



**FACILITIES SERVICES**  
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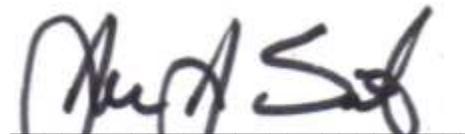
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**BULLETIN  
TO  
DESIGN AND CONSTRUCTION PROFESSIONALS**

**Date:** March 4, 2021  
**Bulletin:** 0001 – 2021  
**Division:** 28 23 00 – Web Based CCTV Security System  
**Re:** APS Design Guidelines and Standard Specifications Update

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- Item 1:** This is a clarification, change or addition to the existing Atlanta Public Schools (APS) Design Guidelines, Standard Specifications and any previous Bulletins to Design and Construction Professionals.
- Item 2:** This set of requirements and specifications should be implemented IMMEDIATELY on all projects that are in the “Construction Document” phase of the project delivery process. On projects where the “Construction” has begun, these requirements and specifications should be implemented IMMEDIATELY, WHERE PRACTICAL as to not adversely impact the schedule, budget or overall delivery of the project.
- Item 3:** The existing APS Design Guidelines, Division 28 23 00 Web Based CCTV Security System should be updated as indicated by the attached document titled, CCTV Updated Specifications, dated December 3, 2020.



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Jere J. Smith III, AIA  
Director of Capital Improvements



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**CCTV Updated Specifications**

Dec. 3rd, 2020

**Approved By:**

A handwritten signature in black ink that reads "Ralph Velez".

**Ralph Velez, Director of Security**

12/3/20

**Date**

## CCTV SECURITY SYSTEM

### Part I: General Conditions & Scope of Work

1. Current Environment: The Atlanta Public Schools has 96 schools/centers serving approximately 48,000 students and about 6,500 employees. To optimize safety and security, the Department of Safety and Security has facilitated the installation, maintenance and monitoring of one of the most sophisticated camera systems with approximately 5,000 units. With the renovation, modernization and or construction of schools, the department seeks manufacturer-certified Vendors to collaborate with the Security Engineering Manager to acquire, install, configure, and commission a fully integrated web accessible IP system.
  - 1.1. The Vendor shall be responsible for IP Cameras and all material, Cat-6 cable installation, testing, mounting and labor from the camera communication outlet (Cat-6 Data drop) to the termination on the patch panel in the closet. This shall further include camera configuration and proper documentation to include; but is not limited to cable labels, camera descriptions, test data, IP address and manufacturer training manuals. Delivery and installation of hardware and material and all such activities required to meet the scope of work, must be performed solely and exclusively by the award recipient who has demonstrated proof of Company and Lead-Tech certification by the manufacturer.
  - 1.2. Vendor is required to deliver a complete turnkey system as a single provider. No part of the SOW should be subcontracted to a third-party unless the respondent so designate the intent at the time of submission; receives approval from APS; and the third-party has met the required manufacturer certifications.
  - 1.3. All work must be seamless to APS and contractor employees MUST wear identification badges, a form of uniform designating vendor name; and must comply with all other terms and conditions as outlined.

### 2. Scope of Work

The SOW includes the provisioning and installation and final commissioning of an IP based closed circuit television (CCTV) System that is fully compatible with the current Atlanta Public School's CCTV System. This shall encompass compatibility in operation, design, functionality, and manufacturer specification.

- 2.1. Multi-School Environment: The layout and design shall accommodate multiple schools in a single facility or a campus-like setting. The positioning of the cameras and therefore the routing of the cable MUST allow for each "school" to operate independent of the others; and still meet the requirements of a single integrated system.
- 2.2. Most schools shall be designed to meet the requirements for a single intra-building system and integrated into the APS network; and requires that the CCTV Vendor provide all material, labor, installation, software, hardware, equipment, etc. to meet the following:
  - 2.2.1. Cat-6 Cable: Patch Panels, Patch Cables
  - 2.2.2. IP Cameras (*Analog cameras are not accepted*)
  - 2.2.3. UPS Equipment (1 unit per closet with DL120 Server)

- 2.2.4. HP Desktop Workstations
  - 2.2.5. HP DL120 Server 1-U (1 per 32 cameras)
  - 2.2.6. Lenel/SkyPoint-EV/OnSSI License & Software
  - 2.2.7. SkyPoint Version EV
  - 2.2.8. Documentation
  - 2.2.9. Training
- 2.3. The APS Department of Safety & Security shall facilitate the configuration and integration of the following, and shall work with the Vendor for final commission of the system:
- 2.3.1. HP DL120 Server 1-U Servers
  - 2.3.2. License & Software

## Part II: Vendor General Requirements

### 3. Purchase & Install

The Vendor shall purchase and install all hardware as outlined herein for the CCTV system and must ensure proper operation for a period of two years from the final acceptance of the system by the Owner. Individual pieces of equipment may carry a longer warranty than two years; and should be so designated at final acceptance. All Hardware shall include material, mounting, peripherals and installation for the following:

- 3.1. IP Cameras
- 3.2. Cat-6 Cabling
- 3.3. Patch Panels
- 3.4. Patch Cables
- 3.5. HP Desktop Workstation
- 3.6. HP Rack Mounted DL120 Server 1-U Server

### 4. Camera Placement

The Vendor shall refer to the electrical drawings and/or the security drawings for the exact camera location, Server placement, UPS, and the conduit location from each individual IP camera to a dedicated CCTV Patch Panel. The system shall be designed for maximum building coverage to include the following key areas:

- 4.1. Building Entrance & Exits with badge readers
- 4.2. Adequate coverage for all Hallways
- 4.3. Front Office & Administrative Area
- 4.4. Safe Room (Installed inside room regardless of location within building)
  - 4.4.1. One camera is to be mounted in exterior hallway focused on entrance
  - 4.4.2. The second safe room camera must be mounted in the interior safe room with field of view located to maximum view of internal contents of rooms.
- 4.5. Adequate coverage for Stairwell Entrances and Exits
- 4.6. Bus Pickup & Drop-off
- 4.7. Cafeteria & Loading Dock
- 4.8. Gym and all "Commons" areas
- 4.9. Media Centers

- 4.10. Breezeways
- 4.11. Portables
- 4.12. Courtyards
- 4.13. Playgrounds
- 4.14. Computer Labs
- 4.15. MDF/IDF Closets

5. Shop Drawings

Within 14 days of contract award, Vendor must provide shop drawings to reflect cable routing to each MDF/IDF and closet-specific breakdown of the number of ports required for each.

- 5.1. Shop Drawings will be validated by an APS designated Representative
- 5.2. Camera Schedule & Drawings must be approved prior to Kick-off meeting with APS Safety & Security that shall be held within 30 days of contract award.
- 5.3. Errors & Omissions must be identified and approved during Kick-off meeting

6. Cable

The Vendor shall utilize a minimum standard of CAT-6 cable routed between the camera locations and the MDF/IDF room housing the video system components; and shall meet the distance limitations as required for Cat-6 cable; and shall include 3-foot slack per drop. The cable is to be terminated to a CCTV specific Patch Panel and labeled with individual camera identifiers. Cables routed between the CCTV patch panel and the network switch should be **RED** as designated and accepted by the APS Technology Department.

6.1. Patch Panel & Cable:

- 6.1.1. Cables routed between the (vendor-provided) CCTV patch panel and the (APS-provided) network switch; as well as the PoE Cat-6 Cable must be **RED** as designated and accepted by the APS IT Department
- 6.1.2. Each Patch Panel Port is to be labeled with the last 2 Octets of the device (Camera, Axis phone, etc.) that it connects.
- 6.1.3. Patch Cords are to feature a boot with an integrated lock to prevent disconnection.
- 6.2. Vendor is liable for camera failures that are caused by inferior cable practices up to twenty-four months on installation; and is responsible to provide authenticated cable test before warranty starts. System will not be deemed complete without test data.
- 6.3. This standard shall have a NEMA 3 approved junction box for mounting the converters, transformers, and other electrical gear where mounted in an exterior or high humidity (such as a gymnasium) setting.

7. Cameras

The Vendor shall install the camera and housing units as per the manufacturer recommendations to accommodate housings in a secure, vandal resistant manner; and all exposed cabling must be protected in metallic or liquid tight conduit.

- 7.1. The digital camera signal shall be carried through CAT-6 wiring terminating at a designated patch panel in the nearest MDF/IDF.
  - 7.1.1. Each cable shall be labeled within one foot of the terminating connection with the identifier and location.
  - 7.1.2. The patch panel shall be labeled with the camera identifier. This label must be printed clearly and not handwritten.
- 7.2. The IP cameras will receive power from the nearest PoE switch provided by APS Department of Technology and placement shall be validated by an APS designated representative.

## 8. Rack Mounted Equipment

The Vendor shall install new rack mounted patch panels and UPS in the designated CCTV rack or equipment cabinet in the Owner's MDF/IDF room. Note: The racks and cabinets are not in the Vendor's Scope of Work.

8.1 MDF: Patch Panels must be mounted in Rack #4

8.2 MDF: NVR must be installed in the 4-Post Rack

8.3 IDF: Patch Panels must be mounted in Rack #3

## 9. Desktop Workstation

The Vendor must provide at least one work station for up to 32 cameras. Any addition of cameras in any denomination over 32 requires an additional work station (1 per 32 cameras). If the building calls for multiple schools or academies, the Vendor must provide at least one workstation for each location; and shall also comply with the 1:32 camera allowance. The monitor shall be a 22" LCD monitor.

## 10. Documentation

The Vendor shall configure the cameras and provide documentation in Excel format that incorporates the following guidelines

### 10.1. Configure IP Cameras with IP Addresses

10.2. IP Addresses shall be coordinated through the Department of Safety & Security

10.3. See camera schedule sample form included within this specification. The schedule shall include the following

10.3.1. Camera Models

10.3.2. IP Address

10.3.3. Description (describe physical placement location to include nearest room number)

10.3.4. Patch Port Position Number

10.3.5. Numbering scheme

10.3.6. Network Switch & Network Switch Port Number

10.3.7. Network Switch MAC Address

10.3.8. Floor Number

10.3.9. Building Number

10.3.10. IDF number & IDF room number

10.3.11. Interior & Exterior

## 11. Vendor Deliverables

The Vendor is responsible for installation and demonstrated operability of all IP Cameras, Cat-6 Cable, HP Desktop Workstations, Recording Servers, UPS Devices and final coordination with the APS Building System Engineer for final commissioning. The final coordination for placement of cameras shall be coordinated with a designated APS representative.

11.1. The Vendor is responsible for providing descriptions to uniquely identify the cameras and the delivery of a copy of the final closeout documentation to the APS Project Manager; in addition to any requirements made by the GC or Electrical contractor; and shall include the following:

- 11.1.1. Placement of camera icons with descriptions and/or identifiers on CAD drawings.
- 11.1.2. Correlate camera identifiers to a legend that describes location of camera MDF/IDF location with camera identifiers and IP Addresses
- 11.1.3. Detailed summary of IP Addresses correlated to camera identifier submitted in an electronic format
- 11.1.4. Cat-6 Test Data "Pass" (Warranty does not commence until documentation is provided and approved.)

## Part III: Technical Requirements

The CCTV Surveillance system must be designed to insure full compliance with current conditions throughout the district and to afford consistency and manufacturer compatibility for hardware and software; meets current end-user functionality and monitoring guidelines; and insures ongoing support from the Vendor and Manufacturer during the warranty period. All costs associated with provisioning for an alternative system, will be borne by the Designer and/or Vendor.

The technical requirements specified herein shall provide for PoE IP cameras, sending video signals via appropriately specified cabling to a network switch; that assures adequate coverage throughout the school. Adequate camera coverage can be determined using any standard Field of View Calculator. The system must be designed for recording servers to provide for access to files, storage of files; and allow for remote access.

## 12. IP CAMERA

12.1. Building Mounted Interior/Exterior: Network IP Dome Camera, mounted on Main Building, Cat-6: weather and vandal-resistant enclosure, color CCTV camera and varifocal lens with the following minimum features:

- 12.1.1. Resolution: Min 5M (2560 x 1920) resolution
- 12.1.2. 3-8.5mm (2.8x) motorized varifocal lens

12.1.3. ONVIF compliant

**12.1.4. Manufacturer: Samsung Hanwha Models (Interior) #XND-8020, (Exterior) #XNV-8020R or #XN0-8080R, These listed models are the ONLY acceptable models for use.**

12.1.5. Manufacturer: Samsung

12.2. Pole mounted Parking Lot/Exterior: Pole mounted parking lot coverage with fiber. Pole must be grounded with lighting rod affixed to the top of the pole. Cameras and cable must be weather and vandal-resistant enclosures and lens with the following minimum features:

**12.2.1. Resolution: Min 5M (2560 x 1920) resolution**

12.2.2. 3.7mm motorized varifocal lens

12.2.3. ONVIF compliant

12.2.4. Manufacturer: Samsung XNV-8020R

12.3. Alternative cameras must be submitted to APS Security for review at least 1 month before installation. A sample of each camera to be considered shall be delivered to APS security along with proposal mounting hardware and configuration software. Cameras must meet all APS specifications listed.

### 13. CABLE

13.1. Cat-6 cable (RED in color) is the system standard unless the cable will be exposed to exterior conditions or conditions which are electronically “noisy” or to other environmental failures. Outdoor cables must be routed through conduit with compression connectors and weather resistant pull boxes. Absolutely no indoor rated 4 square boxes will be allowed outdoors. Vendor shall be liable for all equipment and system malfunctions due to their failure to use the proper cable where warranted; and must provide test data to authenticate cable prior to start of warranty.

13.2. Category-6 4-Pair Plenum Cable: The cable must be rated for plenum return ceilings. The cable shall be paired, 4 pairs, 24 AWG, Solid BC - bare copper conductors, FEP Fluorinated Ethylene Propylene insulation, unshielded, flexible Flam arrest jacket with nylon ripcord. The jacket should be sequentially marked at two-foot intervals. The cable shall be red in color. The cable shall have a flame rating and test: UL CMP, JL910, C (UL) CMP, DSAFT6. This cable will be used, only, in those instances where a video server/station is located away from an IDF/MDF and with written permission of APS and for patch cables. Test data is that authenticates “Pass” is mandatory.

### 14. FIBER OPTIC TRANSMISSION EQUIPMENT

14.1. All fiber optic transmission equipment shall be as manufactured by Fiber Options, Inc. or International Fiber Systems, Inc.

- 14.2. All fiber optic cable shall be 62.5 micron, multi-mode type fiber, using "ST" type connectors. Fiber jacketing shall be selected dependent upon application: aerial, burial, armored, plenum. Provide the type recommended by manufacturer for specific installation and environmental condition.
- 14.3. Provide Category 6 4-Pair Plenum Cable Red in color with crimped RJ-45 connectors between the camera and the fiber optic video transmitter where applicable.
- 14.4. The Vendor shall provide media converters. Media Converters shall provide POE power. Coordination of the exact specifications shall be done with APS designated representative.
- 14.5. When a unit is mounted outdoors, a NEMA 3 box or Hoffman type box must be supplied.
- 14.6. All power cable is provided in the Electrical Contractor Scope of Work.

## 15. CONTROL CABLES

Multi-conductor, color-coded type, minimum #22 AWG, stranded tinned-copper for energy limited control circuits conforming to NFPA 70-1999, and minimum #14 AWG size, stranded tinned-copper for others. Insulation and jacket may be vinyl, PVC, cross-linked polyethylene. Voltage rating shall be 200, ac or dc, minimum except where cable is pulled in same raceway with non-energy limited systems, insulations shall be rated 600V minimum. Any control cable, if utilized, must be approved by the APS building systems programmer.

## 16. HARDWARE & SOFTWARE

**16.1. Recording Server (NVR): (SENECA) will be the ONLY acceptable recording server. SENECA Build #SQ412433 Part #CTY-96T-4LWS16-G2 with the following mobile server Seneca build #SQ412510 Part #CORP-PED-PX2-MC1. This server is to be utilized whenever more than 100 cameras are installed.**

**16.2. SENECA Build #SQ412433 Part #ASC-40T-2L-WS16-G1. This server is to be utilized whenever less than 40 cameras are to be installed.**

**16.3. SENECA Build #SQ412433 Part #CTY-96T-4L-WS16-G2. This server is to be utilized whenever more than 40 but less than 100 cameras are installed.**

**16.3.1. (1) SD Card per Camera**

**16.4. HP Desktop Workstation:** The Vendor shall be responsible for the purchase, delivery, installation and coordination and final commissioning for the HP Desktop Workstations. The placement of each shall be coordinated with the site Principal and APS Security Engineer.

16.4.1. The vendor must purchase the entire configuration of equipment based on a ratio of one (1) workstation per 32-max cameras. The equipment must meet the following minimum specifications.

16.4.1.1. Processor – Intel Core i7

16.4.1.2. Memory – 4GB (8 GB if using 64bit OS)

16.4.1.3. Graphics card – PCI-Express, Minimum 256 MB RAM, Direct 3D supported

16.4.1.4. DVD Drive

16.4.1.5. Windows 7

- 16.4.1.6. 22" Flat Panel Color CCTV Monitor
- 16.4.2. The Vendor shall purchase and deliver Workstations to the APS Building Systems Engineer for programming and final commissioning. The BSE will configure each unit and coordinate pick-up and installation with the Vendor.
- 16.4.3. Install Cat-6 cable, or VGA cable based on whichever is appropriate for the installed CCTV system; accessibility to the nearest MDF/IDF; and in respect to locations designated by the Principals and APS Field Engineers.
- 16.5. Software and License: Milestone is the current VMS of Atlanta Public Schools. Please follow listed guidelines below for all licensing for each installed camera. Ensure that the Care Plus and Care Premium are set to expire 3/28/2024. Each Camera will have the following three parts of software.**
- 16.6. XPCODL Milestone Xprotect Corporate Device Channel License. (Camera License).**
- 16.7. Y5XPCODL Milestone Care Plus for Xprotect (Software support).**
- 16.8. MCPR-Y5XPCODL Milestone Care Premium (APS Direct End User Support).**

## 17. SUBMITTALS

The Vendor must submit data information sheets for all items listed below:

- 17.1. Provide three copies of the Operations manual for all equipment, modified as necessary for this particular system, for the Owner's use; and which contains operation, proper maintenance, and possible purchases that may be required for replacement parts beyond the two-year warranty.
- 17.2. Provide a site specific electronic schematic design of building with camera placement.
- 17.3. Electronic As-built deliverables are as follows and must be available at time of final walkthrough and acceptance.
  - 17.3.1. Cameras must be labeled with location and descriptions
  - 17.3.2. Placements must be identified by building, hall, corridor, and/or room # to include the direction the camera is facing.
  - 17.3.3. Vendor must identify cable routing from camera to MDF/IDF

## 18. WARRANTY:

The warranty shall not commence until the system has been demonstrated; the positioning of cameras is validated and all documentation, to include Cat-6 Test Data has been delivered in the format required.

- 18.1. The warranty period for the operational system shall commence after the acceptance of the entire building warranty or the acceptance of the CCTV system warranty, whichever is later; and shall be enforced up to two years. However, in the event of a continuous failure in any area of the hardware, APS has the right to defer the warranty until the Vendor has completely eliminated the problem and restored the system to optimum performance; at which time the warranty period shall resume.

## PART IV - INSTALLATION

### 19. PATHWAYS & CONDUIT

- 19.1. The General Contractor is responsible for all conduits, cable trays, J-hooks and other pathways in accordance with drawings and shall insure a neat workmanlike appearance.
- 19.2. APS Field Representative will work with the Vendor and GC to coordinate pathway issues and requirements that may arise during construction. Conduits shall be tight to corners and plumb.
- 19.3. Conduit and/or pathway requirements that may arise as a result of Moves, Adds or Changes shall be the responsibility of the CCTV Vendor. All work must be completed according to code and will be inspected and approved by APS Safety and Security.

### 20. CAMERA MOUNTS

Vendor must insure that the correct camera mounts are selected based on surface requirements, and care must be taken to neatly provide penetrations for conduit, and to locate electrical service in a logical and orderly manner.

- 20.1. Exterior Cameras shall be mounted using Bosh approved wall mount/arm plate. Vendor must utilize the Bosch Wall Mount diagram schematics and instruction.
- 20.2. Exterior Cameras shall be sealed with waterproof sealant.
- 20.3. **Outdoor Pendant Mounts:** This mount suspends out-door dome housing from an outdoor ceiling or horizontal surface and should be used on all exterior cameras and must be compatible with the camera selected for installation.

### 21. SERVER INSTALLATION

APS Building System Engineer is responsible for sign-off of the final programming and installation of the HP DL120 Server 1-U Servers and Software; and shall coordinate system test and verification with the CCTV Vendor.

- 21.1. The rack-mounted NVR Server will be installed in the 4-Post Rack in the MDF or IDF Closet, as directed by the Building System Programmer; and work shall not commence until the closets are certified to be complete; the LEC circuit complete; and the APS Network Servers and Switches are installed and fully operational.
- 21.2. Servers shall be installed in client-provided Rack #5 in the MDF or Rack #3 in either IDF and approved by the APS Security Field Engineer.

### 22. SYSTEM TEST & VERIFICATION

An APS Field Engineer will be assigned to inspect and insure quality conditions during installation; will perform preliminary walk-thru and create punch list prior to system completion. After satisfactory completion of punch list the Field Engineer and Vendor shall conduct final test to verify proper operation of all equipment. Final Verification shall include:

- 22.1 Camera Scheduled hand-off to Field Engineer
- 22.2 Test Data with "Pass" for all Cat-6 Cable

- 22.3 IP Addresses & Camera Descriptions hand-off to Field Engineer
- 22.4 Coordination with BSE to facilitate install of Servers
- 22.5 Installation of Desktop Workstations & 22" Monitors
- 22.6 As-Built Drawings & Electronic AutoCAD
- 22.7 Cameras focused on viewable online

## 23. TRAINING

Vendor shall demonstrate to Owner the proper operation of the entire CCTV system from the MDF/IDF Closet. The contractor shall demonstrate operation of the system and provide two 4-hour training sessions for the Building Administrator and designees.

- 23.1. The Vendor is responsible for providing 8 hours per school of System Administrator/maintenance Training to consist of features, function, and operation. Sessions can be held in 2 hour increments and will not exceed two sessions in one day.
- 23.2. Operation training shall be at a level that allows the Administrator to access, monitor, maintain, diagnose, and trouble shoot day-to-day issues and occurrences. Administrator shall maintain the right to add addition training elements as required.
- 23.3. Features training shall include PTZ controls and Work station features.
- 23.4. Cost associated with training shall be included in base bid
- 23.5. Training sessions shall be scheduled by the Vendor directly with each school and approved by APS DSS. Vendor shall inform the Principal that one training session will be provided and that it should be scheduled such that all desired attendees may be present. Attendance shall be documented by name, date, and signature as a Training Sign-In Sheet for each training session and shall be completed and delivered to APS DSS as a final deliverable to this project. All training sessions are to be completed prior to the substantial completion deadline.
- 23.6. Vendor shall record training sessions and provide DVDs for use by the Principals and APS DSS. Audio and video recording shall both be of professional quality.
- 23.7. APS DSS will deem audio and video quality acceptable at the time of acceptance. Poor quality may result in duplicate sessions at cost to contractor.

## 24. SYSTEM COMMISSIONING & CLOSEOUT

Throughout the entire life-cycle of each project, an APS representative will be assigned to work with the vendor for review and coordination of tasks associated with the final commissioning and successful closeout of the project. This person will coordinate and validate the following tasks

- 24.1. Vendor Kick-Off Meeting:
- 24.2. Drawing Review and Sign-off
- 24.3. MDF/IDF Closet Readiness
- 24.4. Coordination of Pathways
- 24.5. Coordination of Hardware Delivery & Installation
- 24.6. Port Assignment for connectivity to APS Switch
- 24.7. Camera Focusing
- 24.8. System Testing & Verification
- 24.9. Field Engineer Quality Control

- 24.9.1. Validation of appropriate housing & mounting
- 24.9.2. Lens Selection
- 24.9.3. Cable Routing
- 24.9.4. Correct use and specification of cabling and connectors.
- 24.9.5. Correct grouping and specification of video server/station.
- 24.9.6. System backup power specification
- 24.9.7. Testing and commissioning of the operational system from cameras
- 24.9.8. Verification of adequate lighting for cameras field of view.
- 24.9.9. Coordinate (with Principal) placement of Workstation Monitors
- 24.9.10. Vendor Punch-list
- 24.1. Vendor Completion & Closeout
  - 24.1.1. Satisfactory completion of Punch-list items
  - 24.1.2. Closeout Documentation
    - 24.1.2.1. Camera As-Builts must include APS IP Addresses with last 2 Octets.
    - 24.1.2.2. Spreadsheets should include MAC Address & Camera Models
    - 24.1.2.3. As-Builts should use Digital JPEG
  - 24.1.3. Satisfactory focusing of Cameras
  - 24.1.4. Coordination & Installation of Workstations & Monitors
  - 24.1.5. Coordination & Installation of UPS
  - 24.1.6. Availability to BSE for Final System Test & Verification
  - 24.1.7. Training
- 24.2. Building System Engineer Quality Control
  - 24.2.1. Specification & Configuration of HP DL120 Server 1-U Server
  - 24.2.2. Insure proper quantities & placement of UPS by Vendor
  - 24.2.3. Review and Signoff of Closeout Documentation
  - 24.2.4. Facilitate System Testing & Final Launch
  - 24.2.5. Other special requirements deemed by the APS project
  - 24.2.6. Review and approval of proposed Change Requests
  - 24.2.7. Coordination of the entire system with the APS Project Manager and the General Contractor.

END OF DOCUMENT