEATHERPROOF SERIES (System Sensor).
  - i. WHEELock RSSWP SERIES.
12. Combination Audible Alarm Horns and Visual Signals:

Where shown on the drawings as combination alarm horns and visual signals, devices shall meet the requirements specified hereinbefore for the individual components and be housed within a single unit. Combination units shall be provided without manufacturer's logos.

Combination units installed in conditioned spaces shall be white finish semi-flush wall mounted and provided as indicated on the Drawings and as required for proper coverage. If the combination units comply with these specifications, they shall be either:

- a. SIEMENS U-MMT-MCS SERIES.
- b. EST GENESIS SERIES.
- c. SPECTRALERT SERIES (System Sensor).
- d. SIMPLEX SERIES 4903 TRUEALERT.
- e. WHEELock NS SERIES.

Combination units installed in un-conditioned spaces, exterior locations, or in parking decks shall be wall or surface mounted, red finish, weatherproof devices, suitable for an ambient temperature range of -31 F to 150 F. Devices shall be mounted to a surface mounted weatherproof backbox. Combination units shall be provided as indicated on the Drawings and as required for proper coverage. If the combination units comply with these specifications, they shall be either:

- f. SIEMENS U-HN-MCS SERIES.
- g. EST GENESIS WP4 SERIES.
- h. SPECTRALERT WEATHERPROOF SERIES (System Sensor).
- i. WHEELock ASWP SERIES.

Where combination devices are not available in weatherproof configurations, individual horns and visual signals shall be provided.

13. Combination Audible Speakers and Visual Signals:

Where shown on the drawings as combination audible speakers and visual signals, devices shall meet the requirements specified hereinbefore for the individual components and be housed within a single unit. Combination units shall be provided without manufacturer's logos.

Combination units installed in conditioned spaces shall be white finish semi-flush wall mounted and provided as indicated on the Drawings and as required for proper coverage. If the combination units comply with these specifications, they shall be either:

- a. SIEMENS SEF SERIES.
- b. EST GENESIS SERIES.
- c. SPECTRALERT SP-2 SERIES (System Sensor).
- d. SIMPLEX SERIES 4903 TRUEALERT.
- e. WHEELock ET 70 SERIES.

Combination units installed in un-conditioned spaces, exterior locations, or in parking decks shall be wall or surface mounted, red finish, weatherproof devices, suitable for an ambient temperature range of -31 F to 150 F. Devices shall be mounted to a surface mounted weatherproof backbox. Combination units shall be provided as indicated on the Drawings and as required for proper coverage. If the combination units comply with these specifications, they shall be either:

- f. EST GENESIS WP4 SERIES.
- g. SPECTRALERT SP-2 WEATHERPROOF SERIES (System Sensor).

Where combination devices are not available in weatherproof configurations, individual speakers and visual signals shall be provided.

14. Fire Protection Waterflow Switches:

- a. Fire protection waterflow switches will be provided, installed, and adjusted by Division 21 where indicated on the Drawings.



- b. Each unit shall contain two (2) sets of SPDT alarm contacts. Waterflow switches shall be connected to the FDAC system by the FDAC Subcontractor.
- 15. Fire Protection System Supervisory Switches:
  - a. Fire protection system supervisory switches will be provided by Division 21 as required and/or as indicated on the Drawings at valves, tanks, pump controllers, dry pipe valves, etc. Each unit shall contain one set of SPDT contacts. Fire Protection system supervisory switches and devices shall be provided, installed and adjusted by the Fire Suppression Subcontractor and connected to the FDAC system by the FDAC Subcontractor.
- 16. Auxiliary Relays:
  - a. Auxiliary relays shall be provided as required for HVAC control and interface. Relays shall be rated up to 4 amps at 30VDC. Relays shall be provided with a NEMA 1 dust cover assembly and be provided with DPDT contacts.
- S. Remote Central Station Signaling:
  - 1. Provide an auxiliary contact to signal common alarm, common trouble, and common supervisory to the remote control station hookup at the City of San Francisco Fire Department or to an outside exchange selected by the Owner and approved by the City of San Francisco Fire Department.
- T. Detection Zoning:
  - 1. Fire detection system shall as a minimum be zoned as follows:
    - a. In general, each addressable detection device shall constitute independent initiation zones, including area smoke detectors, manual pull stations, duct mounted smoke detectors, heat detectors and electrical closet smoke detectors.
    - b. A separate initiation zone shall be provided for each fire protection flow switch on each level.
    - c. The smoke detectors in each passenger and service elevator lobby shall each be a separate alarm zone for each level.
    - d. (\*) Each fire protection system gate valve supervisory switch on branch piping serving each floor or occupied area on each and every riser shall constitute a separate zone.
    - e. (\*) Additional separate supervisory zones shall be provided for each standpipe riser isolation valve supervisory switch and fire pump isolation valve supervisory switches.
    - f. (\*) Operation of the fire pumps shall each constitute a separate zone. (Reference Division 21, Section 21 30 00 titled "Fire Pumps and Controllers").
    - g. (\*) Power failure to the fire pump controllers shall each constitute a separate zone. (Reference Division 21, Section 21 30 00 titled "Fire Pumps and Controllers"). The following shall be monitored:
      - 1) Controller has operated into a motor running position.
      - 2) Loss of line power on line side of motor starter, in any phase.
      - 3) Phase reversal on line side of motor starter.
      - 4) Controller connected to alternate source
    - h. (\*) Provide separate low and high level alarms on each fire protection storage tank that will activate separate visual zone alarms and an audible signal at the fire alarm panel only. The following shall be monitored:
      - 1) Water level indicator (more than plus three inches or minus three inches off normal)
      - 2) Water level restored
      - 3) Decrease in water temperature (below 40 degrees Fahrenheit)
      - 4) Water temperature restored (40 degrees Fahrenheit or higher)
    - i. In addition to the detection zoning and indication required herein, each fire alarm control panel shall be provided with approximately 20% expansion capacity for detection devices and addressable modules.
      - \* These alarms shall activate a visual zone alarm and an audible signal at the fire alarm panel in the Fire Command Center, and at the remote annunciation panels in the Engineer's office, the Building Management Office, and at the Security Desk.
  - 2. The fire detection system shall perform the following functions:
    - a. Whenever any alarm initiating device except as indicated by an asterisk (\*) above is activated, the following functions shall automatically occur:
      - 1) Initiate an audible alarm signal and a visual zone indication alarm signal at the central fire alarm control panel in the Fire Command Center.
      - 2) Initiate an audible alarm signal and a visual zone indication alarm signal via a remote LCD annunciator at the Engineer's office, the Building Management Office and the Security Desk. The FDAC Subcontractor shall furnish and install the remote annunciators at locations as directed by the Architect.
      - 3) Initiate a fire alarm signal to a remote central station as determined by the Owner.

- 4) Automatically sound a general alarm and flash the strobe lights on the floor of incidence, one floor above and two floors below.
  - 5) Automatically activate the fire safety ventilation system as specified hereinafter.
  - 6) Automatically activate the door unlocking system. Coordinate with Division 28 Security Subcontractor.
- b. Refer to Division 14 for the elevator recall function requirements and associated interface with the building Fire Alarm System. The system should perform the following functions or functions as approved by the authorities having jurisdiction:
- 1) Smoke detectors located in the elevator machine room, elevator lobbies and elevator shafts shall recall the elevators to the designated floor of recall. Smoke detectors shall be connected to the main fire alarm panel and shall not operate the shunt trip function or the sprinkler system control valve.
  - 2) Heat detectors located within 2'-0" of each sprinkler head in the elevator shafts and machine room shall operate the shunt trip function for elevator power.
  - 3) Heat detectors shall have a setting of 10°F lower than the setting of the automatic sprinklers in the elevator shaft and machine rooms.
  - 4) Activation of heat detectors shall be annunciated at the main fire alarm panel.
  - 5) Control circuits that shut down elevator power shall be monitored for presence of operating voltage. Loss of voltage to the control circuit for the disconnecting means shall cause a supervisory signal to be indicated at the control unit and required remote annunciators.
  - 6) Provide controls, relays, control panels, and interfaces for automatic override control of each air handling system used for smoke control.
  - 7) Fire detection and control systems for mechanical smoke control systems shall be supervised in accordance with the Fire Code. Supervision shall provide positive confirmation of actuation, testing of devices, manual override mechanisms, and the presence of power downstream of power disconnect switches.
  - 8) Damper status supervision shall be accomplished by activation of damper limit switches. Air flow status shall be by differential pressure switches.
- c. Whenever a fire protection or standpipe system valve supervisory switch or device is activated, an audible and visual zone alarm shall be initiated at the central fire alarm control panel in the Fire Command Center and at each remote annunciator specified herein.
- U. Firefighter's Air Handling Unit and Fan Control Override System (FCIP):
1. The FDAC manufacturer shall furnish and the FDAC Subcontractor shall install a firefighter's override control system to permit operation of smoke exhaust fans, makeup air fans, air handling units, fans and dampers, as required for smoke control operations and/or as required by the local authorities. The firefighter's override control system shall operate independently from the Division 25 BMCS when activated by the firefighter's key and shall be hard wired to local control modules. The firefighter's override control system operation shall not be altered or interfered with by the Division 25 BMCS. Control panel shall be located in the Fire Command Center and shall contain the following items:
    - a. A single plane graphic schematic riser diagram of the building indicating each toilet exhaust automatic damper, air handling unit, ventilating fan and automatic fire, smoke and fire/smoke damper on the respective level. Damper, air handling unit and fan designations shall be the same as indicated on the Drawings. The schematic diagram shall be sandwiched beneath a clear Plexiglas on the panel face. The diagram shall be prepared AutoCAD format and diskettes with the diagram shall be delivered to the Owner at Substantial Completion. Detail drawings of the diagram and panel details shall be submitted to the Engineer and the Fire Department for review.
    - b. An operating status pilot light in each toilet exhaust automatic damper, air handling unit, ventilating fan and automatic fire, smoke and fire/smoke damper symbol on the schematic riser diagram. The pilot light shall be lighted continuously whenever the respective unit is operating. Provide terminal strip for all wiring terminations and indicate same on point-to-point wiring diagram when submitted to the Engineer.
    - c. A three-position "Normal-Off-Emergency On" manual switch for each smoke exhaust fan, makeup air fan, ventilating fan, toilet exhaust automatic damper, air handling unit fan, toilet exhaust fan and stairway and elevator pressurization fan.
    - d. A three-position "open/normal/closed" switch for each automatic fire damper with red and green status pilot lights. Pilot lights shall be wired to the automatic fire damper end switches and shall indicate damper position.
    - e. A pilot lamp test switch.
    - f. Six (6) spare three-position manual switches and six (6) spare status pilot lights.

- g. A two-position "Stairway Doors Locked," and "Stairway Doors Unlocked" switch as specified hereinafter.
  2. The firefighter's air handling unit, damper and fan control override panel, all relays, controls, etc. required for a fully operational firefighter's override system including interlocking devices shall be furnished and installed by the FDAC Subcontractor. All required wiring including interlock wiring shall be furnished and installed under Division 28 FDAC Subcontractor.
  3. In the normal switch position, the dampers, fans and air handling units, will operate automatically as controlled by the Division 25 BMCS or the fire safety ventilating system (smoke detectors, sprinkler flow switches, etc.). The firefighter can override the automatic controls, safety controls and interlocks regardless of the position of the "hand-off-automatic" motor controller switch ("Off", "On" or "Automatic") and the fire safety controls to reverse the automatic operation to start, stop and restart the air handling units and fans or open, close and reopen the automatic fire, smoke and fire/smoke dampers manually at the firefighter's control panel. The operation of the firefighter's control panel shall be completely superior and override any other conflicting command from the Division 25 BMCS. The FDAC Subcontractor shall coordinate any interface with the Division 25 BMCS Subcontractor.
  4. The firefighter's air handling unit, damper and fan control override panel shall comply with all the requirements of the City of San Francisco Fire Department and the City of San Francisco Inspection Department and shall be UL UUKL listed for smoke control systems.
  5. The firefighter's override control panel cabinet shall have a key lock to disable the switches and the panel's control functions.
- V. Exit Stairway Door Lock Release System:
1. The FDAC Subcontractor shall provide a stairwell exit door unlocking system coordinate with the Division 28 Security Subcontractor for the building with master controls in the Fire Command Center as follows:
    - a. All the stairwell exit doors shall simultaneously lock or unlock, but not unlatch by manual activation of a two-position switch ("Stairway Doors Locked" and "Stairway Doors Unlocked") at the Fire Command Center or shall simultaneously unlock but not unlatch automatically by activation of any fire alarm initiating device.
    - b. The Division 28 Security Subcontractor shall furnish the power wiring including transformers, fuses, etc. necessary to coordinate with the door mounted electric lock bolt unit furnished and installed by the Contractor. The electric bolt unit shall only unlock the exitway door, but not unlatch the door. Refer to the Architectural Specifications and Drawings for doors equipped with electric locks and for additional requirements.
    - c. The electric lock units shall automatically unlock the doors upon a loss of power. The exit stairway door release system power shall be connected to the normal building utility source.
    - d. The FDAC Subcontractor shall provide a relay within each IDF room at each level to signal the security system that the building has gone into alarm.
- W. Fire Safety Sequences :
1. The operation of certain automatic dampers (AD), smoke exhaust fans, makeup air fans, outside air handling units, exhaust and ventilating fans, air handling units, combination fire, smoke and automatic dampers (FSD and AFD), etc., will be governed by the fire alarm systems. The FDAC Subcontractor shall provide any necessary relays to start and stop fans and air handling units and open and close automated dampers as required by this sequence. The fire safety and fire alarm sequences shall take precedence over all manual, safety or automatic functions and shall be as specified hereinafter.
  2. The BMCS Subcontractor for Division 25 will furnish and install all relays and any similar components necessary to accomplish normal building control sequences as required by Division 25. Refer to Division 25 Specifications.
  3. The fire safety and fire alarm sequences shall be as follows:
    - a. Smoke Control Sequence of Operation
      - 1) Parking Garage Zone – Basement Levels P3 through P1  
The Parking Garage Zone includes the three basement levels P3, P2 , P1 and the garage entrance ramp located at the south side of the ground floor level. The parking garage smoke control system shall be initiated by the activation of the automatic sprinklers protecting the garage zone. The fire alarm system will override the CO system for operation of the garage smoke exhaust system. The following automatic sequence shall be initiated for damper and fan control:
        - a) The stairwell (SF-P1-2, SF-2-2, SF-2-3, SF-2-4, SF-64-1, SF-64-2, SF-62-5) and elevator machine room pressurization (SF-62-1, SF-62-2, SF-62-3, SF-63-2) fans shall be energized.

- b) The Fire Service elevator lobby supply dampers shall open on all floors except the ground floor Fire Service elevator lobby supply dampers shall close.
  - c) The Fire Service elevator lobby pressurization fans shall turn on (AHU-2-1, AHU-62-1).
  - d) The Elevator lobby doors and dampers separating the lobbies from the floors shall close on all levels (FSD-X-7 Thru FSD-X-8).
  - e) Electrical and Telecom room shaft dampers protecting opening in the smoke barrier shall close (FSD-P1-3, FSD-P1-5, FSD-P1-6,) and fan coil units shall shutdown (FCU-P1-4).
  - f) Doors and Dampers located in walls separating the garage zone from other smoke control zones shall close.
  - g) The garage exhaust dampers associated with the exhaust fans shall open and the following dampers shall close.
  - h) All garage exhaust fans shall operate at 100 percent exhaust. (GX/SX-P1-2, EF-P3-1, EF-P3-2, EF-P2-1, EF-P2-2, EF-P1-1, EF-P1-2).
  - i) All garage supply fans shall turn off (SF-P1-1, SF-P2-1, SF-P2-2, SF-P2-3, SF-P3-1, SF-P3-2, SF-P3-3). The garage supply air dampers shall open to allow make-up air into the garage. (FSD-P1-2, FSD-P2-2, FSD-P3-2)
  - j) All other supply and exhaust fans or AC units or fan coil units shall be turned off via the BMS system and associated dampers shall close except for the supply/exhaust fans and AC units serving the fire pump, fuel oil, MPOE rooms, transformer vaults, and switchgear rooms.
4. Ground Floor Main Entrance Lobby  
This zone includes the Ground Floor Main Entrance Lobby and the adjacent passenger elevator lobbies. The adjacent two Retail areas (Retail 2 and Retail 3) will be passive smoke control zones. The Ground Floor Main Entrance Lobby shall be provided with a smoke detection system for activation of the lobby smoke control system. Upon activation of the smoke detectors, the following sequence shall be initiated:
- a. The stairwell (SF-P1-2, SF-2-2, SF-2-3, SF-2-4, SF-64-1, SF-64-2, SF-62-5) and elevator machine room pressurization (SF-62-1, SF-62-2, SF-62-3, SF-63-2) fans shall be energized.
  - b. The Fire Service elevator lobby supply dampers shall open on all floors except the ground floor Fire Service elevator lobby supply dampers shall close.
  - c. The Fire Service elevator lobby pressurization fans shall turn on (AHU-2-1, AHU-62-1).
  - d. The Elevator lobby doors and dampers separating the lobbies from the floors shall close on all levels (FSD-X-7 Thru FSD-X-8).
  - e. Electrical and Telecom room shaft dampers protecting opening in the smoke barrier shall close and transfer fans shall shutdown.
  - f. Doors and Dampers located in walls separating the Main Lobby smoke zone from other smoke control zones shall close.
  - g. The dampers associated with the Ground Floor Main Lobby Pressurization shall open ( FSD-2-3,)
  - h. The Ground Floor Main Lobby pressurization fans shall be energized and the variable frequency drives (VFD) will be directed to the required set points. (EF-2-3)
  - i. The Ground Floor Main Lobby HVAC Systems (AHU -2-2 ) shall turn off and associated dampers shall close (FSD-2-1, FSD-2-2).
  - j. The elevator hoistway vent control dampers located at the top of the high-rise elevator hoistways and fire service access elevator hoistway will close.
  - k. The Fire Command Center shall remain under local control and is not part of the smoke management system.
5. Second Floor  
This zone includes the Second Floor central corridor, Janitorial area, Engineering Offices, Security Area, and Break room. This zone shall be provided with a smoke detection system for activation of the smoke control system. Upon activation, the following automatic sequence shall be initiated for fan and damper control:
- a. The stairwell (SF-P1-2, SF-2-2, SF-2-3, SF-2-4, SF-64-1, SF-64-2, SF-62-5) and elevator machine room pressurization (SF-62-1, SF-62-2, SF-62-3, SF-63-2) fans shall be energized.
  - b. The Fire Service elevator lobby supply dampers shall open on all floors except the ground floor Fire Service elevator lobby supply dampers shall close.
  - c. The Fire Service elevator lobby pressurization fans shall turn on (AHU-2-1, AHU-62-1).
  - d. The Elevator lobby doors and dampers separating the lobbies from the floors shall close on all levels.
  - e. Electrical room shaft dampers protecting opening in the smoke barrier shall close and transfer fans shall shutdown .

- f. The Second floor HVAC system and Fan coil units shall turn off and associated outside air and relief dampers shall close.
  - g. The dampers associated with the second floor exhaust fan shall open ( FSD-2-3,) and all remaining dampers on this system shall .
  - h. The second floor smoke exhaust fan shall energize (EF -2-3) and the VFD will be directed to the required set point.
  - i. and fire service access elevator hoistway will remain open.
6. Third Floor
- The Third Floor consists mostly of leasable office space, typical to the upper floors but it includes two Generator Rooms located along the south east exterior wall. The Generator Rooms will be passive zones and separated from the adjacent smoke control zones. The Third Floor smoke control system will be activated by the automatic fire sprinklers protecting the office zone. The fire sprinklers protecting the adjacent Generator Room passive zone will be zoned on a separate water flow detection device and will not activate the smoke control system on this level. Upon activation of the office area sprinkler zone, the following automatic sequence shall be initiated for fan and damper control:
- a. The stairwell (SF-P1-2, SF-2-2, SF-2-3, SF-2-4, SF-64-1, SF-64-2, SF-62-5) and elevator machine room pressurization (SF-62-1, SF-62-2, SF-62-3, SF-63-2) fans shall be energized.
  - b. The Fire Service elevator lobby supply dampers shall open on all floors except the ground floor Fire Service elevator lobby supply dampers shall close.
  - c. The Fire Service elevator lobby pressurization fans shall turn on (AHU-2-1, AHU-62-1).
  - d. The Elevator lobby doors and dampers separating the lobbies from the floors shall close on all levels.
  - e. Electrical room shaft dampers protecting opening in the smoke barrier shall close.
  - f. The Third floor HVAC system (AHU-3-1 and AHU-3-2) shall turn off and associated outside air and relief dampers shall close.
  - g. The dampers associated with the third floor pressurization fan shall open (FSD-3-1, FSD-3-4) and all remaining dampers on this system shall close (FSD- 3-2, FSD-3-3)
  - h. The third floor pressurization fan shall energize (EF -2-3) and the VFD will be directed to the required set point.
  - i. The elevator hoistway vent control dampers located at the top of the high-rise elevator hoistways and fire service access elevator hoistway will remain open.
7. Fourth Floor
- The Fourth Floor is similar to the third floor and consists mostly of leasable office space, typical to the upper floors and includes shafts at the south east and south west corners associated with the 3<sup>rd</sup> floor generator rooms. These shafts will be separated from the Fourth Floor Zone by smoke barriers. The Fourth Floor smoke control system will be activated by the automatic fire sprinklers protecting the office zone. Upon activation of the office area sprinkler zone, the following automatic sequence shall be initiated for fan and damper control:
- a. The stairwell (SF-P1-2, SF-2-2, SF-2-3, SF-2-4, SF-64-1, SF-64-2, SF-62-5) and elevator machine room pressurization (SF-62-1, SF-62-2, SF-62-3, SF-63-2) fans shall be energized.
  - b. The Fire Service elevator lobby supply dampers shall open on all floors except the ground floor Fire Service elevator lobby supply dampers shall close.
  - c. The Fire Service elevator lobby pressurization fans shall turn on (AHU-2-1, AHU-62-1).
  - d. The Elevator lobby doors and dampers separating the lobbies from the floors shall close on all levels.
  - e. Electrical room shaft dampers protecting opening in the smoke barrier shall close.
  - f. The Fourth floor HVAC system (AHU-4-1 and AHU-4-2) shall turn off and associated outside air and relief dampers shall close.
  - g. The dampers associated with the Fourth floor pressurization fan shall open (FSD-4-1, FSD-4-4) and all remaining dampers on this system shall close (FSD- 4-2, FSD-4-3)
  - h. The Fourth floor pressurization fan shall energize (EF -2-3) and the VFD will be directed to the required set point.
  - i. The elevator hoistway vent control dampers located at the top of the high-rise elevator hoistways and fire service access elevator hoistway will remain open.
8. Fifth Floor
- The Fifth Floor consists mostly of leasable office space, typical to the upper floors, but also includes a large Retail Space located along the south east exterior wall. The office and retail space are both served by a central corridor that surrounds the building core and extends to the south east exterior wall. The Fifth Floor smoke control system will be activated by the automatic fire sprinklers protecting the zone. Upon activation of the fifth floor sprinkler zone, the following automatic sequence shall be initiated for fan and damper control:



- a. The stairwell (SF-P1-2, SF-2-2, SF-2-3, SF-2-4, SF-64-1, SF-64-2, SF-62-5) and elevator machine room pressurization (SF-62-1, SF-62-2, SF-62-3, SF-63-2) fans shall be energized.
  - b. The Fire Service elevator lobby supply dampers shall open on all floors except the ground floor Fire Service elevator lobby supply dampers shall close.
  - c. The Fire Service elevator lobby pressurization fans shall turn on (AHU-2-1, AHU-62-1).
  - d. The Elevator lobby doors and dampers separating the lobbies from the floors shall close on all levels.
  - e. Electrical room shaft dampers protecting opening in the smoke barrier shall close.
  - f. The fifth floor HVAC system (AHU-5-1 and AHU-5-2) shall turn off and associated outside air and relief dampers shall close.
  - g. The dampers associated with the Fifth floor pressurization fan shall open (FSD-5-1, FSD-5-2,) and all remaining dampers on this system shall close
  - h. The Fifth floor pressurization fan shall energize (EF -2-3) and the VFD will be directed to the required set point.
  - i. The elevator hoistway vent control dampers located at the top of the high-rise elevator hoistways and fire service access elevator hoistway will remain open.
9. Typical Office Floors (Levels 6-61)  
Floors 6 through 61 consist of office areas and a central core area. Each floor will be considered a separate smoke zone. The office floor smoke control system shall be initiated by the activation of the automatic sprinklers protecting each floor's smoke zone. Upon activation, the following automatic sequence shall be initiated for fan and damper control:
- a. The stairwell (SF-P1-2, SF-2-2, SF-2-3, SF-2-4, SF-64-1, SF-64-2, SF-62-5) and elevator machine room pressurization (SF-62-1, SF-62-2, SF-62-3, SF-63-2) fans shall be energized.
  - b. The Fire Service elevator lobby supply dampers shall open on all floors except the ground floor Fire Service elevator lobby supply dampers shall close.
  - c. The Fire Service elevator lobby pressurization fans shall turn on (AHU-2-1, AHU-62-1).
  - d. The Elevator lobby doors and dampers separating the lobbies from the floors shall close on all levels.
  - e. Electrical room shaft dampers protecting opening in the smoke barrier shall close (FSD -X-1 and FSD-X-2).
  - f. The Office Fire Floor HVAC system (AHU-"X"-1 and AHU-"X"-2) shall turn off and associated outside air and relief dampers shall close.
  - g. The dampers associated with the Office Fire Floor pressurization fan shall open (FSD-"X"-3, FSD-"X"-6,) and all remaining dampers on this system shall close
  - h. The Office Floor pressurization fan shall energize (EF -2-3, EF-62-1, EF-64-1,) and the VFD will be directed to the required set point.
  - i. The elevator hoistway vent control dampers located at the top of the high-rise elevator hoistways and fire service access elevator hoistway will remain open.
10. Electrical and Telecom Room Shaft Zones  
Upon activation of the sprinkler water flow system or the smoke and heat detectors, the following automatic sequence shall be initiated for fan and damper control:
- a. The stairwell (SF-P1-2, SF-2-2, SF-2-3, SF-2-4, SF-64-1, SF-64-2, SF-62-5) and elevator machine room pressurization (SF-62-1, SF-62-2, SF-62-3, SF-63-2) fans shall be energized.
  - b. Electrical room shaft dampers protecting opening in the smoke barrier shall close (FSD -X-1 Thru FSD-X-2).
11. Other Passive Zones  
Upon activation of the sprinkler water flow system, the following automatic sequence shall be initiated for fan and damper control:
- a. The stairwell (SF-P1-2, SF-2-2, SF-2-3, SF-2-4, SF-64-1, SF-64-2, SF-62-5) and elevator machine room pressurization (SF-62-1, SF-62-2, SF-62-3, SF-63-2) fans shall be energized.
  - b. Doors and dampers protecting openings in the smoke barrier shall close.
  - c. Fire Service Access Elevator  
Upon activation of the Fire Service Access Elevator Lobby smoke detector, the following automatic sequence shall be initiated for fan and damper control:
  - d. The stairwell (SF-P1-2, SF-2-2, SF-2-3, SF-2-4, SF-64-1, SF-64-2, SF-62-5) and elevator machine room pressurization (SF-62-1, SF-62-2, SF-62-3, SF-63-2) fans shall be energized.
  - e. The Elevator lobby doors and dampers separating the lobbies from the floors shall close on all levels.
  - f. The Fire Service Access Elevator Lobby pressurization system will not be initiated.
  - g. Upon activation of the Fire Service Access Elevator Machine Room smoke detector, the following automatic sequence shall be initiated for fan and damper control:

- h. The stairwell (SF-P1-2, SF-2-2, SF-2-3, SF-2-4, SF-64-1, SF-64-2, SF-62-5) and passenger elevator machine room fans shall be energized.
  - i. The Elevator lobby doors and dampers separating the lobbies from the floors shall close on all levels.
  - j. The Fire Service Access Elevator Lobby and Elevator Machine Room pressurization systems will not be initiated.
12. Passenger Elevators
- Upon activation of the Passenger Elevator Lobby smoke detector, the following automatic sequence shall be initiated for fan and damper control:
- a. The stairwell (SF-P1-2, SF-2-2, SF-2-3, SF-2-4, SF-64-1, SF-64-2, SF-62-5) and elevator machine room pressurization (SF-62-1, SF-62-2, SF-62-3, SF-63-2) fans shall be energized.
  - b. The Fire Service elevator lobby supply dampers shall open on all floors except the ground floor Fire Service elevator lobby supply dampers shall close.
  - c. The Fire Service elevator lobby pressurization fans shall turn on (AHU-2-1, AHU-62-1).
  - d. The Elevator lobby doors and dampers separating the lobbies from the floors shall close on all levels.
  - e. Upon activation of a Passenger Elevator Machine Room smoke detector, the following automatic sequence shall be initiated for fan and damper control:
  - f. The stairwell (SF-P1-2, SF-2-2, SF-2-3, SF-2-4, SF-64-1, SF-64-2, SF-62-5) and elevator machine room pressurization (SF-62-1, SF-62-2, SF-62-3, SF-63-2) fans shall be energized except the machine room with the activated smoke detector.
  - g. The Fire Service elevator lobby supply dampers shall open on all floors except the ground floor Fire Service elevator lobby supply dampers shall close.
  - h. The Fire Service elevator lobby pressurization fans shall turn on (AHU-2-1, AHU-62-1).
  - i. The Elevator lobby doors and dampers separating the lobbies from the floors shall close on all levels.
13. Stairways
- Each stair shaft, 3 high-rise stairways, will constitute a separate smoke control zone. The stair pressurization fans shall turn on when any fire alarm signal is activated within the building.

Fire Detection, Alarm And Communication System Sequence Of Operation	Manual Pull Station	Elevator Lobby Smoke Detectors	Area Smoke Detector	Duct Smoke Detector	Elevator Shaft Smoke Detector	Fire Protection Water Flow Switch	Fire Protection Supervisory Switch Or Device	Power Failure
Annuciate at fire control room (alarm).	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Annuciate at fire control room supervisory trouble.	No	No	No	Yes	No	No	Yes	Yes
Annuciate at fire control room circuit supervision.	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Annuciate at twenty-four hour attended security desk.	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Shut down all air handling (HVAC) on alarm floor.	Yes	Yes	Yes	Yes	No	Yes	No	No
Active audible alarm signal on alarm floor.	Yes	Yes	Yes	Yes	No	Yes	No	No
Release all electro-magnetically held open doors on alarm floor.	Yes	Yes	Yes	Yes	No	Yes	No	Yes
Activate pressurization system on alarm floor.	No	Yes	Yes	Yes	No	Yes	No	No
Recall all elevators serving alarm floor.	No	Yes	No	No	Yes	No	No	Yes
Release all electric door locks in building.	Yes	Yes	Yes	Yes	No	Yes	No	Yes
Transmit off site signal	Yes	Yes	Yes	Yes	Yes	Yes	Yes	No

Table 28 31 10-1 - Fire Detection, Alarm and Communication System Sequence of Operation matrix.

**PART 3 EXECUTION****3.1 INSTALLATION****A. Wiring:**

1. All wiring shall be by the FDAC Subcontractor and shall be in accordance with NFPA 72, the National Electrical Code and all local codes. All wiring sizes shall conform to recommendations of the equipment manufacturer and as indicated on the engineered Shop Drawings.
2. All wire shall be UL Listed for fire alarm applications and shall be installed in conduit, except where plenum rated wiring is specifically allowed. See Section 26 05 19 titled "Electrical Conductors-600V" for permissible uses of plenum rated wiring.
3. All wiring for fire pump monitoring and control shall be in rigid metal conduit or liquid tight flexible metal conduit.
4. No AC wiring or any other wiring shall be run in the same conduit as fire alarm wiring.

**B. Conduit/Raceway:**

1. All wire shall be installed in an approved conduit/raceway system except as noted above. Maximum conduit "fill" shall not exceed forty (40%) percent per the National Electrical Code.
2. Conduit and raceway system shall be installed in accordance with the Division 26 Specifications and per the National Electrical Code.
3. Conduit shall be installed per engineered Shop Drawings.
4. All vertical wiring and all main trunk/riser wiring shall be installed in a complete raceway/conduit system. All riser boxes shall be adequately sized for the number of conductors traversing the respective box as well as the number of terminations required.

**3.2 FIELD TESTING****A. Refer to Section 28 31 40 titled "Testing" for additional testing requirements for the FDAC system.****B. Test and Reports:**

1. A state licensed and factory trained technical representative of the manufacturer shall supervise the final control panel connections and testing of the system. Upon completion of the acceptance tests, the owner and/or his representatives shall be instructed in the proper operation of the system.
2. The installing FDAC Subcontractor shall functionally test each and every device in the entire system for proper operation and response. In addition, each circuit in the system shall be fully tested for wiring supervision. Any items found not properly installed or nonfunctioning shall be replaced or repaired and retested.
3. The installing FDAC Subcontractor shall provide a complete written report on the functional test of the entire system. A copy of the test report shall be provided with maintenance manuals. The test report shall be signed and dated by the licensed fire alarm technician responsible for supervising the final system test and checkout.
4. A complete demonstration of the operation of the entire system shall be conducted by the FDAC Subcontractor, the Division 14 Subcontractor, the Division 21 and 23 Subcontractors, the Division 26 Subcontractor and the FDAC manufacturer in the presence of the Owner, Architect, Engineer, City of San Francisco Building Department Officials and the City of San Francisco Fire Department.
5. Any required retests shall be made by the FDAC Subcontractor and the FDAC manufacturer at no expense to the Owner. The Contractor shall pretest the system for Contract Document and City Building and Fire Department requirements and shall so certify to the Engineer and shall provide at least two (2) weeks written notice to the Architect, Owner, Engineer, City of San Francisco Building Department Officials and the City of San Francisco Fire Department prior to the date of witness testing.
6. The Division 14, 21, 23, 25, and Division 26 Subcontractors shall participate in the testing program.
7. Refer to the Division 14 Specifications for additional testing requirements.
8. Requirements for temporary occupancy shall be verified with the City Building Department.

**END OF SECTION**