

# MEPNN Supplier Scouting Opportunity Synopsis

## Section 1: General Information

Scouting Number	2025-272
Item to be Scouted	Closed-Circuit Television (CCTV) Camera
Days to be scouted	30
Response Due By	09/19/2025
Description	The Closed-Circuit Television (CCTV) Camera will be used to produce clear, detailed, and usable video images of the areas, objects, and other subjects visible from a roadside field site.

## Section 2: Technical Information

Type of supplier being sought	Manufacturer
Reason	BABA
Describe the manufacturing processes (elaborate to provide as much detail as possible)	All parts shall be constructed of corrosion-resistant materials, such as plastic, stainless steel, anodized aluminum, brass, or gold-plated metal. All fasteners exposed to the elements shall be Type 304 or 316 passivated stainless steel. See Additional Information for the FDOT Standard Specification file.
Provide dimensions / size / tolerances / performance specifications for the item	PTZ cameras shall include a minimum 18x motorized optical zoom lens with automatic iris. Fixed cameras shall have a 3-9 mm varifocal lens with automatic iris. See Additional Information for the FDOT Standard Specification file.
List required materials needed to make the product, including materials of product components	See Additional Information for the FDOT Standard Specification file.
Are there applicable certification requirements?	Yes
Certification(s) required	IEEE ,ISO
Details	CCTV cameras shall be compliant with the Code of Federal Regulations (CFR) Section 200.216 Prohibition on certain telecommunications and video surveillance services or equipment <a href="https://www.ecfr.gov/current/title-2/subtitle-A/chapter-II/part200/subpart-C/section-200.216">https://www.ecfr.gov/current/title-2/subtitle-A/chapter-II/part200/subpart-C/section-200.216</a> . The camera's LAN connection shall support the requirements detailed in the IEEE 802.3 Standard for 10/100 Ethernet connections. The camera shall have a minimum of one 10/100 Base-TX connection Ethernet port. The camera shall utilize the Moving Picture Experts Group's MPEG4 part 10 (H.264) video compression technology in accordance with the ISO and IEC requirements detailed in the ISO/IEC 14496-10:2009 Standard. Cameras shall be compatible with the current version of the Florida Department of Transportation (FDOT) SunGuide® software system.
Are there applicable regulations?	Yes
Details	CCTV cameras shall be compliant with the Code of Federal Regulations Section 200.216 Prohibition on certain telecommunications and video surveillance services or equipment <a href="https://www.ecfr.gov/current/title-2/subtitle-A/chapter-II/part200/subpart-C/section-200.216">https://www.ecfr.gov/current/title-2/subtitle-A/chapter-II/part200/subpart-C/section-200.216</a> . Cameras shall support either National Transportation Communications for ITS Protocol (NTCIP) 1205v01.08 or the Open Network Video Interface Forum (ONVIF) Core, Streaming, and Media Service specifications.
Are there any other standards, requirements, etc.?	Yes
Details	Cameras shall be compatible with the current version of the Florida Department of Transportation's SunGuide® software system.
Additional Technical Comments	

## Section 4: Business Information

Estimated potential business volume	350 annually
Estimated target price / unit cost information (if unavailable explain)	Approximately \$3,000 each
When is it needed by?	5 months
Describe packaging requirements	No packaging requirements. Best available. Delivered undamaged. Specifics discussed in negotiation.
Where will this item be shipped?	Florida

## Additional Comments

Is there other information you would like to include?	Agency providing funds: Florida Department of Transportation Name/POC for BABA related questions: Melissa Hollis or Karen Byram Email address of contact: Melissa.Hollis@dot.state.fl.us or Karen.Byram@dot.state.fl.us
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## SECTION 682 VIDEO EQUIPMENT

### 682-1 CCTV Camera.

**682-1.1 Description:** Furnish and install a closed-circuit television (CCTV) camera at the locations shown in the Plans. The installed equipment must provide video images of the roadway, traffic, and other current conditions around a roadside CCTV field site; respond to camera control signals from the operator; and transmit video images to remote locations for observation.

**682-1.2 Materials:** All equipment shall be permanently marked with manufacturer name or trademark, part number, and date of manufacture or serial number. Meet the requirements of Section 603. Provide a CCTV camera that is compatible with any camera operating software indicated in the Contract Documents. Cameras are classified by camera type and video type. Provide the appropriate type for the locations shown in the Plans. Use only equipment and components that meet the requirements of Section 996 and are listed on the Department's Approved Product List (APL).

All CCTV cameras must support the communication links shown in the Plans. Unshielded twisted pair/shielded twisted pair network cables must be compliant with the TIA-568 Standard.

**682-1.3 Installation:** Install the CCTV camera on a pole in accordance with Standard Plans, Indexes 641-020, 649-020, and 659-020, and as shown in the Plans.

Furnish and install the power supplies and any other camera-related field electronic equipment and transient voltage surge suppressors within a pole- or base-mounted lockable cabinet. The cabinet must meet the requirements of Section 676.

Furnish and install all power, video, and data cables necessary to provide connection points for camera video and PTZ control signals within the cabinet. Furnish and install any and all ancillary equipment required to provide a complete and fully operational CCTV camera. Verify that all wiring meets National Electric Code (NEC) requirements where applicable.

Route the data and video cables from the pole or support structure to the camera inside the mounting hardware and protect from exposure to the outside environment.

Coat the exterior of the dome-type enclosure's lower half with a clear, rain repellant product prior to final acceptance.

**682-1.4 Field Acceptance Testing:** Conduct field acceptance testing in accordance with Section 611.

Perform local field inspection at each local CCTV field site to verify and confirm the following:

1. Physical construction has been completed as specified in the Plans and all existing and proposed lanes are clearly visible with no line of site obstructions.
2. The quality and tightness of ground and surge protector connections.
3. Proper voltages for all power supplies and related power circuits.
4. All connections, including correct installation of communication and power cables.

### 682-2 Video Display Equipment.

**682-2.1 Description:** Furnish and install video display equipment as shown in the Plans.

**682-2.2 Materials:** Video display equipment must have the capability to display analog, digital, and other images associated with the operation of the transportation management center (TMC).

Provide equipment, mounting hardware, cabling, and other video display components that are compatible with each other. All equipment and materials furnished and installed must be reviewed and approved by the Engineer.

**682-2.2.1 Video Display Control System:** Furnish a video display control system that meets the requirements of Section 996.

Provide the video display control system with a minimum configuration of 4 composite video inputs, 4 component (red, green, and blue (RGB)) video inputs, and 4 DVI inputs as well as network connections, decoders, and associated hardware and software required to display 32 inputs simultaneously at a minimum resolution of 720 pixels x 480 pixels and a frame rate of 30 fps, or as shown in the Plans.

Provide the video display control system with a minimum configuration of 4 composite video outputs, 2 component (RGB video outputs), and 4 DVI outputs, or as shown in the Plans. If the projection device requires an analog signal, then breakout cables may be used to convert the DVI output connector to a HD15 analog RGB connector.

**682-2.2.2 Video Wall Display:** Furnish and install a video wall display consisting of display devices described below arranged in a wall, as shown in the Plans, together with a video display control system.

The video wall display must produce, at a minimum, a large-scale, high-resolution video image having accurate color rendition, sufficient image brightness, and a high contrast ratio, as described in 682-2.2.8. The display system must provide access to serviceable components for repair and replacement of electronics, lamps, and optical components without removing the device from service for a period longer than 30 minutes.

Integrate the individual display units in a single, seamless display that provides a continuous image across the entire active display area provided, under the complete control of the TMC operators from their individual shared workstations.

Source all major wall display components from a single provider or manufacturer to ensure that the various devices are compatible with each other and able to function together as an integrated display.

The individual video images must exhibit a uniformity of color quality across the multiple displays. Colors must be displayed evenly across the video wall and the video wall must maintain uniform brightness characteristics from one video display unit to the next in the tiled display, with no degradation in color or brightness uniformity over time. The video wall display must provide features that allow physical and electronic alignment of the separate high-resolution display units that comprise the wall.

**682-2.2.3 Video Wall Support Structure:** Furnish and install an aluminum or steel-frame structure that supports the video display units as mounted and stacked to form the matrix for the video wall display. The support structure must consist of stackable display units that maintain a consistent maximum horizontal and vertical spacing of 0.04 inches between adjacent display units in the video wall matrix.

Fabricate the support structure specifically to ensure that a continuous, accurate image is provided on the screens without any distortion or unused screen space and that no observable distortions are present in the installed video wall display due to normal building

vibration. Each completed structure must be enclosed such that there is no ambient light effect on the screen from behind the display.

Ensure that the components of the individual video displays can be serviced without disturbing the integrity of the entire video wall display.

**682-2.2.4 Rear Projection Video Display:** Use rear projection video displays that are suitable for digital video wall applications in mission-critical TMCs where video wall image quality, operational reliability, and serviceability objectives as stated in this Specification can be achieved.

Use rear projection video displays that display a minimum of a single or quad-split, four-paned CCTV camera video image. Each video display must be able to be independently controlled from any of the central operator or shift supervisor workstations, and that each video display can be integrated with additional video units to form a single video display, or a virtual desktop where video windows can be positioned and resized by the operator.

Ensure that the rear projection video display facilitates lamp replacement without the need to readjust the image being projected on the screen.

The rear projection video display intensity must be sufficient for effective and comfortable viewing by TMC operations personnel under normal lighting conditions, subject to approval by the Department. The unit's display engine must produce a minimum light output of 550 ANSI lumens.

The rear projection video units must have the following minimum features and characteristics:

1. Screen brightness achieved by a combination of projection techniques and screen materials, so that the video display has a minimum brightness measurement of 130 candelas per square meter (cd/m<sup>2</sup>) across the outside viewing surface of the projection screen.

2. Brightness uniformity that meets or exceeds 80 percent across the display unit, as measured using a photometer.

3. A multi-lamp optical engine must be provided for rear projection video units that do not use light-emitting diodes (LEDs) for illumination. Multi-lamp optical engines must provide a failover feature whereby a second lamp can be automatically activated when the first lamp fails. Ensure displays with multi-lamp optical engines provide indication of lamp status.

4. Multi-lamp optical engines must include both a "hot standby" mode in which failover to the second lamp takes no more than two seconds and a "cold standby" mode in which failover and the time for the display to return to full light output does not exceed 30 seconds.

5. A display module that uses modular component architecture to permit service or replacement of serviceable parts without removing the projection engine.

6. Each unit must be completely enclosed and light tight, with fixed panels for access to the lamp, power supply, and projection engine.

**682-2.2.5 Flat Panel Display:** Furnish and install a flat panel display unit to reproduce video and computer graphics information. The device must display, at a minimum, a high-resolution, distortion-free image and maintain a consistent level of illumination across the entire screen area. Ensure that it has the following minimum features and characteristics:

1. Dimensions of 24 inches high by 41 inches wide by 4 inches deep, or as shown in the Plans.

2. Ability to be installed on the face of a standard wall or flush mounted within the wall system.

**682-2.2.6 Cabling:** Furnish each video display component with all required appurtenances, including all the necessary cables, with proper length and connectors for power and communication, as defined by the manufacturer. Ensure that cabling conforms to applicable EIA/TIA standards. Size the power cables to meet NEC requirements. Provide communication cables from each video display component to the network communication devices that are appropriate for and compatible with the technology employed (e.g., fiber optic, twisted pair, or coaxial), and meet the minimum size and bandwidth specifications the manufacturer requires.

Provide all cabling of adequate length, along with the compatible connectors and any ancillary equipment necessary to fully interconnect the video components and display control systems needed to achieve the functions required. Label all cables at both ends, as approved by the Engineer.

**682-2.2.7 Electrical:** Provide equipment that operates on 120 V<sub>AC</sub> at a frequency of 60 Hz. Furnish a transformer or other necessary means of power conversion for any device that requires another voltage or frequency.

Conduct TMC field reviews to examine the electrical distribution panels allocated for various equipment items and the electrical schedules for each. Make any changes, additions, or corrections to the electrical panels, wiring, outlets, and connectors that may be deemed necessary to adequately power all of the equipment proposed for a video display project at the intended location, subject to the approval of the Engineer. Make any changes to the building's electrical wiring in accordance with applicable codes and permits, and with the NEC. Modifications to an existing building's wiring or the video wall electrical wiring plans must be signed and sealed by a Specialty Engineer, and submitted for approval.

**682-2.2.8 Performance:** Use only display devices meeting the following minimum requirements.

Table 682-1 Minimum Requirements for Display Devices				
	Flat Panel Display			Rear Projection Video Display
Type	Direct View LCD			DLP or LCD
Size	(dependent on TMC design, as shown in the Plans)			
Aspect Ratio	(dependent on TMC design, as shown in the Plans)			
Resolution	1600 x 1200 / 1280 x 768 pixels; 16.7 million colors			1024 x 768 pixels
Viewing Angle	170 degrees horizontally and vertically	160 degrees horizontally and vertically		160 degrees horizontally and vertically
Half Gain Angle	—	—		±40 degrees horizontally and vertically
Contrast Ratio	500:1	600:1		600:1
Screen Brightness *	250 cd/m2	450 cd/m2		130 cd/m2
Lamp Life	—	—		8,000 hrs. (avg.)
Video Inputs	Analog/digital via 15-pin D-sub (HD-15) connector; DVI-D connector.	Composite video (NTSC) on RCA connector; analog/digital via 15-pin D-sub (HD-15) connector; DVI-I connector; HDMI.		Composite video (NTSC) on BNC; RGB via 15-pin D-sub (HD-15) connector; DVI-D connector.
Operating Temperature and Humidity	32° to 95°F. 20 to 80%.	32° to 95°F. 20 to 80%.		32° to 95°F. 20 to 80%.
Power Requirements	120 V <sub>AC</sub> at 60 Hz	120 V <sub>AC</sub> at 60 Hz		120 V <sub>AC</sub> at 60 Hz

\* Measured using a photometer.

**682-2.3 Installation:** Do not proceed with any part of the procurement, construction, or installation of the video display equipment until the construction plans and materials are approved by the Engineer. Submit to the Engineer documentation, including the manufacturers' product specification sheets and a detailed description of each item's function as well as a compliance matrix that confirms all equipment meets or exceeds the requirements of these Specifications.

Configure each video display unit to provide individual, independent control from each operator workstation.

Create the video wall display by arranging individual video display units in a framework or apparatus that creates the video wall configuration as shown in the Plans. The finished video wall must provide a single, apparently seamless display area. The adjacent individual display units must be aligned physically and electronically so that image content stretched across multiple monitors align within plus or minus 2 lines of horizontal and vertical resolution.

All rear projection video unit controls must be accessible at all times when the devices are permanently installed. Ensure that installation and positioning does not conceal or limit access to any display unit controls at any time during active use.

Follow proper ventilation and cooling procedures for the equipment installed, as determined by the equipment manufacturers. Provide electrical requirements and power distribution units and power supplies for the video display components as-needed.

**682-2.4 Testing:** Submit a detailed system acceptance test plan to the Engineer for review and approval. Prepare a test plan that covers all areas of system function described in this Section, and that is developed according to the various equipment manufacturers' recommendations.

Check and test the satisfactory operation of all video display components upon completion of the equipment's installation. At minimum, include in the video display system test the testing of each color video monitor type, each secondary display output at workstations, each rear projection video display unit, and the video wall display's image alignment and control functions.

Subject the video wall display to a 90 day operational observation period. During this time, perform any and all maintenance, recalibration, system checking, and display modifications required by the Engineer. The Engineer has the option to require a restart of the observation period if a major system flaw or failure occurs.

### **682-3 Warranty.**

Ensure that CCTV cameras and video display equipment have a manufacturer's warranty covering defects for a minimum of one year from the date of final acceptance. Ensure that the warranty requires the manufacturer to furnish replacements for any part or equipment found to be defective during the warranty period at no cost to the Department or the maintaining agency within 10 calendar days of notification.

Warranty repairs of the video display control system and related TMC display equipment must commence within 24 hours after notification by the Department.

### **682-4 Method of Measurement.**

The Contract unit price for each CCTV camera or video display device or system, furnished and installed, will include furnishing, placement, and testing of all equipment and materials, and for all tools, labor, operational software packages and firmware, supplies, support, personnel training, shop drawings, documentation, and incidentals necessary to complete the work. The cabinet will be paid for in accordance with Section 676.

The video display equipment will be measured as each major system component is furnished, installed, made fully operational, and tested in accordance with this Specification or as directed by the Engineer.



**682-5 Basis of Payment.**

Price and payment will be full compensation for all work specified in this Section.

Payment will be made under:

Item No. 682- 1- CCTV Camera - each.

Item No. 682- 2- Video Display Equipment - each.

**SECTION 996****INTELLIGENT TRANSPORTATION SYSTEM DEVICE AND AUXILIARY  
COMPONENT MATERIALS****996-1 Description.**

**996-1.1 General:** This Section governs the requirements for all permanent intelligent transportation system devices, surge protection devices for traffic control devices, pull boxes, splice boxes, fiber optic splice vaults, camera lowering devices, and traffic control system auxiliaries. All equipment shall be permanently marked with manufacturer name or trademark, part number, and date of manufacture or serial number.

**996-1.2 Product Acceptance:** All specified products shall be items listed on the Department's Approved Product List (APL), unless otherwise noted below. Manufacturers seeking evaluation of products for inclusion on the APL shall submit an application in accordance with Section 6 and include the following documentation. A separate application must be submitted for each product to be evaluated, showing that the product meets the applicable requirements.

Table 996-1	
Documentation	Requirements
Assembly and Installation Instructions	Include any surface preparations, assembly/installation instructions, operation manual, troubleshooting guides, and repair procedures.
Independent Laboratory Test Results	Product meets requirements of this Section.
Product Label Photo	Labeling shows the manufacturer's name, trademark, and product model number/name. Label shows the date of manufacture and/or the manufacturer's batch number. Additional label requirements, as listed within this Section.
Product Photo	Displays the significant features of the product as required in this section.
Compliance Matrix	Include completed compliance matrix at <a href="https://www.fdot.gov/traffic/traf-sys/product-specifications.shtm">https://www.fdot.gov/traffic/traf-sys/product-specifications.shtm</a>
Manufacturer's Product Specifications	Include product specifications showing electrical requirements, voltages, etc.
Product Drawings or Cut Sheet	Show mounting points, mechanical details, block diagrams, schematics, etc.
Parts List	List major parts and field serviceable components.

**996-1.3 Abbreviations:** The following abbreviations are used in this Section:

Alternating Current (AC)  
 Closed Circuit Television (CCTV)  
 Direct Current (DC)  
 Hypertext Transfer Protocol (HTTP)

International Electrotechnical Commission (IEC)  
Internet Protocol (IP)  
International Organization for Standardization (ISO)  
Local Area Network (LAN)  
Network Time Protocol (NTP)  
Pan, Tilt, Zoom (PTZ)  
Telecommunications Industry Association (TIA)  
Uniform Resource Locator (URL)  
Ultraviolet (UV)

## **996-2 Video Equipment.**

**996-2.1 General:** All CCTV camera equipment shall be listed on the Department's Approved Product List (APL). Manufacturers seeking evaluation of their product shall submit an application in accordance with Section 6. All parts shall be constructed of corrosion-resistant materials, such as plastic, stainless steel, anodized aluminum, brass, or gold-plated metal. All fasteners exposed to the elements shall be Type 304 or 316 passivated stainless steel.

### **996-2.2 CCTV Camera:**

**996-2.2.1 Camera:** CCTV cameras shall be compliant with the Code of Federal Regulations Section 200.216 Prohibition on certain telecommunications and video surveillance services or equipment <https://www.ecfr.gov/current/title-2/subtitle-A/chapter-II/part-200/subpart-C/section-200.216>. Cameras shall be compatible with the current version of the Department's SunGuide<sup>®</sup> software system. Camera types include pan-tilt-zoom (PTZ) and fixed.

Cameras shall be IP cameras that provide the following features and capabilities:

1. Day (color)/night (monochrome) switchover.
2. Manual and automatic focus.
3. Automatic iris.
4. Ability to produce clear, detailed, and usable video images of the areas, objects, and other subjects visible from a roadside field site. Video produced by the camera is true, accurate, distortion free, and free from transfer smear, oversaturation, and any other image defect that negatively impacts image quality under all lighting and weather conditions in both color and monochrome modes.
5. Automatic gain control (AGC).
6. A minimum signal-to-noise ratio of 50 dB.
7. Automatic color balance that references the white areas of the scene through the lens.
8. An automatic electronic shutter that is user selectable from 1/60 to 1/10,000 of a second.
9. PTZ cameras shall include a minimum 10x digital zoom.
10. PTZ cameras shall include programmable azimuth and compass display with ability to display pan and tilt position with a 1 degree resolution.

Cameras shall provide titling and masking features including, but not limited to, programmable camera title, programmable preset titles for each preset position, and programmable privacy zones. Programmable titles shall allow a minimum of 18 characters per line.

**996-2.2.2 Lens:** PTZ cameras shall include a minimum 18x motorized optical zoom lens with automatic iris. Fixed cameras shall have a 3-9 mm varifocal lens with automatic iris unless otherwise shown in the Plans. The lens shall have a maximum aperture of at least f/1.6 and the depth of field shall provide a clear image of roadside areas under all lighting conditions.

**996-2.2.3 Pan/Tilt Mechanism for Cameras:** PTZ cameras shall meet the following requirements:

1. Have an integrated pan/tilt mechanism that provides 360 degree continuous pan with a minimum 90 degree tilt range (i.e., 0 degrees to minus 90 degrees);
2. Provide for variable speed control;
3. Have a preset position return accuracy of plus or minus 0.36 degree, or less than 0.10% or better;
4. Support a minimum of 32 presets; support a minimum of one tour with a minimum of 32 presets; and support a minimum of eight programmable blackout zones.

**996-2.2.4 Communication:** Cameras shall provide for remote firmware upgrades via the communication interface.

Cameras shall support either National Transportation Communications for ITS Protocol (NTCIP) 1205v01.08 or the Open Network Video Interface Forum (ONVIF) Core, Streaming, and Media Service specifications.

Cameras shall implement all objects, operations, and commands required by Supplemental CCTV Camera NTCIP and ONVIF Requirements, as published on the Department's State Traffic Engineering and Operations Office website at the following URL: [https://www.fdot.gov/traffic/Traf\\_Sys/Product-Specifications.shtm](https://www.fdot.gov/traffic/Traf_Sys/Product-Specifications.shtm).

**996-2.2.4.1 Network Interface:** The camera's LAN connection shall support the requirements detailed in the IEEE 802.3 Standard for 10/100 Ethernet connections. The camera shall have a minimum of one 10/100 Base-TX connection Ethernet port.

Unshielded twisted pair/shielded twisted pair network cables shall be compliant with the TIA-568-B Standard. The network communication shall conform to transmission control protocol (TCP), user datagram protocol (UDP), internet protocol version 4 (IPv4), real-time streaming protocol (RTSP), and Internet Group Multicast Protocol Version 2 (IGMPv2), at a minimum. If the camera supports NTCIP, then the camera shall be able to be controlled via TCP/IP or UDP/IP.

**996-2.2.4.2 Video Encoding:** The camera shall utilize the Moving Picture Experts Group's MPEG4 part 10 (H.264) video compression technology in accordance with the ISO and IEC requirements detailed in the ISO/IEC 14496-10:2009 Standard.

Cameras shall establish unicast and multicast sessions using RTSP. The encoded video shall transmit using programmable bit rates and the camera supports, at a minimum, a fixed bit rate mode. Cameras must be able to provide 2 simultaneous multicast streams using different configurations (e.g., multicast address, resolution, frame rate, bitrate, etc.).

The camera's encoded video shall support resolutions that include; but are not limited to, those defined in Table 996-1. The camera shall deliver color and monochrome video at 30 frames per second (fps), regardless of resolution.

Table 996-1 Minimum Resolution Requirements	
Format	Vertical Resolutions
H.264	240, 480, 1080
Note: The resolutions attained depend on the data transmission rate.	

**996-2.2.4.3 Configuration and Management:** The camera shall support local and remote configuration and management via serial login, telnet login, or a web-based interface. Configuration and management functions shall include access to all user-programmable features including, but not limited to, network configuration, video settings, device monitoring, and security functions.

**996-2.2.5 Electrical Requirements:** Cameras shall operate on a nominal voltage of 120 V<sub>AC</sub>. Provide an appropriate voltage converter for devices that require operating voltages of less than 120 V<sub>AC</sub>.

**996-2.2.6 Mechanical Requirements:** The total weight of PTZ CCTV cameras shall be less than 35 lbs. If the camera includes an acrylic lower dome, it shall be constructed of distortion free clear plastic.

Pressurized cameras shall include a housing capable of pressurization at 5 psi using dry nitrogen, have a low-pressure alarm feature, and a NEMA 4X/IP-67 rating.

Non-pressurized cameras shall have a NEMA 4/IP-66 rating.

**996-2.2.7 Environmental Requirements:** CCTV cameras shall perform all required functions during and after being subjected to the environmental testing procedures described in NEMA TS 2, Sections 2.2.7, 2.2.8, and 2.2.9.

All CCTV cameras, mounting hardware, and any other camera-related material that is exposed to the environment shall be designed for 150 mph wind speeds and meet the requirements of the Department's Structures Manual.

### **996-2.3 Video Display Control System:**

**996-2.3.1 Display Control System:** The video display control system shall allow the operator to control and manage the display of video and computer-generated graphics on the display equipment connected to the system as well as provide selection and switching of multiple sources for display, including video streams available on the Traffic Management Center (TMC) Ethernet network. The display control system shall also allow for operator control of all displays from the same workstation that is used for the SunGuide® operator interface. The video display control system shall decode and display all video streams produced by encoders listed on the APL.

The video display control system simultaneously displays a minimum of 32 video windows, each containing streaming video at a minimum resolution of 720 pixels by 480 pixels and frame rate of 30 fps. The system shall allow any display window to be sized from 1/32 of the total display area up to the total display area, and any size in between.

The video display control system hardware shall be designed to be rack mounted and secured in an EIA 19 inch equipment rack. Any system incorporating Personal Computer (PC) hardware shall use current microprocessor technology and commercial, off-the-shelf components, including RAM, hard disk drives, and network interface cards sufficient to provide the functional requirements of the system.

The video display control system shall be expandable and scalable to support any combination of inputs and outputs.

The video display control system shall have a minimum configuration of 4 composite video inputs, 4 component (red, green, and blue (RGB) video inputs, and 4 High-Definition Multimedia Interface (HDMI) inputs as well as network connections, decoders, and associated hardware and software required to display 32 inputs simultaneously at a minimum resolution of 720 pixels by 480 pixels and a frame rate of 30 fps.

The video display control system shall have a minimum configuration of 4 composite video outputs, 2 component (RGB video outputs), and 4 HDMI outputs.

**996-2.3.2 Display Control Software:** The display control software shall allow multiple operators to control all features and functions of the video display control system. These features and functions include, but are not limited to, selection of video sources for display; adjusting the size, location, and layout of video and other graphic information the system displays; and system configuration and setup. The control software shall be able to operate a video wall composed of multiple display components as though it were a single, high-resolution display.

The display control software shall include a non-proprietary Software Development Kit (SDK) including, but not limited to, an Application Programming Interface (API) that describes interfaces and protocols which can be used to integrate system features and functions with third-party applications.

**996-2.3.3 Controller Inputs and Outputs:** The video display control system shall support and display a variety of video and data inputs simultaneously, including composite and component NTSC video, HDMI, Digital Visual Interface (DVI), Video Graphics Array (VGA), Super Video Graphics Array (SVGA), and Super Extended Graphics Array (SXGA) computer graphics. All inputs and outputs shall allow for operator control in order to display any or all of this information on any number of display devices within the system. All inputs and outputs shall be sized with and without constrained proportions across multiple screens and moved at will around any display area and combination of displays.

The video display control system shall be expandable and scalable to support any combination of inputs and outputs. The video display control system with a minimum configuration of 4 composite video inputs, 4 component (RGB video inputs), and 4 HDMI inputs as well as network connections, decoders, and associated hardware and software required to display 32 inputs simultaneously at a minimum resolution of 720 pixels by 480 pixels and a frame rate of 30 fps, or as shown in the Plans. Provide the video display control system with a minimum configuration of 4 composite video outputs, 2 component (RGB video outputs), and 4 HDMI outputs. The video display control system can be expanded to accommodate at least 128 discreet inputs and outputs.

A single input shall be able to be routed to multiple displays simultaneously and multiple inputs can be routed to a single display simultaneously for viewing in separate windows. All inputs and outputs shall be synchronized by the video display control system and switching between inputs or outputs does not cause displayed images to unlock, roll, or otherwise exhibit visible distortion.

**996-2.3.3.1 Analog Video:** The video display control system shall be able to accept S-video, composite, and component video sources, and can digitize these signals for manipulation and display on any display device attached to the system. All analog video inputs shall use BNC connectors.

Analog video sources shall display within their own windows and can be resized up to or beyond their native resolution to conform to the wall display size.

**996-2.3.3.2 Digital Video:** The video display control system shall be able to accept digital video sources and can manipulate and display these signals on any display attached to the system. All digital video outputs shall use HDMI connectors unless otherwise directed.

Each MPEG video stream shall display within its own window and be freely movable and sizable up to or beyond its native resolution to conform to the wall display size.

**996-2.3.3.3 RGB Video:** Include an analog input that enables the TMC operator to project an exact copy of their workstation desktop display on the video wall display. Analog RGB inputs shall allow native images up to 1,280 pixels by 1,024 pixels at 60 Hz to be displayed on the video wall.

RGB inputs shall be sizable up to or beyond their native resolution to conform to the wall display size.

**996-2.3.3.4 Streaming Media:** The video display control system shall be able to display a minimum of 32 compressed video streams simultaneously in MPEG-2 over TCP/UDP/RTP over IP and supports multicasting as defined in Version 2 of the IGMP. The video display control system can display MPEG-4 and H.264. The MPEG video input interface is, at minimum, a 10/100 megabit per second network port per every 15 streams.

**996-2.3.3.5 Primary Display Output:** Video display control system can process the various signal input types to be viewed, such as the RGB feeds from monitor outputs and streaming video feeds. The unit shall provide direct digital streaming video through cable feeds using a digital video decoder. The video display control system shall provide the layout definitions for each signal to be displayed and save the predefined layouts and shall also permit switching of the predefined layouts and accept external alarm triggers to change the layouts.

The output capacity shall have sufficient memory and processing speed to provide fast rendering of video and image displays. The output has, at a minimum, a dual HDMI connector that supports 1,280 horizontal pixels by 1,024 vertical pixels or greater resolution. The color depth is a minimum of 24 bits per pixel.

**996-2.3.4 Electrical Requirements:** Provide equipment that operates on 120 V<sub>AC</sub> at a frequency of 60 Hz. Furnish a transformer or other necessary means of power conversion for any device that requires another voltage or frequency.