**REVISION OF SECTION 614**

**TELEMETRY (FIELD)**

**Section 614 of the Standard Specifications is hereby revised for this project as follows.**

**Subsection 614.01 shall include the following:**

This work consists of fan-out and termination of fiber optic communication cable at each traffic signal controller cabinet location identified in the plans. The work also includes providing and installing all necessary telemetry equipment, including but not limited to optical splice closures, field patch panels, splice organizers, cables, pigtails/jumpers and labels.

This work also includes installation of CDOT furnished fiber optic transceivers and/or Ethernet fiber switches.

At every cabinet or optical closure, only the fiber strands that are specified in the plans to be spliced and/or connected to a patch panel or other internal device are required to be landed. All cut and unconnected fibers shall be coiled neatly in a splice organizer.

The same color-coded pairs of fibers and/or wires shall be used throughout the entire project unless specified otherwise in the plans. Gel filling compound shall be removed using filled cable cleaner.

**Subsection 614.08 shall include the following:**

*Fiber Optic Patch Pigtail:* Fiber optic pigtail cables shall consist of Multi-Mode (MM) fiber strands housed individually in protective jackets. Both ends of the cable shall be connected. Fiber optic patch cord cable shall be suitable for operation over a temperature range of -30 degrees to +60 degrees Celsius. The length of fiber optic patch cord cables shall be suitably long to be connected between the interconnect patch panel and the communication equipment (optical transceivers, Ethernet switches, etc.). Patch cord couplings shall be compatible with termination points. Appropriate strain relief in the cabinet (through cable Velcro wraps) shall be installed at a minimum of three locations. Sufficient slack shall be left to allow relocation of the equipment anywhere in the cabinet. The attenuation of a fiber optic patch cord cable after installation, not including the connector loss, shall not exceed 0.1 dB measured at 850 nm and 1300 nm.

*Connectors:* The ceramic ferrule connector shall be either LC or an AT&T ST style compatible field mounted connector. The connector shall be compatible with a physical contact (PC) finish. All connectors shall be polished to a PC finish such that the return loss per mated pair of connectors is less than -25 dB. The return loss when the connector is mated with previously installed connectors shall be less than -18 dB. The connector insertion loss shall not be greater than 0.20 dB (typical). The connector loss shall not vary more than 0.20 dB after 1000 repeated mattings. Tensile strength shall withstand an axial load of 20 lb. with less than 0.20 dB change.

Index matching fluids or gels shall not be used. The connectors shall be compatible with the optical fiber surrounding jacket and shall be installed on one end of the optical fiber in accordance with the manufacturer’s recommended materials, equipment and practices. The connector shall be suitable for the intended environment and shall meet the following environmental conditions:

Operating Temperature: -40o to +80o C

Storage Temperature: -40o to +85o C

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**REVISION OF SECTION 614**

**TELEMETRY (FIELD)**

The connector loss shall not vary more than 0.20 dB over the operating temperature range. Connectors shall be protected by a suitably installed waterproof protection cap.

*Miscellaneous Cabling:* Cable from fiber optic transceiver to Port 3 controller harness shall be 25-pin cable Model 44982G4 or approved equal. The Contractor shall deliver transceivers to the City’s Traffic signal shop. Contact Joe Strauss (720) 865-3984 for coordination.

*Optical Splice Closures:* Coyote Runt, Coyote Pup and Coyote Express Type closures shall be provided for splicing lateral fiber optic cables to the main (backbone) fiber cable in all pull box locations that are identified in the plans. All closures shall include 1-inch future port kit (part no. 8003408, Pre-Formed Line Products. The Coyote Runt Closure shall be used at locations with 3 fiber optic cables. In locations requiring more than 3 cables, a Coyote Pup Closure shall be installed.

**Subsection 614.13 shall include the following:**

Telemetry (Field) shall be measured by the total number of cabinets at which the interconnect cable is fanned out, terminated, connected, patch panels and fiber-optic interfaces installed. All labor and materials required to perform panel installations, provide in-cabinet strain relief, fan-out, cable termination and connection to the controller is considered included in the unit price for this item.

**Subsection 614.14 shall include the following:**

Payment will be made under:

Pay ItemPay Unit

Telemetry (Field) Each