



# COLLIN COUNTY

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COLLIN COUNTY, TEXAS

ADDENDUM No. Four (4)

IFB No. 2021-014

INVITATION FOR BID

FOR

CONSTRUCTION, COLLIN COUNTY JUVENILE DETENTION, VIDEO RETROFIT

DATE: JANUARY 12, 2021

NOTICE TO ALL PROSPECTIVE BIDDERS:

PLEASE MAKE THE FOLLOWING CHANGES TO THE INVITATION FOR BID:

DELETE DOCUMENT: SECTION 28 05 10 ADDENDUM 1

REPLACE WITH: SECTION 28 05 10 ADDENDUM 2 (CHANGES ARE IN RED)

DELETE DOCUMENT: SECTION 28 23 00 ADDENDUM 1

REPLACE WITH: SECTION 28 23 00 ADDENDUM 2 (CHANGES ARE IN RED)

ADD ATTRIBUTE: #29-ADDENDUM No. 4 ACKNOWLEDGEMENT

DELETE DOCUMENT: SECTION 004100-BID FORM ADDENDUM 3

REPLACE WITH: SECTION 004100-BID FORM ADDENDUM 4

ALL OTHER TERMS AND CONDITIONS OF THE BID AND SPECIFICATIONS REMAIN THE SAME.

SINCERELY,  
MICHELLE CHARNOSKI, CPPB  
PURCHASING AGENT

JDG

SECTION 280510 - COMMON WORK RESULTS FOR ELECTRONIC SECURITY SYSTEM

PART 1 - GENERAL

1.1 DESCRIPTION

- A. General:
  - 1. Furnish all labor, materials, tools, equipment, and services for all electronic systems work as indicated, in accord with provisions of Contract Documents.
  - 2. Completely coordinate with work of all other trades.
    - a. 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.
- B. Drawings use and interpretation:
  - 1. Drawings are diagrammatic and indicate general arrangement of systems and equipment, except when specifically dimensioned or detailed.
  - 2. Field measurements take precedence over dimensioned drawings.
  - 3. Intention is to show size, capacity, approximate location, direction and general relationship of one work phase to another, but not exact detail or arrangement.
  - 4. Field verify locations and arrangement of all existing systems and equipment.
  - 5. Where ambiguity may exist between specifications and drawings, the most stringent shall apply.
- C. Installation of all systems and equipment is subject to clarification as indicated in reviewed shop drawings and field coordination drawings.
- D. Dimensions indicated anywhere are limiting dimensions.
- E. Do not use equipment exceeding dimensions indicated or equipment or arrangements that reduce required clearances or exceed specified maximum dimensions.
- F. Description of systems: Furnish and install all materials to provide functioning systems in compliance with performance requirements specified and any modifications resulting from reviewed shop drawings and field coordinated drawings. Electronic security systems work as specified in this section includes:
  - 1. Providing all equipment to provide a functional integrated system indicated in the contract documents.
  - 2. Providing special back boxes for field devices.
  - 3. Providing equipment cabinets and enclosures.
  - 4. Providing wiring for electronic systems.
  - 5. Providing raceway systems for electronic systems.
- G. Electronic Security Systems:
  - 1. Common Work Results for Electronic Security System Section 28 0510
  - 2. Cabinets and Enclosures: Section 28 0555
  - 3. Video Management and Recording System Section 28 2300
  - 4. ~~Uninterruptible Power System: Section 28 5045~~
- H. Furnished and installed the Division 28:

1. All 120 volt AC wiring and connections for power panels and/or terminal strips in electronic panels, cabinets, enclosures or consoles as required to provide sufficient power to new equipment (reuse existing power circuits).
  2. All 120 volt AC wiring, devices and connections for devices and equipment as indicated on drawings, or as required to provide sufficient power to new equipment. (reuse existing power circuits).
  3. All new electrical work 110V and higher must be completed by a licensed electrician under this contract.
  4. Raceway system using J-Hooks spaced at a maximum of 5' (60") from the main head end equipment to the end device. Provide conduit from device into plenum space within 3' of J-hooks. Do not let cables rest on ceilings in plenum.
  5. Conduit sizing shall allow for a maximum conductor fill of 40 percent of conduit cross sectional area.
  6. The Contractor shall be responsible for any additional conduits required (not shown on drawings) or increase in size of conduit to affect the installation of the security system contained herein.
- I. Description of systems: Furnish and install all materials to provide functioning systems in compliance with performance requirements specified and any modifications resulting from reviewed shop drawings and field coordinated drawings.

## 1.2 BASIS OF DESIGN

- A. The purpose of video management and recording system is to provide visual confirmation of movement through security barriers and general surveillance of movement. The Video Management and recording System shall be an IP network-based, fully distributed digital video system. The security video system will utilize local area networks (LAN) as a transmission medium for video, configuration, as well as storage of all data. The IP video management system shall provide support for IP cameras from multiple manufacturers and shall support high megapixel HD IP cameras.
- B. The existing video surveillance system in the facility is analog system and consists of a centralized matrix switcher located in the Tele-Communications Room 160 with video monitors, multiplexers, quad splitters, power supplies and analog DVRs in the equipment room and control room lower cabinets. All existing video surveillance system components shall be removed and replaced for the new Milestone XProtect **Expert-enterprise-level Corporate 2020 R2 (by county)** video management and recording system licenses. All existing cameras shall be removed and replaced with new HD IP based megapixel cameras as noted.
- C. All existing coax **video** cables will be removed and replaced with Cat6 cables. New cameras shall be added to improve video coverage in the facility and outside perimeter. New cables may be pulled in existing conduits and on new J-hooks in the plenum using plenum rated cable. All camera **cabling** will be connected to new PoE network switches **provided by Collin County. Collin County shall provide, configure and install the Cisco network switches, patch panels and head end patch cables with all necessary network related accessories prior to the start of contractor installation.** Video management server, video viewing stations and video storage will be connected via dedicated network. ~~The IP video management and recording system network shall be arranged in a star topology with a L3-10G capable core switch connected to each remote access/edge switch via redundant 1Gig uplinks on the existing OM1 fiber optic backbone, loaded at no more than 60% capacity.~~
- D. The video management system (VMS) shall be 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 shall be 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 shall consist of the following software modules: management server, recording services, configuration client and operator clients. New video management and recording system shall 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.

- E. The Digital Video Storage Array will be designed for high speed; high capacity digital video storage and high performance play back applications. The storage array will be a full featured RAID 6 configuration. All new cameras shall be connected to video network to allow display of any camera on any video viewing station. All cameras shall be recorded and video storage shall be sized to retain recording for 60 days. All cameras shall be continuously recorded at the camera's maximum resolution at 15 images per second. Quiet time recording (no motion) shall be stored at 2 images per second for all cameras, with reduced bandwidth. Motion event recording should be estimated at 65% daily with quality settings at high and scene activity at medium. **Storage capacity shall be minimum 500TB of usable net calculated storage in RAID 6 configuration.**
- F. The system shall provide full video control, with additional full selection capability at any point within the network from a workstation. The security video system shall provide expansion capability for the addition or modification of the system. All new video management and recording system devices and equipment shall communicate over 1G network consisting of and L3 network switches **provided by Collin County** connected via existing fiber optic backbone. The IP networked video management and recording system shall be an integrated hardware and software platform. It shall provide distributed administration of multiple devices and administer rights and privileges for all attached devices.
- G. Video system components shall be powered from the emergency power systems with additional backup from uninterruptible power systems for all components **as provided by Collin County**. ~~UPS runtime shall be provided for a minimum of 20 minutes at full connected load in equipment rooms. Existing UPS units for existing equipment shall remain. Provide new circuits for new UPS units where shown on bid drawings.~~
- H. All Contractor provided hardware (including but not limited to CPUs, IP cameras, monitors) and software (**less Milestone**) shall be the latest available products on the market at the date of the project implementation. The Contractor shall notify the engineer of any models which have been put on end-of-life or end-of-service lists by the manufacturer prior to installation.
- I. The county shall provide the Milestone XProtect Corporate **2020 R2** site license. The Contractor shall provide all additional Milestone licenses for cameras, servers and workstations required for this project with one-year care support and shall provide all site specific configuration. Coordination with county I.T. will be required for IP scheme.
- J. The existing PLC and Intercom control and other ESS systems shall remain functional throughout the contract.
- K. The new video management and recording system shall be interfaced with the existing touch screen control and management system to allow display of all new and existing cameras on the touch screen maps for camera call-up functionality **under separate contract**. The current touch screen control system is maintained by the county's Security System Integrator. The video system integrator shall be required to coordinate with county's Security System Integrator to setup Milestone XProtect rules and certain settings according to their integration needs prior to installation. The Contractor shall provide a CAT6 data drop from the video system core switch to the electronic security equipment room per coordination with county's Security System Integrator. Allow for 300' run.

- L. Existing enclosures and racks may be reused. All equipment to remain in existing enclosures must remain accessible. Do not block existing systems with new equipment. Where necessary provide new expansion wall or floor mounted enclosures, but all new enclosures must be coordinated with owner prior to installation and match existing models in the room. Proper ventilation and airflow must be achieved in the design of the layout of new equipment in new and existing enclosures. All cabinets shall allow for rear access to mounted equipment. A new 44RU lockable cabinet shall be provided in the existing Telecom Room#160/Jan#104 if the existing cabinet is not sufficient to house new equipment. The Contractor shall coordinate with county I.T. for the location and replacement of the cabinet prior to doing any work.

1.3 COUNTY CABLING REQUIREMENTS:

- A. All work done is to be based on Collin County standards and Industry best practices. Where the two diverge the Collin County lead will be responsible for making the decision on which to use.
- B. Vendor is responsible for labeling all equipment and connections according to Collin County specifications.
- C. Cables will be bundled at head end locations using Velcro.
- D. Vendor will terminate all cables on Panduit data jacks at both ends, cables will be terminated on **Collin County provided** Panduit patch panels in the IDF, ~~and there will be no home run connections allowed.~~ **Collin County will provide and install the patch cables between the county provided switches and county provided patch panels.**
- E. Vendor will test each cable connection and provide Collin County with a soft copy and hard copy of test results.
- F. ~~Vendor will provide Collin County with a patch matrix indicating where each network drop is patched to on the switch. Which should be one for one (port 1 on pp should be port 1 on switch, port 48 on patch panel should be port 48 on switch etc.)~~
- G. Each cable is to be labeled at each end using Panduit Label maker or other label maker, no hand-written labels.
- H. Vendor will provide all tools needed to complete the work as prescribed.
- I. Vendor will trouble shoot and resolve any problems that arise as part of this project.
- J. Any deviations from the design drawings must be approved by Collin County.
- K. All personnel working on site at all Collin County Facilities must agree to follow all Collin County rules and regulations.

1.4 ALTERNATE BIDS:

- A. When providing Alternate Bids, include all ancillary costs to increase, modify, or delete the work as described. Do not reduce the overall system capability unless specifically described to do so. As example, deletion of cameras does not include reduction of video/data ports of network switches unless specifically noted as such.
- B. Alternate Bids within the Electronic Security Systems include the following.

- ~~1. Alternate Bid#1 – Provide parking camera CS031, CS032 and CS033 and all associated equipment as part of this alternate bid. Base bid shall not include cameras CS031, CS032 and CS033 (Refer to drawing ES1.00, Key Note#4).~~
2. Alternate Bid#2 – Provide external microphone for cameras C101, C102, C103, C108, C112, C125, C128, C135, C137 and C218 (Refer to drawing ES101, Key Note#1).

## 1.5 WARRANTY

- A. The Contractor will provide a warranty on all workmanship and installation for a period of one (1) year from the date of Substantial Completion per facility.
- B. Manufacturer's warranties shall be maintained and transferred to the Owner. All video manufacturer equipment warranties shall be for a period of no less than 3 years.
- C. The Contractor shall provide advanced replacement for any equipment that fails in the first 12 month warranty period
- D. The existing equipment that is to be re-used need not be warranted. However such exception to the warranty are limited to the equipment itself and excludes damage by the Contractor. All installation, operations, functionality, programming, etc. remains included in the required warranties.
- E. Respond within four (4) hours to an emergency maintenance request. Provide a twenty-four hour telephone contact number (24 hours per day, 365 days per year). Service response time is defined as the period between the placing of a service request and established communications with the designated client representative. Emergency repair personnel shall be on-site within 24 hours of notification and repair or replacement of defective equipment shall be completed within 72 hours of notification. Coordinate a remote connection with owner using an air-gapped Ethernet relay switch designed for the purpose if one is not present in the system.
- F. Maintain a sufficient parts inventory during the warranty period to meet the anticipated system repair times. Contractor shall monitor spare equipment inventory and replenish materials used in an expedient manner.
- G. Prior to expiration of warranty, Contractor shall provide up to date workstation and enrollment server images, software, software patches, best practices for workstation and server support to include workstation and monitor technical builds and specifications.
- H. All computing equipment shall be provided with, and software applications compatible with Windows 10 and Microsoft Server 2016 operating systems at a minimum. Provide later OS versions where compatibility is available.
- I. See individual sections for additional warranty requirements.

## 1.6 QUALITY ASSURANCE

- A. Perform all work in accord with following codes and standards:
  1. Codes Compliance: Comply with the following current adopted codes:
    - a. Federal, state and local codes, regulations and ordinances.
    - b. National Electrical Code (NEC), latest edition
    - c. National Fire Code (NFC)
    - d. Occupational Safety and Health Act (OSHA)
    - e. International Building Code (IBC)

- f. Factory Mutual System (FM) requirements
- g. All authorities having jurisdiction.
- 2. Standards Compliance: Comply with the following standards as applicable:
  - a. Americans with Disabilities Act (ADA)
  - b. American National Standards Institute (ANSI)
  - c. American Society for Testing and Materials (ASTM)
  - d. Electronics Industry Association (EIA)
  - e. Electrical Testing Laboratories (ETL)
  - f. Factory Mutual (FM)
  - g. Institute of Electrical and Electronics Engineers (IEEE)
  - h. Insulated Cable Engineers Association (ICEA)
  - i. National Electrical Contractors Association (NECA)
  - j. National Electrical Manufacturers Association (NEMA)
  - k. National Fire Protection Association (NFPA)
  - l. Underwriter's Laboratories (UL)
- B. Equipment Manufacturer:
  - 1. Regularly engaged in the manufacture of products specified.
  - 2. Manufacturer of products specified for a period of no less than five years with satisfactory performance in similar applications.
- C. Contractor Personnel: (Project Manager, Project Engineer, On-site Supervising Technician)
  - 1. Regularly engaged in installation of products specified.
  - 2. Installer of products specified for a period of no less than five years with satisfactory performance.
- D. Systems specified in this Division shall be engineered, assembled and installed under the direction of the Contractor. The Contractor shall meet the following minimum requirements.
  - 1. Qualifications.
    - a. Successful completion of at least five projects with similar system complexity which have been in successful operation for at least one year.
      - 1) Successful completion shall be determined by information from references confirming project was not delayed by the completion of electronic security systems, electronic security systems were fully operational within 90 days of substantial completion and electronic security systems remained fully operational at conclusion of warranty period.
      - 2) Projects of similar size are represented by electronic security integration scope of work, quantity of nodes, and quantity of similar field devices.
    - b. Technical staff shall be experienced and factory trained in systems specified.
    - c. The Contractor shall be bondable for an amount equal to 100% of his bid.
  - 2. Contractors desiring approval shall submit information supporting compliance with the following minimum requirements.
    - a. Minimum five (5) continuous years in the business of installing electronic security systems in justice/detention and or correctional facilities incorporating systems and equipment including but not limited to intercom/paging, programmable logic controllers, touch screen control, access control, and video management systems.
    - b. References: The Collin County and/or its representative(s) may at their own discretion contact references for projects in addition to those submitted by the applicant.
    - c. Definitions:
      - 1) Similar Size: Detention Facility of...
        - a) Similar dollar value of installed electronic security systems
        - b) Similar duration (12 months)
        - c) Similar systems technology
      - 2) Similar Complexity: Detention Facility ...

- a) Using integration of multiple systems including video, communications, and control.
- E. Termination, testing and start-up of electronic systems shall be done under the direct supervision of the Contractor. Prior to termination at system equipment, all field wiring shall be tested against faults, grounds and other conditions that may impede the proper operation of the system. Contractor shall verify and accept the field wiring prior to termination at system equipment. Beginning of termination constitutes acceptance of conditions as satisfactory.

## 1.7 SUBMITTALS

- A. Review of shop drawings or schedules by Engineer shall not relieve the Contractor from responsibility for deviations from drawings or specifications, unless there is a formal letter which called attention to such deviations at the time of submission and secured written approval; nor shall it relieve the Contractor from responsibility for errors in shop drawings, schedules or coordination of the work with other trades.
- B. Submittals for individual systems and equipment assemblies which consist of more than one item or component shall be made for the system or assembly as a whole. Partial submittals will not be considered. Partial submittals will not be returned except at the request and expense of the Contractor.
- C. The Contractor shall develop and submit complete submittals and do so in a timely manner. By failing to do so, the Contractor agrees to be fully responsible for any and all damages which might be occasioned by the Contractor's failure to do so.
- D. Where Engineer furnished electronic files of the Contract Documents are used as part of the shop drawings, the Contractor shall review such files and confirm completeness and accuracy. Submission of such documentation as a part of the shop drawings shall be indication that such review and confirmation has been performed and completed. Submission and subsequent approval shall not relieve the Contractor from the requirements of the Contract Documents.
- E. All shop drawings shall be created using AutoCAD v2016 or later. Schedules shall be created in spreadsheet format using Microsoft Excel. Incorporate all revisions upon completion of work. Submit all schedules and record drawings in both hard copy and electronic files.
- F. Electronic submittal reviews:
  - 1. PDF submissions of narratives, data sheets, cut sheets and all other documents shall be created in their original size at a high quality resolution.
  - 2. Each PDF submission file shall have a page designated for a review stamp and general comments by the Engineer.
  - 3. Drawings being submitted in PDF form shall have minimum font sizes, preferably .125" but in no case smaller than 0.1"
  - 4. Drawings shall be in a high resolution format so as to not degrade when an area is enlarged while viewing.
  - 5. The original drawings should be converted to PDF's at full scale.
  - 6. PDF files should each be created by each general specification number/system and then all files & drawings as a group submitted as one complete submittal.
  - 7. Do not create a single PDF file for the complete submittal.
- G. Resubmittal of items that have been previously accepted or approved will not be reviewed unless specific attention is called to changes in previously approved items. Resubmission that does not specifically call attention to previously accepted or approved submittals shall not be considered as subsequent approval of a change to the initially accepted or approved item.



- H. Submit drawings, data sheets, schedules, and others, in compliance with Article "Submittal Requirements" of this Section to permit adequate time for review by the Engineer, but in not less than (twenty one) 21 calendar days. This (twenty one) 21 day review period is exclusive of time associated with travel, mail, delivery, copy, and handling. Due to the integrated system, most submittals are interrelated and thus are expected in one group.
  
- I. Provide information required for complete review of each item in one submittal. When individual sections of specifications require more than one item for review, such as shop drawings, product data, samples, and related items, submissions shall include all specified information delivered at one time.
  - 1. Incomplete or partial submittals will not be reviewed by the Engineer.
  - 2. Extra copies of submittals will not be marked or returned, except at the expense of the Contractor.
  - 3. Duplicate copies of incomplete or partial submittals, or extra copies of submittals, will be discarded after 15 calendar days unless Contractor makes arrangement for return, at Contractor's expense.
  - 4. Submittals not requested specifically may be returned to Contractor without review.
  
- J. Review of submittals shall be limited to two submissions. The Engineer shall be compensated for additional reviews. In such an event, the Engineer will determine a cost for the additional review(s) based on previous review cost and provide to the Contractor. Upon receipt of payment, the Engineer will conduct the requested additional review(s).
  
- K. Project Data: Electronic Systems General Requirements: Section 280510.
  - 1. Contractor personnel qualifications: (Project Manager, Project Engineer, On-site Supervising Technician).
  - 2. List of all manufacturers and equipment suppliers.
  - 3. Submittal schedule: Schedule shall be submitted within 14 calendar days of Notice of Intent to Award and shall include time and duration for product data by group, shop drawings by group, and testing procedures.
  - 4. Where modifications are required to existing control systems, the schedule shall include phasing with identification of the time and duration of modifications to each portion of the work. Time and durations shall be reviewed with the Owner/User in order to allow continuous operation of the facility
  - 5. Functional block diagram of complete integrated system with references to all related sub-system drawings.
  - 6. Floor plans indicating device locations and cable assignments/groupings. Submission of these plans indicates that the Contractor has coordinated the placement of all devices with architectural plans, and coordinated raceway requirements with all related trades.
  - 7. Drawings indicating complete conduit and raceway systems.
  - 8. Spare parts inventory with quantity, description and source listed.
  - 9. Testing: Provide complete testing procedure for electronic security systems. The procedure shall identify testing of each function of each device under each condition. Manufacturer recommended test procedures shall be incorporated into the testing procedure. All testing shall be project specific.
  - 10. Construction schedule: A schedule of electronic security system construction phase work shall be submitted within 14 calendar days from the contract signing and shall include time and duration of each of the items listed at a minimum. The schedule shall be updated periodically as needed throughout the duration of the project with resubmission required at each update or modification, but no less than quarterly.
    - a. Submittals
    - b. Conduit and Raceway installation
    - c. Procurement
    - d. Assembly (by equipment room location)
    - e. Programming

- f. Factory Testing of completed system
  - g. Shipping (by equipment room location)
  - h. Terminations (by equipment room location)
  - i. Field device installation (by building area)
  - j. Contractor preliminary testing (by building area)
  - k. Validation Testing
  - l. Test Upon Completion of Work
  - m. Operation and Training Manuals
  - n. Owner Training
  - o. Final Testing
  - p. Pre-Warranty Expiration Review
11. Schedule of Values: A schedule of values for the electronic security systems shall be submitted within 60 calendar days of Notice to Proceed and shall include material and labor costs for each part of the work. Values for the following shall be provided at a minimum.
- a. General Conditions: Section 280510
  - b. Submittals: Section 280510
  - c. Testing: Section 280510
    - 1) Factory Testing
    - 2) System Validation Testing
    - 3) Demonstration Upon Completion of Work:
  - d. Programming: All Sections
  - e. Cable and Wire: All Sections
  - f. Conduit and Raceways: All Sections
  - g. Video Management and Recording System Section 282300
  - h. ~~Uninterruptible Power Systems~~ Section 285045
- L. Transient Surge Protection (TSP / SSD): Section 280510
- 1. Project Data: Submit material specifications and installation data for products specified herein.
    - a. Include electrical characteristics, and ratings for each type of TSP equipment.
    - b. Indicate wiring diagrams indicating internal connections of TSP components within each enclosure.
    - c. Drawings shall be provided indicating unit dimensions, weights, mounting provisions, and connection details.
    - d. Submittals of each system shall indicate location of TSP devices.

1.8 WEATHERPROOF EQUIPMENT AND LOCATIONS

- A. Weatherproof equipment and locations are where weatherproof (WP) is indicated or where equipment is not located inside a building.
- B. Enclosures and boxes to be NEMA 4X stainless steel.
- C. Mounting and support hardware to be stainless steel.

1.9 PROTECTION

- A. Provide covering and shielding for all equipment provided to protect from damage.
- B. Protect nameplates on equipment, to prevent defacing.
- C. Repair, restore or replace damaged, corroded and rejected items.

1.10 DELIVERY, STORAGE AND HANDLING

- A. Protect all materials and equipment from damage during storage at the site and throughout the construction period. Protect equipment and materials during shipment and storage against physical damage, dirt, dust, moisture, heat, cold, rain, and any foreign substances that may damage the equipment.
- B. Prevent damage from rain, dirt, sun and ground water by storing the equipment on elevated supports and covering them on all sides with securely fastened protective rigid or flexible waterproof coverings.
- C. Protect conduit by storing it on elevated supports and capping the ends with suitable closure material to prevent dirt accumulation.
- D. Protect all fabricated and/or installed materials and equipment against dust, dirt, moisture, physical damage, metal debris and any foreign substances that may damage the equipment.
- E. Protect painted surfaces with removable heavy Kraft paper, sheet vinyl or equal, installed at the factory and removed prior to final inspection.
- F. Replace damaged equipment as determined by the Engineer. Repaint and finish damaged paint on equipment and materials with the same quality of paint and workmanship used by manufacturer so that repaired areas are not obvious.

1.11 OPERATING AND MAINTENANCE DATA

- A. Provide the following specific instructional material for this project for each electronic system. Product data shall be original data sheets. Copies are not acceptable. Product data, instructions and manuals from original packaging is preferred.
  - 1. Operations manual for all components and system as a whole.
  - 2. Maintenance manuals for all components and system as a whole.
  - 3. Point-to-point diagrams, wiring diagrams and construction details.
  - 4. All device schedules, I/O schedules, IP Address Schedules, and all calculations.
  - 5. A list of all default and custom passwords for all software and IP devices must be handed over to the owner's administration and included in the manual.
  - 6. List of spare parts, materials and suppliers of components. Provide name, address and telephone number for each supplier.
  - 7. Emergency instructions for operational and maintenance requirements.
  - 8. Copies of all warranties or warranty letters from manufacturers.
  - 9. Delivery time frame for replacement of component parts from suppliers.
  - 10. Recommend inspection schedule and procedures for all components and system as a whole.
  - 11. Complete 'Approved' As-Built shop drawings and product data for all components and system as a whole.

1.12 JOB CONDITIONS

- A. Cause as little interference or interruption of existing utilities and services as possible.
  - 1. Schedule work which will cause interference or interruption in advance with Owner, Architect or Engineer, authorities having jurisdiction and all affected trades.
- B. Examine Contract Documents to determine how other work will affect the execution of electronic systems.

- C. Determine and verify locations of all existing utilities on or near site.
- D. Make arrangements for and pay for necessary permits, licenses, and inspections.

#### 1.13 EQUIPMENT AND SYSTEM IDENTIFICATION

- A. All electronic security systems and equipment shall be labeled for identification.
  - 1. Install a nameplate on each individual equipment rack, enclosure, boxes, cabinet, and significant equipment item with text to coordinate with approved submittal documents.
  - 2. Use identifiers and abbreviations defined in the Drawings whenever possible. Use plan designation for labeling, unless indicated otherwise.
  - 3. Nameplates shall be laminated black phenolic resin with a white core and engraved lettering, a minimum of 1/4" high. Use fasteners to install nameplates. Do not fasten with adhesives.
  - 4. Engrave using upper case letters of uniform height; centered on device, cover plate, or enclosure; with all characters made clearly and distinctly. Allow room for fastener attachment.
  - 5. All equipment shall have the manufacturer's name, address, model number and rating on a nameplate securely affixed in a conspicuous place. All equipment shall bear labels attesting to Underwriters Laboratories approval where subject to Underwriters Laboratories label service.
  - 6. Identify all field terminals and relays with device identification. Lettering shall be 3/16" high, minimum.
- B. New raceway systems shall be labeled at all pull points and on each side of wall penetration, but in no case less than 20 feet between labels. Identify raceways with name of security system
  - 1. Apply preprinted labels with pressure sensitive, self-adhesive backing. If additional adhesion is required to hold label in place, use appropriate taping material wrapped completely around raceway.
  - 2. Position identification so that it is readily visible from eye level.
  - 3. Color scheme for labels:
    - a. Communications: Orange
    - b. Security Control: Green
    - c. Video Surveillance: Blue
    - d. Network: Yellow
- C. All wire and cables shall have wire markers at each and every termination point. Each wire shall be identified by unique code.
- D. Labeling system suppliers:
  - 1. **Panduit**
  - 2. Thomas & Betts
  - 3. Brady
  - 4. Westline
  - 5. Seton

#### 1.14 RECORD DRAWINGS

- A. The Contractor shall keep a complete set of all electronic systems contract drawings and the electronic systems shop drawings in the job site office.
  - 1. Use these sets of drawings for showing as constructed installation of electronic security systems and equipment.

2. Where any material, equipment, wiring or system components are installed differently from that shown, show such differences clearly and neatly using ink or indelible pencil.
3. At project completion, submit the record set of contract drawings to Engineer in electronic files in both PDF and AutoCAD format.
4. At project completion, provide all As-Built drawings and final IP and device schedule in hard copy and digital format to the owner. Provide all files in original CAD and Excel formats to Engineer and owner, as well as PDF versions.

**B. Software Records:**

1. Submit final software programs on electronic media compatible with the installed system.
  - a. Transfer all software licenses to the Owner/User representative at the completion of the project. Transfer shall include customer support rights.
  - b. Fully comply with all license agreements for the installed software. Install sufficient quantities of each software program so that the Owner fully meets the intent of the publisher's site license agreement. When in doubt, contact the publisher for an interpretation and comply with that interpretation.
  - c. Provide the Owner with all original installation media and manuals for every software program installed on the system.
2. Standard and Custom Application Software:
  - a. Prepare and submit the licenses to all software installed for the system. Compile a list with each program name, its installed version number, the number of copies installed, the serial number of each copy, the publisher's name and address, and the publisher's customer support telephone number.
  - b. Prepare and submit complete documentation of the final installed version of the application program, including a diagram of its component modules, subroutines, databases, libraries, drivers, and other parts. Narrative descriptions shall accompany the diagram, giving basic descriptions of each component and describing the interaction between components. Provide a complete, annotated listing of all application settings.
3. User Data and User Programmable Software:
  - a. Provide complete documentation of all user data and user programmable software, including but not limited to properties, preferences, settings, configurations, component modules, plug-in modules, user subroutines, databases, libraries, drivers, macros, templates, objects, slides, maps, images, sounds, icons, screen savers, and any other software files for each site.
  - b. Provide narrative descriptions and diagrams that give basic descriptions of each software component and the interaction between software components. Provide a complete, annotated software component listing.
  - c. Provide a DVD or equivalent media of the final operating version of the user data and user programmable software. Provide three (3) copies of the media, properly labels and dated in hard cases.
  - d. Provide record of all new IP addresses assigned to the electronic security system devices and equipment.
4. Operators Guide
  - a. Operators Guide shall outline the operation of each system. A guide is to be kept at each workstation for reference on the operation of the equipment.
  - b. Include written description in outline form how to operate the basics of the system. This shall include but not be limited to: access and control of individual devices, group control functions, emergency control functions, system acknowledgement and reset of alarms.
  - c. Include 8.5 x 11 inch graphics as needed to identify device locations and facilitate understanding of the written description.
  - d. Provide one copy for each work station and one master copy that may be reproduced by the County.
  - e. Laminate each guide for each workstation, or other approved method.

PART 2 - PRODUCTS

2.1 GENERAL

- A. Acceptable manufacturers:
  - 1. See individual specification section.
- B. 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.
- C. Equipment installed in exterior applications shall be fitted with fasteners and exposed surfaces of stainless steel or other corrosion resistant material.
- D. Use only prime quality, new materials, apparatus and equipment.
- E. Use electrical materials approved by UL and bearing UL label where listing has been established for materials or devices in question.
  - 1. Manufactured items and fabricated assemblies of electrically operating equipment: UL approval or UL re-examination listing.
- F. Structural steel for supports: ASTM A36.
  - 1. Galvanize members installed in areas of high humidity or condensation and exterior locations.
  - 2. Furnish other members with shop coat of red lead primer.
  - 3. Shop fabricate for field assembly using bolts.
  - 4. Minimize field welding.
  - 5. Retouch primer after field welding.

2.2 COMPUTING EQUIPMENT

- A. All computing equipment shall be provided with, and software applications compatible with Windows 10 and Microsoft Server 2016 or later operating systems.

2.3 GROUNDING

- A. All equipment shall be grounded in accordance with the National Electric Code (NEC), these specifications and drawings, and the equipment supplier's recommendations.

2.4 TRANSIENT SURGE PROTECTION (TSP)

- A. Industry Reference Standards: The following specification and standards are incorporated into and become a part of this specification by reference.
  - 1. Underwriters Laboratories, Inc. (UL)
    - a. No. 1449 2nd Edition Standard for Safety
    - b. No. 497 A, B and C.
  - 2. Institute Of Electrical And Electronics Engineers (IEEE)
    - a. Std. 142 - Recommended Practice For Grounding

- b. Std. 518 - Recommended Guide On Electrical Noise
  3. American National Standards Institute (ANSI)/IEEE
    - a. C62.41.1-2002 - IEEE Guide on the Surge Environment in Low Voltage (1000V and less) AC Power Circuits.
    - b. C.62.41.2-2002 - IEEE Recommended Practice on Characterization of Surges in Low-Voltage (1000V and Less) AC Power Circuits.
    - c. C62.36-2000 – IEEE Standard Test Method for Surge Protectors Used in Low-Voltage Data, Communications, and Signaling Circuits.
  4. National Electrical Manufacturers Association (NEMA)
    - a. NEMA LS-1-1992 – Low Voltage Surge Protection Devices
  5. International Electrotechnical Commission (IEC).
    - a. IEC 529:1989 – Type of protection through housing.
    - b. IEC 1024-1:1990 – Protection of structures against lightning – Part 1: general principles.
    - c. IEC 61643-21 – Low Voltage Surge Protective Device: SPD Connected to Telecommunication and signaling networks – Performance requirements and testing methods.
  6. Deutsch Industrial Norm (DIN)
    - a. DIN EN 50022: 1977/DIN EN 50022: 1978-05 Mounting rails 35mm wide for snap-on mounting of equipment
  7. Federal Information Processing Standards
    - a. Publication 94 (FIPS PUB 94)
- B. Acceptable manufactures: All device(s) shall be by the same manufacture.
  1. TSP Devices:
    - a. Base: Eaton, Schneider Electric, Phoenix Contact, Transtector Systems, Inc.
  2. Other manufacturers desiring approval must submit substitution requests prior to bid.
- C. All TSP devices installed shall utilize Silicon Avalanche Diodes (SAD) as the primary means of protection. Secondary protection shall be SADs or Metal Oxide Varistors (MOVs). Each protection circuit shall be independent of each other and neither circuit shall short to ground on clamping transient surges.
- D. Each 120 VAC circuit or feeder required for the VSS shall be provided with a TSP device, power strip or PDU with surge suppressor.
- E. Each electronic security system circuit containing metallic conductor (s) shall be provided with a TSP device when leaving the confines of a building. Each electronic security system circuit containing metallic conductor(s) shall be provided with a TSP device when entering a building. Circuits serving building mounted devices or equipment that are located below the roof that originate or terminate in the building it is attached to, do not require TSP devices.
- F. Locate TSP device at first termination point within the building. Locate all TSP devices in cabinets or enclosures.
- G. All TSP devices shall be provided with a ground connection. The ground circuit shall be sized in conformance with the manufacturer's written requirements for proper grounding for the associated device. The ground conductor shall be routed and connected to the nearest electrical system ground point.

**2.5 WIRING AND CABLE (AS IN MEANS AND METHODS OF SINGLE AND MULTIPLE CONDUCTOR CABLE INSTALLATION)**

- A. Power wiring: Single conductor cable, soft drawn, copper wire with type THWN 600 volt insulation, UL listed.
- B. All cable shall be per manufacturer's written recommendation for the application and environment anticipated for this project, but in no case less than what is required by these specifications. All cable shall be of standard type available from multiple manufacturers. Replace cable determined to be inadequate for specified performance.
- C. All Class 1 wiring shall be building wire rated for 600V. Provide overcurrent protection for conductors in accordance with NEC. Minimum sizes as follows:
  - a. Indication: 18 GA minimum.
  - b. Control: 14 GA minimum.All Class 2 wiring may be single conductor or multiple conductor cables. Conductors to be stranded type tinned copper, 22 GA minimum, PVC insulated. Maintain Class 1 / Class 2 separation per NEC.
- D. Pulling lubricant: Do not use cable pulling lubrication compound containing petroleum or other products which may deteriorate insulation.
- E. All cable installation shall be continuous from equipment/device terminal to equipment/ device terminal. No splicing of cables will be allowed.

**2.6 RACEWAYS, WIREWAYS, BOXES AND FITTINGS**

- A. Raceways, wire ways, boxes and fittings shall be provided under Division 28.
- B. Raceways, wire ways, boxes and fittings shall be provided where indicated on drawings.
- C. All raceways shall be sized for maximum 40 percent fill. All conductors shall be included in fill calculations. Minimum conduit size shall be 3/4".
- D. Provide metal conduits, tubing, fittings, and couplings of types, grades, sizes, and weights (wall thickness) for each service indicated. Where types and grades are not indicated, provide proper selection determined by installer to fulfill wiring requirements and comply with applicable portions of NEC for raceways.
- E. Rigid Metal Conduit and Fittings
  - 1. Rigid steel conduit: ANSI C80.1
  - 2. Fittings and conduit bodies: ANSI/NEMA FB 1; threaded type, material to match conduit.
  - 3. Rigid galvanized conduit shall be used where exposed conduit is required. Exposed conduit that is below 15 feet above finished floor shall be anchored to walls or ceilings with two hole straps on no less than 24 inch centers
- F. Electrical Metallic Tubing (EMT) and Fittings
  - 1. EMT: ANSI C80.3 galvanized tubing
  - 2. Fittings and Conduit Bodies: ANSI/NEMA FB 1; steel compression type
  - 3. Electrical metallic tubing (EMT) with compression connectors shall be used where concealed above ceilings and in equipment rooms
- G. Flexible Metal Conduit and Fittings
  - 1. Conduit: FS WW-C-566; steel



2. Fittings and Conduit Bodies: ANSI/NEMA FB 1
- H. Liquid tight Flexible Conduit and Fittings
1. Conduit: Flexible metal conduit with PVC jacket
  2. Fittings and Conduit Bodies: ANSI/NEMA FB 1
- I. Plastic Conduit and Fittings
1. Conduit: NEMA TC 2; Schedule 40 PVC
  2. Fittings and Conduit Bodies: NEMA TC 3
- J. CONDUIT SIZING, ARRANGEMENT AND SUPPORT
1. Arrange conduit to maintain headroom and present a neat appearance.
  2. Route exposed conduit and conduit above accessible ceilings parallel and perpendicular to walls and adjacent piping.
  3. Maintain minimum 6-inch clearance between conduit and piping. Maintain 12-inch clearance between conduit and heat sources such as flues, steam pipes, and heating appliances.
  4. Arrange conduit supports to prevent distortion of alignment by wire pulling operations. Fasten conduit using galvanized straps, lay-in adjustable hangers, clevis hangers, or bolted split stamped galvanized hangers.
  5. Group conduit in parallel runs where practical and use conduit rack constructed of steel channel with conduit straps or clamps.
  6. Do not fasten conduit with wire or perforated pipe straps. Remove all wire used for temporary conduit support during construction, before conductors are pulled.
- K. CONDUIT INSTALLATION
1. Cut conduit square using a saw or pipe cutter; de-burr cut ends.
  2. Bring conduit to the shoulder of fittings and couplings and fasten securely.
  3. Use conduit hubs for fastening conduit to cast boxes and for fastening conduit to sheet metal boxes in damp or wet locations.
  4. Install no more than the equivalent of three 90-degree bends between boxes.
  5. Use conduit bodies to make sharp changes in direction, as around beams.
  6. Use hydraulic one-shot conduit bender or factory elbows for bends in conduit larger than 2-inches in size.
  7. Avoid moisture traps where possible; where unavoidable, provide junction box with drain fitting at conduit low point.
  8. Use suitable conduit caps to protect installed conduit against entrance of dirt and moisture.
  9. Provide a pull tape for spare empty conduits. The tape shall be fiberglass reinforced polyester tape with distance marking in feet continuous along its length. Furnish T&B or Greenlee products.
  10. Install expansion joints where conduit crosses building expansion joints.
  11. Where conduit penetrates fire-rated walls and floors, provide mechanical firestop fittings with UL listed fire rating equal to wall or floor rating. Seal opening around conduit with UL listed foamed silicone elastomer compound.
  12. Route conduit through roof openings for piping and ductwork where possible; otherwise route through roof jack with pitch pocket.
  13. Maximum size conduit in slabs above grade: 3/4 inch.
  14. Use PVC-coated rigid steel factory elbows for bends in plastic conduit runs longer than 100 feet or in plastic conduit runs, which have more than two bends regardless of length.
  15. Make joints in accordance with manufacturers' written instructions.
  16. Provide plastic warning tape for underground conduit or duct bank installations. Install warning tape directly above conduit one foot below finished grade or as shown on drawings.
  17. Sand for intermediate fill around underground conduits shall be washed sand, suitable for concrete or masonry.

L. CONDUIT INSTALLATION SCHEDULE

1. Underground installations more than two feet from foundation wall: Rigid steel conduit or Schedule 40 plastic conduit.
2. Installations in or under concrete slab, or underground within 2 feet of foundation wall: Rigid steel conduit.
3. In slab above grade: Rigid steel conduit or SCHED .40 PVC.
4. Exposed outdoor locations: Rigid steel conduit or SCHED .80 PVC.
5. Wet interior locations: Rigid Steel Conduit or SCHED .40 PVC.
6. Concealed dry interior locations: Electrical metallic tubing or SCHED .40 PVC.
7. Exposed dry interior locations: Electrical metallic tubing or SCHED .40 PVC.

2.7 SPARE PARTS (**SEE 28 23 00 – 2.24 FOR ADDITIONAL SPARE PARTS**)

- A. Deliver spare parts in protective wrapping and packaging for proper storage.
- B. Provide spare parts as indicated in individual specification section.
- C. Spare parts shall be available to the Contractor to use as immediate replacements during the warranty period. The Contractor shall replace all spare parts used for the warranty requirements within 30 calendar days of use.
- D. Provide the following spare parts:
  1. Transient Surge Protection: two (2) of each type used.

PART 3 - EXECUTION

3.1 GENERAL

- A. Use only workers experienced in electronic security and IP video systems for installation of equipment and termination of wire/cable systems.
- B. When changes in location of any work are required, obtain approval of Engineer and owner before making change. Engineer may move any item prior to or at time of rough-in up to 5 FT - 0 IN without extra cost.
- C. Do not change indicated sizes without written approval.
- D. Equipment Installation:
  1. Install all equipment in accordance with the manufacturer's recommendations, and accepted shop drawings.
  2. Install all equipment in compliance with NEC requirements, NECA's "Standard of Installation", and recognized industry practices.
  3. Do not attach electrical materials to roof decking, removable or knockout panels, or temporary walls and partitions unless indicated otherwise. Use hangers and other supports to support the equipment and materials, intended for this purpose.
  4. Locate equipment as close as practical to the locations shown on the Drawings.
  5. Maintain minimum 3-foot working clearances on each side of equipment or equipment racks where access is required to inspect, service, or adjust.
  6. Check equipment against available mounting space indicated on the drawings. Coordinate location of equipment with existing devices to minimize interference. Bring all conflicts or clearance problems to the attention of the Engineer during the preparation of shop drawings.

7. Where the Engineer determines that equipment installation is not conveniently accessible for operation and maintenance, remove and reinstall equipment in a conveniently accessible manner.
8. Remove and protect existing equipment that is to be reinstalled. Make modifications and adjustments as required for re-mounting devices.
9. Ensure all equipment is adequately ventilated and installed in such a way (rack spacing, additional cooling, etc.) so ALL equipment never exceeds manufactures published maximum operating temperature.

### 3.2 GENERAL

- A. Use only workmen experienced in electronic security systems for installation of equipment and termination of wire/cable systems.
- B. When changes in location of any work are required, obtain approval of Engineer before making change. Engineer may move any item prior to or at time of rough-in up to 5 FT - 0 IN without extra cost. Prior to installation of camera back boxes, the Contractor shall notify the engineer if an obstruction exists that would adversely affect the intended view. An RFI shall be sent with a recommended alternate mounting location.
- C. Do not change indicated sizes without written approval.
- D. Equipment Installation:
  1. Install all equipment in accordance with the manufacturer's recommendations, and accepted shop drawings.
  2. Install all equipment in compliance with NEC requirements, NECA's "Standard of Installation", and recognized industry practices.
  3. Do not attach electrical materials to roof decking, removable or knockout panels, or temporary walls and partitions unless indicated otherwise. Use hangers and other supports to support the equipment and materials, intended for this purpose.
  4. Locate equipment as close as practical to the locations shown on the Drawings.
  5. Maintain minimum 3-foot working clearances on each side of equipment or equipment racks where access is required to inspect, service, or adjust.
  6. Check equipment against available mounting space indicated on the drawings. Coordinate location of equipment with existing devices to minimize interference. Bring all conflicts or clearance problems to the attention of the Engineer during the preparation of shop drawings.
  7. Where the Engineer determines that equipment installation is not conveniently accessible for operation and maintenance, remove and reinstall equipment in a conveniently accessible manner.
  8. Remove and protect existing equipment that is to be reinstalled. Make modifications and adjustments as required for re-mounting devices.

9. Insure all equipment is adequately ventilated and installed in such a way (rack spacing, additional cooling, etc.) so ALL equipment never exceeds manufactures published maximum operating temperature.

### 3.3 CUTTING AND PATCHING

- A. Perform or pay for all cutting, fitting, repairing, patching and finishing of work of other sections where it is necessary to disturb such work to permit installation of work. Repair or replace existing or new work disturbed. Patch all walls/ceilings with material that matches existing texture, color and security grade.
- B. Avoid cutting, where possible, by setting sleeves or frames, and by requesting openings in advance.
- C. Before cutting obtain approval of Architect or Engineer.
  1. Use only approved methods.
  2. Cut all holes neatly and as small as possible to admit work.
  3. Do not weaken walls or floors; locate holes in concrete to miss structural sections.
- D. Locate openings and sleeves to permit neat installation of equipment.
- E. Do not remove or damage fireproofing materials.
  1. Install hangers, inserts, supports, and anchors prior to installation of fireproofing.
  2. Repair or replace fireproofing removed or damaged, at no extra cost.

### 3.4 RENOVATION

- A. Where existing circuits are to be extended for connection to other equipment or systems, break existing circuit at an accessible location, install terminal box with terminal strips or connectors and extend circuitry as required.
- B. Existing devices and equipment that is to remain for re-use shall be tested for proper operation, opens and shorts prior to termination. If found to be defective, notify Architect or Engineer of nature of problem and recommended remedy. Minor modifications shall be made at no additional cost.
- C. Where devices are removed from walls or ceilings that are to remain, provide stainless steel blank cover plate over existing rough-in box, secured with security screws.
- D. Where circuits that are to remain in order to maintain operation to remaining devices, verify continuity of circuits after removal of other equipment and/or devices. Where wire, cable and/or raceway modifications are required to maintain circuits, provide such modification as part of the work.
- E. Where existing equipment is indicated to be reused, Contractor may provide new equipment of equal or greater capability and as specified for such new equipment. Such intent shall be indicated in the submittal documents.

- F. All equipment and/or devices removed shall be turned over to the Owner for use as spare parts. Remove devices and equipment in such a manner to maintain their integrity where possible. That equipment and/or devices not desired by the Owner shall be removed from the site at the Contractor's expense.

### 3.5 PHASING OF THE WORK

- A. The work includes relocation, renovation and/or equipment replacement in control stations within the facility. The control systems of the facility shall remain sufficiently operational to maintain a safe and secure facility at all times. The Contractor shall make all temporary accommodations as required to maintain operations.
- B. Each affected control stations shall be configured ready for use prior to transfer of circuits from the old control to the new. Circuits shall be transferred in logical groups such that at any time a given portion of the building can be controlled from a single point.
- C. All work shall be scheduled in advance with the Owner/User. Work during the night hours will be required for transfer of major systems equipment and circuits.
- D. The Owner/User will make reasonable accommodation for execution of the work. Such reasonable accommodation includes providing appropriate staffing for operations and security during transfer periods, ready access to areas of transfer, and support for preliminary testing of transferred circuits and equipment.

### 3.6 INSTALLATION OF EQUIPMENT

- A. Install all equipment in accord with manufacturer's recommendations.
- B. Provide all necessary anchoring devices and supports.
  - 1. Use structural supports suitable for equipment, or as indicated.
  - 2. Check weight and dimensions of equipment with shop drawings.
  - 3. Do not cut or weld to building structural members.
- C. Verify that equipment will fit support layouts indicated.
  - 1. Where substitute equipment is used, revise indicated supports to fit.
- D. Arrange for necessary openings to allow for admittance of equipment.
  - 1. Where equipment cannot be installed as structure is being erected, provide and arrange for building-in of boxes, sleeves or other devices to allow later installation.
- E. Prior to installation of electronic security equipment in control rooms and/or equipment rooms, complete all room finishes and provide a clean conditioned space for the electronic equipment installation. Maintain a secure, clean and conditioned space throughout the installation process. Where dust, dirt or moisture generating environment is anticipated or encountered after start of installation of equipment, cease work and wrap/seal all equipment in waterproof protective material. When environment is clean and conditioned, protective wrapping shall be removed, equipment cleaned, and work resumed.

### 3.7 FIELD QUALITY CONTROL

- A. Perform indicated tests to demonstrate workmanship, operation, and performance.

1. Conduct tests in presence of inspectors of agencies having jurisdiction if required.
  2. Arrange date of tests in advance with, manufacturer and installer.
  3. Give all inspectors minimum of 24 hours notice.
  4. Furnish all labor and materials required for period of test.
- B. Repair or replace equipment and systems found inoperative or defective and re-test.
1. If equipment or system fails re-test, replace it with products which conform to Contract Documents.
  2. Continue remedial measures and re-tests until satisfactory results are obtained.
- C. Test equipment and systems as indicated for each item, unless otherwise recommended by manufacturer.
- D. Coordinate work of this section with work of other sections to insure timely delivery and installation of work.
- E. Design all systems for continuous 24 hour operation.

### 3.8 TEST AND VERIFICATION

- A. General: The Contractor shall verify that all requirements of this specification are met. Verification shall be through a combination of inspections, demonstrations and tests, as described below.
- B. Verification by Inspection: Verification by inspection includes examination of an item and the comparison of pertinent characteristics against the qualitative or quantitative standard set forth in the cited paragraph. Inspection may require moving or partially disassembling the item to accomplish the verification. Inspection shall be made of all equipment installations, proper functioning of all video system components, mounting and wiring of electrical and signal distribution cabinets and components, and mounting and placement of cameras, etc. to ensure requirements of the specifications are complied with and that the overall installation is accomplished in a professional and workmanlike manner and in accordance with manufacturer's written recommendations. The Owner's quality control representative(s) shall have full opportunity to witness the required inspections or to conduct his own inspections of the installation.
- C. Verification by Test and Demonstration: The Contractor shall verify by formal demonstrations or tests that the requirements of this Specification have been met. All tests shall be documented and report of results submitted to the Engineer.
- D. Test Verification Requirements: Paragraphs 1-3 below list specific requirements which shall be verified by formal demonstration/test. **THE ENGINEER SHALL BE NOTIFIED IN WRITING THIRTY (30) CALENDAR DAYS IN ADVANCE OF ALL SYSTEM TESTS.**
1. Factory Tests: Following factory engineering and assembly, the Contractor shall individually test each component and verify the proper functioning of each component within a particular subsystem. Any deficiency pertaining to these requirements shall be corrected by the Contractor prior to shipment of the equipment to the project site.
    - a. The full network and fiber optic backbones shall be mocked up with full loading of the worst-case security closet, mocking up all cameras, workstations, and any central head end servers, video storage units and controllers. Video workstations shall be loaded to highest capacity specified to test for network overloading.
    - b. The factory testing shall include all equipment and programming for the entire facility.
  2. Preliminary Tests: Following installation, the Contractor shall individually test each connected device and verify the proper functioning of each component as a system. Any

deficiency pertaining to these requirements shall be corrected by the Contractor prior to final functional and operational tests of the system. The entire system shall be tested to assure that all elements are compatible and function properly as a complete system.

3. Demonstration Upon Completion of Work: Upon successful completion of the System Validation Test, the Contractor shall schedule and request final completion demonstration and the Engineer notified. The request and notification shall include certification that the installation is complete and operable and has satisfactorily performed the final tests specified herein. The acceptance testing shall be accomplished in the company of the Engineer and the Owner's representative(s). The demonstration shall be structured so that all cameras are stimulated directly in their installed and finally adjusted positions and all servers, workstations, monitors and storage devices are active. A log of all demonstration activities and results shall be maintained by the Contractor. Original copies of this log shall be submitted to the Engineer within seven calendar days of the demonstration.
- E. Upon successful completion of the Demonstration Upon Completion of Work, the electronic security systems will be considered as substantially complete.
- F. The Contractor shall carefully plan and coordinate the demonstrations so that all activities can be satisfactorily completed within eight (8) cumulative hours. The Contractor shall provide all necessary instruments, labor and materials required for demonstrations, the equipment manufacturer's technical representative, and qualified technicians in sufficient numbers to perform the demonstration within the time limits imposed by this Specification.
- G. In the event that the Engineer are required to witness a retest at a later date because the Contractor is not adequately prepared to conduct the acceptance tests or because the systems being tested have failed such tests, which shall be solely determined by the Engineer, the costs of witnessing additional tests (based on time and expenses at the established rates of the Engineer) shall be borne exclusively by the Contractor. In such an event, a change order to the General Construction Contract will be executed for compensation of the Engineer witnessing the tests.

### 3.9 ADJUST AND CLEAN

- A. Inspect all equipment and put in good working order.
- B. Clean all exposed and concealed items.
- C. Touch up paint where finish is damaged to original color and texture.
- D. Clear debris from and vacuum clean the interior of all turrets, consoles, equipment cabinets and enclosures.

### 3.10 WIRING

- A. New camera, VSS workstation and server locations will require new CAT 6 minimum cabling in new or existing conduits and wireways. All structured Category and fiber optic cables shall **comply with Collin County requirements**.
- B. All wiring within equipment: Point to point with appropriate terminal block connections for each wire and component termination.
  1. All connections mechanically secure.
  2. All terminations on terminal blocks.
  3. All terminal strips labeled to match submittal documents.

- C. All cable and wire: As recommended by manufacturer of system, minimum as indicated in individual sections.
  - 1. Standard type available from multiple manufacturers.
  - 2. Replace cable determined to be inadequate for specified performance.
  - 3. All cable and wire shall be professionally labeled and tagged at each point of termination to match submittal documents.
- D. Provide all wire and cable and perform all terminations. Check each cable system for opens, shorts, faults, or other discontinuities.
- E. All wiring shall be color coded throughout per county requirements.
- F. Install all cable in conduit in accordance with other sections of these specifications. Minimum conduit size shall be 3/4 inch trade size. Size all conduit such that cable, wire and/or tubes do not to exceed 40 percent fill. All conduit shall be installed according to NEC and TIA/EIA standards.
- G. All wire and cables shall be installed continuous from field device to terminal point in equipment cabinet, enclosure or console. No splices or intermediate terminations will be allowed
- H. All cables specified herein are based on indoor “dry” applications unless noted otherwise. Where actual construction conditions require cable other than indoor “dry” applications, provide suitable cable to meet performance requirements of the systems for which they the cable is to be provided.
- I. All Ethernet cabling shall be terminated on a patch panel in equipment room locations and RJ-45 wall/surface jacks in field locations. Factory patch cords shall be used to connect the Ethernet backbone to individual devices. No hand crimped RJ-45 connections allowed on the end of home-run Ethernet cables.
- J. Network Cabling Specifications:
  - 1. CABLE SPECIFICATIONS
    - a. Specification for Category 6 UTP Cabling
      - 1) Category 6 UTP Horizontal Cabling
        - a) Horizontal cabling for data circuits shall be 24 AWG, 4-pair UTP, NEC/NFPA rated.
  - 2. INSTALLATION
    - a. 2.1 General Information
      - 1) Installation Requirements: All installation methods must adhere to the most recent Electronics Industry Association/Telecommunications Industry Association (EIA/TIA) Standards for Commercial Building Telecommunications Wiring and follow Building Industry Consulting Services International (BICSI) standards.
      - 2) Miscellaneous Materials: The Contractor shall identify at the time of installation, any miscellaneous parts and material such as cable ties, screws, D-rings, etc. that are required for the installation. These parts will be required to provide a professional installation. These parts will be used as required by EIA/TIA standards and follow Building Industry Consulting Services International (BICSI) standards.
      - 3) Fire Stopping: The Contractor will be responsible for fire stopping all opening associated with the installation of the cable in accordance with local fire codes.
      - 4) Grounding and Bonding: Ground all telecommunications cable shields, equipment, racks, cabinets, raceways, and other associated hardware that has the potential to act as a current carrying conductor on a separate communications ground.



- 5) Riser Cable: Non-spliced riser cable will be required from the ER to each TR. Two pair of riser cable for each workstation served by the TR will be required. All riser cable will be terminated and tagged at each end, with a labeling scheme provided by the State. Riser cable will be 24 AWG, with standard telecommunications color-coding. A data riser cable may also be required, depending on Agency requirements. Data riser will be fiber optic cable.
- 6) Horizontal Cable Installation: Horizontal cabling is to be installed in a star topology, with each jack cabled directly to a horizontal cross-connect in the appropriate IDF. Splices or bridge taps are not allowed.
  - a) Horizontal Cable Lengths Copper: Horizontal cable runs will not exceed the following lengths:
  - b) From the horizontal cross-connect to the outlet/jack, the cable will be no more than 90 meters (295 ft.)
  - c) The cable used for patch cords and jumpers in the IDF (TR) will be no more than 6 meters (20 ft).
  - d) The cable used to connect the jack to the active equipment at the workstation will be no more than 15 feet. In the case of where a MUTOA is used, the following maximum length guidelines:

Table 1.10 MAXIMUM LENGTH OF HORIZONTAL AND WORK AREA CABLES m (ft) = Length of horizontal cable	W m (ft) = Maximum length of work area cable 24 AWG UTP/24 AWG ScTP patch cords	C m (ft) = Maximum combined length of work area cables, patch cords, and equipment cable 24 AWG UTP/24 AWG ScTP patch cords	W m (ft) = Maximum length of work area cable 26 AWG ScTP patch cords	C m (ft) = Maximum combined length of work area cables, patch cords, and equipment cable 26 AWG ScTP patch cords
90 (295)	5 (16)	10 (33)	4 (13)	8 (26)
85 (279)	9 (30)	14 (46)	7 (23)	11 (35)
80 (262)	13 (44)	18 (59)	11 (35)	15 (49)
75 (246)	17 (57)	22 (72)	14 (46)	18 (59)
70 (230)	22 (72)	27 (89)	17 (56)	21 (70)

In no case will the combined cable length be greater than 100 meters ( 330 ft).

**3. TESTING**

**a. General**

- 1) All cables will be tested in accordance with this document, the ANSI/TIA/EIA-568-C standards, the manufacturer’s certification program and best industry practice. If any of these are in conflict, the Contractor will bring any discrepancies to the attention of the project team for clarification and resolution.
- 2) Any defect in the cabling system installation including but not limited to cable, connectors, feed through couplers, patch panels, and connector blocks will be repaired or replaced in order to ensure 100% useable conductors in all cables installed.
- 3) The Contractor will provide sufficient skilled labor to complete testing within the agreed upon test period.
- 4) The Contractor’s technicians will be fully trained and certified test the provided products.
- 5) The Contractor is responsible for supplying all of the required test equipment used to conduct acceptance tests.

- 6) The Contractor is responsible for submitting acceptance documentation as defined in Section D below.
- 7) Owner reserves the right to be present during any or all of testing.
- b. Testing Equipment – UTP
  - 1) Test equipment used under this Contract will be from manufacturers that have a minimum of 5 years' experience in producing field test equipment. Manufacturers must be ISO 9001 certified.
  - 2) All test tools of a given type will be from the same manufacturer and have compatible electronic results output.
  - 3) Test adapter cables must be approved by the manufacturer of the test equipment. Adapters from other sources are not acceptable.
  - 4) Baseline accuracy of the test equipment must exceed TIA Level III, as indicated by independent laboratory testing.
  - 5) Test equipment must be capable of certifying Category 5E,6 and 6A links.
  - 6) Test equipment must have a dynamic range of at least 100 dB to minimize measurement uncertainty.
  - 7) Test equipment must be capable of storing full frequency sweep data for all tests and printing color graphical reports for all swept measurements.
  - 8) Test equipment must include S-Band time domain diagnostics for NEXT and return loss (TDNXT and TDRL) for accurate and efficient troubleshooting.
  - 9) Test equipment must be capable of running individual NEXT, return loss, etc. measurements in addition to autotests. Individual tests increase productivity when diagnosing faults.
  - 10) Test equipment must include a library of cable type.
  - 11) Test equipment must store Category 5e, 6 or 6A autotests in internal memory.
  - 12) Test equipment must be able to internally group autotests and cables in project folders for good records management.
  - 13) Test equipment must include DSP technology for support of advanced measurements.
  - 14) Test equipment must make swept frequency measurements in compliance with TIA standards.
  - 15) The measurement reference plane of the test equipment will start immediately at the output of the test equipment interface connector. There will not be a time domain dead zone of any distance that excludes any part of the link from the measurement.
- c. Testing Equipment – Fiber
  - 1) Test equipment used under this Contract will be from manufacturers that have a minimum of 5 years' experience in producing field test equipment. Manufacturers must be ISO 9001 certified.
  - 2) All test tools of a given type will be from the same manufacturer and have compatible electronic results output.
  - 3) Multimode Test equipment will be capable of measuring relative or absolute optical power in accordance with TIA/EIA-526-14A, "Optical Power Loss Measurement of Installed Multimode Fiber Cable Plant.
  - 4) Multimode Test equipment will incorporate 850 nm, and 1300 nm LED sources in same unit with output power of  $\geq -20$  dBm at each wavelength. Detectors will have a dynamic range of at least +3 dB to -55 dB.
  - 5) Single-mode Test equipment will be capable of measuring relative or absolute optical power in accordance with TIA/EIA-526-7 Method A, "Measurement of Optical Power Loss of Installed Single-Mode Fiber Cable Plant, Insertion Loss Using An Optical Power Meter."
  - 6) Single-mode test equipment will incorporate 1310 sources. Detectors will have a dynamic range of at least +3 dB to -55 dB.
  - 7) Test equipment will be capable of nulling out the loss and length of the test jumpers used to interface with the cable plant.

- 8) Sources and meters will automatically synchronize wavelengths to prevent calibration-related errors.
  - 9) Test equipment will store tests in internal memory.
  - 10) Test equipment will employ a serial port/USB port to facilitate uploading of saved information from tester to PC.
  - 11) Test equipment capable of measuring a Tx/Rx fiber pair simultaneously is recommended to enhance productivity.
  - 12) It is recommended that test equipment utilizing dual function main and remote units be used for bi- directional testing, eliminating the need to swap source and meter.
- d. Documentation – UTP: reports will include the following information for each cabling element tested:
- 1) Wiremap results that indicate the cabling has no shorts, opens, miswires, split, reversed, or crossed pairs, and end to end connectivity is achieved.
  - 2) For Category 3 cabling: Attenuation and NEXT data that indicate the worst case result, the frequency at which it occurs, the limit at that point, and the margin. These tests will be performed in a swept frequency manner from 1 to 16 MHz. Information will be provided for all pairs or pair combinations and in both directions. Any individual test that fails the relevant performance specification will be marked as a FAIL.
  - 3) For Category 5E,6, 6A cabling: Attenuation, NEXT, PSNEXT, Return Loss, EL-FEXT, and PSELFEXT data that indicate the worst-case result, the frequency at which it occurs, the limit at that point, and the margin. These tests will be performed in a swept frequency manner from 1 MHz to highest relevant frequency, using a swept frequency interval that is consistent with TIA and ISO requirements. Information will be provided for all pairs or pair combinations and in both directions when required by the appropriate standards. Any individual test that fails the relevant performance specification will be marked as a FAIL.
  - 4) Length (in meters), propagation delay, and delay skew relative to the relevant limit. Any individual test that fails the relevant performance specification will be marked as FAIL.
  - 5) Cable manufacturer, cable model number/type, and NVP
  - 6) Tester manufacturer, model, serial number, hardware version, and software version
  - 7) Circuit ID number and project name
  - 8) Autotest specification used
  - 9) Overall pass/fail indication
  - 10) Date and time of test
- e. Documentation: Multi mode: reports will include the following information for each cabling element tested:
- 1) Actual measured attenuation (loss) at 850 nm and 1300 nm, expected attenuation at 850 nm and 1300 nm per this document, and the margin. An individual test that fails the link attenuation criteria will be marked as FAIL.
  - 2) Reference method.
  - 3) Number of mated connectors and number of splices (if any).
  - 4) Actual length and expected length. Any individual test that fails the link length criteria will be marked as FAIL.
  - 5) Group refractive index (GRI) at 850 nm and 1300 nm, if length was optically measured.
  - 6) Tester manufacturer, model, serial number and software version.

**3.11 OWNER PERSONNEL TRAINING**

- A. Provide training of operations and maintenance staff.
  - 1. Training shall be structured and developed to ensure proper understanding of systems to allow effective operation and maintenance of all systems in this Division of work.
  - 2. All training shall be conducted by professionals that are certified by the system manufacturer for the applicable equipment and software.
  
- B. Training shall be divided into multiple groups. Participants may attend multiple sessions.
  - 1. Control station operations
  - 2. System administration
  - 3. Maintenance
  
- C. Conduct twenty-four (24) hours of training for operational staff, maintenance staff and administration staff. One additional session up to 8 hours shall be a “train the trainer” administrator level session. Facility administration will be able to request specific topics to the training session according to their needs. Coordinate training requirements with owner to accommodate different shifts.
  
- D. Training shall be provided in a classroom and location environment onsite at the owner’s facility and utilize installed equipment and systems to demonstrate operations and maintenance techniques.
  
- E. Provide digital video recording of all training on flash drive media (FD) which shall be playable using standard media players. Furnish two (2) copies of each FD to owner with training manuals of each type. Provide electronic copies of training manuals in .pdf format. Provide two (2) FD copies of training manuals. FD media shall not be copy protected.
  - 1. Selected training shall be pre-recorded on FD in a classroom environment at the office of the Contractor.
  - 2. Upon completion of the training at the project site, the Contractor shall update the training presentation based on feedback from the on-site training sessions and prepare final training FD for the facility.
  
- F. No later than 45 calendar days prior to anticipated initiation of training, the Contractor shall develop an outline of all training to be presented. The facility security administration will subsequently identify staff to participate in the training program. Based on this information the Contractor shall prepare sufficient copies of training material to accommodate each participant.
  
- G. See individual sections for specific training requirements.
  
- H. Submittal of Training Documents:
  - 1. List of Trainers including copy of certification by the system manufacturers. (minimum 90 days prior to scheduled training session)
  - 2. Training outline and attendee sign up lists (minimum 45 calendar days prior to scheduled training session).
  - 3. Training manual(s); one for each training group.(minimum 30 calendar days prior to scheduled training session).
  - 4. Prerecorded training demonstration FD: one for each training group.(minimum 30 calendar days prior to scheduled training session).

END OF SECTION 280510

SECTION 282300 - 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.

B. Related work:

- |   |                           |
|---|---------------------------|
| 1. Common Work Results for Electronic Security Systems: | Section 280510            |
| 2. Cabinets and Enclosures:                             | Section 280555            |
| <del>3. Uninterruptible Power System:</del>             | <del>Section 285045</del> |

1.2 BASIS OF DESIGN

- A. The existing video surveillance system in the facility is analog system and consists of a centralized matrix switcher located in the Tele-Communications Room 160 with video monitors, multiplexers, quad splitters, power supplies and analog DVRs in the equipment room and control room lower cabinets. All existing video surveillance system components shall be removed and replaced with the new Milestone XProtect ~~Expert enterprise-level~~ **Corporate 2020 R2 (by county)** video management and recording system. All existing cameras shall be removed and replaced with new HD IP based megapixel cameras.
- B. The purpose of video management and recording system is to provide visual confirmation of movement through security barriers and general surveillance of movement. The Video Management and recording System shall be an IP network-based, fully distributed digital video system. The security video system will utilize local area networks (LAN) as a transmission medium for video, configuration, as well as storage of all data. The IP video management system shall provide support for IP cameras from multiple manufacturers and shall support standard resolution and megapixel HD IP cameras.
- C. 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.
- D. 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. The drawings will be proved during the pre-proposal conference and site visit.

- E. 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~~, work stations, network storage, encoders, decoders, video console displays and all other hardware, software (**less Milestone Corporate**) and additional licenses required to provide a fully operational system.
  - F. All cameras shall be recorded and video storage shall be sized to retain recording for 60 days. All cameras shall be continuously recorded at native resolution, 15 images per second. Quiet time recording (no motion) shall be 2 images per second for all cameras. The motion should be estimated at 65% (15.6 hrs/day) continuous activity and based on balanced scene complexity and high-quality settings. **Storage capacity shall be minimum 500TB of usable net calculated storage in RAID 6 configuration.**
  - G. 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.
  - H. 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.
  - I. 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.
  - J. 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.
  - K. All the cameras shall be mounted within housings suitable for the environment in which they are placed.
  - L. Each typical camera mounting location shall be field verified to confirm best video coverage. Video coverage shall be approved either by the owner or the design engineer.
  - M. Provide user-programmable title and camera number for each camera. Coordinate titles with 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 (USB) 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 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 floor plans and cable routing, system diagrams and terminal point to terminal point wiring diagrams or schedules.
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. Use manufacturer calculation tools specific to each camera model or resolution/compression capability.
5. Bandwidth Calculations: To ensure that adequate bandwidth 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.
- 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 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.
- 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.

## PART 2 - PRODUCTS

### 2.1 OPERATING AND MAINTENANCE DATA (SEE SECTION 280510)

### 2.2 GENERAL

- A. Manufacturers:
  - 1. Video management and recording software:
    - a. Milestone Xprotect Corporate **2020 R2.**
      - 1) County to provide Corporate license
    - b. Contractor to provide all other Milestone camera and hardware licenses and 1 year care package.
      - 1) **Milestone XPCODL camera licenses and Milestone YXPCODL One-Year Care Plus for XProtect Corporate Device License.**
      - 2) No substitutions per Collin County IT Standards, Court Order 2020-523-06-15
  - 2. Video surveillance camera equipment:
    - a. Axis, per camera schedule
      - 1) No substitutions per Collin County IT Standards, Court Order 2020-523-06-15
  - 3. Cabling Infrastructure:
    - a. Panduit cabling
      - 1) No substitutions per Collin County IT Standards, Court Order 2020-523-06-15
  - 4. Video Management Server:



- a. Dell
  - 1) No substitutions per Collin County IT Standards, Court Order 2020-523-06-15
- 5. Video Recording Servers:
  - a. Dell
    - 1) No substitutions per Collin County IT Standards, Court Order 2020-523-06-15
- 6. Video Management Workstations:
  - a. Dell
    - 1) No substitutions per Collin County IT Standards, Court Order 2020-523-06-15
- 7. Network Switches:
  - a. ~~L2/L3 Cisco 9300 UPOE series (L3)~~ **Provided by Collin County.**
    - 1) ~~Include sufficient SFP ports for redundant 1Gig connections to each edge switch.~~
    - 2) ~~No substitutions per Collin County IT Standards, Court Order 2020-523-06-15~~
- 8. 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.
- 9. Other manufacturers desiring approval must submit substitution requests pre-bid per bid document requirements.

**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.

**2.3 1080P MINIDOME CAMERAS**

- A. This network camera offers excellent image quality in HDTV 1080p. The outdoor-ready, IK10-rated camera features forensic WDR and IR illumination to deliver sharp video even in challenging light or complete darkness. It includes low-light technology for video with more life-like colors and sharp images of moving objects. The varifocal lens with remote zoom and focus capabilities eliminates the need for hands-on fine tuning. With two-way audio you can hear what's happening in the scene and benefit from audio analytics. Offers Reduced bandwidth and storage needs with support for H.264/H.265 and enhanced security features.
- B. Image Sensor: 1/2.8-inch CMOS HD image sensor.
- C. Lens:
  - 1. Varifocal, 3.4–8.9 mm, F1.8
  - 2. Horizontal field of view: 100°-36°
  - 3. Vertical field of view: 53°-20°
  - 4. Remote zoom and focus, P-Iris control, IR corrected
- D. Day and night:
  - 1. Automatically removable infrared-cut filter
  - 2. Minimum illumination:
    - a. With Forensic WDR 2.0:
    - b. Color: 0.1 lux at 50 IRE, F1.8
    - c. B/W: 0.02 lux at 50 IRE, F1.8; 0 lux with IR illumination on

- E. Camera angle adjustment
  - 1. Pan  $\pm 180^\circ$ , tilt  $\pm 75^\circ$ , rotation  $\pm 175^\circ$
  
- F. Video compression:
  - 1. H.264 (MPEG-4 Part 10/AVC) Baseline, Main and High Profiles
  - 2. H.265 (MPEG-H Part 2/HEVC) Main Profile
  - 3. Motion JPEG
  
- G. Resolution:
  - 1. 1920x1080 to 160x90
  
- H. Frame rate:
  - 1. With WDR: 25/30 fps with power line frequency 50/60 Hz
  - 2. Without WDR: 50/60 fps with power line frequency 50/60 Hz
  
- I. Video Streaming:
  - 1. Multiple, individually configurable streams in H.264, H.265, and Motion JPEG
  - 2. Reduced bandwidth and storage needs technology for H.264 and H.265
  - 3. Controllable frame rate and bandwidth
  - 4. VBR/ABR/MBR H.264/H.265
  
- J. Audio input/output
  - 1. External microphone input, line input, digital input with ring power, line output
  
- K. Application Programming Interface:
  - 1. ONVIF Profile S, G, T
  - 2. Support for Session Initiation Protocol (SIP) for integration with Voice over IP (VoIP) systems, peer to peer or integrated with SIP/PBX
  
- L. Video Analytics
  - 1. Configurations:
    - a. Included: Video motion detection, active tampering alarm
    - b. Support for installation of third-party applications.
  - 2. Alarm rules (combinable):
    - a. Perimeter defender, motion guard, fence guard, and loitering guard, occupancy estimator, queue monitor, people counter, tailgating detector
  
- M. Casing:
  - 1. IP66- and NEMA 4X-rated, IK10 impact-resistant casing with hard-coated dome and dehumidifying membrane
  - 2. Encapsulated electronics and captive screws
  
- N. Power:
  - 1. Power over Ethernet (PoE) IEEE 802.3af/802.3at Type 1 Class 3
  - 2. Typical 6.4 W, max 11.3 W
  
- O. Connectors:
  - 1. RJ45 10BASE-T/100BASE-TX PoE

2. I/O: 4-pin 2.5 mm (0.098 in) terminal block for 1 supervised digital input and 1 digital output (12 V DC output, max. load 25 mA)
3. Audio: 4-pin 2.5 mm (0.098 in) terminal block for audio in and out

P. Storage:

1. Support for microSD/microSDHC/microSDXC card and encryption
2. Recording to network-attached storage (NAS)

Q. Operating conditions:

1. -40 °C to 50 °C (-40 °F to 122 °F)
2. Start-up temperature: -30 °C to 50 °C (-22 °F to 122 °F)
3. Humidity 10–100% RH (condensing)

R. Model:

1. Axis P3245-V (Indoor)
2. Axis P3245-VE (Outdoor)
3. No substitutions per Collin County IT Standards, Court Order 2020-523-06-15

#### 2.4 4 MEGAPIXEL WIDE ANGLE FIXED LENS MINIDOME CAMERAS

A. The network camera offers a wide-angle view in 4 MP for indoor and outdoor surveillance. This robust, IK10-rated fixed dome includes a weathershield and mounting bracket for easy installation. Featuring WDR and built-in IR illumination it delivers clear and sharp video even in challenging light or complete darkness. Devices can be connected to the I/O ports to trigger alarms or actions, and the input can be supervised. Can connect the HDMI port to a monitor for public viewing. Zipstream enhanced with H.264 or H.265 significantly lowers bandwidth and storage requirements. Image Sensor: 1/2.5-inch RGB CMOS sensor.

B. Lens:

1. Fixed focus, fixed iris 2.9mm, F2.0
2. Horizontal field of view: 105°
3. Vertical field of view: 79°

C. Day and night:

1. Automatically removable infrared-cut filter

D. Minimum illumination:

1. Color: 0.22 lux at 50 IRE, F2.0

E. Video compression:

1. H.264 (MPEG-4 Part 10/AVC) Baseline, Main and High Profiles
2. H.265 (MPEG-H Part 2/HEVC) Main Profile
3. Motion JPEG

F. Resolution:

1. 2304x1728 to 320x240

- G. Frame rate:
  - 1. 25/30 fps with power line frequency 50/60 Hz
  
- H. Video Streaming:
  - 1. Multiple, individually configurable streams in H.264, H.265 and Motion JPEG
  - 2. Zipstream technology in H.264 and H.265
  - 3. Controllable frame rate and bandwidth
  - 4. VBR/MBR H.264 and H.265
  
- I. Audio input/output
  - 1. Two-way audio connectivity via accessory audio and I/O interfaces device with portcast technology
  
- J. Application Programming Interface:
  - 1. ONVIF Profile S, G, T
  
- K. Video Analytics
  - 1. Configurations:
    - a. Included: Video motion detection, active tampering alarm
    - b. Support for installation of third-party applications.
  
- L. Casing:
  - 1. IP66, NEMA 4X and IK10 impact-resistant casing with hard-coated dome and dehumidifying membrane.
  
- M. Power:
  - 1. Power over Ethernet (PoE) IEEE 802.3af/802.3at Type 1 Class 3
  - 2. Typical 4.2 W, max 12.5 W
  
- N. Connectors:
  - 1. RJ45 10BASE-T/100BASE-TX PoE
  - 2. Audio and I/O connectivity via accessory audio and I/O interfaces device with portcast technology
  
- O. Storage:
  - 1. Support for microSD/microSDHC/microSDXC card and encryption
  - 2. Recording to network-attached storage (NAS)
  
- P. Operating conditions:
  - 1. -40 °C to 50 °C (-40 °F to 122 °F)
  - 2. Start-up: -30 °C to 50 °C (-22 °F to 122 °F)
  - 3. Humidity 10 to 100% RH (condensing)
  
- Q. Model:
  - 1. Axis M3206-LVE
  - 2. or later Axis model
  - 3. No substitutions per Collin County IT Standards, Court Order 2020-523-06-15

**2.5 4 MEGAPIXEL IMPACT-RESISTANT INTERIOR CORNER CAMERAS**

- A. The network camera is a compact and robust ligature-resistant (anti-ligature) corner-mount camera that delivers 4 MP video quality. It covers 125 degrees horizontally and 95 degrees vertically, with no blind spots. Features invisible IR illumination, it's ideal for covert video surveillance in complete darkness. With an IK10+/IP66 rated casing, it also includes a removable built-in microphone and an indication LED. The camera has polygonal privacy masking, which allows for flexible coverage and helps ensure occupant privacy is respected. Signed firmware and a Trusted Platform Module (TPM, FIPS 140-2 level 2 certified) help prevent unauthorized access and safeguard your system Image Sensor: 1/3-inch RGB CMOS sensor.
  
- B. Lens:
  - 1. Fixed focus, fixed iris 2.4mm, F2.0
  - 2. Horizontal field of view: 125°
  - 3. Vertical field of view: 95°
  
- C. Day and night:
  - 1. Automatically removable infrared-cut filter
  
- D. Minimum illumination:
  - 1. Color: 0.23 lux at F2.0
  - 2. B/W: 0.05 lux at F2.1
  
- E. Video compression:
  - 1. H.264 (MPEG-4 Part 10/AVC) Baseline, Main and High Profiles
  - 2. H.265 (MPEG-H Part 2/HEVC) Main Profile
  - 3. Motion JPEG
  
- F. Resolution:
  - 1. 2304x1728 to 320x240
  
- G. Frame rate:
  - 1. 30/25 fps with power line frequency 50/60 Hz
  
- H. Video Streaming:
  - 1. Multiple, individually configurable streams in H.264, H.265 and Motion JPEG
  - 2. Zipstream technology in H.264 and H.265
  - 3. Controllable frame rate and bandwidth
  - 4. VBR/ABR/MBR H.264 and H.265
  - 5. HDMI
  
- I. Audio input/output
  - 1. Two-way audio, full duplex
  
- J. Application Programming Interface:
  - 1. ONVIF Profile S, G, T
  
- K. Video Analytics
  - 1. Configurations:

- a. Included: Video motion detection, active tampering alarm
- b. Support for installation of third-party applications.
- L. Casing:
  - 1. Anti-ligature and anti-grip stainless steel casing and polycarbonate hard-coated dome.
  - 2. IP66-, IP69-, IP6K9K- and NEMA 4X-rated IK10+ 50 joules impact-resistant
  - 3. Steel: Color: Stainless steel
- M. Power:
  - 1. Power over Ethernet (PoE) IEEE 802.3af/802.3at Type 1 Class 3
  - 2. Typical 4.7 W, max 10.8 W
- N. Connectors:
  - 1. RJ45 10BASE-T/100BASE-TX PoE
  - 2. I/O connectivity: 4-pin 2.5mm terminal block (1 supervised input and 1 digital output)
  - 3. 3.5mm mic/line in, 3.5mm line out
- O. Storage:
  - 1. Support for microSD/microSDHC/microSDXC card and encryption
  - 2. Recording to network-attached storage (NAS)
- P. Operating conditions:
  - 1. -20 °C to 50 °C (-4 °F to 122 °F)
  - 2. Start-up: -20 °C to 55 °C (-4 °F to 131 °F)
  - 3. Humidity 10 to 85% RH (non-condensing)
- Q. Model:
  - 1. Axis Q9216-SLV
  - 2. or later Axis model
  - 3. No substitutions per Collin County IT Standards, Court Order 2020-523-06-15

## 2.6 12MP 180/360 DEGREE PANORAMIC CAMERA

- A. This network camera offers 360° overview as well as dewarped views. The camera is vandal resistant (IK10) and discreetly designed. It comes factory-focused and is designed for easy installation.
- B. Image Sensor: 1/1.7-inch progressive scan RGB CMOS sensor.
- C. Lens:
  - 1. Fixed iris, fixed focus, 1.3 mm, F2.2
  - 2. Horizontal field of view: 181°
  - 3. Vertical field of view: 181°
- D. Day and night:
  - 1. Automatically removable infrared-cut filter
- E. Minimum illumination:

1. Color: 0.19 lux at 50 IRE F2.2
  2. B/W: 0.04 lux at 50 IRE F2.2
  3. 0 lux with IR illumination on
- F. Video compression:
1. H.264 (MPEG-4 Part 10/AVC) Baseline, Main and High Profiles
  2. Motion JPEG
- G. Resolution:
1. Overview: 2992x2992 to 160x160
  2. Panorama: 3584x1344 to 192x72
  3. Double panorama: 3584x2688 to 256x144
  4. Quad view: 3584x2688 to 256x144
  5. View area 1-4, 16:9: 2048x1152 to 256x144, 4:3: 2048x1536 to 320x240
  6. Panorama corner left/right: 3200x1600 to 192x72
  7. Double panorama corner: 2880x2880 to 320x240
  8. Corridor: 2560x1920 to 256x144
- H. Frame rate:
1. 360° overview only, up to 2992x2992 without WDR: 25/30 fps @ 50/60 Hz
  2. 360° overview and dewarped views up to 5 MP with WDR: up to 20 fps @ 50/60 Hz
  3. 360° overview and dewarped views up to max resolution with WDR: up to 12.5/15 fps @ 50/60 Hz
- I. Video Streaming:
1. Multiple, individually configurable streams in H.264, and Motion JPEG
  2. Controllable frame rate and bandwidth
  3. VBR/MBR H.264
- J. Audio input/output
1. Two-way audio connectivity via accessory audio and I/O interfaces device with portcast technology
- K. Application Programming Interface:
1. ONVIF Profile S, G, T
- L. Video Analytics
1. Configurations:
    - a. Included: Video motion detection, active tampering alarm
    - b. Support for installation of third-party applications.
- M. Casing:
1. IP66- and NEMA 4X-rated, IK10 impact-resistant casing in polycarbonate and aluminium, with hard-coated dome and dehumidifying membrane
  2. Encapsulated electronics and captive screws
- N. Power:
1. Power over Ethernet (PoE) IEEE 802.3af/802.3at Type 1 Class 3
  2. Typical 7.8 W, max 12.95 W

- O. Connectors:
  - 1. RJ45 10BASE-T/100BASE-TX PoE
  - 2. Terminal block for 1 supervised alarm input and 1 digital output (12 V DC output, max. load 25 mA)
  - 3. HDMI type D
  - 4. Audio and I/O connectivity via accessory audio and I/O interfaces device with portcast technology
  
- P. Storage:
  - 1. Support for microSD/microSDHC/microSDXC card and encryption
  - 2. Recording to network-attached storage (NAS)
  
- Q. Operating conditions:
  - 1. -40 °C to 50 °C (-40 °F to 122 °F)
  - 2. Maximum temperature (intermittent): 55 °C (131 °F)
  - 3. Start-up: -30 °C to 50 °C (-22 °F to 122 °F)
  - 4. Humidity 10–100% RH (condensing)
  
- R. Model:
  - 1. Axis M3058-PLVE
  - 2. or later Axis model
  - 3. No substitutions per Collin County IT Standards, Court Order 2020-523-06-15

**2.7 8MP 360 DEGREE MULTI-DIRECTIONAL, MULTI-SENSOR CAMERA**

This network camera is a compact 8-megapixel camera with four varifocal lenses enabling overview and detailed surveillance. 360° IR illumination and Forensic WDR technology provides excellent video quality in any light conditions. Each camera head can be individually positioned (pan, tilt, roll and twist) along a circular track. Remote zoom and focus. The camera comes with an integrated weathershield.

- A. Image Sensor: (4x) 1/1.8-inch progressive scan RGB CMOS sensors.
  
- B. Lens:
  - 1. Varifocal, 3–6 mm, F1.8–2.6
  - 2. 4x1080p capture mode:
  - 3. Horizontal field of view: 96°–49°
  - 4. Vertical field of view: 53°–27°
  - 5. Diagonal field of view: 113°–55°
  - 6. Motorized focus, motorized zoom
  
- C. Day and night:
  - 1. Automatically removable infrared-cut filter
  
- D. Minimum illumination:
  - 1. Color: 0.17 lux at 50 IRE F1.8
  - 2. B/W: 0.04 lux at 50 IRE F1.8, 0 lux with IR illumination on



- E. Video compression:
  - 1. H.264 (MPEG-4 Part 10/AVC) Baseline, Main and High Profiles
  - 2. Motion JPEG
  
- F. Resolution:
  - 1. 4 x 1920x1080 (4 x HDTV 1080p) to 160x90
  
- G. Frame rate:
  - 1. Up to 25/30 fps (50/60 Hz)
  
- H. Video Streaming:
  - 1. Multiple, individually configurable streams in H.264 and Motion JPEG
  - 2. Controllable frame rate and bandwidth
  - 3. VBR/MBR H.264
  
- I. Audio input/output
  - 1. Two-way audio connectivity via accessory audio and I/O interfaces device with portcast technology
  
- J. IP Address
  - 1. One IP address for all channels
  
- K. Application Programming Interface:
  - 1. ONVIF Profile S, G
  
- L. Video Analytics
  - 1. Configurations:
    - a. Included: Video motion detection, active tampering alarm
    - b. Support for installation of third-party applications.
  
- M. Casing:
  - 1. IP66-, IP67-, NEMA 4X-rated, IK09 impact-resistant, aluminium and plastic casing with polycarbonate hard-coated dome, sunshield (PC/ASA)
  
- N. Power:
  - 1. Power over Ethernet (PoE) IEEE 802.3at Type 2 Class 4
  - 2. IR illumination on: class 4, typical 11.1 W, max 17.0 W
  - 3. IR illumination off: class 3, typical 8.6 W, max 11.0 W
  
- O. Connectors:
  - 1. Shielded RJ45 10BASE-T/100BASE-TX PoE
  - 2. Audio and I/O connectivity via accessory audio and I/O interfaces device with portcast technology
  
- P. IR Illumination:
  - 1. Four individually controllable IR with power-efficient, long-life 850 nm IR LEDs
  - 2. Range of reach 15 m (50 ft) or more depending on the scene

Q. Storage:

1. Support for microSD/microSDHC/microSDXC card and encryption
2. Dual SD cards
3. Recording to network-attached storage (NAS)

R. Operating conditions:

1. -40 °C to 65 °C (-40 °F to 149 °F)

S. Model:

1. Axis P3717-PLE
2. or later Axis model
3. No substitutions per Collin County IT Standards, Court Order 2020-523-06-15

2.8 15MP 360 DEGREE MULTI-DIRECTIONAL, MULTI-SENSOR CAMERA

This network camera is a compact 15-megapixel camera with four varifocal lenses enabling overview and detailed surveillance. 360° IR illumination and Forensic WDR technology provides excellent video quality in any light conditions. Each camera head can be individually positioned (pan, tilt, roll and twist) along a circular track. Remote zoom and focus. The camera comes with an integrated weathershield.

A. Image Sensor: (4x) 1/2.5-inch progressive scan RGB CMOS sensors.

B. Lens:

1. Varifocal, 3–6 mm, F1.8–2.6
2. 4x1440p capture mode:
3. Horizontal field of view: 101°–49°
4. Vertical field of view: 54°–29°
5. Diagonal field of view: 116°–58°
6. Motorized focus, motorized zoom

C. Day and night:

1. Automatically removable infrared-cut filter

D. Minimum illumination:

1. Color: 0.20 lux at 50 IRE F1.8
2. B/W: 0.04 lux at 50 IRE F1.8, 0 lux with IR illumination on

E. Video compression:

1. H.264 (MPEG-4 Part 10/AVC) Baseline, Main and High Profiles
2. H.265 (MPEG-H Part 2/HEVC) Main Profile
3. Motion JPEG

F. Resolution:

1. 4 x 2560x1440 (4 x QHD 1440p) to 80x60

G. Frame rate:

1. Up to 25/30 fps (50/60 Hz)
- H. Video Streaming:
  1. Multiple, individually configurable streams in H.264, H.265 and Motion JPEG
  2. Controllable frame rate and bandwidth
  3. VBR/ABR/MBR H.264
- I. Audio input/output
  1. Two-way audio connectivity via accessory audio and I/O interfaces device with portcast technology
- J. IP Address
  1. One IP address for all channels
- K. Application Programming Interface:
  1. ONVIF Profile S, G, T
- L. Video Analytics
  1. Configurations:
    - a. Included: Video motion detection, active tampering alarm
    - b. Support for installation of third-party applications.
- M. Casing:
  1. IP66-, IP67-, NEMA 4X-rated, IK09 impact-resistant, aluminium and plastic casing with polycarbonate hard-coated dome, sunshield (PC/ASA)
- N. Power:
  1. Power over Ethernet (PoE) IEEE 802.3at Type 2 Class 4
  2. IR illumination on: class 4, typical 16.3 W, max 25.5 W
  3. IR illumination off: class 3, typical 10.7 W, max 25.5 W
- O. Connectors:
  1. RJ45 10BASE-T/100BASE-TX PoE
  2. Audio and I/O connectivity via accessory audio and I/O interfaces device with portcast technology
- P. IR Illumination:
  1. Four individually controllable IR with power-efficient, long-life 850 nm IR LEDs
  2. Range of reach 15 m (50 ft) or more depending on the scene
- Q. Storage:
  1. Support for microSD/microSDHC/microSDXC card and encryption
  2. Dual SD cards
  3. Recording to network-attached storage (NAS)
- R. Operating conditions:
  1. -40 °C to 65 °C (-40 °F to 149 °F)

- S. Model:
  - 1. Axis P3719-PLE
  - 2. or later Axis model
  - 3. No substitutions per Collin County IT Standards, Court Order 2020-523-06-15

## 2.9 30X PTZ DOME NETWORK CAMERA

This network PTZ camera features a built-in laser that provides instant focus even in challenging lighting conditions. It also delivers HDTV 1080p video, with 30x optical zoom. Axis Sharpdome and Lightfinder technologies provide full scene fidelity and image quality in all directions, even in low-light conditions, while Axis Zipstream technology significantly reduces bandwidth and storage requirements. The quick and precise pan makes it easy to change viewing position and follow fast moving objects. The speed dry function easily removes water drips from the dome glass, providing clear images in rainy weather. Image Sensor: 1/2.8" progressive scan RGB CMOS

- A. Lens:
  - 1. 4.3-129 mm, F1.6 - 4.7
  - 2. Horizontal field of view: 66.7°–2.36°
  - 3. Vertical field of view: 39.5°–1.37°
  - 4. Laser focus and auto-iris
  
- B. Day and night:
  - 1. Automatically removable infrared-cut filter
  
  - 2. Minimum illumination:  
Color: 0.15 lux at 30 IRE F1.6  
B/W: 0.01 lux at 30 IRE F1.6  
Color: 0.2 lux at 50 IRE F1.6  
B/W: 0.02 lux at 50 IRE F1.6
  
- C. Video compression:  
H.264 (MPEG-4 Part 10/AVC) Baseline, Main and High Profiles  
Motion JPEG
  
- D. Resolution:  
1920x1080 HDTV 1080p to 320x180
  
- E. Frame rate:  
Up to 30/25 fps (60/50 Hz) in 1080P  
Up to 60/50 fps (60/50 Hz) in 720P
  
- F. Video Streaming:
  - 1. Multiple, individually configurable streams in H.264 and Motion JPEG
  - 2. Controllable frame rate and bandwidth
  - 3. VBR/MBR H.264
  
- G. Application Programming Interface:
  - 1. ONVIF Profile S, G
  
- H. Video Analytics

1. Configurations:
  - a. Included: Video motion detection, Axis Fence Guard, Axis Motion Guard
  - b. Support for installation of third-party applications.
  
- I. Casing:

IP66-, NEMA 4X- and IK08 housing IK10 mounting  
Aluminum casing, polycarbonate (PC) dome
  
- J. Power:

High PoE midspan 1–port: 100–240 V AC, max 74 W  
IEEE 802.3at, Type 2 Class 4  
Camera consumption: typical 11 W, max 25 W
  
- K. Connectors:

RJ45 10BASE-T/100BASE-TX PoE  
RJ45 push-pull connector (IP66) included
  
- L. Storage:
  1. Support for microSD/microSDHC/microSDXC card and encryption
  2. Recording to network-attached storage (NAS)
  
- M. Operating conditions:

With 60W midspan: -55 °C to 50 °C (-67 °F to 122 °F)  
Humidity 10–100% RH (condensing)
  
- N. Model:
  1. Axis Q6155-E
  2. or later Axis model
  3. No substitutions per Collin County IT Standards, Court Order 2020-523-06-15

**2.10 20MP 360 DEGREE MULTI-DIRECTIONAL, MULTI-SENSOR CAMERA PTZ ACCESSORY**

- A. With four 5 MP sensors, this model provides a complete 360° overview with great image usability both day and night. Designed for operation with any AXIS Q60-E PTZ Network Camera, it enables one-click PTZ control and autopilot for automatic PTZ tracking within the viewing areas. And, each sensor has exchangeable lenses with autofocus and positioning calibration for maximum flexibility and accurate configuration. AXIS Q6010-E uses the same bracket, power supply and network cable as the connected AXIS Q60-E PTZ Network Camera for cost-efficient installation. Furthermore, Zipstream with support for H.264/H.265 significantly lowers bandwidth and storage requirements without compromising image quality. Image Sensor: (4x) 1/2.5-inch progressive scan RGB CMOS sensors.
  
- B. Lens:
  1. Autofocus lenses, fixed iris, 2.8 mm, F2.0
  2. 4 x 5MP progressive scan RGB CMOS 1/2.5 mm
  3. Horizontal field of view: 360°
  4. Vertical field of view: 84°
  
- C. Day and night:

1. Automatically removable infrared-cut filter
- D. Minimum illumination:
  1. Color: 0.4 lux at 50 IRE F1.8
  2. B/W: 0.03 lux at 50 IRE F2.0
- E. Video compression:
  1. H.264 (MPEG-4 Part 10/AVC) Baseline, Main and High Profiles
  2. H.265 (MPEG-H Part 2/HEVC) Main Profile
- F. Resolution:
  1. 4 x 2592x1944 to 320x240
  2. Panorama: 3904-x800 or 2560x2080
- G. Frame rate:
  1. Up to 20 fps (50/60 Hz) in all resolutions
- H. Video Streaming:
  1. Multiple, individually configurable streams in H.264, H.265 and Motion JPEG
  2. Controllable frame rate and bandwidth
  3. MBR H.264/H2.65
- I. IP Address
  1. Assignable on host PTZ
- J. Application Programming Interface:
  1. ONVIF Profile S, G, T
- K. Video Analytics
  1. Configurations:
    - a. Included: Directional audio detection, Autopilot, AXIS Video Motion Detection, AXIS Guard Suite including AXIS Motion Guard, AXIS Fence Guard, and AXIS Loitering Guard, active tampering alarm, edge storage events
    - b. Support for installation of third-party applications.
- L. Casing:
  1. IP66-, NEMA 4X-rated, IK10
  2. Aluminium casing with polycarbonate hard-coated dome
- M. Power:
  1. Consumption without PTZ: PoE typical 9 W, max 23 W
- N. Connectors:
  1. RJ45 10BASE-T/100BASE-TX/1000BASE-T PoE
  2. RJ45 10BASE-T/100BASE-TX/1000BASE-T Q61-E port
  - 3.
- O. Storage:
  1. Support for microSD/microSDHC/microSDXC card and encryption

2. Recording to network-attached storage (NAS)
- P. Operating conditions:
1. -50 °C to 50 °C (-58 °F to 122 °F) w/ heater kit
  2. -40 °C to 50 °C (-40 °F to 122 °F)
- Q. Model:
1. Axis Q6100-E
  2. or later Axis model
  3. No substitutions per Collin County IT Standards, Court Order 2020-523-06-15

## 2.11 27-INCH HIGH PERFORMANCE HD LED MONITOR

- A. Video
1. The HD monitor shall support Full HD 1080p resolution (1920 x 1080), feature a 3-D comb filter, have performance-enhancing features such as picture-in-picture, picture-and-picture, menu controls to adjust video features, and automatic detection of a NTSC signal, and display images using an aspect ratio of 16:9 and be capable of displaying 16.7 million 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: 260 W
    - b. Standby: 10 W
  4. The HD monitor shall conform to the 130 x 130 mm VESA Mounting standard.
- C. Video:
1. Sync Format: NTSC
  2. LCD Panel: Active Matrix TFT LCD
  3. Viewable Picture Area: 27 in, measured diagonally
  4. Pixel Pitch (H x V): 0.4845 x 0.4845 mm
  5. Resolution: 1920 x 1080 pixels
  6. Aspect Ratio: 16:9
  7. Display Colors: 6.7 million colors
  8. Response Time: <12 milliseconds
  9. Backlight:
    - a. Rated Life: 30,000 hours
- D. Optical Characteristics
1. Luminance: 350 cd/m<sup>2</sup>, anti-glare, hard-coating (3H) treatment
  2. Contrast Ratio: 3000:1 (typical)
  3. Viewing Angle:
    - a. Horizontal: 178°
    - b. Vertical: 178°
- E. Connectors
1. Video: Four (4) BNC types (2 in, 2 out)
  2. RGB: One (1) 15-pin D-sub
  3. Y/C (S-video): Two (2) (1 in, 1 out)
  4. Component: Y, Pb, Pr
  5. Audio:

- a. Four (4) RCA type (2 stereo inputs)
- b. One (1) PC stereo input
- c. One (1) looping output, 1/8 in. mini phono plug
- 6. Digital:
  - a. One (1) DisplayPort
  - b. One (1) DVI-D
  - c. One (1) HDMI
  - d. One (1) VGA
- 7. Power Cord: Two 3-wire with a grounded plug, 1.8 m (6 ft) long.

F. Mechanical:

- 1. Weight:
  - a. Monitor Weight: 6.8 kg (15 lbs)

G. Environmental:

- 1. Operating Temperature: 0° to 90°C
- 2. Humidity: Maximum 90%, non-condensing

H. Model:

- 1. Pelco PMCL Series 27"
- 2. Or equal specs

2.12 55-INCH HIGH PERFORMANCE 1080P HD LCD/LED MONITOR

A. Video

- 1. The HD monitor shall support Full 1080P resolution (1920 x 1080), an LED backlight panel, shall automatically focus on setting the correct color, temperature, and gamma curve settings, shall 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:
- 3. Max Operation: <187 W
- 4. Standby: <0.5 W
- 5. The monitor shall conform to the 400 x 400mm VESA Mounting standard.

C. Video:

- 1. Sync Format: PAL/NTSC
- 2. LCD Panel: LED
- 3. Viewable Picture Area: 55. in, measured diagonally
- 4. Active Display Area (H x V): 1209.6 x 680.4 mm (47.6 x 26.79 in.)
- 5. Resolution: 3840 x 2160 pixels
- 6. Aspect Ratio: 16:9
- 7. Display Colors: 1.07 billion
- 8. Response Time: 6 milliseconds (typical)
- 9. Backlight: 24/7 rated

D. Optical Characteristics

- 1. Luminance: 500 nit
- 2. Contrast Ratio: 5000:1
- 3. Viewing Angle:
  - a. Horizontal: 178°
  - b. Vertical: 178°



- E. Connectors
  - 1. Two DisplayPort 1.2
  - 2. One digital DVI-D input.
  - 3. Two digital HDMI 2.0 input.
  - 4. One 100-240 VAC power input.
  - 5. Audio:
    - a. Stereo mini jack
  
- F. Mechanical:
  - 1. Finish: Black
  - 2. Mount: Wall mounting compatible with standard bracket
  - 3. VESA Mounting Compliance: 400 x 400 mm
  - 4. Dimensions: 1253.8 x 722.6 x 74.1 mm (49.36 x 28.45 x 2.92 in.)
  - 5. Weight: 15.4 kg
  
- 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 0% to 90% relative
  
- H. Model:
  - 1. Samsung PM55H 24/7 Commercial Display
  - 2. Pelco PMCL 55"
  - 3. Or EQUAL

**2.13 65-INCH HIGH PERFORMANCE 4K UHD LCD/LED MONITOR**

- I. Video
  - 1. The 4K monitor shall support Full 4K resolution (3840 x 2160), an LED backlight panel, shall automatically focus on setting the correct color, temperature, and gamma curve settings, shall display images using an aspect ratio of 16:9 and be capable of displaying 1.07 billion colors.
  
- J. Electrical/Mechanical
  - 1. Main Supply Input Voltage: 100–240 VAC, 50/60 Hz
  - 2. Power at Rated Voltage:
  - 3. Operation: <185 W
  - 4. Standby: <0.5 W
  - 5. The 4K monitor shall conform to the 400 x 400mm VESA Mounting standard.
  
- K. Video:
  - 1. Sync Format: PAL/NTSC
  - 2. LCD Panel: LED
  - 3. Viewable Picture Area: 65. in, measured diagonally
  - 4. Resolution: 3840 x 2160 pixels
  - 5. Aspect Ratio: 16:9
  - 6. Display Colors: 1.07 billion
  - 7. Response Time: 8 milliseconds (typical)
  - 8. Backlight: 24/7 rated
  
- L. Optical Characteristics
  - 1. Luminance: 700 nit
  - 2. Contrast Ratio: 4000:1

3. Viewing Angle:
  - a. Horizontal: 178°
  - b. Vertical: 178°

M. Connectors

1. One DisplayPort 1.2
2. One digital DVI-D input.
3. Two digital HDMI 2.0 input.
4. One 100-240 VAC power input.
5. Audio:
  - a. Stereo mini jack

N. Mechanical:

1. Cabinet Material: SECC
2. Finish: Black
3. Mount: Wall mounting compatible with standard bracket
4. VESA Mounting Compliance: 400 x 400 mm
5. Dimensions: 1253.8 x 722.6 x 74.1 mm (49.36 x 28.45 x 2.92 in.)
6. Weight: 30.5 kg (67.2 lb)

O. 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 0% to 90% relative

P. Model:

1. Samsung QH65R Commercial Display
2. Pelco
3. Or EQUAL

## 2.14 QUAD MONITOR WORKSTATION

- A. Provide ~~HP Z4 G4~~ management workstation with **the following minimum requirements:** Intel's Xeon E-2145 (3.7 GHz, 11 MB cache, 2666 MHz memory speed, 8C CPU), 16 GB (2 x 8 GB) DDR4-2666 ECC Registered Memory and (2) NVIDIA Quadro P2000 (4 GB) graphics cards in a convertible mini-tower chassis with 750w, 90% efficient PSU.
- B. Microsoft Windows 10 IOT, 64-bit OS
- C. Minimum 256 GB SSD
- D. Provide with 3-year Next Business Day on-site hardware warranty minimum
- E. Model:
  1. Dell

## 2.15 MANAGEMENT SERVER

- A. Dell PowerEdge Server with **the following minimum requirements:** hot plug fans and power supplies, and RAID controller with RAID-1 operating system protection with 2x 256 GB M.2 SSD. One (1) state-of-the-art eight-core Intel Xeon E-2136 Processor (3.3 GHz, 6 core, 80 W,

and 16 (1 X 16 GB PC3L-10600R (DDR4-2666) Registered DIMMs. 1 x two Port Gigabit Server Adapter. Windows Server 2016 / SQL Express.

- B. Provide a 3–year standard warranty minimum.
- C. 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.
- D. Model:
  - 1. Dell

## 2.16 STORAGE SERVERS

- A. General:
  - 1. The Storage Servers shall be **configured with the following minimum requirements:** a modular digital storage system, providing a 2RU chassis, power supplies, embedded video server and operating system, and provision for 18 enterprise class 7200 RPM hard disk drives, for maximum stated capacity.
  - 2. The IP Video Storage System shall be a pre-configured and pre-installed video management solution with up to 252TB of gross storage capacity with a Windows 10 IOT or Server 2016 OS per VMS recommendations. (2x) 256GB M.2 RAID 1 for OS drives, and RAID 6 for storage drives.
  - 3. The IP Video Storage System shall include a 4 port Gigabit Ethernet network interface, 64 GB system memory and dual (2x) Intel Xeon Silver 4114 Processors, remote monitoring via a desktop application or a Web browser. Nvidia P2000 GPU.
- B. Processor
  - 1. The IP Video Storage Appliance shall contain two Intel Xeon Silver 4114 10-core 2.2 GHz, 13.75 M cache, 85 W processors.
  - 2. The IP Video Storage Appliance processor shall contain two (2) sockets.
  - 3. The IP Video Storage Appliance processor shall feature a 1 x 8 MB Level 2 cache memory.
  - 4. The IP Video Storage Appliance processor shall include ECC Unbuffered memory protection.
  - 5. The IP Video Storage Appliance processor shall contain a 1600 MHz maximum front side Bus minimum.
- C. Management
  - 1. The IP Video Storage Appliance shall provide a user interface for system configuration and unified appliance management.
  - 2. The IP Video Storage Appliance shall offer the Microsoft System Center Suite built-in.
  - 3. The IP Video Storage Appliance shall allow operators to use one central tool for configuration and operations management.
- D. Monitoring
  - 1. The IP Video Storage Appliance shall provide SNMP, Remote Desktop and HTTP monitoring support.
  - 2. The IP Video Storage Appliance shall offer high-availability hardware, embedded design, and system wide monitoring.
- E. Electrical:
  - 1. Input Voltage: 120 VAC
  - 2. Efficiency of Power Supply: 92%
  - 3. ~~Total System Power Consumption: approx. 450 W~~

- F. Mechanical
  - 1. Form Factor: 2U or 3U Rack Mount
  - 2. Power Supply: 1200 W Platinum Level redundant
  - 3. USB Ports: 4 USB 2.0; 2 in rear, 2 in front, 2 USB 3.0 ports rear
  - 4. Network: Dual Intel® i210AT Gigabit LAN
  - 5. 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).)
  - 6. Weight: 23.6 kg (52 lb) 2RU or 32.7 kg (72 lb) 3RU
- G. Model:
  - 1. Dell

## 2.17 VIDEO MANAGEMENT SYSTEM SOFTWARE

- 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 management server and the Video Recording Manager shall run as services on Windows Server 2016 or latest compatible version.
- C. The configuration client software shall run as an application on Windows Server 2016 or latest compatible version.
- D. The operator client software shall run as an application on Windows 10.
- E. The VMS shall support ONVIF Profile G, S, T and Q compliant cameras. It shall be possible to access live streams and to control PTZ functionality.
- F. It shall be possible to record ONVIF compliant cameras. For recording only, 3rd party cameras that support MJPEG or RTSP shall be supported.
- G. The VMS shall provide a transcoding service for supporting HTML5 based web clients as mobile video clients.
- H. 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.
- I. 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.
- J. The VMS shall provide a documented Software Development Kit (SDK) to allow integration to and integration from third-party software.
- K. The VMS specified shall be a centrally managed, scalable client/server based architecture that allows full virtual matrix switching and control systems.

- L. 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.
- M. The VMS shall allow an 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.
- N. 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.
- O. 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.
- P. The VMS shall support all Security Systems MPEG-4 and H.264 and H.265 encoders, IP cameras, IP PTZ domes, panoramic and multisensor cameras.
- Q. The VMS shall provide a minimum of 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.
- R. 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.
- S. The VMS shall interface with third party analytics.
- T. The VMS shall support Microsoft Active Directory.
- U. The VMS shall export video and audio data optionally in ACC format to a CD/DVD drive, a network drive, or a USB drive. The exported data in ACC 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.
- V. The VMS shall auto-discover encoder and VRM devices. Device detection shall support devices in different subnets.
- W. 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.
- X. 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. Milestone Xprotect ~~Expert~~ **Corporate** 2020 R2 or later. The county is providing the Corporate license.
2. Provide all other equipment licenses required.
3. All latest patches shall be installed within 60 days of final acceptance.

~~2.18 EDGE ETHERNET SWITCH~~

~~A. The switch shall support transmission utilizing Category 5 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: 94V0~~

~~O. Models:~~

- ~~1. Cisco Catalyst 9300-48U-E UPoE Network Essentials~~
- ~~2. 1100W AC Platinum Power Supplies (redundant)~~
- ~~3. Cisco StackWise cables (50cm) where required.~~
- ~~4. Cisco DNA Essentials 48-port 3-year.~~
- ~~5. 1Gig SFP modules compatible with existing OM3 backbone (2 minimum for redundant connections to core.)~~
- ~~6. No substitutions per Collin County IT Standards, Court Order 2020-523-06-15~~

~~2.19 CORE ETHERNET SWITCH~~

~~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 Ethernet2 or 2 x 40 Gigabit QSFP2 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 (WIPs), 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

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 Cat5E UTP cabling
  - b. 1000BASE-T SFP based ports: RJ-45 connectors, 4 pair Cat5E 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 Cat5E 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. Models:~~
  - ~~1. Cisco Catalyst 9300-48U-E UPoE Network Essentials – Provide SFP ports sufficient for redundant 1Gig connections to each edge switch.~~
  - ~~2. 1100W AC Platinum Power Supplies (redundant)~~
  - ~~3. 8 Port 10G network module for expansion~~
  - ~~4. Cisco StackWise cables (50cm) where required.~~
  - ~~5. Cisco DNA Essentials 48 port 3-year.~~
  - ~~6. 10G Fiber SFP modules (2 minimum plus additional as needed.)~~
  - ~~7. No substitutions per Collin County IT Standards, Court Order 2020-523-06-15~~

## 2.20 VIDEO WIRING SYSTEMS

- A. Provide multimode fiber optic cabling and patching for ~~all backbone and~~ non-backbone fiber optic media conversion.
  - 1. New fiber optic cabling paths for long camera runs requiring media converters shall use OM3/4 Indoor/Outdoor Fiber, 900 micron tight buffer:
    - a. Panduit (No substitutions per Collin County IT Standards, Court Order 2020-523-06-15)
    - ~~b. New fiber optic patch cables from the switches to the existing fiber optic network backbone shall be OM1 62.5/125 micron.~~
      - ~~a. Panduit (No substitutions per Collin County IT Standards, Court Order 2020-523-06-15)~~
- B. Data Cable: Unshielded 4-pair, shall exceed all requirements for ANSI/EIA/TIA-568-A-5 and support high speed communication network applications. See 28 05 10 for further requirements.
  - 1. Category 6 minimum:
    - a. Panduit
      - 1. Provide riser or plenum jacket rating as applicable per installation environment. Coordinate jacket color with county I.T.
      - 2. Patch cables shall use green keystone jacks and green patch cables for video. **Collin County to provide and install patch cables between network switches and patch panels.**
      - 3. Panduit UTPSP4GRY (4 foot)
      - 4. Panduit UTPSP7GRY (7 foot)
    - b. Panduit (No substitutions per Collin County IT Standards, Court Order 2020-523-06-15)
- ~~C. CAT6 patch panels and management (No substitutions per Collin County IT Standards, Court Order 2020-523-06-15):~~
  - ~~1. Flat 48 port patch panel and keystone jacks~~
    - ~~a. Panduit CPPL48WBLY~~

- b. ~~Panduit CJ688TGGRY~~
- 2. ~~2RU horizontal cable manager~~
- a. ~~Panduit NCMHF2~~

D. See 28 0510 Common Work Results for general cabling requirements.

## 2.21 MEDIA CONVERTERS

- 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. Axis
    - b. No substitutions per Collin County IT Standards, Court Order 2020-523-06-15

## 2.22 PTZ 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. Axis T8134 or later model
  - 2. No substitutions per Collin County IT Standards, Court Order 2020-523-06-15)

## 2.23 CAMERA SCHEDULE (SEE ES DRAWINGS)

## 2.24 SPARE PARTS (SEE 28 05 10 – 2.7 FOR ADDITIONAL SPARE PARTS)

- A. Provide spare parts as follows:
  - 1. Camera: One (1) of each type required **with license.**
  - 2. ~~Network Switches: Each provided network switch shall have 2 minimum spare copper ports per 24 copper ports.~~
  - 3. ~~Network Switch Power Supply: One (1) of each type used.~~
  - 4. LCD HD Monitors: One (1) of each type power supply required.
  - 5. PoE Midspan Injector: Two (2) of each type required.
  - 6. ~~SFP Module: Two (2) of each type required.~~
  - 7. Storage Server RAID HDD: Two (2) of each size installed, **storage and OS 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 between camera and nearest ceiling. Use J-Hooks and plenum rated cable for the cable runs above the ceilings.
- 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.
- G. Coordinate all system downtime with owner.
- H. Coordinate camera views with owner rep. Submit sign off of each view to Engineer.
- I. Coordinate camera alarm call ups with owner for optimal view per alarm.

**3.2 TESTING (SEE SECTION 280510)**

- A. Testing Specifications for each fiber optic cable:
  - a. See 280510
- B. Camera testing:
  - 1. All cameras are configured per the specifications and at max camera resolution. Ensure there are no skips, blacked out video or video tearing. Ensure all video monitors are able to display required feeds without faults.
  - 2. Test all camera call ups.
  - 3. Ensure all audio is being recorded and clearly audible.
  - 4. Ensure each camera is recording.
  - 5. Create masks over toilet areas and where owner requests.
  - 6. Ensure estimating storage retention forecast meets specifications.

**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-Operational staff
  - 1. Functions performed
  - 2. Control Functions
  - 3. Recording/Playback
  - 4. Masking
  - 5. User management
  - 6. Audio/Mic features
- C. Training Outline-Maintenance Staff
  - 1. Systems Operation
  - 2. Component Review

3. Routine Maintenance/Adjustments
4. Troubleshooting/Repair

## Section 004100-Bid Form Addendum 4



# Collin County Purchasing

## 2021-014 Addendum 4

### Construction, Collin County Juvenile Detention, Video Retrofit

Issue Date: 11/17/2020

Questions Deadline: 1/15/2021 12:00 PM (CT)

Response Deadline: 1/21/2021 02:00 PM (CT)

Collin County Purchasing

### Contact Information

Contact: JD Griffin, CPPB Senior Buyer  
Address: Purchasing

Admin. Building  
Ste.3160  
2300 Bloomdale Rd.  
Ste. 3160  
McKinney, TX 75071

Phone: (972) 548-4116  
Fax: (972) 548-4694  
Email: [jgriffin@co.collin.tx.us](mailto:jgriffin@co.collin.tx.us)

## Event Information

Number: 2021-014 Addendum 4  
Title: Construction, Collin County Juvenile Detention, Video Retrofit  
Type: Invitation for Bid - Construction  
Issue Date: 11/17/2020  
Question Deadline: 1/15/2021 12:00 PM (CT)  
Response Deadline: 1/21/2021 02:00 PM (CT)  
Notes: Please log in to view bid documents.  
SCOPE OF WORK INCLUDES all materials, labor, equipment and services to produce or be incorporated in such construction. Contract will be a general contract to include replacement of all existing cameras, video viewing stations and video surveillance head-end equipment at Collin County Juvenile Detention. New cameras shall be IP based, high definition.

## Ship To Information

Address: Juvenile Detention  
4700 Community Ave.  
McKinney, TX 75071

## Billing Information

Address: Auditor  
Admin. Building  
Ste. 3100  
2300 Bloomdale Rd.  
Ste. 3100  
McKinney, TX 75071

## Bid Activities

### Mandatory Pre-Bid Conference (RSVP Required)

12/1/2020

A MANDATORY PRE-BID CONFERENCE will be held by Collin County at the Collin County Juvenile Detention Lobby, 4700 Community Ave., McKinney, TX 75071 on Tuesday, December 1, 2020 in order for bidders to ask questions regarding the proposed work. All bidders desiring to bid the work should have a representative at the pre-bid conference; bidders that do not attend the pre-bid conference shall not be considered in the evaluation for award of a contract per Texas Local Government Code 262.0256. Attendance shall be mandatory at the pre-bid conference. It is the bidder's responsibility to review the site and documents to gain a full understanding of the requirements of the bid.

Due to the current COVID-19 social distancing recommendations, a limit of six (6) attendees will be allowed during each session in addition to three (3) County representatives. Each contractor attending shall be limited to two (2) participants. All participants will be required to provide and wear a face mask that covers the mouth and nose, have temperature checked and complete a Covid-19 screening questionnaire upon arrival. The first conference session will begin at 9:00 AM followed by sessions at 10:00 AM, 11:00 AM and 1:00 PM (as needed). Bidders interested in attending the pre-bid conference shall RSVP to [purchasing@co.collin.tx.us](mailto:purchasing@co.collin.tx.us) with "**2021-014, Collin County Juvenile Detention, Video Retrofit**" in the subject line, no later than Monday, November 30, 2020 at 12:00 PM. RSVP response shall include company name, name of individuals that will be attending (maximum of 2) and the preferred session time. Attendees for each session will be scheduled in the order they are received.

## Bid Attachments

### Addendum 4\_2021-014.doc

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Addendum 4

**28 05 10\_Addendum 2.pdf**

Section 28 05 10 Addendum 2

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**28 23 00\_Addendum 2.pdf**

Section 28 23 00 Addendum 2

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**Addendum 3\_2021-014.doc**

Addendum 3

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**Attachment A.docx**

Attachment A-Pre-Bid Clarifications

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**28 23 00\_ Addendum 1.pdf**

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Drawing ES0.01 Addendum 1

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**ES1.00\_Addendum 1.pdf**

Drawing ES1.00 Addendum 1

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**ES1.02\_Addendum 1.pdf**

Drawing ES1.02 Addendum 1

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Drawing ES2.06 Addendum 1

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**ES2.07\_Addendum 1.pdf**

Drawing ES2.07 Addendum 1

[View Online](#)

**ES2.08\_Addendum 1.pdf**

Drawing ES2.08 Addendum 1

[View Online](#)

**ES3.01\_Addendum 1.pdf**

Drawing ES3.01 Addendum 1

[View Online](#)

**ES4.01\_Addendum 1.pdf**

Drawing ES4.01 Addendum 1

[View Online](#)



**ES5.01\_Addendum 1.pdf**

Drawing ES5.01 Addendum 1

[View Online](#)**004100-Bid Form Addendum 3.pdf**

Section 004100-Bid Form Addendum 3

[View Online](#)**Addendum 2\_2021-014.doc**

Addendum 2

[View Online](#)**004100-Addendum 2.pdf**

Section 004100-Bid Form Addendum 2

[View Online](#)**Addendum 1\_2021-014.doc**

Addendum 1

[View Online](#)**Pre-Bid Attendee List\_2021-014\_12-1-20.pdf**

Mandatory Pre-Bid Attendee List

[View Online](#)**004100-Bid Form Addendum 1.pdf**

Section 004100-Bid Form Addendum 1

[View Online](#)**LEGAL NOTICE-2021-014.doc**

Legal Notice

[Download](#)**Collin County Juvenile - Video Retrofit- Specifications.pdf**

Specifications

[View Online](#)**Collin County Juvenile - Video Retrofit-Drawings.PDF**

Drawings

[View Online](#)**Requested Attachments**

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**Conflict of Interest Questionnaire****W-9***(Attachment required)***Bid Bond***(Attachment required)*

**BID SECURITY:** All Bidders must submit, prior to the bid opening time, a Certified Check, Cashier's Check or acceptable Bid Bond payable without recourse to Collin County in the amount of not less than five percent (5%) of the total bid plus alternates as submitted.

1. Bid Bond, certified check or Cashier's Check may be mailed or delivered to the Office of the Collin County Purchasing Agent, Collin County Administration Building, 2300 Bloomdale Road, Ste 3160, McKinney, TX 75071 and shall be delivered in an envelope, marked plainly on the outside with the Bid Name and Number.
2. Bidders submitting a bid via Collin County eBid shall upload a Bid Bond at <https://collincountytx.ionwave.net>

Regardless of delivery method, all Bid Bonds shall be received prior to the bid opening time to be considered. Failure to submit a copy of bid security prior to bid opening shall be cause for rejection of bid.

The original Bid Bond shall be received in the Collin County Purchasing Department no later than close of business on the third working day after the bid opening. Late receipt of original Bid Bond shall be cause for rejection of bid.

# Bid Attributes

## 1 Solicitation Submittals

In an effort to avoid person-to-person interaction to comply with the latest Order issued to prevent the spread of COVID-19, Collin County Purchasing will temporarily only accept IFB, RFP, RFQ and Quote submittals electronically in Ionwave (eBid) or via parcel carrier until further notice. Please do not deliver your solicitation response in person. All bid openings will be completed on schedule and witnessed by Collin County Purchasing staff to ensure all procurement statutes, policies and state laws are followed. Please initial.

(Required: Maximum 1000 characters allowed)

## 2 eBid Notice

Collin County exclusively uses IonWave Technologies, Inc. (Collin County eBid) for the notification and dissemination of all solicitations. The receipt of solicitations through any other means may result in your receipt of incomplete specifications and/or addendums which could ultimately render your bid/proposal non-compliant. Collin County accepts no responsibility for the receipt and/or notification of solicitations through any other means. Please initial.

(Required: Maximum 1000 characters allowed)

## 3 Contact Information

List the contact name, email address and phone number of the main person(s) Collin County should contact in reference to this solicitation. Contact(s) shall be duly authorized by the company, corporation, firm, partnership or individual to respond to any questions, clarification, and or offers in response to this solicitation.

(Required: Maximum 4000 characters allowed)

## 4 Base Bid Calendar Days Bid

Please state the consecutive calendar days bid from notice to proceed through completion of project.

(Required: Numbers only)

## 5 Exceptions

Do you take exceptions to the specifications. If so, by separate attachment, please state your exceptions.

Yes  No

(Required: Check only one)

**6 Bonding Requirement Acknowledgement**

I understand that the bonding requirements of this solicitation are required and are included in the submitted pricing. A bond certificate (payment, performance, and/or maintenance) as stated in the specification document shall be submitted to the Purchasing department if I am awarded all or a portion of the resulting contract. Please initial.

*(Required: Maximum 1000 characters allowed)*

**7 Insurance Acknowledgement – Construction/Public Works**

I understand that the insurance requirements of this solicitation are required and are included in the submitted pricing. The Contractor shall furnish certificates of insurance for both the Contractor and any subcontractor to the Purchasing department if awarded all or a portion of the resulting contract. Please initial.

*(Required: Maximum 1000 characters allowed)*

**8 Bidder's Experience**

State the number of years' experience installing electronic security systems (refer to Section 28 05 10, 1.6, D.)

*(Required: Maximum 1000 characters allowed)*

**9 Completed Projects**

List at least five projects with similar system complexity which have been in successful operation for at least one year (refer to Section 28 05 10, 1.6, D.)

*(Required: Maximum 4000 characters allowed)*

**10 Subcontractors**

State the business name of all subcontractors and the type of work they will be performing under this contract. If you are fully qualified to self-perform the entire contract, please respond with "Not Applicable-Self Perform".

*(Required: Maximum 4000 characters allowed)*

**1**  
**1** **Reference No. 1**

List a company or governmental agency, other than Collin County, where these same/like products/services, as stated herein, have been provided. Texas references preferred. Include the following: Company/Entity, Contact, Address, City/State/Zip, Phone, and E-Mail.

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*(Required: Maximum 4000 characters allowed)*

**1**  
**2** **Reference No. 2**

List a company or governmental agency, other than Collin County, where these same/like products/services, as stated herein, have been provided. Texas references preferred. Include the following: Company/Entity, Contact, Address, City/State/Zip, Phone, and E-Mail.

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*(Required: Maximum 4000 characters allowed)*

**1**  
**3** **Reference No. 3**

List a company or governmental agency, other than Collin County, where these same/like products/services, as stated herein, have been provided. Texas references preferred. Include the following: Company/Entity, Contact, Address, City/State/Zip, Phone, and E-Mail.

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*(Required: Maximum 4000 characters allowed)*

**1  
4** **Preferential Treatment**

The County of Collin, as a governmental agency of the State of Texas, may not award a contract to a nonresident bidder unless the nonresident's bid is lower than the lowest bid submitted by a responsible Texas resident bidder by the same amount that a Texas resident bidder would be required to underbid a nonresident bidder to obtain a comparable contract in the state in which the nonresident's principal place of business is located (Government Code, Title 10, V.T.C.A., Chapter 2252, Subchapter A).

1. Is your principal place of business in the State of Texas?
2. If your principal place of business is not in Texas, in which State is your principal place of business?
3. If your principal place of business is not in Texas, does your state favor resident bidders (bidders in your state) by some dollar increment or percentage?
4. If your state favors resident bidders, state by what dollar amount or percentage.

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*(Required: Maximum 4000 characters allowed)*

**1  
5** **Debarment Certification**

I certify that neither my company nor an owner or principal of my company has been debarred, suspended or otherwise made ineligible for participation in Federal Assistance programs under Executive Order 12549, "Debarment and Suspension," as described in the Federal Register and Rules and Regulations. Please initial.

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*(Required: Maximum 1000 characters allowed)*

**1  
6** **Immigration and Reform Act**

I declare and affirm that my company is in compliance with the Immigration and Reform Act of 1986 and all employees are legally eligible to work in the United States of America. I further understand and acknowledge that any non-compliance with the Immigration and Reform Act of 1986 at any time during the term of this contract will render the contract voidable by Collin County. Please initial.

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*(Required: Maximum 1000 characters allowed)*

**1  
7** **Disclosure of Certain Relationships**

Chapter 176 of the Texas Local Government Code requires that any vendor considering doing business with a local government entity disclose the vendor's affiliation or business relationship that might cause a conflict of interest with a local government entity. Subchapter 6 of the code requires a vendor to file a conflict of interest questionnaire (CIQ) if a conflict exists. By law this questionnaire must be filed with the records administrator of Collin County no later than the 7th business day after the date the vendor becomes aware of an event that requires the statement to be filed. A vendor commits an offense if the vendor knowingly violates the code. An offense under this section is a misdemeanor. By submitting a response to this request, the vendor represents that it is in compliance with the requirements of Chapter 176 of the Texas Local Government Code. Please send completed forms to the Collin County County Clerk's Office located at 2300 Bloomdale Rd., Suite 2104, McKinney, TX 75071. Please initial.

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*(Required: Maximum 1000 characters allowed)*

**1  
8** **Anti-Collusion Statement**

Bidder certifies that its Bid/Proposal is made without prior understanding, agreement, or connection with any corporation, firm, or person submitting a Bid/Proposal for the same materials, services, supplies, or equipment and is in all respects fair and without collusion or fraud. No premiums, rebates or gratuities permitted; either with, prior to, or after any delivery of material or provision of services. Any such violation may result in Agreement cancellation, return of materials or discontinuation of services and the possible removal from bidders list. Please initial.

\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_  
*(Required: Maximum 1000 characters allowed)*

**1  
9** **Disclosure of Interested Parties**

Section 2252.908 of the Texas Government Code requires a business entity entering into certain contracts with a governmental entity to file with the governmental entity a disclosure of interested parties at the time the business entity submits the signed contract to the governmental entity. Section 2252.908 requires the disclosure form (Form 1295) to be signed by the authorized agent of the contracting business entity, acknowledging that the disclosure is made under oath and under penalty of perjury. Section 2252.908 applies only to a contract that requires an action or vote by the governing body of the governmental entity before the contract may be signed or has a value of at least \$1 million. Section 2252.908 provides definitions of certain terms occurring in the section. Section 2252.908 applies only to a contract entered into on or after January 1, 2016. Please initial.

\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_  
*(Required: Maximum 1000 characters allowed)*

**2  
0** **Notification Survey**

In order to better serve our offerors, the Collin County Purchasing Department is conducting the following survey. We appreciate your time and effort expended to submit your bid. Should you have any questions or require more information please call (972) 548-4165. How did you receive notice of this request?

- Plano Star Courier     Plan Room     Collin County eBid Notification     Collin County Website  
 Other

*(Required: Check only one)*

**2  
1** **Cooperative Contract Name**

State the cooperative contract name this quote is offered under. (i.e. TX DIR, TXMAS, OMNIA Partners, Buyboard, TIPS/TAPS, HGAC, HCDE, etc.) If none, answer N/A.

\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_  
*(Required: Maximum 4000 characters allowed)*

**2**  
**2** **Cooperative Contract Number**  
State the cooperative contract number this quote is offered under. If none, answer N/A.

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*(Required: Maximum 4000 characters allowed)*

**2**  
**3** **Cooperative Contract Website**  
Please provide the website URL for the cooperative contract this quote is offered under. If none, answer N/A.

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*(Required: Maximum 1000 characters allowed)*

**2**  
**4** **Bid Bond Acknowledgement**  
I understand that accompanying this bid, is a certified check, cashier's check or Bid Bond in the amount of five percent (5%) of the total amount bid. Bidders submitting a bid via Collin County eBid shall upload a Bid Bond at <https://collincountytx.ionwave.net>. Regardless of delivery method, all Bid Bonds shall be received prior to the bid opening time to be considered.  
I understand that the original Bid Bond shall be received in the Collin County Purchasing Department no later than close of business on the third working day after the bid opening. **Late receipt of original Bid Bond shall be cause for rejection of bid.** Please initial.

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*(Required: Maximum 4000 characters allowed)*

**2**  
**5** **Construction Acknowledgement**  
Bidder, declares that the only person or parties interested in this bid are those principals named herein, that his/her bid is made without collusion with any other person, firm or corporation, that he/she has carefully examined the Contract Documents including the Advertisement for Bids, Instruction to Bidders, Construction Agreement, Specifications and the Drawings, therein referred to and has carefully examined the locations, conditions and classes of materials for the proposed work, and agrees that he/she will provide all the necessary labor, machinery, tools, equipment, apparatus and other items incidental to construction and will do all the work and furnish all the materials called for in the Contract Documents in the manner prescribed therein. Bidder hereby declares that he/she has visited the site of the Work and has carefully examined the Contract Documents pertaining to the Work covered by the above Bid, and he/she further agrees to commence work within ten (10) consecutive calendar days after date of written Notice to Proceed and to substantially complete the work on which he/she has bid within the number of days specified subject to such extensions of time allowed by Specifications. Bidder certifies that the bid prices contained in this bid have been carefully checked and are submitted as correct and final. The prices have been shown in words and figures for each item listed in this bid and it is understood that in the event of a discrepancy, the words shall govern. Please initial.

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*(Required: Maximum 1000 characters allowed)*

**26 Addendum No. 1 Acknowledgement**  
 Please initial to verify your receipt of the addendum.

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*(Required: Maximum 1000 characters allowed)*

**27 Addendum No. 2 Acknowledgement**  
 Please initial to verify your receipt of the addendum.

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*(Required: Maximum 1000 characters allowed)*

**28 Addendum No. 3 Acknowledgement**  
 Please initial to verify your receipt of the addendum.

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*(Required: Maximum 1000 characters allowed)*

**29 Addendum No. 4 Acknowledgement**  
 Please initial to verify your receipt of the addendum.

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*(Required: Maximum 1000 characters allowed)*

**Bid Lines**

**1 Package Header**

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Base Bid Grand Total

Quantity:   1   UOM:   lump sum   Total: \$

Item Notes: Total Material Cost (Line 1.1) and Total Labor Cost (Line 1.2) must add up to the Base Bid Grand Total.

Supplier Notes: \_\_\_\_\_

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No bid  
 Alternate specification  
*(Attach separate sheet)*  
 Additional notes  
*(Attach separate sheet)*



## Package Attributes

### 1. Base Bid Grand Total- Written in Words

The contract award will be based on the total bid price.

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(Required: Maximum 4000 characters allowed)

## Package Items

### 1.1 Total Base Bid Materials Cost Incorporated in Project

(Response required)

Quantity:   1   UOM:   lump sum   Price: \$  Total: \$

Supplier Notes: \_\_\_\_\_  
\_\_\_\_\_

- No bid
- Additional notes  
(Attach separate sheet)

### 1.2 Total Base Bid Labor Cost Incorporated in Project

(Response required)

Quantity:   1   UOM:   lump sum   Price: \$  Total: \$

Supplier Notes: \_\_\_\_\_  
\_\_\_\_\_

- No bid
- Additional notes  
(Attach separate sheet)

## 2 *Line deleted as part of an Addendum*

### 3 Add Alternate Bid Item #2: Provide external microphone for cameras C101, C102, C103, C108,C112, C125, C128, C135, C137 and C218 (Refer to drawing ES101, Key Note#1).

(Response required)

Quantity:   1   UOM:   lump sum   Price: \$  Total: \$

Item Notes: Refer to Section 28 05 10, 1.3.

Alternate Bid Amount shall include all materials and labor. Alternate Bid Amount Shall Not Include the Base Bid Amount.

Supplier Notes: \_\_\_\_\_  
\_\_\_\_\_

- No bid
- Alternate specification  
(Attach separate sheet)
- Additional notes  
(Attach separate sheet)

## Item Attributes

### 1. Alternate Bid Item #2-Calendar Days Bid

If Alternate Bid Item #2 is awarded, state the number of consecutive calendar days (if any) to be added to Base Bid Calendar Days Bid.

(Required: Numbers only)

## Supplier Information

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Company Name: \_\_\_\_\_

Contact Name: \_\_\_\_\_

Address: \_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_  
\_\_\_\_\_

Phone: \_\_\_\_\_

Fax: \_\_\_\_\_

Email: \_\_\_\_\_

## Supplier Notes

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The undersigned hereby certifies the foregoing bid submitted by the company listed below hereinafter called "bidder" is the duly authorized agent of said company and the person signing said bid has been duly authorized to execute same. Bidder affirms that they are duly authorized to execute this contract; this company; corporation, firm, partnership or individual has not prepared this bid in collusion with any other bidder or other person or persons engaged in the same line of business; and that the contents of this bid as to prices, terms and conditions of said bid have not been communicated by the undersigned nor by any employee or agent to any other person engaged in this type of business prior to the official opening of this bid.

\_\_\_\_\_  
*Print Name*

\_\_\_\_\_  
*Signature*