SECTION 16720

FIRE ALARM SYSTEM

PART 1 - GENERAL

1.01 RELATED DOCUMENTS

A. The requirements of this section are in addition to the requirements of Division 1, General Conditions and Supplementary Conditions.

1.02 SCOPE

A. Provide all material and labor required for the installation of a new Fire Alarm System in accordance with this Specification and the Drawings. Provide and install all components required for proper system operation, whether specifically specified or not. Provide all items of equipment, support structure, devices, etc., incidental to the installation.

B. Related Work Specified Elsewhere:

Section 16010, GENERAL REQUIREMENTS, ELECTRICAL
Section 16110, RACEWAY SYSTEM
Section 16120, WIRE AND CABLE
Section 16180, OVERCURRENT PROTECTIVE DEVICES
Section 16410, GROUNDING

1.03 REQUIREMENTS

A. The fire alarm system provided under these Specifications and described on the Drawings shall conform to Section 809 of the California Building Code, Article 760 of the California Electrical Code, and Article 14 of the California Fire Code.

B. Review the Drawings and Specifications for work and material provided by others, which might affect work specified under this Section. To avoid any potential construction delays, contractor is required to coordinate with all other trades (i.e. equipment suppliers, contractors, etc.) to provide a fully compliant and coordinated installation within the established construction schedule. All project installations and modifications found non-compliant to this specification and as shown on the contract drawings solely due to the lack of coordination, shall be reconstructed and/or reinstalled at the Contractor's expense.

C. Work and materials shall meet or exceed the requirements of the latest published rules and regulations of the State of California, local authority, NFPA, CAL-OSHA, CSFM, AND NECA - "Standard of Installation".

D. The conductors of the fire alarm system are required to be installed in raceway. Raceway and conductors shall be installed under Section 16110 as required for proper system operation. A minimum of 18" of free wire shall be left at each outlet for device connection under this Section.

1.04 FIRE ALARM SYSTEM CONTRACTOR REQUIREMENTS

A. The Contractor shall hold a valid California State Contractor's license (C7, C10).

B. The Contractor must be the factory authorized sales and service representative for all equipment being submitted.

C. The Contractor shall have been in the electronics contracting business for a minimum of six years under the same name. He must maintain a full time sales and service staff at an established business location having the appropriate parts and service facilities. An individual operating out of residential facilities or without the required facilities, staff, or tenure will not be considered as an acceptable contractor for this project.

D. Contractor shall use NICET Level II, or higher, Fire Alarm Certified Technicians for all final terminations, testing and programming of all system components and controls.

1.05 GUARANTEE

A. The equipment supplier/installer shall assume all responsibility for the proper operation of the entire system - new and existing. The entire combined system shall be guaranteed free from defects in material or workmanship for a period of one year after filing of the "Notice of Completion". Provide on-site service for this system for the duration of the guarantee period at no additional cost to the Owner. Where system trouble is caused by misuse, abuse, or accident; current labor rates shall be chargeable for the service call - otherwise, the service shall be free. Service shall normally be available from a factory authorized service center during normal working hours and within 24 hours of receiving a call.

1.06 SYSTEM DESCRIPTION AND OPERATION

A. For the purpose of this specification the new fire alarm control panel shall be manufactured by Silent Knight and the fire alarm control system shall be equal to or exceed the features, control capability and functionality offered in the Silent Knight #5820XL Addressable Fire Alarm Control System.

B. All initiating devices (i.e. photoelectric, heat detectors, manual pull stations, etc.) shall be supervised, two (2) wire normally open addressable appliances, as specified by the Silent Knight #5820XL Control System.

C. The notification circuits shall be 24 VDC, two (2) wire, supervised, parallel-wired with end of line devices located in the control panel or nearest terminal cabinet/backboard as required for proper system operation.

D. Actuation of any initiating device shall cause all system audio and visual signaling devices to operate. Horns shall sound in California standard "March Time" and alarm strobes shall flash at the required rate until the alarm is acknowledged at the control panel or the system is reset.

PART 2 PRODUCTS

2.01 REQUIREMENTS

A. All material and equipment shall be first quality, new, and free from defects. Except as specified herein, system equipment shall be all the product of the same manufacturer. All components of the Fire Alarm System are required to be listed by the California State Fire Marshal.

B. Unless other wise specified here in and on the contract drawings, the fire alarm control panel, remote power supply panel, initiating and monitoring devices, and notification appliances shall be pre-approved by Owner prior to bid.

C. All Fire Alarm System control components, initiating and notification appliances shall meet the requirements listed in the in the contract drawings (i.e. Fire Alarm Symbol List, Notes, and riser diagrams).

D. Verify, provide and install a digital dialer as required by the owner's monitoring agency. Only use dialers equal to or greater than the capabilities and functionality found in the Silent Knight #5104.

2.02 SUBMITTALS

A. Submittals are required for all fire alarm system components, miscellaneous hardware, and cable. The complete submittal package shall include manufacturer data sheet, required load and voltage drop calculation, and a set of full size shop drawings and floor plans.

B. **Only submittal packages prefaced with "lists of contents", per Specification Section 16010 2.02, and Local Fire Marshall listing numbers will be accepted for review**. The list of material prefacing the submittal data sheets shall include the State Fire Marshal listing number for each item.

C. Reproducible prints of the approved submittal Drawings are to be provided upon completion of this project for inclusion in the AS-BUILT set as required in Specification Section 16010, General Requirements, Electrical.

2.04 MATERIAL

A. All material and equipment shall be rated for commercial and/or industrial installations, new, free from all assembly and material defects, and manufactured, and/or assembled, in the U.S.A. for distribution and installation in the Continental United States of America, and specifically the State of California. All equipment and components of the Fire Alarm System shall be the manufacturer's current, and most up-to-date, model and offering.

B. All materials, appliances, control and monitoring equipment, and all miscellaneous remote devices shall be tested and listed by a nationally, State of California, recognized testing and listing agency (i.e. UL) for use as part of a protected premises protective signaling (fire alarm) system.

C. The authorized representative of the manufacturer of the fire alarm control panel shall be responsible for the satisfactory installation of system components and appliances. All system components shall be the products of the same manufacturer and listed by the California State Fire Marshal for specific installation in the State of California.

D. All material and components shall be installed in strict compliance with manufacturers' recommendations. Consult the manufacturer's installation manuals for all wiring diagrams, schematics, physical equipment sizes, etc., before beginning system installation.

E. All equipment shall be attached to walls and ceiling/floor assemblies and shall be held firmly in place (e.g., detectors shall not be supported solely by suspended ceilings). All anchors and supports (i.e. fasteners, screws, bolts, etc.) shall be appropriate to the application and in full compliance to the structural and architectural requirements of this project for the anchoring, attachment, and support of the proposed equipment load.

2.04 COMPONENTS

A. Equipment and part numbers are specified as a standard of quality. Acceptable equipment manufacturer shall be Silent Knight. Unless specifically authorized by the owner, no other manufacturers will be accepted for review after that time.

B. The Main Fire Alarm Control Panel, FACP, Central Console shall be a Silent Knight #5820XL microprocessor based Central Processing Unit. The unit shall communicate with and control the following types of equipment used to make up the system: intelligent detectors,

addressable modules, local and remote operator terminals, printers, annunciators, and other system controlled devices. The main FACP shall perform the minimum following functions:

1. Supervise and monitor all intelligent addressable detectors and monitor modules connected to the system for normal, trouble and alarm conditions.

2. Supervise all initiating signaling and notification circuits throughout the facility by way of connection to monitor and control modules.

3. Detect the activation of any initiating device and the location of the alarm condition. Operate all notification appliances and auxiliary devices as programmed.

4. Visually and audibly annunciate any trouble, supervisory, security or alarm condition on operator's terminals, panel display, and annunciators.

5. Communicate with Owner's designated monitoring company and/or central station via a digital dialer installed internal or external.

PART 3 EXECUTION

3.01 INSTALLATION

A. The installation shall be accomplished by and under the direction of a NACET II Fire Alarm System Certified Technician, factory trained by the equipment manufacturer, and experienced in the installation of fire alarm systems of this type in the State of California. Workmanship shall be equal to or greater than that demonstrated by IBEW Journeyman level trained electricians.

B. Installation showing evidence of poor workmanship or not in accordance with these Specifications and the Drawings shall be re-accomplished or repaired to the satisfaction of the Architect at the Contractor's expense.

C. Avoid splicing of conductors wherever possible; but where splices must be made, use Scotchlok or Wirenut type connectors in interior DRY locations. Connections in wet locations and below grade will not be allowed. NO EXCEPTION!

D. Wire installed in terminal and equipment cabinets shall be parallel to the sides, top, or bottom of the cabinet. All wire counts of six (6) or more with a traveling distance exceeding 12 inches shall be bundled or contained within an approved wire management system. All wires installed in junction boxes shall be labeled, trimmed, coiled, neat and orderly. LABEL ALL WIRES at each accessible raceway opening with Brady "Omni-Grip" devices or the equivalent.

3.02 TESTS, INSTRUCTION, AND DOCUMENTATION

A. The entire system shall be tested and adjusted under the supervision of and performed by a NACET II Fire Alarm System Certified Technician, factory trained representative of the manufacturer. The system shall be tested to demonstrate that:

1. All system controls, initiating components, notification appliances and supervisory equipment perform properly and in full compliance to the manufacture's specifications and design.

2. The entire system is free from grounded or open circuits.

3. The alarm control equipment can indicate an open ground or circuit at the control panel.

B. All system defects (component and programming) found and noted shall be corrected and a "re-test" conducted, to demonstrate proper operation.

C. Upon completion of system testing described above, a satisfactory test of the entire system shall be made in the presence of the enforcing fire agency.

D. The equipment supplier/installer shall instruct the Owner or his designated representative(s) in the proper operation and maintenance of the system. Allow a minimum of eight (8) hours and two (2), or more, meetings for this on-site "in service" instruction. The contractor shall be responsible to verify, communicate and instruct all District personal (i.e. District technicians, maintenance personal, and campus administrators, etc.) responsible for the maintenance and operation of the fire alarm control system.

END OF SECTION

SECTION 16730

INTERCOM SYSTEM

PART 1 – GENERAL

1.1 SECTION INCLUDES

A. Work Included in this Section: Materials, equipment fabrication, installation, and tests in conformity with applicable Codes and authorities having jurisdiction for the following:

1. Provide complete Intercom system as shown on Drawings.
2. Complete system is defined as raceways, cables, custom backboxes, installation of telephones, etc. to achieve a complete and functional system. Also included are all required power supplies, terminal strips, mounts, housings, and interfaces to equipment furnished by others.
3. Coordinate with Architect for custom mounting requirements.
4. Wiring terminations in the Access Control panel (ACP) are by the Security contractor.
5. Provide installation, testing, and adjustment for all equipment.
6. Provide training to the Owner in the operation, adjustment, servicing, and repair of this system.

B. Refer to Section 16700 for Submittal, Substitution, and Warranty requirements.

1.2 RELATED SECTIONS

A. Wire and cable installations performed under this division shall comply with the requirements of Division 16.

B. Refer particularly to requirements and details in Sections 16700-16740.

PART 2 – PRODUCTS

2.1 INTERCOM PRODUCTS

A. System Specifications

1. Manufacturer's catalog and system numbers of equipment listed in this specification indicate type, quality, and functions of the equipment required, and represent the minimum acceptable standards.

B. Wire and Cable

1. Contractor shall follow the manufacturers' recommendation for cabling. Wire and cable sizes, number of conductors, shielding, or other data listed in this specification or shown on Drawings are a guide to the correct product required to achieve a working system and represent minimum acceptable equipment.

2. Wiring shall be grouped and harnessed to facilitate access to all equipment, as well as maintenance and replacement of equipment.

3. All cable shall be labeled at origin and termination, referencing to a master legend schedule shown on submittal Drawings. Labeling and any splice locations shall be noted on "As-Built" Drawings.

4. Cabling shall be sized and installed according to National Electric Code requirements.

5. Cables are to be shielded as necessary and as shown on drawings to preclude any outside noise or interference from entering the cable and degrading system performance.

6. Any cabling or raceway exposed to weather shall be rated for that use.

C. Intercoms

1. Contractor to provide and install Aiphone Intercoms at locations as shown on the drawings. No substitutions will be accepted.

a. The Intercom shall be mounted according to ADA compliant regulations.
b. Security contractor to program camera call-up through the Access Control System when the Intercom call button is activated. Wire master Intercom lock release button as an input on the access control system.
c. Security Contractor shall coordinate with Architect about custom mounting options.
d. Mount Intercom door stations for the gate entrances on custom pedestal at the gates.

PART 3 – EXECUTION

3.1 REQUIREMENTS

A. Refer to Section 16700, Part 3, for requirements regarding "Record" Drawings, Training, Tests and Reports, and Warranty.

B. Software labels shall be consistent between various integrated systems, including Access Control, CCTV System and Intercom system. Refer to 16700, 3.4.A

C. Provide a minimum of 1 hours of scheduled training for the equipment furnished under this Section, including programming, operation, service, and maintenance.

END OF SECTION 16730

SECTION 16780

PAGING/MUSIC/SPEAKER

PART 1 - GENERAL

1.01 CONDITIONS

A. The requirements of the General Conditions and Special Conditions apply to Work of this Section as if fully repeated herein.

1.02 WORK INCLUDED

A. Provide equipment and accessories for a complete 70V distributive public address system as indicated.

B. Paging/music system shall interface with the telephone system to provide zone paging and background music, as indicated. All calls shall access all amplifiers in this system.

C. The system should be capable of delivering 70 dB average program level with additional 10 dB headroom measured with a sound pressure level meter with an 'A' weighted scale and a pink noise source.

1.03 SUBMITTALS

A. Refer to Division 1 and Section16000.

B. Submit complete and accurate listing of major items of equipment to be used in assembling the system, including all items of equipment listed under this specification, and block diagrams indicating proposed interconnection of equipment. Detailed listing of proposed deviations from specifications shall be included. Modifications of standard equipment necessary to meet specifications shall be explained fully and accompanied by complete schematic diagrams.

PART 2 - PRODUCTS

2.01 ACCEPTABLE MANUFACTURERS

A. Part numbers of the first manufacturer listed in each category are used to establish standard of quality.

B. Mixer/Amplifiers:

1. Crown
2. TOA
3. Biamp

C. Speaker Enclosures and Mounting Hardware:

1. JBL
2. Soundolier
3. EV

D. Speakers and Speaker Transformers:

1. JBL
2. Soundolier
3. EV

E. Speaker Volume Controls:

1. Soundolier AT series
2. Lowell

F. Cable:

1. Belden
2. West Penn
3. Columbia

G. Equipment Mounting Cabinet: Atlas Sound 300 Series or Atlas Sound 200 Series.

H. Zone Paging Module: Bogen ZPM Series

2.02 EQUIPMENT

A. 80 Watt Mixer/Amplifiers: Provide a tuner-mixer-amplifier with the following features; XM radio tuner, music-on-hold outputs, priority ducking, (4) inputs, telephone paging input and 80 watt amplifier. Crown 180Max or equal.

B. 600 Watt Power/Amplifiers: Crown CTS 600

C. Speaker Enclosure and Mounting Hardware (JBL): Speaker enclosure and mounting hardware shall hold speakers securely in place and properly enclose them. Speaker baffle shall be constructed of cold rolled steel. Coordinate baffle color and style with Architect.

D. Speakers and Speaker Transformers:

1. Speaker: Speaker shall have a nominal diameter of 6.5 inches self-contained with backbox and transformer. The voice coil diameter shall be at least 1 inch. Sensitivity shall be at least 89 dB on axis at 1 meter with 1 watt input. Frequency response shall be 75Hz to 20,000 Hz. JBL Model Control 26CT or equal.

E. Speaker Volume Control: Mount on front panel of terminal cabinet unless otherwise indicated. Permanently label all rack mounted volume controls with zone numbers. Provide a laminated diagram showing zone numbers to Architect.

1. 10 Watt: Soundolier AT10 - ten 3 dB steps of attenuation. Insertion loss shall not exceed .4 dB.
2. 35 Watt: Soundolier AT35 - ten 3 dB steps of attenuation. Insertion loss shall not exceed .6 dB.

F. Speaker Cable: Classified under NFPA Article 725. Minimum 18 AWG, 2-conductor, stranded, and jacketed.

G. Equipment Mounting Cabinet: Atlas Sound 200 Series (free standing rack, middle Atlantic WRK-SA Series) or Atlas Sound 300 Series (wall mounted rack, middle Atlantic EWR Series). Cabinet shall be sized to accommodate amplifiers signal processing and switching equipment. Provide 1 rack space vented spacer above each amplifier. Provide a receptacle in the rack for each rack mounted unit that requires one. Cube taps not acceptable. Provide 3 sets of keys to Architect.

H. Zone Paging Module: provide paging modules with all call. Bogen ZPM-9, nine zone, or equivalent.

PART 3 - EXECUTION

3.01 INSTALLATION

A. Use workers normally engaged in this line of work.

B. Secure nonportable equipment, including loudspeakers, shelves, cables, and other apparatus. Identify switches, connectors, outlets, and equipment under the provisions of Section 16000

1. Take such precautions as necessary to guard against electromagnetic and electrostatic interference, to supply adequate ventilation, and to install equipment to provide maximum safety to operating personnel.

2. Exercise care in wiring to avoid damage to cables and equipment. Make joints and connections using rosin-core solder or approved mechanical connectors. Installed wiring in accordance with standard broadcast practices.

3. Submit certificate of completion by equipment manufacturer's representative to assure that system has passed required tests and is in proper operating condition, and manufacturer's warranties and guaranties are in effect without limitations.

C. Route wiring continuous between devices without splices.

D. Use nylon one piece self-insulated crimp-on wire joints for splices.

E. Support cable using bridle rings or J-hooks. Attach bridle rings to rod, using spring clips, above suspended ceilings.

F. Do not attach cable to ceiling wires, ceiling supports, conduits, ducts or piping.

G. Provide J-hook cable support at ~~minimum 6 foot intervals~~ 5 foot on center, unless otherwise indicated on Drawings.

H. Support cable using J-hooks for corridor locations having a J-hook routing system.

I. Use cable suitable for purpose above suspended ceiling spaces.

J. Use plenum rated cable for spaces used for environmental air.

K. Install cable in conduit above unaccessible ceiling spaces, in walls, and exposed wiring locations.

L. Install insulated throat fittings on conduit stub-outs for cable protection.

M. Provide conduit sleeves in J-hook path through all rated walls or construction components of the same size and quantity as the J-hooks being extended. Fire proof around conduit sleeves and around cables within sleeves per Division 7.

N. Provide nameplates and cable tags.

3.02 SYSTEM VERIFICATION

A. Inspection of Sound System: Perform following inspections on sound system, and submit written results. 5 days before testing, notify Owner and Owner's Representative.

1. Measure and record impedance of loudspeaker lines before connecting to amplifier. The load impedance shall be equal to or greater than rated output impedance of the amplifier.

2. Measure and record acoustic distribution of loudspeakers in sound system throughout the corridor areas.

3. Measure and record polarity of loudspeakers.

4. After amplifiers have been installed in rack, measure and record, with oscilloscope, output of each power amplifier on a dummy load. Input source to each amplifier being measured shall be sinewave oscillator with less than 0.5-percent THD. Inspect output sinewave appearing on oscilloscope for complete freedom from hum, noise, parasitic oscillation, and RF interference.

5. Provide written test results to Architect for acceptance.

3.03 SYSTEM GUARANTEE

A. Guarantee installation and equipment to be free from defects for 1 year from Date of Substantial Completion.

3.04 OWNER OPERATION AND MAINTENANCE MANUALS

A. Provide 2 sets of bound operation and maintenance manuals, including submittal materials, and record of field changes.

3.05 COMMISSIONING

A. Refer to Section 16970 - ELECTRICAL COMMISSIONING for system commissioning requirements.

END OF SECTION