MICHIGAN
DEPARTMENT OF TRANSPORTATION

SPECIAL PROVISION
FOR
SOLAR LIGHTING SYSTEM

a. Description. This work consists of designing, furnishing, installing, and testing of a solar powered LED luminaire, pole assembly, and foundation at the locations shown on the plans. Furnish all labor, materials, equipment, and all miscellaneous hardware required for complete installation of the solar lighting system as shown on the plans, and as specified herein. Ensure all work is in accordance with the standard specifications and the *NEC*.

b. Materials. Furnish materials meeting subsection 819 of the Standard Specifications for Construction, all applicable *ANSI/NEMA/UL/IES* codes, and the following requirements.

The solar lighting system must consist of a photovoltaic (PV) module and mounting structure, a charge controller/LED driver, a LED luminaire, battery, and enclosure, quick connect wire harnessing with fuse, and pole. The system must, at a minimum, include the following characteristics:

1. Ensure the PV panel is approved by a Nationally Recognized Testing Laboratory (NRTL) as meeting *UL 1703*.

2. Ensure the luminaire is approved by a NRTL. Ensure luminaire housing is *Independent Electrical Contractors (IEC) ingress protection 66* rated.

3. Ensure the charge controller/LED driver is approved by a NRTL as meeting *UL 60950-1*. Ensure the charge controller complies with Part 15 of the FCC rules. Operation is subject to the condition that this device does not cause harmful interference.

4. Ensure the battery is United States Department of Transportation (USDOT) rated “non-spillable”, gel cell or absorbed glass mat (AGM) cell type and complies with *IEC 61427*.

5. Design the system for an ambient temperature from -40 °F to 140 °F. Ensure average maintained footcandles are greater than or equal to 0.1. Ensure lumens are greater than or equal to 3200 with a color temperature of 4000 degrees kelvin.

6. The PV support structure and battery cabinet must mount to a cast aluminum or steel tenon arm as recommended by the manufacturer and as shown on the plans.

7. Integrate the LED driver with the solar charge controller as one unit.

8. Ensure the luminaire has a minimum 10 year manufacturer’s written warranty covering luminaire assembly, electrical components, driver, mechanical components, and paint finish.

Acceptable manufacturers/products: Sol Inc. EverGen M Series, or SEPCO Solar Viper SEPA

400 Series, or Engineer approved equal.

c. Design. Design the pole and foundation in accordance with the *AASHTO LRFD Specifications for Structural Supports for Highway Signs, Luminaires, and Traffic Signals*. The fatigue limit states are not required. Ensure the design is sealed by a Professional Engineer licensed in the State of Michigan and submitted to the Engineer for review.

Furnish shop drawings showing component type, specification sheets and photometric calculations. Submit as a complete package with design calculations. Ensure deviations from plans or specifications are indicated on the shop drawings to be considered as part of the document approval.

d. Construction. Install and place the solar lighting system into operation. Install all equipment in accordance with the manufacturer's instructions.

Examine all components delivered to the jobsite prior to installation to ensure all specification requirements and shop drawing comments have been incorporated by the manufacturer. Ensure components arrive undamaged.

Ensure all solar lighting system components are furnished by one manufacturer. Any proposed luminaire must achieve the photometric levels and uniformity ratios per *IES LM-79* for the fixture spacing shown on the plans. Submit project specific point by point lighting footcandle calculations by an independent third-party testing lab, meeting the following design criteria:

Ensure candle power distribution is accordance with the 2020 AASHTO Roadway Lighting Design Guide criteria as follows:

Average maintained illumination level of at least 1.5 footcandle and minimum maintained illumination level of at least 0.35 footcandles with a uniformity ratio (Average/Minimum Footcandles) not exceeding 3.5:1.

Ensure luminaries are oriented to furnish optimum designed light level distribution.

Clean the luminaire reflector and glassware after installation is complete. Ensure cleaning is done in accordance with the luminaire manufacturer's recommendations.

Furnish manufacturer's calculations and supporting test data indicating lumen maintenance life and product warranty documentation to the Engineer. Ensure final photometric calculations are based on lumen photopic values, scotopic lumen values are not recognized.

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

Pay Item	**Pay Unit**
Solar Ltg System	Each

Solar Ltg System includes designing, furnishing, and installing all component materials as described herein and shown on the plans.