SECTION 28 5000

SECURITY SURVEILLANCE SYSTEM

PART 1 - GENERAL

1.1 RELATED DOCUMENTS:

A. Contract drawings and general provisions of the Contract, including General and Supplementary Conditions apply to this Section and shall be considered a part of this section and shall have the same force as if specified herein full.

1.2 DESCRIPTION:

A. This project includes the demolition of existing analog cameras and all associated cable. Then the supply and installation of a new Avigilon IP / Network Based Video Surveillance System with integration into the existing Avigilon Access Control System. Reference contract drawings and specifications for specific requirements.

B. The School's Principal must review and sign off on all the new camera views. Also, The Museum School must sign the Acceptance Letter as well as receive training on the new Avigilon IP Video Surveillance System.

C. The Security Contractor shall provide and install all Avigilon VMS workstations, including all computer hardware, software, licensing, displays, mounting hardware, UPS Units, data drops, un-switched and dedicated 120VAC circuits / duplex outlets, as noted on the Construction Drawings.

D. The requirements of the IP Based Security Surveillance Systems shall include all raceway, cabling, devices, software and hardware required to provide a fully functional system.

E. The Security Contractor shall provide and install a dedicated, standalone local area network (LAN) for the IP Based Security Surveillance System. The Security Contractor shall be responsible for all network connectivity, including all CAT 6 cable, all fiber optic cable, terminations, PoE network switches, patch panels, patch cords, UPS Units, equipment racks and cabinets unless otherwise noted on the Construction Drawings. Provide all labor, install, check out, adjust, and calibrate the total system.

F. The Security Contractor shall provide and install the network video recorders / (NVR's) servers (including all software and hardware) with internal storage as specified and rack mounted UPS Unit sized to provide a minimum of 30 minutes of run time upon failure of 120VAC power.

G. The Museum School desires to take advantage of the new multi-sensor camera technology. This project includes the deployment of 9 megapixel / 3 sensor, 12 megapixel / 4 sensor cameras and 12 megapixel 360 degree / fisheye cameras. The Security Contractor shall be responsible for adjusting and focusing all image

sensors at each camera location, to the OWNER'S SATISFACTION as well as all programming required to ensure that all cameras are providing the desired views.

H. The Museum School desires to take advantage of the alarm call up capabilities of the Avigilon VMS and ACS. The Security Contractor shall coordinate with The Museum School Staff Members to determine which cameras are programmed for call up. Then provide the necessary programming in the existing Avigilon ACS software as well as in the new Avigilon VMS software, utilizing both standard motion detection well as signals from door position switches, to provide camera call-up.

I. The Museum Schools desires to take advantage of the Avigilon Mobile Application and will provide mobile devices as well as internet connectivity. The Security Contractor shall provide and install CAT 6 jumpers (or CAT 6 cable with connectors) as well as programming and all onsite support necessary to ensure the proper operation of the Avigilon Mobile Application with the Video Surveillance System and the existing Avigilon Access Control System.

J. The Security Contractor shall be responsible for providing ON-SITE MANUFACTURER'S SUPPORT to assist with the installation of the Video Surveillance Systems if the OWNER determines that the Security Contractor is unable to properly program, start-up or commission the Video Surveillance Systems properly and on schedule. The Security Contractor shall bear all cost related to the ON-SITE Manufacturer's support.

K. The requirements of the IP Based Security Surveillance Systems shall include all application and database management software for the VMS Server, Storage and Clients.

L. The requirements of the IP Based Security Surveillance Systems shall include all power supplies, all PoE Extenders, proper sizing of power conductors, connection to existing electrical panels for power circuits, breakers, conduit, copper conductors and duplex outlets for power circuits, step-down transformers and as necessary for a complete and fully operational systems.

M. The requirements of the IP Based Security Surveillance Systems include the following programming.

1. During normal operation, the IP Based Security Surveillance System shall be programmed to record all cameras continuously at a frame rate of 1 frame per second for 45 days and at a minimum of HD resolution with storage calculated on 40% motion. Retention shall be established based on "FIRST IN – FIRST OUT" functionality.
    a. When motion is detected at any single camera or at multiple cameras, the IP Based Security Surveillance System shall be programmed to record the single camera or all cameras (with motion in the field of view), at 15 frames per second and at the full resolution of the camera(s) during the event.
    b. Alarm mode recording is not required for this application so no programming will be necessary for this function.

N. This division of the Specifications covers the complete IP Based Security Surveillance system as indicated on the Drawings and specified herein. The Security Contractor shall provide all labor, materials, equipment, and supervision

to install the specified system. The installation of all equipment and raceways shall be the full responsibility of the Security Contractor for this project.

O. At the Museum School, the Security Contractor shall supply and install one (1) complete Avigilon VMS Dell 3050 Micro Form Factor PC workstation with dual monitor outputs for the Administration Office. This Avigilon workstation shall include one (1) 32" display monitor with wall mount, all computer software and hardware, wireless keyboard / mouse and UPS Unit as well as all associated licensing. The wall mount shall incorporate mounting locations for small form factor PC and UPS Unit. The workstations shall be connected to the dedicated security surveillance system network. The Security Contractor shall be responsible for supply and installation of the network drop (all CAT 6 cable, back box, faceplate, jack and terminations) and 120VAC / 20AMP (un-switched / dedicated) power circuit with duplex outlets as well as programming commissioning and coordination of the exact location of wall mounted monitor with The Museum School.

P. At the Museum School, the Security Contractor shall supply and install one (1) complete Avigilon VMS Dell 3050 Micro Form Factor PC workstation with dual monitor outputs for the Facilities Management Office. This Avigilon workstation shall include one (1) 32" display monitor with wall mount, all computer software and hardware, wireless keyboard / mouse and UPS Unit as well as all associated licensing. The wall mount shall incorporate mounting locations for small form factor PC and UPS Unit. The workstations shall be connected to the dedicated security surveillance system network. The Security Contractor shall be responsible for supply and installation of the network drop (all CAT 6 cable, back box, faceplate, jack and terminations) and 120VAC / 20AMP (un-switched / dedicated) power circuit with duplex outlets as well as programming commissioning and coordination of the exact location of wall mounted monitor with The Museum School.

Q. As part of the scope of this contract, the Security Contractor shall install and configure client monitoring software on up to two (2) Owner provided work stations. The location of the other workstations is to be determined by the Museum School.

R. A minimum of one (1) CD with client monitoring software and one (1) Operating Instruction Manual (for the software) must be provided with each Client Workstation software application that is loaded onto Owner Provided computer hardware. Additional copies of client monitoring software with loading and operating instructions on CD must be available upon Owner's request at no charge for the duration of the warranty period

S. The Security Contractor shall be responsible for setting up user names, passwords and user privileges for the IP Video Surveillance Systems. Coordination shall be required with The Museum School IT Support and Security.

T. The Security Contractor shall be responsible for coordinating any network requirements with the Museum School's IT Support Group. The Security Contractor shall contact the Museum School's - Technical Support a minimum of one (1) week prior to attempting to install any software, connecting any equipment to the existing Museum School network or attempting to install any equipment in the existing IT Equipment Racks. The Security Contractor is completely responsible for all coordination with the Museum School's IT Support and

Facilities Management Departments in order to complete the installation.

U. All conflicts between the drawings and specifications shall be brought to the attention of the owner as soon as possible. In general, the most stringent requirements shall take precedence over conflicting requirements noted on the drawings or specifications. If the Security Contractor neglects to bring conflicts to the attention of the Design Team prior to the acceptance of the Security Contractor's Notice to Proceed, the Security Contractor shall accept full responsibility for all cost associated with meeting the most stringent requirements or ensuring the complete satisfaction of The Museum School.

1.3 QUALITY ASSURANCE:

A. Industry Referenced Standards. The following specifications and standards are incorporated into and become a part of this Specification by reference.

1. NFPA 70 National Electric Code
2. UL 50 Enclosures for Electrical Equipment
3. UL 1590
4. FCC Part 15, Class B
5. ICEA S-83-596 ICEA Standard for Fiber Optic Premises Distribution Cabling – Current Edition
6. IEEE802.3at PoE
7. IEEE802.3af PoE
8. EN 60950-1
9. EN 55022 Class B (Emissions)
10. EN 55024 (Immunity), VCCI

1.4 INSTALLER'S QUALIFICATIONS:

A. Firm with at least 5 years of successful application, installation, and testing experience on specified systems and equipment. All supervisors and installers assigned to the installation of this system or any of its components shall have factory certification from each equipment manufacturer that they are qualified to install and test the provided products. General electric trade staff shall not be used for the installation of the Video Surveillance System and associated hardware. All installers assigned to the installation of this system or any of its components shall have a minimum of 3 years experience in the installation of the specified equipment.

B. Security Contractor must be a Certified Installer of the manufacturer of the Video Management System (VMS) software. Certification must be provided, in the form of a letter from the VMS Manufacturer or training certificate indicating that the Security Contractor (not an employee) is a Certified Installer.

C. The Security Contractor must be licensed in the State of Georgia as a Low Voltage Telecommunications (LV-T) or Low Voltage Unlimited (LV-U) class certification.

D. The responsibilities of the Security Contractor shall include but not be limited to the following:

1. Shop drawings on all IP Based Security Surveillance Systems and equipment.
2. Installation of all new IP Based Security Surveillance Systems and equipment as documented in the drawings and specifications.
3. Set up and programming in the existing ACS and the new VMS of all motion detection and recording parameters for all cameras (as defined by these specifications).
4. Coordination with The Museum School to establish at list of common camera names. Then programming of all camera names into all Video Surveillance System displays.
5. Wire and wiring termination for the IP Based Security Surveillance System and equipment.
6. Testing and check-out of the IP Based Security Surveillance System and equipment.
7. Training for the IP Based Security Surveillance System and equipment.
8. Warranty for the IP Based Security Surveillance System and equipment with the exception of OWNER PROVIDED items.
9. As-Built drawings, operations and maintenance for the complete IP Based Security Surveillance System.

1.5 SUBMITTALS:

A. The Security Contractor shall provide shop drawings on company title block with device locations, one line diagrams, large scales of rooms where equipment will be located and equipment rack configurations.

B. Product Data: Submit manufacturer's technical product data, including specifications and installation instructions, for each type of system equipment. Include drawings which contain complete wiring and schematic diagrams and other details required to demonstrate that the system has been coordinated and will function properly as a system. Drawings shall include floor plan layouts showing device locations, vertical riser diagrams, equipment rack details, elevation drawings of equipment racks, sizes and type of all cables and conduits.

C. It is the responsibility of the Security Contractor to meet with the appropriate Museum School representative to compare the placement and installation of proper devices with the drawings and specifications. A 100% device-by-device test will be conducted by the vendor under the supervision of a Museum School representative. Punch lists will be developed at that time by the owner representative and furnished to the Security Contractor. All punch list items must be corrected and verified prior to acceptance of the system.

D. Written documentation, in the form of a Letter from the Manufacturer or Certificate must be provided with Submittal Package demonstrating that the Security Contractor is a <u>certified</u> and <u>authorized</u> Dealer and Installer of the approved Video Management System.

1.6 DRAWINGS:

A. The Drawings indicate the arrangement of security and IP Based Security Surveillance equipment. Coordinate installation of equipment with the structural, mechanical and electrical equipment and access thereto.

B. Raceway home runs as shown on the security and IP Based Security Surveillance System shall be installed as shown on the Drawings, and as required by the

associated equipment manufacturers.

C. AutoCAD drawings (floor plans only) in electronic DWG format shall be provided to the Security Contractor for the production of shop drawings and As-built drawings. The Security Contractor is totally responsible for the conversion, if necessary, of the electronic files to whatever in house CAD program the Security Contractor utilizes for the production of the as-built drawings.

1.7 FINAL CLOSEOUT DOCUMENTS:

A. Original content, taken directly from the Contract Drawings, shall be rejected. As-built drawings must show true as-built conditions and must be prepared using the Security Contractors title block, symbols and notes explaining specific details of the installation.

B. The following are minimum requirements for close out documents. Final payment shall not be issued until all requirements have been met.

1. Prior to project closeout, provide two (2) sets of complete data on equipment used for the school in this project. This data shall be in bound form and shall include 11 x 17 as built drawings for the school.
2. All as built drawings shall include system interconnection diagrams with major components identified and number and type of interconnecting conductors. Drawings must show actual as built conditions and point-to-point diagrams for the school.
3. Two (2) full size sets of as built drawings shall be provided in hard copy format for the school.
4. As built drawings shall be provided on CD and in electronic format (PDF and AutoCAD - DWG) for the school.
5. Operating and Maintenance (O & M) Manuals shall be provided to the school and Owner's Representative (total of 2 copies)
6. Certificate or Letter of Acceptance from Principal of the school.
7. Training Sign-In Sheets for each training session for the school.
8. Document and provide two (2) copies of network configuration (such as a list of IP addresses and the devices the addresses belong to, line diagram demonstrating network topology, etc.) for the school.
9. Laminated QUICK START INSTRUCTIONS for the Video Surveillance System Workstation at each school that provide simple directions for:
    a. Logging into the system and viewing live video images at the workstation
    b. Logging into the system, searching and reviewing recorded video images at the workstation
    c. Copying recorded events onto CD, DVD, USB Storage Devices and External Hard drives.

C. Completed (meaning open items have been cleared) Construction Observation Report generated by Consulting A/E and signed by Principals or Facility Manager and Security Contractor.

D. Security Contractor Warranty Form / Letter providing detailed description of warranty provisions, duration and start date for the school.

E. All related documents required for substantial completion, system acceptance and final payments.

1.8 ACCEPTABLE MANUFACTURERS:

A. Reference products section of specifications for acceptable manufacturers.

1.9 WARRANTY:

A. The Security Contractor shall warrant the IP Based Security Surveillance System for one year from date of start-up against defects in equipment or workmanship. Failed equipment shall be replaced by the Security Contractor at no cost to the owner. Owner's personnel may perform initial trouble investigation but replacement of failed equipment and escalated problem support will be handled by the Security Contractor.

B. The one year warranty shall include Software Maintenance Agreements for all display workstation operating system software, all VMS application software, all VMS database software, all VMS device driver software and any other software required for proper operation of the IP Based Security Surveillance System.

C. The one year warranty shall include Hardware Maintenance Agreements for all displays and workstations driving the displays required for proper operation of the IP Based Security Surveillance System

D. The Security Contractor shall provide a Warranty Letter indicating the start date of the warranty for each school. The Warranty Letter shall also provide contact information (Company name, Service Supervisor's name and phone numbers for normal working hours and Emergency Service request). The warranty period will not start until Warranty Letter has been reviewed, approved and agreed upon by the Museum School. Also, the Warranty Letter shall provide a brief description of the items covered under the warranty.

E. Owner shall also receive a 20-year manufacturer's warranty as well as a 20-year, 250 MHz transmission warranty on the CAT 6 cable.

PART 2 - PRODUCTS

2.1 MATERIALS:

A. Materials or equipment specified by manufacturer's name shall be provided, unless approval of other manufacturers is listed in addendum to these Specifications. Any materials or equipment approved in addendum shall function the same as the equipment specified.

2.2 SECURITY SURVEILLANCE CAMERAS:

A. The Museum School has recently installed the Avigilon Access Control System (ACS) and desires to have the ACS fully integrated with the Video Management System (VMS). Avigilon has been chosen by The Museum School and is the only approved camera and VMS manufacturer for this project. Substitutions will not be allowed.

B. The Security Contractor shall be required to be a Certified Installer of Avigilon cameras or a Certified Business Partner with Avigilon.

C. All cameras shall be U.L. listed and shall be the standard product of one manufacturer complying with not less than the specifications contained herein. Installation of each camera shall include mounting brackets and/or camera housings fully compatible with the camera provided and as required by IP Based Security Surveillance System camera schedule.

D. All camera installations shall be securely attached to the mounting surface. Use lead shields on solid masonry, toggle bolts for hollow masonry, and machine bolts for steel. All anchoring devices shall be rated to support not less than five times the total equipment weight. All anchor bolts must be a minimum of 2 ½" inches in length. Reference mounting details in contract documents.

E. The Security Contractor shall program all Pan / Tilt / Zoom camera locations with a home position that will be determined by the Museum School / Department of Safety and Security. Pan / Tilt Zoom camera locations shall be programmed to revert back to the "HOME POSITION" after 15 minutes of no USER activity.

F. Bullet Style, Wide Dynamic Range, 5 Megapixel Cameras:

1. The camera shall be the Avigilon 5.0L-H4A-BO1-IR (or BO2-IR) vandal resistant camera with analytics.
2. All cameras, in this category, shall be equipped with variable focal 3 – 9 mm or 9 – 22 lenses. The proper lens must be selected to provide the desired view.
3. All cameras in this category shall provide an option for built-in IR light sources. IR must be provided if called for by the Camera Schedule.
4. The camera shall be equipped with built-in infrared light source and incorporate the Avigilon Light Catcher Technology.
5. It shall be the Security Contractor's responsibility to ensure that the latest version of firmware, that is compatible with the Video Management System, is downloaded to all cameras prior to Final Inspection.
6. Reference the Camera Schedule in the Construction Drawing set for exact model number and lensing requirements.

G. Bullet Style, Wide Dynamic Range, 3 Megapixel Cameras:

1. The camera shall be the Avigilon 3.0C-H4A-BO1-IR (or BO2-IR) vandal resistant camera with analytics.
2. All cameras, in this category, shall be equipped with variable focal 3 – 9 mm or 9 – 22 lenses. The proper lens must be selected to provide the desired view.
3. All cameras in this category shall provide an option for built-in IR light sources. IR must be provided if called for by the Camera Schedule.
4. The camera shall be equipped with built-in infrared light source and incorporate the Avigilon Light Catcher Technology.
5. It shall be the Security Contractor's responsibility to ensure that the latest version of firmware, that is compatible with the Video Management System, is downloaded to all cameras prior to Final Inspection.
6. Reference the Camera Schedule in the Construction Drawing set for exact model number and lensing requirements.

H. Indoor Fixed Surface or Pedant Mounted Dome, 1Megapixel Cameras w/ Analytics:

1. The camera shall be the Avigilon 1.0C-H4A series dome style camera with analytics.
2. All cameras, in this category, shall be equipped with variable focal 3 – 9 mm lens.
3. It shall be the Security Contractor's responsibility to ensure that the latest version of firmware, that is compatible with the Video Management System, is downloaded to all cameras prior to Final Inspection.
4. Reference the Camera Schedule in the Construction Drawing set for exact model number and mounting requirements.

I. Indoor Fixed Surface or Pedant Mounted Dome, Wide Dynamic Range, 2 and 3 Megapixel Cameras:

1. The camera shall be the Avigilon 2.0C-H4A or 3.0C-H4A series vandal resistant dome style camera with analytics.
2. All cameras, in this category, shall be equipped with variable focal 3 – 9 mm lens.
3. All cameras in this category shall provide an option for built-in IR light sources. IR must be provided if called for by the Camera Schedule.
4. It shall be the Security Contractor's responsibility to ensure that the latest version of firmware, that is compatible with the Video Management System, is downloaded to all cameras prior to Final Inspection.
5. Reference the Camera Schedule in the Construction Drawing set for exact model number and mounting requirements.

J. Indoor Fixed Ceiling mounted Dome, Wide Dynamic Range, 2 and 3 Megapixel Cameras:

1. The camera shall be the Avigilon 2.0C-H4A-DC1-IR or 3.0C-H4A-DC1-IR vandal resistant dome style camera with analytics.
2. All cameras, in this category, shall be equipped with variable focal 3 – 9 mm lens.
3. All cameras in this category shall provide an option for built-in IR light sources. IR must be provided if called for by the Camera Schedule.
4. It shall be the Security Contractor's responsibility to ensure that the latest version of firmware, that is compatible with the Video Management System, is downloaded to all cameras prior to Final Inspection.
5. Reference the Camera Schedule in the Construction Drawing set for exact model number.

K. Indoor Fixed Dome, Wide Dynamic Range, 5 Megapixel Cameras:

1. The camera shall be the Avigilon 5.0L-H4A-D1 vandal resistant dome style camera with analytics.
2. All cameras, in this category, shall be equipped with variable focal 4.3 – 8 mm or 9 – 22 lenses. The proper lens must be selected to provide the desired view.
3. It shall be the Security Contractor's responsibility to ensure that the latest version of firmware, that is compatible with the Video Management System, is downloaded to all cameras prior to Final Inspection.

L. Indoor Fixed Dome, Multi-Sensor, 9 Megapixel Cameras (analytics not offered at this time):

1. The camera shall be the Avigilon 9W-H3-3MH-DC1 dome style camera.

2. In this category, cameras shall be equipped with multiple imagers or sensor. Each imager or sensor shall provide a 3 megapixel image.
3. In this category, cameras shall be equipped with multiple imagers or sensor. Each imager or sensor must be equipped with a variable focal 2.8 – 8 mm lens.
4. It shall be the Security Contractor's responsibility to ensure that the latest version of firmware, that is compatible with the Video Management System, is downloaded to all cameras prior to Final Inspection.

M. Indoor Fixed Dome, Multi-Sensor, 12 Megapixel Cameras (analytics not offered at this time):

1. The camera shall be the Avigilon 12W-H3-4MH-DC1 dome style camera.
2. In this category, cameras shall be equipped with multiple imagers or sensor. Each imager or sensor shall provide a 3 megapixel image.
3. In this category, cameras shall be equipped with multiple imagers or sensor. Each imager or sensor must be equipped with a variable focal 2.8 – 8 mm lens.
4. It shall be the Security Contractor's responsibility to ensure that the latest version of firmware, that is compatible with the Video Management System, is downloaded to all cameras prior to Final Inspection.

N. Indoor Fixed Dome, 360 Degree Panoramic, 12 Megapixel Cameras (analytics not offered at this time):

1. The camera shall be the Avigilon 12.0L-H4F-DO1-IR dome style camera.
2. In this category, cameras shall be equipped with a single imager with a fisheye lens capable of producing a panoramic view that shall be de-warped by the Avigilon VMS.
3. The camera shall be provided as a ceiling mounted, pendant mounted camera or wall mounted pendant camera based on the mounting requirement stated on the Camera Schedule.
4. It shall be the Security Contractor's responsibility to ensure that the latest version of firmware, that is compatible with the Video Management System, is downloaded to all cameras prior to Final Inspection.

O. Indoor / Outdoor Pan-Tilt-Zoom Cameras:

1. The camera shall be the Avigilon 2.0W-H4PTZ-DP30 dome style P/T/Z camera with analytics.
2. When utilized outdoors, the camera shall be equipped with heater and blower.
3. All cameras in the category shall be available with corner mounting, pole mounting and indoor / outdoor pendant mounted hardware based on requirements stated in the Camera Schedule
4. All cameras, in this category, shall be equipped with motorized zoom lenses and provide 30 X optical zoom.
5. It shall be the Security Contractor's responsibility to coordinate the exact mounting height, prior to system acceptance and Final Inspection, with Fulton County School Representatives so that the camera is not subject to vandalism and the camera's view is not obstructed.
6. It shall be the Security Contractor's responsibility to ensure that the latest version of firmware, that is compatible with the Video Management System, is downloaded to all cameras prior to Final Inspection.

P. All interior fixed, dome style cameras, installed in lay-in tile ceilings shall be supported by T-bar Support Kits or factory provided "wings' incorporated into the camera housing.

Q. All interior pan / tilt/ zoom, flush mounted dome style cameras installed in lay-in tile ceilings, shall be supported by straps secure to the structure above accessible ceiling.

2.3 FLAT PANEL SECURITY SURVEILLANCE COLOR MONITORS:

A. Monitors shall be 32” and shall be rated for 24/7 continuous operation.

B. Monitors shall be the standard products of one manufacturer and compatible with the total system specified, herein, and complying with these specifications. Monitors shall be UL Listed, CSA Certified, and GS approved.

C. Monitors shall be mounted as indicated in contract documents. The Contractor to coordinate flat panel mounting requirements with General Contractor. The constructor to ensure that wall surface will accommodate display weight and installation requirements.

D. Flat Panel Display Specifications of equipment shall include:

1. Video
    a. Screen Size: Diagonal length of TV screen 32” class or larger
    b. Native Resolution: 1920 X 1080 Progressive Scan
    c. Contrast Ratio: 4000:1
    d. Backlight Type: LED Edge-lit
    e. Aspect Ratio: 16:9
    f. Refresh Rate: 60Hz
2. Connectors:
    a. Inputs: HDMI,PC input(D-sub), PC input Audio(Mini-Jack) RF Input
    b. Control: Accepts RS-232C control.

E. Electrical Specifications:

1. Supply Voltage: 120 VAC, 60 Hz (108 VAC to 132 VAC).
2. Power: 120 watts, nominal, with current requirements not to exceed 1.5 amps.

F. Acceptable manufacturers shall include NEC, Samsung or Panasonic.

1. Accessories shall include:
    a. Flat Panel Wall Mount (Medium): wall mount type, low profile mount for Flat Panel up to 175ibs. And in the size range from 32”-46” diagonal. Capable of 8 degrees of downward tilt. Wall must provide mounting locations for small form factor PC and UPS Unit.

2.4 VIDEO MANAGEMENT SYSTEM (VMS):

A. General

1. The Video Management System (VMS) approved for this project is Avigilon. No other VMS shall be considered and no substitutions will be allowed.
2. The Security Contractor shall provide the most recent version of Avigilon VMS software.

3. The NVR and video channel licensing shall be provided as follows:
    a. The Museum School shall be provided with one (1) HD-NVR3-PRM-84TB-NA. The NVR must be provided with two (2) 10 GbE SFP+ Ports with transceivers for each port and WS2012R2 rack mounts. The NVR shall be licensed for a total of fifty two (52) video channel licenses. The Security Contractor shall provide the licenses in the following bundles:
    b. Two (2) bundles of twenty-four (24)
    c. One (1) bundle of four (4) for future expansion

B. Configuration/Administration User Interface (UI)

1. The Configuration UI shall allow the administrator or users with appropriate privileges to change video configuration.
2. The Configuration UI shall provide the ability to change video quality, bandwidth and frame rate parameters on a per camera (stream) basis for both live and recorded video.
3. The Configuration UI shall provide the ability to configure brightness, contrast and hue settings for each camera on the same DVS.
4. The Configuration UI shall provide the capability to enable audio recording on DVS units that support audio
5. The Configuration UI shall provide the ability to change audio parameters, serial port and I/O configuration of individual DVS units
6. The Configuration UI shall provide the capability to rename all DVS units based on system topology and add descriptive information to each DVS
7. The Configuration UI shall provide the ability to set recording schedules and modes for each individual camera. The recording mode can be:
    a. Continuous
    b. On motion and Manual
    c. Manual only
    d. Disabled
8. The Configuration UI shall support the creation of schedules to which any of the following functional aspects can be attached:
    a. Video quality (for each video stream per camera)
    b. Recording (for each camera)
    c. Motion detection (for each detection zone per camera)
    d. Brightness, Contrast, Hue (for each camera)
    e. Camera sequence execution
9. The Configuration UI shall support creation of unlimited recording schedules and assign any camera to any schedules.
10. The Configuration UI shall detect and warn user of any conflict within assigned schedules
11. The Configuration UI shall provide the capability to set a pan-tilt-zoom protocol to a specific DVS serial port and allow mixing domes of various manufacturers within a system.
12. User shall have the ability to configure a return to home function after a predefined time of inactivity for PTZ cameras. The inactivity time is configurable from 1 to 7200 seconds.
13. The Configuration UI shall provide and include maps with active camera ICONS.

C. Archiving

1. The Archiver (role) shall use an event and timestamp database for advanced search of audio/video archives. This database shall be a Microsoft SQL 2005 or Microsoft SQL 2008.

2. The Archiver shall protect archived audio/video files and the system database against network access and non-administrative user access.

D. Video Streaming

1. The Media Router Role shall be responsible for routing video and audio streams across local and wide area networks from the source (e.g. DVS) to the destination (e.g. CSA).
2. The Media Router Role shall support multiple transport protocols such as unicast TCP, unicast UDP, and multicast UDP.
3. The Media Router shall support IGMP (Internet Group Management Protocol) to establish multicast group memberships.
    a. IGMP v3 including SSM (Source-Specific Multicast) shall be supported.

E. Client Software Applications

1. The Client Software Applications (CSA) shall provide the user interface for configuration and monitoring over any network, accessible locally or from a remote connection.
2. The CSA shall consist of the Configuration UI for system configuration and the Surveillance UI for monitoring. The CSA shall be Windows based and provide an easy-to-use graphical user interface (UI).
3. The Server Administrator shall be used to configure the server database(s). It shall be web-based and accessible locally on the SSM or across the network.
4. The CSA shall seamlessly merge access control, license plate recognition (LPR), and video functionalities within the same user application.
5. All applications shall provide an authentication mechanism, which verifies the validity of the user. As such, the administrator (who has all rights and privileges) can define specific access rights and privileges for each user in the system.
6. Logging on to a CSA shall be done either through locally stored user accounts and passwords or using the operators Windows credentials when Active Directory integration is enabled.
7. When integrated with Microsoft's Active Directory, the CSA shall authenticate users using their Windows credentials. As such, the USP will benefit from Active Directory password authentication and strong security features.
8. The CSA shall support multiple languages, including but not limited to the following: English, French, Arabic, Dutch, German, Italian, Japanese, Korean, Persian (Farsi), Simplified Chinese, and Spanish.

F. Hardware and Software Requirements

1. The server software module (SSM) shall be compatible with both 32-bit and 64-bit operating systems including Windows Vista, Windows XP, Windows 7, Windows Server 2003, and Windows Server 2008.
2. The client modules shall run on Windows XP or Windows Vista or Windows 7.
3. The core client/server software shall be built in its entirety using the Microsoft .NET software framework and C-Sharp programming language.
4. The USP database server(s) shall be built on Microsoft's SQL Server 2005, SQL Server 2008, including SQL Server 2005/2008 Express Editions. All versions and packages of the USP can run on SQL 2005/2008 Express editions. The LPR-specific services and applications shall only support SQL Server 2008.
5. The USP shall use the latest user interface (UI) development and programming technologies such as Microsoft WPF (Windows Presentation Foundation), the XAML markup language, Direct3D, and .NET software framework.

2.5 CORE NETWORK SWITCHES

A. All CORE Network Switches shall be Stackable, Managed switches capable of providing 10/100/1000 ethernet connection on all ports with at least two (2) dedicated Small Form-factor Pluggable (SFP) transceiver ports dedicated to Stacking and capable of 10Gbps connectivity.

B. Acceptable models are the Cisco Catalyst3850 series, Netgear GS7 series, or HP Aruba 2930F series..

C. All remote PoE Network Switches shall be produced by the same manufacturer and shall be managed from a single Graphic User Interface (GUI).

D. The PoE Network Switch shall be capable of providing 802.3af POE power (15.4 Watts) simultaneously to each port.

E. Minimum number of RJ-45 Ethernet ports shall be 24. See Contract drawings to verify the approximate quantity of RJ 45 Ethernet ports required at each location. It shall be the Contractors responsibility to determine the exact number of Ethernet ports required. Note that spare ports are required for future expansion.

F. Additional PoE power must be provided and installed by the Security Contractor for any cameras (interior or exterior) that have power requirements exceeding PoE IEEE802.3af standards or at exterior camera locations that incorporate heaters, blowers and P/T/Z function.

2.6 HARDENED POE NETWORK SWITCHES

A. All Hardened network switches shall be manufactured for Industrial-grade applications with an IP-30 rated enclosure and protected against electromagnetic and radio frequency interference.

B. Hardened switches shall be Managed switches capable of providing 10/100/1000 ethernet connection on all ports with at least two (2) dedicated Small Form-factor Pluggable (SFP) transceiver uplink ports capable of 1Gbps connectivity.

C. POE network switch shall be capable of providing 802.3af POE power (15.4 Watts) simultaneously to each port.

D. Minimum number of RJ-45 ports shall be 8. See Contract drawings to verify the approximate quantity of RJ 45 Ethernet ports required at each location. It shall be the Contractors responsibility to determine the exact number of Ethernet ports required. Note that spare ports are required for future expansion.

E. Acceptable models shall be Cisco 1000 series, IFS NS3500 series, or approved equal.

2.7 SMALL FORM-FACTOR PLUGGABLE (SFP) TRANSCEIVERS

A. All SFP modules shall be cisco compatible manufactured to meet or exceed OEM

specifications and MSA industry standards.

B. SFP modules shall be hot-swappable, transparent devices capable of providing 1000BASE-T connectivity. Contractor shall be responsible for providing SFP modules compatible with the specified cable and connector type.

2.8 PoE EXTENDERS / INSERTERS

A. Minimum configuration shall be:

1. 10/100/1000 pass through rate
2. Each device / port shall meet EEPoE standards
3. Each port extends data and PoE connections 200 meters

B. PoE Inserters must be installed in wall mounted, lockable, metal enclosures with ventilation. The preference is for the PoE Inserters and the associated enclosures to be mounted in the MDF Room or the closest IDF Room.

C. Acceptable manufacturers shall be PowerDsine or Veracity. NO SUBSTITUTIONS ALLOWED.

2.9 KVM EXTENDER (KEYBOARD, VIDEO & MOUSE)

A. Minimum requirements shall be:

1. Supports low and high speed USB
2. Uses Data Industry Standard CAT-6 cable
3. Operates USB peripherals up to 330 feet (100m) from computer
4. Supports DVI resolutions up to 1920 x 1200 or 1080p at 330 feet(100m)
5. Unit shall be wall mountable

B. Preferred manufacturers shall be Gefen. Substitutions shall be allowed with prior approval.

2.10 MASTER NTP CLOCK SERVER

A. The Museum School does not have a unified NTP Server. The Security Contractor must provide and install a standalone GPS-based Master NTP clock.

B. All Video Surveillance Servers, Storage Servers and cameras shall be synchronized with the Master NTP time server.

C. Acceptable manufacturers shall be Veracity TIMENET. NO SUBSTITUTIONS ALLOWED.

2.11 APPLICATION AND STORAGE SERVERS

A. The Security Contractor shall provide the required Avigilon network video server and network storage with the necessary expansion.

1. The Security Contractor shall provide the Avigilon HD – NVR3 Premium Series Network Video Recorder Server and shall be responsible for sizing the server according to the

number of cameras to be installed as well as future camera locations as noted by the Camera Schedule incorporated in the Construction Drawings.

2. The Security Contractor shall be responsible for calculating and providing an adequate amount of network storage so that all cameras are recorded at a frame rate of 1 frame per second for 45 days and at HD resolution. Retention shall be established based on "FIRST IN – FIRST OUT" functionality. The IP Based Security Surveillance System shall be programmed to record, when activity is detected in the camera's field of view, at 15 frames per second and at the full resolution of the camera(s) viewing the event. All activity detection recording shall be archived for 45 days.

2.12 WORK STATIONS

A. The following are the minimum requirements for the Avigilon workstations in the Principal's and in the School Police Officer's Office:

1. The minimum configuration for all workstations shall be Dell (desk-top) OptiPlex 3050 Micro Form Factor PC with Intel Core i5-7500T Processor (Quad Core, 6MB, 4T.2, 7GHz w/ internal Graphics), 8GB RAM 2400MHz DDR4, 500GB Hard drive 2.5 inch ATA (7,200 RPM), Windows 10 – 64 bit, HDMI, Display Port and serial outputs, separate wireless keyboard and optical mouse, Dell Support and Hardware Warranty.

2. Acceptable model shall be the Dell (desk-top) OptiPlex 3050 Micro Form Factor.

2.13 COPPER AND FIBER WIRING REQUIREMENTS

A. Cable All cable provided and installed for the IP Video Surveillance system shall be the color PINK.

B. Horizontal Cable – Balanced twisted-pair also referred to as unshielded twisted-pair (UTP)

1. 23 AWG/4 pair – UTP
2. Cable must be manufactured by CommScope or Siemon.
3. Jacket color – Pink
4. Category 6
5. CMP or CMR flammability rating as determined by local codes
6. Cable must be factory certified to 400 MHz minimum and include test report which meets or exceeds the performance specifications set for CommScope 7504 UltraMedia Category 6 cable
7. The manufacturers channel warranty shall support a 4-connector channel that covers all category 6 balanced twisted-pair applications approved by the Institute of Electronic and Electrical Engineers (IEEE), The ATM Forum, the American National Standards Institute (ANSI) and the International Organization of Standardization (ISO) that specify compatibility with the cabling referenced herein. Examples of applications that are covered by the vendor warranty include Gigabit Ethernet (IEEE 802.3ab) and 155 Mb/s ATM.
8. Meet North American Standards – ANSI/TIA/EIA-568-B.2-1 and all applicable addenda.

C. Fiber backbone – main distribution frame (MDF) to horizontal and or intermediate distribution frame (IDF)

1. Minimum – 12 fibers between distribution frames – adhere to manufacturer's installation procedures. All 12 fibers must be terminated.

2. Star configuration
3. Fiber cable must be manufactured by CommScope
4. Routed through Trade size 1 innerduct. CommScope Fiber Guard interlocking armored fiber cable may be used instead of innerduct.
5. Below grade runs must use indoor/outdoor rated or outdoor rated water blocking fiber cable.
6. 50/125 μm LOMMF – OM3 laser certified multimode fiber
7. Transmission performance – Fiber cable must be DMD (Differential Mode Delay) tested and meet or exceed the performance specifications set for CommScope LaserCore 300™ Type 5L multimode fiber:
8. Cables must meet OFNR or OFNP determined by local code.

Optical Characteristics	**850 nm**	**1300 nm**
Maximum attenuation	3.0 dB/km	1.0 dB/km
Bandwidth OFL	1500 MHz *km	500 MHz *km
Bandwidth Laser	2000 MHz*km	500 MHz*km
Guaranteed 10 Gigabit	300 m	

D. Cable Supports – 3 options

1. Wire basket cable tray above ceiling – trapeze style supported with threaded rod and associated hardware
2. Without wire basket using threaded rod and J-Hooks
3. Gridwire and J-Hooks
    a. J-Hooks placed every 4-5 feet. Follow manufacturer's guidelines.
    b. Number of cables per J-Hook is based upon J-Hook size. Follow manufacturer's guidelines.
    c. Support method must not exceed support or cable manufacturers required weight and or cable quantity limits.

E. Surface mount raceway for horizontal (station) cables

1. Size of surface mount raceway shall depend on number of cables.
2. Surface mount raceway to be secured neatly to all surfaces – cut to length.
3. Must be installed per the manufacturer's recommendations.

F. Fire Stopping

1. Where data cables penetrate fire rated walls, floors and ceilings fireproof the opening. Provide conduit sleeves for cables that penetrate fire rated walls. After the cabling installation is complete install fire proofing material in and around all conduit sleeves and openings. Install fireproofing material thoroughly and neatly. Seal all floor, wall and ceiling penetrations. When installing in existing installations all breached fire stopped openings must be returned to original condition.

G. Grounding, Bonding

1. Attach a #6 bare, solid ground wire from a local ground bar to each equipment rack/cabinet/tray using appropriate ground lugs.
2. Contractor to conform to NEC, EIA, ANSI, ASTM, UL, BICSI, and local regulations.

H. UTP Cabling Installation

1. All data cabling shall be installed per ANSI/BICSI/NECA-568, ANSI/TIA/EIA 568-B.1, ANSI/TIA/EIS-568-B.2, ANSI/TIA/EIA-568-B.2-1, ANSI/TIA/EIA-568-B.3 and local building codes.
2. Leave 1.5 m to 3 m (5-10 ft) of service loops near both workstation and data rack. Service loops are to be coiled neatly at both ends. Caution: coils should be made in large loops and preferably in figure eights to avoid transmission performance issues.
3. Do not exceed a total cable length of 90 meters of any data UTP cable from outlet to patch panel termination. Overall channel link – (cable and 2 patch cables) not to exceed 328 feet.
4. Do not lay data cables on top of light fixtures, ceiling tiles, mechanical equipment or ductwork. Maintain at least 0.6 m (2ft) clearance from all shielded apparatus. All cables must be supported using approved method from Section 3.
5. All classrooms, offices, teacher work areas, the Media Center, and any other space that may accommodate a computer shall be wired for the network. All network drops must provide two (2) network data connections. Each classroom must be equipped with two drops for the students and one drop for the teacher (a total of six connections in each classroom). For computer labs and other multi-drop areas include a data connection for each network device (computer, printer, etc.). Placement of network drops in these areas shall be determined by the room layout, computer furniture and other factors. Submit floor plans for mark-up at the appropriate phase in design.
6. Network drops to support ceiling mounted wireless access point devices shall be terminated with an 8 contact modular plug, Siemon part number P-8-8, on the work area end and be coiled with a 20 foot service loop. The service loop shall be supported above the ceiling by wire tie to a J hook or other structural support.

J. Category 6 Connectivity

1. Patch Panels
    a. 48-port RJ45 modular to 110 with (6) or (8) ports
    b. Wired 568B
    c. Standard or high density – 19” wide
    d. Rack or wall mount
    e. Designation strips – front and rear
    f. All Patch Panels and hardware must be manufactured by the Siemon Company.
2. RJ45 modular jacks 8P8C
    a. Wired 568B
    b. 45° exit
    c. Dual Siemon CT jacks only
    d. 110 type termination
    e. All jacks must be manufactured by the Siemon Company.

K. 50/125 Multimode fiber connectivity
1. Connectors
    a. SC Simplex only – composite or ceramic ferrule
2. Fiber patch panels
    a. Rack and wall mount
    b. 12 fiber adapter panels (SC Connectors only)
    c. Splice trays if needed
    d. All fiber patch panels and adapters must be manufactured by the Siemon Company.

L. Patch cables – Category 6
1. Copper

a. Color-coded – (PINK)
b. 4-pair – 24 AWG Stranded – PVC
c. Snag less Boot
d. LengtMS – not to exceed 6 m (20 ft)
e. Every cord must be 100 % factory performance tested with a network analyzer and test reports must be included with every shipment.

2. Fiber Multimode
   a. Duplex
   b. Terminated with appropriate connector (to mate with fiber panels)

M. Racks and Cabinets

1. Racks – universal self supporting
   a. 7 feet tall – 19" mounting space (23" if needed)
   b. Bolt racks securely to floor

N. Wire management

1. Horizontal – single or double space
   a. 19" or 23" rack mount
   b. Wire managers to be mounted between patch panels
   c. Ladder-rack from top of racks – secured to back wall in MDF and IDF's
2. Vertical
   a. Between racks – single or double-sided

O. Labeling

1. Furnish and install all labels throughout the entire system. Labels should be attached securely so that they shall not peel off. All labels shall be machine generated or as approved.
2. Labels should indicate telecommunications room and port number: Example IDF2-A12 would be IDF room number 2, patch panel "A", port number 12.
3. Label the following: faceplates, cable at each outlet (within 200 mm (8 in) of the termination, cable at the rear of patch panels (within 200 mm (8 in) of the termination, front of patch panel for each termination, all voice MDF and IDF blocks.
4. Wireless access point drops shall be labeled as indicated in 13.b and 13.c of this document. Since wireless access point drops do not have faceplates attach the labels with plenum rated wire-ties or other methods suitable for plenum spaces.
5. Submit proposed labeling scheme to the Museum School for approval prior to installation

2.14 SURFACE MOUNT BOXES "BISCUIT":

A. Items specified in the section are to be provided and installed by the Security Contractor.

B. Surface mount boxes shall house two jacks.

C. Bases shall be installed with two screws to building structure.

D. Boxes shall be compatible with connectivity.

E. Blanks shall be provided for each unused port.

2.15 UNINTERRUPTIBLE POWER SUPPLY (UPS):

A. All UPS Units must be sized adequately to support the complete load of the VIDEO SURVEILLANCE SYSTEM equipment and to provide battery backup for a minimum of 15 minutes.

B. Uninterruptible power supply (UPS) Units shall be provided and installed by the Security Contractor for all active Video Surveillance System equipment including:

1. Wall or rack mounted video monitors in Administrative and Facilities Management Offices where viewing monitors might be installed.
2. All locations where Video Surveillance System viewing and archiving workstations are installed.
3. All locations where Video Surveillance System servers and archiving equipment / hardware is installed.
4. All locations where Video Surveillance System network switches, routers, fiber optic receivers and transmitters are installed.
5. VIDEO SURVEILLANCE SYSTEM head end equipment in the VIDEO SURVEILLANCE SYSTEM Equipment Rack must be powered by UPS.

C. The UPS Units provided and installed by the Security Contractor and shall have the following minimum features:

1. Audible Alarms
2. Automatic Self Test
3. Automatic Voltage Regulation (AVR)
4. Building wiring fault indicator
5. Lightning and Surge Protection
6. Network-grade line conditioning
7. Overload Indicator
8. Replace Battery Indicator
9. Status Indicator LED's
10. UPS shall have the ability to handle crest factor ratios of 2.5 or above.
11. UPS shall provide continuous (no-break power) during momentary or complete blackouts.
12. UPS shall have the ability to recharge the battery to 90 percent capacity within a reasonable period of time (5 to 10 times the discharge time).
13. The UPS output shall be regulated with maximum deviations from nominal of +6 percent to –13 percent over the full input range, both AC and DC.
14. UPS shall meet ANSI C84.1 requirements.

D. UPS batteries shall be valve regulated (sealed or maintenance free) lead-acid cell type. Batteries shall be installed within the UPS enclosure or in a standard enclosure provided for that purpose by the UPS manufacturer.

E. Security Contractor to furnish calculations with shop drawings verifying UPS sizing in compliance with these specifications.

2.16 TRANSIENT VOLTAGE SURGE SUPPRESSION (TVSS):

A. All equipment must be protected against surges induced on all control, video, and

power cables.

B. At all exterior camera locations, copper cables and conductors which serve as 120V power, control, or video conductors shall have surge protection circuits installed at each end (at device locations and where connections are made to network equipment). Fuses shall not be used for surge protection.

C. Surge suppression devices shall meet the following standards/publications:

1. UL 497B
2. UL 1449 (must meet 330 Volt suppression rating)
3. IEEE Category B impulse and ring wave tests

D. Acceptable Manufacturers: Northern Technologies, Inc., EDCO. Product shall be warranted against defect for a period of not less than five (5) years.

E. All power connections, including 24 VDC and 24 VAC power supplies and direct wired or plug-in 120 VAC power connections, for all systems and components specified herein, shall be equipped with surge suppression devices. Devices shall be bonded to building grounding system in accordance with Article 250 of the National Electric Code.

F. Grounding: Provide a dedicated, separate No. 6 AWG copper conductor from building grounding system to the security equipment room, security equipment cabinets, and central control room. Connect all lightning protection devices and security equipment non-current carrying metal parts to grounding conductor in accordance with Article 250 of the National Electric Code. Provide ground bus bar in equipment room and control room with dedicated ground conductor to each cabinet, enclosure, pull/junction box and all equipment.

G. Ground Resistance Measurement: Each signal ground system D.C. resistance shall be measured between any point on the signal ground bus and the earth ground. An instrument designed specifically to measure the resistance of a point to each earth ground shall be used. The systems subcontractor shall measure ground resistance in accordance with the procedure as outlined by the test equipment manufacturer. Instrument shall be Biddle earth resistance test instrument, or approved equal.

2.17 VIDEO EQUIPMENT CABINETS:

A. In the event that there are not existing equipment racks or cabinets, the Security Contractor shall be required to provide and install free standing Data Racks or Video Equipment Cabinets as noted on the drawings.

B. Free standing, full height (74” or higher) equipment cabinets that are provided and installed by the Security Contractor must meet the following requirements:

1. Ventilation fans (minimum of two) shall be provided and installed at the top of the equipment cabinet.
2. Solid side panels shall be provided and installed in the Equipment Cabinet.
3. If cabinets are free standing, casters that are rated for the total weight of the completely loaded cabinet must be provided and installed on the Equipment Cabinet base.

4. A wire mesh, hinged, lockable front door must be provided and installed back door shall be solid and lockable.
5. Horizontal and vertical wire management must be provided and installed on inside and on the backside of the Equipment Cabinet.
6. No cables will be allowed to enter the cabinet without being properly supported by wire management.
7. The Equipment Cabinet must be deep enough to incorporate all equipment and terminations. No equipment or terminations will be allowed to extend out of the back side of the cabinet.
8. Power strips, power supplies and other miscellaneous equipment will not be allowed to lie in the bottom of the cabinet. Such devices must be neatly strapped to the frame or wire management support. Should devices be too large to strap, the Security Contractor must provide a rack mounted shelf or factory mounting plate to accommodate power strips.
9. Provide both solid and vented rack unit blanks for proper airflow. Size and select blanks based upon the ventilation requirements of each piece of active equipment. No open spaces in the cabinet will be allowed. Shop drawings must indicate airflow management through the cabinets.

C. Wall mounted equipment cabinets that are provided and installed by the Security Contractor must meet the following requirements:

1. Wall mounted equipment cabinets shall be no taller than 48”.
2. Wall mounted equipment cabinets must incorporate a hinged, lockable, back plane.
3. Ventilation fan (minimum of one shall be provided and installed at the top of the equipment cabinet.
4. Solid side panels shall be provided and installed in the Equipment Cabinet.
5. Wall mounted equipment cabinets shall be rated for the total weight of the completely loaded cabinet.
6. A wire mesh, hinged, lockable front door must be provided and installed.
7. Horizontal and vertical wire management must be provided and installed on inside and on the backside of the Equipment Cabinet.
8. No cables will be allowed to enter the cabinet without being properly supported by wire management.
9. The Equipment Cabinet must be deep enough to incorporate all equipment, terminations and wire management such that the backside of the cabinet may be completely closed and secured.
10. Power strips, power supplies and other miscellaneous equipment will not be allowed to lie in the bottom of the cabinet. Such devices must be neatly strapped to the frame or wire management support. Should devices be too large to strap, the Security Contractor must provide a rack mounted shelf.
11. Provide both solid and vented rack unit blanks for proper airflow. Size and select blanks based upon the ventilation requirements of each piece of active equipment. No open spaces in the cabinet will be allowed. Shop drawings must indicate airflow management through the cabinets.

D. Approved manufactures are Emcor, Hoffman, Middle Atlanta Products or approved equal.

PART 3 - EXECUTION

3.1 INSTALLATION:

A. Cameras shall be numbered as identified by the Construction Drawings. The cameras shall also be named by the Security Contractor after coordinating The Museum School. The Security Contractor shall be provided with the Excel Spreadsheet that is a duplication of the Camera Schedule provided in the Construction Drawing Package. The expectation is that the Security Contractor shall complete the column labeled CAMERA IDENTIFIER prior to the start-up and commissioning of the system. Then coordinate one (1) onsite meeting between the Security Contractor and The Museum School to review the numbering and naming convention. If the numbering and naming convention is approved by The Museum School, the Security Contractor shall start the focusing and aiming process. This must also be coordinated with the Principal, The Museum School as required by Construction Documents (drawings and specifications). The Construction Documents require that The Museum School be satisfied with camera views and image quality. The Security Contractor shall not call for Final Inspection until all of the aforementioned requirements are met.

B. System components and appurtenances shall be installed in accordance with NFPA 70, manufacturer's instructions, and as shown. Necessary interconnections, services, and adjustments required for a complete and operable signal distribution system shall be provided. Penetrations in fire-rated construction shall be fire-stopped in accordance with contract documents. Conduits and raceways shall be installed in accordance with the National Electric Code (NEC). Cables shall not be installed in the same cable tray, utility pole compartment, or floor trench compartment with AC power cables. Metal conduits shall not be continuous between buildings. Security Contractor to provide ground isolation between buildings by breaking continuous copper cabling and metal conduit runs.

C. Equipment: All monitor and camera mount support brackets shall be securely attached to mounting surfaces. Use lead shields on solid masonry, wood screws on wood, and machine bolts on structural steel. All anchoring devices shall be rated to support not less than five times the total equipment weight. See installation details for mounting to gypsum board and lay-in ceilings.

D. Surge Protection:

1. All copper cables and conductors which serve as control, power, or data conductors shall have surge protection devices installed at each end that complies with electrical and security specifications.
2. Protect all video and data equipment from surges induced on all control, power and data cables. All cooper cables and conductors which serve as control, power, or data conductors shall have surge protection circuits installed at each end that meet the IEEE 472 surge witMStand capability test. Fuses shall not be used for surge protection.

E. Power: All interior cameras shall be powered by POE network switches. All exterior cameras shall be powered by POE inserters located in IDF / MDF Rooms and housed in lockable, wall mounted, metal enclosures.

3.2 TESTING:

A. (a) Category 6

1. Each cabling permanent link or channel shall be tested and certified. Each pair of the permanent link or channel shall be tested. The permanent link measurement is recommended although the entire channel may be tested. The entire channel includes

the patch cables at the workstation end of the permanent link to the patch cables at the patch panel end. All links must be tested using test heads with Siemon Company patch cords.

2. Each outlet must pass the following parameters for category 6 as described in ANSI/TIA/EIA-568-B.2-1: wire map, length, insertion loss, NEXT, Power Sum NEXT, ELFEXT, Power Sum ELFEXT, Return Loss, Propagation Delay, Delay Skew.

    a. All tests shall be favorable, no *PASS, *FAIL or FAIL results shall be accepted.
    b. All test results shall be turned over to the owner in both electronic files and in hard copy.

B. Fiber Optic

1. Optical fiber (backbone) cables shall be 100% tested for attenuation and length.
2. Testing shall be done with an optical power meter and light source.
3. Length shall be recorded using an OTDR, optical length test measurement device or sequential cable measurement markings. Attenuation shall be tested at 850 nm and at 1300 nm for multimode fiber cable
4. All test results shall be turned over to the owner in both paper and electronic format.
5. Each strand shall not exceed a level of: 3.5 db/km of attenuation for 850 nm
6. 1.5 db/km of attenuation for 1300 nm
7. Each strand shall be tested and the following information be turned over to the owner
    a. From point to point
    b. Fiber I.D. label number
    c. RX level
    d. Attenuation total
    e. Wave length
    f. Reference level

3.3 TRAINING:

A. The Security Contractor shall include in the base Contract all costs required to train the operating and maintenance personnel in the use and maintenance of systems provided under this section of the Specifications.

B. Training session schedules shall conform to the requirements of the owner; therefore such schedules, agendas and outlines shall be submitted to the owner for approval not less than two weeks prior to starting the training sessions.

C. Training sessions shall be conducted by instructors certified in writing by the manufacturer of the specific system.

D. The Security Contractor shall be responsible for the following:

1. Coordination with The Museum School, the training date, starting time and duration of the training session.
2. Prior to training, provide all Attendees with the following documentation:
    a. Training Agenda (include introductions, estimated start / end times and topics to be covered)
    b. Training Outline (include topics and sub-topics to be covered with instructional bullet points).
    c. Hard copy of User's Manual (one for each attendee)
    d. Laminated Quick Reference Card(s) for routine task.

E. Training sessions shall be provided individually and on-site for the school. Sessions shall be provided in four (4) hour increments.

F. Training shall be provided on-site at The Museum School for Administrative Staff, Principals and Facilities Management.

G. Time to be included in base Contracts for specific systems shall be as follows:

1. For this school, the total number of training hours shall be sixteen (16). At the school or facility, eight (8) hours shall be provided at substantial completion. Then an additional eight (8) hours after the new IP Video Surveillance System has been in use for a minimum of 30 days.

END OF SECTION