

# Special Specification 6435

## Installation of Traffic Management Equipment




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### 1. DESCRIPTION

Transport, install, and test Department furnished Field Hardened Ethernet switches and Cellular Modems as shown on the plans, as detailed in the Specification, and as directed.

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### 2. MATERIALS

The Department will furnish: Field Hardened Ethernet switches with Power Supply and Cellular Modems with Power Supply.

Provide all materials not supplied by the Department necessary for the Field Hardened Ethernet switch and Cellular Modem installation. All materials provided by the Contractor must be new.

Unless otherwise shown on the plans, equipment for Field Hardened Ethernet switches and Cellular Modems for this project will be stored by the Department for pick up at a Department location shown on the plans.

Ensure that all materials and construction methods necessary to complete the installation in accordance with the requirements of this Item, the plans, and are in accordance with Item 620, "Electrical Conductors."

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### 3. POWER REQUIREMENTS

Provide equipment appurtenances as required to ensure that operations are not affected by the transient voltages, surges, and sags normally experienced on commercial power lines.

- 3.1. **Wiring.** Provide wiring that meets the requirements of the National Electric Code. Provide wires that are cut to proper length before assembly. Provide cable slacks to facilitate removal and replacement of assemblies, panels, and modules. Do not double back wire to take up slack. Lace wires neatly into cable with nylon lacing or plastic straps. Secure cables with non-adhesive clamps and anchors. Provide service loops at connections.

- 3.2. **Power Service Protection.** Provide equipment that contains readily accessible, manually re-settable or replaceable circuit protection devices (such as circuit breakers or fuses) for equipment and power source protection.

Provide and size circuit breakers or fuses such that no wire, component, connector, PC board, or assembly are subjected to sustained current in excess of their respective design limits upon failure of any single element or wiring.

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### 4. MECHANICAL REQUIREMENTS

- 4.1. **Connectors and Harnesses.** Provide external connections made by means of connectors. Provide connectors that are keyed to preclude improper hookups. Color code wires and appropriately mark origin and destination of each cable.

Provide connecting harnesses of appropriate length and terminated with matching connectors for interconnection with the communications system equipment.

Provide pins and mating connectors that are plated to improve conductivity and resist corrosion. Cover connectors utilizing solder type connections by a piece of heat shrink tubing securely shrunk to ensure that it protects the connection.

- 4.2. **Mechanical Components.** Provide external screws, nuts, and locking washers that are stainless steel. Provide parts made of corrosion resistant material, such as plastic, stainless steel, anodized aluminum, or brass. Protect materials from fungus growth and moisture deterioration. Separate dissimilar metals by an inert dielectric material.

## 5. INSTALLATION OF FIELD HARDENED ETHERNET SWITCHES

Install all materials, equipment, power, video, and control cabling. Ensure an operating and functional system.

Prevent damage to all Field Hardened Ethernet Switch system components supplied by the Department. Replace any component that is damaged, lost during transportation, or installation, at the Contractor's expense.

- 5.1. **Testing.** Verify operation of the Hardened Ethernet Switch, together with operation of its links and demonstrate that data can be transmitted at a satisfactory rate from the field location to the central location. Demonstrate that the Field Hardened Ethernet Switch data packets are being received at the central site via a networked computer.

**Experience Requirements.** Contractor or designated subcontractors involved in the installation and testing of the Field Hardened Ethernet Switches must, as minimum, meet the following:

- 2 yr. experience in the installation of Field Hardened Ethernet Switches,
- must have a minimum record of having installed two Hardened Ethernet Switches where they have been in continuously satisfactory operation for at least 1 yr.,
- Contractor must submit as proof, photographs or other supporting documents, and the names, addresses, and telephone numbers of the operating personnel who can be contacted regarding the system, and
- provide necessary documentation of subcontractor qualifications pursuant to Contract award.

## 6. INSTALLATION OF CELLULAR MODEMS

Install all materials, equipment, power, video, and control cabling. Ensure an operating and functional system.

Prevent damage to all Cellular Modem components supplied by the Department. Replace any component that is damaged, lost during transportation, or installation, at the Contractor's expense.

- 6.1. **Testing.** Verify operation of the Cellular Modems, together with operation of its links, demonstrate that data can be transmitted at a satisfactory rate from the field location to the central location. Demonstrate that the Cellular Modems data packets are being received at the central site via a networked computer.
- 6.2. **Experience Requirements.** Contractor or designated subcontractors involved in the installation and testing of the Cellular Modems must, as a minimum, meet the following:
- 2 yr. experience in the installation of Cellular Modems,
  - must have a minimum record of having installed two Cellular Modems where they have been in continuously satisfactory operation for at least 1 yr.,
  - Contractor must submit as proof, photographs, or other supporting documents, and the names, addresses, and telephone numbers of the operating personnel who can be contacted regarding the system, and

- provide necessary documentation of subcontractor qualifications pursuant to contract award.

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**7. MEASUREMENT**

This Item will be measured as each Field Hardened Ethernet Switches, Cellular Modems, and made fully operational, and tested.

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**8. PAYMENT**

The work performed and material furnished in accordance with this Item and measured as provided under "Measurement" will be paid for at the unit price bid for or "Installation of Field Hardened Ethernet Switch" or "Installation of Cellular Modems." This price is full compensation for transportation and installation of all equipment described under this Item; furnishing and installing all cables, connectors, and mounting assemblies; all documentation and testing; all labor, manipulations, materials, tools, equipment, and incidentals.