MICHIGAN

DEPARTMENT OF TRANSPORTATION

SPECIAL PROVISION

FOR

**LUMINAIRE**

BWB:DWS 1 of 5 APPR:BMB:KSH:02-15-22

**a. Description**. This work consists of furnishing and installing LED luminaires in a bridge/roadway lighting application, or canopy illumination, either as direct replacements for existing lighting or as new lighting in accordance with the plans. Ensure all work is in accordance with the standard specifications, the *NEC*, as specified herein and as shown on the plans.

**b. Materials**. Furnish luminaire assemblies (luminaires plus mounting fittings such as slip fitters, brackets, tilt mechanisms and accessories) in accordance with the Manufacturer and model numbers shown below for each Luminaire assembly. The indicated Manufacturer/models have been photometrically evaluated to furnish lighting solutions in each application area. Alternatives or approved equal can be presented but must allow a minimum of 14 calendar days for review and acceptance by the Engineer. The alternative luminaire submitted must also include a complete photometric analysis meeting the criteria specified herein and the dimensions, mounting heights, spacing and constraints of the area to be illuminated, all in accordance with the plans.

1. Luminaire, Type 1-1, 10000 lumens LED (Canopies).

A. LSI Industries. SCV-LED-10L-SC-UNV-DIM-30-WHT (80 color rendering index (CRI) Minimum).

B. GE Current. ECLP-01-0-C5-SM-8-30-1-1-SM-WHTE (80 CRI Minimum).

2. Luminaire, Type 1-2, 10000 lumens LED (Canopies).

A. LSI Industries. SCV-LED-10L-SC-UNV-DIM-30-WHT-557193WHT (80 CRI Minimum).

B. GE Current. ECLP-01-0-C5-SM-8-30-1-1-SM-WHTE-ECL-E-1-WHTE (80 CRI Minimum).

3. Luminaire, Type 2-1, 15000 lumens LED (First and Second Blue Water Bridges).

A. GE Current. Evolve LED Area Light, part #: EALS-03-0-F2-AN-7-30-N-D-V1-Standard Finish (GRAY) including photocell.

B. GE Current. Evolve LED Roadway Lighting, part #: ERL2-0-23-C3-30-GRAY.

C. CREE Lighting. RSW Series Luminaire: RSWX-B-HT-3ME-24L-30K7-UL-GY.

4. Luminaire, Type 2-2, 15000 lumens LED (Crossover Section).

A. GE Current. Evolve LED Area Light, part #: EALS-03-0-F2-AN-7-30-N-D-S1-Standard Finish (GRAY).

B. GE Current. Evolve LED Roadway Lighting, part #: ERL2-0-23-C3-30-GRAY.

C. CREE Lighting. RSW Series Luminaire: RSWX-B-HT-3ME-24L-30K7-UL-GY.

5. Luminaire, Type 3-1, 30000 lumens LED (Toll Plaza Area).

A. GE Current. Evolve LED Area Light: EALS-03-04-K3-AW-7-30-C1-GRAY.

B. CREE Lighting. RSWX-A-HT-3ME-32L-30K7-UL-GY-4BLT.

6. Luminaire, Type 3-2, 30000 lumens LED (Toll Plaza Area, near Admin Building with universal mounting arm for a square pole).

A. GE Current. Evolve LED Area Light. ALS-03-04-K3-AW-7-30-D1-DKBZ.

B. CREE Lighting. RSWX-A-HT-3ME-32L-30K7-UL-BZ-4BLT.

7. Luminaire, Flood, 30000 lumens LED (Pole mounted Flood Light).

A. GE Current. EFH1-01-0-77x70-30-K1-GRAY.

B. LSI Industries. T2XFL-LED-33L-W-UNV-DIM-30-MSV-SF.

Contact information for the Manufacturers listed above are:

GE Current

586-254-0770

800-327-0097

www.gecurrent.com

CREE Lighting

248-829-6900

800-236-6800

www.creelighting.com

LSI Industries

248-545-9555

800-436-7800

[www.lsicorp.com](http://www.lsicorp.com)

Luminaires furnished for this project must comply with the requirements of the Buy America Act. Each of the luminaires listed above must also meet Title 23 CFR 635.410.

Luminaires must meet all relevant and applicable codes and standards of the following agencies.

ANSI *American National Standards Institute*

ASTM *ASTM International* (formerly *American Society for Testing and Materials*)

NEMA *National Electrical Manufacturers Association*

UL *Underwriters Laboratories Inc.*

IESNA *Illumination Engineering Society of North America*

IEC *International Electrotechnical Commission*

The luminaire housing must be rated Ingress Protection (IP)66 per *IEC Standard EN 60529*, die-cast aluminum construction with stainless steel or zinc-plated steel fastening hardware and comply with *ANSI C136.25-2019*. The housing is to be a grey or silver powder-coat finish unless otherwise shown on the plans. Furnish luminaires with factory tenon-mount fittings for either horizontal or pole-top mounting with 0 degree to +45 degree tilt adjustment as shown on the plans. The luminaire driver design must operate with passive heat sink cooling within a -40 °F to 104 °F ambient temperature range.

The Contractor is to provide the luminaire optical assembly with a correlated color temperature (CCT) of 3000 degree Kelvin and a color rendering index (CRI) of 70 or greater in accordance with *ANSI/NEMA/C78.377* and with an *IES* photometric distribution as shown on the plans. Canopy lights must also have a CRI of 80 or greater.

Ensure the LED driver is solid-state type with built-in overload and voltage surge protection. The driver power factor is to be 90 percent or greater with less than 20 percent total harmonic distortion at full load and input voltage as shown on the plans.

Furnish luminaires with a minimum 10 kilovolt (kV)/10kA replaceable internal surge suppression module meeting *UL1449*/*IEEE C62.41.2 for location* *Category C*, high exposure requirements. Ensure the luminaire power supply, driver, optical assembly, and surge suppression module is field serviceable and upgradable by means of modular electrical connections and easy access mounting hardware. Unless otherwise shown on the plans, luminaires must be fused at the pole base via the handhole.

The luminaire is to be rated for the following:

8. 3G vibration per *ANSI C136.31/37* for bridge and overpass applications,

9. *ASTM B 117* for Salt Spray (Fog) testing (minimum 3000 hours), and

10. Backlight, Up-light and Glare (BUG) ratings per *IES TM-15*, without requiring additional shields attached to luminaire housing.

The luminaire must deliver 90 percent or greater of initial delivered lumens after 25,000 hours of operation and have an 80 percent or greater lumen maintenance (LM) after 100,000 hours of operation. Submit for review and approval the proposed luminaire manufacturer’s documentation and photometric data per *IES-LM-80* calculated at an ambient temperature of 25 °C. The submittal is to be prepared by a third-party independent test lab recognized by the Department of Energy as qualified to conduct photometric testing per *IES LM-79*. All costs associated with this submittal are included in the unit price.

Any proposed luminaire other than those listed herein must be shown by photometric calculations using AGi32 Lighting software by Lighting Analysts, Inc. or approved equal, to meet the photometric levels per *IES RP-08* or as otherwise indicated on the plans and reviewed and approved by the Engineer. Submit project specific point by point illuminance value calculations in footcandles on scaled drawings of the background, roadway, plaza area or other defined area, meeting the indicated design criteria.

Unless otherwise indicated, the calculated values must include:

● average illuminance (fc),

● avg/min, and

● maximum/minimum.

Road surface classification is to be “R3” unless otherwise noted.

Ensure all luminaires are supported by a 10-year manufacturer’s written warranty covering luminaire assembly and paint finish.

The Engineer reserves the right to request a standard production model luminaire sample for inspection for each type of luminaire used in the design and to require such tests as deemed necessary to ensure complete compliance with the specifications. Luminaires that do not meet these tests or those luminaires with improper or inadequate light distribution are subject to rejection. All costs associated with submitting and testing of replacement luminaires or lamps due to rejection of submitted luminaires are the responsibility of the Contractor.

**c. Construction**. Furnish shop drawings showing luminaire type, driver specification sheets and photometric calculations for approval. Submit as a complete package with the associated pole or other type of mounting shop drawing.

Prior to construction, prepare and submit for review and approval by the Engineer, a quality control checklist to use for the installation of each type of luminaire.

All new installations must have luminaires furnished as shown on the plan or as otherwise reviewed and approved by the Engineer. Examine all luminaires delivered to the job site prior to installation to ensure all specification requirements and shop drawing comments have been incorporated by the manufacturer. Luminaires must be individually packaged for shipment and stored in a regulated temperature and humidity-controlled environment until installed.

With the installation of each luminaire, a separate checklist must be completed to document dates, times, location of the luminaire by pole number or station number, all attachments, bolt tightness (torque) values, tilt angle, fusing and electrical connections (phase connections to match the plans) are to be signed by the installer and submitted to the Engineer for review and acceptance.

Orient (aim and tilt) luminaires to provide optimum designed light level distribution on the roadway.

Clean the luminaire lens after installation is complete in accordance with the luminaire manufacturer’s recommendations

As a requirement for acceptance by MDOT, the Contractor must temporarily field-install a minimum of one new luminaire on both bridges. The Contractor will then submit a plan for review and acceptance of the trial installation. This process is to be repeated until an acceptable luminaire combination of light and globe is achieved. As a condition for acceptance, the Contractor is to perform and submit the results of a side-by-side test comparison of the existing light and the proposed LED replacement to demonstrate that the visual aspect is identical. The lights must be photographed from various angles and distances while emitting light. The cost of the testing is to be included in the contract unit price.

**d. Measurement and Payment.** The completed work, as described, will be measured and paid for at the contract unit price using the following pay item(s):

**Pay Item Pay Unit**

Luminaire, Type 1-1, 10000 Lumens LED Each

Luminaire, Type 1-2, 10000 Lumens LED Each

Luminaire, Type 2-1, 15000 Lumens LED Each

Luminaire, Type 2-2, 15000 Lumens LED Each

Luminaire, Type 3-1, 30000 Lumens LED Each

Luminaire, Type 3-2, 30000 Lumens LED Each

Luminaire, Flood, 30000 Lumens LED Each

1. **Luminaire, Type 1-1, 10000 lumens LED** includes the material and installation cost of the luminaire (light housing), lamp, wiring, hardware and connections for making luminaire operational.

2. **Luminaire, Type 1-2, 10000 lumens LED** includes the material and installation cost of the luminaire (light housing), lamp, wiring, hardware, decorative face plate and connections for making luminaire operational.

3. **Luminaire, Type 2-1, 15000 lumens LED** includes the material and installation cost of the luminaire (light housing) with knuckle wall mount, lamp, wiring, hardware and connections and testing to make luminaires operational.

4. **Luminaire, Type 2-2, 15000 lumens LED** includes the material and installation cost of the luminaire (light housing) with knuckle slip fitter, lamp, wiring, hardware, connections and testing to make luminaires operational.

5. **Luminaire, Type 3-1, 30000 lumens LED** includes the material and installation cost of the luminaire (light housing), lamp, wiring, hardware, connections and testing to make the luminaires operational.

6. **Luminaire, Type 3-2, 30000 lumens LED** includes the material and installation cost of the luminaire (light housing) with knuckle wall mount, lamp, wiring, hardware, connections and testing to make the luminaires operational.

7. **Luminaire, Flood, 30000 lumens LED** includes the cost of furnishing and installing the complete luminaire, including the drivers or ballasts, lamps, and associated hardware as described here and on the plans for making the luminaire operational.

The unit price for each of these items includes all testing and submittal requirements.