

STATE	PROJECT NO.	YEAR	SHEET NO.	TOTAL SHEETS
KANSAS	87 N-0720-01	2023	343	517

10.3.1.4 ITS CABINETS

- Inside cabinets, place a patch panel key/diagram of patch panel with port numbers.
- On each diagram/key include the following:
  - Cable number for mainline fiber.
  - What cabinet/shelter and device to which the fiber connects.
  - The port on the Cisco switch to which a jumper/patch cable connects.
- Label each port on the fiber optic patch panel with the designated port number.
- Jumper cables need not be labeled in ITS cabinets as long as they are less than three meters in length.
- Label each network device (CCTV encoders, DMS controllers, and site numbers, Vehicle Detectors, Media Converters, Power Distribution Devices and Uninterruptable Power Supplies) with IP addresses, ports, and site numbers.
- Label Cellular Modems with IP addresses and assigned phone numbers.
- Label Cisco switches with IP address and site number. Label switch ports with Tx1, Rx1, Tx2, Rx2 and what port they connect to on the fiber optic patch panel. Label each port with its corresponding VLAN address.
- Wireless network devices shall be labeled with the following items:
  - IP address and ports
  - Programmed radio frequency/channel
  - Other wireless devices that link to the unit
  - e.g.: "AU, 10.8.32.25, 4.97 GHz, TO SU@CCTV 03, TO SU@DET 01, TO SU@DET 02" or "SU, 10.8.34.24, 4.95 GHz, TO AU@SG CO COURTHOUSE"

10.3.1.5 POP BUILDINGS

- Label patch panels ports to indicate the origin of the fiber optic cable terminated.
- Label jumper cables at each end with a tag that includes the destination patch panel and port number(s) (e.g. "TO Panel 1 Ports 11-12" and "TO Panel 2 Ports 3-4").
- Label outer jackets of fiber cables entering patch panels/distribution frames as in Section 10.3.1.1.
- Label individual fibers entering back of patch panel with the corresponding strand number and origin.

10.3.1.6 TMC COMMUNICATION ROOM (IF UTILIZED)

- Label patch panels to indicate the origin of the fiber optic cable terminated.
- Label individual fibers entering back of patch panel with the corresponding strand number and origin.
- Label jumper cables at each end with a tag that includes the destination patch panel and port number(s) (e.g. "TO: Panel 1 Ports 11-12" and "TO Panel 2 Ports 3-4").
- Label jumpers from patch panel to Cisco SFPs with the fiber strand numbers, and origin to which they connect (e.g. Fiber #3, P.O.P. Building).
- Provide Cisco switch port diagram denoting what fiber and ring they are connected to.

10.3.1.7 CONDUITS

- Label empty conduits noting to where they connect (e.g. "TO PB2-2 TO PB2-3").
- If a conduit color is not per plans (Red for Power, Green for Communications), label it so it is clear what it is being used for, even if there are cables inside conduit.

11.0 DYNAMIC MESSAGE SIGN SYSTEM

11.1 DESCRIPTION

The purpose of this section is to provide general information for the installation of KDOT furnished dynamic message sign (DMS) systems as shown on the Plans and specified herein.

11.2 MATERIALS

11.2.1 GENERAL

KDOT will supply the dynamic message sign systems. The equipment supplied by KDOT consists of a DMS case including contents, sign controller unit (SCU) and communication unit; communications cables between the DMS case and the sign controller unit, display modules, equipment cabinet; and DMS software and power supplies. Do not attach the DMS to the support posts until the supporting systems of conduits, pull boxes, controller assemblies, power supply assemblies and all other items necessary are in place to provide a fully functioning DMS system. Contractor is responsible for providing and installing power cables to and between the DMS cabinet and the DMS.

11.2.2 DELIVERY

Contractor is responsible for all loading, unloading, and relocation of DMS prior to installation, including unloading from manufacturer delivery.

Be responsible for any damage to the DMS system upon delivery from the manufacturer. Prior to unloading from the manufacturer, document, in writing and detailed photographs, any visible damage or non-functioning portion of the KDOT-provided DMS system prior to accepting the DMS and leaving the KDOT storage facility. Schedule 72 hours in advanced with KDOT for date and time to pick-up the DMS from the KDOT facility. Do not store the DMS at the field site for more than 24 hours prior to installation.

11.2.3 LIGHTNING PROTECTION

Use system materials that are copper and high copper-content bronze castings. For all fittings, except cable holders, use heavy-duty type made from bronze castings. For all terminal rods, bolts, screws, and related type hardware use copper clad steel, bronze, or brass to prevent galvanic corrosion. The system consists of all necessary equipment as required to provide a complete and coordinated system. Ensure that all cables and all air terminals bear the UL label. Do not mix materials unless using a UL approved transition. All components of the lightning protection system shall conform to the current edition requirements of UL 96A and NFPA 780. Submit 150 foot radius rolling sphere zone of protection drawing with air terminal equipment.

11.3 CONSTRUCTION REQUIREMENTS

11.3.1 GENERAL

Furnish any and all additional tools, equipment, mounting hardware, beam clips, cabling, materials, supplies, manufactured articles and perform all operations necessary to install the DMS as shown on the Plans and as specified herein. The hardware, construction services, and support services specified are intended to describe the minimum configuration that would be acceptable for this DMS system. Furnish and install the DMS support structure as detailed on the Plans.

11.3.2 ERECTION

For category A structures, the Contractor shall submit detailed erection plans to the field engineer per KDOT specifications and per KDOT Field Erection special provisions. The seal of a licensed professional engineer is not required. Field erection and field erection plans are incidental to the site bid and no additional payment will be made.

11.3.3 DMS CONTROLLER CABINET

Install the DMS controller cabinet; this includes providing anchor rods for pad mounted cabinets as shown on the Plans. Coordinate with the Engineer to ensure proper anchor bolt spacing for DMS cabinets provided by KDOT or the manufacturer. Connect the DMS controller to the appropriate communication equipment specified in the plans to access the network as shown on the Plans and as directed by the Engineer. Contractor shall provide and install a raised nameplate with label "KDOT ITS" for all DMS controller cabinet doors. Nameplates shall be of similar material as the controller cabinet.

11.3.4 MOUNTING

Mount the DMS to the support posts or structure as herein specified, shown on the Plans, or as directed by the Engineer.

11.3.5 DMS ORIENTATION

Orient the DMS such that the face of the sign is towards the roadway. Follow the DMS orientation detail located in the construction drawings for the orientation and exact position of the DMS. Receive approval by the Engineer prior to placement of the foundations.

11.3.6 SECURITY

Change manufacturer default password to a unique temporary password upon taking possession of and commissioning the controller. Provide temporary password to KDOT.

11.3.7 LIGHTNING PROTECTION

Furnish and install lightning protection at every DMS to reduce electrical differential potential. Install all equipment in accordance with the requirements of current editions of UL 96A, NFPA 780, and LPI 175.

12.0 CLOSED CIRCUIT TELEVISION SYSTEM (CCTV)

12.1 DESCRIPTION

Furnish and install the closed circuit television (CCTV) camera and equipment cabinet as specified in the plans. Orient all equipment as shown on the construction drawings. Pay attention to the specific orientation of the pole and the specific mounting orientation of all equipment on the pole.

Provide and install a pole, pole foundation, anchor rods, equipment cabinet, connection hardware, camera lowering device, composite cable, camera lowering tool, surge protection and grounding, air terminal, CCTV communication equipment and cables as specified in the plans.

Install the new CCTV cameras adjacent to and have their operating and communication equipment located in the pole mounted controller cabinets or in ground mounted cabinet assemblies as indicated on the Plans, or as directed by the Engineer.

12.2 MATERIALS

12.2.1 CCTV CAMERA ASSEMBLY

The CCTV camera assembly consists of a high performance color CCTV camera, zoom lens, pan and tilt drive unit, domed enclosure, mounting brackets, connectors and cabling all assembled together into one operational unit. Ensure that the CCTV camera assembly weighs less than 100 lbs and has a center of gravity of less than 24" from the center of the pole.

Provide an Axis Q-60-E IP series PTZ dome camera such as the Q6125-LE or an approved equal. Ensure an IP video encoder is integrated inside the camera dome assembly. Ensure the encoded video is H.264 (MPEG-4 Part 10/AVC) compliant using the baseline profile. Provide a 100Base-TX network interface that facilitates the transmission of camera control commands and video over an Ethernet-based IP network.

The following electrical and environmental requirements are applicable for all CCTV equipment:

- Power: 120VAC @ 60Hz;
- Environmental: Operating Temperature: -35° to 50°C; and
- Operating Humidity: Up to 95% RH non-condensing.
- Minimum Power Output: 60W

A combination POE and DC power supply may be utilized to power the camera if both the POE injector and DC power supply meet the environmental requirements listed above. Use a Meanwell SDR 120-48 AC to DC Power Supply or approved equal and Axis T8144 60W Industrial Midspan POE or approved equal.

Ensure that the camera operates with a motorized-iris lens and is designed for day and night functionality. Ensure that the shutter speeds are remotely adjustable from 1/60 to 1/10,000 seconds. Ensure that the camera incorporates Digital Signal Processing (DSP) circuitry to provide advanced features such as automatic electronic shutter control, backlight compensation, digital zoom, and image stabilization. Ensure that the camera supports closing of the iris when pointed directly at the sun. Ensure the camera has a minimum horizontal resolution of 470 lines. Ensure the system to noise ratio is no less than 48 dB. Ensure that the camera is equipped with Automatic Gain Control (AGC) so that the camera will be capable of remotely controlling the white balance in response to changes in environmental lighting conditions. If the AGC is switchable, set the AGC to the "on" position. Ensure that the camera supports on-screen title generation that will allow the user to define the camera with character specific information.

Ensure the camera is supplied with optical and digital zoom capabilities. Ensure the optical zoom lens is remotely controlled through the camera unit and has a magnification factor of at least 30x. Ensure the zoom lens has an automatic and manual iris and focus controls. In addition, ensure the camera has at least a 12x digital zoom capability. Ensure the lens aperture range is F1.6 to F2.8 minimum.

Provide a camera housing that contains the CCTV camera, lens, and pan/tilt drive unit. Securely mount and wire the domed enclosure to the camera-lowering device. Supply all hardware required to mount the domed camera enclosure to the camera lowering device. Provide the domed camera enclosure that is water tight and constructed so that the enclosed equipment will not be affected by rainfall, blowing dust, salt, fungus, and other debris. Supply the unit with a heater to keep the camera and lens within the acceptable operating temperature range.

Ensure that the pan and tilt drive unit allows the remote position of the CCTV camera to view freeway traffic conditions. Fit the units to mount to the CCTV camera and domed enclosure and supply with all of the necessary mounting plates, connectors, brackets and wiring for operation. Ensure the unit allows 360° of continuous panning which is variable from 1 to 40°/second. Ensure the unit allows a minimum of 10 preset positions accurate to within 0.5° accuracy.

Demonstrate that the camera assembly functions with the applicable ATMS and video distribution software for KDOT or KC Scout.

Minimum functionality to be demonstrated shall include the ability to decode and display a video stream using the codes, resolution and frame rate specified and all pan-tilt-zoom, iris, focus and present functions.

Video Stream Settings for an Axis IP CCTV

Communication	Resolution	Frame Rate (frames per sec)	Compression	Zipstream	Bitrate (kbit/s)
Fiber	4CIF (704x480)	*30	30	Off	**Variable
Radio	4CIF (704x480)	25 or lower	50	Off	**Variable
Cell	CIF (352x240)	10 or lower	50	Off	**Variable

\*may be set to higher rates if no issues are observed

\*\*may be set to a constant 100kbit/s if needed

Camera functionality must also include the ability to add a text overlay with the camera name and image stabilization.

Change manufacturer default passwords of the cameras to a unique temporary password prior to their connection to the network. Provide temporary password to KDOT.

12.2.2 CCTV CAMERA LOWERING SYSTEM

Ensure that the camera lowering system is designed to support and lower the CCTV camera assembly without damage or causing degradation of camera operations. The camera lowering system device and the pole are interdependent and thus, must be considered a single unit or system. Provide a lowering system that consists of a suspension contact unit, divided channel support arm, pole top adjustable tenon, pole top junction box, conduit mount adapter, and camera connection box. Provide a cable strain relief device/wire mesh grip if not provided by the lowering device supplier. Provide a MG system or approved equal.

Plotted : 25-SEP-2023 18:45

Drawn By : lovohs  
File : ITS-S06.dgn

KANSAS DEPARTMENT OF TRANSPORTATION			
ITS EQUIPMENT SPECIFICATIONS			
ITS-S06		VERSION DATE: 08-23-21	
APPD	DESIGNED	QUANTITIES	TRACED
	DETAILED	QUAN. CK.	TRACE CK.
	DESIGN CK.		