

SECTION 13556

CLOSED CIRCUIT TELEVISION (CCTV) ASSEMBLY

PART 1 GENERAL

1.1 SECTION INCLUDES

- A. All materials, labor, workmanship, equipment, testing, documentation, and incidental items required to install and test a complete and operational Freeway CCTV system as shown on plans and details.
- B. State furnished CCTV pole with foundation and anchor bolts, furnish and install junction box at the base of the pole with ground rods, ground wire, and all other incidental hardware. Includes Contractor furnished CCTV Cable, and all other conduit and junction boxes required to provide a path from the CCTV pole to the control cabinet.
- C. Furnish and install wood CCTV pole.
- D. State furnished freeway CCTV assembly with pan/tilt unit, camera control receiver, and pole-mounted cabinet.

1.2 RELATED SECTIONS

- A. Section 02892: Traffic Signal
- B. Section 03055: Portland Cement Concrete
- C. Section 03310: Structural Concrete
- D. Section 13551: General ATMS Requirements
- E. Section 13553: ATMS Conduit
- F. Section 13554: Polymer Concrete Junction Box
- G. Section 13555: ATMS Cabinet
- H. Section 13595: ATMS Integration

1.3 REFERENCES

- A. AASHTO M 31: Deformed and Plain Billet-Steel Bars for Concrete Reinforcement
- B. AASHTO M 111: Zinc (Hot Dipped Galvanized) Coatings on Iron and Steel Products
- C. AASHTO M 270 Grade 36: Carbon and High-Strength Low-Alloy Structural Steel Shapes, Plates, and Bars and Quenched-and-Tempered Alloy Structural Steel Plates for Bridges
- D. AASHTO M 284: Epoxy Coated Reinforcing Bars
- E. AASHTO Standard Specifications for Structural Supports for Highway Signs, Luminaires and Highway Bridges
- F. AASHTO Standard Specifications for Structural Supports for Highway Signs, Luminaires and Traffic Signals
- G. AASHTO Division II Section 5
- H. AASHTOs Standard Specifications for Highway Bridges
- I. ASTM A 36: Standard Specification for Carbon Structural Steel
- J. ASTM A 123: Standard Specification for Zinc (Hot-Dip Galvanized) Coatings on Iron or Steel Products
- K. ASTM A 153: Standard Specification for Zinc (Hot-Dip Galvanized) Coatings on Iron and Steel Products
- L. ASTM A 307: Carbon Steel Bolts and Studs, 60 000 PSI Tensile Strength
- M. Electronic Industries Association (EIA) Standards
- N. International Municipal Signal Association (IMSA) Specifications
- O. National Electric Code (NEC)

1.4 SUBMITTALS

- A. Provide all of the following submittals as described in Section 13551:
 - 1. Contractor Furnished Material and Equipment Lists
 - 2. Test Reports for the Cable & Conductor Test, the Local Field Operations Test, and the Thirty-Day Burn-In Test
 - 3. Completion Notice
 - 4. Manufacturer's Equipment Documentation
 - 5. As-Built Drawings

PART 2 PRODUCTS

2.1 CCTV POLE OR LUMINAIRE

- A. Wood Pole Mounted CCTV: provide class 5 or 6 Douglas Fir wood pole, treated with Chromated Copper Arsenate CCA Type C, 33 ft nominal length and not less than 5½ inches diameter at top.
- B. Steel Pole Mounted CCTV: steel pole with anchor bolts provided by the Department. Refer to ASTM A 36.
 - 1. Anchor bolts: conform to AASHTO M 270 Grade 36.
 - 2. Nuts, washers, and anchor bolts: galvanized according to ASTM A 153 and ASTM A 123.
- C. Luminaire Mast Arm Mounted CCTV: provide luminaire extension per Section 02892 and SL series Standard Drawings.

2.2 CCTV STEEL POLE FOUNDATION

- A. Class AA(AE) concrete. See Section 03055 and Section 03310.
- B. Reinforcing Steel
 - 1. Coated
 - 2. AASHTO M 284 or M 111
 - 3. AASHTO M 31 Grade 400
- C. Non-Shrink Grout

2.3 JUNCTION BOX

- A. Refer to Section 13554.

2.4 CCTV ASSEMBLY

- A. Department furnished:
 - 1. Camera assembly, including camera, pan/tilt unit, control receiver, environmental enclosure, and cabling.
 - 2. Type G pole-mount cabinet.

2.5 MOUNTING EQUIPMENT

- A. Provide clamp kit, mounting hardware, pipe, shims, grommet, and all additional equipment to attach CCTV assembly to pole or mast arm.
- B. Provide all stainless steel or hot-dipped galvanized fasteners and hardware unless otherwise approved. Provide copper pole grounding lug.

2.6 DATA SURGE SUPPRESSOR

- A. General characteristics (typical):
 - 1. Typical application: RS-422.
 - 2. Surge: 36 kA.
 - 3. Turn-on at 10 mA: +2.8/-0.6 V dc.
 - 4. Resistance: 1 Ohm.
 - 5. Capacitance: 30 pF.
 - 6. Energy: 310 ft-lbs
 - 7. Let-through: less than +10/-1 Vp (peak open circuit voltage at max current).
 - 8. -3dB (600 Ohms) BW: 95Mhz
 - 9. Temperature: -40 degrees F to 185 degrees F Storage/Operating
122 degrees F.

2.7 VIDEO SURGE SUPPRESSOR

- A. General characteristics (typical):
 - 1. Typical application: VLF/HF receive only, LAN, closed circuit video.
 - 2. Surge: 18 kA IEC 1000-4-5 8/20 ms waveform 80 ft-lbs.
 - 3. Turn-on Time: 4 ns for 2 kV/ns.
 - 4. VSWR: less than or equal to 1.1 to 1 over frequency range.
 - 5. Insertion Loss: less than or equal to 0.3 dB over frequency range.
 - 6. User Current: 2.0A dc continuous.
 - 7. Vibration: 1G up to 100Hz.
 - 8. Temperature: -50 degrees F to 185 degrees F Storage/Operating
113 degrees F.

PART 3 EXECUTION

3.1 INSTALLATION

- A. Load, transport, and install all state-furnished materials per the manufacturer's instructions and as shown in the plans.
- B. Provide foundation, junction boxes, ground rod, grounding lug, conduit, stainless steel mounting bands, wood pole, and all additional equipment required for a complete and operational CCTV system.
- C. Install all wiring, conduit, and junction boxes as shown on site plans and details.
 - 1. Field locate all conduits per Section 13553 and junction boxes to avoid drainage areas and steep slopes whenever possible.
 - 2. Protect existing conductors while installing camera cables and conductors.
- D. Connect the controller and all wires as specified by the manufacturer.
- E. Furnish and install all incidental items, such as wire nuts, grommets, tape connectors, and electrical nuts, necessary to make the CCTV system complete.
- F. After installation, the exterior of all equipment must be free of all loose rust and mill scale, dirt, oil, grease and other foreign substances.

3.2 STEEL CCTV POLE FOUNDATION

- A. All material and workmanship conforms to AASHTO's Standard Specifications for Highway Bridges.
- B. Verify that the installation of the CCTV camera, pole, pole mount cabinet, junction boxes, and foundation in the location marked in the field has no conflict with existing utilities, underground and overhead. Comply with all utility and blue stake requirements.
- C. Excavation
 - 1. Refer to Section 13551.
- D. Caissons conform to AASHTO Division II Section 5, Drilled Piles and Shafts. Drill caissons into either native soil or compacted fill.
 - 1. If formwork is required during drilling, the forms may be withdrawn during concrete placement.
 - 2. Cast the top of the caisson against the formwork for appearance.

- E. Place concrete directly into the excavation. Use minimum forming.
- F. Do not weld reinforcing steel, conduit, or anchor bolts; tie reinforcing steel and conduit securely in place.
- G. Coat all reinforcing steel to conform to AASHTO M 284 or M 111 and AASHTO M 31 Grade 420, respectively. Coat the ends of cut reinforcing with approved coating.
- H. All cast-in-place concrete will be class AA(AE) except where specified otherwise. Cap all conduits before placing concrete.
- I. After pole is installed, place non-shrink grout between base plate and foundation surface.
- J. Install weep hole in foundation per SL series Standard Drawings.

3.3 ANCHOR BOLTS

- A. Refer to ASTM A 307 and Section 13551.

3.4 STEEL CCTV POLE

- A. Install the metal camera poles on concrete bases as described herein. Apply rust, corrosion, and anti-seize protection at all threaded assemblies by coating the mating surfaces with an approved compound. Refer to AASHTO Standard Specifications for Structural Supports for Highway Signs, Luminaires, and Highway Bridges, as well as AASHTO Standard Specifications for Structural Supports for Highway Signs, Luminaires, and Traffic Signals.
- B. Install pole such that the hand hole is facing away from traffic.
- C. Install ground rod. NEC 250.1.
- D. All fasteners and attachment hardware for bands and other equipment: stainless steel.
- E. Furnish and install all incidental items, such as wire nuts, grommets, tape connectors, electrical nuts, etc., necessary to make the CCTV system complete.
- F. Adjusting the anchor bolt nuts, plumb all steel poles to the vertical with all camera equipment installed.

- G. Pole Mount Cabinet
 - 1. The Department rejects poles that are damaged by improper drilling of holes.
 - 2. Drill and nipple holes at each site.
 - 3. Touch-up by hot stick method.

3.5 WOOD CCTV POLE

- A. Install wood pole below grade to a minimum depth equal to one-sixth the total pole height. Refer to AASHTO Standard Specifications for Structural Supports for Highway Signs, Luminaires, and Traffic Signals.
- B. Increase the installation depth by one times the diameter of the pole when wood pole is installed on a slope of 2:1 or greater. Measure depth from the down-slope side of the pole.
- C. Backfill with native material in 1 foot lifts to match surrounding grade. Tamp each lift to 90 percent compaction.

3.6 CCTV ASSEMBLY

- A. Assemble the camera assembly and prepare for installation per the manufacturer's instructions prior to delivery to the job site.
- B. Deliver the assemblies to the job site as complete units, and install as per the plan details.

3.7 CCTV CABLES

- A. Install camera cables in conduit and poles. All cable runs must be continuous and must run without splices between the camera and the cabinet.
- B. Keep cable ends sealed at all times during installation using an approved cable end cap. Keep cable end sealed until connectors are installed.
- C. Do not violate the minimum bending radius and the maximum pulling tension recommended by the manufacturer's specifications at any time.
- D. Provide 6 ft of cable slack in all cabinets. Refer to Section 13555.
- E. Make all camera cable connections between the CCTV assembly, RS-422/RS-232 converter, and communications equipment, as required to provide a fully operational CCTV system.

3.8 CONDUCTORS

- A. Dome CCTV: furnish and install 3-#12 stranded IMSA Spec 20-1 power conductor cables between the 24 VAC transformer in the cabinet and the cabinet assembly on the luminaire arm.
- B. Freeway CCTV: furnish and install 3-#6 from camera assembly to cabinet.
- C. Freeway CCTV with Pole Mounted Cabinet: furnish and install 3-#12 from camera assembly to cabinet.
- D. Splices: not allowed between camera and cabinet.

3.9 POLE-MOUNTED CABINET

- A. Install cabinet such that cables enter the underside of the cabinet.
- B. Arrange all equipment installed in the cabinet in a neat and orderly fashion on shelf. Refer to Section 13555.
- C. Install pole mounted cabinet such that it faces away from traffic. Use stainless steel bands.

3.10 JUNCTION BOX

- A. Refer to Section 13554.

3.11 TESTING AND ACCEPTANCE

- A. Successfully complete the following tests:
1. Cable and Conductor Test: Refer to Section 13551.
 2. Local Field Operations Test: Use the Closed Circuit Television (CCTV) Local Field Operations Test form Instruction. Obtain UDOT's newest version of the form from the UDOT Web site. Refer to <http://www.udot.utah.gov/index.php/m=c/tid=719>.
 - a. Conduct the test after the Cable and Conductor test has been successfully completed and the Cable and Conductor Test Report has been approved by the Engineer.
 - b. Furnish all equipment, material, and labor necessary for the test.
 3. Acceptance Tests: Refer to Section 13595.

END OF SECTION