davisdesign
making ideal happen

ADDENDUM
(AD)

PROJECT: ***Nebraska Department of Correctional Svcs***
Community Corrections Center - Omaha
Security Camera Upgrade
Omaha, Nebraska

AD NO.: ***2***

DATE: ***December 1, 2023***

DAVIS DESIGN PROJECT NO.: ***22-0112***

ISSUED BY: ***Jon Dalton, Coordinating Professional***
Igor Abadzic, Security Consultant

This addendum is issued by the Architect to all known bidders before receipt of proposals, for the purpose of explaining, interpreting, or modifying the original plans and specifications. When enumerated by the bidder upon the proposal sheet, the information or instructions given hereon will be equally binding upon all parties as if included in the original plans and specifications.
BIDDER MUST ENTER THE NUMBER OF THIS ADDENDUM ON HIS PROPOSAL SHEET

THE FOLLOWING ITEMS ARE APPLICABLE TO THE SPECIFICATIONS:

AD-2, ITEM #1:

In reference to Section 28 2300 Video Management and Recording System, see attached replacement section.

THE FOLLOWING ITEMS ARE APPLICABLE TO THE DRAWINGS:

AD-2, ITEM #2:

In reference to Sheet ES5.01 – CAMERA SCHEDULE, see attached sheet for revisions.

END AD-2

SECTION 28 2300

VIDEO MANAGEMENT AND RECORDING SYSTEM

PART 1 - GENERAL

1.1 DESCRIPTION

A. General:

1. Furnish all labor, materials, tools, equipment, and services for all video surveillance systems as indicated, in accordance with provisions of Contract Documents.

2. Completely coordinate with work of all other trades.

3. Although such work is not specifically indicated, furnish and install all supplementary or miscellaneous items, appurtenances and devices incidental to or necessary for a sound, secure and complete installation.

4. See Section 280510 for Electronic Systems General Requirements.

5. See Division 1 for General Requirements.

1.2 BASIS OF DESIGN

A. The scope of this project includes replacement of all existing analog cameras, selected number of existing IP cameras (refer to ES series drawings) video viewing stations and video surveillance system head-end equipment (including but not limiting to servers, video storage, media converters, etc.). New cameras shall be IP based, high definition and POE cameras. All new cameras shall be manufactured by Bosch (to match NDCS standard). **ADD#2** ~~**AXIS (or**~~ (Hanwha) multisensory camera with integrated PTZ unit shall be used at locations indicated on the drawings and camera schedule. New video management software shall be the latest available version of Bosch VMS (BVMS 11.1). All cameras shall be recorded, and video storage shall be sized to retain video recording for 90 days. All cameras shall be continuously recording at native resolution at 15 images per second. Quiet time recording (no motion) shall be at native resolution and 2 images per second. The motion shall be estimated at 70%.

B. The upgraded video management system shall NOT be interfaced and integrated with the existing electronic security control system to allow display of all new camera icons on the existing touch screen maps for cameras call-up feature.

C. The existing CAT6 cables shall remain for reuse. All CAT6 cables that are planned to be reused shall be tested to confirm uncompromised signal strength. All cables failing this test shall be replaced with the new fiber optic cable for exterior cameras and CAT6 for interior cameras.

D. All new video system components shall be connected to network switches via CAT6 cable using patch panels. If any cable length between a component (camera, workstation, etc.) and a network switch, including slack, exceeds 300', provide new fiber optic cable, media converters and power supplies to support camera and media converter operation. Provide power for media converters from approved UPS circuits. All underground CAT6 runs shall be in conduit and shall utilize direct-burial rated cable.

E. Work shall be phased to install all new infrastructure and servers, etc. in place prior to removing existing surveillance equipment. Coordinate with the owner for the phasing of work by area. A phasing plan shall be submitted for owner approval prior to commencement of work. Downtime of existing systems shall be kept to a minimum during the course of the installation.

F. Network switches shall be provided by the NDCS OCIO. Patch panels and associated head end patch cables shall be provided and installed by the contractor.

G. All exiting video surveillance equipment (included but not limited to cameras, video monitors, servers and recorders, etc.) shall be removed and returned to the owner.

H. New video management system equipment and all system components shall be powered from the back-up power systems with additional backup from uninterruptible power systems. New UPS backup shall be used for a minimum of 10 minutes at fully connected load. Refer to “E” series drawings for the power requirements.

I. All security integrator provided hardware (including but not limited to CPUs, IP cameras, monitors, servers, etc.) and software shall be the latest available products on the market at the date of the project implementation and no more than 6 months prior to the system installation.

J. The system shall provide full video control, with additional full selection capability at any point within the network from any workstation or a video console display. The security video system shall provide expansion capability for the addition or modification of the system.

K. The system shall permit normal monitoring and analytics monitoring of all secured areas on monitors as shown in the specifications and drawings. Video monitoring consoles shall be installed as shown on the drawings and described in these specifications. In all cases, the equipment shall be state of the art, standardized commercial off-the-shelf, and modular. In all cases, the method of communication from remote locations within the network to the central components shall be transparent to the user. Equipment shall be selected and installed so repairs may be accomplished on site by module replacement, utilizing spare components whenever possible.

L. The Contractor shall furnish and install all security video cameras, mounts, housings, power supplies, network cables, connectors, equipment racks, monitors and consoles, computer-controlled network switches, workstations, network storage, encoders, decoders, video console displays and all other hardware and software to provide a fully operational system.

M. All licensing for cameras and software shall be included and no recurring license fees shall apply. The NDCS has standardized Bosch BVMS (latest version) software – it shall be purchased with all upgrades to allow the owner to replace cameras without additional license fees or software upgrade fees for the life of the system.

N. The video management and recording system specified is an enterprise-class client/server-based IP video security solution that provides seamless management of digital video, audio and data across an IP network. The system is designed to work with CCTV and ONVIF compliant 3rd party products as part of a total video security management system to provide full virtual matrix switching and control capability. Cameras, recorders, and viewing stations may be placed anywhere in the IP network.

O. The system shall provide multi-level diagnostics of each component in all critical areas. These diagnostics shall be reported to a diagnostic console for processing. In addition, the diagnostic data shall be capable of being scripted into actionable events within the system.

P. The system shall be able to handle future expansion of an unlimited total capacity from what is shown in the drawings, including but not limited to cameras, monitors, workstations and keyboards.

Q. The system shall be installed by a manufacturer certified dealer/integrator. Certification for installation shall be conducted by the manufacturer and shall provide all necessary knowledge to fulfill the systemization and deployment across diverse networks and infrastructures, as well as provide commissioning abilities at the integrator level.

R. All the cameras shall be mounted within housings suitable for the environment in which they are placed. Exterior wall mount cameras shall be mounted so that the conduit penetrations into the building will enter into the plenum space above the interior ceiling. Coordinate final heights with owner.

S. Each typical camera mounting location shall be field verified prior to installation to confirm best video coverage. Obstructions to the intended view shall be called out to the owner and Engineer prior to final mounting. Video coverage shall be approved either by the owner and submitted to the Engineer.

T. Provide user-programmable title and camera number for each camera. Coordinate titles with owner. All camera titles for the new and the existing IP cameras (that will be reused) shall be coordinated with the owner.

1.3 QUALITY ASSURANCE (SEE SECTION 280510)

A. Work shall be performed in accordance with the applicable national and local codes or standards current at the commencement of installation. The following list summarizes applicable standards:

1. National Electrical Safety Code, current edition.

2. National Fire Protection Association National Fire Codes, current edition.

3. EIA/TIA – 568: Commercial Building Telecommunications Wiring Standard.

4. EIA/TIA – 569: Commercial Building Standard for Telecommunications Pathways and Spaces.

5. EIA/TIA – 606: Administrative Standards for the Telecommunications Infrastructure of Commercial Buildings.

6. IEEE, RS 170 Variable Standard.

7. IEEE 802.3 digital data network standard.

8. Premises cabling standard EIT/TIA568A.

9. Member, MPEG-4 Industry Forum

10. Member, Universal Plug and Play (UPnP) Forum

11. Member, Universal Serial Bus (USP) Implementers Forum

12. Compliance, ISO/IEC 14496 standard (also known as MPEG-4)

B. Where more than one code or regulation is applicable, the more stringent regulation shall apply.

1.4 SUBMITTALS (SEE SECTION 28 0510)

A. Video Surveillance System 28 2300

1. Project data: Description of system operation indicating purpose and capabilities of each component of the system with functional system diagram indicating all interfaces to other systems. Description shall include, and call attention to, all variances from the contract documents.

2. Shop drawings: Complete installation drawings including system diagrams and terminal point to terminal point wiring diagrams or schedules showing all device names, locations, IP addresses, hardware components and accessories, and switch port assignments.

3. Product data: Technical data sheets and specifications for each and every component.

4. Storage Calculations: To ensure that adequate storage is available to meet the specification requirements.

5. Bandwidth Calculations: To ensure that adequate bandwidth (backbone and per switch/stack) is available to support the full functionality of any camera, any recorder and any viewing station.

1.5 WARRANTY (SEE DIVISION 1)

1.6 OPERATING AND MAINTENANCE DATA (SEE SECTION 28 0510)

1.7 VIDEO MANAGEMENT SYSTEM CAPABILITIES

A. The video management system (VMS) specified is an enterprise-class client/server-based IP video security solution that provides seamless management of digital video, audio and data across an IP network. The video management system is designed to work with CCTV and ONVIF compliant 3rd party products as part of a total video security management system to provide full virtual matrix switching and control capability. Cameras, recorders, and viewing stations may be placed anywhere in the IP network.

B. The VMS shall be capable to be deployed in Local Area Networks (LAN) as well as in Wide Area Networks (WAN). For establishing remote connections across WAN, it shall be possible to setup a port mapping table within the configuration manager in order to map the public port to a private IP and port of the devices.

C. The VMS shall provide a built-in command script editor that allows customized command scripts to be written to control virtually all the system functions.

D. The VMS shall be built upon open, industry standards and facilitate integration with IT infrastructures and other digital and analog systems.

E. The IP video management system shall have no restriction as to the resolution, frame rate, or number of standard resolution or mega pixel cameras that can be recorded, viewed, and managed on the system.

F. All displays shall retain the camera's aspect ratio and accommodate 4:3, 16:9, or 16:10 monitor displays.

G. Multiple users shall be able to simultaneously view the same camera view or sequence. The system shall support and implement multicast streaming video to allow multiple users to view the same video stream, though not necessarily synchronized with each other, without affecting the bandwidth of the network. A purely unicast system is not acceptable.

H. The VMS shall allow for programming of alarms and associated incoming alarms with related parts of the system. Alarms and other triggers can be grouped into system events.

I. The VMS shall log all alarms and events in the database.

J. The VMS shall provide for virtual matrix functionality, leveraging the IP network to switch any camera to any monitor either through a PC Keyboard/Mouse or a joystick controller as well as transmit alarms and other system messages to any console on the network.

K. The VMS shall be designed in such a way that configuration changes to any part of the system shall not interrupt operational tasks, until the operator decides to update re-fresh the workstation configuration.

L. The VMS shall be able to handle future expansion of an unlimited total capacity from what is shown in the drawings, including but not limited to cameras, monitors, workstations and keyboards.

M. The IP video management system network shall be arranged so each area will operate independently and shall communicate via a 10Giga-bit network at a minimum to the server. The system shall utilize virtual matrix switcher capabilities through the use of a server. The server shall provide a user interface and database management of the VMS. The server shall allow for users to be restricted via software to logical configurable groups of cameras, monitors and system operations

PART 2 - PRODUCTS

2.1 OPERATING AND MAINTENANCE DATA (SEE SECTION 280510)

2.2 GENERAL

A. Manufacturers:

1. Video management and recording software:

   a. Bosch BVMS (TO MATCH THE EXISTING)

2. Video surveillance equipment:

   a. Bosch

   ~~**b. Axis (MODELS COMPATIBLE WITH BOSCH VMS for operation of PTZ)**~~ **ADD#2**

   c. Hanwha (MODELS COMPATIBLE WITH BOSCH VMS for operation of PTZ)

3. CAT6 cable and Fiber Optic cable

a. Base: Belden, West Penn, CommScope, Inc.

4. Video Management and Recording Servers:

   a. Dell

   b. HP - Hewlett-Packard

5. Video Management Workstations:

   a. Dell

   b. HP - Hewlett-Packard

6. Network Switch (BY THE OWNER):

7. The product numbers contained herein are for reference only and may not be the most current available nor a complete listing of all features or options required. Where a manufacturer is listed without a product number, an equivalent item of the specified manufacturer is acceptable. Determination of equivalent is at the sole discretion of the Engineer. Where a conflict or ambiguity exists between the written description and the product number, the written description shall govern.

8. Other manufacturers desiring approval comply with Division 1.

B. System Operation:

1. Provide complete system for viewing of remote scene including control of equipment accessories.

2. Provide all programming of system as indicated herein.

3. Video Surveillance Automated Call-Up:

   a. The video surveillance system shall be configured for automatic camera viewing on selected intercom calls and alarms upon acknowledgment by the control operator.

      1) When an intercom call or alarm is acknowledged, the camera viewing the device shall be displayed.
      2) Intercom calls shall call up the camera viewing the intercom station. If the intercom is at a door with a camera on each side, then cameras on each side of the door shall be called up in quad view.
      3) Door alarms shall call up the cameras viewing each side of the door in quad view.
      4) Panic/Duress activation shall call up to four cameras in quad mode viewing the complete area of the alarm. If a camera is not available for such, call up cameras on entry to area.
      5) All call-ups shall be reviewed and revised as needed during the submittals.

   b. Camera display shall reset to single camera view upon selection of another camera icon or single camera alarm.

2.3 VIDEO ANALYTICS

A. Provide state-of-the-art intelligent video analysis that reliably detects, tracks, and analyzes moving objects while suppressing unwanted alarms from spurious sources in the image.

B. Cameras shall be capable of processing and analyzing video within the camera itself, with no extra hardware required.

C. VMS shall record metadata so analytics can be used on recorded video without having been setup for live video.

D. Analytics shall intelligently adapt to difficult conditions like changes in lighting or environment such as rain, snow, clouds, and leaves blowing in the wind. The built-in tamper detection generates alarms on camera hooding/masking, blinding, defocusing, and repositioning.

E. Analytics shall include

1. Detect objects within, entering, or leaving an area
2. Detect multiple line crossing from single line up to three lines combines in a logical row
3. Detect objects traversing a route
4. Detect loitering in an area related to radius and time
5. Detect objects which are idle for a predefined tine span
6. Detect removed objects
7. Detect objects who’s properties such as size, speed, direction, and aspect ratio change within a configured time span according to specification (for example something falling down)
8. Count objects crossing virtual line or entering a certain area
9. Overhead people counting (Bird’s eye view)
10. Detect a certain crowd level in a predefined field
11. Detect specified motion direction and speed even in crowds (for example a person moving the wrong way in a one-way gate)
12. Detect objects that move contrary to the motion of all other objects in the scene, even in crowds
13. Take snapshots of frontal faces
14. Combine tasks using scripts

F. To enhance robustness, analytics shall be capable of being configured to ignore specified image areas and small objects. Calibrated cameras shall automatically distinguish between upright persons, bikes, cars, and trucks. Furthermore, object size, speed, two-way direction, aspect ratio, and color filters shall be available for use in any combination to create specific detection rules for exactly the objects you are looking for. Statistics on object properties shall

be stored and capable of being displayed for fine tuning the object filters. Object properties shall also be able to be defined by selecting an appropriately similar object in the video.

G. Cameras specified and listed in the camera schedule with analytic requirements shall include all of these capabilities without any licenses for individual features and functions. All cameras analytics shall be calibrated and tested by the contractor.

2.4 2MP MINIDOME CAMERAS

A. The Vandal resistant 2MP camera shall have a microSD card slot that uses standard; off-the-shelf microSD (SDHC and SDXC) cards for local storage (up to 2 TB) and be enclosed in a cast-aluminum housing with an aluminum trim ring and a clear polycarbonate dome bubble (with UV blocking anti-scratch coating) and be capable of operating in an indoor or an outdoor environment.
B. Image Sensor: 1/2.8-inch CMOS, 2MP image sensor.
C. Lens: 3.2-10.5mm motorized automatic zoom and focus (remote varifocal) lens with an advanced iris design. Horizontal field of view shall be 31 to 105 degrees and vertical field of view shall be 18 to 57 degrees minimum.
D. Camera processing latency: <55 ms
E. Dynamic Range: 120 dB HDR
F. Compression: H.265 MP, H.264 MP, M-JPEG
G. Audio
    1. Standard:
        a. AAC
        b. G.711, 8 kHz sampling rate
        c. L16, 16 kHz sampling rate
    2. Signal-to-Noise Ratio: >50 dB
    3. Audio Streaming: Full duplex / Half duplex
H. Light sensitivity (measured according to IEC 62676 Part 5 (1/25, F1.6):
    1. Color: 0.021 lx
    2. Monochrome: 0.004lx
I. Content-based Imaging Technology (C-BIT), Intelligent streaming and Intelligent Dynamic Noise Reduction (iDNR) technology to reduce the bitrate and storage requirements by removing noise artifacts.
J. Resolution: 1920X1080 pixels (1080P HD) at 60 fps with a 16:9 image format.
K. Network:
    1. Protocols: IPv4, IPv6, UDP, TCP, HTTP, HTTPS, RTP/RTCP, IGMP V2/V3, ICMP, ICMPv6, RTSP, FTP, Telnet, ARP, DHCP, SNTP, SNMP (V1, MIB‑II), 802.1x, DNS, DNSv6, DDNS, SMTP, iSCSI, UPnP (SSDP), DiffServ (QoS), LLDP, SOAP, Dropbox, CHAP, Digest Authentication.
    2. Encryption: AES with 256-bit keys, RSA, HTTPS
    3. Ethernet: STP, 10/100 Base-T, auto-sensing, half/full duplex, RJ45
    4. PoE Supply: IEEE 802.3af compliant
L. Connectivity:
    1. ONVIF Profile S, G, T and M
    2. Auto-MDIX
M. Intelligent Video Analytics Pro (IVA Pro)
    1. Configurations:
        a. Silent VCA / Profile1/2 / Scheduled / Event Triggered
    2. Alarm rules (combinable):
        a. Any object / Object in Field / Line Crossing / Enter/Leave field / Loitering / Follow route / idle/remove object / Counting / Occupancy / Crowd density estimation / Condition change / similarity search

N. Operating Temperature: -40°C to +55°C (-40°F to 131°F)
O. Operating Humidity: 0% to 90% relative humidity
P. Water Protection: IP66
Q. Impact Protection: IK10
R. Model:
    1. Bosch NDE-5702-A series with mounting accessories as required

2.5 MAXIMUM SECURITY CELL CORNER CAMERA (6MP)

A. The ruggedized, vandal resistant MP POE camera shall be a corner mount, no-grip design with a microSD card slot that uses standard; off-the-shelf microSD (SDHC and SDXC) cards for local storage (up to 2 TB) and be enclosed in a cast-aluminum housing. Ii shall be able to view the entire floor and all four walls of a 15 foot square room, including the two walls to which it is attached and have a night-time IR monochrome mode and built in microphone and IR illuminators.
B. Image Sensor: 1/1.8-inch CMOS MP image sensor with mechanical filter technology for vivid daytime color and effective night-time performance under infrared illumination.
C. Lens: 2.5 mm allowing a full 131º H-FoV and 96º V-FoV of the entire room.
D. Camera processing latency: <55 ms
E. Dynamic Range: 120 dB
F. Audio
    1. Standard:
        a. AAC
        b. G.711, 8 kHz sampling rate
        c. L16, 16 kHz sampling rate
    2. Signal-to-Noise Ratio: >50 dB
    3. Audio input: Built in Microphone and Line Level In
    4. Audio output: Line out
    5. Audio Streaming: Full duplex / Half duplex
G. Light sensitivity (based on 3200K, Scene Reflectivity 89%, 30 IRE)
    1. Color: 0.090 lx
    2. Monochrome: 0.0 lx (IR on)
H. Content-based Imaging Technology (C-BIT) and Intelligent Dynamic Noise Reduction (iDNR) technology to reduce the bitrate and storage requirements by removing noise artifacts.
I. Resolution: 2816X2112 (6 MP) sensor at 30 FPS.
J. IR Illumination: 940nm IR LED’s with Smart IR for sensitivity adjustment
K. Network:
    1. Protocols: IPv4, IPv6, UDP, TCP, HTTP, HTTPS, RTP, IGMP V2/V3, ICMP, RTSP, FTP, Telnet, ARP, DHCP, SNTP, SNMP (V1, MIB‑II), 802.1x, SMTP, iSCSI, UPnP (SSDP)
    2. Encryption: The camera shall offer three levels of password protection, support 802.1x authentication using a RADIUS (Remote Authentication Dial In User Service) server, store a SSL certificate for use with HTTPS, and be capable of being independently AES encrypted with 128-bit keys.
    3. Ethernet: STP, 10/100 Base-T, auto-sensing, half/full duplex, RJ45
    4. PoE Supply: IEEE 802.3af Type-1 compliant
L. Connectivity:
    1. ONVIF Profile S, G, M, T
    2. Auto-MDIX
M. Intelligent Video Analytics Pro (IVA Pro)
    1. Configurations:
        a. Silent VCA / Profile1/2 / Scheduled / Event Triggered
    2. Alarm rules (combinable):

a. Any object / Object in Field / Line Crossing / Enter/Leave field / Loitering / Follow route / idle/remove object / Counting / Occupancy / Crowd density estimation / Condition change / similarity search

N. Operating Temperature: -10°C to +50°C (14°F to 122°F)
O. Operating Humidity: 5% to 93% relative humidity
P. Water/Dust Protection: IP66
Q. Impact Protection: IK10+
R. Model:
1. Bosch NCE-7703-FK (6MP) series with mounting accessories as required

2.6 5MP MINIDOME CAMERAS

A. The Vandal resistant 5MP camera shall have a microSD card slot that uses standard; off-the-shelf microSD (SDHC and SDXC) cards for local storage (up to 2 TB) and be enclosed in a cast-aluminum housing with an aluminum trim ring and a clear polycarbonate dome bubble (with UV blocking anti-scratch coating) and be capable of operating in an indoor or an outdoor environment.
B. Image Sensor: 1/2.7-inch CMOS image sensor.
C. Lens: 3.2-10.5mm motorized automatic zoom and focus (remote varifocal) lens with an advanced iris design. Horizontal field of view shall be 29 to 96 degrees and vertical field of view shall be 22 to 71 degrees minimum.
D. Camera processing latency: <55 ms
E. Dynamic Range: 120 dB HDR
F. Compression: H.265 MP, H.264 MP, M-JPEG
G. Audio
1. Standard:
a. AAC
b. G.711, 8 kHz sampling rate
c. L16, 16 kHz sampling rate
2. Signal-to-Noise Ratio: >50 dB
3. Audio Streaming: Full duplex / Half duplex
H. Light sensitivity (measured according to IEC 62676 Part 5 (1/25, F1.6):
1. Color: 0.060 lx
2. Monochrome: 0.012lx
I. Content-based Imaging Technology (C-BIT), Intelligent streaming and Intelligent Dynamic Noise Reduction (iDNR) technology to reduce the bitrate and storage requirements by removing noise artifacts.
J. Resolution: 2688X1944 pixels (MP 5MP) at 30 fps with a 4:3 image format, 2592X1456 pixels (MP 3.8MP) at 30 fps with a 16:9 image format, and 1920 x 1080 (HD 1080P) at 30 fps with a 16:9 image format.
K. Network:
1. Protocols: IPv4, IPv6, UDP, TCP, HTTP, HTTPS, RTP/RTCP, IGMP V2/V3, ICMP, ICMPv6, RTSP, FTP, Telnet, ARP, DHCP, SNTP, SNMP (V1, MIB‑II), 802.1x, DNS, DNSv6, DDNS, SMTP, iSCSI, UPnP (SSDP), DiffServ (QoS), LLDP, SOAP, Dropbox, CHAP, Digest Authentication.
2. Encryption: AES with 256-bit keys, RSA, HTTPS
3. Ethernet: STP, 10/100 Base-T, auto-sensing, half/full duplex, RJ45
4. PoE Supply: IEEE 802.3af compliant
L. Connectivity:
1. ONVIF Profile S, G, T and M
2. Auto-MDIX
M. Intelligent Video Analytics Pro (IVA Pro)
1. Configurations:
a. Silent VCA / Profile1/2 / Scheduled / Event Triggered

2. Alarm rules (combinable):
   a. Any object / Object in Field / Line Crossing / Enter/Leave field / Loitering / Follow route / idle/remove object / Counting / Occupancy / Crowd density estimation / Condition change / similarity search

N. Operating Temperature: -40°C to +55°C (-40°F to 131°F)
O. Operating Humidity: 0% to 90% relative humidity
P. Water Protection: IP66
Q. Impact Protection: IK10
R. Model:
   1. Bosch NDE-5703-A series with mounting accessories as required

2.7 12MP 180/360 DEGREE PANORAMIC CAMERA

1. The panoramic camera shall be available in a360 degree model, offer Content-based Imaging Technology (CBIT), utilize Intelligent Dynamic Noise Reduction (iDNR) technology to reduce the bitrate and storage requirements by removing noise artifacts, accept power via Power over Ethernet (IEEE 802.3af compliant), and offer optional Intelligent Video Analysis (IVA).

2. The camera shall offer a 1/2.3-inch CMOS image sensor, 12MP sensor pixels (9MP used pixels..

3. The camera shall provide direct network connection, allow full camera control and configuration capabilities over the network, be capable of capturing and storing images using the following compression standards:

   a. H.264

   b. H.265

   c. M-JPEG

4. Video performance – Sensitivity (Measured according to IEC 62676 Part 5): color 0.150lx, monochrome 0.048lx, with IR, 0 lx

5. Wide Dynamic Range: 120dB

6. Built-in IR: 360 degree LED high efficiency array, 850nm, 20M (66 foot) range, 5 controllable zones

7. The camera shall deliver video over a 10/100 Base-T, auto-sensing, half/full duplex, RJ45 Ethernet connection, comply with the IEEE 802.3af

8. The camera shall be capable of processing and analyzing video within the camera itself, with no extra hardware required, be capable of detecting and sending alarms for abnormal events, and allow users to set up separate profiles, and switch profiles based on day/night or holiday schedules.

9. The camera shall offer three levels of password protection, support 802.1x authentication using a RADIUS (Remote Authentication Dial In User Service) server, store a SSL certificate for use with HTTPS, and be capable of being independently AES encrypted with 128-bit keys.

10. The camera shall support iSCSI devices to allow video stream to be recorded directly to an iSCSI RAID array, support iSCSI storage targets to enable the camera to function as a conventional DVR, have a microSD card slot that uses standard; off-the-shelf microSD (SDHC and SDXC) cards for local storage (up to 2 TB), and the local storage feature shall be capable of storage for Automatic Network Replenishment (ANR).

11. The camera shall have an integrated array with 3 digital MEMS audio sendors offer two-way, full duplex audio communication, and offer G.711, AAC and L16 audio compression (live and recording).

12. The camera shall provide a full circle image (3008 X 3008) as well as two distortion-free channels with their own streams. One of these channels is an E-PTZ channel which is always available. Viewing options for the second channel shall include full panoramic, double panoramic, Quad Corridor, E-PTZ.

13. The camera shall be ONVIF Profile S, ONVIF Profile D, ONVIF Profile M and ONVIF Profile T compliant.

14. Operating Temperature: -40°C to +50°C (-40°F to 122°F)

15. Model:

    a. Bosch NDS-5704-F360LE

2.8 20MP MULTI-SENSOR ADJUSTABLE CAMERA

A. The multi-sensor adjustable dome network camera shall be outdoor (IP66) and vandal rated (IK10) and capable of operating in an indoor and an outdoor environment, capture very high quality images with a total resolution of 20MP via four independent 5MP CMOS sensors, require a single IP address, accept power via Power over Ethernet (POE+), contain a built-in microphone, and incorporate built-in intelligent Video Analytics capability.

B. The camera shall offer 4X CMOS image sensor, 5MP sensor pixels.

C. The camera shall provide direct network connection, allow full camera control and configuration capabilities over the network, be capable of capturing and storing images using the following compression standards:

    1. H.264 (Baseline)

    2. H.265 (Baseline)

    3. MJPEG

D. The camera shall deliver video over a 10/100 Base-T, auto-sensing, half/full duplex, RJ45 Ethernet connection

E. The camera shall be capable of processing and analyzing video within the camera itself, with no extra hardware required, be capable of detecting and sending alarms for abnormal events, and allow users to set up separate profiles, and switch profiles based on day/night or holiday schedules.

F. The camera shall offer password protection, support IEEE 802.1x authentication, and store a SSL certificate for use with HTTPS.

G. The camera shall have an integrated microphone and offer two-way bi-directional audio communication.

H. The camera shall provide four images that enable 360 degree coverage capturing images from every angle for comprehensive video coverage with 4 separate views from a single IP address.

I. Maximum frame rate: 30 FPS

J. Lens: 3.7 to 7.7mm, F1.9 with viewing angle of 88.8 to 40.2 H and 59.8 to 28.6 V

K. Light sensitivity: 0.095 lx in color mode and 0.005 lx in monochrome mode

L. Dynamic range: 120dB

M. Edge Storage: via SD/SDHC memory card (sold separately)

N. The camera shall be ONVIF Profile S and G compliant.

O. IP66 weatherproof rating and IK10 vandal resistance rating.

P. Operating Temperature: -40°C to +50°C (-40°F to 122°F)

Q. Model:

1. Bosch NDM-7703-A with accessories and mounts as required

2.9 34MP 360 DEGREE MULTI-DIRECTIONAL MULTI-SENSOR CAMERA WITH PTZ (ADD#2)

A. Manufacturer : Hanwha Vision

1. Model : PNM-C34404RQPZ

2.10 27-INCH-HIGH PERFORMANCE HD LED MONITOR

A. Video

1. The industrial grade 4K monitor shall support Full 4K resolution (3840 x 2160), feature a 3-D comb filter, and display images using an aspect ratio of 16:9 and be capable of displaying 1.07 billion colors.

B. Electrical/Mechanical

1. Main Supply Input Voltage: 100–230 VAC, 50/60 Hz

2. Monitor Input Voltage/Power Requirements: 90–264 VAC, 50/60 Hz

3. Power at Rated Voltage:

a. Operation: 29.2 W

b. Standby: .5 W

4. The 4K monitor shall conform to the 75 x 75 mm VESA Mounting standard.

C. Video:

1. LCD Panel: LED
2. Viewable Picture Area: 27 in, measured diagonally
3. Resolution: 3840 x 2160 pixels
4. Aspect Ratio: 16:9
5. Display Colors: 1.07 billion colors
6. Response Time: 12 milliseconds
7. Backlight rated life 30,000 hours

D. Optical Characteristics

1. Luminance: 200 cd/m^2,
2. Contrast Ratio: 1000:1
3. Viewing Angle:
    a. Horizontal: 178°
    b. Vertical: 178°

E. Connectors

1. HDMI
2. Display Port
3. USB
4. Audio:
    a. One (1) PC stereo input
5. Power Cord: Two 3-wire with a grounded plug, 1.8 m (6 ft) long.

F. Mechanical:

1. Dimensions:
    a. Monitor Only: 615.11 x 428.40 x 219.70 mm (24.22 x 16.87 x 8.65 in.)
2. Weight:
    a. Monitor Weight: 6.1 kg (13.45 lbs)

G. Environmental:

1. Operating Temperature: 0° to 40°C (32° to 104°F)

2. Storage Temperature: 0° to +50°C (32° to 122°F)

3. Humidity: Maximum 90%, non-condensing

H. Model:

1. Bosch UML-275-90 with appropriate mount

2. Or EQUAL

2.11 55-INCH HIGH PERFORMANCE HD LCD/LED MONITOR

A. Video

1. The HD monitor shall be industrial grade and support 4K resolution (38400 x 2160), feature a 3-D comb filter, , and display images using an aspect ratio of 16:9 and be capable of displaying 1.07 billion colors.

B. Electrical/Mechanical

1. Main Supply Input Voltage: 100–240 VAC, 50/60 Hz

2. Power at Rated Voltage:

a. Operation: 155 W

3. The HD monitor shall conform to the 400 x 200 and 400 x 400 mm VESA Mounting standard.

C. Video:

1. Viewable Picture Area: 1209.6 X 680.4 mm (47.6 X 26.79 in)

2. Resolution: 3840 x 2160 pixels

3. Aspect Ratio: 16:9

4. Display Colors: 1.07 billion colors

5. Response Time: 6.5 milliseconds

6. LCD Panelt: LED

7. Rated Life: 50,000 hours

D. Optical Characteristics

1. Luminance: 450 cd/m^2

2. Contrast Ratio: 4000:1

3. Viewing Angle:

a. Horizontal: 178°

b. Vertical: 178°

E. Connectors

a. DVI

b. HDMI

c. VGA

d. Display Port

2. Audio:

a. 3.5mm stereo jack input

3. Power Cord: two 3-wires with a grounded plug, 1.8 m (6 ft) long.

F. Mechanical:

1. Dimensions:

a. Monitor Only: 49.36x 28.45 x 2.92 in.

2. Weight:

a. Monitor Weight: 30.5 kg (67.2 lbs)

G. Environmental:

1. Operating Temperature: 0° to 50°C (32° to 122°F)

2. Storage Temperature: 0° to +50°C (32° to 122°F)

3. Humidity: Maximum 90%, non-condensing

H. Model:

1. Bosch – UML-554-90

2. Or EQUAL

2.12 QUAD MONITOR WORKSTATION

A. Provide HP Z4 G4 management workstation with Intel's Xeon W-2223 (3.6 GHz, 8.25 MB cache, 2666 MHz memory speed, 4C, HT, Turbo), 16 GB (16 x 1 GB) DDR4-2666 ECC Registered Memory and NVIDIA RTX A2000 (6 GB, 4 x mini display ports) 3D graphics card ensures highest performance and resolution for fast presentation of displayed video data in a rackable mini-tower chasis with 700w, 90% efficient, custom PSU.

B. Microsoft Windows 10 Professional Edition, 64-bit OS minimum

C. 500 GB, 7200RPM, SATA hard drive,

D. Provide with HP 3–year Next Business Day on-site hardware warranty.

E. Only Two (2) monitors may be driven from a Quad Monitor Workstation for this installation.

F. Model:

1. Bosch MHW-WZ4R4-HEN4

2. Dell

3. HP

2.13 SERVER

A. Provide as required for BVMS and VRM.

1. Server specs must be calculated by VMS manufacturer to exceed actual projected usage of the system by 20% for future growth.

a. Must support all cameras, storage, decoders, local users, and (5) remote enterprise users over the WAN (future) simultaneously.

B. HP ProLiant DL380 Generation 10 Server with hot plug fans and power supplies, and RAID controller with RAID-1 operating system protection. One (1) state-of-the-art eight-core Intel Xeon Silver 4110 Processor (2.1 GHz, 8 core, 15 MB L3 cache, 85 W, and 16 (1 X 16 GB (DDR4-2666) Registered DIMMs. 1 x Four Port Gigabit Server Adapter.

C. MS Windows Server 2016 R2 standard edition, 64 bit plus license

D. Provide a 3–year standard warranty.

E. The server shall come in a 2U, 19-inch rack mount version with a quick deploy rail system, including sliding universal rails. The rack mount version allows access to all system components for easy in-rack serviceability.

F. Model:

1. Bosch MHW-S380RA-SCUS

2. Dell

3. HP

2.14 ISCSI STORAGE DEVICES

A. General Characteristics:

1. The IP Video Storage System shall be an embedded, all-in-one IP Video Storage subsystem that provides “plug-and-play” iSCSI-based recording and management, pre-configured and pre-installed iSCSI disk array, 2U rack-mount chassis with eight (8) or sixteen (16) hot swappable, SATA-3 hard disk drives with RAID-5/RAID-6 protection,

The IP Video Storage System shall be a pre-configured and pre-installed video management solution with , 32TB (8X4) , 64TB (8X8), 96TB (8X12), 128 (16X8) or 192 (16X12) of gross storage capacity, and a bandwidth of 550 Mbit/s.

2. The IP Video Storage System shall offer a dual port Gigabit Ethernet network interface, 4 GB system memory and an Intel Xeon 6 Core E-2226GEProcessor, remote monitoring via a desktop application or a Web browser.

B. Processor

1. The IP Video Storage Appliance shall contain an Intel Xeon 6 Core 3.4 GHz, 12 M cache, 80 W processor.

The IP Video Storage Appliance processor shall contain one (1) socket.

2. The IP Video Storage Appliance processor shall feature a 1 x 12 MB Level 2 cache memory.

The IP Video Storage Appliance processor shall include ECC Unbuffered memory protection.

3. The IP Video Storage Appliance processor shall contain a 1600 MHz maximum front side Bus.

C. Memory

1. The IP Video Storage Array shall have 16 GB, DDR4-2666 ECC UDIMM of memory installed.

D. Storage

1. The IP Video Storage Appliance shall contain eight (8) or sixteen (16) 3.5 in. SATA storage trays.

The IP Video Storage Appliance shall have 8 or 16, , 4, 8 or 12 TB SATA-3 (7,200 RPM, 64 M 3.5 in.) hard drives installed.

2. The IP Video Storage Appliance shall offer a 3108-based SAS3 RAID card.

The IP Video Storage Appliance shall include an onboard graphics card with 2 x Display Port Ports

3. The IP Video Storage Appliance shall include 2 X 240 GB SSD RAID-1 OS hard drives

E. Functions

1. The IP Video Storage Appliance shall feature a single-socket system, sever-class motherboard.

The IP Video Storage Appliance shall offer an energy-efficient hot-swap redundant power supply.

2. The IP Video Storage Appliance shall offer hot-swap SATA-3 hard drives providing up to 192 TB of gross storage capacity.

The IP Video Storage Appliance shall come pre-installed and pre-configured with all necessary software.

3. The IP Video Storage Appliance shall utilize Microsoft Windows Server IoT2019.

F. Management

1. The IP Video Storage Appliance shall provide a user interface for system configuration and unified appliance management.

The IP Video Storage Appliance shall offer the Microsoft System Center Suite built-in.

2. The IP Video Storage Appliance shall allow operators to use one central tool for configuration and operations management.

G. Monitoring

1. The IP Video Storage Appliance shall provide SNMP, Remote Desktop and HTTP monitoring support.

The IP Video Storage Appliance shall offer high-availability hardware, embedded design, and system wide monitoring.

H. Electrical:

1. Input Voltage: 120 VAC

a. Actual Output Wattage from Power Supply: 317.8 W

Efficiency of Power Supply: 96%

b. Total System Power Consumption: 331 W

Total BTU/h: 1129.8

c. Power Factor: .96

System AC Input VA Requirement: 344.8 VA

I. Mechanical

1. Form Factor: 2U or 3U Rack Mount

Power Supply: 1200 W Platinum Level redundant

2. USB Ports: 6 USB 2.0; 2 in front, 32 USB 3.1 ports rear 1 USB-C port

Network: Dual Intel® i210AT Gigabit LAN

3. Dimensions (H x W x D): 648 x 437 x 89 mm (25.5 x 17.2 x 3.5 in (2RU) or 5.2 in(3RU).)

Weight: 23.6 kg (52 lb) 2RU or 32.7 kg (72 lb) 3RU

J. Environmental:

1. Operating Temperature: +10°C to +35°C (+50°F to +95°F)

Operating Relative Humidity: 8 to 90%, non-condensing

K. Model:

1. Bosch Divar IP 7300 series

2.15 VIDEO MANAGEMENT SYSTEM

A. The video management system (VMS) specified is an enterprise-class client/server based IP video security solution that provides seamless management of digital video, audio and data across an IP network. The video management system is designed to work with ONVIF compliant 3rd party products as part of a total video security management system to provide full virtual matrix switching and control capability. The video management system consists of the following software modules: management server, recording services, configuration client and operator clients. Video from other sites may be viewed from single or numerous workstations simultaneously at any time. Cameras, recorders, and viewing stations may be placed anywhere in the IP network.

B. The VMS shall support the following recording services:

1. Video Recording Manager (VMS VRM)

2. Local Storage and Direct-to-iSCSI recording

C. The management server and the Video Recording Manager shall run as services on Windows Server 2019.

D. The configuration client software shall run as an application on Windows Server 2019.

E. The operator client software shall run as an application on Windows 10.

F. The VMS shall support ONVIF compliant cameras. It shall be possible to access live streams and to control PTZ functionality.

G. It shall be possible to record Onvif compliant cameras. For recording only, 3rd party cameras that support JPEG or RTSP shall be supported.

H. The VMS shall provide a transcoding service for supporting iPad and iPhone devices as well as html5 based web clients as mobile video clients.

I. Mobile video clients shall be able to access live and recording data of all cameras in the video management system. It shall be possible to view up to 4 video streams at once on a web client or iPad and mix live and playback streams. The mobile video clients shall further more provide an option for the user to zoom in as well as to opt between high resolution and smooth motion (higher rate of frames per second). It shall be possible to access the video management system from mobile video clients with the user accounts in the video management system.

J. The VMS shall be scalable to an Enterprise Management System that allows a user of an operator client to simultaneously access the devices of multiple subsystems. Each subsystems shall contain 1 management server. The Enterprise Management Server shall manage up to 10 subsystems. If each subsystem is restricted to 100 cameras, the number of subsystems may be extended to 30 Subsystems. Access permissions of Enterprise Operator Clients to subsystems and their devices shall be managed within the subsystems by means of a user ID and PW. Enterprise Operator Clients can than only access subsystems, when respective user ID and PW and set correctly in their Enterprise User group. An Enterprise Management Server shall be able to provide 20 Enterprise Management User groups. A change in a subsystem’s configuration shall be automatically reflected for the Enterprise Operator Client. Extensions in the subsystems shall not require any additional licensing within the dedicated Enterprise Management Server.

K. The VMS shall provide a documented Software Development Kit (SDK) to allow integration to and integration from third-party software.

L. The VMS specified shall be a centrally managed, scalable client/server based architecture that allows full virtual matrix switching and control systems.

M. The VMS shall be capable to be deployed in Local Area Networks (LAN) as well as in Wide Area Networks (WAN). For establishing remote connections across WAN, it shall be possible to setup a port mapping table within the configuration manager in order to map the public port to a private IP and port of the devices. The VMS shall provide a RRAS configuration tool to transfer the port mapping table to a RRAS Service.

N. The VMS shall allow a operator client to control and view live and playback streams of cameras allocated to the VRM, VSG and DVRs from a remote site (across WAN). This includes ONVIF cameras connected to the VSG.

O. The VMS shall provide the possibility to the operator to view transcoded video streams (live and playback) in order view high quality images, when the remote operator client accesses the camera via a low bandwidth connection. On selection, there shall be an indication in the image pane of the operator client to indicate, that the stream is being transcoded.

P. The VMS shall provide a built-in command script editor that allows customized command scripts to be written to control virtually all the system functions. Command scripts may be activated by system operators or automatically in response to alarms or system events. The built-in command script editor shall support C# and VB.NET.

Q. The VMS shall emulate the Matrix Command Console Language (CCL). The VMS shall receive the CCL commands on a freely definable serial port on the management server. It shall be possible to select the Allegiant model that shall be emulated. CCL commands shall control:

1. Camera to decoder connections
2. Sequences on decoders
3. Virtual Inputs
4. PTZ commands

R. The VMS shall support all Security Systems MPEG-4 and H.264 encoders, decoders, IP cameras, and IP AutoDomes.

S. The VMS shall provide up to 10 different and independent programmable recording schedules. The schedules may be programmed to provide different record frames rates for day, night, and weekend periods as well as special days. Advanced task schedules may also be programmed that could specify allowed logon times for user groups, when events may trigger alarms, and when data backups should occur.

T. The VMS shall allow the establishment of user groups and Enterprise user groups that have access rights to specific cameras, priority for pan/tilt/zoom control, rights for exporting video, and access rights to system event log files. Access to live, playback, audio, PTZ control, preset control, and auxiliary commands shall be programmable on an individual camera basis.

U. The VMS shall interface with the Intelligent Video Analysis (IVA) techniques of the Bosch IP encoders and IP cameras to provide advanced motion detection that analyzes object size, direction, and speed as well as detecting objects entering or leaving designated areas.

V. The VMS shall support Lightweight Directory Access Protocol (LDAP) that allows integration with enterprise user management systems such as Microsoft Active Directory.

W. The VMS shall export video and audio data optionally in ASF format to a CD/DVD drive, a network drive, or a USB drive. The exported data in ASF format may be played back using standard software such as Windows Media Player. It shall also export video and audio data optionally in its native recording format to a CD/DVD drive, a network drive, or a direct attached drive. The exported data in native recording format shall include all associated metadata. Viewer software shall be included with the export. Once installed, the viewer software allows playback of the streams on any compatible Windows PC.

X. The VMS shall auto-discover encoder, decoder, VRM devices and DVRs. Device detection shall support devices in different subnets.

Y. The VMS shall support continuous operation during management server down-times as live viewing, playback of recording and export of video data. The operator client shall indicate its connection status to the management server.

Z. The VMS software shall be maintenance free and provide free software upgrades, patches and firmware. Software with annual maintenance agreements shall not be allowed

AA. Model:

1. Bosch Video Management Software MBV-BPRO-11.1.1 or equal software with expansion licenses as required by project.

2.16 VIDEO RECORDING MANAGER

A. The VMR shall be an optional package of the installation program of the VMS.

B. The video management system shall be capable of managing multiple VRMs.

C. The VRM shall be configured from the VMS configuration client. It shall be possible to assign encoders and IP cameras to it.

D. The recording parameters shall be configured in the recording tables of the VMS configuration program. These settings will be replicated into the devices from the management server.

E. The VRM shall manage any encoders, IP-Cameras, Streaming Gateways, and the iSCSI storage systems. It shall offer system wide recording monitoring and management of iSCSI storage, video servers and cameras.

F. The VRM shall support the encoders and cameras to directly stream the data to the iSCSI storage. The VRM shall not be involved in the processing of the data.

G. The VRM shall manage all disk arrays in the system as a single virtual common pool of storage. It shall dynamically assign portions of that pool to the encoders and IP-Cameras.

H. The transfer rate of the data from the encoder or IP-Camera is limited by network speed and the iSCSI data throughput rate.

I. The VRM shall provide redundancy for storage provisioning and failover design for central recording management service.

J. The VRM shall be able to restore a lost recording database from data on the iSCSI storages.

K. The VRM shall provide flexible retrieval of recordings. It shall be able to determine on which iSCSI disk array data from each camera or encoder has been stored.

L. It shall be possible to secure the access to the VRM software with a password. This shall be done in the configuration client.

M. The VRM software shall provide status monitoring information as a web interface. The following information shall be provided:

1. Uptime of the VRM software

2. Bit rate information for the recorded data

3. Retention times per camera

4. Status on recording and storage

N. The video management system shall allow configuring if playback of recordings is streamed through the VRM or is streamed directly from the iSCSI storage.

O. The video management system shall support to retrieve the playback information, i.e. from which iSCSI storages to retrieve the video, audio and meta-data, either from the Video Recording Manager or directly from the IP encoder or camera. Playback information directly from the IP encoder or camera is limited in time and should be used while the VRM is not available to increase the reliability of the video management system.

P. Model:

1. Bosch Video Recording Manager (VRM) 4.03.0025 or the latest available

2.17 EDGE ETHERNET SWITCH (PROVIDED BY THE OWNER)

A. The switch shall support transmission utilizing Category 6 cable or better, multimode fiber, or single-mode fiber. The switch shall support IEEE 802.3 protocol using Auto-negotiating and Auto-MDI/MDI-X features. The switch shall be capable of supporting IEEE 802.3at 30 Watt PoE at each of the 24 (twenty-four) RJ-45 ports, considering the 400 W PoE budget for the switch as a whole. The switch shall have a fully internal power supply. The switch shall feature 22 (twenty-two) dedicated 10/100/1000T(X) RJ-45 ports capable of 802.3at PoE, 2 (two) dedicated 100/1000FX SFP ports, and 2 (two) combo ports, each combo port containing 1 (one) 10/100/1000T(X) RJ-45 port capable of 802.3at PoE and 1 (one) 100/1000FX SFP port

B. To ease installation, the switch shall require no in-field electrical or optical adjustments or in-line attenuators. The switch shall provide power, link speed, and fiber port status indicating LED’s for monitoring proper system operation. The switch shall provide a serial connection for local management of the device. The switch shall have a lifetime warranty to reduce system life cycle cost in an event of a failure.

C. The following IEEE Networking Standards shall be supported:

1. IEEE 802.3 10Base-T Ethernet
2. IEEE 802.3u 100Base-TX Fast Ethernet
3. IEEE 802.3ab 1000Base-TX Gigabit Ethernet
4. IEEE 802.3at Power over Ethernet
5. IEEE 802.3z Gigabit Ethernet Fiber
6. IEEE 802.3x Flow Control and Back-pressure
7. IEEE 802.1p class of service
8. IEEE 802.1Q VLAN and GVRP
9. IEEE 802.1D-2004 Rapid Spanning Tree Protocol (RSTP)
10. IEEE 802.1s Multiple Spanning Tree Protocol
11. IEEE802.3ad LACP
12. IEEE802.1X Port-based Network Access Control
13. IEEE 802.1AB LLDP

D. Switching Performance

1. Switch Technology: Store and Forward Technology with 52 Gbps Switch Fabric.
2. Transfer Packet Size: 64 bytes to 9600 bytes (with VLAN Tag)
3. MAC Address: 8K MAC
4. Packet Buffer: 1Mbits
5. Relay Alarm: Dry Relay output with 1A@24V ability

E. Management

1. Configuration: Web, HTTPS, SSH, TFTP/Web Update for firmware and configuration backup/restore, DHCP Client, Warm reboot, Reset to default, Admin password, Port Speed/Duplex control, status, statistic, MAC address table display, Static MAC, Aging time, SNMP v1, v2c, v3, Traps and RMON1.
2. SNMP MIB: MIB-II, Bridge MIB, VLAN MIB, SNMP MIB, RMON and Private MIB
3. Port Trunk: Up to 5 Static Trunk and 802.3ad LACP
4. VLAN: IEEE802.1Q VLAN, GVRP. Up to 64 VLAN groups
5. Quality of Service: Four priority queues per port,
6. IEEE802.1p COS and Layer 3 TOS/DiffServ
7. IGMP Snooping: IGMP Snooping V2/V3 for multicast filtering and IGMP Query

8. Rate Control: Ingress filtering for Broadcast, Multicast, Unknown DA or all packets, and Egress filtering for all packets
9. NTP: Network Time Protocol to synchronize time from Internet
10. PTP: Precision Time Protocol for clock synchronization.
11. Port Mirroring: Online traffic monitoring on multiple selected ports
12. Port Security: Assign authorized MAC to specific port
13. IP Security: IP security to prevent unauthorized access
14. 802.1x: Port-based Network Access Control
15. DHCP Server: Can assign 255 IP address, support IP and MAC binding
16. System Log: Supports both Local mode and Server mode

F. Network Redundancy

1. Rapid Spanning Tree Protocol: IEEE802.1D-2004 Rapid Spanning Tree Protocol.
2. Compatible with Legacy STP and IEEE802.1w.
3. Multiple Spanning Tree Protocol: IEEE 802.1s

G. Data Specifications

1. Data Interface: Ethernet IEEE 802.3
2. Data Rate: up to 1000 Mbps
3. Data Inputs/Outputs: up to 26
4. Operation Mode: Half or Full Duplex

H. Specification

1. Number of Optical ports: up to 4 SFP-based
2. Number of Fibers Required: 1 or 2, SFP-dependent
3. Optical Wavelength: 1310 or 1550 nm, SFP-dependent
4. Optical Power Budget: SFP-dependent
5. Maximum Distance: up to 120 km (70 mi) singlemode, SFP-dependent

I. Status Indicators

1. Power: Proper Power = Green
2. RJ-45 Link/Data: Green, No Link/No Data: Off
3. SFP Link/Data: Green, No Link/No Data: Off

J. Connectors

1. Optical: LC or SC, SFP-dependent
2. Power: IEC60320 connector for standard AC line cord.
3. Data: RJ-45
4. Console: DB9 serial communication.

K. Electrical Specifications

1. Power: Internal power supply, 100 to 240 VAC, 50-60 Hz input.
2. PoE Support: 400 watts available for 24 ports with PoE+ (30W available at all 24 ports, not to exceed 400 W total PoE consumption), at a maximum ambient operating temperature of +60˚ C.
3. Current Protection: Automatic re-settable solid-state current limiters
4. Voltage Regulation: Solid-state, Independent on each board
5. Circuit Board: UL 94 flame rated and meets all IPC standards.

L. Mechanical Specifications

1. 16.97 in (W) x 13.46 in (D) x 1.73 in (H) 431 mm (W) x 342 mm (D) x 44 mm (H)
2. Finish: Module shall be constructed of a metal enclosure with a powder coat.
3. Weight: <13lb/6kg

M. Environmental Specifications

1. MTBF: >100,000 Hours
2. Operating Temp: –10˚ C to +60˚ C.
3. Storage Temp: -40˚ C to +85˚ C.
4. Relative Humidity: 5% to 95% (non-condensing).

N. REGULATORY AGENCIES/APPROVALS AND LISTINGS

1. Underwriters Laboratory (UL) Listing Number: I.T.E. 6D16
2. Underwriters Laboratory Canada (ULC) Listing Number: I.T.E. 6D16
3. UL 94-flame rated PCB board: 94VO

O. Models:

1. Cisco Catalyst 9200 Series (PoE + Network Essentials)

2. Or Equal

2.18 CORE ETHERNET SWITCH (PROVIDED BY THE OWNER)

A. The core Ethernet switch shall be enterprise-class stackable Ethernet and Multigigabit Ethernet access and aggregation layer switches that provide full convergence between wired and wireless on a single platform. The core Ethernet switch shall support full IEEE 802.3at Power over Ethernet Plus (PoE+), modular and field-replaceable network modules, RJ45 and fiber-based downlink interfaces, and redundant fans and power supplies. With speeds that reach 10Gbps, the core Ethernet switch shall support current and next-generation wireless speeds and standards (including 802.11ac Wave 2) on existing cabling infrastructure. The switch shall support transmission utilizing Category 5 cable or better, multimode fiber, or single-mode fiber.

B. The core Ethernet switch shall be provided with following capabilities:

1. Integrated wireless controller capability with:

   a. Up to 40G of wireless capacity per switch (48-port models)

   b. Support for up to 50 access points and 2000 wireless clients on each switching entity (switch or stack)

2. 24 and 48 10/100/1000 data PoE+ models with energy-efficient Ethernet (EEE)

3. 24 and 48 100Mbps/1/2.5/5/10 Gbps UPOE models with energy-efficient Ethernet (EEE)1

4. 12- and 24-port SFP-based models

5. Five optional uplink modules with 4 x Gigabit Ethernet, 2 x 10 Gigabit Ethernet, 4 x 10 Gigabit Ethernet, 8 x 10 Gigabit Ethernet$_2$ or 2 x 40 Gigabit QSFP$_2$ ports

6. Dual redundant, modular power supplies and three modular fans providing redundancy

7. Full IEEE 802.3at (PoE+) with 30W power on all copper ports in 1 rack unit (RU) form factor

8. Software support for IPv4 and IPv6 routing, multicast routing, modular quality of service (QoS), Flexible NetFlow (FNF), and enhanced security features

9. The core Ethernet switch shall be provided with advanced wired plus wireless QoS capabilities. The switch shall manage wireless bandwidth using unprecedented hierarchical bandwidth management starting at the per-access-point level and drilling further down to per-radio, per-service set identification (SSID), and per-user levels. The switch shall be capable of automatically allocating equal bandwidth among the connected users within a given SSID. This makes sure that all users within a given SSID get a fair share of the available bandwidth while being connected to the network. The UADP ASIC enables the hierarchical bandwidth management and fair sharing of bandwidth, thereby providing hardware-based QoS for optimized performance at line-rate traffic.

10. The core Ethernet switch shall be provided with security features such as IEEE 802.1x, port security, Dynamic Host Configuration Protocol (DHCP) Snooping and Guard,

Dynamic ARP Inspection, RA Guard, IP Source Guard, control plane protection (CoPP), wireless intrusion prevention systems (WIPSs), and so on enable protection against unauthorized users and attackers. With a variety of wired plus wireless users connecting to the network, the switch shall supports session-aware networking, in which each device connected to the network is identified as one session, and unique access control lists (ACLs) and/or QoS policies can be defined and applied using the ISE for each of these sessions, providing better control on the devices connecting to the network.

C. The core Ethernet switches performance capabilities:

1. Switch capacity:
    a. 176Gps on 48 port model
    b. 92 Gbps on 24-port models
    c. 68 Gbps on 12-port model
2. Stacking bandwidth: 480Gps
3. Total number of MAC addresses: 32,000
4. Total number of IPv4 routes: 24,000
5. FNF entries:
    a. 48,000 flow on 48-port models
    b. 24,000 flows on 12-port and 24-port models
6. DRAM: 4 Gb
7. Flash: 2 Gb
8. Vlan ID(s): 4,000
9. Jumbo Frame: 9198 bytes
10. Total Routed ports per 3850 Stack: 2018

D. The core Ethernet switches physical characteristics:

1. Dimensions: 1.75” X 17.5” X 17.7”
2. Weight: 15.5 lb
3. Environmental: -5C to 45C
4. Relative Humidity: 10% to 95%, noncondensing
5. Connectors and Cabling:
    a. 1000BASE-T ports: RJ-45 connectors, 4-pair Car5E UTP cabling
    b. 1000BASE-T SFP based ports: RJ-45 connectors, 4-pair Car5E UTP cabling

c. 100BASE-FX, 1000BASE-SX, -LX/LH, -ZX, -BX10, DWDM and CWDM SFP transceivers: LC fiber connectors (single mode and multimode fiber)

d. 10GBASE-SR, LR, LRM, ER, ZR, DWDM SFP+transceivers: LC fiber connectors (single mode and multimode fiber)

e. CX1 cable assemblies: SFP+Connectors

f. Ethernet Management Port: RJ-45 connectors, 4-pair Car5E UTP cabling

g. Management Console Port: RJ-45 to DB9 cable for PC connection

E. The core Ethernet switches Power characteristics:

a. Power Supply Rated Maximum: 1100W/715W/350W/440W

b. Total BTU Output: 3793 BTU/hr; 2465 BTU/hr; 1207 BTU/hr; 1517 BTU/hr

c. Input Voltage Range: 115-240VAC

d. Input Current Range: 12-6A

F. Model:

1. Cisco Catalyst 9300 Series (PoE + Network Advantage)

2. Or Equal

2.19 VIDEO WIRING SYSTEMS

A. The singlemode fiber cable shall be made for long-reach applications in campus and outside plant backbones. The singlemode fiber cable shall be Single-Jacket, All Dielectric Loose Tube Cables. The singlemode fiber cable shall be low-water peak fiber that is ideal for Wavelength Division Multiplexing (WDM) technology where multiple wavelengths operating at 10 or 25Gb are transmitted over a single fiber to deliver extremely high bandwidth to distances of 10 km or more.

1. The singlemode fiber shall support all broadband applications and complies with the most stringent industry standards, such as:

a. ITU-T G.652 (Tables A, B, C and D)
b. IEC 60793-2-50 Type B1.3
c. ISO 11801 052
d. TIA/EIA 492-CAAB
e. Telecordia GR-20-CORE

2. Model:

a. Indoor/Outdoor Ribbon cable: Single-Jacket, All Dielectric Loose Tube Cables
1) Belden
2) General Cable
3) West Penn

B. Provide multimode fiber optic cabling and patching for non-backbone fiber optic media conversion.

1. OM3/4 Indoor/Outdoor Fiber, 900 micron tight buffer:

a. OCC

b. Commscope

c. Mohawk CDT

d. Belden

C. Provide fiber optic patch panels and splice shelves with all required materials at each electronic security equipment room. Enclosures and panels shall be of sufficient size and capacity to terminate all of the combined fiber count of risers and backbone outside fiber optic cables.

1. Models:

a. Leviton Opt-X 1000 Rack Mount

b. Belden AX Series Fiber Express

c. West Penn Wire

D. Data Cable: Unshielded 4-pair, shall exceed all requirements for ANSI/EIA/TIA-568-A-5 and support high speed communication network applications.

1. Category 6:

a. Belden: 7881A – Dry, Wet not available

b. West Penn: 4246 – Dry, M57562 – Wet

c. Comscope: 75N4 – Dry, 6NF4+ – Wet

2.20 MEDIA CONVERTERS – INDUSTRIAL GRADE

A. Transmits and receives 1000 Mbps data over multimode, single mode, optical fiber, or 10/100/1000 Mbps data over CAT5e or Cat6 electrical cable. The media converter shall meet following requirements:

1. Data Interface: Ethernet

2. Data Rate: 10/100/1000 Mbps, IEEE 802.3 Compliant

3. Operating Mode: Full Duplex or Half Duplex

4. MTBF: > 100,000 hours

5. Operating Temp: -40° C to +74° C

6. Storage Temp: -40° C to +85° C

7. Relative Humidity: 0% to 95%

8. Model:

   a. Comnet

   b. KBC Networks

   c. Blackbox

   d. Redlion

2.21 CAMERA POWER SUPPLIES

A. Provide minimum 60W PoE+ injector where recommended by the camera manufacturer. Provide adequate mounting hardware in rack to accommodate the number of PoE injectors required.

   1. Bosch NPD-6001B or equal

   2. Axis

2.22 SPARE PARTS

A. Provide spare parts as follows:

   1. Camera: Two (2) of each type required.

   2. LCD HD Monitors 27”: One (1)

   3. VIDEO STORAGE: Provide Two (2) of each type of RAID hard drives.

PART 3 - EXECUTION

3.1 INSTALLATION (SEE SECTION 280510)

A. Install all equipment in accordance with manufacturer’s recommendations.

B. Provide rack mount equipment as required for all equipment shown rack mounted on the drawings.

C. Install all video surveillance system cabling in conduit.

D. Provide conduit with pull strings, boxes, and video system capacity for future cameras indicated on plans.

E. Make all connections to video equipment with approved connectors for cable used.

F. After Substantial Completion and initial programming as specified, provide a minimum of eight (8) hours of time with Owner Representative for review of specified program and modification to User’s requirements.

3.2 TESTING (SEE SECTION 280510)

A. Testing Specifications for each fiber optic cable:

1. All of the following test shall be performed on each fiber in each cable installed and each test results shall be provided in written form

2. End to end attenuation test with power meter. Maximum attenuation on installed cables / fibers shall be within the manufacturer's specifications.

B. The testing of both windows of each fiber optic cable.

1. If splicing of a fiber optic cable is required due to site conditions, each fiber in the associated cable shall be tested using an Optical Time Division Reflectometer (OTDR). All testing information and locations of each splice shall be in written form and provided with the as-build documents. The following items must be tested on each fiber associated with a splice.

a. Test each strand on one wavelength in one direction on each segment, no jumper allowed, and document.

b. Test for overall continuity and document.

c. Verify the length of each segment and document.

d. Locate and indicate all splices on drawings.

3.3 WIRING (SEE SECTION 280510)

3.4 OWNER PERSONNEL TRAINING (SEE SECTION 280510)

A. Provide training of owner personnel in proper operation and maintenance of video surveillance system.

B. Training Outline-Admin staff

1. Functions performed

2. Control Functions

3. Recording/Playback/Archival

4. User Rights

C. Training Outline-Operational staff

1. Functions performed

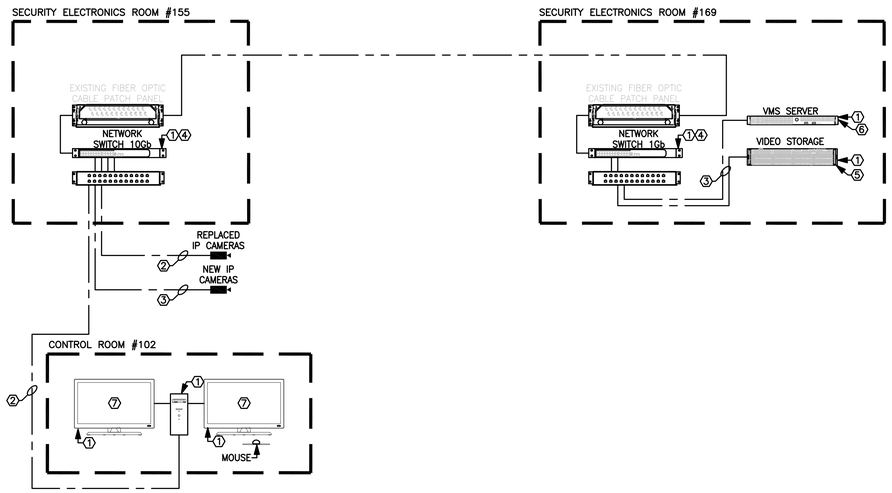
2. Control Functions

3. Recording/Playback

D. Training Outline-Maintenance Staff

1. Systems Operation
2. Component Review
3. Routine Maintenance/Adjustments
4. Troubleshooting/Repair

END OF SECTION 28 2300



1 SYSTEM NETWORK DIAGRAM
ES4.01 SCALE: NOT TO SCALE

LEGEND:

CAMERA POWER SUPPLY
DATA CABLE/CAT 6
FIBER OPTIC CABLE

GENERAL NOTES:

1. LOCATION AND NUMBER OF ALL EXISTING ELECTRONIC SECURITY FIELD DEVICES SHOWN ON THIS DRAWING ARE BASED ON AS-BUILT DRAWINGS. FIELD VERIFY AND CONFIRM LOCATION, NUMBER AND FUNCTIONALITY OF ALL EXISTING FIELD DEVICES.
2. REFER TO CAMERA SCHEDULE FOR THE EXACT CAMERA MOUNTING LOCATIONS AND TYPES. THE FINAL CAMERAS MOUNTING LOCATIONS SHALL BE FIELD VERIFIED (TO PROVIDE OPTIMUM VIEW) AND CONFIRMED BY THE OWNER AND SECURITY CONSULTANT.
3. ALL EXISTING AND NEW WIRING SHALL BE MANAGED IN ACCORDANCE TO APPLICABLE CODES AND INDUSTRY STANDARDS. ALL EXISTING AND NEW WIRING SHALL BE LABELED PER CONSTRUCTION DOCUMENTS REQUIREMENTS.
4. REUSE EXISTING UPS CIRCUITS TO CONNECT NEW EQUIPMENT.
5. PATCH PANELS SHALL BE USED TO TERMINATE AND DISTRIBUTE ALL DATA CABLES (CAT6) IN EQUIPMENT CABINETS/ENCLOSURES
6. ALL NETWORK SWITCHES FOR THE ELECTRONIC SECURITY SYSTEM SHALL BE PROVIDED BY THE OWNER (NDCS-OCIO). ELECTRONIC SECURITY CONTRACTOR SHALL COORDINATE SWITCHES SETUP WITH THE OWNER. ALL IP ADDRESSES AND VLAN CONFIGURATION SHALL BE COORDINATED BETWEEN THE ELECTRONIC SECURITY CONTRACTOR AND THE OWNER DURING THE SUBMITTAL PROCESS.
7. ALL GENERAL NOTES SHOWN ON THE FLOOR PLAN DRAWINGS APPLY TO THIS DRAWING.

NOTES

1. 120 VAC, 20A POWER FROM THE EXISTING UPS. REUSE EXISTING UPS POWER RECEPTACLE WHERE AVAILABLE.
2. REUSE CAT6 CABLE.
3. NEW CAT6 CABLE.
4. EXISTING 24 PORT NETWORK SWITCH.
5. NEW ARRAY OF HARD DRIVES IN RAID 6 CONFIGURATION FOR VIDEO RECORDING STORAGE. PROVIDE QUANTITY AS REQUIRED TO MEET CONSTRUCTION DOCUMENTS REQUIREMENTS.
6. NEW VIDEO MANAGEMENT SYSTEM (VMS) SERVER. THE SERVER SHALL MANAGE ALL VIDEO SYSTEM DEVICES, EQUIPMENT AND NETWORK TRAFFIC.
7. NEW VIDEO VIEWING/MONITORING STATION (27" LCD MONITORS, CPU AND KEYBOARD). PROVIDE HDMI CABLE FOR CONNECTION BETWEEN VIDEO MONITORS AND CPU.

CAMERA SCHEDULE

	Camera Number	Room Name	Sheet	Model Number	Resolution	Lens	Mount	Video Analytics	Notes:
Site Level									
1	CS01	Exterior Southeast corner	ES1.00	PNM-C34404RQPZ	34MP	360°ms/PTZ	Wall		
2	CS02	Exterior South	ES1.00	PNM-C34404RQPZ	34MP	360°ms/PTZ	Wall		
3	CS03	Exterior West	ES1.00	NDM-7703-A	20MP	360°ms	Wall		
4	CS04	Exterior Northwest	ES1.00	NDM-7703-A	20MP	360°ms	Wall Corner		
5	CS05	Exterior North	ES1.00	PNM-C34404RQPZ	34MP	360°ms/PTZ	Wall		
6	CS06	Exterior Pole Outdoor Yard North	ES1.00	PNM-C34404RQPZ	34MP	360°ms/PTZ	Pole		
7	CS07	Exterior Northeast	ES1.00	NCE-7703-FK	6MP	2.5mm	Ceiling Corner		
8	CS08	Exterior Northeast	ES1.00	NDS-5704-F360LE	12MP	360°	Ceiling		
9	CS09	Exterior East	ES1.00	PNM-C34404RQPZ	34MP	360°ms/PTZ	Wall		
Building Main									
10	C01	101	ES1.01	NDS-5704-F360LE	12MP	360°	Ceiling		
11	C02	102	ES1.01	NDE-5702-A	1080P	3-9mm	Ceiling		
12	C03	158	ES1.01	NDS-5704-F360LE	12MP	360°	Ceiling		
13	C04	160	ES1.01	NDS-5704-F360LE	12MP	360°	Ceiling		
14	C05	161	ES1.01	NDE-5702-A	1080P	3-9mm	Ceiling		
15	C06	159	ES1.01	NDE-5702-A	1080P	3-9mm	Ceiling		
16	C07	167	ES1.01	NDE-5702-A	1080P	3-9mm	Ceiling		
17	C08	165	ES1.01	NDS-5704-F360LE	12MP	360°	Ceiling		
18	C09	168	ES1.01	NDE-5702-A	1080P	3-9mm	Ceiling		
19	C10	171	ES1.01	NDS-5704-F360LE	12MP	360°	Ceiling		
20	C11	179	ES1.01	NDS-5704-F360LE	12MP	360°	Ceiling		
21	C12	153	ES1.01	NDS-5704-F360LE	12MP	360°	Ceiling		
22	C13	150	ES1.01	NDS-5704-F360LE	12MP	360°	Ceiling		
23	C14	150	ES1.01	NDE-5703-A	5MP	3-10mm	Ceiling		
24	C15	149	ES1.01	NDS-5704-F360LE	12MP	360°	Ceiling		
25	C16	149	ES1.01	NDE-5703-A	5MP	3-10mm	Ceiling		
26	C17	139	ES1.01	NDE-5702-A	1080P	3-9mm	Ceiling		
27	C18	138	ES1.01	NDE-5703-A	5MP	3-10mm	Ceiling		
28	C19	137	ES1.01	NDE-5703-A	5MP	3-10mm	Ceiling		
29	C20	156	ES1.01	NDE-5702-A	1080P	3-9mm	Ceiling		
30	C21	115	ES1.01	NDS-5704-F360LE	12MP	360°	Ceiling		
31	C22	115	ES1.01	NDE-5703-A	5MP	3-10mm	Ceiling		
32	C23	130	ES1.01	NDS-5704-F360LE	12MP	360°	Ceiling		
33	C24	130	ES1.01	NDE-5703-A	5MP	3-10mm	Ceiling		
34	C25	116	ES1.01	NDE-5702-A	1080P	3-9mm	Ceiling		
35	C26	114	ES1.01	NDS-5704-F360LE	12MP	360°	Ceiling		
36	C27	118	ES1.01	NDS-5704-F360LE	12MP	360°	Ceiling		
37	C28	113	ES1.01	NDS-5704-F360LE	12MP	360°	Ceiling		
38	C29	108	ES1.01	NDE-5702-A	1080P	3-9mm	Ceiling		
39	C30	104	ES1.01	NDS-5704-F360LE	12MP	360°	Ceiling		
40	C31	103	ES1.01	NDE-5702-A	1080P	3-9mm	Ceiling		
Building Portable									
41	C32	Entrance Corridor	ES1.01	NDS-5704-F360LE	12MP	360°	Ceiling		
42	C33	Left Classroom	ES1.01	NDS-5704-F360LE	12MP	360°	Ceiling		
43	C34	Right Classroom	ES1.01	NDS-5704-F360LE	12MP	360°	Ceiling		

2 CAMERA SCHEDULE
ES4.01 SCALE: NOT TO SCALE

LattaTech
Advanced Security Engineering
LATTA TECHNICAL SERVICES INC.
1255 West 15th Street, Suite 300
Plano, TX 75075
T: (972) 633-5850 ★ F: (469) 467-0300
Corporate P.E. Board Reg. No. CA1424

Lincoln
1221 N Street, Suite 600
Lincoln NE 68508
Phone 402-476-9700
Fax 402-476-9722

Vermillion
15 East Main, Suite 201
Vermillion SD 57069
Phone 605-624-1061

davis design

MICHAEL JOSEPH SMITH E-14020 STATE OF NEBRASKA PROFESSIONAL ENGINEER
11/17/23

CLIENT INFORMATION
Nebraska Department of Correctional Services
York, NE

PROJECT INFORMATION
CCCO SECURITY CAMERA UPGRADE

Job # 22-0112

ISSUE DATE: 11/17/2023

Revisions:

ID	Date	Description
1	12/08/2023	ADDENDUM #2

CHECKED: IA
DRAWN BY: DN

SHEET TITLE
VIDEO MANAGEMENT SYSTEM DIAGRAM / CAMERA SCHEDULE

SHEET NUMBER
ES4.01