

# BALTIMORE COUNTY PUBLIC SCHOOLS

S. Dallas Dance, Ph.D., Superintendent

6901 Charles Street

Towson, Maryland 21204

## ADDENDUM NUMBER   3

DATE: December 9, 2016

BID NAME: NEW SCHOOL CONSTRUCTION LANSDOWNE ELEMENTARY SCHOOL  
DEMOLITION OF LANSDOWNE ELEMENTARY SCHOOL

BID NUMBER: **MBU-516-17**  
DUE DATE: NO CHANGE  
DUE TIME: NO CHANGE  
PUBLIC OPENING: NO CHANGE

TOTAL PAGES: Twenty-Nine [(29) to include Specification Section 281300 and 282300]

The following revisions and responses to questions are made to the original bid document. This addendum forms a part of the Contract Documents and modifies the Original Bidding Documents accordingly and as noted below. Acknowledge receipt of this Addendum in the space provided on the Bid "Addenda" form.

### **SPECIFICATIONS:**

- (1) **DELETE** Specification Section 281300 Access Control System should be deleted in its entirety and replace with the attached Specification Section 281300.
- (2) **DELETE** Specification Section 282300 Video Surveillance System should be deleted in its entirety and replace with the attached Specification Section 282300.

### **DRAWINGS**

N/A

### **GENERAL:**

N/A

**END OF ADDENDUM**

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Purchasing Agent – Office of Purchasing

Bid file

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**SECTION 28 13 00 - ACCESS CONTROL****PART 1 - GENERAL****1.1 SUMMARY**

- A. This Section includes a security access system consisting of Request-to-Exit sensors, proximity card readers, entry-level controllers, and controllers, connected to each other by a high-speed electronic data transmission network. Controllers are connected to the BCPS Central Station over the BCPS WAN. Entry-level controllers monitor and control door strikes, magnetic locks, and door contacts specified in Division 08.

**1.2 DEFINITIONS**

- A. BCPS: Baltimore County Public Schools (Owner).
- B. Central Station: The existing BCPS computers hosting the BCPS software that controls access systems at BCPS buildings.
- C. Controller: An intelligent peripheral control unit that uses a computer for controlling its operation. Where this term is presented with an initial capital letter, this definition applies.
- D. LAN: Local area network.
- E. PC: Personal computer. This acronym applies to the Central Station, workstations, and file servers.
- F. PDF: (Portable Document Format.) The file format used by the Acrobat document exchange system software from Adobe.
- G. RS-232: A TIA/EIA standard for asynchronous serial data communications between terminal devices. This standard defines a 25-pin connector and certain signal characteristics for interfacing computer equipment.
- H. RS-485: A TIA/EIA standard for multipoint communications.
- I. WAN: Wide area network.
- J. Wiegand: Patented magnetic principle that uses specially treated wires embedded in the credential card.
- K. Windows: Operating system by Microsoft Corporation.

**1.3 SYSTEM DESCRIPTION**

- A. System shall consist of field-installed controllers, entry-level controllers, and sensors connected to each other by a high-speed electronic data transmission network and connected to the BCPS Central Station over the BCPS WAN.
- B. Network connecting the Central Station and controllers shall be the BCPS WAN.

C. Network(s) connecting controllers shall consist of one or more of the following:

1. BCPS LAN to connect controllers at different locations.
2. RS-485 to interconnect controllers at one location.

#### 1.4 PERFORMANCE REQUIREMENTS

- A. Security access system shall use the BCPS database for access-control and credential-creation functions.
- B. System network requirements: Interconnect system components and provide automatic communication of status changes, commands, field-initiated interrupts, and other communications required for proper system operation.
- C. Field equipment shall include controllers, entry-level controllers, sensors, and controls. Controllers shall serve as an interface between the BCPS Central Station and sensors and controls. Data exchange between the BCPS Central Station and the controllers shall include down-line transmission of commands, software, and databases to controllers. The up-line data exchange from the controller to the Central Station shall include status data such as intrusion alarms, status reports, and entry-control records.
- D. Door Hardware Interface: Coordinate with Division 08 Sections that specify door hardware required to be monitored or controlled by the security access system. The controllers in this Section shall have electrical characteristics that match the signal and power requirements of door hardware. Integrate door hardware specified in Division 08 Sections to function with the e controls and PC-based software and hardware in this Section.

#### 1.5 SUBMITTALS

- A. Product Data: For each type of product indicated. Include operating characteristics, furnished specialties, and accessories. Reference each product to a location on Drawings.
- B. Shop Drawings:
1. Diagrams for cable management system.
  2. System labeling schedules, including electronic copy of labeling schedules that are part of the cable and asset identification system of the software specified in Parts 2 and 3.
- C. Project planning documents as specified in Part 3.
- D. Field quality-control test reports.
- E. Operation and Maintenance Data: For security system 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. Hard copies of manufacturer's specification sheets, operating specifications, design guides, user's guides for software and hardware, and PDF files on CD-ROM of the hard-copy submittal.

2. System installation and setup guides, with data forms to plan and record options and setup decisions.

## 1.6 QUALITY ASSURANCE

- A. Installer Qualifications: An employer of workers trained and approved by manufacturer.
  1. Cable installer must have on staff a registered communication distribution designer certified by Building Industry Consulting Service International.
- B. Testing Agency Qualifications: An independent agency, with the experience and capability to conduct the testing indicated, that is a nationally recognized testing laboratory (NRTL) as defined by OSHA in 29 CFR 1910.7, and that is acceptable to authorities having jurisdiction.
- C. Source Limitations: Obtain controllers, and all software through one source from a single manufacturer.
- D. Electrical Components, Devices, and Accessories: Listed and labeled as defined in NFPA 70, Article 100, by a testing agency acceptable to authorities having jurisdiction, and marked for intended use.
- E. Comply with NFPA 70, "National Electrical Code."

## 1.7 DELIVERY, STORAGE, AND HANDLING

- A. Controllers:
  1. Store in temperature- and humidity-controlled environment in original manufacturer's sealed containers. Maintain ambient temperature between 50 and 85 deg F (10 and 30 deg C), and not more than 80 percent relative humidity, noncondensing.
  2. Open each container; verify contents against packing list, and file copy of packing list, complete with container identification for inclusion in operation and maintenance data.
  3. Mark packing list with designations that have been assigned to materials and equipment for recording in the system labeling schedules that are generated by cable and asset management system specified in Part 2.

## 1.8 BCPS APPROVED VENDORS

A. ARK Systems, Inc.  
Shari Coccia  
[scoccia@arksysinc.com](mailto:scoccia@arksysinc.com)  
410-997-0188 x107  
Alt. Email: [dpate@ARKSYSINC.com](mailto:dpate@ARKSYSINC.com)

B. ASG Security  
Jeff Stroh  
[jstroh@asgsecurity.com](mailto:jstroh@asgsecurity.com)  
301-623-3186  
Alt. Email: [pmcgloin@asgsecurity.com](mailto:pmcgloin@asgsecurity.com)

C. HP Secure, Inc.

Tod Connor

[tod.connor@hpsecure.net](mailto:tod.connor@hpsecure.net)

443-568-0180

Alt. Email: [rickc@hpelectronics.com](mailto:rckc@hpelectronics.com)

D. Kratos Public Safety & Security Solutions, Inc.

Tobe Henry

[Tobe.Henry@kratospss.com](mailto:Tobe.Henry@kratospss.com)

410-379-2748 ext. 1206

Alt. Email: [Tobe.Henry@kratos-hbe.com](mailto:Tobe.Henry@kratos-hbe.com)

## PART 2 - PRODUCTS

### 2.1 MANUFACTURERS

A. In other Part 2 articles where titles below introduce lists, the following requirements apply to product selection:

1. Manufacturers: Subject to compliance with requirements, provide products by one of the manufacturers specified.

### 2.2 CARD READERS

A. Manufacturer:

1. HID Global Corporation An ASSA ABLOY Group brand  
[www.hidglobal.com](http://www.hidglobal.com)

B. Manufactured Units:

1. Provide multi class Readers:
  - a. RP40

### 2.3 DOOR STRIKES – REQUEST-TO-EXIT

A. Manufacturer:

1. Bosch Security Systems, Inc. 130 Perinton Parkway Fairport, NY 14450 Tel:  
800-289-0096  
[www.boschsecurity.us](http://www.boschsecurity.us)

B. Manufactured Units:

1. Provide request-to-exist Detectors:
  - a. DS160 Series

### 2.4 DOOR STRIKES – ELECTRIC STRIKES

A. Manufacturer:

1. HES An ASSA ABLOY Group brand  
[www.hesinnovations.com](http://www.hesinnovations.com)

B. Manufactured Units:

1. Provide surface mounted electric strikes:
  - a. 8500 Series Genesis™ -Finish to match door frame.
  - b. 9500 Series

## 2.5 DISCONNECT CABLE (Mullion Installation)

- A. Manufacturer
  - 1. Ademco
- B. Manufactured Units
  - 1. Disconnecting Door Cord Model 69

## 2.6 MAGLOCK

- A. Manufacturer
  - 1. Securitron an ASSA ABLOY Company
- B. Manufactured Units:
  - 1. M62 Series Magnalock

## 2.7 ACCESS CONTROL CONTROLLER

- A. Manufacturer:
  - 1. Lenel International A part of UTC Climate, Controls, & Security A unit of United Technologies Corporation Tel: 585-248-9720  
www.lenel.com
- B. Manufactured Units:
  - 1. Provide access control controller
    - a. M3PPMSP – Secure Perfect M3000 PXNplus 2) 8RP Board
    - b. WIU 4 Reader Interface

## 2.8 CABLES

- A. Available Manufacturers:
  - 2. Belden Inc.; Electronics Division.
  - 3. Berk-Tek; a Nexans Company.
  - 4. General Cable Technologies Corporation.
  - 5. Mohawk/CDT; a division of Cable Design Technologies.
  - 6. West Penn Wire/CDT; a division of Cable Design Technologies.
- B. Plenum-Type, RS-232 Cable: Paired, 2 pairs, No. 22 AWG, stranded (7x30) tinned copper conductors, plastic insulation, and individual aluminum foil-polyester tape shielded pairs with 100 percent shield coverage; plastic jacket. Pairs are cabled on common axis with No. 24 AWG, stranded (7x32) tinned copper drain wire.
  - 1. NFPA 70, Type CMP.
  - 2. Flame Resistance: NFPA 262 Flame Test.
- C. RS-485 communications require 2 twisted pairs, with a distance limitation of 4000 feet (1220 m).
- D. Plenum-Type, RS-485 Cable: Paired, 2 pairs, No. 22 AWG, stranded (7x30) tinned copper conductors, fluorinated-ethylene-propylene insulation, unshielded, and fluorinated-ethylene-propylene jacket.
  - 1. NFPA 70, Type CMP.
  - 2. Flame Resistance: NFPA 262 Flame Test.
- E. Plenum-Type, Paired, Readers Cable: Paired, 3 pairs, No. 22 AWG, stranded (7x30) tinned copper conductors, plastic insulation, individual aluminum foil-polypropylene tape shielded pairs each

with No. 22 AWG, stranded tinned copper drain wire, 100 percent shield coverage, and fluorinated-ethylene-propylene jacket.

1. NFPA 70, Type CMP.
  2. Flame Resistance: NFPA 262 Flame Test.
- F. Plenum-Type, Paired Lock Cable: 1 pair, twisted, No. 16 AWG, stranded (19x29) tinned copper conductors, PVC insulation, unshielded, and PVC jacket.
1. NFPA 70, Type CMP.
  2. Flame Resistance: NFPA 262 Flame Test.
- G. Plenum-Type, Paired Input Cable: 1 pair, twisted, No. 22 AWG, stranded (7x30) tinned copper conductors, fluorinated-ethylene-propylene insulation, aluminum foil-polyester tape shield (foil side out), with No. 22 AWG drain wire, 100 percent shield coverage, and plastic jacket.
1. NFPA 70, Type CMP.
  2. Flame Resistance: NFPA 262 Flame Test.
- H. Plenum-Type, Paired AC Transformer Cable: 1 pair, twisted, No. 18 AWG, stranded (19x30) tinned copper conductors, fluorinated-ethylene-propylene insulation, unshielded, and plastic jacket.
1. NFPA 70, Type CMP.
  2. Flame Resistance: NFPA 262 Flame Test.
- I. LAN Cabling: Comply with Division 16 Section "Wires and Cables."
1. NFPA 262.

## 2.9 TRANSFORMERS

A. NFPA 70, Class II control transformers, NRTL listed. Transformers for security access-control system shall not be shared with any other system.

## 2.10 CABLE AND ASSET MANAGEMENT

A. Available Manufacturers:

2. IMAP Textron; Division of Greenlee Textron.
3. Total Wire Software Company, Inc.
4. Brady Corporation

B. Computer-based cable and asset management system, with fully integrated database and graphic capabilities, complying with requirements in TIA/EIA-606.

5. Document physical characteristics by recording the network, asset, user, TIA/EAI details, device configurations, and exact connections between equipment and cabling.
  - a. Manage the physical layer of security system.
  - b. List device configurations.

- c. List and display circuit connections.
  - d. Record firestopping data.
  - e. Record grounding and bonding connections and test data.
6. Information shall be presented in database view, schematic plans, or technical drawings.
  7. System shall interface with the following testing and recording devices:
    - a. Direct upload tests from circuit testing instrument into the PC.
    - b. Direct download circuit labeling into labeling printer.

C. Software shall be designed for Microsoft Windows of same version as security access system's workstations and shall be installed on the designated PC, using a hard drive dedicated only to this management function. Hard-drive capacity shall be not less than 50 GB.

### PART 3 - EXECUTION

#### 3.1 EXAMINATION

- A. Examine pathway elements intended for cables. Check raceways, cable trays, and other elements for compliance with space allocations, installation tolerances, hazards to cable installation, and other conditions affecting installation.
- B. 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.
- C. Proceed with installation only after unsatisfactory conditions have been corrected.

#### 3.2 PREPARATION

- A. Comply with recommendations in SIA CP-01.
- B. Comply with EIA/TIA-606, "Administration Standard for the Telecommunications Infrastructure of Commercial Buildings."
- C. Obtain detailed Project planning forms from manufacturer of access-control system; develop custom forms to suit Project. Coordinate with Owner's requirements. Fill in all data available from Project plans and specifications and publish as Project planning documents for review and approval.
  1. Record setup data for control station and workstations.
  2. For each Location, record setup of Controller features and access requirements.
  3. Propose start and stop times for time zones and holidays, and match up access levels for doors.
  4. Set up groups, facility codes, linking, and list inputs and outputs for each Controller.
  5. Assign action message names and compose messages.
  6. Set up alarms. Establish interlocks between alarms, intruder detection, and video surveillance features.
  7. Develop user-defined fields.
  8. Develop screen layout formats.



9. Complete system diagnostics and operation verification.
  10. Prepare a specific plan for system testing, startup, and demonstration.
  11. Develop acceptance test concept and, on approval, develop specifics of the test.
  12. Develop cable and asset management system details; input data from construction documents. Include system schematics.
- D. In meetings with Architect and Owner, present Project planning documents and review, adjust, and prepare final setup documents. Use final documents to set up system software.
- E. Verification of Conditions:
1. Visit Site to identify and become familiar with existing field conditions and specific requirements of each Site.
  2. Verify all dimensions in field and confirm condition of existing hardware to be utilized.
  3. Confirm space requirements and physical confines of all work areas to ensure that all materials can be installed in indicated spaces. Engineer and Owner in writing of any discrepancies or issues in Design described in Contract Documents.
  4. Examine conditions under which cabling and equipment and related components are to be and notify Engineer and Owner in writing of any conditions detrimental to proper and timely installation. Do not proceed with installation until unsatisfactory conditions have been corrected to ensure a safe and timely installation.
  5. When Installer confirms conditions as acceptable to ensure proper and timely installation and to ensure requirements for applicable warranty or guarantee can be satisfied, submit to Engineer and Owner written confirmation. Failure to submit written confirmation and subsequent installation will be assumed to indicate conditions are acceptable to Contractor.

### 3.3 CABLING

- A. Comply with NECA 1, "Good Workmanship in Electrical Contracting."
- B. Install cables and wiring according to requirements in Specifications.
- C. Wiring Method: Install wiring in raceway and cable tray except within consoles, cabinets, desks, and counters. Conceal raceway and wiring except in unfinished spaces.
- D. Install LAN cables using techniques, practices, and methods that are consistent with Category 6 rating of components and that ensure Category 6 performance of completed and linked signal paths, end to end.
- E. Install cables without damaging conductors, shield, or jacket.
- F. Boxes and enclosures containing security system components or cabling, and which are easily accessible to employees or to the public, shall be provided with a lock. Boxes above ceiling level in occupied areas of the building shall not be considered to be accessible. Junction boxes and small device enclosures below ceiling level and easily accessible to employees or the public shall be covered with a suitable cover plate and secured with tamperproof screws.

G. Install end-of-line resistors at the field device location and not at the Controller or panel location.

### 3.4 CABLE APPLICATION

A. Comply with EIA/TIA-569, "Commercial Building Standard for Telecommunications Pathways and Spaces."

B. Cable application requirements are minimum requirements and shall be exceeded if recommended or required by manufacturer of system hardware.

C. RS-232 Cabling: Install at a maximum distance of 50 feet (15 m).

D. RS-485 Cabling: Install at a maximum distance of 4000 feet (1220 m).

E. Card Readers:

1. Install number of conductor pairs recommended by manufacturer for the functions specified.
2. Unless manufacturer recommends larger conductors, install No. 22 AWG wire if maximum distance from Controller to the reader is 250 feet (75 m), and install No. 20 AWG wire if maximum distance is 500 feet (150 m).
3. For greater distances, install "extender" or "repeater" modules recommended by manufacturer of the Controller.
4. Install minimum No. 18 AWG shielded cable to readers and keypads that draw 50 mA or more.

F. Install minimum No. 16 AWG cable from Controller to electrically powered locks. Do not exceed 500 feet (150 m).

G. Install minimum No. 18 AWG ac power wire from transformer to Controller, with a maximum distance of 25 feet (8 m).

### 3.5 GROUNDING

A. Comply with Division 16 Section "Grounding."

B. Comply with IEEE 1100, "Power and Grounding Sensitive Electronic Equipment."

C. Ground cable shields, drain conductors, and equipment to eliminate shock hazard and to minimize ground loops, common-mode returns, noise pickup, cross talk, and other impairments.

D. Bond shields and drain conductors to ground at only one point in each circuit.

E. Signal Ground:

1. Terminal: Locate in each equipment room and wiring closet; isolate from power system and equipment grounding.
2. Bus: Mount on wall of main equipment room with standoff insulators.
3. Backbone Cable: Extend from signal ground bus to signal ground terminal in each equipment room and wiring closet.

### 3.6 INSTALLATION

- A. Provide and install all components necessary to install complete cabling and equipment systems, including (but is not limited to) patch cables, connectors, terminators, card swipes, catches, controllers, etc.
  - 1. Install the system and equipment in accordance with the equipment manufacturers recommended procedures.
    - a. WIU 4 Boards shall be installed in their own enclosure located above the ceiling near the door.
  - 2. Install system using generally acceptable industry practices for network appliances.
- B. Ensure system and network configuration is fully coordinated with the Owner's Department of Information Technology and Department of Physical Facilities, Office of Maintenance – Security.
- C. Ensure system and all related components are configured to support Owner's performance requirements.
- D. Install all exposed cabling in surface raceway by Wiremold, Hubbell, or Panduit where in-wall conduit has not been provided. Follow all manufacturers' guidelines requirements regarding bending radius and slack.
- E. Install all cable in accordance with National, state and local codes and TIA/EIA Standards, and BICSI methods.
  - 1. Follow manufacturer's guidelines and requirements for all cable termination.
- F. Properly terminate all cables at card swipes and controllers. Provide and install a diode to all strikes and mag-locks. Permanently identify all cables in pullboxes, transition points, and termination points by affixing pre-marked self-adhesive wraps similar to Brady "B-500+ Plastic Cloth Markers."
- G. Permanently identify all system components.
- H. Magnetic Locks (Maglocks) shall be tied into fire alarm system.

### 3.7 IDENTIFICATION

- A. In addition to requirements in this Article, comply with applicable requirements in Division 16 Section "Basic Electrical Materials and Methods" and with TIA/EIA-606.
- B. Using cable and asset management software specified in Part 2, develop Cable Administration Drawings for system identification, testing, and management. Use unique, alphanumeric designation for each cable, and label cable and jacks, connectors, and terminals to which it connects with same designation. Use logical and systematic designations for facility's architectural arrangement.
- C. Label each terminal strip and screw terminal in each cabinet, rack, or panel.
  - 1. All wiring conductors connected to terminal strips shall be individually numbered, and each cable or wiring group being extended from a panel or cabinet to a building-mounted device shall be identified with the name and number of the particular device as shown.
  - 2. Each wire connected to building-mounted devices is not required to be numbered at the device if the color of the wire is consistent with the associated wire connected and numbered within the panel or cabinet.
- D. At completion, cable and asset management software shall reflect as-built conditions.

### 3.8 SYSTEM SOFTWARE

- A. Owner will install databases for the complete and proper operation of systems involved.
- B. Programming:
  - Contractor to program card readers and controllers per manufacturer instructions.
  - Contractor to provide a checklist to Owner requesting information necessary to program card reader and controller units.
- C. System Update:
  - Owner will contract directly with Kratos Public Safety and Security (Kratos PS&SS) to integrate the new access control system into the Owner's existing multi-building system.
  - Provide necessary information to Owner so Kratos PS&SS can update programming.

### 3.9 FIELD QUALITY CONTROL

- A. Perform the following field tests and inspections and prepare test reports:
  - 1. LAN Cable Procedures: Inspect for physical damage and test each conductor signal path for continuity and shorts. Use Class 2, bidirectional, Category 5 tester. Test for faulty connectors, splices, and terminations. Test according to TIA/EIA-568-1, "Commercial Building Telecommunications Cabling Standards - Part 1 General Requirements." Link performance for UTP cables must comply with minimum criteria in TIA/EIA-568-B.
  - 2. Test each circuit and component of each system. Tests shall include, but are not limited to, measurements of power supply output under maximum load, signal loop resistance, and leakage to ground where applicable. System components with battery backup shall be operated on battery power for a period of not less than 10 percent of the calculated battery operating time. Provide special equipment and software if testing requires special or dedicated equipment.
  - 3. Operational Test: After installation of cables and connectors, demonstrate product capability and compliance with requirements. Test each signal path for end-to-end performance from each end of all pairs installed. Remove temporary connections when tests have been satisfactorily completed.
- B. Remove and replace malfunctioning devices and circuits and retest as specified above.

### 3.10 STARTUP SERVICE

- A. Engage a factory-authorized service representative to supervise and assist with startup service. Complete installation and startup checks according to approved procedures that were developed in "Preparation" Article and with manufacturer's written instructions.
- B. Testing: Ensure system operates to manufacturer's specifications.
  - 1. Upon completion of work, all parts of the installation shall be tested by the Contractor and demonstrated free of any defects. Preliminary testing will be permitted but shall not be accepted in lieu of obtaining final test results. Final test results shall be accomplished by the use of proper test equipment for the system being tested.
- C. Ensure system and all related components are configured to and comply with Owner's performance requirements.

- D. Training:
  - 1. None.
- E. Documentation: Provide manufacturer's hardware installation and software user guides for each level of authorized users.
  - 1. Provide 2 sets of printed guides.
  - 2. Provide set in PDF format on a DVD.

### 3.11 DEMONSTRATION

- A. Engage a factory-authorized service representative to train Owner's maintenance personnel to adjust, operate, and maintain security access system.
- B. Develop separate training modules for the following:
  - 1. Computer system administration personnel to manage and repair the LAN and databases and to update and maintain software.
  - 2. Operators who prepare and input credentials to man the control station and workstations and to enroll personnel.
  - 3. Security personnel.
  - 4. Hardware maintenance personnel.
  - 5. BCPS management.
- C. Upon completion and demonstration of the system, provide BCPS Safety and Security Department a typed list of all System Administrative Passwords, user ID's and Panel Locations

### 3.12 ACCEPTANCE

- A. Accurate as-built drawings shall be provided in electronic and hard copy format.
  - 1. 1 copy of electronic (CAD) drawings shall be distributed on DVD or memory stick to the Owner.
  - 2. 1 hard copy of CAD drawings shall be plotted on full size sheets and test results of every installed cable have been given to the Owner.
- B. Contractors work shall be considered complete after the following conditions have been met:
  - 1. Cable, Card Swipe, Catches, and Controller installation is complete and all cable runs have been tested and documented to be installed according to specifications and drawings.
  - 2. Representatives of the DoIT and Office of Maintenance – Security have successfully tested the “LIVE” system.
  - 3. All punch list items have been reconciled.
  - 4. All disturbed ceiling panels, covers, etc. have been properly reinstalled.
  - 5. All materials and trash have been removed from the site.

END OF SECTION

**SECTION 282300 – VIDEO SURVEILLANCE SYSTEM****PART 1 - GENERAL****1.1 REFERENCES, CODES AND STANDARDS**

- A. The codes, standards and publications are referenced in the text by the basic designation only. Unless indicated otherwise, the latest editions, at the time of bid proposal, shall be used.
- B. New construction and modification to existing construction shall comply with requirements of:
1. Comply with applicable requirements in Local, State and Federal Codes, TIA/EIA Standards, and BICSI methodology.
  2. Specified cabling system derived from recommendations in approved telecommunications industry codes, standards and methods, including the following documents: a. Articles 250, 725, 760, 770, 800,810 and 820 of the current National Electrical Code.
  3. ANSI/TIA/EIA-568-B.1: Commercial Building Telecommunications Cabling Standard Part 1 – General Requirements
  4. ANSI/TIA/EIA-568-B.2: Commercial Building Telecommunications Cabling Standard Part 2 – Balanced Twisted Pair Cabling Components and subsections.
  5. ANSI/TIA/EIA-568-B.3: Commercial Building Telecommunications Cabling Standard Part 3 – Optical Fiber Cabling Components
  6. ANSI/TIA/EIA-569-A: Commercial Building Standard for Telecommunications Pathways and Spaces
  7. ANSI/TIA/EIA-606: Administration Standard for Telecommunications Infrastructure of Commercial Buildings
  8. ANSI/TIA/EIA-607: Commercial Building Grounding and Bonding Requirements for Telecommunications
  9. ANSI/TIA/EIA-758: Customer-Owned Outside Plant Telecommunications Cabling Standard
  10. BICSI Telecommunications Distribution Methods Manual (TDMM), Tenth Edition
  11. National Fire Protection Agency (NFPA-70): National Electrical Code (NEC)
  12. Occupational Safety and Health Association (OSHA)
  13. National Life Safety Code (NFPA 101)
  14. National Electrical Code (NEC, NFPA 70)
  15. National Electrical Safety Code (NESC, IEEE C2)
  16. National Electrical Contractors Association (NECA) National Electrical Installation Standards (NEIS)

## 1.2 INTERIOR ELECTRICAL SYSTEMS

- A. Panelboards: Provide circuit breaker type to match existing panelboards. Directory cards shall identify load locations by room number or name.
- B. Wiring Methods: All wiring shall be installed in conduit, minimum size 3/4 inch except where larger sizes are recommended by equipment manufacturers or required for code compliance. Conduit shall be run concealed or above suspended ceilings in finished spaces and may be run exposed elsewhere. Provide a green color insulated equipment grounding conductor in all raceway with conductors.
- C. Conduit shall be rigid steel (zinc-coated; intermediate metal conduit, zinc-coated steel only; electrical metallic tubing (EMT); PVC Type EPC-40; flexible metal conduit; liquid-tight flexible steel conduit; as permitted by the National Electrical Code.
- D. Fittings: Cadmium or zinc coated for metal conduit, EMT and flexible metal conduit; threaded type (split couplings are unacceptable) for rigid metal conduit and IMC; and compression type for EMT.
- E. Conductors: all conductors shall be copper, manufactured within 12 months of date of delivery. Power and lighting conductors shall be 600 volt, type THWN/THHN or XHHW 90°C insulation. Provide color coding of underground conductors as follows:
- |           |          |          |
|-----------|----------|----------|
|           | 208Y/120 | 480Y/277 |
| Phase A - | black    | brown    |
| Phase B - | red      | orange   |
| Phase C - | blue     | yellow   |
- F. Receptacle Outlets shall be specification grade, heavy duty, grounding type. Provide NEMA configuration 5-20R duplex and quad receptacle outlets, special purpose outlets and connections per NFPA 70, as required by dedicated equipment, and as a minimum as follows (outlets noted are duplex) type unless noted otherwise).
1. CCTV power supplies and networking equipment.

## 1.3 VIDEO SURVEILLANCE SYSTEM

- A. Section Includes:
1. CCTV Cabling.
  2. CCTV Cameras.
  3. CCTV Recording Equipment.
  4. CCTV Hardware.
  5. CCTV Software.
  6. CCTV Accessories.
  7. All materials, terminations, equipment, labeling and associated cable performance testing.

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## 1.4 DEFINITIONS

- A. CCTV and video surveillance refer to the same system and are used interchangeably. Terms refer to cabling system included in this specification section.

## 1.5 SYSTEM DESCRIPTION

A. Design Requirements:

1. Provide labor, materials, equipment, services and operations required for complete installation of LAN compatible Category 6 copper horizontal (camera) wiring for the CCTV system and associated power wiring. All horizontal UTP wiring employs a star topology.
  - a. Category 6 UTP “Yellow” wiring terminates in Category 6 RJ-45 male connector jack at camera locations and on Category 6 rack-mounted patch panel dedicated for security cameras in telecommunications room. Connections wired per TIA/EIA-568A.
  - b. Power for interior fixed cameras shall be provided via Power Over Ethernet switches.
  - c. Power for interior PTZ cameras shall be provided via a multi camera power supply located in the nearest IDF/MDF.
  - d. Power for exterior cameras shall be provided shall be provided via a multi/individual camera power supply (as per manufacturer recommendation) located in the nearest IDF/MDF.
  - e. Power wiring shall be homerun from end device location to headend/LAN equipment location without breaks or splices.
  - f. Network cables routed from distribution racks throughout building as shown on T-Drawings.
    - 1) Refer to notes on each drawing to determine exact installation methods.
  - g. Note and record all cable lengths to the nearest foot.
  - h. Replace any UTP cable exceeding 90 meters (295 feet) and route to reduce length to a minimum of 90 meters. Complete all cable rerouting for compliance at no additional cost to Authority.
  - i. Identify to Design consultant prior to installation of any UTP cables that cannot be reduced to 90 meters or less in total length (rise and run).
  - j. Strictly adhere to most current version of TIA/EIA Telecommunications cabling standards.
  - k. Category 6 rated RJ-45 type connectors with all four copper pairs terminated and tested in accordance with EIA 568B wiring standard.
  - l. Permanently identify and label all cables and termination devices, at distribution rack in accordance with ANSI TIA/EIA-606 Standard or as agreed by Design consultant and Authority.
  - m. Remove and replace any cables failing to meet end-to-end testing requirements; do not abandon cable in place. All cable shall be terminated at both ends, unless noted in T-Drawings.
  - n. Installation of a fiber backbone between MDF and any utilized IDF rooms using 6 Strand 50 micron MM Fiber with sc connectors and a LIU 6 port patch panel.



2. Provide labor, materials and equipment for a complete electronics installation including all servers, cameras, software and hardwired components.
3. The system shall be fully operational prior to acceptance by the designer and owner.
4. Maintain existing CCTV system until new CCTV system is complete. Remove existing cameras, cabling and equipment in each phase of construction.

B. Performance Requirements:

1. The CCTV system shall use IP protocols to transmit signal information and images.
2. The CCTV system shall provide 24/7 recording capability on all cameras.
3. Cameras shall employ Video Motion Recording (VMR).
4. Cameras (fixed) shall be powered inline
5. Cameras (PTZ) shall be powered off power supplies.
6. Cameras shall be IP type cameras.
7. Cameras shall have varifocal lenses and auto iris.
8. Cameras shall have a selectable recording frame rate.
9. Cameras shall be enclosed within vandal proof enclosures/domes.
10. Network Video Recording equipment shall provide uninterrupted recording.
11. NVRs/Servers shall allow simultaneous recording and playback
12. The system shall be accessible onsite via the LAN and offsite via IP communications.
13. The system shall employ user access levels and password protections.
14. Onsite archiving and DVD/CD transfer

## 1.6 SUBMITTALS

- A. Comply with requirements of Division 0 and Division 1 - Submittals and as modified below.
- B. Product Data: Submit manufacturer's product literature, technical specifications and similar information for the following items demonstrating compliance with the specified requirements.
  1. Copper cable, patch cables and termination devices.
  2. Fiber.
  3. Power conductors.
  4. Power Supplies.
  5. Cameras.
  6. NVRs.
  7. Software.
  8. Inner duct and accessories.
  9. Wiring diagrams.
  10. Sample of each cable test report.

- C. Samples: Provide samples of assemblies and connections as described below, prior to installation, for approval by designer. 1. CCTV cables and connections – Submit samples of cables and terminations to be provided including following components and characteristics: a. Provide all components in colors selected by Design consultant.
- D. As-Builts:
1. Contractor shall supply as-built drawings in hardcopy and electronic CAD (2008 or newer) format that clearly shows:
    - a. Device locations.
    - b. Wiring runs.
    - c. Labeling schemes.
    - d. System interconnections.
- E. Quality Control Submittal:
1. Test Reports: Submit complete sample test data and reports with exact labels used on cables and patch panels.
  2. Certificates:
    - a. Manufacturer Certification: Submit certification from manufacturer of products to be installed under this contract certifying that Installer is authorized by manufacturer to install specified products.
    - b. Installer Experience Listing: Submit list of at least 5 completed projects as specified below in “Quality Assurance – Qualifications – Installer.”
- F. Contract Closeout Submittal: Comply with requirements of Division 1, including submission of operating and maintenance instructions as item in “Operation and Maintenance Data” manual described in that Section.
- G. O&M manuals:
1. Operation and Maintenance manuals must be provided by the contractor to the owner prior to job completion.
  2. O&M manuals shall be reviewed by the design consultant and owner for verification of the sequence of operations and troubleshooting instructions.
  3. All passwords and relevant codes shall be included with the O&M manuals.

## 1.7 WARRANTY

- A. Installer’s Warranty: Provide manufacturer’s system warranty against electrical or mechanical defects for 2 year from date of final acceptance.
- B. A fifteen year Extended Product Warranty and Systems Assurance Warranty for UTP camera wiring system shall be provided by the Manufacturer as follows:
1. Extended Product Warranty: The Extended Product Warranty shall ensure against product and workmanship defects, that all approved cabling components exceed the specifications of TIA/EIA 568B and Addenda for fiber link/channels and copper components, for a fifteen year period. The warranty shall apply to all passive components, including both cable and connecting hardware as a combined system. Any

claims cover replacement costs on any defective product, both material and labor. Extended warranties beyond fifteen years will be considered.

2. System Assurance: The System Assurance shall cover the failure of the wiring system to support the application which it was designed to support as well as additional application(s) introduced in the future by recognized standards or user forums that use the TIA/EIA 568B component and link/channel specifications for cabling, for a fifteen year period.
3. System Certification: Upon successful completion of the installation and subsequent inspection, the Authority shall be provided with a numbered certificate, from the manufacturing company, registering the installation.

C. Manufacturer warranty coverage for cable systems associated with the CCTV System.

D. Products shall be warranted for a 2 year period of time from the date of completion if not covered by the 15 year cable warranty.

#### 1.8 BCPS APPROVED VENDORS

A. ARK Systems, Inc.

Shari Coccia

[scoccia@arksysinc.com](mailto:scoccia@arksysinc.com)

410-997-0188 x107

Alt. Email: [dpate@ARКСYSINC.com](mailto:dpate@ARКСYSINC.com)

B. ASG Security

Jeff Stroh

[jstroh@asgsecurity.com](mailto:jstroh@asgsecurity.com)

301-623-3186

Alt. Email: [pmcgloin@asgsecurity.com](mailto:pmcgloin@asgsecurity.com)

C. HP Secure, Inc.

Tod Connor

[tod.connor@hpsecure.net](mailto:tod.connor@hpsecure.net)

443-568-0180

Alt. Email: [rickc@hpelectronics.com](mailto:rickc@hpelectronics.com)

D. Kratos Public Safety & Security Solutions, Inc.

Tobe Henry

[Tobe.Henry@kratospss.com](mailto:Tobe.Henry@kratospss.com)

410-379-2748 ext. 1206

Alt. Email: [Tobe.Henry@kratos-hbe.com](mailto:Tobe.Henry@kratos-hbe.com)

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**PART 2 PRODUCTS****2.1 MATERIALS****A. Copper Cabling Components for video surveillance systems:****1. UTP Camera Cabling:**

- a. Requirements: Complete balanced, twisted-pair compliant with current Category 6 provisions under TIA/EIA 568B Telecommunications Cabling Standard, including but not limited to:
  - 1) “Component compliant” components certified to meet all requirements of TIA/EIA-568-B.2 “Balanced Twisted Pair Cabling Components.”
  - 2) After assembly into completed cabling channel, all components meet performance requirements as specified in TIA/EIA-568-B.1 and B.2, meet cable manufacturer’s and outlet manufacturer’s performance requirements and are performance certified for Category 6 as a complete channel system.
  - 3) Shall meet specified physical and transmission characteristics requirements.
  - 4) Exceed minimum performance requirements of TIA/EIA-568-B. Cabling solutions not demonstrating performance greater than minimum requirements are not acceptable.
- b. Physical Characteristics:
  - 1) 100 Ohm Category 6 Unshielded Twisted Pair Cable (UTP)
  - 2) Meeting requirements of ANSI/ICEA S-80-576. For cables not specified in “Approved Components” paragraph, all 4 pairs insulated with F.E.P. providing maximum 0.023-inch diameter of insulated conductor.
  - 3) Cable shall be unique in color from voice and other data cabling. (see section 27 1500)
  - 4) Acceptable Cable:
    - a) Berk-Tek 10033817(PVC)-Cat 6.
    - b) Or Approved Equivalent.
  - 5) Consists of four 22 - 26 AWG twisted pairs.
  - 6) Cable shall be plenum rated.
  - 7) Color coding of pairs:
    - a) Pair 1.....W-BL; BL
    - b) Pair 2.....W-O; O
    - c) Pair 3.....W-G; G
    - d) Pair 4.....W-BR; BR
  - 8) Overall diameter not exceeding 0.250 inches for a single cable.
  - 9) Ultimate Breaking Strength (ASTM D 4565): 400 N minimum
  - 10) Withstands 1-inch bend radius at -20 degrees Celsius without jacket or insulation cracking.
- c. Third-party verified to meet TIA/EIA Category 6 requirements. All completed cabling channels fully backwards compatible with requirements of Category 5 and 5e cabling systems.
- d. Transmission Characteristics:
  - 1) DC resistance of any conductor not exceeding 9.38 Ohms per 100m max. at 20 degrees Celsius measured in accordance with ASTM D4566.
  - 2) Mutual capacitance of any pair at 1 kHz for 100 m. of cable not exceeding 5.6nF.

- 3) DC resistance unbalance between any two conductor of any pair not exceeding 5 percent when measured at or corrected to 20 degrees Celsius in accordance with ASTM D 4566.
  - 4) Capacitance unbalance to ground at 1 kHz of any pair not exceeding 330 pF per 100 m.
  - 5) Delay skew not exceeding 25 ns at 100 MHz.
  - 6) Propagation delay of any pair at 10 MHz not exceeding 5.7 ns/m.
  - 7) Maximum Attenuation of any pair not exceeding values given in TIA/EIA-568-B.2-1.
  - 8) NEXT coupling loss, PSNEXT loss, ELFEXT loss, PS-ELFEXT loss and Return Loss meeting requirements of TIA/EIA-568-B.2-1.
2. Fiber:
    - a. 6 Strand 50 micron MM Fiber with sc connectors.
    - b. Fiber shall be identical in performance to the fiber installed as part of section 27 1500.
    - c. LIU 6 Port Fiber Patch Panel shall be used in MDF and IDF rooms for fiber termination.
  3. Patch Panels for CCTV Cabling:
    - a. Shall meet requirements for category 6e performance requirements.
    - b. Panels shall contain the number of termination ports required to terminate all jacks in service area, plus 20% spare capacity.
    - c. Acceptable units:
      - 1) OR-PHD6E6U xx (24 or 48 cat 6e).
      - 2) Or approved equivalent.
  4. Patch Cables for CCTV Cabling:
    - a. Factory terminated and tested UTP patch cables at equipment cross-connect meeting requirements of ANSI/TIA/EIA-568-B for patch cable testing.
      - 1) Meet all requirements of ANSI/TIA/EIA-568-B.2 standard.
      - 2) Contact plating of minimum of 50 micro inches of gold in contact area over 50 micro inch of nickel, compliant with FCC part 68.5.
      - 3) Use 8-position connector, unkeyed.
      - 4) Modular connector maintaining paired construction of cable to facilitate minimum untwisting of wires.
      - 5) Factory assembled and constructed to 100 ohm, 4-pair UTP per ANSI/TIA/EIA-568-B for minimum, Category 6 compliance.
      - 6) Performance marking indelibly labeled on jacket by manufacturer.
      - 7) Accepts color-coded labels to comply with TIA/EIA-606 labeling requirements at both ends.
      - 8) Manufactured by ISO 9001 Company.
    - b. Patch cords shall be “yellow” in color and without boots.
    - c. Patch cord length shall be as follows: 1) LAN outlet, station end shall be 15 feet.
  5. Switching Equipment:
    - a. NS3702-24P-4S 24 Port 4 GigE SFP POE Stackable Managed Switch:
      - 1) Part number NS3702-24P-4S 24.
      - 2) No Substitutes.
    - b. Interlogix SFP 1000 BASE-SX Mini GBIC-2MM:

- 1) Part number S30-2MLC / S30-2MLC-2
  - 2) No Substitutes.
6. Power Supplies:
- a. Interlogix Individual Power Supply:
    - 1) Part Number Interlogix KTP-24.
    - 2) 2) No Substitutes.
  - b. Interlogix Multi Power Supply:
    - 1) Part Number Interlogix KTP-24—4- 400.
    - 2) No Substitutes.
7. CCTV Cameras:
- a. Interior Fixed Camera:
    - 1) TruVision 1.3MPX WDR IP Open STD, Progressive Scan CMOS Outdoor Vandal Dome, True Day/Night, 2.8-12mm Motorized
      - a) 1.3MPX.
      - b) UTP.
      - c) 2.8-12mm Motorized.
      - d) True Day/Night.
      - e) Smoked Dome.
      - f) Part Number TVD-3203.
      - g) POE.
  - b. Exterior Fixed Camera:
    - 1) TruVision 1.3MPX WDR IP Open STD, Progressive Scan CMOS Outdoor Vandal Dome, True Day/Night, 2.8-12mm Motorized
      - a) 1.3MPX.
      - b) UTP.
      - c) 2.8-12mm Motorized.
      - d) True Day/Night.
      - e) Clear Dome.
      - f) Part Number TVD-3203.
      - g) POE.
  - c. Exterior PTZ Camera:
    - 1) TruVision 1.3MPX PTZ, NTSC, Pan/Tilt/Zoom, CMOS, True D/N, DWDR, Motorized IR Cut Filter, H.264, ONVIF/PSIA, 20X Optical Zoom, SD Card Slot, PoE+/24VAC:
      - a) 1.3MPX.
      - b) DWDR.
      - c) Motorized IR Cut Filter H.264.
      - d) 20X Optical Zoom True Day/Night.
      - e) Smoked Dome.
      - f) POE.
      - g) Part Number: TVP-3101.
  - d. Fixed exterior bullet camera:
    - 1) TruVision 3.0 MPX WDR IP open STD, progressive scan, CMOS bullet, True D/N, 2.7-9mm motorized AI, IRLED, ONVIF/PSIA, NTSC frame rate, POE/12VDC.
      - a) 3MPX.
      - b) WDR.
      - c) IP66 rated vandal-resistant housing.

- d) POE.
  - e) Part number TVC-M3245E-2M-N.
- e. Exterior PTZ camera:
- 1) TruVision 2.0 MPX, NTSC, pan/tilt/zoom, CMOS, True D/N, DWDR, motorized IR cut filter, H2.64, ONVIF/PSIA, 20X optical zoom, SD card slot, POE +/-24VAC.
  - 2) Provide five cameras.
8. Mount Types:
- a. Ceiling Mount Kits - TVD-M2-WM.
  - b. Wall mount – TVD-CB5; TVD-SNB.
  - c. Wall Mount GEA-102.
  - d. Corner Mount - GEA-105.
  - e. Parapet Mount – GEA-104.
9. CCTV Software and applications:
- a. GE-NAV v5, or higher.
  - b. System must be license free style software.
10. Monitor:
- a. Provide 42-inch monitor Interlogix TVM-4200.
  - b. Monitor mounted with box, Technologies Model 1507M3780.
  - c. HDMI extender VX-HDMI-7P-100M.
11. Power Wiring:
- a. Power wiring shall be approved by the CCTV manufacturer for use with the CCTV system.
  - b. 14/2 AWG copper cable.
  - c. Power source to be located at the closest network closet (IDF / MDF).
12. UPS Equipment:
- a. APC Smart-UPS 750VA LCD 120V unit shall be provided at each rack to power NVRs, POE switches and camera power supplies. Existing UPC units shall be replaced and removed by installer and disposed of in accordance of local regulations.
  - b. Provide quantity for each device to have a dedicated connection.
13. NETWORK VIDEO RECORDER
- a. Provide one (1) Interlogix TruVision TVN-2132-P-16T network video recorder .

## 2.2 SECURITY CAMERA SCHEDULE

A. Provide Security Camera per drawings and as listed in schedule below:

CAMERA NUMBER	LOCATION	CAMERA TYPE	EXTERIOR	INTERIOR	SHEET
1	MAIN ENTRY	FIXED	X		T-1.1C
2	VESTIBULE C10	FIXED		X	T-1.1C
3	EXTERIOR	PTZ	X		T-1.1C
4	EXTERIOR	PTZ	X		T-1.1B
5	A101	FIXED		X	T-1.1C
6	CORRIDOR A14	FIXED		X	T-1.1C
7	CAFETERIA B128	FIXED		X	T-1.1B
8	CORRIDOR B12	FIXED		X	T-1.1B
9	STAIR ST3	FIXED		X	T-1.1B
10	CORRIDOR	FIXED		X	T-1.1C
11	EXTERIOR	PTZ	X		T-1.1C
12	EXTERIOR	PTZ	X		T-1.1A
13	EXTERIOR	PTZ	X		T-1.1A
14	EXTERIOR	PTZ	X		T-1.1B
15	CORRIDOR C12	FIXED		X	T-1.1C
16	EXTERIOR	PTZ	X		T-1.1C



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**PART 3 EXECUTION****3.1 INSTALLATION**

A. Contractor must collaborate with BCPS Security, IT and/or the current vendor for programming, testing and commissioning in the central station for all security systems.

B. Provide and install all components necessary to install complete CCTV cabling and equipment systems, including (but is not limited to) connectors, patch cables, terminators, cameras, servers, etc.

14. Cable runs shall be continuous and unbroken from end to end. Splicing of any LAN, Fiber or coaxial video distribution cable is prohibited.
15. Secure all horizontal cables within ceiling cavities to building structure.
16. Loosely bundle all cables and support from structure at unequal intervals from 5 to 6 feet with spring steel fasteners and cable clip rated for use with high performance cables where cable tray or other support structure has not been provided as indicated on Drawings. All mounting clips shall be seismic type as per BOCA.
17. Do not violate manufacturer's recommended loadings. Leave 30% capacity for future use of pathway.
18. Verify all horizontal cable run lengths prior to installation. Re-distribute horizontal cabling to maintain distance requirements and maintain pathway route accessibility.
19. Do not support cables from ceiling grid T-Bars, grid wire supports or bridle rings. Do not allow cables to touch ceiling grid.
20. Install cables in EMT in all unfinished, exposed areas as shown in Design consultant and Architectural roof plans and/or T-Drawings, unless alternate pathways are noted.
21. Do not secure cables with permanent cable ties. Do not tighten cable bundles in such a way as to cause jacket deformation or damage.
22. Provide a minimum of 16' of cable slack at camera location and 24 inches at patch panels, unless noted otherwise.
23. Place cables in compliance with TIA/EIA-568.B standards and BICSI recommended methods.
24. Tight 90-degree bends are unacceptable, and use of plastic "cinch-type" tie-wraps are not permitted, in order to prevent damage to cable jacket and compromise the cable's electrical or optical characteristics.
25. Cable bundles shall be neatly routed with a service loop to provide 10 feet of slack at the cross-connect end and as noted in the T-drawings. Cable bundles shall be secured using only black Velcro cable wraps.

C. Determine allowable cable proximity to other electrical power sources of 480 Volts or less using TIA/EIA-569A "Cabling Pathway Standard" for UTP cable separations from sources of EMI:

26. Minimum separation distance form Power Source at 480 V or less:

CONDITION < 2kVA 2-5 Kva > 5 kVA

- a. Unshielded power lines or electrical 6 in. 12 in. 24 in. equipment in proximity to open or non-metal pathways

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- b. Unshielded power lines or electrical 3 in. 6 in. 12 in. equipment in proximity to open or non-metal pathways
  - c. Power lines enclosed in a grounded 3 in. 6 in. 12 in. metal conduit (or equivalent shielding) in proximity to grounded metal conduit pathway
  - d. Transformers & Elec. Motors 40 in. 40 in. 40 in.
  - e. Fluorescent Lighting 12 in. 12 in. 12 in.
- D. Install all exposed cabling in surface raceway by Wiremold, Hubbell or Panduit where in-wall conduit has not been provided. Follow all manufacturers' guidelines requirements regarding bending radius and slack. All bends, offsets and fittings shall be appropriately sized to provide 30% capacity after installation.
- E. Install all cable in accordance with National, state and local codes and TIA/EIA Standards, and BICSI methods.
- 1. Follow manufacturer's guidelines and requirements for all cable termination.
- F. Properly terminate all cables at camera locations and distribution racks. Permanently identify all cables in pullboxes, transition points, and termination points by affixing pre-marked self-adhesive wraps similar to Brady "B-500+ Plastic Cloth Markers."
- G. Permanently identify all system components following TIA/EIA-606A "Administration Standard for Commercial Telecommunications Infrastructure" with identification format:
- 1. Identification: Provide permanent identification labels for patch panels, access panels and entrance facilities.
- 3.2 TESTING
- H. CCTV, LAN, Video Cabling System, and Electronics:
- 1. CCTV Field of View must be verified onsite and with the properly installed lens. Any camera view that is blocked, blurry, unclear or unusable for its intended purpose shall be corrected and reinstalled using the proper lens and camera.
  - 2. Upon completion of work, all parts of the CCTV installation shall be tested by the CCTV Contractor and demonstrated free of any defects. Preliminary testing will be permitted but shall not be accepted in lieu of obtaining final test results. Final test results shall be accomplished by the use of proper test equipment for the system being tested.
  - 3. Re-terminate and re-test any cables or pairs of cables failing end-to-end testing requirements. Replace any faulty cables/pairs or termination devices. Remove all defective cables completely from pathways.
  - 4. Accurate as-built drawings shall be provided in electronic and hard copy format.
    - a. 3 copies of electronic (CAD) drawings shall be distributed on appropriate media: 1 to construction management, 1 to designers and 1 to the school.
    - b. 3 hard copies of CAD drawings shall be plotted on full size sheets and test results of every installed cable have been given to the construction management for appropriate distribution.

### 3.3 ACCEPTANCE

- I. Contractors work shall be considered complete after the following conditions have been met:
  - 1. Cable, Cameras and Electronics installation is complete and all cable runs have been tested and documented to be installed according to specifications and drawings.
  - 2. A school technology representative has successfully tested the “LIVE” system.
  - 3. All punch list items have been reconciled.
  - 4. All disturbed ceiling panels, covers, etc. have been properly reinstalled.
  - 5. All materials and trash have been removed from the site.
  - 6. A 2-Year Installers warranty has been given to a school district Security or Technology representative.
- J. Testing: Provide tests and inspection of electrical systems. Tests shall include: insulation resistance of wiring, ground resistance of grounding systems; load test of generator; automatic transfer switch operation; IDS system operation; CCTV system operation; and operational tests of all electrical equipment. Tests shall include those recommended by the equipment manufacturer and those required by applicable codes and NEMA and ANSI standards. Equipment shall not be placed in service until testing has been completed and test results have been evaluated.

### 3.4 INSTALLATION

- A. Comply with requirements of Division 26.
- B. Outdoor installation: Conform to ANSI C2, National Electrical Safety Code.
- C. Install wiring in raceways except as otherwise indicated.
- B. Wiring in enclosures: Bundle, lace, and train the conductors to terminal points with no excess. Provide and use lacing bars and distribution spools.
- C. Pulling Cable: Do not exceed manufacturers recommended pulling tensions. Do not install bruised, kinked, scored, deformed, or abraded cable. Do not splice cable between indicated termination, tap, or junction points. Remove and discard cable where damaged during installation and replace it with new cable.
- D. Grounding: As recommended by manufacturers except as otherwise indicated.
- E. Installer’s RCDD shall supervise each final connection to equipment.
- F. Install cameras in the locations indicated, adjusted to final locations defined by camera location tests. Provide adequate headroom below cameras and their mountings. Where necessary, change the type of mounting to provide adequate headroom.
- G. Pan and tilt units: Set stops to suit final position and mounting and field required to be viewed by the camera.
- H. Install central power supply, and other auxiliary components in equipment rack.

- I. Install remote viewing software on security officer's desktop computer and on principal's desktop computer.
- J. Install all software, listed in Part 2, on Video Network Server.

### 3.5 IDENTIFICATION

- A. Identify system components, wiring, cabling, and terminals according to Division 26.

### 3.6 FIELD QUALITY CONTROL

- A. Manufacturer's field services: Provide services of factory-authorized service representatives to supervise the field assembly and connection of components and system pretesting, testing, and adjustment. Installer's RCDD personnel shall supervise cabling and network integration.
- B. Inspection: Verify that units and controls are properly labeled and interconnecting wires and terminals are identified.
- C. Pretesting: Align and adjust the system and pretest all components, wiring, and functions to verify they conform to specified requirements. Replace malfunctioning or damaged items with new items. Retest until satisfactory performance and conditions are achieved.
- D. Final acceptance testing schedule: Schedule tests after pretesting has been successfully completed and system has been in normal functional operation for at least 2 weeks. Provide a minimum of 10 days notice of acceptance test performance schedule.
- E. Operational acceptance tests: Perform operational system tests to verify conformance to specifications. Include all modes of system operation. Methodically test for proper system operation in each functional mode.
- F. Record results of tests.
- G. Retest: Correct deficiencies identified by tests and observations and retest until specified requirements are met.

### 3.7 ADJUSTMENT

- A. Occupancy adjustments: When requested, during the correction period required by the General Conditions and Division 26, provide on-site assistance in adjusting the system to suit actual occupied conditions. Provide visits for this purpose without additional cost.

### 3.8 CLEANING

- A. Clean system components including camera housing windows and lenses. Use methods and materials recommended by manufacturer.

### 3.9 OPERATING INSTRUCTIONS

- A. As specified in Division 26, provide operating instructions.

- B. Arrange and pay for the services of a factory-authorized service representative to demonstrate adjustment, operation, and maintenance of the system and to train Owner's personnel. Include demonstration of methods to determine optimum settings for system controls.
- C. Conduct a minimum of 6 hours of training for the system specified in this section. Schedule training and adjustment with at least 7 days advanced notice.
- D. Upon completion and demonstration of the system, provide BCPS Safety and Security Department a typed list of all camera locations including assigned IP addresses, Server ID and Administrative Passwords.

**END OF SECTION**