

SECTION 280500
ELECTRONIC SAFETY AND SECURITY

PART 1 – GENERAL

1.01 REQUIREMENTS

- A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.
- B. Security contractor shall review all documents for additional requirements and information that apply to the Work. If conflicts between this section and/or the General Requirements and General Conditions occur, the more stringent shall apply. Security contractor shall deliver the complete communications system, including and design-build requirements of this Section and the following Drawings:

TS-001 Sheet Index and Notes
TS-100 Overall Floor Plans
TS-200 Overall Reflected Ceiling Plans
TS-701 Coordination Details

1.02 PROJECT DESCRIPTION

- A. Section Includes: Provide new equipment for this project that will interface with the Owner's existing integrated electronic security system (IESS) according to the requirements defined in this section, and specific requirements defined in related sections and in the contract drawings.
- B. This project involves making additions to currently operating systems. Great care must be exercised before making changes to the Owner's systems or programming.
- C. The IT infrastructure and hardware required for all IT based security devices is to be supplied by the Owner's structured cabling contractor.
- D. Owner furnished and installed items:
 - 1. Access control system credentials.
 - a. ~~Test cards will be issued by Owner for contractor testing and verification.~~
 - 2. Security workstation computers and monitors
 - 3. ~~Avigilon Video Management System software, licenses and recording/storage hardware~~
 - 4. ~~Network switches, including PoE ports as necessary~~
- E. Security contractor furnished and installed items:
 - 1. All equipment as required for a complete and fully functioning IESS.
 - a. Card access readers to match existing devices in current space in locations specified per drawings
 - b. Axis network cameras in locations specified per drawings
 - 2. All security device cabling for connected field located security devices not serviced by provided network cables.
 - 3. All IESS programming and provisioning of new devices on Owner's:
 - a. Current access control system.
 - b. Current Video Management System and all camera programming based on Owners requirements whether delineated in this document or not.
- F. Alternate Work

1. All external cameras shown on drawings will be an alternate to the base system.

1.03 SCOPE OF WORK

- A. Contractor shall provide a turn-key security system installation including, but not limited to, all cabling, cameras, mounting hardware and electrical components including the necessary equipment, interconnections, labor, and services required to meet the functional requirement outlined in the design documents.
- B. The Contractor will be held responsible to have examined the site and premises and satisfied them self as to existing conditions under which they will be obligated to operate in performing their part of the work or that, which will in any manner affect the work under this contract.
- C. Permits: Obtain any necessary permits for the execution of this work in conformance with applicable union regulations, local, State and Federal codes and regulations.
- D. All aesthetic issues are to be coordinated and approved by the Owner, Architect, and Design Consultant.
- E. Provide, size, and install all conduit and penetrations, wire raceways, back boxes, and cabling connecting system components, as required by the Security System, not installed by the General Contractor.
- F. Verify all conduit and penetrations, wire raceways, back boxes, mounting hardware to building structure, and cabling connecting system components, as required by the Security System and installed by the General Contractor/Electrical Contractor as part of the base building fit out. Notify Owner of any discrepancies that may exist between the Contract Documents and existing conditions.
- G. Verify AC power requirements for each equipment location. Notify Owner of any discrepancies that may exist between Contract Documents and existing conditions.
- H. Patch, repair, finish and paint any surfaces that are damaged or demolished for access during this work. Room finishes to be returned to initial condition.
- I. Coordinate the resolution of any audiovisual system issues including, but not limited to, architectural and structural items associated with the project.
- J. Coordinate with other trades to ensure that all required access and clearances to equipment and services are provided and maintained.
- K. Verify site conditions including dimensions and clearances. Coordinate and size the exact location of the equipment racks with the architectural drawings.
- L. Conduct preliminary testing and adjustment. Submit documentation required by this Specification. Participate in approval testing for acceptance by the Owner. Perform final adjustments as required to meet the Specifications.
- M. Deliver to the Owner, bound "as-built" system documentation. Transfer all warranties and equipment guarantees to the Owner and provide a written description of system operation at the time of acceptance of the Work by the Architect/Owner.

1.04 QUALITY ASSURANCE

- A. Perform the work in accordance with current editions of all applicable local, municipal, and state codes and statutes listed below. In instances where a conflict of requirements occurs, the more stringent shall be deemed acceptable:
 - 1. NEC Article 725
 - 2. NEC Article 800
 - 3. TIA 568A/B
 - 4. UL 294 Access Control Systems
- B. Contractor organization shall have a minimum of 5 years' experience installing, configuring and servicing the IESS software applications.
 - 1. Contractor must be a factory authorized reseller of all major IESS head end components and software.
- C. Contractor personnel for the project shall include, the following qualified resources at a minimum for the duration of the project:
 - 1. A dedicated project manager, with a minimum of 3 years' experience managing IESS installation of similar scope and design.
 - 2. A dedicated IESS designer, factory trained proficient in, and with no less than 3 years' experience in the design, installation, configuration, and maintenance of the major IESS components and software.
 - 3. Installation and Service Technicians, with a minimum of 2 years' experience, factory trained and proficient in: the installation and maintenance of the major IESS components and software; wire selection, sizing, and installation; wire termination methods; power supply installation; camera housing and lens selection and installation; camera image adjustments and optimization.
- D. Notify Owner in writing where Contractor does not have the requisite installation and design experience for any equipment or materials identified in the specifications.
- E. Substitutions: All proposed substitutions shall be submitted and approved prior to procurement.
- F. Verify compatibility of all equipment that is to be furnished and integrated under this scope of work.
- G. Notify Owner in writing where the actual dimensions or appearance of installed materials or equipment will vary from the submitted and approved materials and equipment.
- H. Insurance: Provide evidence of insurance for the full value of equipment and material located on-site. Insurance shall cover losses due to fire, theft and vandalism, until the final acceptance of the system, by the Owner. Maintain additional liability insurance to protect the supplier and/or Owner, Architect, Design Consultant against damage claims for personal injury, including death, which may arise during the performance of this work.

1.05 DEFINITIONS AND ABBREVIATIONS

- A. Brunswick County Schools and their designated appointees and representatives shall be referred to in this document as Owner. The respondent to this scope of work shall be referred to as Contractor.

- B. Definitions:
 - 1. Final acceptance:
 - a. Owner's written acknowledgement of the successful completion of the scope or a portion of the scope of work.
 - 2. Fully functional and operational:
 - a. Ready for Owner use and providing all functionality and performance characteristics as defined in the specifications and drawings.
 - 3. Notify in writing:
 - a. Use of either paper or electronic documentation for project communication

1.06 SUBMITTALS

- A. Contractor shall comply with the General Requirements and General Conditions of this Specification.
- B. Bid Submittals: Contractor shall submit the following qualification documents with the bid proposal:
 - 1. Firm description of the Contractor, and a copy of the Contractor's license, as well as a statement regarding the relationship of the License Holder to the Contractor.
 - 2. Provide a minimum of ten related projects, four of which must have been completed within the last 12 months.
 - 3. Résumé of Project Manager and onsite Foreman/Project Supervisor documenting related experience. Foreman/Project Supervisor must have completed at least two similar installations in the past 12 months. Indicate any certifications held by the Project Manger and onsite Foreman/Project Supervisor such as PMP or other.
 - 4. Project Manager and Foreman/Project Supervisor cannot be changed without approval of Owner.
 - 5. Submit a list of major equipment components, along with any deviations, to the system design and Specification. Indicate which products will not be purchased directly from the manufacturer.
 - 6. Submit a list including names, firm description, job foreman, copy of license and scope of work, for any subcontractors whose work would be part of this Contract.
 - 7. Submit a list of names for the lead installers who will be working on this project and indicate for each, any certifications held.
- C. Construction Submittals
 - 1. Before ordering equipment, submit an electronic equipment cut sheet book:
 - a. Organize book by specification section, first by applicable specification section, then by manufacturer name and part name or number. For devices required by drawing references, add these devices to the end of the specification submittal data sheets.
 - b. Include an alphabetized index at the front of each binder. Use consistent text font, alignment and justification.
 - c. Include a manufacturer's cut sheet for each unique type of material or equipment to be supplied. Annotate cut sheets to indicate the specific equipment models proposed, and all proposed options and accessories.
 - d. Submit manufacturer's product literature showing cable specifications including NEC Type and UL listing information to verify compliance with this specification. Clearly identify all proposed substitutions, variances and exceptions.

- e. Submit proposed changes to camera mounting methods and heights, camera angle/orientation, if required, for compatibility with coverage requirements.
2. A list of proposed substitutions, if any.
 - a. Identify all proposed equipment substitutions. Identify all instances where a part other than that specified is proposed for use. All proposed substitutions shall be submitted and approved by the Owner or architect prior to procurement.
3. Proposed system riser and communications diagrams.
 - a. Show all equipment head end locations.
 - b. Show all data communications methods between security head end equipment and client provided equipment.
 - c. Indicate any transition between data communications methods or communications cable types. Show each typical major head end equipment component and the quantity contained in each location.
 - d. Show each typical field equipment component and cable, with aggregated quantities, for each destination equipment location.
 - i. Use device symbols and abbreviations consistent with those used on the drawings.
 - ii. Key cable types to the submitted and approved cable legend.
4. Proposed point to point wiring diagrams for all equipment and components.
 - a. Provide a typical wiring diagram for each instance of field device wiring
 - i. Standard wiring diagrams from manufacturer's installation manuals are acceptable *where standard wiring is proposed*.
 - ii. For each wiring diagram identify applicable details or equipment locations by the reference or device number(s) shown on the drawings.
 - b. Provide specific point to point wiring diagrams for interfaces to third party control equipment and specialty portals, listed below.
 - c. Provide a point to point diagram for each access control panel.
 - i. Create panel point to point diagrams in Microsoft Visio or equivalent.
 - ii. Show each board and its terminals in spatially accurate location and orientation.
 - iii. Show each terminal and punch block.
 - iv. Show data communication connections.
 - v. Show power distribution and connections.
 - vi. Show each specific security device symbol and component with connections to the boards in the panel: indicate the device type, device number, and description. Identify all terminals by function with text labels.
 - vii. Identify all cables and conductor by type with text tag.
5. Proposed cable legend with proposed manufacturers and model numbers.
6. Proposed loading schedule and addressing for all system device points.
 - a. Include the following information:
 - i. Device number as shown on plan drawings
 - ii. Proposed system device name
 - iii. Room name and number, or other device location
 - iv. Device type description or abbreviations as shown on plan drawings
 - v. Destination equipment room (IDF, SER, etc.)
 - vi. Specific port and address of device.
 - b. Review existing Owner naming standards prior to submitting loading schedules. Conform to existing standards.
 - c. Use consistent abbreviations in all system device names.

7. Proposed testing reports:
 - a. Create and submit for Owner approval a testing report for each detail or equipment type.
 - i. Include a line item for each instance of each numbered functional or technical requirement identified in the security drawings and in the appropriate specification section.
 - ii. Test reports should include: The device number and room number, as indicated in the drawings, of each device tested, an indication of the result of each test, the signature of the project manager and installation technician, with the date of the test.
 - b. Include a test report for any additional tests recommended or required by the manufacturer of each piece of equipment.
8. Submit for Owner approval, not less than 10 business days prior to Owner's final acceptance test.
 - a. Composite Equipment Manuals. Submit copies of all installation, operation and maintenance manuals for all equipment.
 - b. Include all manuals, installation guides, instruction sheets, data sheets and any related literature from the original shipping containers for the equipment.
 - i. Include all warranty cards in a separate container.
 - c. Organize the Composite Equipment Manuals alphabetically, first by manufacturer name, and then by product part number or name.
9. Final project record documents (copies of current "red-lines"). See 1.6, A, 3 below.
10. Completed testing forms.
 - a. Create and submit a completed testing report for each instance of each detail or equipment type following the completion of all installation and configuration work.
 - i. Include a line item for each instance of each functional and technical requirement identified in the security drawings and in this section.
 - b. Test reports should include:
 - i. The device number or room number, as indicated in the drawings, of each device tested.
 - ii. The result of each test.
 - iii. The signature of the project manager and installation technician, with the date of the test.
11. Include a test report for any additional tests recommended or required by approved equipment manufacturers.

1.07 PROJECT CLOSE OUT

- A. General
 1. Submit for Owner approval, no more than 10 business days after Owner's final acceptance test.
 - a. Use the design drawings as the basis for the as-built drawings. Obtain electronic copies from the system designer, architect or general contractor.
 - b. Include the following information
 - i. Accurate locations of all pull boxes, security junction boxes and access locations for raceways.
 - ii. Accurate location of all equipment installed under this SOW.
 - iii. A complete equipment list for each head-end location, including manufacturer name, model number, firmware version and quantities for each major component.

- iv. Electrical breaker panel and circuit identifiers for input AC power for all IESS equipment and power supplies.
- 2. Final riser and communications diagrams.
- 3. Final loading and addressing schedules.
- 4. Final Point-to-point wiring diagrams.
- 5. Final testing reports (as required following Owner's final acceptance test).
- 6. Warranty Letter ready for Owner signature.

1.08 GUARANTEES AND WARRANTIES

- A. Provide a warranty to cover all parts and labor to remain in effect for one year from the date that the warranty letter is signed by Owner, unless the manufacturer's equipment warranty exceeds 1 year, in which case the equipment warranty period shall be the longer of the two. The warranty expiration date shall be specified within the warranty letter and agreed to by the Owner.
- B. For all new equipment installed under the contract:
 - 1. Provide materials and labor as required for the duration of the warranty period to repair and correct any of the following conditions:
 - a. Defects in material.
 - b. Defects in workmanship.
 - c. Defects in design or implementation.
 - d. Product not new or not of the kind and quality specified.
 - e. Product not suitable for the use intended.
 - f. Product not performing in the manner specified.
 - 2. Equipment warranty will exclude repairs to Owner provided equipment.
- C. Respond to all Owner requests for warranty service according to terms and conditions defined in section 1.10, Service Levels, below.
- D. Owner may place requests for service both prior to final acceptance and during the warranty period.
- E. Provide normal warranty service at no additional cost to Owner during normal business hours, which are between 7:00 AM and 5:00 PM, Monday through Friday.
- F. Provide emergency service at an additional cost to Owner, upon Owner request.
 - 1. All Emergency Service within the first year warranty period will be performed and billed using the labor rates submitted at the time of bid.
- G. Response time is the elapsed time measured from when a problem is first reported by an Owner representative to Contractor's designated help line, to when a qualified Contractor technician arrives on site and begins working on the problem (or via phone if approved by Owner).
 - 1. Required response times:
 - a. Normal Service:
 - i. Within 4 hours for all calls placed before 1:00pm.
 - ii. By 7:00 am the following business day for all calls placed after 1:00pm.
 - b. Emergency Service: within 2 hours.
- H. Resolution time is the elapsed time measured from when an Owner representative first reports a problem, to when the system has been restored or an acceptable work-around has been implemented
 - 1. Required resolution times:

- a. Normal Service: 1 business day.
 - b. Emergency Service: 4 hours.
2. If the resolution time expires without problem resolution, Contractor will provide:
- a. A written explanation for the delay along with an estimate of the time required for fully restoring the system to complete functionality. (Due within 1 business day).
- I. Owner will classify all service calls as "Normal" or "Emergency" at the time the call is placed.
- J. Contractor's service dispatch and response personnel will possess a written definition of and be trained in:
1. Required Response times.
 2. Required Resolutions times.
- K. The conditions of the service levels will apply through the conclusion of the warranty period.

PART 2 - PRODUCTS

2.01 GENERAL

- A. Contractor is responsible for identifying all equipment necessary for a fully functional and operational IESS. Review the specifications and drawings to identify all products, materials and components required to provide the functionality indicated at the locations shown. Verify all required quantities.
- B. Coordinate with Owner on integrating proposed new system device(s) as indicated on the plan drawings connecting with existing ACS systems/components.
- C. Provide all functionality as defined in the drawings and details.
- D. This specification may contain parts and/or equipment that are not specifically included in this project. Refer to drawings to confirm all required device types and quantities.

2.02 CONDUCTORS, CABLES AND CONNECTORS

A. GENERAL

1. All cables shall be UL listed for the intended use
2. When cable is to be installed in wet locations as defined by NEC, provide "Water Blocked" cable listed for use in such locations.
3. Cables shall meet or exceed NEC classifications as follows:
 - a. Article 725 Class 1, Class 2, and Class 3 Remote-Control, Signaling, and Power-Limited Circuits
 - 1) Commercial Cable Types: Type CM, CMG or CL2
 - 2) Riser Cable Types: Type CMR or CL2R
 - 3) Plenum Cable Types: Type CL2P
 - b. Article 800 Communications Circuits
 - 1) Commercial Cable Types: Type CM or CMG
 - 2) Riser Cable Types: Type CMR
 - 3) Plenum Cable Types: Type CMP

4. Cable Marking
 - a. Provide manufacturers name, manufacturers part number, manufacturers UL file number and sequential foot markers not more than every 2 feet along the entire cable length.

5. Shield/drain wiring requirements
 - a. All shield/drain wires shall have clear vinyl insulating tubing installed over bare conductor from 1/8" below (inside) the cable jacket to within 1/8" of the wire attachment point, screw terminal and the like.
 - b. Multiple shield/drain wires may not share a single insulated tubing.
 - c. ID of insulated tubing shall not be more than 50% larger than the shield/drain wire diameter.

- B. CABLES AND CONDUCTORS
 1. Belden 2413 Enhanced CAT 6 Non-Bonded cable, no substitutions
 - a. Plenum rated Cable
 - b. Exterior color - Violet

 2. Wiring, Multiconductor with Flamearrest Jacket
 1. Belden 6302FE 4 Conductor bare copper cable, no substitutions
 - a. 18AWG
 - b. Beldfoil outer shield

- C. INSULATION DISPLACEMENT CONNECTORS
 1. 3M Scotchlok™ Insulation Displacement Connectors (Solid wires only).
 - a. Dry type
 - 1) UAL, UP2, UP3, UR2-D, UY2-D etc. or approved equal.
 - b. Gel Filled
 - 1) UG, UR, UY2, etc. or approved equal.
 2. Utilize only single stroke, parallel jaw, and ratchet-release connector tool with minimum 10:1 mechanical advantage or approved equal. Use of non-ratchet style connector tools is not acceptable.

- D. INSULATED ELECTRICAL CRIMP SLEEVE CONNECTORS
 1. 3M Scotchlok S-11.
 - a. 22 AWG to 14 AWG.
 - b. UL Listed.
 - c. CSA Certified.
 - d. .091" ID copper insert.
 2. 3M Scotchlok S-31.
 - a. 18 AWG to 10 AWG.
 - b. UL Listed.
 - c. CSA Certified.
 - d. .152" ID copper insert.

 3. Tyco Electronics D-200-0228, In-line solder/crimp with heat shrink sleeve, Red
 - a. 20 AWG to 26 AWG
 - 1) Use at all wired hinge connection locations
 4. Tyco Electronics D-200-0229, In-line solder/crimp with heat shrink sleeve, Blue
 - a. 16 AWG to 20 AWG

- E. WIRE & CABLE LABELS
 1. Labels shall be sleeved heat shrink type, machine-printed, polyolefin wire markers for all cables, or approved equal.

2. Provide Brady IDxpert labeler or approved equal.
 - a. Model XPERT-ABC
 - b. Wire label for control cables, wire wrap style
 - 1) Brady X-19-498 label cartridge, 1" H x 1" W
 - c. Wire label for large wires or cords (wire wrap style) or flat label
 - 1) Brady X-21-498 label cartridge, 1" H x 2 1/2" W
 - d. Wire label for outlets or boxes
 - 1) Brady X-61-483 label cartridge, 1/2" H x 2" W
 - e. Wire label for small outlet boxes
 - 1) Brady X-17-422 label cartridge, 1/2" H x 1" W
 - f. Large label for general use
 - 1) Brady XC-1000-595-WT-BK, 1" W x continuous

2.03 TERMINAL BLOCKS

A. TERMINAL BLOCKS

1. Phoenix Contact MBK 2,5/E or approved equal
 - a. Feed through style, 24 – 14 AWG wire, DIN rail mount
 - b. Phoenix Contact E/MBK End bracket or approved equal
 - c. Phoenix Contact NS 15 PERF 2000MM DIN rail or approved equal
 - d. Phoenix Contact terminal labels or approved equal
2. TAMPER SWITCHES
 - a. Provide tamper switch for interior enclosures per section 2.8, B, 1

2.04 POWER SUPPLIES

A. GENERAL

1. Furnish each power supply assembly manufactured as an integral unit, complete with all parts and ready for field installation.
2. Power Supplies shall have UL listing marks for the intended categories:
 - a. UL294 Access Control Systems.
3. Power Supplies shall be Class 2 power limited.
4. Power Supplies shall have lifetime warranty.

B. Ethernet Switch Power Supply

1. TrendNet 120 W Single Output Industrial (TI-S12048), no substitutions
 - a. DIN-Rail Power Supply
 - b. Provides up to 120 Watts of power (48 V, 2.5 A)
 - c. Built-in active PFC (PF > 0.93)

C. Fiber Converter Power Supply

1. TrendNet 60 W Single Output Industrial (TI-M6024), no substitutions
 - a. DIN-Rail Power Supply
 - b. Provides up to 60 Watts of power (48 V, 2.5 A)
 - c. Rated to -20 Celsius operating temperature

D. BACK UP BATTERIES

1. Powersonic PS1270, 12 VDC, 7 Amp Hour or approved equal, UL Listed
 - a. Provide 1 battery for every 12 VDC power supply
 - b. Provide 2 batteries (series connected) for every 24 VDC power supply

2.05 ACCESS CONTROL SYSTEM

A. GENERAL

1. Contractor is responsible for identifying all equipment necessary for a fully functional and operational ACS addition to the Owner's currently functioning Lenel ACS.
2. Review the specifications and drawings to identify all products and components required to provide a complete and fully functional system.
3. Verify all required quantities.

B. EQUIPMENT AND MATERIALS

A. Access Control System Equipment

1. Card Reader, Wall mounted
 1. To match Owners existing hardware
2. Electric Lockset with internal REX switch
 1. To match Owners existing hardware
3. Electric Lockset with internal Power Transfer Hinge / Pivot
 1. To match Owners existing hardware

B. SYSTEM INTERFACES AND INTEGRATION

1. None required

2.06 VIDEO CAMERA SYSTEMS

A. GENERAL

1. Contractor is responsible for identifying all equipment necessary for a fully functional and operational Camera System .
2. Review the specifications and drawings to identify all products and components required to provide a complete and fully functional system.
3. Verify all required quantities.

B. EQUIPMENT AND MATERIALS

A. Parapet, Dome and Building Mounted Cameras

1. 1080P PTZ Camera
2. Indoor/Outdoor rated
3. Dimensions 232mm X 280mm X 280mm
4. Accessories / mounting hardware as required.
5. Axis P5635-E MkII PTZ Dome Network Camera, w/ 30X Zoom lens

B. Dome Ceiling Mounted Cameras

1. 1080P Camera
2. Indoor rated
3. Dimensions 91mm X 36mm
4. Accessories / mounting hardware as required.
5. Axis M3015 Network Camera

C. Bullet Ceiling and Wall Mounted Cameras

1. 1080P Camera
2. Indoor rated
3. Dimensions 91mm X 36mm
4. Accessories / mounting hardware as required.
5. Axis P1435-LE Network Camera

- D. 360-degree Ceiling Mounted Camera
 - 1. 12MP Camera
 - 2. Indoor/Outdoor rated
 - 3. Dimensions 66mm X 149mm
 - 4. Accessories / mounting hardware as required.
 - 5. Axis M3058-PLVE 360 degree Network Camera

2.07 SECURITY EQUIPMENT WIRE HANDLING DEVICES AND CAT 6 PATCH CABLES

- A. ~~Furnished, installed and provisioned by owner.~~ Furnished and installed by Network / Data Contractor.

PART 3 - EXECUTION

3.01 EXAMINATION

- A. Verify site conditions are appropriate and satisfactory to accept the equipment and work identified in this section and in the project drawings. Do not begin installation until all unsatisfactory conditions have been corrected.
- B. Verify all rough-in is completed as show on Architectural, Civil and/or Electrical drawings prior to installation of IESS equipment.
- C. All IESS equipment and components shall be inspected and tested in the Contractor's facility for workmanship dimensions and finishes per the manufacturer's specification and the procurement order. Verify that equipment is free from physical defects prior to installation.
- D. Observe cable manufacturer's color coding for individual conductors or pairs and apply consistent color coding for similar devices across all installed locations.
- E. Verify all cable distances for compatibility with IESS devices, including but not limited to:
 - 1. Cameras, illuminators and media converter power and data communication requirements.
 - 2. Notify Owner in writing where measured cable run distances shall exceed manufacturer's specifications or common standards for power and data.

3.02 SHIPPING

- A. Equipment and components shall be packaged as necessary to prevent damage from handling. The shipping container(s) shall maintain their structural integrity when transported by common carrier or installer's vehicle.

3.03 COORDINATION AND PREPARATION

- A. Coordinate all security tasks and milestones with the general contractor for inclusion in the project schedule.
 - 1. Identify all tasks on the project critical path.
 - 2. Identify all system testing and close-out tasks.
 - 3. Include all equipment burn in, orientation and training activities required by Owner.
- B. Provide documentation to and coordinate with the Electrical Contractor for the timely installation of all required conduit, junction boxes, metal wire gutters and 120VAC power.
- C. Provide documentation to and coordinate with the Low Voltage Systems Contractor for the timely installation of all vertical and horizontal data network infrastructure.

- D. Provide documentation to and coordinate with the appropriate suppliers for the timely installation of all doors and door hardware.

3.04 INSTALLATION – CABLE

- A. ~~By owner by others.~~ Installed by Network / Data Contractor.
- B. Obtain specific approval from Owner for the location and appearance of any cable or raceway that is not hidden.
- C. Coordinate with the Electrical Contractor for the timely installation of all required conduit, junction boxes and pull strings.
- D. Coordinate with the Electrical Contractor to obtain information on conduit and junction box locations as required for the accurate completion of all project record and as-built documentation.
- E. Comb wire groups. Route and support all wiring and cable to achieve the highest quality appearance in all areas, including the interior of all panels and racks.
- F. Install a maximum of two wires to any single screw terminal.
- G. Wiring Inspection
 1. Visually inspect wire and cable for faulty insulation prior to and during installation.
 2. After installation, visually inspect all wiring for flaws such as cuts, punctures and abrasions. If any flaws are found, replace the wire at no additional cost to Owner.

3.05 INSTALLATION – GENERAL

- A. This contract involves integration to currently functioning systems. Coordination with Owner is critical. Do not interrupt any functioning system without prior coordination with Owner.
 1. Schedule all work required at current project site with Owner a minimum of 48 hours in advance. Submit work requests in writing to Owner's representative, and include:
 - a. Description of work to be performed.
 - b. Name of resource(s) to perform the work.
 - c. Expected duration.
 - d. Projected system down time and risks to operations.
 2. Following configuration of the first equipment in the IESS software, submit to Owner and maintain the Installation Status Report summary as defined above. Update as often as necessary to communicate any changes in device installation status.
- B. Comply with all manufacturers' written installation instructions, unless more stringent requirements are indicated. Notify Owner of all conflicts between construction documents and written manufacturer's requirements. Resolve all conflicts prior to installation.
- C. If any technical problem or malfunction occurs, and if in Owner's judgment adequate progress is not being demonstrated in resolving the problems, provide manufacturers' factory technical representatives and diagnostic equipment at no additional cost to Owner until the problems are resolved to Owner's satisfaction.
- D. Aesthetics are an important consideration in this installation. Install all components to provide aesthetically pleasing results. Coordinate the actual locations of all visible components in advance with Architect and Owner.
- E. Perform all installation in a professional and workmanlike manner.

- F. Consistency of installation:
 - 1. Install all equipment and parts of the same type in a consistent manner throughout the entire project. Include in the consistency of installation, at a minimum, the following:
 - a. Wire type and brand
 - b. Wire color coding
 - c. Wire tagging
 - d. Terminal board connection order
 - e. Physical layout in security junction boxes and equipment enclosures
- G. Provide Velcro wire dressing materials for wiring inside all panels, enclosures and racks.
- H. Install all equipment and parts plumb and true at locations shown on the drawings.
- I. Connections to door hardware (door hardware provided by others) are to be installed to best industry standards. Electrified door hardware is to be configured as fail-secure, with the unlock function initialized from the ACS.
- J. Install all equipment so that outlet boxes and back boxes are fully concealed.
- K. Install all accessible components with tamper resistant security fasteners.
 - 1. Provide and install tamper resistant security fasteners on all exposed and accessible pull boxes and junction boxes.
 - 2. Provide a minimum of 2 compatible tools to Owner prior to final acceptance for use with tamper resistant fasteners.
- L. Before commencing installation of any powered component, confirm that the necessary electrical power and grounding provisions are available to meet the manufacturer's stated requirements.
- M. Cutting, Sealing, Patching, and Painting
 - 1. Do not drill, bore or notch any structural member in any manner that impairs its structural value.
 - a. If cutting holes in structural members is required, only use core drills and only with the specific approval of Owner for each instance.
 - b. Any required core drilling shall include Link-Seal protection.
 - 2. Patching, painting, and repairs the buildings to facilitate conduit and mount installations will be by Owner.
 - 3. Coordinate all repair needs with Owner prior to final install.
 - 4. Contractor is responsible for all outdoor device painting as required.
- N. Installation Status Reporting.
 - 1. Create and maintain an up-to-date list of all equipment locations by device or room number, indicating the installation status of the field devices and the equipment at the IESS head-end locations.
 - 2. Provide a summary report of all equipment and devices that are or will be configured in the IESS software, sorted by device number and device description. Indicate when each device is:
 - a. Rough-in
 - b. Configured in the software but not fully installed and/or tested.
 - c. Installed
 - d. Installed, fully tested and available for Owner's use and monitoring.
 - 3. Installation status reports will be updated on a daily basis at a minimum.

- O. System programming and device naming
 - 1. Owner to provide programming sheets to be completed by the VAR per the Owner's specified format. Once the Owner has reviewed and approved the programming sheets, the program IESS.

3.06 ADJUSTING

- A. Adjust all equipment and components after installation for proper and smooth operation.
- B. Complete all required adjustments prior to commencing cleaning, training or testing.

3.07 CLEANING

- A. On a daily basis, clean up all debris from work performed and deposit in the appropriate containers.
 - 1. Stack and organize all parts, tools and equipment when not being used.
- B. Protect, and where necessary, cover all installed devices to protect from dust and debris during construction/installation.
- C. At the conclusion of the installation work in all areas (including all enclosures), vacuum and clean to remove all debris, grease and smudges.
- D. Repair damaged

3.08 TRAINING

- A. Training requirements: refer to specific system sections.
- B. Where specific system sections do not mention training session numbers and length, provide a minimum of 8 hours of total user training combined for all major systems, including Access Control, Video Management and Video Cameras.

3.09 TESTING

- A. Test and verify the fully functional and operational status of each field device prior to Owner's final acceptance testing.
- B. Verify compliance with each functional and technical requirement at each location as defined in the drawings and the specifications.
- C. Document test results using approved testing reports.
- D. All completed testing reports will be signed and dated by Contractor's installation technician and project manager prior to delivery to Owner for use in performing the final acceptance test.
- E. Successful testing of all devices and equipment is required. Failure to complete and document the tests will delay Owner's final testing and acceptance.
- F. Attend and assist with Owner verification testing.
- G. All test failures or instances of non-compliance with the drawings, approved submittals, this section, and referenced related sections will be added to an Owner-generated punch list as items

to be repaired or remedied. Excessive punch list items will result in the rescheduling of Owner's final acceptance test.

1. Contractor shall remedy or repair all punch list items within 10 business days of punch list generation.
2. Exception: punch list items that cannot be remedied due to Owner caused delays will be remedied 5 business days following Owner notification

3.10 CLOSE OUT

- A. Owner will provide final acceptance of the work contingent on the successful completion of all punch list items.
- B. The following conditions must be met in order for any portion of the work to be considered by Owner for final acceptance:
 1. Each piece of electronic equipment must be properly grounded prior to applying power.
 2. All wire shields must be insulated with clear vinyl tubing and grounded to the appropriate earth ground at the head or controller end only, not at the remote or device end.
 3. Disconnect, remove and dispose off-site of all temporary equipment and utilities.
 4. Label and identify all systems, equipment and devices.
 5. Labeling for all wiring must match as-built documentation.
 6. Have all systems, equipment and devices in full and proper adjustment and operation.
 7. Have all equipment and materials in neat, clean and unmarred condition with parts securely attached.
 8. Replace or properly repair all broken work, including glass, raised flooring and supports, ceiling tiles and supports, walls, doors, etc. Clean up and appropriately discard all debris.
 9. Deliver and store all extra materials at the premises as directed.
- C. Once all conditions for final acceptance defined above have been satisfied, perform the following in preparation for Owner's final acceptance test:
 1. Complete and submit all required testing reports.
 2. Submit final redlined project record documentation to Owner for comment and approval.
 3. Notify Owner in writing of any work in the building that will not be completed at the time of Owner's final acceptance test.
 - a. Deliver this notification no less than one business day prior to the scheduled test time and date.
- D. After Owner approves test reports and project record drawings, test the completed security systems in the presence of Owner. Demonstrate performance and compliance with specifications, drawings and details. This demonstration will serve as Owner's final acceptance test.
 1. Assume Owner will test and verify proper operation of all devices, Lenel controllers and boards, power supplies, and batteries.
 2. Owner will use the testing reports to assist in final acceptance testing. Owner will initial or mark individual test report records at Owner's convenience only.
- E. After completion of Owner's final acceptance test, incorporate all Owner requested changes and corrections to the project record drawings, and transfer all data information to a final set of as-built documents.
- F. Complete the Owner generated punch list following the final acceptance test. Notify Owner when all punch list items have been completed. Demonstrate completion of all punch list items in the presence of Owner.
 1. Owner will sign and date each testing report to acknowledge proper operation of each device listed.
- G. Deliver all spare parts to Owner with an itemized list.

H. Letter of Completion.

1. After the system acceptance requirements described above for each portion of the work have been satisfactorily completed, Owner will, within 3 business days, issue a letter of completion to Contractor, acknowledging punch list completion and receipt of as-built documents.
2. The invoice for final payment may be submitted following Owner's acknowledgement of punch list completion and receipt of final as-built documents.

I. Warranty Letter.

Issue a warranty letter to Owner within 3 business days of receipt of the letter of completion. The date of the warranty letter shall be the start of the warranty period.

END OF SECTION 28 05 00

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