SECTION 27 6400

ELECTRONIC ACCESS CONTROL SYSTEM

PART 1 - GENERAL

1.01 SCOPE

A. This specification section covers the furnishing and installation of a new and complete enterprise-wide, low-voltage, Electronic Access Control System (EACS). Include at a minimum the following pieces:

1. Proximity card readers
2. Intelligent controllers
3. Interface to locking hardware
4. Power supplies
5. Wiring/cabling
6. LAN module for network connectivity
7. Lock-down switch
8. Door position switches

B. Contractor shall furnish and install access control hardware devices, mounting brackets, power supplies, switches, controls, consoles and other components of the system as shown and specified.

C. Contractor shall furnish and install access control related software to allow this system expansion. Software includes required license addition for access control readers and electrified portals, workstations and Video Management System (VMS) Integration.

D. Furnish and install outlets, junction boxes, conduit, connectors, wiring, and other accessories necessary to complete the system installation. Requirements shall be in accordance with Division 26 00 00, Electrical.

1.02 PRECEDENCE

A. Obtain, read and comply with General Conditions and applicable sub-sections of the contract specifications. Where a discrepancy may exist between any applicable sub-section and directions as contained herein, this section shall govern.

PART 2 - PRODUCTS

2.01 SUBSTITUTIONS

A. Unless noted otherwise, products in this section are intended as a basis of design and are open to substitutions per the product substitution procedures defined in Section 27 00 00.

2.02 ELECTRONIC ACCESS CONTROL HARDWARE

A. The Access Control Panel (ACP) is used as the subcomponent to the security management system for the purpose of initiating all decision-making criteria as it relates to the cardholders, readers, and associated hardware connected. Decisions are made by the ACP and uploaded to the host computer as historical events.

B. The ACP shall be listed for Underwriters Laboratory (UL):

1. UL294 (Access Control System)

C. Provide an access control system based off of Mercury Security open platform hardware and interface modules. The panels shall:

1. Operate without the need for the host to be on-line. No decisions shall be dependent on the host.
2. Support on-board 10/100 Ethernet communications to the host as primary communication.
3. Include a request-to-exit and door status contact input for each reader without the need for additional modules for future use.
4. Detect “forced entry” and “door left open.” A separate action is required for each.
5. Allow mapping of readers to any output address within the same controller.
6. Support at least 50 user-selected holidays.
7. Allow all unused door logic, such as door strike relays, request-to-exit inputs, and door status inputs to be assigned as general-purpose points.
8. Support optional modules for additional customization of inputs and outputs.
9. Wireless reader support.
10. Elevator support.
11. Support a minimum of 5,060 alarm input points.
12. Support a minimum of 5,060 relay output points.
13. Maintain historical information for a minimum of three (3) months without AC power.
14. Automatically adjust for daylight savings time and leap year.
15. Support a variety of reader technologies.
16. Support for OSDP and OSDP SC (Secure Channel).
17. Support the following card/reader technologies as a minimum:
    a) Magnetic Stripe
    b) 125KHz Proximity cards
    c) 13.56Mhz Smart Cards and technologies
    d) Biometrics
    e) Wiegand
    f) Vehicle Identification
    g) Support multiple technologies simultaneously.
    h) Support for HID 37-bit card formats.
    i) Support for HID iClass SE and Seos technologies.
    j) Support for NXP MiFare DESFire EV1
18. Maintain the expiration date for each cardholder. Once the date is reached, the card will automatically be disabled. No access shall be authorized.
19. Maintain three (3) access times for each door location: Standard, Long, and Egress.
20. Have the ability to maintain an automatic door unlock during specific hours and days.
21. Support a minimum of (2) “levels” of Anti-Passback: Global and Area.

22. Panels shall use Mercury Security LP controllers with Series-3 MR interface panels. Legacy EP controllers, LP controllers in EP mode and Series-2 interface panels are not allowed. The Contractor shall provide adequate number of access control panels, controllers, door interface panels and I/O panels for a complete turnkey system to support all components as indicated on project drawings. Basis of design is LP1502 controllers, MR52-S3 interface panels and MR16IN-S3/OUT-S3 I/O panels. Single door controllers shall only be used when specifically specified or approved by the District.

2.03 SYSTEM SOFTWARE

A. Operating System Requirements: Shall operate in conjunction with and be compatible with Microsoft Windows 10 Professional 32 and 64 bit, and Server 2012R2, 2016, 2019CU1 operating systems.

B. Support for Microsoft Active Directory (LDAP).

1. Provide all licenses and integration required for LDAP integration.

C. Support for virtualization.

1. System shall support VMware and Microsoft Hyper V virtualization.
2. The Contractor shall provide the Owner with server requirements.

D. Software shall include:

1. Graphical user interface to show pull-down menus and a menu tree format.
2. Password-protected operator login and access.

E. Access Control Application Software: Shall provide interface between the ACS Host Workstation, IP based Reader-Controllers, inputs, and outputs in order to monitor sensors operate displays, report alarms, generate reports and provide all other system functions as follows:

1. Overall Access Control System Parameters:
   a) Number of access control readers per system: Unlimited
   b) Number of client work stations per system: Unlimited
   c) Number of cardholders: 64,000 per reader stand-alone mode, unlimited in network mode.
   d) Number of credentials per cardholders: Unlimited
   e) Number of cardholder groups: Unlimited
   f) Number of system inputs: Unlimited
   g) Number of system outputs: Unlimited
   h) Reader Inputs: Door sense, request to exit, auxiliary, optical tamper, RS-232
   i) Reader Outputs: (2) outputs; TTL1 and TTL2
2. Access Control Software Functions: The system software shall provide for the following features and functions:
   a) Door Programming Functions
      (1) Extended open alarms Individual Extended open timers per door.
      (2) Personal Identification Number (PIN) Codes – Up to 9 digits.
      (3) Device Support: Supports selected serial RS-232 and Wiegand devices.
      (4) Number of Door Groups: Unlimited
   b) Shifts

(1) Number of shifts: Unlimited

(2) Interval assignments: Any day of the week.

c) Permissions

(1) Number of Permissions: Unlimited

d) Holidays: The software shall provide for an unlimited number of holidays.

e) Door Control: The software shall provide the following types of area control functions:

(1) Door control based on dual-authentication rules.

(2) Support requiring credentials belonging to two people

(3) Support requiring two credentials belong to same person

(4) Cardholder use limits

(5) Elapsed Time based

(6) Number of usage based

(7) Configurable individual door strike times.

(8) Configurable extended individual door hold open times.

f) Elevator Control: The software shall provide elevator control for an unlimited number of floors.

g) System Graphical Tree: The software shall provide for graphical tree displays of the configured field hardware.

h) Alarm and Event Logging: The software shall provide for logging of all system alarms and events chronologically including time and date stamp.

i) System Scheduling: The system shall provide for scheduling of events including:

(1) Open Door, Open Door Group

(2) Deactivate Badges

j) Help Documentation: The software shall include complete documentation on CD.

k) Alarm attributes: The software shall provide for programming of the following alarm and monitoring attributes:

(1) Display of alarm events at the ACS Host workstation, or support networked workstation.

(2) Require the reader-controller, which generated the alarm to be restored to its normal state before the alarm is cleared.

(3) Require acknowledgment of an alarm to clear the alarm.

(4) Support auto-clearing of network related communication alarms.

(5) Trigger a programmed system actions(s) when the alarm is acknowledged.

(6) Require a User Logon for Acknowledgment.

l) Programming Downloads: The software shall provide for downloading of programming from the ACS Host to the Reader-controller-controllers as follows:

(1) Credential holders and authorized time zones

(2) Time zones.

(3) Alarm configurations.

(4) Latch intervals.

(5) TTL output on REX, Tamper, Unauthorized.

(6) Beep on events (REX, Tamper, Reject)

(7) Complete database download of 10,000 cardholder records in less than 15 minutes with system continuing to operate normally during this time.

m) Reader-controller Programming Options: Provide the following minimum reader-controller programming functions:

(1) Request to exit and door position switch: Provide programming for independent supervision of request to exit and door position switch.

(2) Manual activation of outputs: Provide for configurable activation of outputs from a credential presentation.

(3) User definable door strike time: Provide user definable/ programmable door strike functionality for each reader-controller.

(4) In/ out Reader-controller configuration: Reader-controller programmed as either an in reader or out reader for recording of time in and time out data.

(5) Program use Limits: Limiting the number of times that cardholders may use their credential to gain access at the Reader-controller.

(6) Input/output linking: Provide programming for linking of reader outputs with inputs.

3. ACS Host Software Functions: The system ACS Host software shall provide for the following features and functions:

a) Device Status Monitoring

(1) Alarm Status Indication: Provide real time status display that indicates the current status of all devices in the device tree.

(2) Reader-controller status: Provide display of Reader-controllers that are off line.

b) Device Group Programming

(1) Reader-controller Groups: Provide for programming of Reader-controller groups.

(2) Input Groups: Provide for programming of input groups.

(3) Output Groups: Provide for programming of output groups.

c) Trace

(1) Historical Trace: Provide for historical trace on any Reader-controller or cardholder.

d) Test Utilities: Provide system test utilities to allow for testing of the following functions:

(1) Alarm inputs status.

(2) Output operations.

(3) Credential Presentations.

(4) LED and buzzer operations

e) Real-Time Graphical Maps: Provide graphical maps that display reader-controller status and allow for manual operation of the reader-controller.

f) Map Device Icons: Icons shall dynamically change to reflect the current state of the devices.

g) Map Formats: Support import of maps to include the following file formats:

(1) JPEG (.jpg)

(2) Windows Metafile (.wmf)

(3) Windows Bitmap (.bmp)

h) Web- Browser Support

(1) Support commonly used ACS functions from a standard workstation internet browser

(2) Support commonly used ACS functions from a standard mobile phone internet browser

4. Credential Management Software Functions: The system credential management software shall provide for the following features and functions:

a) Modification of cardholder records: Add, Modify and Delete records based upon permissions.

b) Access and Credential Management: Provide for the following credential management functions:

(1) Assignment of single or multiple active badges.

(2) Programming personnel groups.

(3) Programming of group access permissions.

(4) Programming of individual access permissions

c) Badge Design: Provide badge design software that is integral to the access control source code with the following badge layout tools:

(1) Complete Badge design and Layout.

(2) Image Import.

d) ID Printers: Provide support for industry standard printers and Microsoft Certified Windows 7 printer drivers and the following badge print formats:

(1) Double-sided full color printing.

(2) Edge to edge printing.

F. Software Manufacturer

1. Open Options

G. Client Software

1. The Contractor shall install the client software on (3) workstations of the Owners choosing.

2. The software shall be configured to only allow access to certain zones as defined by the Owner.

3. The software and web interface shall support at a minimum, (5) concurrent connections.

2.04 CARD READERS

A. Operating Frequency: 13.56 MHz (ISO 15693, 14443A & 14443B)

B. Contactless smart card reader shall implement the following high security

C. 13.56 MHz applications out-of-box.

1. HID Seos, iClass SE, iClass SR and iClass with Secure Identity Object (SIO)

2. Mifare DESFire EV1/EV2, Classic

3. Able to read 37-bit card format support with no facility code.

4. NFC based credentials

5. 2.4 GHz based Bluetooth credentials
6. Apple Enhanced Contactless Polling (ECP) capable

D. OSDP V2 enabled.

E. Bluetooth ready.

F. Operating voltage range: 12 VDC

G. Current draw: 65mA average and 200mA peak @ 12VDC.

H. Color: Black with Silver Bezel

I. UL294 Outdoor and Indoor rated and IP65 rated.

J. With attached pigtail

K. Typical read range of 1.6” to 4”

L. Provide adapter plate to mount on a single-gang mud ring as required.

M. Firmware upgradable via OSDP, HID Reader manager, or pre-programmed cards.

N. Provide the ability to transmit an alarm signal via an integrated optical tamper switch if an attempt is made to remove the reader.

O. An audio beeper and RGB light bar shall provide various tone and light sequences to signify: access granted, access denied, power up, and diagnostics.

P. Card readers shall be Wavelynx Model ET20-7WS for standard wall mount applications, and Model ET10-7WS for mullion / jam applications.

2.05 RECEPTION DOOR RELEASE BUTTONS

A. Provide door release buttons physical installed within the reception areas for each door identified as requiring door release. Coordinate final location of door release buttons with owner.

B. Door releases shall be wireless.

C. Coordinate exact mounting location after deck or counter is fully complete and the seating position(s) has been decided.

1. Manufacturer:
   a) Transmitter: Seco-Larm SK-919TP4H-NQ
   b) Receiver: Seco-Larm SK-910R4Q

2.06 POWER SUPPLIES

A. Provide a power supply/chargers and sub-assemblies to power various access controller boards, locking hardware and other access control or security system components. The Contractor shall select the appropriate enclosure, power supply and sub-assemblies for each application.

B. Enclosures

C. Shall be capable of accommodating power supplies, sub-assemblies and other manufactures access control controller boards when required.

D. Wall mountable.

E. Include a cam-lock and tamper switch.

F. Trove 2 enclosures when housing access control electronics.

1. Trove 2 enclosures shall be provided with Altronix/Mercury specific backplanes. Where necessary, Contractor shall include a door backplane as well. Owner's preference is to keep number of enclosures to a minimum.

G. eFlow or Maximal enclosures when only power supply components will be within the enclosure.

H. Power Supplies

1. 115 VAC input
2. 12VDC or 24VDC selectable outputs at:
3. 10 amp continuous power @ 24VDC.
4. High capacity battery charging circuit.
5. Provide adequate battery backup as required by Authority Having Jurisdiction (AHJ) or a minimum of 4-hours.
6. Form "C" supervision contacts for AC Low, AC Fail, and battery presence.
7. Supervised Fire Disconnect.
8. Low power Disconnect.
9. Class 2 aux. output.
10. UL 294 listed sub-assembly for access control.

I. Sub-Assemblies

1. The Contractor shall provide all sub-assemblies to meet the project requirements
2. Access Control Module
3. Independently controlled fused protected outputs:
   a) Fail-Safe and/or Fail-Secure power outputs.
   b) Dry form "C" 5 amp rated relay outputs (fused).
   c) Any combination of the above
4. Access Control System trigger inputs:
   a) Normally open (NO) inputs.
   b) Open collector sink inputs.
   c) Any combination of the above.
5. Fire Alarm Disconnect:
   a) Individually selectable for any or all outputs.
   b) Latching or non-latch input FACP disconnect.
   c) Normally open (NO), normally closed (NC) dry contact or polarity reversal from FACP signaling circuit trigger input.
   d) LED indicates that the Fire Alarm Disconnect has been activated.
   e) Form "C" relay output for auxiliary reporting.
6. Multi-Output Power Distribution Module
   a) Single input distributed over eight (8) outputs.
   b) Fused protected outputs.
   c) Output terminals shall accommodate up to 12AWG wires.

7. Multi-Output Power Distribution Module with Dual Inputs
    a) Two (2) inputs distributed over eight (8) outputs.
    b) Outputs shall be configurable by input.
    c) Fused protected outputs.
    d) Output terminals shall accommodate up to 12AWG wires.
8. Voltage Regulator
    a) The Contractor shall provide a voltage regulator to provide constant 5VDC or 12VDC outputs for access control boards, modules or other applicable components as well as a voltage regulator for door hardwiring or controllers requiring 12VDC.
    b) 24vdc Input.
    c) Selectable 5 or 12VDC output.
    d) Output rating of 6amp max.

J. Stackable with both Networkable and dual input power distribution modules for space savings.
1. Power supplies and sub-assemblies shall be manufactured by Altronix or approved equal:
    a) eFlow104NB - 10amp 24vdc power supply (UL listed Sub-assembly).
    b) ACMS8 – Dual input, eight (8) output, fused Access Control Module (UL listed Sub-assembly).
    c) Linq2 - Network Communication Module (UL listed Sub-assembly).
    d) Linq8PD - Dual input, eight (8) output, fused Network Communication Module (UL listed Sub-assembly).
    e) PDS8 - Dual input, eight (8) output, fused power distribution module (UL listed Sub-assembly).
    f) VR6 - Voltage Regulator (UL listed Sub-assembly).

2.07 CABLES

A. Provide cabling per manufacturer's recommendations and code requirements for riser rated, plenum, and non-plenum cable types.

B. UTP data cabling required will be provided, installed, terminated and tested by the Division 27 structured cabling Contractor.

C. UTP patch cables will be provided and installed by the Owner in the IDF and provided by Owner and installed by Contractor at the door. The EACS Contractor shall provide the Owner a list of patch cable lengths at the door side.

D. OSDP cables for electronic access-controlled doors shall be a composite bundled

cable and include the following cables and conductor counts:

1. Card reader, OSDP – 2 conductor stranded, twisted, 24 awg, 100% foil shield with 90% tinned copper braid shield with drain, 120 ohm nominal impedance, designed for RS-485.
2. Card reader power - 2 conductor, 18 awg unshielded
3. Lock power – 4 conductor, 18 awg unshielded.
4. Door contact – 2 conductor, 22 awg unshielded
5. Request to exit and/or latch detection/spare – 4 conductor, 22 awg unshielded

E. Manufacturer (OSDP):

1. Belden #Y66871
2. Windy City Wire – 4461030-OSDP
3. Or approved equal

F. Cables for RS-485/OSDP in panel, remote controller or secondary card reader shall be: 2 conductor stranded, twisted, 24 awg, 100% foil shield with 90% tinned copper braid shield with drain, 120 ohm nominal impedance.

1. Manufacturer:
   a) Belden #82841
   b) Or approved equal

2.08 DOOR CONTACTS/DOOR POSITION SWITCHES (DC)

A. The Security Contractor shall be responsible for the connection of all door position devices to the access control system. Door position devices shall be integral to the door hardware whenever possible. The Contractor shall refer to the door hardware schedule and coordinate with the door hardware Contractor on locations and requirements.

B. Sealed and potted magnetic reed switch in contact housing.

C. Provide DPDT for applications with multiple security systems (Access Control/Intrusion Detection or PLC) utilizing a single door contact.

D. Door contacts shall be appropriately sized for any established holes within door frames.

E. Parts provided are basis of design. Determination of final part number is the responsibility of Contractor.

F. Provide color that matches door as close as possible.

G. Provide recessed switch whenever possible.

H. Armored whip for surface mount contacts.

I. Provide with a 1k/2k end of line (EoL) pre-built resistor pack. GRI (George Risk Industries, Inc.) 6644 series or approved equal.

J. Provide GRI (George Risk Industries, Inc.) 180 Series for recessed applications.

1. Or approved equal.

K. Provide GRI (George Risk Industries, Inc.) 4400 series for surface mount applications.

1. Or approved equal.

L. Provide GRI (George Risk Industries, Inc.) MC-180 Series for hollow top channel applications.

1. Or approved equal.

M. Provide GRI (George Risk Industries, Inc.) 4532 Series for overhead door applications.

1. Or approved equal.

2.09 REQUEST TO EXIT (REX) DEVICES

A. The Security Contractor shall be responsible for the connection of all request to exit devices integral to the door, motion based or other to the access control system. Request to Exit devices shall be integral to the door hardware whenever possible. The Contractor shall refer to the door hardware schedule and coordinate with the door hardware Contractor on locations and

requirements. Motion based Request to Exit devices shall only be used when not available in the door hardware.

B. Provide with a 1k/2k end of line (EoL) pre-built resistor pack when utilized to release doors with magnetic locks or other high security applications. GRI (George Risk Industries, Inc.) 6644 series or approved equal.

C. Independent adjustable beam pattern.

D. Provide with mounting plate or wall mounting plate to mount over a single-gang backbox when required.

E. Provide white or black color that matches door as close as possible.

F. (2) Form C relay contacts each rated 1 A at 30 VAC or VDC for resistive loads.

G. DC Power draw: 39mA max @ 12 VDC.

H. Dimensions: 1.8”H x 6.75”W x 1.75”D.

I. Utilize contact closure REX hardware built into the handle or crashbar whenever possible.

J. Provide Bosch DS160/161

1. Provide with TP160/161 mounting plate when mounted over a backbox.
2. Or approved equals.

2.10 END OF LINE SUPERVISION

A. All input devices shall include EoL monitoring.

B. Provide a dual 1k + 1k end of line (EoL) pre-built resistor pack. GRI (George Risk Industries, Inc.) 6644 series or approved equal.

1. Adjust resistance values as required by the manufacturer.

2.11 AUDIBLE ALARMS:

A. Provide a local audible annunciator at each exterior door

B. Local audible aunnunciators shall consist of a processor controlled circuit with inputs, outputs, local keyswitch, and sounder behind a wall mounted plate

C. The local alarm unit shall activate an audible alarm and a normally closed alarm output contact when a protected door is held open for longer than a set period of time.

D. The Contractor shall coordinate with the Owner’s Security Department to determine exact programming requirements and how long the door must be propped to trigger the alarm.

E. Audible alarms shall be powered from centralized power supplies at the same location as the access control system power supplies.

F. Manufacturer:

1. DSI ES4200-K3-T1

2.12 ELECTRONIC ACCESS CONTROL SERVER

A. All server hardware and software shall be provided by Owner.

B. The Contractor shall provide coordinate with Owner on the hardware requirements.

C. The Contractor shall provide any programming required for the system.

2.13 WORKSTATIONS

A. All workstation hardware and software shall be provided by Owner.

B. The Contractor shall provide coordinate with Owner on the hardware requirements.

C. The Contractor shall provide any programming required for the system.

2.14 BADGES AND CREDENTIALS

A. All badges and credentials shall be provided by Owner.

2.15 MASTER BADGE PRINTERS AND BADGING STATIONS

A. The badge printer shall be provided by Owner.

2.16 SECURITY PEDESTAL

A. 14-awg or greater cold rolled steel, 2” minimum pipe size.

B. Single neck design for standard vehicle height.

1. 48” high hood location with 12” neck.

C. Dual neck design for standard vehicle height and truck height.

1. 48” high and 92” high hood locations with 12” necks.

D. All welded construction.

E. 12“x12” base with painted cover.

F. Color: Black, coordinate final color with Owner and/or architect prior to purchase.

G. The pedestal shall be grounded.

H. Provide custom, painted, lockable hood large enough to accommodate long range readers, video intercoms and other devices as required.

I. Manufacturer:

1. Chase Security Systems, Inc
   a) Single Neck Pedestal: CPD 48122
   b) Dual Neck Pedestal: CPDN 9248122
2. Hood(s): HOD 221653
3. Pedestal Pro
4. Or approved equal

PART 3 - EXECUTION

3.01 OSDP COMMUNICATION

A. The Contractor shall implement OSDP V2 bi-directional communication for all newly card readers in accordance with Open Options manufacturer instructions, and Card reader (HID) manufacturer instructions.

B. All Mercury based access control panels leveraging OSDP shall be updated to the most current firmware version supported by Open Options to support maximum OSDP feature set, and HID reader manager solutions.

3.02 INSTALLATION PROCEDURES

A. The Contractor shall cable all controlled or monitored doors and terminate this cable in the access control panels no less than 3 weeks prior to substantial completion regardless of the status of the field devices such as door hardware, card readers, intercoms, etc.

B. The Contractor shall program the access control system no less than 2 weeks prior to substantial completion so when field devices are installed and terminated, associated door hardware and full system functionality can be tested. Programming shall include all doors, associated inputs, outputs, and interoperability regardless of final field device status.

C. The Contractor shall perform final connections and testing onsite when field devices such as electrified door hardware has been installed.

3.03 ADA POWER ASSIST DOOR OPERATOR INTERFACE

A. As required, certain electric locking mechanisms with card access shall be connected (hardwired) to the ADA Power Assist Door Operator pushbutton. In this scenario, card reader shall be interfaced to the ADA Door Operator pushbutton to approve activation of door motor based on card authorization or pre-programmed security schedule.

B. Door motor/operator shall not be energized until authorized by the security system to prevent operation and eventual burn-out of the motor from hitting the button with the security system activated.

C. Where required, an additional delay shall be implemented between door lock release and activation of the automatic door operator to ensure binding on equipped locking hardware does not occur.

D. The door shall allow free egress via push paddle regardless if the door is in a locked or unlocked state.

E. The paddles and operators shall be tied through the access control system, so the actions appear in the device trees, are mappable, logged and can be scheduled or overridden.

F. Contractor shall provide all necessary cable, hardware, relays, I/O modules, interfaces, and system programming to support all necessary functionality.

G. All logic and programming shall be controlled through the access control system. Local logic boards, smart relays, etc. shall not be utilized.

3.04 DOOR RELEASE BUTTONS

A. Door release buttons shall be tied through the inputs of the access control system.

B. The button release shall be interfaced in a way that the actions appear in the device trees, are mappable, logged and can be scheduled or overridden.

C. Contractor shall provide all necessary cable, hardware, relays, I/O modules, interfaces, and system programming to support all necessary functionality.

3.05 TESTING

A. Prior to energizing or testing the system, ensure the following:

1. All products are installed in a proper and safe manner per the manufacturer’s instructions.
2. Dust, debris, solder, splatter, etc., is removed.
3. Cable is dressed, routed, and labeled; connections are consistent with regard to polarity.
4. All products are neat, clean, and unmarred, and parts are securely attached.

B. Contractor shall ensure that each device in the security system is functioning normally and in such a manner as to meet the functional and performance requirements in this specification.

3.06 TRAINING

A. Contractor shall:

1. Provide system operations, administration, and maintenance training by factory-trained personnel qualified to instruct.
2. Contractor shall provide up to 6 hours of scheduled and dedicated training time in three (3) four (2) hour sessions for administration and investigation.
3. The Contractor shall provide up to 2 hours of dedicated training time for badge creation, printing and printer maintenance.
4. Provide printed training materials for each trainee, including product manuals, course outline, workbook or student guides, and written examinations for certification.
5. Provide hands-on training with operational equipment.
6. Training shall be oriented to the specific system being installed under this contract as designed and specified.
7. Contractor shall provide all necessary documentation of system operating parameters prior to scheduled training sessions.

3.07 INSTALLATION PRACTICES

A. All services provided shall be professional and conform to the highest standards for industry practices. The Owner reserves the right to halt any installation due to poor workmanship. All work shall be defect free, and the installer shall replace, at their expense, any work found to be defective.

B. The Owner reserves the right to halt any installation due to failure of Contractor to observe installation-free periods due to instructional or administrative requirements. To the maximum extent possible, the Owner will provide advance notice of such periods.

C. Contractor is responsible for providing a complete and system.

D. All manufactured items, materials, and equipment shall be applied, installed, connected, erected, used, and adjusted as recommended by the manufacturers, or as indicated in their published literature, unless specifically noted herein to the contrary.

E. Contractor shall follow these standards and approved submittals for locations of power supplies. The Owner intends to limit the number and location of power supplies to facilitate more effective long-term support and maintenance of the system.

3.08 COORDINATION

A. Contractor shall provide up to 8 hours (up to four, 2-hour sessions) of scheduled and dedicated coordination time to assist Owner with sequence of operation, rule creation and coordination as requested by Owner.

3.09 AESTHETICS

A. All cables and equipment terminating at panels frames shall be vertically straight, with no cables crossing each other, from twelve inches inside the ceiling area to the termination block.

B. All cable bundles shall be combed and bundled to accommodate individual termination block rows and panels.

C. For any given telecom room, a horizontal and vertical alignment for all mounting hardware will be maintained to provide a symmetrical and uniform appearance to the distribution frame.

D. All surface-mounted devices shall be firmly secured level and plumb

E. All rack mount equipment shall be securely installed.

3.10 HARDWARE LAYOUT

A. Hardware positioning and layout shall be reviewed and approved by the Owner prior to construction. The review does not exempt Contractor from meeting any of the requirements stated in this document.

3.11 DEVICE CABLING/WIRING INSTALLATION PRACTICES

A. All external wire and cables shall be supported at least every five feet from the structure or as required to maintain not more than 12" cable sag between supports and without over tensioning the cables. Provide j-hooks as needed where cable tray or raceway is not available.

B. This Contractor shall coordinate installation with Division 27 cabling Contractor to ensure there is at least 2-inches of physical separation between security cabling and voice/data cabling throughout cable path. Voice/data cabling Contractor has first claim to cable tray.

C. All cables, regardless of length, shall be labeled within 18" of both ends with an identifier that is keyed to the door, room, or corridor number as identified.

D. All cables shall have 6-foot service loops neatly coiled in the equipment room. During initial cable rough-in, this Contractor shall have sufficient slack to route anywhere within the equipment room.

E. Cabling shall be adequately supported with Velcro wire wraps and horizontal support cable managers fastened to rack frame. Cables shall be dressed in a neat and orderly fashion. Any cabling or equipment installation that is deemed unacceptable by the Owner shall be replaced or corrected by the Contractor at no additional cost. Plastic zip ties are not allowed.

F. All cables are to run at right angles to the structure, placed above the ceiling in halls or corridors.

G. Cables shall not run above red iron joist.

H. Contractor shall make every effort to conceal wiring and other apparatus into walls, floors, and ceilings, assuming code and good engineering practice allows and suggests.

I. Ties and straps shall be installed snugly without deforming cable insulation. Ties shall be spaced at uneven intervals not to exceed four feet. No sharp burrs shall remain where excess length of the cable tie has been cut.

J. Contractor shall notify Owner immediately if obstruction or hazard is discovered in a pathway provided by others.

K. Cable shall be stored and handled to assure that it is not stretched, kinked, crushed, or abraded in any way. Bend radiuses shall meet manufacturer specifications and/or recommendations. Cable shall not be installed in ambient temperatures or moisture conditions above or below the manufacturer’s rating.

L. No splices shall be installed in any cable.

3.12 CABLE TERMINATION

A. Termination hardware (blocks and patch panels) positioning and layout shall be reviewed and approved by the Owner prior to construction. The review does not exempt Contractor from meeting any of the requirements stated in this document.

3.13 FIRE STOPPING

A. Fire stopping of openings between floors, fire-rated walls, and smoke-rated walls, created by others for This Contractor to pass cable through, shall be the responsibility of the This Contractor. Sealing material and application of this material shall be accomplished in such a manner that is acceptable to the local fire and building authorities having jurisdiction over this work.

B. Any openings created by or for This Contractor and left unused shall be sealed up by This Contractor.

C. This Contractor shall be responsible for creating a waterproof seal in and around any openings that This Contractor creates from the structure to the outside environment.

3.14 SYSTEM INSPECTION

A. Contractor shall coordinate with project representative for inspection after Contractor has completed testing of entire system.

B. Contractor shall have trained Contractor representative and testing equipment on site during inspection to assist with spot verification of tests.

C. Contactor shall verify with Project Representative the precise positioning of camera aim and shall make fine adjustments as requested.

3.15 LABELING

A. Contractor shall neatly label all security devices and cabling at both ends. All labels shall be on Project as-built drawings.

3.16 DOCUMENTATION

A. Upon completion of the installation, Contractor shall provide full documentation sets to the Owner. All documentation shall become the property of the Owner.

B. Documentation shall include the additional specific items detailed in the subsections below:

1. Contractor shall provide hard copy and electronic forms of the final test results.
2. Contractor shall provide a document including the following:
    a) Door label/identifier
    b) Location of each drop by orientation/permanent landmark in the room
    c) Contractor shall provide accurate as-built Construction Drawings. The drawings are to include cable routes and device locations.

3.17 PRE-CHECK OUT

A. The Contractor shall demonstrate the following to Owner during system demonstration.

1. The card readers are fully installed and functional.

3.18 FINAL ACCEPTANCE

A. In addition to closeout requirements in section 27 60 00, This Contractor shall demonstrate the following before final approval.

1. Owner training is complete.
2. Punch list items are complete.
3. As-built documentation is complete and submitted to Owner

3.19 ANNUAL SUPPORT AGREEMENT

A. An annual support agreement (after the 1st year full of support/warranty) shall not be part of the bid. The Contractor shall work directly with the Owner at the end of the project to determine the ongoing hardware/software support. The Contractor shall send the Owner a copy of the support agreement for review prior to finalization.

3.20 FINAL PROCEDURES

A. Perform final procedures in accordance with section 27 60 00.

END OF SECTION