

SECTION 28 00 00

ELECTRONIC SECURITY

PART 1 - GENERAL

1.01 GENERAL REQUIREMENTS

- A. Applicable requirements of Division 01 - General Requirements shall be considered a part of this section and shall have the same force as if printed herein full.

1.02 QUALITY ASSURANCE

- A. Specifications, Standards and Codes: All work shall be in accordance with the following:

1. The 2014 edition of the National Electrical Code (NFPA 70)
2. The 2012 edition of the Life Safety Code (NFPA 101).
3. Building Industry Consulting Service International (BICSI)
4. Telecommunications Distribution Methods Manual (TDMM)
5. American National Standards Institute (ANSI)
6. The National Electrical Safety Code (NESC)
7. The National Electrical Safety Code (ANSI C-2).
8. National Electrical Manufacturers Association (NEMA)
9. Telecommunications Industries Association (TIA)
10. Electronic Industries Association (EIA)
11. Institute of Electrical & Electronics Engineers (IEEE)
12. Underwriters Laboratories (UL)
13. American Standards Association (ASA)
14. Federal Communications Commission (FCC)
15. Occupational Safety and Health Administration (OSHA)
16. American Society of Testing Material (ASTM)
17. Americans with Disabilities Act (ADA)
18. Local city and county ordinances governing electrical work
19. In the event of conflicts, the more stringent provisions shall apply.

1.03 SCOPE

- A. The work to be performed under this section of the Specifications shall include all labor, material, equipment and tools required for the complete installation of the work indicated on the Drawings and as specified herein.

- B. All materials, that are a part of the Electronic Security Infrastructure and necessary to its proper operation, but not specifically mentioned and shown on the Drawings, shall be furnished and installed without additional charge.
- C. The Drawings and Specifications are complementary to each other and what is called for by one shall be as binding as if called for by both. If a discrepancy exists between the Drawing and Specifications, the higher cost shall be included, and the engineer shall be notified of the discrepancy.

1.04 WORK INCLUDED

The Electronic Security Infrastructure installed and work performed under this division of the Specifications shall include but not necessarily be limited to the following:

- A. Access Control
- B. Intrusion Detection
- C. Video Surveillance
- D. Conduits, Raceways, Racks, Cabinets and Equipment Mounting Boards
- E. Grounding and Bonding

1.05 DEFINITIONS

- A. Terms: The following definitions of terms supplement those of the General Requirements and are applicable to Division 27 - Communications:
 - 1. Provide: As used herein shall mean “furnish, install and test (if applicable) complete.”
 - 2. Infrastructure: As used herein shall mean cable, conduit, raceway, cable tray or j-hooks with all required boxes, fittings, connectors, and accessories; completely installed.
 - 3. Work: As used herein shall be understood to mean the materials completely installed, including the labor required.

1.06 DRAWINGS

- A. Drawings are generally diagrammatic and show the arrangement and location of pathways, outlets, support structures and equipment. The Contractor shall coordinate the structural and finish conditions affecting his work and arrange his work accordingly. Should conditions on the job make it necessary to make adjustments to pathways or materials, the Contractor shall so advise the Engineer and secure approval before proceeding with such work.

- B. Where exact locations are required by equipment for stubbing-up and terminating conduit concealed in floor slabs, the Contractor shall provide shop drawings, equipment location drawings, foundation drawings, and any other data required to locate the concealed conduit before the floor slab is poured.
- C. Materials, equipment or labor not indicated but which can be reasonably inferred to be necessary for a complete installation shall be provided. Drawings and Specifications do not undertake to indicate every item of material, equipment, or labor required to produce a complete and properly operating installation.
- D. The right is reserved to make reasonable changes in locations of equipment indicated on Drawings prior to rough-in without increase in contract cost.
- E. The Contractor shall not reduce the size or number of conduit runs indicated on the Drawings without the written approval of the Engineer.
- F. Any work installed contrary to Contract Drawings shall be subject to change as directed by the Engineer, and no extra compensation will be allowed for making these changes.
- G. The location of equipment, support structures, outlets, and similar devices shown on the Drawings are approximate only. Do not scale Drawings. Obtain layout dimensions for equipment from Architectural plans unless otherwise noted.
- H. Schematic diagrams shown on the Drawings indicate the required functions only. The technology of a particular manufacturer may be used to accomplish the functions indicated without exact adherence to the schematic Drawings shown. Additional labor and materials required for such deviations shall be furnished at the Contractor's expense.
- I. Verify the ceiling type, ceiling suspension systems, and clearance above hung ceilings prior to ordering cabling and associated hardware. Notify the Engineer of any discrepancies.
- J. Review all architectural drawings for modular furniture.
- K. Portions of these Drawings and Specifications are abbreviated and may include incomplete sentences. Omissions of words or phrases such as "the Contractor shall," "shall be," "as indicated on the Drawings," "in accordance with," "a," "the" and "all are intended" shall be supplied by inference.

1.07 SUBMITTALS

- A. Provide submittals for the following systems:

1. Access Control
 2. Intrusion Detection
 3. Video Surveillance
 4. Conduits, Raceways, Racks, Cabinets and Equipment Mounting Boards
 5. Grounding and Bonding
- B. Submit for approval, details of all materials, equipment and systems to be furnished. Work shall not proceed without the Owner and/or the Project Manager's approval of the submitted items. Three (3) copies of the following shall be submitted:
1. Submittals for individual systems and equipment assemblies that consist of more than one item or component shall be made for the system or assembly as a whole. Partial submittals will not be considered, reviewed or stored, and such submittals will not be returned except at the request and expense of the Contractor.
 2. Contractor shall generate shop drawings. Modify reviewed and accepted shop drawings to include revisions based upon completion of work. Submit shop drawings with record drawings on hard copy.
 3. Shop drawings shall include equipment racks, patch panels, termination blocks, connection details, rack mounting details and any other details not included in the construction drawings.
- C. Any materials and equipment listed that are not in accordance with Specification requirements may be rejected.
- D. The approval of material, equipment, systems and shop drawings is a general approval subject to the Drawings, Specifications and verification of all measurements at the job. Approval does not relieve the Contractor from the responsibility of shop drawing errors. The Contractor shall carefully check and correct all shop drawings prior to submission for approval.
- E. Materials List: Submit a complete materials list indicating all equipment to be provided as part of this section.
- F. Samples: Submit selection and verification samples of finishes, colors, and textures as requested.
- G. Complete details of equipment mounting configuration.
- H. Manufacturing assembly and testing procedures and forms.
- I. Installation testing and check out procedures and forms to be used by the Contractor and Architect and/or Consultant.

- J. The conduit plans, equipment plans, riser diagrams, block diagrams and details are to be submitted in the latest version of MicroStation or AutoCAD, and shall be submitted on a minimum of 'D' size drawings. Documents submitted in any other manner including marked up sets of the bid documents shall receive immediate rejection and will not be reviewed. A complete set of as-built documents will be issued at the completion of the project inclusive of CAD files on CD.
- K. Submittals issued in a manner inconsistent with the requirements of these specifications shall receive immediate rejection and will not be reviewed. Submittals issued containing materials, products and/or equipment that is not listed or approved by addendum shall receive immediate rejection and will not be reviewed.

1.08 QUALITY ASSURANCE

- A. Equipment and materials required for installation under these Specifications shall be the current model and new (less than one [1] year from the date of manufacture), unused and without blemish or defect.
- B. Equipment shall bear labels attesting to Underwriters Laboratories, where subject to label service. Manufacturers of equipment and materials pertinent to these items shall have been engaged in the manufacture of said equipment a minimum of three (3) years and, if so directed by the Owner, be able to furnish proof of their ability by submitting affidavits and descriptive data about their product including size and magnitude comparable to requirements specified herein.

1.09 CONTRACTOR QUALIFICATIONS

- A. The Contractor shall have total responsibility for the coordination and installation of the work shown and described in the Drawings and Specifications. The Contractor shall be a company specializing in the design, fabrication and installation of integrated communications systems.
- B. Electronic Security Systems specified shall be installed under the direction of a qualified Contractor. Qualification requirements shall include submittal by the Contractor to the Architect of the following:
 - 1. List of previous projects of this scope, size and nature; including names and sizes of projects, description of work, time of completion and names of contact persons for reference.
 - 2. Shall certify that they are manufacturer-authorized for work to be performed.

- C. Contractor must employ at least one (1) full-time Registered Communications Distribution Designer (RCDD).

1.10 COORDINATION WITH OTHER TRADES

- A. The Contractor shall coordinate Electronic Security work with that of other sections as required ensuring that the entire communications work will be carried out in an orderly, complete and coordinated fashion.

1.11 SITE INVESTIGATION

- A. Prior to submitting bids of the project, visit the site of the work to become aware of existing conditions that may affect the cost of the project. Where work under this project requires extension, relocation, reconnections or modifications to existing equipment or systems, the existing equipment or systems, shall be restored to their original condition before the completion of this project.

1.12 PERMITS

- A. Obtain all permits and inspections for the installation of this work and pay all charges incident thereto. Deliver to the Owner all certificates of said inspection issued by authorities having jurisdiction.

1.13 RENOVATIONS AND ADDITIONS

- A. All work that would adversely affect the normal operation of the other portions of the Owner's property shall be done at a time other than normal working hours. Normal working hours shall be considered 8 a.m. to 5 p.m. Monday through Friday.
- B. Prior to submitting bids on the project, visit the site of the work to become aware of existing conditions that may affect the cost of the project.
- C. Where work under this project requires extension, relocation, reconnections or modifications to existing equipment or systems, the existing equipment or systems shall be restored to their original and operating condition. Remove all equipment indicated to be demolished, including outlets, devices, raceways and support structures.
- D. Care shall be exercised in the removal and storage of equipment indicated to be relocated or removed and reused. Prior to placing back into service, equipment shall be cleaned and marred or chipped paint surfaces touched-up.
- E. Provide all coring, cutting and patching to existing walls, floors, etc., required for the removal of existing work or the installation of new work.

1.14 OPERATION & MAINTENANCE MANUALS

- A. The Contractor shall furnish three (3) sets of operational and maintenance manuals for all systems furnished. The manuals shall include component lists, instructions for care, operation instructions, instructions for ordering replacement equipment and personnel to contact for warranty work.

1.15 APPROVALS

- A. Deviations from this specification must be documented in writing to the Architect and Engineer at least twenty-one (21) business days prior to the bid date.
- B. Complete catalogue data, product specifications and technical information on alternative equipment must be provided including all associated cost savings or additions, including but not limited to equipment, equipment installation, power wiring and materials, programming, documentation and project management.

1.16 DELIVERY & HANDLING

- A. General: Comply with Division 1 Product Requirements Section.
- B. Delivery: Deliver materials in manufacturer's original, unopened, undamaged containers with identification labels intact.
- C. Storage and Protection: Store materials and equipment in an area protected from harmful weather conditions and at temperature conditions recommended by manufacturer. After initial installation, protect equipment from exposure to dust, dirt, paint and other contaminants.

1.17 PROJECT CONDITIONS

- A. Field Measurements: Verify actual measurements/openings by field measurements before fabrication; show recorded measurements on shop drawings.
- B. Scheduling: Coordinate taking field measurements, fabrication schedule and deliveries with construction progress schedule to avoid construction delays.

1.18 WARRANTY

- A. Manufacturer's Warranty: All equipment and labor provided under this section is warranted for two (2) years from Substantial Completion or System Commissioning, whichever occurs first.

- B. During the warranty period, the Contractor shall perform quarterly preventative maintenance inspections on all installed equipment.
- C. Nothing in the above warranty shall apply to material which has been misused or abused as follows: neglect by the owner, defects or damage caused by work or failure of work by others, ordinary wear or normal equipment adjustment.
- D. Additionally, any unauthorized modifications, repairs or tampering shall constitute termination of the warranty.

1.19 TRAINING

- A. The Contractor shall provide four (4) hours of on-site training for operational purposes and forty (40) hours of training for maintenance purposes at the turnover of the project.

PART 2 - PRODUCTS

2.01 SUBSTITUTIONS

- A. Where equipment is identified by manufacturer and catalog number, it shall be as the base of requirements for quality and performance. Where manufacturers for equipment are identified by name, the Contractor may submit for approval, similar equipment of other manufacturers as substitution. The Engineer's decision as to whether the submitted equipment is acceptable shall be final and binding.
- B. All changes necessary to accommodate the substituted equipment shall be made at the Contractor's expense, and shall be as approved by the Engineer. Detailed drawings indicating the required changes shall be submitted for approval at the time the substitution is requested.
- C. If substitutions are made in lieu of device specified; form, dimension, design and profile shall be submitted to the Engineer for approval.
- D. Submit request for approval of substitute materials in writing to the Architect at least ten days prior to bid opening.

2.02 MATERIALS

- A. All materials used in this work shall be new and shall bear the inspection label of Underwriters' Laboratories Inc. or certification by other recognized laboratory.
- B. The published standards and requirements of the Telecommunications Industries Association (TIA), National Electrical Manufacturers Association (NEMA), the

American National Standard Institute (ANSI), the Institute of Electrical and Electronic Engineers (IEEE), and the American Society of Testing Materials (ASTM), are made a part of these Specifications and shall apply wherever applicable.

- C. Materials and equipment furnished shall be of current production by manufacturers regularly engaged in the manufacture of such items, for which replacement parts are available.
- D. When more than one unit of the same class of equipment or material is required, such units shall be the products of a single manufacturer or partner manufacturers that offer a certified solution.
- E. Components of an assembled unit need not be products of the same manufacturer, but must offer a certified end-to-end solution.
- F. Manufacturers of equipment assemblies, which include components made by others, shall assume complete responsibility for the final assembled unit.
- G. Components shall be compatible with each other and with the total assembly for the intended service.

PART 3 - EXECUTION

3.01 EXAMINATION OF CONDITIONS

- A. Prior to the start of work, the Contractor shall carefully inspect the installed work of other trades and verify that such work is complete to the point where installation may properly commence. Start of work indicates acceptance of conditions.
- B. Install equipment in accordance with applicable codes and regulations, and the referenced standards.
- C. In the event of a discrepancy, immediately notify the Project Manager.
- D. Do not proceed with installation until unsatisfactory conditions and discrepancies have been fully resolved.

3.02 PROTECTION OF SYSTEMS AND EQUIPMENT

- A. Protect materials and equipment from damage during storage at the site and throughout the construction period. Equipment and materials shall be protected during shipment and storage against physical damage, dirt, theft, moisture, extreme temperature and rain.

- B. Damage from rain, dirt, sun and ground water shall be prevented by storing the equipment on elevated supports and covering the sides with securely fastened protective rigid or flexible waterproof coverings.
- C. During installation, equipment shall be protected against entry of foreign matter on the inside and be vacuum cleaned both inside and outside before testing, operating or painting.
- D. As determined by the Project Manager, damaged equipment shall be fully repaired or shall be removed and replaced with new equipment to fully comply with requirements of the Contract Documents.
- E. Damaged paint on equipment and materials shall be repainted with painting equipment and finished with the same quality of paint and workmanship as used by the manufacturer.

3.03 ACCESS TO EQUIPMENT

- A. Equipment shall be installed in location and manner that will allow access for maintenance and inspection.
- B. Working spaces shall be not less than specified in the National Electrical Code (NEC) for voltages specified.
- C. Where the Project Manager determines that the Contractor has installed equipment not accessible for operation and maintenance, equipment shall be removed and reinstalled as directed by the Project Manager, at no additional cost to the Owner. "Accessible" is defined as being capable of being reached without the use of ladders or without climbing or crawling under or over obstacles such as motors, pumps, belt guards, transformers, piping and duct work.

3.04 CLEANING

- A. During construction, and prior to Owner acceptance of the building, remove from the premises and dispose of packing material and debris caused by communications work.
- B. Remove dust and debris from interiors and exteriors of electrical equipment. Clean accessible current carrying elements prior to being energized.
- C. General: Upon completion of the work, remove excess dust & debris, materials, equipment, apparatus, tools and similar items. Leave the premises clean, neat and orderly.

3.05 COMPLETION

- A. Results Expected: Systems shall be complete and operational and controls shall be set and calibrated. Testing, start-up and cleaning work shall be complete.
- B. Maintenance Materials: Special tools for proper operation and maintenance of the equipment provided under this Specification shall be delivered to the Owner.

3.06 TESTING AND VERIFICATION

- A. See specific Division 28 sections for testing parameters of sub-systems.
- B. The Contractor shall verify that requirements of this Specification are met. Verification shall be through a combination of analyses, inspections, demonstrations and tests, as described below.
- C. Verification by inspection includes examination of items and comparison of pertinent characteristics against the qualitative or quantitative standard set forth in the Specifications. Inspection may require moving or partially disassembling the item to accomplish the verification, included as part of the work at no additional cost to the Owner.
- D. The Contractor shall verify by demonstrations and/or tests that the requirements of this Specification have been met. The Contractor shall demonstrate that the communications systems, components and subsystems meet Specification requirements in the “as-installed” operating environment during the “System Operation Test.” The Contractor shall measure and record temperature, humidity and other environmental parameters.
- E. The Contractor shall schedule and coordinate the final acceptance tests. The Contractor shall provide necessary instruments, labor and materials required for tests. Provide equipment manufacturer’s technical representative and qualified technicians.
- F. The Contractor shall satisfy all items detailed in the final acceptance check-off list (punch list). The list shall be a complete representation of specified installation requirements. At the time of final acceptance punch list items shall be corrected until the system is found to be acceptable to the Owner and the Project Manager.

END OF SECTION

SECTION 28 13 00

ACCESS CONTROL SYSTEM

PART 1 - GENERAL

1.01 SUMMARY

- A. Provide Card Access Control equipment as specified herein and as shown on the schedules and drawings. Installing contractor shall receive, place, connect, and mount all equipment specified in this Section per the manufacturer's instructions. Installing contractor shall furnish all hardware, wire, connectors, and other necessary items as required for a complete and functional Card Access Control system.
- B. Related Sections
 - 1. 27 00 00 Communications
 - 2. 27 15 13 Communications Copper Horizontal Cabling
 - 3. 28 00 00 Electronic Security

1.02 REFERENCES

- A. The General Conditions, Supplementary Conditions, and Division 1 Specifications shall apply to all work of this section.
- B. Standards listed by reference, including revisions by issuing authority, form a part of this specification section to extent indicated. Standards listed are identified by issuing authority, authority abbreviation, designation number, title, or other designation established by issuing authority. Standards subsequently referenced herein are referred to by issuing authority abbreviation and standard designation.
- C. Underwriter's Laboratories (UL)
 - 1. UL 508 Industrial Control Equipment
 - 2. NEC National Electrical Code (latest edition)

1.03 WORK INCLUDED

- A. The Electronic Security Contractor shall furnish labor, equipment, and materials for the Access Control system including but not limited to:
 - 1. Wiring.
 - 2. Equipment cabinets.

3. Card reader data gathering panels, readers, system software, access control host computer, badging station and system software & programming.
- B. This Section consists of furnishing and installing a card access system as part of the Security Monitoring and Control System to include the following:
1. File Server
 2. Remote Interfaces and Processors
 3. Enrollment Terminal/Photo ID System
 4. Administrative Terminal
 5. Proximity/RFID Card Readers
 6. RFID Long-Range Fob Readers
 7. Keypads
 8. PoE Switches or Power Supplies (as required by system)
 9. Logging Printer
 10. Proximity/RFID Fobs
 11. Vehicle Entry Gate RFID Transmitters and Receivers
 12. Telephone Entry Stations

1.04 APPROVALS

- A. General
1. Submittals shall be made in accordance with the General Provisions of these specifications.
- B. Specific Requirements
1. Submit catalog cuts for all equipment and devices being furnished under this Section.
 2. Submit a complete Access Control System riser diagram. Diagram shall include labeling of each reader and its corresponding head end equipment connection point and interconnecting wiring of all components.
 3. Submit floor plan drawings showing location and mounting of each card reader.

1.05 DESCRIPTION

- A. The Access Control System shall provide a means to control and monitor access at specified doors throughout the facility.
- B. Each system shall consist of proximity/RFID-type Card/Fob sensor devices, status input devices, output control devices, control processor(s), interface modules, file server, remote terminals, printers, software and programming.

- C. Hardware and software to interface the Access Control System with the Touch Screen and/or Graphic Control Panel Systems.
- D. An enrollment terminal for programming the card access system security functions shall be provided for the system. No other terminal shall be capable of entering or modifying the card access system. The enrollment station shall be capable of having a color photo ID badging system as an integral component.
- E. The software shall run on a Microsoft Windows (latest version) operating system.
- F. The contractor shall provide the latest version of operating system at the end of the project. At closeout and at the end of the warranty period, the latest version of software shall be loaded onto the operating system. In addition, a backup copy of the software shall be turned over to the Owner.
- G. The software shall be user programmable. All source codes, passwords and any other codes shall be turned over to the Owner such that the Owner can have access to any and all parts of the software and any other components. The intent is for the Owner to have complete access to all components of the system he is purchasing without the need of a maintenance contract. Although an after warranty maintenance contract may be considered by the Owner. See additional requirements herein and in the Security General specification sections.
- H. System shall be equipped for expansion to remote sites by the addition of an interface card and modem.
- I. The new system shall have a 5.25 TeraByte hard drive minimum.

PART 2 - PRODUCTS

2.01 MATERIALS

- A. Acceptable Manufacturers
 - 1. HID
 - 2. Honeywell – Pro-Watch Series
 - 3. Vicon – VAX Series
 - 4. DoorKing
 - 5. Aiphone
 - 6. Securitron
 - 7. Altronix
 - 8. Or Approved Equal
- B. Scope

1. This specification outlines the requirements for a single local controller up to a centrally controlled distributed processing and centrally programmed monitored access control system capable of running on an industry standard computer with the manufacturer's priority software.

C. Computer Hardware Requirements

1. The computer shall be configured at a minimum in a following manner.
2. Furnish and commission a centrally located host computer and software as described following:
 - a. IBM PC 100% compatible computer, Intel Core i7-3770 CPU at 3.4 MHz
 - b. 64 GB of RAM
 - c. 6 TB Hard Drive
 - d. DVD +/- RW Optical Drive
 - e. 25" LCD Color Display
 - f. Printer port and line printer for event printing
 - g. Two RS232 and one RS485 serial communication ports
 - h. Microsoft compatible bus mouse
 - i. Surge protector
 - j. Uninterruptable Power Supply

D. Computer Software Requirements

1. The computer shall include the following software:
 - a. Windows 7
 - b. WINPAK Pro or approved equal.
 - c. Approved equal

E. Computer Software Features

1. The following features shall be provided for the computer:
 - a. Programming of users and system configuration information across multiple systems.
 - b. Password protected, multilevel operator programming capabilities
 - c. Issue of commands to any controller from the computer, like momentarily unlocking a door.
 - d. Storage to hard disk of all event transactions.
 - e. Archive to floppy or tape of stored event transactions for long term storage.
 - f. User customizable reports generated from stored event transactions.
 - g. User, door and alarm input English text names appear on screen, printer and reports.
 - h. Host operator action logging to disk.
 - i. Customizable event and report print.

- j. The system shall provide for a minimum of 1,000 users.
- k. The system shall provide for a maximum of 10,000 users.

F. Host Computer to Controller Communication Protocols

- 1. Communications between the computer and the controller shall be accomplished utilizing a standard 10/100 TCIP connection.

G. Maximum System Wide Capacities

- 1. The following shall be the maximum system-wide capacities. Actual numbers shall be dependent upon mix of controllers that make up the system.
 - a. 32,640 readers
 - b. 261,120 monitor alarm inputs
 - c. 4032 control relay inputs
 - d. 2,040 controllers which can be any combination of access control; alarm monitoring and relay controllers

H. Head End Components

- 1. Controller
 - a. There shall be three primary types of controllers: access control, alarm monitoring and relay control.
 - b. The controller board shall be microprocessor-based incorporating ROM, on board battery backup RAM and a clock calendar. The ROM shall be modularly upgradeable in the field for enhancements to systems features. All power connections to the controller board shall be protected by fuses. All wiring connections to the controller board shall be screw terminals. Each door connection shall consist of terminals for two readers, one 5 amp rated form c dry output relay for lock control and one input for monitoring and status switch, a request to exit device and tamper switch. There shall be status indicator lights for active relays as well as diagnostic indicator lights to aid in system trouble shooting.
 - c. There shall be dedicated alarm output relays for external reporting of the following conditions: Alarm, Duress, Tamper, Trouble.
 - d. The controller enclosure shall be a NEMA style metal cabinet designed for surface mounting. It shall have a tamper proof removable hinge door with a high security lock.
 - e. The controller shall have an internal power supply that will accept 60 Hz 120V AC. The primary site of the power supply shall be protected with a fuse. The power supply shall provide 28V DC power to the controller board, internal battery charger, scrambling

keypads (if applicable), selected card readers and reader interface boards.

- f. Controller shall be Honeywell PRO-2200 Series or approved equal.

I. Standby Battery

1. The controller shall have an internal standby battery that is capable of running the system during AC power interruption which shall be automatically recharged by a charging circuit incorporated into the controller board. This standby battery shall be capable of operating the system for 4 hours minimum.

J. Expansion Options

1. A maximum of 5 expansion boards can be installed in each controller. An interface board is included with each controller.
2. Alarm Inputs:
 - a. Each controller shall be capable of accepting up to 16 additional supervised alarm inputs in increments of 4 and/or 8. Alarm expansion boards shall be mounted in the controller cabinet and connect to the controller board by an expansion bus cable.
 - b. Alarm Input units shall be Honeywell PRO22IN or approved equal.
3. Relay Outputs:
 - a. The two access control and one alarm monitoring controller shall be capable of accepting up to 32 additional relay outputs in increments of 8. The outputs shall be used for control applications other than standard door access such as elevator floor control, local door annunciator, HVAC interface etc. The relay expansion boards shall be mounted in the control room cabinet and connect to the controller board via an expansion bus cable.
 - b. Relay Output Units shall be Honeywell PRO22OUT or approved equal.
4. Code Database:
 - a. The controller shall be capable of expanding the code database up to a minimum of 50,000 users with the addition of a memory expansion board. The board shall be mounted in the controller cabinet connected to the controller board via an expansion bus cable.
5. Event Transaction Buffer:
 - a. The controller shall be capable of expanding the event transaction buffer up to a maximum 3500 alarms with in each board. The board shall be mounted in the controller cabinet and connected to the controller board via an expansion bus cable.
6. Serial Communication Interface:

- a. The controller shall be capable of interfacing to a serial printer for event transaction printing or to a serial terminal for programming with the addition of a serial interface board.

K. Proximity/RFID Readers

1. The controller shall accept all of the reader technologies concurrently.
 - a. Proximity/RFID
2. The readers can be used for access control, alarm management and or/relay control and shall be capable of being used in combined operation with keypad and any other reader technology to operate as a dual technology reader where two valid IDs are required.
3. Proximity Card Readers:
 - a. The controller shall be capable of using proximity/RFID card readers that output a standard Wiegand data format. The readers can have a short or long read range and be unidirectional or bi-directional.
 - b. Provide a slim line reader for builders store front doors with 2" jambs.

L. Vehicle Entry Gate RFID Transmitters and Receivers

1. Vehicle entry gate RFID transmitters and receivers shall be Door King – MicroPLUS Series, or approved Equal.
2. Transmitters and receivers shall allow for long-range, single click open functionality of vehicle gates for authorized Users.

M. Power Supplies

1. Power supplies shall be:
 - a. Securitron – BPS Series
 - b. Altronix – AL 1012 Series
 - c. Or Approved Equal
2. Each access controlled door shall be provided with a power supply, meeting the following minimum performance requirements:
 - a. Input: 115-120VAC
 - b. Output: 12VDC or 24VDC
 - c. Output Current: 1A
 - d. Battery Backup
 - e. UL Class 2 Listed
3. Multiple controlled doors, in close proximity to one another, may connect to the same Power Supply dependent upon available outputs and manufacturer's recommended electrical specifications.
4. 115-120VAC circuits to Power Supplies shall be by the Electrical Contractor.

N. PoE Switches

1. PoE Switches shall be:
 - a. Honeywell – ProWatch Series
 - b. Securitron – AQE Series
 - c. Or Approved Equal
 2. Switches shall be rack mountable, and meet the following minimum performance requirements:
 - a. 16 output ports
 - b. IEEE 802.3at compliant
 - c. Remote PoE shutdown per port or all ports simultaneously
 - d. 10/100/1000 Base-T Gigabit support
- O. Telephone Entry Systems
1. Telephone Entry Systems shall be DoorKing – 1835 Series, or approved equal.
 2. Telephone Entry stations shall meet the following minimum performance requirements:
 - a. Up to 1,000 4-digit entry codes
 - b. Up to 8,000 device codes
 - c. Single line LCD display
 - d. Elevator control support
 - e. PC programmable
 - f. Vandal-resistant
 - g. 12VAC
 - h. Compatible with Cellular, VoIP, Wireless, or POTS connectivity methods
 - i. Compatible with Wiegand devices
 3. Telephone Entry stations shall be home run to the MDF Room via Category 6 cabling.
- P. Access Control Features
1. The controller shall have the following access control features at a minimum:
 - a. Restrict access by time of day, day of week, door or holiday.
 - b. Momentary unlock of door.
 - c. Relock of door by code, card or time zone.
 - d. Door status monitoring shall allow for door forced monitoring, door open too long monitoring, door opened too long while door is unlocked, auto relock of door when open or closed.
 - e. Request exit alarms and/or unlocks.
 - f. Two person requirement per door.
 - g. Passback control including use restriction based on status.
 - h. Absentee rule limits.
 - i. Temporary day limits.
 - j. Occupancy counting minimum/maximum limits.

- k. Coordinate with the Owner for any other operating features required.

Q. Hot Redundant CPU & Software

1. Provide a complete redundant CPU equipped with all software and hardware necessary, hot and on line, ready to take over in case of failure of the primary CPU operating system.
2. Provide a second workstation with complete operating software. Coordinate location with the Owner.

R. Fobs and Users:

1. Provide 1000 Fobs. Fobs shall be:
 - a. HID – iClass Series
 - b. DoorKing – MicroPLUS Series
 - c. Or Approved Equal
2. Each User shall require only a single Fob for access control.
3. Where multiple systems are utilized on the property (i.e. conventional hard-wired access control in addition to battery-operated controlled doors), coordinate to ensure single Fob compatibility between systems.

S. Pedestals

1. Provide mounting pedestals, per manufacturer recommendations, for all Proximity/RFID Readers, Telephone Entry stations, and/or Video Intercom stations located at vehicle entry gates.
2. Pedestals shall be of steel construction.
3. Style of pedestal and number of arms/face plates shall be as noted in the Drawings and Details.

PART 3 - EXECUTION

3.01 MANUFACTURER'S INSTRUCTIONS

- A. Compliance: Comply with manufacturer's product data; including product technical bulletins, product catalog, installation instructions, submittal sketches or drawings, and product carton instructions for installation.

3.02 EXAMINATION

- A. Site Verification of Conditions: Verify that related conditions, including equipment that has been previously installed under other sections, are acceptable for product installation in accordance with manufacturer's instructions.

- B. All devices connected to equipment specified in this section shall bear the UL, cUL, or CSA label and comply with all applicable National Electrical Code (NEC) standards.

3.03 PREPARATION

- A. The electronic security contractor shall develop custom software as required to affect the functions of the system as dictated by the drawings and Specifications.
- B. The electronic security contractor shall provide equipment cabinets for installation of the control equipment and cable terminations to the equipment.
- C. All equipment related to the system shall be factory tested before shipment.

3.04 INSTALLATION

- A. Contractor shall furnish all equipment, labor, system setup, and other services necessary for the proper installation of the products/system as indicated on the drawings and specified herein.
- B. Install in accordance with manufacturer's handling and installation instructions.
- C. Install in accordance with all local and pertaining codes and regulations.
- D. All equipment and systems shall be installed by the ESC. Subcontracting of equipment installation shall not be permitted.
- E. Equipment shall be ready to use condition at end of installation.
- F. Energize equipment in accordance with manufacturer's instructions.

3.05 PROTECTION AND CLEANING

- A. Storage and Protection: Store materials protected from exposure to harmful environmental conditions and at temperature and humidity conditions recommended by the manufacturer.
- B. Touch up, repair, or replace damaged components before Substantial Completion.
- C. Remove temporary tags, coverings, and construction debris from interior and exterior surfaces of equipment. Remove construction debris from equipment area and dispose of debris.
- D. Clean integral air filters, heatsinks, grills, and fans before Substantial Completion and Commissioning Services.

3.06 WARRANTY

- A. The ESC shall provide a single source warranty for all supplied equipment specified in this section to be free of defects in material and workmanship for a period of two (2) years from the date of substantial completion.

END OF SECTION

SECTION 28 16 00

INTRUSION DETECTION

PART 1 - GENERAL

1.01 GENERAL REQUIREMENTS

- A. Applicable requirements of Division 28 - Electronic Security shall be considered a part of this section and shall have the same force as if printed herein full.
- B. This document describes the products and execution requirements relating to furnishing and installing Intrusion Detection System.
- C. All cables and related terminations, support and grounding hardware shall be furnished, installed, wired, tested, labeled, and documented by the Contractor as detailed in this document.
- D. Product specifications, general design considerations, and installation guidelines are provided in this document. The successful vendor shall meet or exceed all requirements for the system(s) described in this document and on the drawings.
- E. Refer to architectural section for the Windows and Glass Specifications.
- F. Intrusion Detection system shall be compatible and integrated with the components specified in Access Control System and Video Surveillance System.

1.02 SUBMITTALS

- A. Provide product data from manufacturer's specifications.

1.03 WORK INCLUDED

- A. The work included under this specification consists of furnishing all labor, equipment, materials, and supplies and performing all operations necessary to complete the installation of this system. The Contractor will provide and install all of the required material to form a complete system whether specifically addressed in the Specification or not.
- B. The work shall include, but not be limited to the following:
 - 1. Furnish and install a complete intrusion detection system.
 - 2. Furnish and install all motion detection devices.
 - 3. Furnish and install all glass break detectors.

4. Furnish and install all duress devices.
5. Furnish and install all door and window contacts.
6. Furnish and install all horns.
7. Furnish any other material required to form a complete system.
8. Perform testing of all components.
9. Furnish test results of all cabling to the Owner on disk and paper format.
10. Provide Owner training and documentation.
11. Verify all AC power requirements for all systems and components. Confirm AC voltage and frequency of all systems and components match the facility power distribution system. Coordinate the above with Electrical Contractor.
12. Shop drawings shall include door schedule showing hardware pertaining to the security system as provided by the Contractor.
13. Shop drawings shall include window schedule showing hardware pertaining to the security system as provided by the Contractor.

PART 2 - PRODUCTS

2.01 APPROVED PRODUCTS

- A. Approved System Controller
 1. Bosch
 2. Or Approved Equal
- B. Approved Input Module
 1. Bosch
 2. Or Approved Equal
- C. Approved Output Module
 1. Bosch
 2. Or Approved Equal
- D. Enclosures & Batteries
 1. Enclosure
 - a. Bosch
 - b. Or Approved Equal
 2. Backup Batteries
 - a. Bosch
 - b. Or Approved Equal

E. Approved Access Control Monitoring Software

1. Intrusion Detection Software
 - a. Lenel
 - b. Or Approved Equal

F. Approved Keypad

1. Bosch
2. Or Approved Equal

G. Approved Motion Detector

1. Honeywell
2. Or Approved Equal

H. Approved Glass Break Device

1. Honeywell
2. Or Approved Equal

I. Approved Window/Door Contact

1. Honeywell
2. Or Approved Equal

J. Approved Horn

1. Honeywell
2. Or Approved Equal

K. Approved Duress Button

1. United Security
2. Or Approved Equal

L. Approved Residential System Controller

1. GE
2. Or Approved Equal

M. Approved Residential Keypad

1. GE
2. Or Approved Equal

- N. Approved Residential Transformer
 - 1. DSC
 - 2. Or Approved Equal

- O. Approved Residential Battery
 - 1. 12V, 7Ah Sealed Lead Acid
 - 2. Or Approved Equal

- P. Approved Wiring
 - 1. RS-485 (2-conductor, shielded, 24 AWG)
 - a. Non-Plenum – Belden
 - b. Plenum – Belden
 - c. Or Approved Equal
 - 2. Device Cable (2-conductor, shielded, 22 AWG)
 - a. Non-Plenum – Belden
 - b. Plenum – Belden
 - c. Or Approved Equal
 - 3. 12 VDC Cable (2-conductor, unshielded, 18 AWG)
 - a. Non-Plenum – Belden
 - b. Plenum – Belden
 - c. Or Approved Equal
 - 4. 12 VDC Cable (2-conductor, unshielded, 16 AWG)
 - a. Non-Plenum – Belden
 - b. Plenum – Belden
 - c. Or Approved Equal
 - 5. Keypad & Motion Detector Cable (4-conductor, shielded, 18 AWG)
 - a. Non-Plenum – Belden
 - b. Plenum – Belden
 - c. Or Approved Equal
 - 6. RS-232 (2-conductor, shielded, 24 AWG)
 - a. Non-Plenum – Belden
 - b. Plenum – Belden
 - c. Or Approved Equal

PART 3 - EXECUTION

3.01 GENERAL REQUIREMENTS

- A. Install system components and appurtenances in accordance with the printed instructions.

- B. Provide all necessary interconnections, services, and adjustments required for a complete and operable system.
- C. Install control signal, communications, and data transmission line grounding as necessary to preclude ground loops, noise, and surges from adversely affecting system operation.

3.02 FIELD QUALITY CONTROL

A. Testing

- 1. All devices shall be tested for full operational compliance.
- 2. Testing of system shall be the sole responsibility of the Contractor.
- 3. Communications Tests
 - a. Controllers to manager server
 - b. Manager server to client
 - c. Remote dial-up support
- 4. Device Tests
 - a. All system devices requiring power shall be tested.

B. Inspection

- 1. Provide an on-sight, factory-trained technician to assist, advise or manage installing personnel.
- 2. All final connections shall be made under the direct supervision of the Systems Integrator.

C. Field Service

- 1. Provide first line support for both the hardware and software properties of the selected system.
- 2. Provided second line support directly from the manufacturer for all components and computer hardware, and all operating and application software that comprise the complete system.
- 3. Determine and report all problems to the manufacturer's customer service departments.
- 4. Support shall be available to the integrator via the following methods:
 - a. Phone inquiries
 - b. Direct dial-in to the customer system for remote system troubleshooting by a qualified Field Service Engineer
 - c. On-site visits if required, upon approval by the manufacturer's Customer Service Manager

3.03 LABELING

- A. Label all devices with machine generated labels.
- B. Label all cables at each end of each cable. Labels shall be machine generated, wrap-around type.
- C. Labeling system shall designate the cable's origin and destination on each end of each distribution/horizontal cable.

3.04 FINAL ACCEPTANCE

- A. Perform the following performance standards before final acceptance:
 - 1. Operate all mechanical devices without down time for a period of 10 days.
 - 2. Operate all electronic devices and equipment without downtime or programming problems for a period of 30 days.

3.05 WARRANTY

- A. All equipment, components, etc., shall be guaranteed free of defects and any faulty workmanship for a period of one year after final acceptance.
- B. The Contractor shall replace defective materials and repair faulty workmanship within 24 hours of discovery, except emergency conditions (system failures), which must be placed in service within six (6) hours after notification, all at no cost to the Owner.

END OF SECTION

SECTION 28 23 00

VIDEO SURVEILLANCE SYSTEM

PART 1 - GENERAL

1.01 GENERAL REQUIREMENTS

- A. Applicable requirements of Division 28 - Electronic Security shall be considered a part of this section and shall have the same force as if printed herein full.
- B. This document describes the products and execution requirements relating to furnishing and installing Video Surveillance System.
- C. All cables and related terminations, support and grounding hardware shall be furnished, installed, wired, tested, labeled, and documented by the Contractor as detailed in this document.
- D. Product specifications, general design considerations, and installation guidelines are provided in this document. The successful vendor shall meet or exceed all requirements for the system(s) described in this document and on the drawings.
- E. Video Surveillance system shall be compatible and integrated with the components specified in Access Control System and Intrusion Detection.

1.02 SUBMITTALS

- A. Provide product data from manufacturer's specifications.

1.03 WORK INCLUDED

- A. The work included under this specification consists of furnishing all labor, equipment, materials, and supplies and performing all operations necessary to complete the installation of this system. The Contractor will provide and install all of the required material to form a complete system whether specifically addressed in the specification or not.
- B. The work shall include, but not be limited to the following:
 - 1. Furnish and install a complete video surveillance system.
 - 2. Furnish and install all cameras, lenses, housings, and mounting devices.
 - 3. Furnish and install all network video recorders.
 - 4. Furnish and install all work stations and monitors.
 - 5. Furnish and install all PoE switches.

6. Furnish and install all UPSs.
7. Furnish and install all system cabling. (Provide lightning and surge protection where cabling leaves building perimeter).
8. Furnish and install all equipment cabinets.
9. Furnish and install all cabling.
10. Furnish any other material required to form a complete system.
11. Perform testing of all components.
12. Furnish test results of all cabling to the Owner on disk and paper format.
13. Provide Owner training and documentation.
14. Verify all AC power requirements for all systems and components. Confirm AC voltage and frequency of all systems and components match the facility power distribution system. Coordinate the above with Electrical Contractor.

PART 2 - PRODUCTS

2.01 APPROVED PRODUCTS

- A. Approved Fixed Indoor Dome Camera
 1. Avigilon
 2. Hikvision
 3. Vicon
 4. Or Approved Equal

- B. Approved Fixed Outdoor Dome Camera
 1. Avigilon
 2. Hikvision
 3. Vicon
 4. Or Approved Equal

- C. Approved Encoder
 1. Avigilon
 2. Hikvision
 3. Vicon
 4. Or Approved Equal

- D. Approved Fiber Transmitter & Receiver
 1. Avigilon
 2. Hikvision
 3. Vicon
 4. Or Approved Equal

- E. Approved Pan-Tilt-Zoom (PTZ) Dome Camera
 - 1. Avigilon
 - 2. Hikvision
 - 3. Vicon
 - 4. Or Approved Equal

- F. Approved License Plate Recognition (LPR) Dome Camera
 - 1. Bosch
 - 2. Or Approved Equal

- G. Approved Network Video Recorder
 - 1. Avigilon
 - 2. Hikvision
 - 3. Vicon
 - 4. Or Approved Equal

- H. Approved Software
 - 1. Avigilon
 - 2. Hikvision
 - 3. Vicon
 - 4. Or Approved Equal

- I. Approved PoE Switch(es)
 - 1. Allied Telesis
 - 2. Or Approved Equal

- J. Approved UPS
 - 1. APC
 - 2. Middle Atlantic
 - 3. Tripp Lite
 - 4. Or Approved Equal

- K. Approved Wall Mounted Cabinet
 - 1. Chatsworth Products, Inc.
 - 2. Middle Atlantic
 - 3. Panduit
 - 4. Or Approved Equal

- L. Approved Cabling
 - 1. Category 6
 - a. Belden
 - b. Or Approved Equal

PART 3 - EXECUTION

3.01 CAMERAS

- A. All camera housings and support brackets shall be securely attached to mounting surfaces. Use lead shields on solid masonry, wood screws on wood, and machine bolts on structural steel. All anchoring devices shall be rated to support not less than five times the total equipment weight.

3.02 EQUIPMENT

- A. Equipment shall be installed as per the requirements specified by the manufacturer's installation guidelines and best industry practices.

3.03 CABLING

- A. All system cabling shall be installed in concealed conduit.

3.04 LABELING

- A. Label all devices with machine generated labels.
- B. Label all cables at each end of each cable. Labels shall be machine generated, wrap-around type.
- C. Labeling system shall designate the cable's origin and destination on each end of each cable.

3.05 TESTING AND PERFORMANCE VERIFICATION

- A. Included under this section is the aiming and testing of the complete CCTV system and the interface to the components of the security system.
- B. Prior to final installation of CCTV cameras, the Contractor shall verify the specified lens size is correct for the final building design/construction. Confirm the proper field of view for each location. Install cameras at the approximate locations shown on the Drawings. Field adjustments shall be made as required to provide or improve the field of view of the area to be monitored.

- C. Align and adjust all video cameras and synchronize all switchers, pan, tilt and zooms to provide smooth, glitch-free operation and to optimize the images at the display monitor.
- D. If the need for additional adjustment becomes evident during demonstration and testing, the Contractor's work shall be continued until the installation operates properly. If final acceptance is delayed because of defective equipment or because installation is not in accordance with these Specifications, the Contractor shall pay for all additional time and expense during any extensions of the acceptance-testing period.
- E. Contractor shall program, label and set up systems to the satisfaction of the Owner. The Owner shall direct the Contractor as to the system programming and labeling requirements. A factory-trained technician shall fully test and operate the system. Upon completion, a manufacturer's letter shall confirm testing and programming has been completed and that the system operates all component features and to its designed maximum potential.

3.06 WARRANTY AND SERVICE RESPONSIBILITY

- A. All equipment, components, etc., shall be guaranteed free of defects and any faulty workmanship for a period of one year after final acceptance.
- B. The Contractor shall replace defective materials and repair faulty workmanship within 24 hours of discovery, except emergency conditions (system failures), which must be placed in service within six (6) hours after notification, all at no cost to the Owner.

END OF SECTION

SECTION 28 30 00

TWO-WAY EMERGENCY COMMUNICATION SYSTEM

PART 1 – GENERAL

1.1 GENERAL REQUIREMENTS

- A. Applicable requirements of Section 26 00 00 - Electrical General shall be considered a part of this section and shall have the same force as if printed herein full.
- B. Product specifications, general design considerations, and installation guidelines are provided in this document. The successful vendor shall meet or exceed all requirements described in this document and/or on the Drawings.

1.2 WORK INCLUDED

- A. The work included under this specification consists of furnishing all labor, equipment, materials, supplies and performing all operations necessary to complete the installation. The Contractor will provide and install all of the required material whether specifically addressed in the Specification or not.
- B. The work shall include, but not be limited to the following:
 - 1. Furnish and install communication base system, call boxes, graphics, labeling and all associated wiring.

1.3 QUALITY ASSURANCE

- A. Coordination: Coordinate installation with architectural and structural features, equipment installed under other sections of the Specifications.
- B. Components and installation shall be in accordance with the requirements of the International Building Code, NFPA, and ADAAG.

1.4 SHOP DRAWINGS

- A. Shop drawings shall be submitted and shall contain the following:
 - 1. Specification sheet/sheets of technical data on each hardware component
 - 2. Specification sheet(s) on wiring to be utilized
 - 3. One-line schematic riser diagram made specifically for this job
 - 4. Calculation for sizing batteries and power supplies
 - 5. Sequence of operation for the entire system
 - 6. Verification of central supervising station (UL Certified)
 - 7. Equipment and service warranty
 - 8. Scaled floor plans showing device locations and wire routing

PART 2 – PRODUCTS

2.1 APPROVED PRODUCTS

A. Approved Two-Way Communication System Manufacturer

1. Rath Area of Refuge
2. Approved Equal

2.2 SYSTEM COMPONENTS

A. The Base Station shall be installed in location shown on the Architectural drawings, and shall have the following components:

1. Stainless steel or powder-coated steel housing, red coil cord emergency Handset, 120vac powered, with battery back-up power for 4 hours operation of any call box and base station.
2. Audible and visual indicator that a call box has been activated.
3. 24vac power supply model capable of supplying power to a minimum of 40 call boxes.

B. Each Call Box shall be installed in designated areas of refuge (typically a vestibule near stairwell, or within a stairwell) as is indicated on the Architectural drawings. If no area is designated, IBC requires a call box at each accessible floor elevator lobby above or below level of exit discharge. Each call box shall have the following features:

1. Must comply with Americans with Disabilities Act (ADA)
2. Hands-free speakerphone with an LED to indicate status of call
3. Programmable for specific location message of the Call Box. This allows rescue personnel to know the location of the activated Call Box.
4. Braille faceplate located no higher than 48" for front reach and 54" for side reach above ground level to ensure conformance with the ADA requirements.

2.3 SYSTEM FEATURES

A. Operational Communication Features

1. Call Box shall be hands-free operable and be a push-button-once to talk system. Once the button has been pushed, the Call Box will call the Base Station. If no answer at the Base Station, it will automatically call preprogrammed emergency numbers. The Call Box must be capable of being programmed with up to 5 emergency numbers to activate two-way off-site person to person voice communications.
2. Call Box shall have Location Message capability. Call Box must have a minimum 18 second recordable message capability, programmable to play 1 or 2 times. Call Box shall notify called party of the location of the call upon being received at the emergency dispatch center.
3. Call Box shall be capable of allowing the called party to replay the Location Message if necessary to ensure an understanding of the caller location.
4. Once call has been made (button pushed), the call can be terminated only by the called party.
5. Call Box must have a red LED that will light up upon push of the button. The light shall be a solid color when the Call Box is activated, and will flash when call has been answered.
6. Call Box must be capable of being programmed and reprogrammed on-site and remotely.
7. Operating temperature of call box shall be between -40 deg. F to 150 deg. F.
8. Call Box shall have EEPROM memory to protect programming.

B. Graphics and Labeling

1. Base Station shall have appropriate wording to indicate the location of each call box, located adjacent to the LED associated with each call box.
2. Call Box graphics must include "Help Phone," international phone symbol and raised Braille lettering.

PART 3 - EXECUTION

3.1 MONITORING

- A. Contractor shall coordinate with the owner to arrange for an off-site monitoring agency associated with this communication system.

3.2 CABLING

- A. Cabling for two-way communication system shall meet the applicable requirements for pathway survivability. Cabling installation shall consist of one or more of the following:
1. 2-hour fire-rated circuit integrity (CI) cable
 2. 2-hour fire-rated cable system
 3. 2-hour fire-rated enclosure or protected area

3.3 TESTING

- A. Prior to completion, contractor shall test the functionality of all call boxes, both for connection to the base station, as well as for successful communication with off-site monitoring agency.

3.4 WARRANTY

- A. System shall be warranted for a period of three years.

END OF SECTION

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SECTION 28 31 11
FIRE ALARM SYSTEM

PART 1 – GENERAL

1.1 DESCRIPTION

- A. This section covers the complete installation of a new automatic fire alarm system, as well as necessary materials, labor, calibration, testing and training.
- B. The complete installation shall be in compliance with NFPA 70, 72, 101 (Life Safety Code) and NEC Article 760. The installation shall also comply with state and local ordinances, as well as the Americans with Disabilities Act (Public Law 101-336).
- C. All equipment supplied shall be listed for the purpose and area in which it is used and installed in accordance with any instructions included in its listing.
- D. All equipment must be new and bear the UL (Underwriters Laboratories Inc.) Label.

1.2 SHOP DRAWINGS

- A. Fire alarm shop drawings shall contain the following:
 - 1. Specification sheet/sheets of technical data on each hardware component
 - 2. Specification sheet(s) on wiring to be utilized
 - 3. One-line schematic riser diagram made specifically for this job
 - 4. Calculation for sizing batteries and power supplies
 - 5. Sequence of operation for the entire system
 - 6. Copy of vendor's NICET fire alarm certificate (level III or higher)
 - 7. Verification of central supervising station (UL Certified)
 - 8. Equipment and service warranty
 - 9. Scaled floor plans showing fire alarm device locations and wire routing

1.3 ACCEPTABLE MANUFACTURERS

- A. Products of the following manufacturers which comply with these specifications are acceptable:
 - 1. Notifier
 - 2. Siemens
 - 3. E.S.T.
 - 4. Simplex
 - 5. Gamewell-FCI

1.4 STORAGE AND HANDLING

- A. Smoke detectors shall be covered with plastic wrapping if installed prior to the completion of painting, sanding and other work producing dust, etc.
- B. The fire alarm control panel(s) shall not be installed until its designated room has been completely painted and cleaned.

PART 2 - PRODUCTS

2.1 CONTROL PANEL/SYSTEM DESCRIPTION

- A. The fire alarm system shall be an electrically supervised, power limited, low voltage (24 VDC), non-coded, multiplexed, fully analog, addressable system. The fire alarm control panel shall be of modular design for ease of future system addition or modification (up to 20% addition capacity).
- B. The control panel shall provide system status via an 80 character liquid crystal display and shall also have the following features:
1. Power "ON" Light Emitting Diode (LED)
 2. System Reset Switch
 3. System Alarm LED
 4. System Trouble LED
 5. Alarm Silence Display
 6. Trouble Silence Display
 7. Control panel shall be lockable.
 8. Normally open and normally closed sets of contacts for control of remote equipment/devices.
- C. Batteries shall be mounted in space provided in the fire alarm control panel. Control panel shall include automatic charging circuit to maintain battery/batteries in charged condition. Batteries may be lead acid or nicad; charging circuit shall match battery type.
- D. The battery/batteries shall have sufficient ampere-hour capacity to operate the system under normal supervisory conditions with A.C. power disconnected for 24 hours, and at the end of that period to operate all alarm notification appliances for 5 minutes. For calculation purposes, all audible devices shall be tapped at a minimum of one (1) watt.
- E. The system shall operate from one (1) 20-ampere, single-phase, 3-wire 120 V.A.C. circuit. The circuit breaker shall be labeled "Fire Alarm Circuit Control."
- F. The fire alarm system shall respond to a fire emergency as follows:
1. Smoke damper control and automatic shutdown of HVAC air systems shall occur upon activation of respective duct smoke detector.
 2. Automatic audible/visual notification (via horns/strobes) shall be provided upon activation of a flow switch, manual station, or area smoke detector.
 3. For any areas noted or classified or defined as an Assembly, automatic audible/visual notification (via speakers/strobes) shall be provided upon activation of a flow switch, manual station, or area smoke detector. Automatic alarm notification shall be distributed throughout the facility as a general alarm.
Pre-recorded voice message capability shall be provided for automatic transmission to building occupants during alarm conditions. A standard evacuation message shall be provided under this Contract. The message player must be capable of transmitting a customized message of up to 3 minutes long. A self-contained speaker will be provided to allow testing of the message without disturbing the occupants of the facility. The system shall be configured to allow selective voice paging. If any manual control switches are activated, the control panel operator shall be able to make announcements via a push-to-talk paging microphone over the preselected speaker circuits (where applicable).
 4. Signal output to the UL Listed central station (for fire system reporting) via a D.A.C.T. communication device (or similar UL Listed "fire" device) in FACP(s). Provide and install 3/4" conduit from the panel to the main telephone backboard.

5. Smoke door release (where applicable) shall occur generally throughout the entire facility.
6. Tamper switch operation shall cause a supervisory signal to indicate audibly and visually at the control panel.
7. Activation of elevator lobby or elevator equipment room smoke detector shall cause immediate, non-stop return of all respective elevators to designated discharge level. Provide and install 3/4" conduit from control panel to elevator controller(s).
8. Notification at control panel upon activation of kitchen hood fire suppression system.
9. Fire pump status shall be displayed for the following conditions:
 - a. Power failure
 - b. Pump operation
 - c. Phase reversal
10. Fire pump normal power availability, fire pump normal source phase reversal, fire pump normal source loss of phase and fire pump run status shall be monitored. Loss of normal power, phase reversal and loss of phase shall announce as trouble, fire pump running shall announce as a supervisory alarm.
11. Fire pump alternate power source availability, fire pump alternate source phase reversal and fire pump alternate source loss of phase shall be monitored. Loss of alternate power source, alternate source phase reversal and loss of alternate source phase shall announce as trouble.
12. Controls for unlocking stairwell doors simultaneously.
13. Heat detectors shall be installed in sprinklered elevator machine rooms and hoistways to activate shunt trip devices for power to elevator motors. Heat detectors shall be placed within 24 inches of each sprinkler head, and shall have a temperature threshold that is lower than the sprinkler heads. Upon activation of the heat detector there shall be a delay in the activation of the power shunt trip. This delay shall be the time necessary for the elevator cab to travel from the top of the hoistway to the lowest recall level.
14. Where elevators are designated as fire service access elevators, or for use in occupant evacuation, the following conditions shall be monitored by the fire alarm system:
 - a. Availability of main and emergency power to operate the elevator(s), elevator controller(s), and machine room (if provided) ventilation.
 - b. Status of the elevator(s), including location within the hoistway, direction of travel, and whether they are occupied.
 - c. Temperature and presence of smoke in associated lobbies and machine room.
15. Fire alarm system shall electrically supervise the signal boosters and batteries of the Emergency Responder Radio Coverage System (where applicable).

G. Supervision

1. Fire alarm pathways shall be Class B.
2. Pathway survivability for notification appliances shall be as follows:
 - Pathways shall be protected from the point at which they exit the control unit until they enter the evacuation signaling zone they serve, and shall meet survivability requirements Level 0 or 1.
3. Each independently supervised circuit shall include a discrete panel readout to indicate disarrangement conditions per circuit.
4. Power failures, opens, or grounds shall be audibly and visually indicated at the control panel and the remote annunciator (where applicable). A green "power on" LED shall be displayed continuously while incoming power is present.
5. Power wiring to sprinkler pipe heat tracing shall be supervised by fire alarm system.

- H. Provide remote annunciator panel with 80 character liquid crystal display, audible signal and alarm/trouble lights.

I. Underground Signaling Line Circuits

1. All underground signaling line circuits (SLC) routed exterior to building shall be fiber optic cabling. Cabling shall be installed in conduit with tracer wire.

2.2 FIELD DEVICES

- A. Manual Stations: Semi-flush, addressable, double action type. Station shall be constructed of high impact red polycarbonate.
- B. Area Smoke Detectors: Smoke detectors shall be of the analog, addressable, photoelectric type. A pulsed diode pilot lamp, visible from the floor, shall be provided to indicate alarm condition or component failure. Diode pilot lamp may be pulsed diode type for normal and steady for alarm trouble indication. Detectors shall be self-supervising for component failure as well as line failure. Detector failure or removal of detector shall initiate (zone) trouble signal. Detector shall be capable of monitoring 900 square feet of unobstructed area with spacing not to exceed 30 feet on center. Smoke detectors shall be ceiling mounted and shall be interconnected into alarm system to function in same manner as the manual station. Detectors shall report analog level of smoke/dirt to panel.
- C. Duct Smoke Detectors: Detectors shall be of the analog, addressable, photoelectric type. The unit shall consist of a detector and an air sampling assembly housed in a casting designed for duct mounting. The sampling tubes shall extend completely across the duct. Detectors shall report analog level of smoke/dirt to panel. Where detector LEDs are concealed, not easily observable, or greater than 10' above floor, detectors shall have remote LED alarm indicators in a nearby observable location for alarm identification. Each LED shall be labeled to identify location of duct smoke detector.
- D. Audible/Visual Devices: Audible/visual devices shall be horns with flashing visual appliances with the word "FIRE" written on the lens. The horns shall produce at least 15 dBA above ambient noise level. Audible and visual devices (including the combination device) shall utilize a 4" electrical backbox. Visual devices shall be multi-candela, field-selectable, with a constant flash rate of one (1) flash per second. The device color shall be white.
- E. Any audible device installed in a sleeping room shall have a low-frequency sounder approved for fire protective service, and shall be listed to UL 464. The device shall be powered from a notification appliance circuit output and shall operate on nominal 12 or 24 volts (includes fire alarm panels with built in sync). All notification appliances shall be backward compatible.
- F. Any visual device in a sleeping area shall be minimum 110 candela, unless noted otherwise.
- G. Addressable relays shall be provided as required to accomplish all mechanical systems and other related control functions.
- H. Addressable input monitoring devices shall be provided as required to monitor existing water flow, tamper switch, and other devices.
- I. Heat detectors shall be addressable, fixed temperature type rated at 135 degrees F, unless noted otherwise on drawings. Where heat detectors are used to shut down elevator power prior to sprinkler operation, the detector must have a faster response time than the sprinkler head, and must be mounted within 2 feet of each sprinkler head. Power required to activate shunt-trip breakers for elevator motors shall be monitored via supervisory wiring to the fire alarm control panel.
- J. Fire phone jacks shall mount on stainless steel single gang plates labeled in red "Fire Emergency Phone."

- K. Monitoring of remote fire protection valves on site (if applicable) shall be accomplished via fire alarm system connection.

PART 3 - EXECUTION

3.1 GENERAL

- A. The Contractor shall obtain approval from Owner as to the final and exact location of each control panel and remote annunciator prior to installation.
- B. All wiring shall be suitably protected from damage. Wiring shall be routed within conduit where installed in the following areas:
 - 1. underground
 - 2. damp and wet locations
 - 3. where exposed on interior walls
 - 4. for all input and output signal wiring for smoke exhaust (including stairwell pressurization) equipment
- C. All wiring installed exposed within a plenum shall be UL Listed accordingly. Plenum rated cable shall be tied to the building structure at approximately 6'-0" on center using cable ties.
- D. Conduit sleeves with bushings shall be installed for fire alarm cabling that passes through walls and floor assemblies. Seal the opening around the conduit and the hole in the conduit with a UL Listed fire rated sealant as required.
- E. Provide necessary programming to accomplish the indicated system operation and control functions.
- F. All conduit, control wiring, power wiring, relays, and other equipment and devices required to form a complete and operational system shall be provided as part of this Contract.
- G. All wiring requirements for shielding certain conductors from others or routing in separate raceways shall be as recommended by the manufacturer.

3.2 WARRANTY

- A. Equipment, materials, workmanship and system performance incorporated into the work shall be guaranteed for a period of one (1) year from the time the Owner receives beneficial use of the fire alarm system and the acceptance tests herein specified have been satisfactorily completed. Any defects due to faulty materials, methods or installation or workmanship within this period shall be promptly repaired or replaced.
- B. Vendor shall provide pricing for system inspections for a period of four (4) additional years after the initial 12-month warranty as a bid alternate to the Owner. Provide inspections per N.F.P.A. 72 and N.F.P.A. 101.
- C. Spare Parts: Provide the following spare equipment items to the Owner upon project completion:
 - 1. Addressable modules: 2
 - 2. Smoke detectors: 2
 - 3. Manual stations: 2
 - 4. Duct mounted smoke detectors: 1
 - 5. Audible/visual devices: 4

3.3 TESTING AND CERTIFICATION

- A. Testing and certification of the life safety system per NFPA 72 shall be as required by the Fire Marshal and Engineer. The Contractor shall be responsible for identifying the required testing, coordinate scheduling, and conducting the test necessary to achieve occupancy certification, and assurance of complete system operation. The Contractor shall submit proof of complete system operation signed by the Fire Marshal to Engineer and Owner.
- B. Contractor shall notify the Owner's representative in writing that the Owner is responsible for hiring a monitoring agency for remote supervision of the fire alarm system.

END OF SECTION