Special Specification 6391
LED Decorative Illumination Assembly

1. DESCRIPTION

Furnish, fabricate, and install decorative illumination assemblies with light-emitting diode (LED) luminaire modules, in accordance with the details shown on the plans.

2. MATERIALS

Use new materials conforming to the details shown on the plans and the pertinent requirements of the following Standard Specification Items:
- Item 442, "Metal for Structures,"
- Item 449, "Anchor Bolts,"
- Item 616, "Performance Testing of Lighting Systems," and
- Item 620, "Electrical Conductors."

2.1. Submittals

Furnish seven sets of submittals of the illumination assemblies with luminaires, poles, bases, all mounting hardware, and color sample to the Engineer at the project address. Do not purchase materials or begin work before these submittals are approved.

2.2. Pole Options

Furnish a one-piece straight steel shaft with round cross section, with a nominal height of 30 ft. Green octa-flute shaft (26.5') with different sized scrolled arms with nut covers. The yield strength must be minimum of 55,000 psi (ASTM-A595 Grade A.) Longitudinal weld seam to appear flush in shaft wall. Steel base plate with axial bolt circle slots welded flush to pole shaft with a minimum yield strength of 36,000 psi (ASTM A36.) Provide base plate with 1.25-in. bolt holes on a 13-in. B.C. Standard and arms should be HDG. Anchor bolts must conform to ASTM F1554 Grade 55. Transformer breakaway base should meet FHWA and AASHTO breakaway requirements, should have an access door. All structural fasteners should be galvanized high strength carbon steel. All non-structural fasteners should be galvanized or zinc-plated carbon steel or stainless steel. Provide rectangular 3x5 steel, hand hole frame with mounting provisions for grounding lug located behind gasketed cover. Provide a removable two-piece square aluminum base cover. Shown below are the different pole options and arm lengths.

a) LED Decorative Illumination Assembly 4' Arm – 100W
b) LED Decorative Illumination Assembly 8' Arm – 100W
c) LED Decorative Illumination Assembly 8'-8' Dual-Arms – 100W
d) LED Decorative Illumination Assembly 10' Arm – 50W

Pole assembly must meet the aesthetics and design criteria shown on the plans and should closely match the existing poles in the vicinity. Exposed hardware must be fluted-green stainless steel. All electrical components must be UL listed.

Pole assembly finish must be hot-dip galvanized coat finish followed by a prime coat and final powder coat with 5.0 mil nominal dry film thickness. Powder coat must meet AAMA 2605 gloss and color requirements, scratch, and abrasion resistant. Decorative finish coat will be Dark Green 923 color in accordance with the details shown on the plans. Arms and standard must have two-bolt simplex attachments.

Anchor bolts should conform to ASTM F1554 Grade 54.
Fabricate hardware, brackets, nuts, bolts, washers, ballast tray, and parts from corrosion resistant material of adequate thickness as approved. Ensure compatibility of metals used in contact with one another will not induce accelerated galvanic corrosion. Pole shaft must support the luminaires and all equipment, as detailed for typical wind load expected at location of installation. Provide grounding provision with hardware.

2.3. **LED Luminaire:**

2.3.1. **General Requirements.** Provide a decorative LED luminaire with a minimum of 12,000 lumens for the 100W LED and a minimum of 5,000 lumens for the 50W LED, maximum 3000K CCT and “dark sky” compliant shielding. All luminaires to be installed on strut arm assemblies as detailed on the plans. Luminaire should be dark-sky compliant, NEMA 3 photo-control lock-type receptable. Lighting should turn on and off automatically. Lighting should be AASHTO, FHWA, and IESNA design criteria. Lighting should be 100W LED EQ or 50W LED EQ.

2.3.2. **Electronic Driver and LED Lamp Modules.** Provide replaceable LED driver modules that will operate at 120V to 240V line voltage. Provide lugs with captive screws for wire sizes up to 10AWG. Identify each terminal position.

2.3.3. Provide LED lamp modules so that catastrophic loss or failure of an individual LED will not result in the loss of the entire lamp. Provide LED lamp modules with a color temperature of 3000K. Provide enough thermal management of the heat generated by the lamp to ensure a minimum operable life of >100,000 hrs. at 25°C, L70 with an average operating time of 12 hr. per night. Provide a passive thermal management system if required. Fans or other mechanical cooling systems will not be allowed. Design lamp so that the maximum junction temperature of the LEDs, at maximum ambient temperature, will not be exceeded and will not exceed 105°C. Provide a 3-prong ANSI C136.10 rotatable photocell receptacle with smart photocontrol. All photocell equipment should include a ROAM node compatible with the system in place.

2.3.4. **Performance Requirements.** Photometric data must be certified by manufacturer's laboratory with a current accreditation under the National Voluntary Laboratory Accreditation Program for Energy Efficient Lighting Products. Provide photometric data (in ies format) for luminaires at specified color temperature and operating at 25°C ambient temperature. Ensure the fixture will be IESNA cutoff or better.

2.3.5. **Warranty.** The manufacturer will replace failed luminaires, when non-operable due to defect in material or workmanship, within 10 years of installation with a luminaire that meets all specifications, delivered to the project location. Photocells (if used) are subject to the warranties of their respective manufacturers.

3. **CONSTRUCTION**

Perform work in accordance with the details shown on the plans in accordance with the manufacturers’ requirements and the requirements of this Item.

Use established industry and utility safety practices when installing poles or luminaires located near overhead or underground utilities. Consult with the appropriate utility company before beginning work.

Prevent scarring or marring of poles, luminaire arms, and luminaires. Replace damaged components. Repair damaged painted areas of roadway illumination assemblies according to manufacturer’s recommendation.

Stake, install, and align each illumination assembly as shown on the plans. The Department may shift a luminaire’s location, if necessary, to secure a more desirable location or to avoid conflict with utilities.

Fabricate and install illumination assembly components in accordance with the details, dimensions, and requirements shown on the plans. Do not use screw-in type foundations. Install anchor bolts and coat anchor bolt threads. Erect structures after foundation concrete has attained its design strength as required. Tighten anchor bolts for poles with shoe bases. Do not place grout between base plate and foundation. Test installed illumination assemblies.
4. **MEASUREMENT**

This Item will be measured as each LED Decorative Illumination Assembly installed, tested, and made fully operational.

5. **PAYMENT**

The work performed and materials furnished, in accordance with this Item and measured as provided under "Measurement," will be paid for at the unit price bid for “LED Decorative Illumination Assembly 4’ – 100W", or “LED Decorative Illumination Assembly 8’ – 100W", or “LED Decorative Illumination Assembly 8’-8’ – 100W", or “LED Decorative Illumination Assembly 10’ – 50W.”

This price is full compensation for furnishing, installing, and testing LED luminaires; drivers, anchor bolts, anchor plates, internal transformer, internal conductors, lighting arrestors, photocell receptacles, poles, decorative bases, arms, brackets, and connections; system performance testing; and equipment, labor, tools, and incidentals.

New precast shaft foundations will be paid for under Special Specification 4128 “Precast Light Pole Foundations.” New conduit will be paid for under Item 618, “Conduit.” New conductors, except the conductors internal to the pole, will be paid for under Item 620, “Electrical Conductors.” New ground boxes will be paid for under Item 624, “Ground Boxes.” New electrical services will be paid for under Item 628, “Electrical Services.”