**SECTION 17000**

**IP / NETWORK BASED VIDEO SURVEILLANCE SYSTEM**

**PART 1 - GENERAL**

1.1 RELATED DOCUMENTS

1. Drawings and general provisions of the Contract, including General and Supplementary Conditions, apply to this Section.
2. Pricing Form shall be provided and must be completed by the Security Contractor.

1.2 DESCRIPTION

1. This project includes and requires the installation of an IP video surveillance system in the Macon Centreplex and the Exhibition Hall. Reference contract drawings and specifications for specific requirements.
2. The Macon Centreplex shall be responsible for providing a fiber optic network infrastructure connection to the Head End within the Macon Marriott for the new IP Video Surveillance System. Also, the server, storage and workstation hardware with operating system and database engine shall be provided by the Security Contractor. The Security Contractor shall provide and install the VMS System server and client software, CAT 6 cable for cameras as well as equipment needed for the Security Control Room. The Security Contractor shall also be responsible for the supply / installation of exterior.
3. This section includes furnishing and installing all materials and providing all labor and supervision for a new IP Based Video Surveillance System. The new IP Based Video Surveillance System shall include all raceway, cabling, hardware, and miscellaneous equipment required to complete the scope of work described by the drawings. Provide all labor, materials, equipment and supervision to install, check out, adjust, and calibrate the system.
4. This division of the Specifications covers the complete IP Based VIDEO SURVEILLANCE SYSTEM as indicated on the Drawings and specified herein. The Security Contractor shall provide all labor, materials, equipment, supervision, documentation and warranties necessary to implement each specified system upgrade. The installation of all equipment and raceways shall be the full responsibility of the IP VIDEO SURVEILLANCE SYSTEM contractor for this project.
5. The IP Based VIDEO SURVEILLANCE SYSTEM must incorporate spare capacity for future expansion. A minimum of 15% spare capacity is required for all licensing, for all software and hardware inputs and outputs, for all processing capability, storage capability and data through-put. The spare capacities must be noted and documented in the close-out and as-built documentation. The only exception to this requirement is video channel licenses. The IP Based Video Surveillance System only has to be licensed for the number of cameras in use at the time of start-up and commissioning.
6. All conflicts between the drawings and specifications shall be brought to the attention of the owner as soon as possible. In general, specification requirements shall take precedence over drawing requirements.
7. The Security Contractor must complete and shall be totally responsible for the following items:
8. Performing calculations and providing an adequate amount of storage to record all cameras, at a constant frame rate of 7 fps at a minimum of HD resolution, for 30 days. The Security Contractor shall be held responsible for providing and installing, at no additional cost, any additional storage that might be required if after the system has been in operation for 90 days and it is found the 30 days of storage is not being provided.
9. Set standard motion detection parameters for each camera.
10. Set standard recording parameters for each camera.
11. Verify and program the correct on-screen camera identifications (names defined by Macon-Bibb) in all Video Viewing Workstations and at all video display monitors.
12. Set up and configure all Administration and client workstations as shown on the drawings.
13. Program the Administrative Client Workstations to communicate with the new IP Based Video Surveillance System so that live and archived video from all cameras is available on demand.
14. The Security Contractor must have been present and signed in at the mandatory pre-bid meeting and walk-through.

1.3 QUALITY ASSURANCE

1. Industry Referenced Standards. The following specifications and standards are incorporated into and become a part of this Specification by reference.
2. NFPA 70 National Electric Code
3. UL 50 Enclosures for Electrical Equipment
4. UL 1590
5. FCC Part 15, Class B
6. ICEA S-83-596 ICEA Standard for Fiber Optic Premises Distribution Cabling – Current Edition
7. IEEE802.3at POE
8. IEEE802.3af POE
9. EN 60950-1
10. EN 55022 Class B (Emissions)
11. EN 55024 (Immunity), VCCI

1.4 INSTALLER’S QUALIFICATIONS:

1. Firm with at least 5 years of successful application, installation, and testing experience on specified systems and equipment. Firm shall be located within 100 miles of the project site. 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 of experience in the installation of the specified equipment. Contractor shall include a copy of qualification statements from product vendor showing how long a partner with them.
2. The responsibilities of the VIDEO SURVEILLANCE SYSTEM contractor shall include but not be limited to the following:
3. Shop drawings and submittals on all VIDEO SURVEILLANCE SYSTEM systems and equipment.
4. Installation of all new VIDEO SURVEILLANCE SYSTEM systems and equipment as documented in the drawings and specifications.
5. Removal of all existing faulty analog VIDEO SURVEILLANCE SYSTEMS. Owner is allowing old wiring that will not be used, to be cut back, unexposed and abandoned.
6. Wire and wiring termination for all VIDEO SURVEILLANCE SYSTEM and control systems and equipment.
7. Testing and check-out of all VIDEO SURVEILLANCE SYSTEM systems and equipment.
8. On-site and factory training for new software.
9. Warranty for all new VIDEO SURVEILLANCE SYSTEM systems and equipment for one year (12 months).
10. Complete and detailed as-built drawings, operations and maintenance for the new VIDEO SURVEILLANCE SYSTEM systems.
11. All raceway and electrical power routing required by the contract drawings.
12. 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.

1.5 RELATED DOCUMENTS

1. 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.

1.6 SUBMITTALS

1. Product Data: Submit manufacturer's technical product data, including specifications and installation instructions, for each type of system equipment. Include drawings that 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. Drawings shall also include locations of emergency power panels, 120VAC power loads per equipment cabinet and estimated UPS loads and estimate run time based upon load.
2. Test Plan: Security Contractor shall submit a test plan that defines the tests required to ensure that the system meets technical, operational, and performance specifications, 14 days prior to the proposed test date. The test plan must be approved before the start of any testing. The test plan shall identify the capabilities and functions to be tested, and include detailed instructions for the setup and execution of each test and procedures for evaluation and documentation of the results.
3. Manufacturer Certification: Submit a letter from the manufacturer's representative stating the proposed systems being submitted for review are in accordance with the recommendations of the manufacturer.
4. It is the responsibility of the Security Contractor to meet with the Macon-Bibb County 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 Macon-Bibb County Representative. Punch lists will be developed at that time by the Owner’s Representative and furnished to the Security Contractor. All punch list items must be corrected and verified prior to acceptance of the system.

1.7 DRAWINGS

1. The Drawings indicate the arrangement of the security and VIDEO SURVEILLANCE SYSTEM equipment. The Security Contractor must coordinate installation of the Video Surveillance System with the structural, mechanical and electrical equipment and access thereto.
2. Raceway home runs as shown on the security and VIDEO SURVEILLANCE SYSTEM Drawings shall be installed as shown on the Drawings, and as required by the associated equipment manufacturers.

1.8 RECORD DOCUMENTS

1. At the time of final inspection, provide two (2) hard copy sets of complete product data sheets on all security and VIDEO SURVEILLANCE SYSTEM equipment used in this project. The hard copy data shall be in bound in 3-ring binder with Cover Page, Table of Contents and all sections labeled. The binder shall include punched and inserted 11 x17 copies of all shop drawings required for this project. Provide one (1) identical electronic copy on CD of the aforementioned product data on CD with table of contents and tabs. Include a sleeve in binder to hold CD or multiple CD’s if required.
2. Provide two (2) copies of the Operation and Maintenance Manuals (bound, with Table of Contents and tabbed sections) including any equipment provided under this contract that can be operated or maintained by the customer. Provide one (1) identical copy of the aforementioned Operation and Maintenance Manuals in electronic format on CD as well as copy manuals onto the VMS Server for future reference.

1. As-built drawings must be prepared and provided by the Security Contractor. Two (2) complete full size (30"x42"), bound sets. As-built drawings must be provided.
2. Original content from the contract documents (key notes, cable routing, one-line diagrams, and device details) will not be accepted.
3. The As-built drawings must be provided with Cover Page with symbol and sheet legend. All as-built drawings must be on the Security Contractor’s title block. Title block must identify the installation company and the project specific details (project name, street address, city and state.
4. The As-built drawings must include floor plans will device location, proper symbols, location identification numbers, cable routing, head end equipment locations, wall penetrations. A Cable Legend must be provided that identifies cable type, color and number of conductors. Each cable route shall be identified as noted by the Cable Legend.
5. The As-built drawings must include interconnection diagrams with all components identified by manufacturer and part number. Additional equipment wiring diagrams with conductors identified by number, wire type and color of interconnecting conductors must be provided. As-built drawings are to show wiring for all installed equipment including terminal numbers and conductor colors. Typical wiring diagrams may be included when device terminations are duplicated.
6. The as-built drawings must include head end equipment rack layouts for each IDF / MDF Room or Closet. Layouts must be tagged with room number, make and model number of each device. The exact configuration of switches, power inserters, servers, archiving and UPS units must be provided. Typical layouts may be provided for equipment configuration scenarios that are repeated.
7. The as-built drawings must note spare capacities (network ports, camera channels, etc.)
8. Certification from system manufacturers that systems are installed in accordance with manufacturer's recommendations and are functioning correctly at the time of final inspection.
9. Provide a Warranty Letter in each O&M Manual Binder (2 copies total).
10. Provide two (2) copies on DVD of Manufactures training CD’s.
11. 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.) and documentation of spare capacities.
12. The final pay application will not be approved until the post final inspection is completed, all Construction Observation items have been satisfied, and all of the above requirements for Record Documents are submitted and approved.

1.9 ACCEPTABLE MANUFACTURERS

1. Reference products section of specifications for acceptable manufacturers.

1.10 WARRANTY

1. The Security Contractor shall include a one (1) year warranty for the Video Surveillance System as part of BASE BID for each portion and phase of work.
2. The one (1) year warranty shall include all materials and labor, for one (1) 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. The owner shall have the right to add and/or remove cameras from the system without voiding the warranty.
3. During the one (1) year warranty period, the Security Contractor must provide STANDARD service. The Security Contractor must provide a response to STANDARD service request during normal working hours, Monday – Friday, 8:00 AM – 5:00PM. At a minimum, the Security Contractor must respond by phone with 8 hours and provide an onsite response if necessary by the end of the next business day. The Security Contractor must also be able to respond to EMERGENCY services. The Security Contractor must be able to respond to an EMERGENCY service request 24 hours a day, seven days a week (including Holidays). At a minimum, the Security Contractor must respond by phone within 4 hours and provide onsite response if necessary within 8 hours of an EMERGENCY service request. State within the proposal the fees for EMERGENCY response.
4. The Security Contractor shall include annual Software Maintenance Agreements for all VMS application software, all VMS database software and all VMS device driver software required for proper operation of the IP Based Security Surveillance System as part of the one (1) warranty period.
5. The Security Contractor shall submit additional pricing for the 2, 3rd, 4th and 5th year Video Surveillance System (all parts and labor) extended warranties. During the extended warranty period, the Security Contractor must provide response to EMERGENCY service request 24 hours a day, seven days a week (including Holidays). At a minimum, the Security Contractor must respond by phone within 4 hours and provide onsite response if necessary within 8 hours of an EMERGENCY service request. The Security Contractor must provide a response to STANDARD service request during normal working hours, Monday – Friday, 8:00 AM – 5:00 PM. At a minimum, the Security Contractor must respond by phone with 8 hours and provide an onsite response if necessary by the end of the next business day.
6. The Security Contractor shall submit additional pricing for Software Maintenance Agreements (SMA’s) for 2nd, 3rd 4th and 5th years. SMA shall include all video channel license renewal cost and SMA for Video Management System application software.

**PART 2 - PRODUCTS**

2.1 MATERIALS

1. 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. Security Contractor must obtain approval from the Macon-Bibb County Representative prior to installing any surface mounted raceway or conduit. If approval is granted, the Security Contractor is responsible for supplying the paint and for painting all new surface mounted raceways and conduits that are installed below ceiling and as a result of this project.

2.2 VIDEO SURVEILLANCE SYSTEM CAMERAS

1. VIDEO SURVEILLANCE SYSTEM 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 VIDEO SURVEILLANCE SYSTEM camera schedule.
2. 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. Reference mounting details in contract documents for installation of cameras on gypsum board and lay-in tile ceilings.
3. All cameras utilized for this project shall be H.264 compatible and shall be recorded in H.264 format by the Video Management System.
4. Analog Video Encoder by Avigilon ENC-4P-H264:
5. The Analog Video Encoder Series (including ENC-4P-H264) shall support 100BASE-TX and POE 802.3af network interfaces for streaming video and control data over standards compliant networks.
6. The Analog Video Encoder Series (including ENC-4P-H264) shall operate in the Avigilon Control Center (ACC) environment with support for automatic detection of cameras, encoders and NVRs in the same broadcast domain.
7. The Analog Video Encoder Series (including ENC-4P-H264) shall support H.264 (MPEG 4 Part 10/AVC) and Motion JPEG compression algorithms.
8. The Analog Video Encoder Series (including ENC-4P-H264) shall support motion adaptive 3D deinterlacing to improve image accuracy and sharpness with fast motion and film video source processing.
9. The Analog Video Encoder Series (including ENC-4P-H264) shall be ONVIF compliant.
10. The Analog Video Encoder Series (including ENC-4P-H264) shall have a built-in web server to make video and configuration available in a standard browser environment. The built-in web server shall support multiple users with different permission levels and unique usernames and passwords.
11. The Analog Video Encoder Series (including ENC-4P-H264) shall support user configuration of network parameters including: Static IP address; Subnet Mask; Gateway; and Control Port for control communications.
12. The Analog Video Encoder Series (including ENC-4P-H264) shall support user configuration of camera parameters including Camera Name and Location.
13. The Analog Video Encoder Series (including ENC-4P-H264) shall support user configuration of a fully customizable motion detection mask within the camera field of view.
14. The Analog Video Encoder Series (including ENC-4P-H264) shall support user configuration of image acquisition parameters including Color Saturation and Sharpening.
15. The Analog Video Encoder Series (including ENC-4P-H264) shall support user configuration of up to 4 privacy zones within the camera field of view.
16. The Analog Video Encoder Series (including ENC-4P-H264) shall support user configuration of compression quality and bandwidth parameters per individual video channel including: Image Rate; Maximum Bit Rate; and Keyframe Interval.
17. The Analog Video Encoder Series (including ENC-4P-H264) shall have 4 video inputs.
18. The Analog Video Encoder Series (including ENC-4P-H264) shall have 4 audio inputs and 4 audio outputs.
19. The Analog Video Encoder Series (including ENC-4P-H264) shall support user configuration of video input termination.
20. The Analog Video Encoder Series (including ENC-4P-H264) shall have video input status LEDs for each channel that indicates when a video signal has been detected.
21. The Analog Video Encoder Series (including ENC-4P-H264) shall have 4 input and 4 output terminals for connecting alarm inputs and alarm outputs.
22. The Analog Video Encoder Series (including ENC-4P-H264) shall have a RS-485 serial port for controlling PTZ devices.
23. The Analog Video Encoder Series (including ENC-4P-H264) shall be remotely upgradeable over an IP network for feature enhancements and investment protection.
24. The Analog Video Encoder Series (including ENC-4P-H264) shall meet or exceed the following design and performance specifications.
25. It shall be the Security Contractor’s responsibility to ensure that the latest version of firmware, that is compatible with the PROPOSED Digital Video Management System, is downloaded to all cameras prior to Final Inspection.

E. Video With IR

* + - * 1. The camera shall be capable of simultaneously delivering at least two individually configurable video streams, for use when connecting to the Video Management Software for recording and live viewing.
				2. The camera(s) shall support the video resolution prescribed in the scope of work and be capable of generating the following image rates (in frames per second-fps) regardless of the complexity of the scene:

 2.0 Megapixel Camera

1920x1080 @ 30fps

1280x720 @ 30fps

768x432 @ 30fps

3.0 Megapixel Camera

2048x1536 @ 20fps

1920x1080 @ 30fps

1280x960 @ 30fps

1280x720 @ 30fps

768x576 @ 30fps

768x432 @ 30fps

5.0 Megapixel Camera

2592x1944 @ 13fps

2560x1440 @ 13fps

2048x1536 @ 20fps

1920x1080 @ 30fps

1280x960 @ 30fps

1280x720 @ 30fps

768x576 @ 30fps

768x432 @ 30fps

You will find the camera models and quantities on the camera schedule.

* + - * 1. Encoding

The camera shall:

* 1. Be able to provide independently configured simultaneous H.264 and Motion JPEG streams (multi-stream).
	2. Support Motion JPEG encoding:

Selectable range from 1 up to 30 NTSC/25 PAL frames per second.

Supports compression and image quality settings from 1 to 64

Provide user configuration of compression quality, bandwidth and image rate per camera.

* 1. Support H.264 encoding:

Selectable range from 1 up to 30 NTSC/25 PAL frames per second.

Supports Variable Bit Rate (VBR) in H.264 with a configurable maximum bit rate threshold.

Provide user configuration of compression format, compression quality, maximum bit rate, key frame interval, and image rate per camera.

* 1. Support motion compensation and motion vector during motion estimation in H.264, able to maintain frame rate, regardless of scene complexity, when bandwidth is capped at:

2048kbps, for 2.0MP, for 30NTSC/25PAL FPS

2560kbps, for 3.0MP, for 30NTSC/25PAL FPS

2560kbps, for 5.0MP, for 13NTSC/12PAL FPS

* 1. Support G.711 PCM 8kHz audio compression.
		+ - 1. Transmission

The camera shall allow for video and audio to be transported over:

HTTP (Unicast)

HTTPS (Unicast)

RTP (Unicast & Multicast)

RTP over RTSP (Unicast)

RTP over RTSP over HTTP (Unicast)

RTP over RTSP over HTTPS (Unicast)

* + - * 1. Image Control

The camera shall support user configuration of:

Automatic and manual white balance control

Automatic and manually defined exposure zones operating in the range

1. 2.0 MP Camera - 1/6 and 1/8000 second.

2. 3.0 MP Camera - 1/6 and 1/8000 second.

3. 5.0 MP Camera - 1/6 and 1/8000 second.

Flicker control (50 Hz , 60 Hz)

Automatic and manual iris control

Automatic and manual Day/Night control

Color saturation and sharpening

Motion detection sensitivity and threshold

Backlight compensation

Digital rotation of the image

Wide Dynamic Range (WDR) – the Dynamic Range shall be at a minimum:

1. 100db for 2.0Megapixel Cameras

100db for 3.0Megapixel Cameras

69db for 5.0Megapixel Cameras

2. Scene Adaptive IR Illumination Technology

The IR spread must dynamically adjust to the camera field of view and zoom level through the use of focused and tuned LEDs generating the specific spread and intensity of illumination.

The cameras shall automatically adjust to compensate for excessive scene reflectivity and prevent image saturation by synchronizing the following camera settings to attain optimum video quality:

1. Wide Dynamic Range

2. Electronic shutter covering at minimum the range 1/6 to 1/8000

3. P-Iris

c. The electronic shutter shall:

1. When using a 3 to 9mm lens, the camera shall provide uniform illumination in the dark under 0 lux, up to a maximum distance of 30m (100ft).

2. When using a 9 to 22mm lens, the camera shall provide uniform illumination in the dark under 0 lux, up to a maximum distance of 60m (200ft).

* + - * 1. Network

The camera shall support both fixed (static) IP addresses and dynamically assigned IP addresses provided by a Dynamic Host Control Protocol (DHCP) server.

The camera shall support user configuration of network parameters including: a. Fixed (static) IP address

Subnet mask

Gateway

Control port

3. The camera shall be automatically detected when using a Video Management Application (VMA) or Network Video Recorder (NVR) supporting this feature.

1. The camera shall provide support for both IPv4 and IPv6 Networks.
	* + - 1. Video Motion Detection Functionality

The camera shall support video motion detection functionality.

The camera motion detection shall be user configurable to detect motion based on:

Motion detection mask – defined areas within the camera’s field of view for the camera to detect motion

Sensitivity – how much each pixel within the masked areas must change before it is considered in motion

Threshold – percentage of pixels that must detect change

* + - * 1. Event functionality

The camera shall be equipped with an integrated event functionality, which can be trigged by:

Alarm input terminal

Video motion detection

Camera temperature outside operative range

PTZ position

Schedule

* + - * 1. Protocol support

The camera shall incorporate support for at least IPv4, HTTP, HTTPS, SOAP, DNS, NTP, RTSP, RTCP, RTP, TCP, UDP, IGMP, ICMP, DHCP, Zeroconf, and ARP.

* + - * 1. Video overlay

The Camera shall:

Provide four individually configurable privacy zones and 3D privacy masks to conceal defined areas in the image as non-viewable. These masks shall be dynamically adjusted based on current zoom-factor, and the operator shall not be able to bypass.

Permanently obscure video masked by privacy zone prior to streaming video.

* + - * 1. Security

The camera shall:

Support the use of password protection, and HTTPS encryption.

Restrict access to the built-in web server by usernames and passwords at three different user group levels.

* + - * 1. API support

The camera shall be fully supported by an open and published API (Application Programming Interface), which shall provide the necessary information for functional integration into third party applications.

The camera shall conform to the network video standard version 1.02, version 2.00 and Profile S as defined by the ONVIF organization ([www.onvif.org](http://www.onvif.org)).

* + - * 1. Installation and Maintenance

The camera shall:

Allow firmware updates over the network.

All customer-specific settings shall be stored in a non-volatile memory and shall not be lost during power cuts or soft reset.

Manufacturer shall provide:

A Microsoft Windows™-based management software, which allows camera configuration, upgrade of firmware, and backup of individual camera configurations.

* + - * 1. Materials

The camera shall be factory assembled and designed for continuous duty. Allowing for commercial/industrial 24/7/365 use.

The camera shall provide the following optical requirements:

Use a progressive scan CMOS sensor.

1/3” for 2.0Megapixel Cameras

1/3” for 3.0Megapixel Cameras

1/3.2” for 5.0Megapixel Cameras

* + - * 1. Be equipped with a P-Iris lens supporting zoom and focus control by camera and user.
				2. Be equipped with a factory integrated and tuned lens depending on camera model:

3-9mm varifocal F1.2 lens

2.0 MP Cameras shall provide 26 to 79 degree angle of view

3.0 MP Cameras shall provide 28 to 84 degree angle of view

5.0 MP Cameras shall provide 28 to 84 degree angle of view

9-22mm varifocal F1.6 lens

2.0 MP Cameras shall provide 11 to 26 degree angle of view

3.0 MP Cameras shall provide 11 to 28 degree angle of view

5.0 MP Cameras shall provide 12 to 28 degree angle of view

* + - * 1. Be equipped with an automatically and manually removable IR-cut filter to provide day/night functionality where the camera enters a monochrome mode when the available light drops below a set threshold.

The cameras shall provide pictures down to the following Lux ratings:

2.0 MP Cameras – Color @ 0.2 lux at F1.2 and 0.4 lux at F1.6, Monochrome @ 0.02 lux at F1.2 and 0.04 lux at F1.6.

3.0 MP Cameras – Color @ 0.2 lux at F1.2 and 0.4 lux at F1.6, Monochrome @ 0.02 lux at F1.2 and 0.04 lux at F1.6.

5.0 MP Cameras – Color @ 0.3 lux at F1.2 and 0.6 lux at F1.6, Monochrome @ 0.03 lux at F1.2 and 0.06 lux at F1.6.

* + - * 1. Be equipped with support for onboard storage

The camera shall accept SD cards (full size) to record video onboard the camera.

Video recorded on the SD card shall be retrievable via the camera web interface or directly from the SD card.

The camera’s web interface shall allow for the configuration of onboard storage options. These parameters shall include but not limited to:

Recording on motion

Recording continuously

Recording when server connection is interrupted

* + - * 1. Be equipped with a real time clock.
				2. The camera shall provide the following mechanical requirements:

Be equipped with alarm input and output terminals.

Be equipped with line audio input (for external microphone) and audio output (for external speaker) connections.

Be equipped with a configuration port for direct connection to the camera.

Be equipped with a firmware reset button to reset the camera to factory default settings.

* + - * 1. The camera shall provide the following camera diagnostics:

Be equipped with LEDs, indicating the camera’s functional status.

Allow user to disable Status LEDs.

Be monitored by a Watchdog functionality which shall automatically re-initiate processes or restart the unit if a malfunction is detected.

* + - * 1. The Scene Adaptive IR Camera shall have integrated Infrared Illuminators.

Illuminator Technology

High-Power IR LED

Wavelength 850nm

IR illumination distance:

Maximum 60 m (200 ft) at 0 Lux

* + - * 1. The camera shall provide physical interfaces to external devices & systems:

Network interface

The camera shall be equipped with one 100BASE-TX Fast Ethernet-port, using a standard RJ-45 socket and shall support auto negotiation of network speed (100 Mbps and 10 Mbps) and transfer mode (full and half duplex).

Audio / Input Terminals

The camera shall be equipped with one input terminal for receiving line level analog audio from an external microphone.

The camera shall be equipped with one output terminal providing line level analog audio for connection to an external speaker.

Configuration Port

The camera shall be equipped with a configuration port for direct connection to the camera without the need for network access.

The configuration port shall provide a live video stream and access to the camera’s web interface for camera configuration.

External I/O Terminals

The device shall be equipped with one (1) alarm input terminal and one (1) alarm output terminal.

Alarm inputs shall be individually configured for normally open/normally closed.

Alarm outputs shall be individually configured

Normally open/normally closed

Duration of state change when triggered.

* + - * 1. The camera enclosure shall include the following:

Manufactured with an all-aluminum body suitable for outdoor installations including:

IP66-rating

Temperature and humidity sensors,

Heater inside the enclosure.

Tamper resistant screws

Be equipped as a surface mount

The camera enclosure shall not exceed these dimensions:

241.7 mm x 94.9 mm x 70 mm (9.5” x 3.7” x 2.8”)

The camera enclosure shall not exceed these weights:

1.15 kg (2.5 lbs)

* + - * 1. The camera shall be capable of being powered by the following power sources:

POE: IEEE 802.3af Class 3 POE Plus Compliant

24 VAC +/-10%

12 VDC +/-10%

* + - * 1. The camera power consumption shall be:

Not to exceed 13W with POE 802.03af

Not to exceed 22W with external power

* + - * 1. The camera shall be connected to power through:

Ethernet connection with IEEE 802.3af Class 3 POE power

Auxiliary power cables with external power

* + - * 1. The camera shall operate in the following environment:

Operate in a temperature range of -40º C to +50º C (-40º F to +122º F)

Operate in a humidity range of 20–80% RH (non-condensing)

Be stored in a temperature range of -10º C to +70º C (14º F to +158º F)

* + - * 1. Assembly

Vandal Resistant/Outdoor Fixed Bullet-Type Network Camera

Model 2.0W-H3-BO1-IR – 2.0 Megapixel WDR 3-9mm HD Bullet Camera

Model 2.0W-H3-BO2-IR – 2.0 Megapixel WDR 9-22mm HD Bullet Camera

Model 3.0W-H3-BO1-IR – 3.0 Megapixel WDR 3-9mm HD Bullet Camera

Model 3.0W-H3-BO2-IR – 3.0 Megapixel WDR 9-22mm HD Bullet Camera

Model 5.0-H3-BO1-IR - 5.0 Megapixel 3-9mm HD Bullet Camera

Model 5.0-H3-BO2-IR - 5.0 Megapixel 9-22mm HD Bullet Camera

These cameras shall be supplied with the H3-BO-JB junction box.

2.3 CAMERA LENSES

1. Camera lenses shall be compatible with the camera construction and iris control circuit. The lenses shall be compatible with remote control devices as specified herein.
2. All lenses shall be auto iris type driven by the camera iris control circuit. Additionally, all exterior lenses shall be equipped with spot filters giving the lens a minimum effective aperture of f/360.
3. Approximate lens size shall be as indicated on the drawings and VIDEO SURVEILLANCE SYSTEM schedule. Variable focus lenses are required for all cameras.
4. All lenses provided and installed on megapixel cameras shall be specifically designed and manufactured for megapixel camera optic applications.

2.4 CAMERA HOUSINGS AND SUPPORTS FOR FIXED CAMERAS

1. All exterior wall penetrations made for the purpose of securing camera mounting hardware to exterior surfaces shall be sealed with weather-resistant, outdoor rated sealant. Security Contractor must submit sealant colors to the Macon-Bibb County Representative for approval prior to installation.
2. All camera housings and support brackets shall be compatible with VIDEO SURVEILLANCE SYSTEM camera specified herein. Housings shall be provided with cable entrance facilities for camera control and power and shall be adaptable to mounting devices used with cameras. All mounts shall be “Feed Through” type to ensure that power, signal, and data cables are concealed. All camera housings and support brackets shall be securely attached to mounting surfaces. Escutcheon plates attached with security screws shall be used to conceal holes in walls or ceilings. Manufacturer guidelines for mounting devices and support brackets shall be adhered with unless contract details exceed manufacturer guidelines.
3. Exterior Wall Housing: Housings shall be medium-sized “Dome” environmental housings designed for wall mount applications. Domes shall be rugged, vandal resistant, and impact resistant type. Housing shall be provided with mounting hardware. Liquid-tight fittings shall be used for cable routing. All exterior housings shall be provided with tamper resistant kit, and mounting hardware. Reference manufacturer guidelines for mounting requirements.
4. Camera Housing Brackets: Camera mounting brackets shall be heavy duty type and shall he suitable for outdoor use. Bracket shall be provided with locking, swivel, adjustable head for maximum tilt angle of 60 degrees and rotation of 360 degrees when not used with pan and tilt. Wall mounting brackets shall be suitable for camera and enclosures specified and shall be rated for support of not less than 50 lbs. Brackets with extension of 610 mm or larger shall be provided with support strut. All brackets shall be feed-through type to allow concealing of cables.
5. Reference VIDEO SURVEILLANCE SYSTEM details and VIDEO SURVEILLANCE SYSTEM schedule for housing types required.
6. Acceptable manufacturer is Avigilon.

2.5 47” FLAT PANEL LCD MONITORS

1. PANEL Screen Size 47" Class

Panel Technology IPS

Aspect Ratio 16 : 9

Native Resolution 1920 x 1080 (FHD)

Brightness 300cd/m²

Contrast Ratio 1,200:1 (Typ.)

Dynamic CR 500,000:1

Viewing Angle (H x V) 178 x 178

Response Time 9ms(G to G BW)

Orientation Portrait & Landscape

1. CONNECTIVITY

Input Digital HDMI(1)

Analog RGB(1)

Audio RGB(3.5Ø 1)

External Control RS232C(1), RJ45(1), IR(1)

USB Yes(1)

Output Audio Speaker L/R

External Control RS232C(1)

1. PHYSICAL SPEC

Color Metallic Titan

Bezel Width 47" Flat Bezel : 0.33inch (L/R/U), 0.55inch (B) [8.5mm (L/R/U), 14mm (B)]

47" After Curvature : 0.51inch (L/R/U), 0.73inch (B) [13.2mm (L/R/U), 18.7mm (B)]

Monitor Dimension(W x H x D) 42.16 x 24.47 x 2.19 inch [1071mm x 621.6mm x 55.8mm]

Weight(Head) 26.89 lbs.

Monitor w/Optional Stand(W x H x D) 42.16 x 26.57 x 9.72 inch [1071mm x 675.1mm x 247mm]

Weight(Head+Stand) 27.55 lbs.

Monitor w/ Opt Stand & Spkr(W x H x D)42.16 x 26.57 x 9.72 inch [1071mm x 675.1mm x 247mm]

Weight(Head+Stand+Speaker) 29.32 lbs.

Carton(W x H x D) 45.27 x 27.95 x 5.98 inch [1150mm x 710mm x 152mm]

Packed Weight 35.05 lbs.

VESA Standard Mount Interface 400mm x 400mm

1. SPECIAL FEAT.

 Temperature Sensor Yes

ISM Method Normal, White Wash

Key Lock Yes

DPM Select Yes

Energy Saving Yes (Minimum, Medium, Maximum, Screen off)

Smart Energy Saving Yes

File Play with USB Yes

1. ENVIRONMENT

 Operation Temperature 0 °C to 40 °C

Operation Humidity 10 % to 80 %

1. POWER

Power Supply 100-240V~, 50/60HzYes

Power Consumption Typ. 73W(Typ)

Smart Energy Saving 50W(Typ)

DPM 0.5W (RGB), 0.7W (HDMI)

Power off 0.5W

1. STANDARD

 Safety UL / cUL / CB / TUV / KC

EMC FCC Class "A" / CE / KCC

ErP / Energy Star Operation Humidity Yes / Yes (Energy Star 6.0)

1. MEDIA

 External Media player Attachable Yes (MP500/MP700)

1. SOFTWARE

SuperSign-w lite / SuperSign-c Yes / Yes

1. ACCESSORY

Accessory Remote Controller(include battery 2ea), Power Cord, IR Receiver, CD(Owner's Manual,

SuperSign Program /Manual), RGB Cable

Optional Accessory SP-2100 (speaker), ST-471T (stand)

1. Articulating, wall mounted bracket: Mounting brackets shall accommodate monitor size and finish shall be black. Bracket shall be an articulating type mount so that the monitor may be tilted down for viewing by operator.
2. Acceptable manufacturers shall include LG and Panasonic.

2.6 DIGITAL VIDEO MANAGEMENT SYSTEM (DVMS)

1. The approved DVMS Manufacturers for this project is Avigilon. No substitutions shall be allowed.
2. The DVMS shall be a software-based solution designed for large installations that shall consist of multiple sites and, therefore, the base solution must utilize multiple servers to run the deployment.
3. The software solution shall be quick and easy to set up and manage. The solution shall have functionality to detect hardware. The system shall support devices from different vendors.
4. The software solution shall allow an unlimited number of cameras to be connected.
5. A system shall consist of at least one management server, one SQL server (may reside on same machine as management server), a recording server (may reside on the same machine as the management server), an optional event server (may reside on the same machine as the management server), and an optional dedicated mobile server.
6. The software solution shall have the ability to run on virtualized Windows® servers if desired by the client and if cost-effective.
7. The software solution shall have the ability to store video and audio recordings on any form of storage selected by the client including internal hard drives, direct attached storage, network attached storage, storage area network, and so on.
8. The software solution shall support archiving for optimizing recorded data storage through data storage solutions that shall combine performance and scalability with cost efficient long-term video storage.
9. The software solution shall include an alarm management function that shall make it possible to manage all alarms generated by all the components on the system, including:
10. Internal system-related events, such as motion and archiving issues.
11. External integrated events, such as video analytics, access controlled doors that have been open too long or forced open and invalid card events.
12. Other events from third-party-developed plug-ins.

1. Management server
2. A management server shall control the DVMS so that the system administrator has full control of all system components locally, or from a remote location.
3. The management server shall contain the following services, which by default shall be installed on the same server as the management server software. It shall be possible to install on other servers if required:
	1. Event server service, a service for storing and handling incoming alarm data and events. It shall enable monitoring and instant overview of alarms and possible technical problems within the system via the map function.
	2. Log server service, based on Internet Information Services, shall provide necessary functionality for logging information from the DVMS.
	3. Service channel service, based on the Internet Information Services shall enable automatic and transparent configuration communication between servers and clients in the DVMS.
	4. Data collector server service, a service for collecting performance counter values on servers and cameras that shall be used in the system monitoring function.
4. The management server shall be able to handle client login, system configurations, performance counters and logging.
5. The management server shall be able to store the system’s configuration in a relational database, either on the management server computer, or on a Microsoft SQL Server on the network.
6. Recording server
7. The software solution shall support an unlimited number of recording servers. One or more recording servers shall be used in a software solution, depending on the number of cameras or the configuration of the physical system.
8. Recording servers shall be able to record video feeds and communicate with cameras and other devices.
9. Each recording server shall have a default storage container where the database content, primarily recordings from the connected cameras, shall be stored.
10. Recordings from each connected cameras shall be stored in individual camera databases.
11. The software solution shall not limit the amount of storage allocated for each connected device.
12. Event server
13. The event server shall manage all event- and map-related communication. It shall store events, image files and map configurations, and shall make status information about the surveillance system available.
14. Mobile server
15. The mobile server shall handle communication between the software solution, and the mobile viewing client and web viewing client.
16. Clients
17. Management client
	1. The DVMS shall support a centralized management client to control the DVMS.
	2. The management client shall provide a feature-rich administration client for system configuration and day-to-day administration of the system.
	3. The management client shall typically be installed on the DVMS administrator’s workstation.
	4. The management client shall be used to authorize the recording servers connected to the system.
18. Full viewing client
19. The full viewing client shall enable operators to connect to the software solution for initial authorization. Upon authorization, the full viewing client shall be able to connect to the recording server(s), for access to video recordings.
20. It shall be possible to view live video from cameras on the DVMS from 1 to 100 per view.
21. Mobile viewing client
22. The software solution shall support a free iOS and Android compatible mobile viewing client that shall allow users to access cameras, views and recordings as well as to activate outputs and events on mobile devices (mobile phones and tablets).
23. The mobile viewing client shall connect to the software solution through a mobile server component that shall be installed on the software solution.
24. The mobile viewing client shall be able to stream live video from the mobile device’s camera to the software solution from where it can be seen live in other clients and recorded for later viewing.
25. Web viewing client (cross-platform)
26. The software solution shall support a free web viewing client accessible through Internet browsers that shall allow users to access cameras, views and recordings without installing any software.
27. The web viewing client shall support the following browsers: Internet Explorer, Mozilla Firefox, Google Chrome, Opera and Safari.
28. The web viewing client shall be able to run on the supported browsers without installing any components on the client PC.
29. The web viewing client shall connect to the software solution through a server component that shall be installed on the software solution.
30. The software solution shall allow users of the web viewing client to make video exports without transferring the data to the client PC. It shall then be possible to download exports on-demand from the web viewing client, or access them directly from the software solution system storage.
31. Standalone viewing client
32. The software solution shall include a standalone viewing client that shall be able to play back video files exported from clients in proprietary database format.
33. The standalone viewing client shall be able to play back encrypted video files in the proprietary database format.
34. System
35. Unlimited number of recording servers per system
	1. The software solution shall support an unlimited number of recording servers. One or more recording servers shall be used in a system, depending on the number of cameras or the configuration of the physical system.
36. Unlimited number of cameras per recording server
	1. The software solution shall allow for the connection of an unlimited number of cameras or other devices for each recording server.
37. Unlimited video retention time
	1. The software solution shall not place limits on video retention time, making it possible to save recorded video for as long as needed.
38. Simultaneous live, recording and playback capability
	1. The software solution shall support simultaneous live, recording, playback and export capability.
39. Remote connect services
	1. Remote connect services shall enable the DVMS to retrieve video and audio from external cameras where firewalls and/or router network configuration normally prevents initiating connections to such cameras. The communication takes place via Axis one-click connection component.
	2. Axis one-click connection component shall provide a secure connection between a camera and the surveillance system.
	3. Only devices holding a valid key shall be able to operate within the Axis one-click connection component. This shall provide a secure tunnel where data can be exchanged between public networks in a safe way.
40. Edge storage support with flexible retrieval
	1. The DVMS shall support edge storage which secures that video from cameras can be sent to the DVMS in the event that the connection between a camera and the DVMS is lost, by saving recordings on the camera’s internal storage and then sent to the DVMS once the connection between camera and the DVMS is restored.
	2. The edge storage shall secure that the camera records the video stream directly on its own internal storage, if the connection between the hardware and the recording server is terminated, for example due to recording server crash, power failure on the recording server machine, network failure or in case of a controlled shut down of the recording server. For example, in case of maintenance or upgrade.
	3. Users of the full viewing client shall be able to retrieve recordings from a camera with edge storage remote site, connected to the DVMS through an interconnected systems feature, for example buses or ships, which are then entered into the system when the bus or ships comes within network range.
	4. The DVMS shall make it possible to set up a rule or an event that retrieves recordings from a selected amount of time before scheduled recording has taken place, for example 30 minutes before scheduled recording began, which then enables full viewing client operators to view recordings from that time frame in the DVMS.
	5. The DVMS shall make it possible to set up a rule or an event that retrieves recordings from a certain time frame before scheduled recording has taken place, for example from 8 PM to 9 PM, which then enables full viewing client operators to view recordings from that time frame in the DVMS.
41. Audio
42. The software solution shall support two-way audio from a microphone at the operator’s PC to a loudspeaker mounted elsewhere, and from a microphone mounted elsewhere to a loudspeaker at the operator’s PC.
43. The software solution shall support recording of audio from speakers and microphones attached to cameras.
44. The software solution shall make it possible to enable or disable audio recording for on a per device basis.
45. Support for MJPEG, MPEG-4 SP, MPEG-4 ASP, MxPEG and H.264 compression formats
46. The software solution shall support H.264, MPEG-4 (both ASP and SP), and MJPEG compression formats for the video stream from all devices including analog cameras connected to encoders, DVRs, and IP cameras connected to the system.
47. The software solution shall support the MxPEG video compression algorithm, unique to Mobotix. MxPEG encoding shall have the capability to maintain high image quality for megapixel cameras while dramatically decreasing bandwidth consumption.
48. Support for ONVIF™ and PSIA compliant devices
49. The software solution shall support interoperability with the IP camera standards Physical Security Interoperability Alliance (PSIA) and the Open Network Video Interface Forum (ONVIF).
50. Generic device support via universal driver
51. The software solution shall include a universal driver that shall support any generic network camera. The driver must be able to handle standard video streaming formats including MJPEG, MPEG4 and H.264.
52. IP device brands and models directly supported via dedicated driver
53. A continuously updated list of supported brands and models shall be made available by the software manufacturer.
54. Multi-streaming (one or more live streams plus one recording stream)
55. The software solution shall allow live multi-streaming from the cameras in different resolutions, formats, and frame rates.
56. When running a JPEG stream, it shall be possible to record less JPEG images than the amount of JPEG images retrieved in the stream, for example receive or view live 25 images and only record 5.
57. Built-in video motion detection (VMD)
58. The VMD shall be able to detect motion on key frames or at a set interval.
59. VMD exclusion zones shall ensure that the software solution does not detect motion in selected areas of an image.
60. Set video motion detection per camera
61. The software solution shall provide the possibility to set video motion detection on a per camera basis.
62. Input, output and events
63. The DVMS shall support setting up or adding events rules or time profiles in the DVMS which shall be used for triggering actions. The DVMS shall support the following events:
	1. Hardware-related events (configurable or predefined)
	2. Device-related events (configurable or predefined)
	3. External events (Predefined, generic or user-defined)
	4. Recording server-related events
	5. Analytic events (video content analysis events from third-party integrations)
64. The DVMS shall support attaching external units, typically external sensors, to input ports on devices.
65. The DVMS shall support attaching external units to output ports on devices. This shall allow operators to, for example, turn on/turn off lights.
66. Notifications
67. The software solution shall make it possible to set notification profiles which shall allow e-mail notifications to be pre-defined and automatically sent by a rule. The software solution shall support the attachment of still images (JPEG), AVI video clips and system information to the e-mail.
68. The software solution shall act as an SNMP agent which can generate an SNMP trap as a result of rule activation in addition to other existing rule actions.
69. Pan-tilt-zoom (with patrolling and presets)
70. The software solution shall make it possible to:
	1. Change the direction and/or zoom of cameras with pan-tilt-zoom capabilities.
	2. Set unlimited preset positions per camera.
	3. Define a go-to preset on event feature.
	4. Define patrolling profiles.
	5. Combine patrolling and go-to preset on event.
	6. Set and change a scanning/transition speed.
	7. Define PTZ priorities
	8. Go to preset positions
	9. Pause patrolling at manual operation
	10. Joystick support
71. Microsoft® Active Directory support and basic users
72. The software solution shall support Active Directory to add users and groups.
73. The software solution shall support defining users directly in the DVMS.
74. Map function
75. The full viewing client shall include a built-in map function which shall provide an intuitive overview of the system and shall offer integrated access to all system components.
76. The map function shall be able to use standard graphical file formats including: JPG, GIF, PNG, and TIF.
77. The map function shall be to use an unlimited number of layered maps and to easily drag-and-drop and point-and-click icons representing cameras, servers, microphones, speakers, I/O devices, connection areas (to quickly move from one map layer to another), and PTZ presets to maps.
78. The map function shall show a video preview of the relevant camera at mouse over.
79. The map function shall support an integrated PTZ control.
80. Alarm management feature
81. The DVMS shall support an alarm management feature which shall be a single- point alarm function that shall be integrated with the map function and provide a clear and consolidated list and overview of security and system-related alarms and give instant access to cameras.
82. In the management client, the alarm management feature shall make it possible to:
	1. Set time profiles for alarms.
	2. Trigger alarms on events.
	3. Set an alarm description, work instructions and assign an initial owner of an alarm.
	4. Set a customizable alarms, priority levels, sound notifications, customizable alarm categories, alarm statuses, and customizable codes for how the alarm was resolved.
	5. View triggered alarms.
	6. Manage alarms (reassign, change status, comment, set category, status and result code).
	7. Show up to 15 related cameras in an alarm preview window.
	8. View alarm handling reports.
	9. View alarm logs.
83. In the full viewing client, the alarm management feature shall make it possible to:
	1. See an alarm list in live and playback views.
	2. Use extensive sort and filtering functions.
	3. See instant preview of primary camera and related cameras.
	4. Manage alarms (reassign, change status, comment).
	5. Integrate with map function.
	6. See an alarm description and work instructions.
	7. Perform escalation and forwarding handling.
	8. Print alarm report.
	9. See alarm location maps in alarm list.
	10. Have combined access to live and playback video.
	11. See a report of alarm handling.
	12. Use a dedicated alarm management tab that can be displayed as floating window.
84. Privacy masking
85. The management client shall allow an administrator to define privacy masks, where areas of a camera image can be blocked from a view in clients as well as in exported video material.
86. Privacy masks shall be indicated through a black blurring of the selected area, hiding the selected area(s) in the view in clients.
87. Camera navigation feature
88. A camera navigation feature shall make it possible to drag multi-level maps with cameras onto live view. This shall automatically display the positions of defined cameras in relation to each other based upon map data, for example as cameras are laid out in a floor plan either in relation to each other or relative to the current view.
89. Integration platform (software development kit SDK) for third-party application integration
90. The software solution shall support a software development kit (SDK) that shall allow for integrating the DVMS with third-party applications, for example access control, video analytics, and so on.
91. Integration of third-party developed applications and plug-ins shall be possible in three different ways: protocol integration, .Net framework-integration and plug-in integration.
92. Integration through protocol shall allow for the possibility to choose coding platform.
93. Integration through the .NET-framework shall allow for using software components to integrate with the DVMS.
94. Integration through a plug-in embedded directly into the DVMS environment shall run as part of the software solution and client applications.
95. Export
96. The software solution shall have an export function that shall make it possible to export still images and video files from the DVMS to external sources.
97. The software solution shall support the following:
	1. Export in still image format (JPEG).
	2. Export in media player format (AVI) (with or without audio).
	3. Export in proprietary database format.
	4. Encrypted export with password.
	5. Auto-export of standalone viewing client.
	6. Prevention of re-export of an exported file.
	7. Additional export-specific privacy masks.
	8. Direct export to optical media.
	9. Flexible camera selection for export.
	10. Bulk export to multiple media formats.
	11. General and camera specific export comments.
	12. Pre/post comment slides for AVI files.
	13. Verification of digital signatures in the standalone viewing client.
98. Storage
99. Archiving of recorded video
	1. The software solution shall support archiving (an automatic transfer) of recordings (archives) from a camera’s live database location to another location on a time-schedule, without the need for user action, or initiation of the archiving process.
	2. The DVMS shall make it possible to define and configure a storage container wherein archives shall be possible to archive to new locations.
	3. The DVMS shall make it possible to select a storage container for each device and move a device from one storage container to another. It shall be possible to move all un-archived recordings or to keep them in the old location.
	4. The DVMS shall make it possible to set a retention time that shall define how long recordings should stay in an archive before being deleted or archived.
	5. The DVMS shall provide an overview of the defined storage containers, their archives with path, and free and used space on the drives for each device, including the used storage space in the recording database, and in archives.
	6. Archives shall be located on either the recording server computer or on a connected network drive. If the storage container on a network drive becomes unavailable for recording, the system shall be able to trigger actions such as automatic e-mails to defined personnel.
	7. The DVMS shall make it possible to access all recordings for playback, whether the recordings are archived or not.
	8. The DVMS shall make it possible for archiving and recording processes to take place at the same time, which shall enable recording to continue when the software solution is archiving databases.
	9. The DVMS shall make it possible archive at a particular point in time, up to 24 times a day, with a minimum of one hour between each, in order to prevent that a camera database becomes full. Recordings shall be archived automatically if a camera’s database is full.
	10. It shall be possible to use network drives such as Network Attached Storage device (NAS) as an archiving location.
100. Integration
101. Video content analysis support
	1. The software solution shall support video content analysis through third- party integrations via the SDK.
102. Recording server application programming interface (API)
	1. The SDK shall offer a full API for access to the entire DVMS.
103. Client plug-in support
	1. The full viewing client and the management client shall be able to extend standard functionality through third-party plugins that enable support for video content analysis, access control or other functionality.
104. Open integration platform and/or software development kit.
	1. The SDK shall allow third-party development of functionality to integrate with the DVMS through an open platform integration.
105. Generic and user-defined events via TCP/IP
	1. The software solution shall be able to trigger events when receiving specific data sent via TCP/IP.
106. Management
107. Centralized management
	1. All aspects of system management shall be managed through a unified management client.
108. Device group support
	1. Device groups shall make it possible to specify common properties for all device types in a common device group.
	2. Device groups shall make it possible to specify rules to perform actions on a group of devices.
	3. Device groups shall make it possible to set user rights on a group of devices.
109. Client application options (profiles)
	1. The DVMS shall make it possible to set client profiles centrally.
110. System monitoring
	1. The system monitoring feature shall make it possible to view system information and create reports on:
111. Management servers (show CPU and memory usage).
112. Recording server (show CPU and memory usage and usage data for disks, storage, networks and cameras).
113. Failover servers (show CPU and memory usage).
114. Additional servers (show CPU and memory usage on log servers, events servers, and so on.
115. Cameras (such as camera status, if the individual camera is recording, the recording server the camera is connected to and more).
116. Time schedule-controlled user access to devices and functions
	1. The software solution shall make it possible to set a time profile on a role that shall only give access to various functionalities within a specific period of time.
117. Day length time profile
	1. The software solution shall make it possible via GPS coordinates to set day length time profile that adjusts sunrise and sunset time as well as daylight saving time for cameras placed outside in areas where the day length changes throughout the year.
118. Configuration reports
	1. The DVMS shall support a functionality to generate a PDF that shall document all parts of the system configuration, including preview of video.
119. Automatic device scanning with automatic device model detection
	1. The software solution shall be able to scan a network for hardware device and list these in real-time as they are detected.
	2. The software solution shall be able to recognize relevant hardware devices, such as cameras and video encoders, and include them in the device scanning process.
120. Device replacement wizard
	1. A device replacement wizard shall make it possible to replace an already added and configured hardware device with a new hardware device.
121. Run servers as Windows Services
	1. The software solution shall run the recording server, mobile server and event server as Windows Services.
122. Scheduled start/stop of devices
	1. The software solution shall have the possibility to schedule or create an event that shall make it possible to set when a device shall be on/off.
123. Backup and restore of configuration data
	1. The software solution shall be able to manually backup and restore configuration data.
	2. The software solution shall be able to be programmed to automatically back-up system configuration data based on date and time.
124. System configuration restore points
	1. The software solution shall include system configuration restore points that shall make it possible to return to a previous configuration state.
	2. The software solution shall generate a new restore point each time a configuration change is applied in the software solution.
125. Online and offline activation
	1. The software solution shall support activation of license files either via online or offline activation.
	2. Online activation shall only be possible if the software solution server has Internet access.
126. Interconnected systems
127. The DVMS shall connect the high-end DVMS with most other DVMS versions made by the software manufacturer through an interconnected systems functionality.
128. The interconnected system functionality shall make it possible to have a central site for surveillance monitoring and evidence handling that shall operate geographically scattered remote sites.
129. The remote site shall connect to the central site through a designated device driver, as a multi-channel video encoder with edge storage support. Cameras from the remote site shall provide the same access to live and playback of video on the central site as cameras connected directly to the central site.
130. The remote site using the interconnected systems functionality shall operate as a full and separate DVMS system.
131. The interconnected systems feature shall allow the following settings for recording:
	1. Recording on the remote site only, which shall keep all recording and playback locally on the remote site. No recording shall be done on the central site, however it shall be possible to view live and recorded video and audio from the central site.
	2. Recording on the central site only, which shall stream all video and audio from the remote site to the central site, at which all recordings of video shall take place. It shall not be possible to play back recordings on the remote site, however operators of the central site shall be able to view live and recorded video and audio.
	3. Recording on both the remote site and the central site, which shall record video on both the central and remote site. It shall be possible to schedule recordings, create an event or through an operator request to transfer (copy) video from the remote site to the central site. This shall make it possible to transfer all or selected recordings from the remote site to the central site at a later time in case the connection between the central and the remote sites is broken.
132. In the full viewing client on the central site, it shall be possible to retrieve recordings from remote sites through rules set up in the DVMS.
133. The interconnected systems functionality shall require that a role is set up and assigned to have access to functions on cameras from remote sites.
134. The interconnected systems feature shall make it possible to transfer recordings from mobile means of transportation with surveillance that are not always connected to a network, for example busses, trains, ferries, once the mobile vehicle/boat connects to the network to which the central site is connected. It shall be possible to request recordings from the vehicle or boat, which shall then be transferred to the central site once the vehicle or boat is connected to the central site’s network.
135. The DVMS shall require a dedicated device license for each interconnected camera that is enabled on the central site. If a camera is disabled from the central site, it shall not take up a camera license until it is enabled again.
136. Logging
137. The software solution shall provide the following logs:
	1. System logs
	2. Event logs
	3. Audit logs
	4. Rule logs
138. Viewing clients
139. The basic functionality of the full viewing client, the mobile viewing client and the web viewing client is listed in chapter 1.
140. Video wall application (add-on)
141. The video wall application shall:
	1. Be hardware agnostic (open platform).
	2. Support an unlimited number of video wall displays.
	3. Show an unlimited number of concurrent video streams.
	4. Show a minimum of 100 video streams per display.
	5. Support presets for display layout and camera contents.
	6. Support a rule-based and manual control of layout and content.
142. Transactional data solution
143. The transactional data solution shall enable the operator to search and view transaction data from third-party systems that are time-linked with video recordings of the relevant transaction activities.
144. The transactional data solution shall integrate digital video surveillance images with Point of Sale (POS) or Automated Teller Machine (ATM) transaction data.
145. License plate recognition solution
146. The license plate recognition (LPR) solution shall be video-based content analysis (VCA) and recognition of vehicle license plates.
147. The license plate recognition solution shall be able to trigger recordings in the DVMS in a particular quality, match against positive/negative lists, open gates, switch on lights, push video of incidents to computer screens of particular members of security staff, send mobile phone text messages, and shall be able to do this all at once.
148. Screen recording service
149. The screen recording service shall enable a computer with Windows installed to act as an IP video camera, sending the contents of its desktop to the recording server to which it is connected.
150. The screen recording service shall consist of a small service to install on one or more Windows computers, and a camera driver to apply to the management client.
151. The screen recording driver shall only be able to connect to and request video from a computer with the screen recording service installed.
152. Software manager utility
153. The software manager utility shall offer a centralized platform from which to install, uninstall and upgrade large-scale, multi-server installation of the software solution.
154. The software manager utility shall make it possible to quickly deploy and upgrade the software solution from a single software application.

2.7 GIGABIT POE ETHERNET NETWORK SWITCHES

1. Ethernet switches shall be U.L. listed and shall minimally meet with all regulatory agency approvals specifications as the recommended models. Provide the following HP network switches and related supporting equipment in applicable distribution frames:

1. NVR, IDF and MDF switches: quantity as applicable.

2. Spare Capacity: Provide minimum six (6) spare switch ports in each distribution frame.

3. Each switch port shall be capable of providing adequate power to the cameras.

1. All switches to be mounted in standard 19” racks, interconnected and configured by the Contractor per the Owner’s instructions. Contractor shall provide and connect all patch cords to these switches as specified. Provide a single sided horizontal wire manager below each switch in racks.
2. All switches must support QOS. All switches should support minimally: IEEE 802.1p COS, and DSCP.
3. All switches shall support rate-limiting based on source/destination IP address, source/destination MAC address, or Layer 4 TCP/UDP information.
4. Additional standards that must be supported: IEEE 802.3ad, IEEE 802.1Q, 802.1D, 802.1x and 802.3af for Power over Ethernet switches (POE).
5. Specified manufacturers for Ethernet switches shall be HP ProCurve or equivalent. Substitutions shall be allowed with prior approval.

2.8 POE INSERTERS

1. Minimum configuration shall be:
2. 10/100/1000 Mbps pass through rate
3. Each device / port shall meet IEEE POE or upcoming IEEE POH

Standards

1. Minimum number of ports shall be 12. See Contract drawings to verify the exact quantity of ports required at each facility. Note that spare ports are required for future expansion.
2. POE power options shall be 30, 36 or 72 watts.
3. Acceptable manufacturers shall be PowerDsine. Substitutions shall be allowed with prior approval.

2.9 POE Extenders

1. Minimum configuration shall be:
2. 10/100/1000 pass through rate.
3. Each device / port shall meet EEPOE standards.
4. Each port extends data and POE connections 200 meters.
5. Acceptable manufacturers shall be PowerDsine or Veracity. Substitutions shall be allowed with prior approval.

2.10 APPLICATION AND STORAGE SERVERS

1. The Security Contractor shall provide and install all VMS Server computer hardware, Operating System, Database Engine and Network Storage devices.
2. The Security Contractor and VMS Manufacturer shall provide written specifications, for the items described above. Then be responsible for certification of these items prior to installation and after system has been commissioned.

2.11 WORK STATIONS

1. The Security Contractor shall provide and install all workstations. The Security Contractor and VMS Manufacturer shall provide written specifications, for the workstations. Then be responsible for certification of these items prior to installation.
2. The Security Contractor shall provide the workstations utilized to drive the video display monitors in the Security Command Center for installation, set-up, and programming by the contractor.

2.12 COPPER WIRING REQUIREMENTS

1. Contractor shall be a certified H2Max contractor and execute installation in accordance with HellermannTyton and Hitachi Cable America H2Max Lifetime Warranty requirements.
2. Contractor shall warrant all materials and workmanship in accordance with industry best practices to provide a working standards compliant system as specified in ANSI/TIA/EIA-568 standards.
3. HellermannTyton warrants all manufactured components will be free from defects in material.
4. Hitachi Cable America warrants all manufactured components will be free from defects in material.
5. HellermannTyton and Hitachi Cable America guarantee installed system to exceed TIA/EIA standards.
6. HellermannTyton and Hitachi Cable America warrant that: (i) the HellermannTyton Connectivity Products and the Hitachi Cable America Cable (defined below) included in your structured cable system (the "System") will be free from defects in materials and workmanship; and (ii) the system will perform as specified in ANSI/TIA/EIA-568 applicable to Cat 6A, Cat 6, and Cat 5e cable systems. As used herein, HellermannTyton Connectivity Products and Hitachi Cable America Cabling Products (the "Products") means such products as may be covered by the H2MAX Structured Cabling System Warranty Program (the "Program") as in effect on the date the System is installed as follows: (i) the System is installed by an installer who is an H2Max Certified Installer as of the date the System is installed; (ii) the installer installs the System in accordance with the installation and testing standards set forth in the Program as in effect on the date the System is installed; and (iii) any changes or modifications to the System are installed and tested in accordance with the Program as in effect on the date of such change or modification. The H2MAX Program warranty is a lifetime warranty effective upon receipt and approval of installation registration, and test documentation.
7. Category 6 – H2Max System

Cabling system performance shall be guaranteed to exceed TIA/EIA-568-B.2-1 Category 6 and ISO Class E requirements.

Approved Manufacturer(s):

Connecting Hardware – HellermannTyton

Twisted Pair Copper Cable – Hitachi Cable America

1. Keystone Modular Jack, Category 6

 The modular jack shall be designed with 10 pin cross talk reducing technology. The contact set shall be constructed of phosphor bronze material with 50 micron gold plating. The jack shall be a standard keystone style interface and configured to accept both 568A and 568B wiring schemes. The jack shall be designed with staggered contacts and provide a strain relief design to secure cable terminations. These RJ45 jacks shall be factory tested a minimum 200 times with an RJ11 plug to ensure no contact damage, and be able to sustain 1,000 insertions.

* + 1. HellermannTyton RJ45FC6-X

 X – Denotes Color (FW=Office White, W=White, I=Ivory, GRY=Gray, BLK=Black, YEL=Yellow, ORN=Orange, BRN=Brown, BLU=Blue, GRN=Green, VIO=Violet, RED=Red)

1. Patch Panels, Universal, Category 6

 The patch panels shall be designed with 10 pin cross talk reducing technology. The panels shall be designed with a flush front face and labeling for easy identification. The panel shall be provided with 6 port module configured for 568A or 568B wiring scheme and utilize a clear plastic channel to protect the printed circuit board. Panel shall be designed to accept optional lightweight aluminum Zero U rear cable management.

* + 1. 24 Port, 1U, HellermannTyton PP110C624
		2. 48 Port, 2U, HellermannTyton PP110C648
1. Patch Panels, AlphaSnap®, Category 6 with Rear Cable Manager

 The patch panels shall be designed with 10 pin cross talk reducing technology. The panels shall be designed with a flush front face and a slide label system protected under a clear plastic finish for easy identification. The panel shall be designed with single port modules configured for 568A or 568B wiring. Panel shall be provided with a lightweight aluminum Zero U rear cable management.

* + 1. 24 Port, 1U, HellermannTyton PP110C6G24
		2. 48 Port, 2U, HellermannTyton PP110C6G48
1. Patch Cords, Category 6 UTP

 Patch Cords shall be of a slim line design with strain relief boots. All Patch cords must be ETL tested and approved as component compliant.

1. HellermannTyton PC6XXYYSC

 XX – Denotes color (BLU=Blue, BLK-Black, YEL=Yellow, GRN=Green, RED=Red, GRY=Gray, W=White)

 YY – Denotes length (3, 5, 7, 10, 14, 20 ft.)

1. 110 Wiring Blocks, Category 6 Rated

 Category 6, 110 Wiring blocks shall be designed with IDC spacing to provide superior NEXT performance. The blocks shall be provided as block base, block base with legs, block kits, and rack mountable kits. Product shall be offered in 48, 96 and 288 pair blocks. Product must be ETL tested and approved as Component Compliant.

* + 1. 48 Pair Wiring Block Base, HellermannTyton T110WB48
		2. 288 Pair Wiring Block Base, HellermannTyton T110WBL288
		3. 96 Pair Kit w/ legs and C4 clips, HellermannTyton T110KIT964
		4. Cable Trough, HellermannTyton T110CT
		5. 192 pair 110 Kit w/ C4 clips, HellermannTyton T110RM192-4
		6. 1U Rack Mt. Cable Trough, HellermannTyton T110RMCT
1. Category 6, 4-Pair UTP Riser Rated Cable
	* 1. Hitachi Cable America 30024-8 (HCM-PLUS)
2. Category 6, 4-Pair UTP Plenum Rated Cable
	* 1. Hitachi Cable America 30025-8 (HCM-PLUS)
3. All CAT 6 Video Surveillance System cable shall be a common color and terminated.
4. All copper VIDEO SURVEILLANCE SYSTEM video cabling shall be CAT 6 plenum rated cable throughout all the facilities. Minimum bend radius for CAT 6 plenum cable shall be 12”.
5. Data cables shall be 100 Ohm, 0.5mm, un-shielded twisted pair (UTP), 23 AWG, plenum rated with solid copper conductors. Cables shall exceed ANSI/TIA/EIA-568-B.2 Category 6 requirements and the spool shall be labeled as such. Cables shall be tested to 250 MHz. Cables shall be UL or ETL verified to exceed Category 6 requirements and cable jacket shall be labeled to indicate verification.
6. Approved CAT 6 cabling manufacturer shall be Hitachi and provide a lifetime performance manufacturers backed warranty.

2.13 CATEGORY 6 CONNECTIVITY

1. Each jack shall be power sum rated, with a power sum NEXT performance equal to or better than the ANSI/TIA/EIA-568B.2-1 Category 6 pair-to-pair NEXT performance specifications.
2. Each jack shall be T568B wiring configuration.
3. Approved CAT6 connectivity manufacturers shall be Hitachi and HellermannTyton or approved equal with prior written approval.
	1. FIBER OPTIC
		1. Cable shall be six (6) strands, dielectric armored, plenum rated, multimode, and laser optimized fiber optic. This will connect the new Security Office within the Centreplex Concourse level to the Copier room on same level. Manufacturer of fiber optic cabling shall be Hitachi or approved equal with prior written approval.
		2. Fiber – H2Max Cabling System

Fiber cabling system shall meet requirements of IEEE 802.3 standards to support horizontal cabling systems including 100BASE-SX, 1000BASE-SX, 1000BASE-LX and 10GBASE-SX and 10GBASE-LX4

 Approved Manufacturer(s):

Connecting Hardware – HellermannTyton

Fiber Optic Cable – Hitachi Cable America

1. Fiber Indoor Multimode Multi Unit Cable

1. OM1 Fiber Optic Cable, 62.5µm Multimode
2. OFNR 6 Fiber, Hitachi Cable America 60515-6
3. OFNP 6 Fiber, Hitachi Cable America 60517-6
4. Fiber Optic Pre-polished Connectors – Multimode

Fiber connectors shall be pre-polished and terminated in the field without special assembly tools or epoxy. Maximum Insertion loss shall be no greater than 0.5dB

1. OM1 Fiber Optic Connector, 62.5µm Multimode
	* 1. LC Connector, HellermannTyton PFCLC
		2. SC Connector, HellermannTyton PFCSC
		3. ST Connector, HellermannTyton PFCST
2. Optional Fiber Optic Connectors – Multimode

Fiber connectors shall utilize pre-radiused zircon ceramic ferrules and allow for installation using either epoxy or anaerobic adhesive will be accepted alternative

* + 1. LC Connector, HellermannTyton FCLC
		2. SC Connector, HellermannTyton FCSC
		3. ST Connector, HellermannTyton FCST
1. Fiber Connector Adapter Panels

 All adapter panels shall utilize high performance zirconia ceramic and phosphorous-bronze split sleeve inserts for minimal insertion loss. All adapter panels shall utilize a snap lock mounting fixture for easy snap in installation in to the enclosures.

* + 1. 6 Duplex LC MM/SM, HellermannTyton FAP6DMMLC
		2. 6 Simplex SC MM/SM, HellermannTyton FAP6SMMSC
		3. 6 Duplex SC MM/SM, HellermannTyton FAP6DMMSC
		4. 6 ST MM/SM, HellermannTyton FAP6MMST
		5. 6 MTRJ MM, HellermannTyton FAP6MTRJ
1. Fiber Optic Modules

 Fiber modules shall be multimode and designed with standard Keystone interface dimensions for installation in standard flush face plates.

* + 1. LC Fiber Module, HellermannTyton LCINSERT-X
		2. SC Fiber Module, HellermannTyton SCINSERT-X
		3. ST Fiber Module, HellermannTyton FIBERINSERT-X
		4. MTRJ Fiber Module, HellermannTyton MTRJINSERT-X

 X – Denotes Color (FW=Office White, W=White, I=Ivory)

1. Fiber Enclosures - Rack Mount

Rack mount fiber enclosures shall be designed with front slide out trays and removable front and rear access lids. Enclosures shall have tinted plexiglass window for 2-4U units with all models equipped with built in cable management to maintain bend radius. Rack mount enclosures shall fit 19” or 23” racks and accept standard fiber adapter panels.

* + 1. 18/24 fiber unloaded, HellermannTyton FERM18S
1. Fiber Enclosures - Wall Mount

Wall mount fiber enclosures shall be designed to support two or four fiber adapter panels and come equipped with built in cable management to maintain bend radius. The enclosures must accommodate a one splice tray for the units of 12/16 fiber, and two splice trays for units of 24/32 fiber. Units must provide locking option.

* + 1. 12/16 fiber unloaded, HellermannTyton FEWM12
		2. 24/32 fiber unloaded, HellermannTyton FEWM24
1. Fiber Assemblies

 All Multimode Fiber Assemblies shall provide typical insertion loss less than .5dB per connection.

1. Duplex Multimode Fiber Assemblies
	1. 62.5/125 µm Fiber - OM1
		1. LC-LC Duplex Assembly, HellermannTyton FAXLCLC
		2. LC-SC Duplex Assembly, HellermannTyton FAXLCSC
		3. LC-ST Duplex Assembly, HellermannTyton FAXLCST

 X – Denotes length (1, 2, 3 meter)

 Other options that shall be available include ST-SC, SC-SC,

 MTRJ-ST, MTRJ-SC and MTRJ-MTRJ

* 1. 50/125 µm Fiber - OM2
		1. LC-LC Duplex Assembly, HellermannTyton FAXLCLC50
		2. LC-SC Duplex Assembly, HellermannTyton FAXLCSC50
		3. LC-ST Duplex Assembly, HellermannTyton FAXLCST50

 X – Denotes length (1, 2, 3 meter)

 Other options that shall be available include ST-SC, SC-SC,

 MTRJ-ST, MTRJ-SC and MTRJ-MTRJ

* 1. Laser Optimized 10G 50/125 µm Fiber - OM3
		1. LC-LC Duplex Assembly, HellermannTyton FAXLCLC10G

 X – Denotes length (1, 2, 3 meter)

* + 1. Ceramic LC laser optimized connectors manufactured by Corning, CommScope, Hitachi or approved equal with prior written approval.
		2. Fiber Optic Rack Mount Enclosures needed where all fibers are to be terminated. Use 12 pair LC adapter panel capacity fiber optic rack mount enclosure with fiber optic cable routing accessory kit and 12 pair LC adapter panel with phosphor bronze sleeves. Manufactured by Hitachi and HellermannTyton or approved equal with prior written approval.
	1. SURFACE MOUNT BOXES
1. Surface mount boxes shall house two jacks.
2. Bases shall be installed with two screws to building structure.
3. Boxes shall be compatible with connectivity.
4. Blanks shall be provided for each unused port.

2.16 CABLE MANAGEMENT

1. Horizontal Cable Management
2. The horizontal wire manager shall be compatible with 19-inch equipment racks and cabinets.
3. The horizontal cable manager shall provide support for patch cords at the front of the panel.
4. The horizontal wire manager shall be equipped with management fingers and covers.
5. The horizontal cable manager shall be 2 rack-units in height.
6. Acceptable Manufacturers & Products include:
7. Hoffman
8. Chatsworth
9. Approved equal

2.17 WIRING DUCT

1. Security Contractor shall provide surface mount raceway in control room for routing of video and data cables.
2. Wiring duct shall be typical to Hubbel PS3 series.
3. Wiring duct shall be painted to match existing wall color.

2.18 UNINTERRUPTIBLE POWER SUPPLY (UPS)

1. Uninterruptible power supply (UPS) Units shall be provided and installed for all active Video Surveillance System equipment including:
2. Wall or rack mounted video monitors in Main Control Room, Remote Control Rooms and Administrative Offices where viewing monitors might be installed.
3. All locations where Video Surveillance System viewing and archiving workstations are installed.
4. All locations where Video Surveillance System servers and archiving equipment / hardware is installed.
5. All locations where Video Surveillance System network switches, routers, fiber optic receivers and transmitters are installed.
6. VIDEO SURVEILLANCE SYSTEM head end equipment in the VIDEO SURVEILLANCE SYSTEM Equipment Rack must be powered by UPS.
7. 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.
8. The UPS installed at the VIDEO SURVEILLANCE SYSTEM Equipment Rack shall be an on-line double conversion UPS which shall have the following minimum features:
9. Audible Alarms.
10. Automatic Self-Test.
11. Automatic Voltage Regulation (AVR).
12. Building wiring fault indicator.
13. Hot Swap Batteries with Intelligent Battery Management.
14. Lightning and Surge Protection.
15. Line-interactive.
16. Load Meter.
17. Network-grade line conditioning.
18. Overload Indicator.
19. Rack Mount.
20. Replace Battery Indicator.
21. Sine-wave output.
22. Status Indicator LED's.
23. UPS shall have the ability to handle crest factor ratios of 2.5 or above.
24. UPS shall provide continuous (no-break power) during momentary or complete blackouts.
25. 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).
26. 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.
27. UPS shall meet ANSI C84.1 requirements.
28. UPS and batteries shall be sized to 150% output VA required and 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.
29. Furnish calculations with shop drawings verifying UPS sizing in compliance with these specifications.
30. Uninterruptible power supply (UPS) for video workstation or video network switches shall be a minimum of 1000 Watts.
31. Uninterruptible power supply (UPS) for Video Equipment cabinets shall be a minimum of 1.5 KVA

2.19 TRANSIENT VOLTAGE SURGE SUPPRESSION (TVSS)

1. Protect all exterior cameras (analog & IP) equipment against surges induced on all control, video, and power cables. All copper cables and conductors which serve as 120V power, control, or video conductors shall have surge protection circuits installed at each end and locations where conductors enter or exit a building. Fuses shall not be used for surge protection.
2. Surge suppression devices shall meet the following standards/publications:
3. UL 497B
4. UL 1449 (must meet 330 Volt suppression rating)
5. IEEE Category B impulse and ring wave tests
6. Acceptable Manufacturers: Ditek. Product shall be warranted against defect for a period of not less than five (5) years.
7. 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.
8. 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.
9. 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.

2.20 VIDEO EQUIPMENT CABINETS

1. The Security Contractor shall be required to provide and install free standing Data Racks or Video Equipment Cabinets as noted on the drawings.
2. Equipment Racks that are provided and installed by the Security Contractor must meet the following requirements:
3. Racks must be rated for the combined and total weight of all equipment installed in the rack.
4. Horizontal and vertical wire management must be provided and installed on sides and back of the rack.
5. No cable will be routed into the rack without proper cable management and tie-wraps or wiremold.
6. Power strips, power supplies and other miscellaneous equipment will not be allowed to lie on the floor. 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.
7. All active components must be mounted with 1 Unit of space on top and bottom to allow for proper airflow.
8. Approved manufactures are APC, Hoffman, Middle Atlantic Products or approved equal.

**PART 3 - EXECUTION**

3.1 INSTALLATION

1. 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.
2. 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.
3. Surge Protection:
4. 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.
5. 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 withstand capability test. Fuses shall not be used for surge protection.
6. Power: All interior and exterior cameras shall be powered from central power supplies in the security equipment rooms.

3.2 TESTING

1. Materials and documentation to be furnished under this specification are subject to inspections and tests. All components shall be terminated prior to testing. Equipment and systems will not be accepted until the required inspections and tests have been made, demonstrating that the video distribution system conforms to the specified requirements, and that the required equipment, systems, and documentation have been provided.
2. The Security Contractor shall complete the Commissioning Form (provided as part of the Bid Document Package). The form must be completed and signed off by the Security Contractor prior to Final Inspection. Final Inspection of the equipment and systems will not be granted until the required inspections and test have been completed by the Security Contractor.

3.3 STRUCTURED CABLING PLANT COMMISSIONING

1. General
2. All cables and termination hardware shall be 100% tested for defects in installation and to verify cabling system performance under installed conditions according to the requirements of ANSI/TIA/EIA-568-B.1-3. All pairs/strands of each installed cable shall be verified prior to system acceptance. Any defect in the cabling system installation including but not limited to cable, connectors, feed through couplers, patch panels, and connector blocks shall be repaired or replaced in order to ensure 100% useable conductors/strands in all cables installed.
3. Copper Testing
4. All twisted-pair copper cable links shall be tested for continuity, pair reversals, shorts, opens and performance as indicated below. Additional testing is required to verify Category 6 performance. Horizontal balanced twisted pair cabling shall be tested using a level III test unit for category 6 compliance (data).
5. Continuity - Each pair of each installed cable shall be tested using a test unit that shows opens, shorts, polarity and pair-reversals, crossed pairs and split pairs. The test shall be recorded as pass/fail as indicated by the test unit and referenced to the appropriate cable identification number and circuit or pair number. Any faults in the wiring shall be corrected and the cable re-tested prior to final acceptance.
6. Length - Each installed cable link shall be tested for installed length using a TDR type device. The cables shall be tested from patch panel to patch panel, block to block, patch panel to outlet or block to outlet as appropriate. The cable length shall conform to the maximum distances set forth in the ANSI/TIA/EIA-568-B.1-3 Standard. Cable lengths shall be recorded, referencing the cable identification number and circuit or pair number. For multi-pair cables, the shortest pair length shall be recorded as the length for the cable.
7. Cables extended with POE Ethernet extenders, each cable link shall be tested.
8. Test Results
9. Test documentation shall be provided on disk as part of the as-built package. The disk shall be clearly marked on the outside front cover with the words "Project Test Documentation", the project name, and the date of completion (month and year). The results shall include a record of test frequencies, cable type, conductor pair (or strand) and cable (or outlet) I.D., measurement direction, reference setup, and crew member name(s). The test equipment name, manufacturer, model number, serial number, software version and last calibration date will also be provided at the end of the document. Unless the manufacturer specifies a more frequent calibration cycle, an annual calibration cycle is anticipated on all test equipment used for this installation. The test document shall detail the test method used and the specific settings of the equipment during the test as well as the software version being used in the field test equipment.
10. The field test equipment shall meet the requirements of ANSI/TIA/EIA-568-B.1-3.
11. Printouts generated for each cable by the wire test instrument shall be submitted as part of the documentation package. Alternately, the Security Contractor may furnish this information in electronic form (CD). These diskettes or CDs shall contain the electronic equivalent of the test results as defined by the bid specification and be of a format readable from Microsoft Word.
12. When repairs and re-tests are performed, the problem found and corrective action taken shall be noted, and both the failed and passed test data shall be documented.

3.4 LABELING

1. Cable labeling:
2. All cable and wire installed for VIDEO SURVEILLANCE SYSTEM Systems shall be properly tagged. Use the following standard labeling scheme to identify the physical location of both ends of each cable. Use provided map.
	1. Designate closet (ex. IDF “A”, “B” or Head End(HE))
	2. Use camera number from supplied map. Use one number per cable.
	3. Format Example (A-7 or HE-9)
3. Complete two (2) labels for each cable, one for each end. Secure label to end of cable, within view of the termination of the cable at each end. Labels shall be white with a protective wrap-around plastic transparent cover that will serve to protect the ink from smearing and secure the label to the cable. All labels shall be typed with black ink.
	1. TRAINING
		1. 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. Training sessions shall be conducted by instructors certified in writing by the manufacturer of the specific system.
		2. Training session requirements shall include individual sessions for each facility. Training session schedules shall conform to the requirements of the owner; therefore such schedules shall be submitted to the owner for approval not less than two weeks prior to the training session. Training sessions shall include instruction on changing camera text identifiers, adding cameras to the system, changing camera viewing displays in the Security Control Room and saving stored video to CD or DVD.
		3. Time to be included in base Contracts for specific systems shall be as follows:
4. The total number of hours shall be four (4) with 2 hours of training to be provided prior to system acceptance and an additional 4 hours provided upon a request from Macon Bibb County Representative and 30 days after the system is fully operational.

**END OF SECTION**