

**CONNECTED VEHICLE ROADSIDE EQUIPMENT.
(REV 8-30-24)**

The following new Section is added:

**SECTION 681
CONNECTED VEHICLE ROADSIDE EQUIPMENT**

681-1 Description.

Furnish and install Connected Vehicle (CV) Roadside Equipment (RSE) in accordance with the Contract Documents. CV RSE includes the CV Roadside Unit (RSU) and Industrial Computer for CV Applications.

681-2 Materials.

Meet the following requirements:

CV RSU* 995-20.3

Industrial Computer for CV Applications* 995-20.4

*Use products on the Department's Approved Product List (APL).

681-3 Installation.

Install and configure CV equipment and systems, including RSUs, in accordance with the Contract Documents, manufacturer's recommendations, and as directed by the Engineer.

RSUs must be preconfigured by the manufacturer, an authorized manufacturer's representative, or authorized personnel trained by the manufacturer to be ready for installation and operation at the locations shown in the Plans. Each RSU must be preconfigured with communication settings and a MAP file that has been developed for the locations shown in the Plans. Ensure site specific conditions including lane configuration, signal group phase assignments, allowed maneuvers, and verified location markers are addressed during MAP development and configuration of the RSU prior to installation.

Provide all equipment with the appropriate weatherproof power and communication cables, power supplies, power converters, mounting brackets, and mounting hardware according to the manufacturer's recommendations.

Ensure that equipment is mounted securely and is fully accessible by field technicians. Ensure that status indicators remain unobstructed and visible.

681-3.1 RSU Site Registration: Coordinate RSU site registration with the Department. Provide all information required to register RSU devices and locations with the FCC to the Engineer for review and approval. Support FCC site registration efforts until complete.

681-3.2 Enrollment and Provisioning: Coordinate RSU enrollment and provisioning in the FDOT Security Credential Management System (SCMS) with the Department. Provide the Department with the manufacturer, model, and quantity of RSUs requiring enrollment within sixty (60) of Notice to Proceed (NTP). Ensure each RSU is enrolled and provisioned within the Department's statewide SCMS by the manufacturer per the guidance provided at the following location <https://www.fdot.gov/traffic/teo->

divisions.shtm/cav-ml-stamp/cv/maplocations/scms. RSUs must be enrolled and provisioned in the FDOT SCMS prior to installation.

681-3.3 Network Coordination and Configuration: The system must use existing Department and maintaining agency networks and Internet connection for data transfer between field equipment and systems, including cloud-hosted services. Ensure field devices do not allow unauthorized access to local networks from inbound Internet connections. Coordinate configuration parameters including network settings and firewall rules with the Department and local maintaining agency.

Ensure system configuration, management, and operational monitoring functions can be performed and completed through remote connection to the system using virtual private network (VPN) access to the Department's or maintaining agency's network. Coordinate and verify remote access with the Department.

Ensure all personnel follow the Department's procedure for requesting user and system access accounts to the Department's network. Failure to comply with Department rules and regulations can result in termination of access. Submit electronic configuration file backups to the Engineer following field testing. Backup files must include all configuration files, communication settings, firmware, and any other files with settings required to program a new replacement device (e.g., RSU, industrial computer, etc.). Coordinate method of file transfer with the Engineer.

681-3.4 Cabling: Cut all wires to their proper length before assembly. Do not double back excessive wire to take up slack. Neatly lace wires into cables with nylon lacing or plastic straps.

Secure cables and provide service loops at all connections. Secure drip loops and outdoor cables with self-locking cable ties of UV stabilized black plastic.

Use shielded twisted pair CAT6 Ethernet network cables that are compliant with the TIA-568-B standard and UL type CMX for outdoor runs.

Ensure that all unshielded twisted pair and shielded twisted pair CAT6 Ethernet network cables are compliant with the TIA-568-B standard. Ensure that all device cabling is free from defects.

Provide slack coils within cabinets and pull boxes to facilitate future re-terminations. Neatly bundle, coil, and band slack cable within storage areas using heavy duty cable ties. Label cables at all storage points and at cable termination ends using weatherproof tags.

681-3.5 Connectorized Ends: Securely and properly perform all field terminations using connectors recommended by the manufacturer to meet all environmental and performance requirements.

681-3.6 Surge Protection: Provide surge protection devices at locations as shown on the Plans and in accordance with Section 620. Ensure that all cables are protected against surges and induced voltage when entering cabinets. Ensure that all grounding clips or cables are provided and properly grounded. All grounding wires for surge protection within the cabinet shall be connected to the cabinet's grounding busbar.

If coaxial antenna cables are used, provide surge protection and grounding where cables connect to the RSU. Ensure that antenna cabling is grounded to the site ground in accordance with Section 620.

681-4 Testing.

681-4.1 General: Subject all equipment to field acceptance tests. Develop and submit a test plan for field acceptance tests to the Engineer for consideration and approval. Testing must demonstrate that CV equipment is fully functional, operational, and in accordance with the Contract Documents. The Engineer reserves the right to witness all field acceptance tests.

681-4.2 Manufacturer Testing: Ensure that the manufacturer has performed production testing on all RSE to verify proper operation prior to shipment, including successful enrollment of RSUs within the FDOT SCMS production environment.

681-4.3 Field Testing: Once the CV equipment has been installed, conduct local field acceptance tests at each field site according to the submitted test plan. Perform the following:

1. Verify that physical construction has been completed as detailed in the Plans.
2. Verify all wire and cable connections are correct and secure.
3. Verify proper voltages for all power supplies and related power circuits.
4. Connect devices to the power sources. Verify that the power LED on roadside equipment illuminates.
5. Log in to CV equipment and verify access to user interface.
6. Verify the configuration of CV equipment network interfaces.
7. Confirm the RSU can communicate with the FDOT SCMS, verify that downloaded security certificates are current, and verify automatic certificate top-offs.
8. Verify RSU data exchange to and from vehicles equipped with an OBU capable of message display.
 - a. Verify MAP, SPAT, and TIM message broadcast.
 - b. Verify BSM receipt and forwarding by RSU.
9. Verify local functionality of CV applications.
 - a. MAP, SPAT, and TIM functionality
 - b. Vulnerable Road User warning functionality
 - c. Red light violation warning functionality
 - d. Preemption and priority functionality

681-5 Warranty.

Ensure that the manufacturer will 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. Ensure that CV equipment has a manufacturer's warranty covering defects and remote troubleshooting for a minimum of two (2) years from the date of final acceptance.

681-6 Method of Measurement.

The Contract unit price for each CV RSE furnished and installed, will include furnishing, placement, and testing of all materials and equipment, and for all tools, labor, equipment, hardware, operational software packages and firmware, supplies, support, personnel training, shop drawings, documentation, connections, troubleshooting, labor, and incidentals necessary for a complete and accepted installation.

681-7 Basis of Payment.

Price and payment will be full compensation for furnishing all materials and completing all work as specified in this section or shown in the Plans.

Payment will be made under:

Item No. 924-681- Connected Vehicle Roadside Equipment – RSU – each.

Item No. 924-681- Connected Vehicle Roadside Equipment – Industrial
Computer – each.

Do Not Use Without CO Specs Authorization