SECTION 281000
ACCESS CONTROL SYSTEM

PART 1 GENERAL

1.01 SECTION INCLUDES

A. Access control system requirements.

B. Access control units and software.

C. Access control point peripherals, including readers and keypads.

D. Accessories.

1.02 RELATED REQUIREMENTS

A. Section 087100 - Door Hardware: Door hardware, for interface with access control system.

B. Section 087400 - Access Control Hardware: Electrically operated door hardware, for interface with access control system.

1. Includes door hardware with integral request to exit devices.

C. Section 142400 - Hydraulic Elevators: For interface with access control system.

D. Section 260526 - Grounding and Bonding for Electrical Systems.

E. Section 260533.13 - Conduit for Electrical Systems.

F. Section 260553 - Identification for Electrical Systems: Identification products and requirements.

G. Section 284600 - Fire Detection and Alarm: For interface with access control system.

1.03 DEFINITIONS

A. Access Control Cloud Services: Subscription-based hosted application utilizing Software as a Service (SaaS) delivery model in lieu of on-premises servers/software.

1.04 REFERENCE STANDARDS

A. NECA 1 - Standard for Good Workmanship in Electrical Construction 2015.

B. NFPA 70 - National Electrical Code Most Recent Edition Adopted by Authority Having Jurisdiction, Including All Applicable Amendments and Supplements.

C. UL 294 - Access Control System Units Current Edition, Including All Revisions.

1.05 ADMINISTRATIVE REQUIREMENTS

A. Coordination:

1. Coordinate the work with other installers to provide suitable door hardware as required for both access control functionality and code compliance.

2. Coordinate the placement of readers with millwork, furniture, equipment, etc. installed under other sections or by others.

3. Coordinate the work with other installers to provide power for equipment at required locations.

4. Notify Architect of any conflicts with or deviations from Contract Documents. Obtain direction before proceeding with work.

B. Preinstallation Meetings:

1. Conduct meeting with facility representative and other related equipment manufacturers to discuss access control system interface requirements.

1.06 SUBMITTALS

A. See Section 013000 - Administrative Requirements, for submittal procedures.

B. Shop Drawings: Include plan views indicating locations of system components and proposed size, type, and routing of conduits and/or cables. Include elevations and details of proposed equipment arrangements. Include system interconnection schematic diagrams. Include requirements for interface with other systems.

C. Product Data: Provide manufacturer's standard catalog pages and data sheets for each system component. Include ratings, configurations, standard wiring diagrams, dimensions, finishes, service condition requirements, and installed features.

D. Design Data: Standby battery/UPS calculations.

E. Certify that proposed system design and components meet or exceed specified requirements.

F. Evidence of qualifications for installer.

G. Manufacturer's Installation Instructions: Indicate application conditions and limitations of use stipulated by product testing agency. Include instructions for storage, handling, protection, examination, preparation, installation, and operation of product.

H. Manufacturer’s detailed field testing procedures.

I. Field quality control test reports.

J. Maintenance contracts.

K. Project Record Documents: Record actual locations of system components and installed wiring arrangements and routing.

L. Operation and Maintenance Data: Include detailed information on system operation, equipment programming and setup, replacement parts, and recommended maintenance procedures and

intervals.

1. Include contact information for entity that will be providing contract maintenance and trouble call-back service.

M. Warranty: Submit sample of manufacturer's warranty and documentation of final executed warranty completed in Owner's name and registered with manufacturer.

N. Software: One copy of software not resident in read-only memory.

O. Maintenance Materials: Furnish the following for Owner's use in maintenance of project.

1. See Section 016000 - Product Requirements, for additional provisions.

1.07 QUALITY ASSURANCE

A. Comply with the following:

1. NFPA 70.

2. The requirements of the local authorities having jurisdiction.

3. Applicable TIA/EIA standards.

B. Maintain at the project site a copy of each referenced document that prescribes execution requirements.

C. Manufacturer Qualifications: Company specializing in manufacturing the products specified in this section with minimum ten years documented experience.

1. Company specializing in manufacturing the products specified in this section with minimum ten years documented experience.

2. Provides toll-free technical assistance and support available 24 hours per day, 7 days per week.

D. Installer Qualifications: Company specializing in performing the work of this section with minimum three years documented experience with access control systems of similar size, type, and complexity and providing contract maintenance service as a regular part of their business; authorized manufacturer's representative.

1. Contract maintenance office located within 100 miles of project site.

E. Maintenance Contractor Qualifications: Same entity as installer.

F. Product Listing Organization Qualifications: An organization recognized by OSHA as a Nationally Recognized Testing Laboratory (NRTL) and acceptable to authorities having jurisdiction.

1.08 DELIVERY, STORAGE, AND HANDLING

A. Receive, inspect, handle, and store products in accordance with manufacturer's instructions.

B. Store products in manufacturer's unopened packaging, keep dry and protect from damage until ready for installation.

1.09 FIELD CONDITIONS

A. Maintain field conditions within manufacturer's required service conditions during and after installation.

1.10 WARRANTY

A. See Section 017800 - Closeout Submittals, for additional warranty requirements.

B. Provide minimum one year manufacturer warranty covering repair or replacement due to defective materials or workmanship.

PART 2 PRODUCTS

2.01 MANUFACTURERS

A. Access Control System:

1. Electronic Access Control Locking Devices Basis of Design:

a. Sargent Manufacturing Company: https://www.sargentlock.com/

2. Access Control Software and Control Panels Basis of Design:

a. Keri Systems: www.kerisys.com/

b. Other Acceptable Manufacturers:

1) DSX

2) Keyscan

3) Or approved equal.

B. Substitutions: See Section 016000 - Product Requirements.

C. Products other than basis of design are subject to compliance with specified requirements and prior approval of the Architect. By using products other than basis of design, Contractor accepts responsibility for costs associated with any necessary modifications to related work, including any design fees.

D. Source Limitations: Where possible, furnish system components and accessories produced by a single manufacturer and obtained from a single supplier.

2.02 ACCESS CONTROL SYSTEM REQUIREMENTS

A. Provide new access control system consisting of required equipment, conduit, boxes, wiring, connectors, hardware, supports, accessories, software, system programming, etc. as necessary for a complete operating system that provides the functional intent indicated.

B. Connect to existing peripherals as indicated.

C. System Battery Backup: Provide batteries/uninterruptible power supplies (UPS) as requiredfor 30 minutes full operation.

D. Surge Protection:

1. Provide surge protection for readers and door strikes/locks.

2. Provide equipment power surge protection where electrical distribution system surge protection is not provided.

E. Access Control Points:

1. See article "ACCESS CONTROL POINT PERIPHERALS" below for device descriptions.

F. Computers Required:

1. See article "ACCESS CONTROL UNITS AND SOFTWARE" below for product descriptions.

2. Server(s):

a. Quantity: One, provided by Owner.

b. Location(s): To be determined.

3. Workstation Computer(s):

a. Quantity: One.

b. Location(s): To be determined.

c. Peripherals required for each workstation computer:

1) Mouse and keyboard.

2) Monitor(s): One.

3) Alarm/report printer.

G. Interface with Other Systems:

1. Provide products compatible with other systems requiring interface with access control system.

2. Interface with electrically operated door hardware as specified in Section 087400.

a. Capable of locking/unlocking/releasing controlled doors.

b. Capable of receiving input from integral door hardware switches.

3. Interface with fire alarm system as specified in Section 284600.

a. Capable of affecting access for designated doors for selected fire alarm system events.

H. Provide products listed, classified, and labeled as suitable for the purpose intended.

1. Access Control Units and Readers: Listed and labeled as complying with UL 294.

2.03 ACCESS CONTROL UNITS AND SOFTWARE

A. Provide access control units and software compatible with readers to be connected.

B. Unless otherwise indicated, provide software and licenses required for fully operational system.

C. Access Control Unit:

1. Basis of Design: Assa-Abloy.

a. General Requirements:

1) UL 294 and UL 1076 listed.

2) Utilizes embedded web server to allow full control monitor, viewing live events and manually controlling doors and readers.

3) Each controller loop capable of 31 panels or 124 readers.

4) Door Control Modes Supported: fob only, fob and PIN, fob or PIN, PIN only, lockdown, disabled, supervisor, escort, limited use fob, expire on date, first fob rule, snow day rule, time zone toggle, anti-passback, duress.

5) Storage Capacity: 10,000 fobs; 25,000 events.

6) Supports unlimited access codes.

7) Supports offline database backup.

8) fob database, alarm, and event export capabilities.

9) Supports 128 unique fob formats.

10) Supports 8 site codes.

11) Supports 75-bit maximum fob format size.

12) Supports 127 time zones.

13) Supports 128 access levels.

14) Supports 255 holidays.

15) Dedicated tamper and power fail alarms.

16) Supports duress detection.

17) Threat Level Support: 100 levels.

18) Supports two-person access rule.

19) Anti-Passback Support: While preventing access (hard), while allowing access (soft).

D. Computers:

1. Workstation Computers: Unless otherwise indicated, workstation computer hardware and associated peripherals not furnished by access control system manufacturer to be provided by Contractor as part of work of this section, meeting access control system equipment manufacturer's recommended requirements.

E. Software:

1. Unless otherwise indicated, provide all software and licenses required for fully operational system.

2. Windows based application.

3. At least 2 concurrent connections.

4. SQL 2012 Express database.

5. Photobadging and visitor management included.

6. Ability to add and delete fobholders through Active Directory.

7. Web client available.

8. Ability to manage door from an active graphical interface.

9. Ability to fully integrate with a variety of Video Management Systems (VMS).

10. Ability to automatically email reports and alarms.

11. Access Control System: Keri Systems.

2.04 ACCESS CONTROL POINT PERIPHERALS

A. General Requirements:

1. Emergency Override: Locking device shall have the ability- to utilize emergency mechanical key override with the following manufacturer' s key systems in the lever: See Specification Section 087400.

2. Levers:

    a. See Specification Section 087400.

3. Power Supply:

    a. Locking device powered by four AA batteries with options for eight AA batteries or a 12V or 24V DC power supply.

    b. Locking device shall have ability to communicate battery status.

4. Features: Locking device shall incorporate the following features.

    a. Visual tri-colored LED indicators that indicate activation, additional PIN code credential required, operational systems status, system error conditions and low power conditions.

    b. Visual bi-colored LED indicator on interior that is capable of indicating secured/unsecured status of device to occupants on interior.

    c. Audible feedback that can be enabled or disabled.

    d. Onboard processor with memory capacity of 5,000 users, 5,000 event audit history, up to 16 time zones and up to 32 calendar events.

    e. Tamper-Resistant Screws: Tamper torx screws on inside escutcheon for increased security.

5. Adaptability:

    a. Open Architecture: Locking device manufactured with open architecture characteristics capable of handling new and existing access control software and credential reading technology.

    b. Field changeable Reader Modules: Locking device to have the ability to change credential reader technologies without being removed from door.

6. Switches: Provide locking device with the following switches, standard:

    a. Door Position Switch

    b. Interior Cover Tamper Guard

    c. Mechanical Key Override

    d. Request to Exit

e. Request to Enter

f. Lock/Unlock Status (Clutch Position).

7. Credential Reader:

a. Provide credential reader modules in the following configurations, as indicated in door hardware sets. Multi-tech contactless reader shall be NFC-Compatible and read access control data from both 125 kHz and 13.56 MHz contactless keyfobs. The multi-tech contactless reader shall be optimally designed for use in access control applications that require reading both 125 kHz proximity and 13.56 MHz contactless keyfobs.

1) Proximity, Keyfob via Multi-Technology.

2) Credential reader capabilities, which can be configured at locking device with handheld programming device and remotely by Partner integrated software to include, but may not be limited to:

3) Keyfobs credentials: Sargent.

8. Operation:

a. Directly via RS485. Remote Commanding By Partner Integrated Access Control Network Software: Battery-powered locking device shall have “Wake on Radio” feature causing activation of remote, wireless access control locking device, enabling activated locking device to be configured, locked or unlocked from a centralized location within 10 seconds or less without user interface at the device.

b. Local Commanding: Locking device shall have the ability to be configured, locked or unlocked locally by handheld programming device, in real-time.

c. When Utilized with Access Control Network Software With Remote Commanding Capability: Locking device shall have ability to be remotely locked down or unlocked within 10 seconds or less while battery powered without user interface at the device.

d. Real-time response of battery powered device capable of being configured at door by handheld programming device and remotely by Partner integrated software.

e. Upon Loss of Power: Locking device shall have ability to manage access control offline in one of three methods below that can be configured in the field at locking device by handheld programming device and remotely by Partner integrated software:

1) Fail locked (secured)

2) Fail unlocked (unsecured)

3) Fail As-Is

f. Upon Loss of Communication Between Locking Device and Network: Locking device shall have ability to manage access control offline in one of four methods below that can be configured in the field at locking device by handheld programming device and remotely by Partner integrated software:

1) Fail locked (secured)

2) Fail unlocked (unsecured)

3) Fail As-Is

4) Fail to Degraded/cache mode utilizing cache memory with following selectable options:

g. Grant access up to the last 1,000 unique previously accepted User IDs.

h. Grant access up to the last 1,000 unique previously accepted facility/site codes.

i. Remove from cache previously stored User IDs or facility/site codes that have not been presented to lock within the last 5 days.

j. Locking device shall have ability to be configured at door by handheld programming device and remotely by Partner integrated software the length of time device is unlocked upon access grant.

k. Locking device shall have the ability to communicate identifying information such as firmware versions, hardware versions, serial numbers, and manufacturing dates by handheld programming device and remotely by Partner integrated software.

l. Encryption: AES-128 bit Key minimum.

m. Modulation: 900 MHz spread spectrum, direct sequence, 10 channels.

B. Wireless Bored Lockset

1. Requirements: Wireless electronic lockset to comply with the following requirements.

a. Type: Heavy-duty, bored cylindrical, non-handed, field-reversible.

b. Backset: 2-3/4-inch (70 mm) standard, with 2-3/8-inch (60 mm), 3-3/4-inch (95 mm) and 5-inch (127 mm) backset optional.

c. Latchbolt Throw: 1/2-inch (13 mm) with optional 3/4-inch (19 mm) throw available.

d. Chassis: Shall accommodate standard 161 cylindrical lock prep for 1-3/4-inch (44 mm) doors standard, or 1-3/8-inch (35 mm) to 2-3/4-inch (70 mm) thick doors in 1/8-inch (3 mm) increments.

e. Applicable Standards:

1) Listed, UL 294 - The Standard of Safety for Access Control System Units.

2) Compliant with ANSI Standard A156.25 and A156.2 Series 4000, Grade 1 strength and operational requirements.

3) Compliant with ANSI/BHMA A156.25 Grade 1 Operation and Security Requirement.

4) Certified to UL10C, FCC Part15, Florida Building Code Standards TAS 201 large missile impact, TAS 202 and TAS 203.

5) Compliant with ASTM E330 for door assemblies.

6) Compliant with ICC / ANSI A117.1, NFPA 101, NFPA 80, and Industry Canada IC.

f. Lockset Functions: Provide locks with following functions, as scheduled, that are field configurable without taking the lock off the door:

g. As indicated in the Doors Schedule on the contract drawings.

2. Manufacturer and Product:

a. Scheduled Manufacturer and Product:

1) See Specification Section 087400

b. Acceptable Manufacturer and Product:

1) Sargent Aperio via Aperio Hub connected to a RS485 connection in real time communication from host device.

C. Offline Exit Device Trim:

1. Requirements: Wireless electronic exit device trim shall comply with the following requirements.

a. Type: Exit device trim, non-handed, field-reversible.

1) Exit Device Configurations: Exit device lever trim to retract latchbolt for the following exit device applications:

(a) Rim

(b) Concealed vertical cable

b. Applicable Standards:

1) Listed, UL 294 - The Standard of Safety for Access Control System Units.

2) Compliant with ANSI/BHMA A156.25 Grade 1 Operation and Security Requirement.

3) Certified to UL10C, FCC Part15, Florida Building Code Standards TAS 201 large missile impact, TAS 202 and TAS 203.

4) Compliant with ASTM E330 for door assemblies.

5) Compliant with ICC / ANSI A117.1, NFPA 101, NFPA 80, and Industry Canada IC.

c. Exit Device Trim Functions: Provide locks with following functions, as scheduled, that are field configurable without taking the lock off the door:

1) As indicated in the Doors Schedule on the contract drawings.

2. Manufacturer and Product:

a. Scheduled Manufacturer and Product:

1) See Specification Section 087400

b. Acceptable Manufacturer and Product:

1) Sargent Aperio via Aperio Hub connected to a RS485 connection in real time communication from host device.

2.05 COMPONENTS

A. Handheld Programming Device for Electronic Access Control Locksets and Exit Device Trim

1. Requirements: Handheld programming device with software shall comply with the following requirements.

a. Capable of initializing lock and accessories using preloaded Sargent Utility Software.

b. Used to field configure electronic access control devices for the following attributes:

1) Credential reader formats

2) Lock function

3) Unlock period

4) Power failure mode

5) Audible alarm ON/OFF

6) Battery status

7) Validate hardware and software revision

8) Troubleshooting status signals

9) Special access delay (ADA)

10) Delayed egress (release delay)

11) Door propped open delay

12) Lockdown cancel delay time out between credential and PIN

13) Number of key presses without valid PIN before lockout

14) Current date/time

15) Enable/disable manual programming

c. Utilized to download firmware updates and door files to device.

d. Utilized to download audit files from device.

e. Features/Components:

1) 3.5-inch (89 mm) LCD display minimum

2) Touch Screen/Keypad Backlit

3) 32-bit processor minimum

4) Memory: 128MB RAM/256 MB ROM

5) Battery: Rechargeable Li-ion

2. Manufacturer and Product:

a. Acceptable Manufacturer and Product:

1) Sargent's handheld programming device and Utility Software.

B. Panel Interface Module for Wireless Electronic Access Control Lockset and Exit Device Trim

1. Requirements: Panel interface module shall comply with the following requirements.

a. Provide panel interface module, used to connect wireless lockset or exit device trim to the access control board or reader interface board, where Wiegand or Clock & Data protocol is required.

b. Distribution:

1) General: Provide one (1) panel interface module per sixteen (16) electronic access control devices, subject to the following limitations:

(a) Panel interface module is located on the same floor as associated electronic access control devices.

(b) Panel interface module is located within 200-feet (60m) indoor range with normal building obstructions; or 1000-feet (300m) with unobstructed, clear

line-of-sight of associated electronic access control device(s).

2) Where panel interface module cannot comply with general distribution requirements for associated electronic access control devices, provide additional modules, as required.

c. Applicable Standards:

1) Listed, UL 294 - The Standard of Safety for Access Control System Units.

2) Compliant with NEMA 1, 4, 4X, 6; 294

3) Certified compliant with FCC Part 5 and RoHS.

d. Power Supply: 12VDC or 24VDC.

e. Wireless Transmission:

1) Modulation: 900 MHz spread spectrum, direct sequence, 10 channels.

2) Encryption: AES-128 bit Key minimum.

2. Manufacturer and Product:

a. Acceptable Manufacturer and Product:

1) Sargent's interface modules as required.

C. Power Supplies

1. Requirements:

a. Provide power supplies, recommended and approved by manufacturer of electrified locking component, for operation of electrified locks, electrified exit devices, magnetic locks, electric strikes, and other components requiring power supply.

b. Provide appropriate quantity of power supplies necessary for proper operation of electrified locking components as recommended by manufacturer of electrified locking components with consideration for each electrified component using power supply, location of power supply, and approved wiring diagrams. Locate power supplies as directed by Architect.

c. Provide regulated and filtered 24 VDC power supply, and UL class 2 listed.

d. Options:

1) Provide power supply, where specified, with internal capability of charging sealed backup batteries 24 VDC, in addition to operating DC load.

2) Provide sealed batteries for battery back-up at each power supply where specified.

3) Provide keyed power supply cabinet.

e. Provide power supply in an enclosure, complete, and requiring 120VAC to fused input.

f. Provide power supply with emergency release terminals, where specified, that allow release of all devices upon activation of fire alarm system complete with fire alarm input for initiating “no delay” exiting mode.

2. Manufacturers and Products:

a. Acceptable Manufacturer and Product:

1) Securitron, AQD Series

D. Combo Keyfob, MIFARE 13.56 MHz Smart Credentials

1. Requirements:

a. Key tags shall be used with access readers to gain entry to access control portals (e.g. doors, gates, turnstiles) and to hold information specific to the user.

b. The tag shall function at 13.56 MHz.

c. Presentation to the access control reader at any angle within a minimum distance of one half (1/2) inch shall result in an accurate reading of the tag.

d. The tag shall have a read range of up to 2.5 inches.

e. The tag shall be compatible with aptiQ, XceedID, and Schlage keyfob readers.

f. The tag shall be composed of polycarbonate material.

g. The tag shall use AES 128-bit key encryption.

h. The tag shall have open memory architecture.

i. The tag shall be GSC-IS® certified.

j. The tag shall have a MIFARE microprocessor.

k. The tag shall have a passive design, requiring no batteries.

l. The tag shall have 8k bits of memory.

m. The tag shall be ISO14443 compliant.

2. Manufacturer and Product:

a. Acceptable Manufacturer and Product:

1) Keri Proximity Key Fob

3. Quantity: 200.

PART 3 EXECUTION

3.01 EXAMINATION

A. Verify that field measurements are as indicated.

B. Verify that ratings and configurations of system components are consistent with the indicated requirements.

C. Verify that mounting surfaces are ready to receive system components.

D. Verify that branch circuit wiring installation is completed, tested, and ready for connection to system.

E. Verify that conditions are satisfactory for installation prior to starting work.

3.02 INSTALLATION

A. Install access control system in accordance with NECA 1 (general workmanship).

B. Install products in accordance with manufacturer's instructions.

C. Wiring Method: Unless otherwise indicated, use cables (not in conduit).

1. Use suitable listed cables in wet locations, including underground raceways.

2. Use suitable listed cables for vertical riser applications.

3. Use listed plenum rated cables in spaces used for environmental air.

4. Install wiring in conduit for the following:

a. Where required for rough-in.

b. Where required by authorities having jurisdiction.

c. Where exposed to damage.

d. Where installed outside the building.

e. For exposed connections from outlet boxes to devices.

5. Conduit: Comply with Section 260533.

6. Conceal cables unless specifically indicated to be exposed.

7. Use power transfer hinges complying with Section 087400 for concealed connections to door hardware.

8. Cables in the following areas may be exposed, unless otherwise indicated:

a. Within joists in areas with no ceiling.

1) Apparatus Bays.

9. Route exposed cables parallel or perpendicular to building structural members and surfaces.

10. Do not exceed manufacturer's recommended maximum cable length between components.

D. Provide grounding and bonding in accordance with Section 260526.

E. Identify system wiring and components in accordance with Section 260526.

3.03 FIELD QUALITY CONTROL

A. See Section 014000 - Quality Requirements, for additional requirements.

B. Provide services of a manufacturer's authorized representative to observe installation and assist in inspection and testing. Include manufacturer's detailed testing procedures and field reports with submittals.

C. Prepare and start system in accordance with manufacturer's instructions.

D. Program system parameters according to requirements of Owner.

E. Test for proper interface with other systems.

F. Correct defective work, adjust for proper operation, and retest until entire system complies with Contract Documents.

G. Submit detailed reports indicating inspection and testing results and corrective actions taken.

3.04 CLEANING

A. Clean exposed surfaces to remove dirt, paint, or other foreign material and restore to match original factory finish.

3.05 CLOSEOUT ACTIVITIES

A. See Section 017800 - Closeout Submittals, for closeout submittals.

B. See Section 017900 - Demonstration and Training, for additional requirements.

C. Demonstration: Demonstrate proper operation of system to Owner, and correct deficiencies or make adjustments as directed.

D. Training: Train Owner's personnel on operation, adjustment, and maintenance of system.

1. Use operation and maintenance manual as training reference, supplemented with additional training materials as required.

2. Instructor: Manufacturer's authorized representative.

3. Location: At project site.

3.06 PROTECTION

A. Protect installed system components from subsequent construction operations.

3.07 MAINTENANCE

A. See Section 017000 - Execution and Closeout Requirements, for additional requirements relating to maintenance service.

B. **Provide to Owner, a proposal as an alternate to the base bid, a separate maintenance contract for the service and maintenance of access control system for two years from date of Substantial Completion; Include a complete description of preventive maintenance, systematic examination, adjustment, cleaning, inspection, and testing, with a detailed schedule.**

C. Conduct site visit at least once every three months to perform inspection, testing, and preventive maintenance under the base bid. Submit report to [CHOICE TEXT] indicating maintenance performed along with evaluations and recommendations.

D. Provide trouble call-back service upon notification by Owner:

1. Include allowance for call-back service during normal working hours at no extra cost to Owner.

2. Owner will pay for call-back service outside of normal working hours on an hourly basis, based on actual time spent at site and not including travel time; include hourly rate and definition of normal working hours in maintenance contract.

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SECTION 281500
INTEGRATED ACCESS CONTROL HARDWARE DEVICES

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.

1.2 SUMMARY

A. This Section includes access control door hardware for the following:

1. Swinging doors.
2. Other doors to the extent indicated.

B. Section includes, but is not necessarily limited to, the following for the integrated access control security and site management system:

1. Electrified and Integrated Access Control Card Key Door Hardware

C. Related Sections include the following:

1. Division 01 Section “Cash Allowances”.
2. Division 01 Section “Product Allowances”.
3. Division 08 Section “Door Schedule”.
4. Division 08 Section “Door Hardware Schedule”.
5. Division 08 Section "Hollow Metal Doors and Frames."
6. Division 08 Section "Flush Wood Doors".
7. Division 08 Section "Clad Wood Doors".
8. Division 08 Section "Stile and Rail Wood Doors".
9. Division 08 Section “Fiberglass Doors”,
10. Division 08 Section "Integrated Door Opening Assemblies".
11. Division 08 Section "Aluminum-Framed Entrances and Storefronts".
12. Division 08 Section "All-Glass Entrances".
13. Division 08 Section "Automatic Entrances".
14. Division 08 Section "Door Hardware".
15. Division 08 Section "Automatic Door Operators".
16. Division 14 Section "Elevators" for security access to elevator floor selection controls.
17. Division 26 Section "Electrical" for connections to electrical power system and for low-voltage wiring work.
18. Division 27 Section "Communications" for connections to the LAN.
19. Division 28 Section "Access Control" for access control devices and equipment installed at door openings and provided as part of a security and site management system.
20. Division 28 Section "Intrusion Detection" for detection devices installed at door openings and provided as part of an intrusion detection system.

21. Division 28 Section "Video Surveillance" for motion detection and video camera devices and equipment installed at door openings and provided as part of a security and site management system.
22. Division 28 Section "Fire Detection and Alarm" for connections to building fire alarm system.

D. References:

1. ANSI A117.1 (1998) - Accessible and Usable Buildings and Facilities.
2. IBC - International Building Code
3. NFPA 70 (2002) - National Electrical Code.
4. NFPA 80 (1999) - Fire Doors and Windows.
5. NFPA 101 (2006) - Life Safety Code.
6. UL 294 - Access Control Systems.
7. UL 1076 - Proprietary Burglar Alarm Units and Systems.

E. Products installed, but not provided under this Section include the following. Coordination to remain a requirement of this Section.

1. Security or High Security keyed cylinders, including provisions for temporary construction keying, for mechanical override at access control locking hardware to be furnished under Division 8 Section "Door Hardware".

1.3 SUBMITTALS

A. Product Data: Manufacturer's product data sheets including installation details, material descriptions, dimensions of individual components and profiles, operational descriptions and finishes.

B. System Operational Descriptions: Complete system operational narratives for the integrated access controlled openings defining the owner's prescribed requirements for the opening functionality. Narratives include, but are not limited to, the following situations: normal secured/unsecured state of door; authorized access; authorized egress; unauthorized access; unauthorized egress; fire alarm and loss of power conditions, and interfaces with other building control systems.

C. Shop Drawings: Details of electrified integrated locking hardware and access control firmware, indicating the following:

1. Wiring Diagrams: Upon receipt of approved schedules, submit detailed system wiring diagrams for power, signaling, monitoring, communication and control of the access control system electrified hardware and firmware. Differentiate between manufacturer-installed and field-installed wiring. Include the following:

a. Elevation diagram of each unique access controlled opening showing location and interconnection of major system components with respect to their placement in the respective door openings.
b. Complete (risers, point-to-point) access control system block wiring diagrams.

2. Electrical Coordination: Coordinate with related Electrical Sections the voltages and wiring details required at electrically controlled and operated hardware openings.

D. Proof of Certification: Upon request provide a copy of manufacturer(s) official certification or accreditation document indicating proof of status as a qualified and authorized provider of the primary access control components.

E. Operating and Maintenance Manuals: Provide manufacturers operating and maintenance manuals for each item comprising the complete access control and site management installation in quantity as required in Division 01, Closeout Submittals. The manual to include the name, address, and telephone number of the supplier/integrator providing the installation and the nearest service representatives for each item of equipment included in the system. The final copies delivered after completion of the installation test to include "as built" modifications made during installation, checkout, and acceptance.

1. As-Built Drawings: During system installation, the Contractor to maintain a separate hard copy set of drawings, elevation diagrams, and wiring diagrams of the access control system to be used for record drawings. This set to be kept up to date by the Contractor with all changes and additions to the access control system accurately recorded.

F. Warranties and Maintenance: Special warranties and maintenance agreements specified in this Section.

1.4 QUALITY ASSURANCE

A. Manufacturers Qualifications: Engage qualified manufacturers with a minimum of five (5) years of documented experience in providing access control and security systems equipment and software similar to that indicated for this Project and that have a proven record of successful in-service performance.

1. Software and access control systems components to have been previously and thoroughly tested together with proven installations similar in size and functionality to the design requirements indicated for this Project.

B. Supplier Qualifications: Supplier/Dealers, verifiably authorized and in good standing with the primary product manufacturers, with a minimum of three (3) years of experience supplying integrated access control systems similar in material, design, and scope to that indicated for this Project and whose work has resulted in construction with a proven record of successful in-service performance.

1. ASSA ABLOY access control products are required to be supplied only through designated “Authorized Channel Partners.”

a. List Qualified ACP Companies

C. System Integrator Qualifications: Systems Integrators, verifiably factory trained and certified by the primary product manufacturers, with a minimum of three (3) years documented experience installing complete integrated access control systems similar in material, design, and scope to that indicated for this Project and whose work has resulted in construction with a proven record

of successful in-service performance. Qualifications include, but are not necessarily limited, to the following:

1. References: Provide a list of references for similar projects including contact name, phone number, name and type of project.
2. Professional Staffing: Firms to have a dedicated access control systems integration department with full time, experienced professionals on staff experienced in providing on site consulting services for both electrified door hardware and integrated access control systems installations.
3. Factory Training: Installation and service technicians are to be competent factory trained and certified personnel capable of maintaining the system.
4. Service Center: Firms to have a service center capable of providing training, in-stock parts, and emergency maintenance and repairs at the Project site with 24-hour/7-days a week maximum response time.

D. Installer Qualifications: Certified technicians, verifiably authorized with the primary product manufacturers for installation of IP-Enabled, Wireless, and Power-over-Ethernet Access Control products in accordance with documented instructions and NFPA 80.

1. ASSA ABLOY access control products are required to be installed only through designated "Preferred Installers" with Intertek Qualified Hardware Installer certification.

2. Installation technicians are authorized by Intertek to apply supplemental serialized labels to Warnock-Hersey fire-rated openings modified after access control hardware has been installed.

E. Source Limitations: Obtain the access control door hardware, system firmware and application software specified in this Section from a single source, qualified supplier/integrator unless otherwise indicated.

1. Electrified modifications or enhancements made to a source manufacturer's product line by a secondary or third party source will not be accepted.
2. Provide integrated access control door hardware from the same manufacturer as mechanical door hardware, unless otherwise indicated.

F. Regulatory Requirements: Comply with NFPA 70, NFPA 80, NFPA 101 and ANSI A117.1 requirements and guidelines as directed in the model building code including, but not limited to, the following:

1. Comply with NFPA 70 "National Electrical Code", including electrical components, devices, and accessories listed and labeled as defined in Article 100 by a testing agency acceptable to authorities having jurisdiction, and marked for intended use.
2. Where indicated to comply with accessibility requirements, comply with Americans with Disabilities Act (ADA), "Accessibility Guidelines for Buildings and Facilities (ADAAG)," ANSI A117.1.
3. Comply with NFPA 101 "Life Safety Code" for doors in a means of egress.
4. Comply with NFPA 80 "Fire Doors and Windows" for fire labeled opening assemblies.
5. The installed access control system shall conform to all local jurisdiction requirements.

G. Keying Conference: Reference Division 8 Section "Door Hardware".

H. Pre-Submittal Conference: Conduct conference in compliance with requirements in Division 01 Section "Project Meetings" with attendance by representatives of Supplier/Dealer, Systems Integrator, and Contractor to review proper methods and procedures for receiving, handling, and installing the access control system hardware. At completion of installation, provide written documentation that components were applied to manufacturer's instructions and recommendations and according to approved schedules.

1. Inspect and discuss Division 26 electrical roughing-in and similar preparatory work performed by other trades.
2. Review and verify sequence of operation descriptions for each unique access controlled opening.
3. Review and finalize construction schedule and verify availability of materials.
4. Review the required inspecting, testing, commissioning, and demonstration procedures.

1.5 DELIVERY, STORAGE, AND HANDLING

A. Do not store electronic access control hardware, software or related accessories at Project site without prior authorization.

1. Access control firmware and software: Where approved and directed, inventory upon receipt and store electronic access control equipment in a secure, temperature and humidity controlled environment in original manufacturer's sealed containers.

B. Tag each item or package separately with identification related to the final Access Control Door Schedule, and include basic installation instructions with each item or package.

C. Deliver permanent keys, cores, access control credentials, software and related accessories directly to Owner via registered mail or overnight package service. Instructions for delivery to the Owner established at the “Pre-Submittal Conference".

1.6 COORDINATION

A. Coordinate quantity and arrangement of assemblies with ceiling space configuration and with components occupying ceiling space, including structural members, pipes, air-distribution components, raceways, cable trays, recessed lighting fixtures, and other items.

B. Access Control System Electrical Coordination: Coordinate the layout and installation of scheduled electrified door hardware, and related access control equipment, with required connections to source power junction boxes, power supplies, detection and monitoring hardware and fire alarm system.

1. Door Hardware Interface: The card key access control system to interface and be connected to electronic door control hardware (electromechanical locks, electric strikes, magnetic locks, door position switches, other monitoring contacts, and related auxiliary control devices) as described under Division 8 "Door Hardware". Coordinate the installation and configuration of specified door hardware being monitored or controlled with the controls, software and access control hardware specified in this Section.

C. Templates: Obtain and distribute to the parties involved templates for doors, frames, and other work specified to be factory prepared for installing electrified door hardware and access control system components. Check Shop Drawings of other work to confirm that adequate provisions are made for locating and installing access control system hardware to comply with indicated requirements.

D. Door and Frame Preparation: Related Division 08 Sections (Steel, Aluminum and Wood) doors and corresponding frames are to be prepared, reinforced and pre-wired (if applicable) to receive the installation of the specified electrified, monitoring, signaling and access control system hardware without additional in-field modifications.

1.7 WARRANTY

A. General Warranty: Reference Division 01, General Requirements. Special warranties specified in this Article will not deprive Owner of other rights Owner may have under other provisions of the Contract Documents and are in addition to, and run concurrent with, other warranties made by Contractor under requirements of the Contract Documents.

B. Warranty Period: Written warranty, executed by manufacturer(s), agreeing to repair or replace components of the installed access control system hardware and software that fails in materials or workmanship, including all related parts and labor, within specified warranty period after final testing and acceptance by the Owner. Failures include, but are not limited to, the following:

1. Structural failures including excessive deflection, cracking, or breakage.
2. Faulty operation of the hardware.
3. Deterioration of metals, metal finishes, and other materials beyond normal weathering.
4. Electrical component defects and failures within the systems operation.

C. Standard Warranty Period: One year from date of Substantial Completion, unless otherwise indicated.

D. Special Warranty Periods (Electrified Access Control Door Hardware):

1. Two years for Electrified, Wiegand Output, and IP-Enabled Access Control Door Hardware.

E. Maintenance Support and Extended Service Agreement: Submit for Owner’s consideration an optional extended Service Agreement for the installed access control system, including support for software related issues. The extended Service Agreement is considered elective and is without manufacturer's requirement stipulating mandatory coverage for owner and/or vendor system support.

1. A published copy of this agreement to be included with the submittal package
2. Support for the installed access control system components is provided through the vendor under a 24 hour technical assistance program.
3. Access control and management system components are to be available on a one-day turn around time frame from the manufacturer.

4. Primary systems manufacturer to offer and provide remote modem or internet access for direct factory support to the vendor. The factory level support to include diagnostics and troubleshooting support on systems related issues at no additional cost to the owner.

F. Access Control Software Upgrades: Version upgrades and "fix" releases to the access control system software are available at no extra charge as long as the version of software provided under this specification remains the current manufacturer's version or for up to (2) years after a new version release.

1. Major access control software revisions that provide new functionality to the product provided free of charge for up to one (1) year from the date of substantial completion.
2. Access control system software is to be upgradable as may be required or as necessary, to expand and manage the owner's site or sites. Upgrades are to be offered at a published flat fee for the primary system software, with single license modules included in the primary fee structure. System upgrades offered at a costing structure based upon the original number of licensed modules issued, or on those to be purchased at a future date, are not allowed.
3. As part of the submittal package, provide a list of available software upgrades and/or expansions modules. List to identify related costs for upgrades, or expansions to the original system, up to the next qualifying operational level.

1.8 MAINTENANCE SERVICE

A. Maintenance Tools and Instructions: Furnish a complete set of specialized tools and maintenance instructions as needed for Owner's continued adjustment, maintenance, and removal and replacement of the installed access control system hardware and components.

B. Maintenance Service: Beginning at Substantial Completion, and running concurrent with the specified warranty period, provide continuous (6) months full maintenance by skilled employees of the Systems Integrator. Include repair or replacement of worn or defective components, lubrication, cleaning, and adjusting as required for proper door opening operation. Provide parts and supplies as used in the manufacture and installation of original products.

1.9 SCOPE OF WORK

A. On-Line Electronic Access Control System: Furnish and install at the indicated locations the specified electrified and integrated door hardware and access control firmware and software for a completely operational access control and security site management system. System includes, but is not necessarily limited, to the following:

1. Electrified integrated card reader locks and exit hardware, permanent and temporary override cylinders, network control processors, reader controller panels, I/O monitor/control interfaces, door position switches, remote card readers, keypads, and display terminals, access cards and credentials, system application software, special tools, operating manuals, and required cabling and accessories as detailed below and listed in the Access Control Hardware Sets at the end of Part 3.

a. Provide the appropriate number of reader controller panels and I/O monitoring/control expansion interfaces as needed to handle the number of card

readers, locking devices, door status devices, and identified alarm inputs specified in this section, and as shown on the security drawings.

b. Provide manufacturer approved integrated card reader locks, exit hardware, and remote mounted card readers, keypads, and display terminals that are functionally compatible with the specified access control equipment interfaces.

2. Access control system equipment to be installed in an enclosure box compatible with the specified components. This enclosure to include, but is not necessarily limited to, the network control processor, I/O monitor/control interface panels, power supplies, terminal strips, wire ducts, keyed lock cylinder, integrated outlet for A/C power, and standoffs.

    a. Enclosure box to be located in the designated IT/Telecom room(s) with connection to local area network for communication back to the central server host.

3. Owner to provide the following:

    a. Central server host computer, client workstations, and hardware peripherals to be from an approved, major line computer manufacturer. Specific information detailing compliance with system requirements to be included in the project submittal package as specified.
    b. Owner will be responsible for ensuring that each computer hardware component includes the required interfaces, expansion boards, and peripherals that will be necessary to allow the system to operate as described within this specification and as indicated on the drawings.
    c. Power Sourcing and Network Switches: Quantity as required to accommodate installed access control (and video surveillance) devices.
    d. Network Control Processor Connections:

        1) LAN/Ethernet communication ports (jacks) and network interface cards as needed, CAT5e cabling from network router/switch to network control processor, outlet and cover plates and/or patch cables required for network connection within each designated IT/Telecom room.
        2) Required static IP addresses.

4. Power Supplies, including battery back up and separately fused surge protection, required for the electrified door hardware and access control equipment.
5. Installation, final configuration and commissioning of electrified door and access control system hardware, communication firmware, power supplies and related accessories.
6. System application software including installation, programming, and end user training of the access control system demonstrating operating, repair, and maintenance procedures. Include no fewer than 8 hours of on-site central server training for designated personnel (facilities maintenance, security, IT, administration) by a factory certified representative.

7. Provide manufacturer required power controllers, interface boards, and programming that may be required for approved electric latch retraction exit devices supplied under Division 08 Section "Door Hardware."
8. Electrical contractor, Division 26, to provide the following:

    a. Source power wiring (120VAC) as required for the electrified locking and access control hardware, equipment, accessories and power supplies. This includes quad outlets as required on a dedicated circuit in the designated IT/Telecom room(s) and

the related conduit, stub-in, junction boxes and connectors required for the source power delivery and connections.

b. Provide required conduit, stub-in, junction and back boxes for both the electrified locking hardware and access control equipment at each of the access controlled or monitored openings per plan drawings and specs. Supply and install conduit between each of the aforementioned devices and between the electrical junction boxes, power supplies and access control equipment located on or above the door opening.

    1) At wall mounted remote readers, provide conduit on the secured side of the door, 36" from the finish floor and 6" from the edge of the frame, to the related power supplies and access control equipment.
    2) At electrical hardware power transfers provide conduit on the secured side of the opening from the power transfer, thru-wire hinge, or serviceable panel location on the frame jamb to the related power supplies and access control equipment.

c. Electrical Contractor to provide all 120VAC cabling connections and terminations from the electrical junction boxes to these electrical devices.

9. Access Control System Integrator to provide the following:

    a. Low voltage wiring (12/24VDC) and communication cabling (RS-232/RS-485) from network control processors to reader controllers, I/O monitor/control interface panels, electrified and integrated locking hardware, remote card readers, keypads, or display terminals, monitoring and signaling switches, and power supplies. Work includes related connectors, final terminations, and hook-ups required for a complete and functional access controlled opening in accordance with applicable codes and specified system operational narratives.

10. Elevator Contractor to provide the following:

    a. Interface or landing of interface cable onto the elevator call button will be performed by a certified elevator contractor.
    b. Coordinate with access control systems integrator provisions for a card reader with output allowing the elevator call button to be activated. A validated card read will be required for activation.

11. Full and seamless integration of the site intrusion alarm service if applicable, with the installed site access control system software.
12. Final connections to fire alarm system, if required, by electrical and fire alarm system contractors.
13. Provide permits, submittals and approvals required by the authority having jurisdiction, prior to commencing with work.
14. Provide manufacturer required power controllers, interface boards, and programming that may be required for approved electric latch retraction exit devices supplied under Division 08 Section "Door Hardware."
15. Electrical contractor (Division 26) to provide the following:

    a. Provide required conduit, stub-in, junction and back boxes for both the electrified locking hardware and access control equipment at each of the access controlled or monitored openings per plan drawings and specs. Supply and install conduit

between each of the aforementioned devices and between the electrical junction boxes, power supplies and access control equipment located on or above the door opening.

1) At off-line remote readers, provide conduit on the secured side of the door, 36" from the finish floor and 6" from the edge of the frame, to the related power supplies and access control equipment.
2) At electrified hardware power transfers provide conduit on the secured side of the opening from the power transfer, thru-wire hinge, or serviceable panel location on the frame jamb to the related power supplies and access control equipment.

b. Electrical Contractor to provide all 120VAC cabling connections and terminations from the electrical junction boxes to these electrical devices.

16. Access Control System Supplier to provide the following:

a. Low voltage wiring (12/24VDC) for the electrified locking hardware, remote card readers, monitoring and signaling switches, and power supplies. Work includes related connectors, final terminations and hook-ups required for a complete and functional access controlled opening in accordance with applicable codes and specified system operational narratives.

17. Typical System Requirements (Owner Provided): Central server host computer, client workstations, and hardware peripherals to be from an approved, major line computer manufacturer. Specific information detailing compliance with system requirements to be included in the project submittal package as specified.

PART 2 - PRODUCTS

2.1 APERIO WIRELESS ACCESS CONTROL

A. Wireless Access Control Mortise Locks: Wireless technology ANSI/BHMA A156.13 Grade 1 mortise lockset with integrated card reader, deadbolt monitoring, and request-to-exit and door position switch signaling in one complete unit. Motor driven locking/unlocking control of the lever handle trim, 3/4" stainless steel latch, and optional 1" deadbolt with hardened inserts. Lock is U.L listed and labeled for use on up to 3 hour fire rated openings. Available with or without keyed high security cylinder override.

1. Wireless access control cylindrical locks interface using local wireless connection between the lock unit and a nearby communication hub. Communication hub connected via RS-485 or Wiegand to a new or existing online electronic access control system platform.
2. Fully-encrypted AES 128 wireless communication between lock and communication hub (IEEE 802.15.4, 2.4 GHz) with no proprietary programming device requirements. Locks will continue functional operation independent of wireless connection slowdown or failure.

3. Integrated card reader supports 125kHz proximity credentials; 13.56 MHz contactless credentials: HID® iCLASS (full authentication, all formats, including SEOS), Mifare Classic (Sector and UID), DESFire, NFC-enabled mobile phones.
4. Support for HID Mobile Access via Bluetooth Low Energy (BLE) short-range wireless communication.
5. Lockdown capability with maximum 10 second response.
6. Patent pending credential cache to ensure offline access.
7. Power Source: 6 AA alkaline batteries power supply with LED indication of locked, programming mode and low capacity warning status conditions.
8. Energy Efficient Design: Provide lock bodies which have a holding current draw of 15mA maximum, and can operate on either 12 or 24 volts. Locks are to be field configurable for fail safe or fail secure operation.
9. Outside lever rigid except when valid user code is entered. Emergency override access capability with optional mechanical key cylinder retraction of lock latch bolt without necessary electronic activation.
10. Communication Hub: Provide the necessary number of hubs which is connected to the access control system via RS-485 or Wiegand as required by the system. Provide hubs factory paired with the locks, but allow for field configuration as needed.
11. Complete installation to include manufacturer's Installation Tool and USB Radio Dongle for initial lock set-up and configuration. Electronic on-line access control system platform, including communication cabling and software, by others.

12. Manufacturers:

    a. Corbin Russwin Hardware (RU) – IN100 – ML2000 Series.
    b. Sargent Manufacturing (SA) – IN100 – 7900 Series.

B. Wireless Access Control Exit Hardware: Wireless technology ANSI/BHMA A156.3 Grade 1 rim and mortise exit device hardware with integrated card reader. Separate DPS connects directly to exit hardware electronics for door position (open/closed status) monitoring. Motor driven locking/unlocking control of the lever handle exit trim with 3/4" throw latch bolt. U.L listed and labeled for either panic or "fire exit hardware" for use on up to 3 hour fire rated openings. Available with or without keyed high security cylinder override trim.

1. Wireless access control exit hardware interfaces using local wireless connection between the electronic exit trim and a communication hub located directly above the door. Communication hub connected via RS-485 to a new or existing online electronic access control system platform.
2. Fully-encrypted AES 128 wireless communication between lock and communication hub (IEEE 802.15.4, 2.4 GHz) with no proprietary programming device requirements. Locks will continue functional operation independent of wireless connection slowdown or failure.
3. Integrated card reader supports 125kHz proximity credentials; 13.56 MHz contactless credentials: HID® iCLASS (full authentication, all formats, including SEOS), Mifare Classic (Sector and UID), DESFire, NFC-enabled mobile phones.
4. Support for HID Mobile Access via Bluetooth Low Energy (BLE) short-range wireless communication.
5. Lockdown capability with maximum 10 second response.
6. Patent pending credential cache to ensure offline access.
7. Power Source: 6 AA alkaline batteries power supply with LED indication of locked, programming mode and low capacity warning status conditions.

8. Outside lever rigid except when in "passage" mode, or valid user code is entered. Emergency override access capability with optional mechanical key cylinder retraction of exit device latch without necessary electronic activation.
9. Complete installation to include manufacturer's Installation Tool and USB Radio Dongle for initial lock set-up and configuration. Electronic on-line access control system platform, including communication cabling and software, by others.

10. Manufacturers:

    a. Corbin Russwin Hardware (RU) – IN100 – ED5000 Series.
    b. Sargent Manufacturing (SA) - IN100 – 80 Series.

2.2 CABLES AND WIRING

A. Data Line Supervision: System to include alarm initiation capability in response to opening, closing, shorting, or grounding of data transmission lines.

B. Install appropriate number of conductor pairs, in the wire gage (AWG) recommended by manufacturer, corresponding to the electronic locking functions specified, amperage drawn and distances covered between the power supplies, power transfer devices, electrified hardware and access control equipment.

2.3 ACCESS CONTROL HARDWARE FINISHES

A. Standard: Comply with BHMA A156.18.

B. Protect mechanical finishes on exposed surfaces from damage by applying temporary protective coverings before shipping.

C. Where specified, finishes on integrated card key locksets or exit hardware to incorporate an FDA recognized antimicrobial coating (i.e., MicroShield™) listed for use on equipment as a suppressant to the growth and spread of a broad range of bacteria, algae, fungus, mold and mildew.

D. BHMA Designations: Comply with base material and finish as specified.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Examine scheduled openings, with Installer present, for compliance with requirements for installation tolerances, labeled fire door assembly construction, wall and floor construction, and other conditions affecting performance of the installed access control system.

B. Examine roughing-in for electrical source power to verify actual locations of wiring connections before electrified and integrated access control door hardware installation.

C. Examine roughing-in for LAN and control cable conduit systems to PCs, controllers, card readers, and other cable-connected devices to verify actual locations of conduit and back boxes before device installation.

D. Notify architect of any discrepancies or conflicts between the specifications, drawings and scheduled access controlled hardware. Proceed only after such discrepancies or conflicts have been resolved in writing.

3.2 PREPARATION

A. Doors and frames at scheduled access controlled openings to be properly prepared to receive specified electrified and access control hardware and connections without additional in-field modifications.

3.3 INSTALLATION

A. Install each item of electronic integrated door hardware and access control equipment to comply with manufacturer's written instructions and according to specifications.

B. Mounting Heights: Mount electronic integrated door hardware units at heights indicated in following applicable publications, unless specifically indicated or required to comply with governing regulations:

1. Standard Steel Doors and Frames: DHI's "Recommended Locations for Architectural Hardware for Standard Steel Doors and Frames."
2. Wood Doors: DHI WDHS.3, "Recommended Locations for Architectural Hardware for Wood Flush Doors."
3. Where indicated to comply with accessibility requirements, comply with ANSI A117.1 "Accessibility Guidelines for Buildings and Facilities."

C. Boxed Power Supplies: Verify locations.

1. Configuration: Provide the least number of power supplies required to adequately serve doors with access control hardware and equipment.

D. Final connect the system control switches (integrated card key locking hardware, remote readers, keypads, display terminals, biometrics), and monitoring, and signaling equipment to the related Controller devices at each opening to properly operate the electrified door and access control hardware according to system operational narratives.

E. Retrofitting: Install each door hardware and access control item to comply with manufacturer's published templates and written instructions. Where cutting and fitting are required to install door hardware onto or into surfaces that are later to be painted or finished in another way, coordinate removal, storage, and reinstallation of surface protective trim units with finishing work specified in Division 9 Sections. Do not install surface-mounted items until finishes have been completed on substrates involved.

F. System Application Software: Install, and test application(s) software and databases for the complete and proper operation of systems involved. Assign software license(s) to Owner.

3.4 ADJUSTING

A. Adjust and check each operating item of integrated access control door hardware, and each door opening to ensure proper secured operation and function of every unit. Replace units that cannot be adjusted to operate as intended.

3.5 CLEANING AND PROTECTION

A. Clean adjacent surfaces soiled by access control system installation.

B. Clean operating items as necessary to restore proper finish and provide final protection and maintain conditions that ensure access control door hardware is without damage or deterioration at time of owner occupancy.

3.6 DEMONSTRATION

A. Engage an authorized systems manufacturer representative to train Owner's maintenance personnel to adjust, operate, and maintain electronic integrated door hardware and the access control system.

3.7 ACCESS CONTROL HARDWARE SETS

A. The access control system hardware sets listed below represent the design intent and direction of the owner, architect, and security consultant (as applicable). They are intended as a guideline only and should not be considered a detailed opening schedule. Discrepancies, conflicting, and missing items should be brought to the attention of the architect with corrections made prior to the bidding process. Omitted items not included in a hardware set should be scheduled with the appropriate additional hardware required for proper application and functionality.

B. The supplier is responsible for handing and sizing all products and providing the correct option for the appropriate door type and material where more than one is presented in the hardware sets. Quantities listed are for each pair of doors, or for each single door.

C. Refer to Section 080671, Door Hardware Sets, for hardware sets.

END OF SECTION 281500

SECTION 28 31 11

DIGITAL, ADDRESSABLE FIRE ALARM SYSTEM

PART 1 GENERAL

1.01 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.

1.02 SUMMARY

A. Section Includes:
   1. Fire-alarm control unit.
   2. Manual fire-alarm boxes.
   3. System smoke detectors.
   4. Heat detectors.
   5. Notification appliances.
   6. Remote annunciator.
   7. Addressable interface device.
   8. Digital alarm communicator transmitter.

1.03 SYSTEM DESCRIPTION

A. Noncoded, addressable system, with multiplexed signal transmission, dedicated to fire-alarm service only.

1.04 SUBMITTALS

A. Product Data: For each type of product indicated.
B. Shop Drawings: For fire-alarm system. Include plans, elevations, sections, details, and attachments to other work.
   1. Comply with recommendations in the "Documentation" Section of the "Fundamentals of Fire Alarm Systems" Chapter in NFPA 72.
   2. Include voltage drop calculations for notification appliance circuits.
   3. Include battery-size calculations.
C. Qualification Data: For qualified Installer in the State of New York.
D. Operation and Maintenance Data: For fire-alarm systems and components to include in emergency, operation, and maintenance manuals. In addition to items specified in Division 01 Section "Operation and Maintenance Data," include the following:
   1. Comply with the "Records" Section of the "Inspection, Testing and Maintenance" Chapter in NFPA 72.
   2. Provide "Record of Completion Documents" according to NFPA 72 article "Permanent Records" in the "Records" Section of the "Inspection, Testing and Maintenance" Chapter.
   3. Provide "Maintenance, Inspection and Testing Records" according to NFPA 72 article of the same name and include the following:
      a. Frequency of testing of installed components.
      b. Frequency of inspection of installed components.
      c. Requirements and recommendations related to results of maintenance.

d. Manufacturer's user training manuals.
4. Manufacturer's required maintenance related to system warranty requirements.
5. Abbreviated operating instructions for mounting at fire-alarm control unit.

1.05 QUALITY ASSURANCE

A. Installer Qualifications: Personnel shall be trained and certified by manufacturer for installation of units required for this Project.
B. Source Limitations for Fire-Alarm System and Components: Obtain fire-alarm system from single source from single manufacturer.
C. Electrical Components, Devices, and Accessories: Listed and labeled as defined in NFPA 70, by a qualified testing agency, and marked for intended location and application.
D. NFPA Certification: Obtain certification according to NFPA 72 by a UL-listed alarm company.

1.06 EXTRA MATERIALS

A. Furnish extra materials that match products installed and that are packaged with protective covering for storage and identified with labels describing contents.
1. Lamps for Strobe Units: Quantity equal to 2.
2. Smoke Detectors, Fire Detectors: Quantity equal to 2.
3. Detector Bases: Quantity equal to 2.
4. Keys and Tools: One extra set for access to locked and tamperproofed components.
5. Fuses: Two of each type installed in the system.

PART 2 PRODUCTS

2.01 SYSTEMS OPERATIONAL DESCRIPTION

A. Fire-alarm signal initiation shall be by one or more of the following devices and systems:
1. Manual stations.
2. Heat detectors.
3. Smoke detectors.
4. Duct smoke detectors.
5. Automatic sprinkler system water flow.
B. Fire-alarm signal shall initiate the following actions:
1. Continuously operate alarm notification appliances.
2. Identify alarm at fire-alarm control unit and remote annunciators.
3. Transmit an alarm signal to the remote alarm receiving station.
4. Switch heating, ventilating, and air-conditioning equipment controls to fire-alarm mode.
5. Record events in the system memory.
C. System trouble signal initiation shall be by one or more of the following devices and actions:
1. Open circuits, shorts, and grounds in designated circuits.
2. Opening, tampering with, or removing alarm-initiating and supervisory signal-initiating devices.
3. Loss of primary power at fire-alarm control unit.
4. Ground or a single break in fire-alarm control unit internal circuits.

5. Abnormal ac voltage at fire-alarm control unit.
6. Break in standby battery circuitry.
7. Failure of battery charging.
8. Abnormal position of any switch at fire-alarm control unit or annunciator.

D. System Trouble and Supervisory Signal Actions: Initiate notification appliance and annunciate at fire-alarm control unit and remote enunciators.

2.02 FIRE-ALARM CONTROL UNIT

A. General Requirements for Fire-Alarm Control Unit:
   1. Field-programmable, microprocessor-based, modular, power-limited design with electronic modules, complying with UL 864 and listed and labeled by an NRTL.
      a. System software and programs shall be held in flash electrically erasable programmable read-only memory (EEPROM), retaining the information through failure of primary and secondary power supplies.
      b. Include a real-time clock for time annotation of events on the event recorder and printer.
   2. Addressable control circuits for operation of mechanical equipment.

B. Alphanumeric Display and System Controls: Arranged for interface between human operator at fire-alarm control unit and addressable system components including annunciation and supervision. Display alarm, supervisory, and component status messages and the programming and control menu.
   1. Annunciator and Display: Liquid-crystal type, 2 lines of 40 characters, minimum.
   2. Keypad: Arranged to permit entry and execution of programming, display, and control commands.

C. Transmission to Remote Alarm Receiving Station: Automatically transmit alarm, supervisory, and trouble signals to a remote alarm station.

D. Primary Power: 24-V dc obtained from 120-V ac service and a power-supply module. Initiating devices, notification appliances, signaling lines, trouble signals, supervisory and digital alarm communicator transmitters shall be powered by 24-V dc source.
   1. Alarm current draw of entire fire-alarm system shall not exceed 80 percent of the power-supply module rating.

E. Secondary Power: 24-V dc supply system with batteries, automatic battery charger, and automatic transfer switch.
   1. Batteries: Sealed lead calcium.

2.03 MANUAL FIRE-ALARM BOXES

A. General Requirements for Manual Fire-Alarm Boxes: Comply with UL 38. Boxes shall be finished in red with molded, raised-letter operating instructions in contrasting color; shall show visible indication of operation; and shall be mounted on recessed outlet box. If indicated as surface mounted, provide manufacturer's surface back box.
   1. Double-action mechanism requiring two actions to initiate an alarm, pull-lever type; with integral addressable module arranged to communicate manual-station status (normal, alarm, or trouble) to fire-alarm control unit.
   2. Station Reset: Key- or wrench-operated switch.

2.04 SYSTEM SMOKE DETECTORS

A. General Requirements for System Smoke Detectors:
   1. Comply with UL 268; operating at 24-V dc, nominal.

2. Detectors shall be four-wire type.
3. Integral Addressable Module: Arranged to communicate detector status (normal, alarm, or trouble) to fire-alarm control unit.
4. Base Mounting: Detector and associated electronic components shall be mounted in a twist-lock module that connects to a fixed base. Provide terminals in the fixed base for connection to building wiring.
5. Self-Restoring: Detectors do not require resetting or readjustment after actuation to restore them to normal operation.
6. Integral Visual-Indicating Light: LED type indicating detector has operated and power on status.

B. Photoelectric Smoke Detectors:
1. Detector address shall be accessible from fire-alarm control unit and shall be able to identify the detector's location within the system and its sensitivity setting.
2. An operator at fire-alarm control unit, having the designated access level, shall be able to manually access the following for each detector:
   a. Primary status.
   b. Device type.
   c. Present average value.
   d. Present sensitivity selected.
   e. Sensor range (normal, dirty, etc.).

C. Duct Smoke Detectors: Photoelectric type complying with UL 268A.
1. Detector address shall be accessible from fire-alarm control unit and shall be able to identify the detector's location within the system and its sensitivity setting.
2. An operator at fire-alarm control unit, having the designated access level, shall be able to manually access the following for each detector:
   a. Primary status.
   b. Device type.
   c. Present average value.
   d. Present sensitivity selected.
   e. Sensor range (normal, dirty, etc.).
3. Weatherproof Duct Housing Enclosure: NEMA 250, Type 4X; NRTL listed for use with the supplied detector.
4. Each sensor shall have multiple levels of detection sensitivity.
5. Sampling Tubes: Design and dimensions as recommended by manufacturer for specific duct size, air velocity, and installation conditions where applied.
6. Relay Fan Shutdown: Rated to interrupt fan motor-control circuit.

2.05 HEAT DETECTORS

A. General Requirements for Heat Detectors: Comply with UL 521.

B. Heat Detector, Combination Type: Actuated by either a fixed temperature of 135 deg F or a rate of rise that exceeds 15 deg F per minute unless otherwise indicated.
1. Mounting: Adapter plate for outlet box mounting.
2. Integral Addressable Module: Arranged to communicate detector status (normal, alarm, or trouble) to fire-alarm control unit.

2.06 NOTIFICATION APPLIANCES

A. General Requirements for Notification Appliances: Individually addressed, connected to a signaling line circuit, equipped for mounting as indicated and with screw terminals for system connections.

B. General Requirements for Notification Appliances: Connected to notification appliance signal circuits, zoned as indicated, equipped for mounting as indicated and with screw terminals for system connections.

1. Combination Devices: Factory-integrated audible and visible devices in a single-mounting assembly, equipped for mounting as indicated and with screw terminals for system connections.

C. Horns: Electric-vibrating-polarized type, 24-V dc; with provision for housing the operating mechanism behind a grille. Comply with UL 464. Horns shall produce a sound-pressure level of 90 dBA, measured 10 feet from the horn, using the coded signal prescribed in UL 464 test protocol.

D. Visible Notification Appliances: Xenon strobe lights comply with UL 1971, with clear or nominal white polycarbonate lens mounted on an aluminum faceplate. The word "FIRE" is engraved in minimum 1 inch high letters on the lens.

1. Rated Light Output:

a. 15/30/75/110 cd, selectable in the field.

2. Mounting: Wall mounted unless otherwise indicated.
3. Flashing shall be in a temporal pattern, synchronized with other units.
4. Strobe Leads: Factory connected to screw terminals.
5. Mounting Faceplate: Factory-finished, red.

2.07 REMOTE ANNUNCIATOR

A. Description: Annunciator functions shall match those of fire-alarm control unit for alarm, supervisory, and trouble indications. Manual switching functions shall match those of fire-alarm control unit, including acknowledging, silencing, resetting, and testing.

1. Mounting: Surface cabinet, NEMA 250, Type 1.

B. Display Type and Functional Performance: Alphanumeric display and LED indicating lights shall match those of fire-alarm control unit. Provide controls to acknowledge, silence, reset, and test functions for alarm, supervisory, and trouble signals.

2.08 ADDRESSABLE INTERFACE DEVICE

A. Description: Microelectronic monitor module, NRTL listed for use in providing a system address for alarm-initiating devices for wired applications with normally open contacts.

B. Retain paragraph below for elevator recall or shutdown duty.

2.09 DIGITAL ALARM COMMUNICATOR TRANSMITTER

A. Digital alarm communicator transmitter shall be acceptable to the remote central station and shall comply with UL 632 and be listed and labeled by an NRTL.

B. Functional Performance: Unit shall receive an alarm, supervisory, or trouble signal from fire-alarm control unit and automatically capture two telephone lines and dial a preset number for a remote central station. When contact is made with central station, signals shall be transmitted. If service on either line is interrupted for longer than 45 seconds, transmitter shall initiate a local trouble signal and transmit the signal indicating loss of

telephone line to the remote alarm receiving station over the remaining line. Transmitter shall automatically report telephone service restoration to the central station. If service is lost on both telephone lines, transmitter shall initiate the local trouble signal.

C. Local functions and display at the digital alarm communicator transmitter shall include the following:
   1. Verification that both telephone lines are available.
   2. Programming device.
   3. LED display.
   4. Manual test report function and manual transmission clear indication.
   5. Communications failure with the central station or fire-alarm control unit.

D. Digital data transmission shall include the following:
   1. Address of the alarm-initiating device.
   2. Address of the supervisory signal.
   3. Address of the trouble-initiating device.
   4. Loss of ac supply or loss of power.
   5. Low battery.
   6. Abnormal test signal.

E. Secondary Power: Integral rechargeable battery and automatic charger.

PART 3 EXECUTION

3.01 EQUIPMENT INSTALLATION

A. Comply with NFPA 72 for installation of fire-alarm equipment.

B. Equipment Mounting: Install fire-alarm control unit with tops of cabinets not more than 72 inches above the finished floor.

C. Smoke- or Heat-Detector Spacing:
   1. Comply with NFPA 72, "Smoke-Sensing Fire Detectors" Section in the "Initiating Devices" Chapter, for smoke-detector spacing.
   2. Comply with NFPA 72, "Heat-Sensing Fire Detectors" Section in the "Initiating Devices" Chapter, for heat-detector spacing.
   3. HVAC: Locate detectors not closer than 5 feet from air-supply diffuser or return-air opening.

D. Duct Smoke Detectors: Comply with NFPA 72 and NFPA 90A. Install sampling tubes so they extend the full width of duct.

E. Audible Alarm-Indicating Devices: Install not less than 6 inches below the ceiling and not less than 80 inches above the floor. Install bells and horns on flush-mounted back boxes with the device-operating mechanism concealed behind a grille.

F. Visible Alarm-Indicating Devices: Install adjacent to each alarm bell or alarm horn and at least 6 inches below the ceiling and not less than 80 inches above the floor.

G. Annunciator: Install with top of panel not more than 54 inches above the finished floor.

H. Manual Pull Stations: Install device at 48 inches above floor.

3.02 CONNECTIONS

A. Make addressable connections with a supervised interface device to the following devices and systems. Install the interface device less than 3 feet from the device controlled. Make an addressable confirmation connection when such feedback is available at the device or system being controlled.
   1. Supervisory connections at valve supervisory switches.

2. Supervisory connections at low-air-pressure switch of each dry-pipe sprinkler system.

3.03 IDENTIFICATION

A. Identify system components, wiring, cabling, and terminals. Comply with requirements for identification specified in Division 26 Section "Identification for Electrical Systems."
B. Install framed instructions in a location visible from fire-alarm control unit.

3.04 GROUNDING

A. Ground fire-alarm control unit and associated circuits; comply with IEEE 1100. Install a ground wire from main service ground to fire-alarm control unit.

3.05 FIELD QUALITY CONTROL

A. Field tests shall be witnessed by Construction Manager.
B. Manufacturer's Field Service: Engage a factory-authorized service representative to inspect, test, and adjust components, assemblies, and equipment installations, including connections.
C. Perform tests and inspections.
1. Manufacturer's Field Service: Engage a factory-authorized service representative to inspect components, assemblies, and equipment installations, including connections, and to assist in testing.
D. Tests and Inspections:
1. Visual Inspection: Conduct visual inspection prior to testing.
a. Inspection shall be based on completed Record Drawings and system documentation that is required by NFPA 72 in its "Completion Documents, Preparation" Table in the "Documentation" Section of the "Fundamentals of Fire Alarm Systems" Chapter.
b. Comply with "Visual Inspection Frequencies" Table in the "Inspection" Section of the "Inspection, Testing and Maintenance" Chapter in NFPA 72; retain the "Initial/Reacceptance" column and list only the installed components.
2. System Testing: Comply with "Test Methods" Table in the "Testing" Section of the "Inspection, Testing and Maintenance" Chapter in NFPA 72.
3. Test audible appliances for the public operating mode according to manufacturer's written instructions. Perform the test using a portable sound-level meter complying with Type 2 requirements in ANSI S1.4.
4. Test visible appliances for the public operating mode according to manufacturer's written instructions.
5. Factory-authorized service representative shall prepare the "Fire Alarm System Record of Completion" in the "Documentation" Section of the "Fundamentals of Fire Alarm Systems" Chapter in NFPA 72 and the "Inspection and Testing Form" in the "Records" Section of the "Inspection, Testing and Maintenance" Chapter in NFPA 72.
E. Reacceptance Testing: Perform reacceptance testing to verify the proper operation of added or replaced devices and appliances.
F. Fire-alarm system will be considered defective if it does not pass tests and inspections.
G. Prepare test and inspection reports.

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END OF SECTION