SP-155053a
(Replaces SP-155053)

SPECIAL PROVISIONS
FOR
STREET/AREA LIGHTING

Des Moines County
EDP-0977(650)--7Y-29
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Effective Date
~~**October 20, 2020**~~ **June 15, 2021**

THE STANDARD SPECIFICATIONS, SERIES 2015, ARE AMENDED BY THE FOLLOWING MODIFICATIONS AND ADDITIONS. THESE ARE SPECIAL PROVISIONS AND THEY SHALL PREVAIL OVER THOSE PUBLISHED IN THE STANDARD SPECIFICATIONS.

155053a.01 DESCRIPTION.

A. Scope.
This Specification governs the furnishing of all material, equipment, and labor for the installation and testing of a complete, operational LED lighting system, including power and data to miscellaneous equipment noted. All material and equipment supplied, and all work performed, shall be in accordance with these Specifications, and as shown on the plans.

B. Definitions.

1. Luminaire: Complete lighting unit consisting of housing, optical chamber, lens, lamps, driver, mounting hardware and all parts as required to direct and distribute light.

2. Color System Controller: Electronic unit with hardware, software and memory to store shows and transmit data signal to play the light show.

3. Data Drivers: Electronic unit that combines power and data signal into a single cable.

4. Color Luminaire Cables: Cables with connectors which join luminaires together into a system.

C. Operating Instructions.

1. Fully and carefully instruct the City representatives, regarding the proper operation, care and maintenance of each system and its equipment.

2. Furnish all keys and special wrenches furnished with equipment under his contract to the City at the completion of the project.

D. Coordination of Work.

The electrical contractor shall plan all work so that it proceeds with minimum interference with other trades. The electrical contractor shall cooperate with all other contractors in furnishing material and information, in proper sequence, for the correct location of all sleeves, inserts, foundations, wiring, etc. The electrical contractor shall pay for all extra cutting and patching made necessary by his failure to properly direct such work at the correct time.

E. Submittals.

1. Product Data.

a. For each luminaire, and support component, arranged in order of lighting unit designation. Include data on features, accessories, finishes, and LED Fixtures including drivers and all electrical and mechanical parts required for a fully installed and functioning LED Light Fixture.

b. For each lighting control panel include data on circuit breakers, meter socket, enclosure and Digital controller features, accessories and finishes.

2. Shop Drawings.

Include complete scaled, technical drawings showing all existing and proposed lights, materials, support poles, bases, audio speakers, wifi router, fasteners, wiring, connections, and other parts as indicated in the contract documents.

a. LED Fixtures
b. Color System Controller
c. Power Supplies
d. Data Drivers
e. Manufacturer supplied cables
f. Lighting Photometric Calculations shall be submitted to show the lighting system performance. The Contractor shall submit point by point computer calculations confirming the minimum proposed footcandles. The calculations shall be done with a 0.85 light loss factor.

155053a.02 MATERIALS.

A. General.

1. The Contractor shall be solely responsible to verify quantities, installation locations and wiring requirements for this work. It is the responsibility of the contractor to verify all control and interface devices with the manufacturer to provide a complete functioning system.

2. Unless otherwise specified, all materials and equipment shall be new, unused and undamaged. Materials and equipment shall be the current and standard designs of manufacturers regularly engaged in their production.

3. Where materials and equipment are indicated as furnished by others and installed or connected under this contract, it shall be the Contractor's responsibility to verify installation details.

~~**B. Wires and Cables.**~~

~~**1. Network Communication Cable.**~~

~~**a.** Non-plenum rated, 4-pair unshielded cable, No. 24 AWG, solid bare copper, polyolefin insulated, adjoined singles, ripcord, flexible PVC jacket. Jacket is sequentially marked at two foot intervals.~~

~~**b.** Supports Category 6 applications, such as 100 Base TX, 100 Base VF. Ideal for high bandwidth applications.~~

c. UL tested for use with high speed audio-video systems in accordance with FCC Class A digital devices at a fundamental frequency of 135 MHz.
d. Suitable for noisy environments such as running next to power cables and transformers.
e. Cable shall contain the following physical characteristics:
f. Belden DataTwist 4800 or equal.

2. Fiber Optic Cable.
a. Multi-strand cable with FRP outer jacket; containing 6-strand 62.5/125 um core/cladding multi-mode.
b. Cable material shall be all di-electric.
c. Cable shall be filled with water blocking material.
d. Outer sheath shall be marked with manufacturer name identifying cable type, year of manufacturer, and sequential length markings.
e. Cable shall carry an OFNR rating (Optical Fiber Non-Conductive Riser) and shall be listed as being suitable for use in a 'vertical run in a shaft or from floor to floor and shall be listed as having fire-resistant characteristics capable of preventing the carrying of fire from floor to floor.
f. Corning DX006, or equal.

C. Wi-Fi Router.

1. Street lighting pole(s) shall be furnished with Wi-Fi router where shown in the plans. Router shall be contained within the pole and shall accept a fiber optic network connection.

2. Router shall accept 120V power connection, 23W maximum.

3. One 10/100/100BASE-T Ethernet network interface.
a. Auto-sensing link speed and MDI/MDX.
b. 802.3az Energy Efficient Ethernet.

4. Visual indication of radio status. Contains reset button and Micro USB console interface.

5. Bluetooth low energy radio.

6. Wi-Fi radio
a. Software-configurable dual radio supports 5 GHz and 2.4 GHz.
b. Supports up to 256 associated client devices per radio, and up to 16 BSSIDs per radio.

7. Aruba 318 Series.

D. Light Pole Speaker System.

1. Street lighting poles shall be furnished with integral speaker system, as shown in the plans. Speakers shall be contained within the pole and accept an ethernet network connection.

2. Speaker shall operate on POE (Power Over Ethernet) configuration with ethernet network cable daisy-chained between poles.

3. Frequency Response: 100 Hz – 20 kHz.

4. Signal to Noise Ratio: >88dB noise floor of -95 dBV.

5. Revolution Acoustics, POE++LZ220.

B. Lighting Control Panel.
The Control Panel shall be Millbank CP3 Series, EMI or approved equal.

1. **General.**
   - **a.** Control panel shall satisfy the functional requirements of this specification and the relevant equipment specifications. Panel shall be fabricated with UL Listed components.
   - **b.** Panelboards within lighting control panel assembly shall be dead front factory assembled. Panelboards shall comply with NEMA PB-1, as well as the provisions of UL 50 – Safety Enclosures for Electrical equipment. Panelboards used for service equipment shall be UL labeled for such use. Lighting panelboards shall be rated for 120/240VAC operation.

2. **Lighting Control Panel.**
   - **a.** The control panel shall receive power from 1-phase, wye connected 120/240VAC system. Power distribution from the control panel shall be 120/240VAC,1-phase,3-wire, however, the control panel shall include provisions for termination of an incoming neutral conductor in conformance to NEC requirement for service entrance.
   - **b.** Switches and circuit breakers used as switches shall be located so that the center of the grip of operating handle, when at its highest position, will not be more than 6 feet 7 inches above grade, including the height of concrete pad.
   - **c.** Lighting control panel shall have copper bus bars. The bus bars shall be rated at 200 amp minimum, but in no instance less than main lug or main breaker frame size.
   - **d.** Panelboards rated 240VAC or less shall have short circuit current rating not less than 10,000 amp RMS symmetrical.
   - **e.** Furnish panel with lightning protection; lighting protection unit shall be installed at the point of connection for incoming power. All units shall be rated for a minimum of 100,000 amps. The unit shall be capable of withstanding an unlimited number of surges. Housing shall be made of PVC and shall attach through the wall of the control panel enclosure.
   - **f.** Lighting contactor(s) shall be Square D Class 8910, or equal. Contactors shall be NEMA type, definite purpose double pole, single throw, rated for 200A minimum at 600V; continuous duty open type coil.
   - **g.** Hand-Off-Auto selector switch shall be rotary style with placard legend. Selector switch shall be Allen Bradley 800T series or equal.
   - **h.** PE photocell shall be fixed position with Lexan housing suitable for conduit mounting. Cell turn-on shall be 1-5 fc, and turn off at 3-15 fc; Cell shall be epoxy coated cadmium sulphide.
   - **i.** Digital timeclock controller shall be Tork 2000 series or equal.

3. **Control Panel Enclosure.**
   - **a.** The enclosure shall be freestanding, NEMA Type 3R, with stainless steel construction. Enclosure shall contain pad-lockable door.
   - **b.** Enclosure size shall be suitable to house all intended components. A locking hasp shall be provided in addition to latches. Enclosure shall be constructed of corrosion resistant stainless steel.
   - **c.** Structural members shall be constructed of not less than 12 gauge steel and side and top panels and door shall be not less than 14 gauge steel.
   - **d.** The control panel shall be fitted with Manufacturer’s nameplate which shall include the NEMA standard rating and other pertinent data; including manufacturer, date of manufacture, and place of manufacture.
   - **e.** Separate sealable and lockable Utility termination and metering sections. Kwh meter to be furnished and installed by Electric Utility.
   - **f.** Separate sealable and lockable lighting control section including PE receptacle, Lexan window, glare shield, Hand-Off-Auto selector switch, timeclock controller and load center contactor(s).
   - **g.** Lighting control panel shall include meter socket complying with Utility requirements.

4. Panelboards.

a. All lighting and power distribution panel shall have copper busbars.

b. Breakers shall be 1 or 2 pole, as indicated, with ampere trip ratings as required by equipment. Breakers shall be quick-make and quick-break, inverse time trip characteristics, to trip free on overload or short circuit, and to indicate trip condition by the handle position.

c. Panels shall have hinged door with combination catch and latch. The front panel shall be arranges so that when plates are removed, gutters, terminals and wiring shall be exposed and accessible. Doors shall have inner doors within the plates to have only the breaker operating mechanism exposed when they are opened. Live conductors and terminals shall be concealed behind plates.

d. All panelboards shall be rated for the intended voltage.

e. All circuit breakers shall be interchangeable and capable of being operated in any position as well as being removable from the front of the panelboard with out disturbing adjacent units. No plug-in circuit breakers will be acceptable.

f. Lighting and power distribution panelboards shall have necessary barriers, supports, and liberal wiring gutters. Trim screws shall be stainless steel.

g. Panelboards shall be UL listed.

h. Panelboards shall be as manufactured by Cutler Hammer, Square D, or Siemens.

155053a.03 CONSTRUCTION.

A. General.

This section governs the construction of all foundations and the installation of all luminaires, poles, conduits, cables and other material and equipment as required to complete the street lighting system as shown on the plans, the standard drawings, and as specified in the Special Provisions. The Contractor is responsible for verifying the correct line and grade of all concrete foundations and conduits prior to installation.

~~**B. Led Luminaire Installation.**~~

~~The Contractor shall comply with the manufacturer's recommendations for installation procedures.~~

B. Lighting Control Panel Installation.

1. The Contractor shall comply with the manufacturer's recommendations for installation procedures.

2. Install electric service entrance where shown, complying with Utility company requirements.

3. The control panel shall be protected at the site from loss, damage, and the effects of weather. The control panel shall be stored in an indoor, dry location.

4. Install lighting control panel at locations shown in accordance with details shown on the drawings and in accordance with manufacturer guidelines.

C. Grounding.

The Contractor shall comply with the NEC and the manufacturer's recommendations for grounding the lighting system.

D. Training.

After the Street ~~LED~~ Lighting Control System is functioning properly, the Contractor shall schedule a training session for City personnel. The training session shall be taught by a factory-trained applications engineer to explain the software program and to aid the City in programing various speaker and router functions. The training shall be planned to include a full day, as

desired by the City.

E. Warranty.
The manufacturer shall warrant the performance and construction of the luminaires to meet the requirements of this special provision, and shall warrant all parts, components and appurtenances against defects due to design, workmanship or material developing within a period of 5 years after the date of manufacture as indicated on the luminaire. This will be interpreted particularly to mean compatible performance of drivers with LED arrays, failure of any component, failure of any of the LED's, and discolorations or fogging of the lens, impairing the transmission of light. Any luminaire or part thereof, not performing as required, or developing defects within this period shall be replaced by the manufacturer without expense to the City.

155053a.04 METHOD OF MEASUREMENT.
Method of measurement shall be each for Lighting ~~Poles with Integrated Speaker and Lighting Poles with WI-FI Router~~ Control Cabinet.

155053a.05 BASIS OF PAYMENT.
Payment for Lighting ~~Poles, of the type specified,~~ Control Cabinet will be at the contract unit price per ~~lump sum~~ each. Payment shall be full compensation for all items required for the system including the ~~aesthetic lighting units,~~ equipment cabinets, cables, connectors, branch circuit breakers, installation and all associated hardware and incidentals, labor, equipment and materials for installation.