

# Special Specification 6347

## Dynamic LED Curve Warning System



### 1. DESCRIPTION

Fabricate, furnish and erect dynamic curve warning system consisting of chevron signs with light emitting diode (LED) lights integrated in the system, solar panels for each sign, radar detection for each approach, communication transmitters and receivers. Dynamic curve warning system function is to warn and guide motorists through a curve once activated with radar by directing the chevrons to flash sequentially.

### 2. MATERIALS

Furnish and construct materials in accordance with the following:

- Item 636, "Signs"
- Item 644, "Small Roadside Sign Supports and Assemblies"

Provide signs that meet TMUTCD W1-8R(L) or W1-2R(L). Provide sign substrate that is a minimum 0.080 5052 alloy highway grade aluminum. Provide reflective sheeting on chevron sign that meets AASHTO Type D or ASTM Type XI sheeting with anti-graffiti overlay. Provide signs with integrated LED lights. LEDs within the signs must be wired in a manner (parallel) that all LEDs continue to flash in the event of failure of an individual LED. Sign will output 550,000 millicandelas at daytime peak ensuring sign is daylight visible. Provide LEDs that have dimming capabilities and automatically adjust flash brightness to varying light conditions. Ensure that each system comes with 1 transmitter and additional receivers for each additional chevron. Ensure that communication between devices on a curve occurs wirelessly. Transmitter will be included with the Lead LED sign. Ensure the system works with either solar power or electrical service. Unless otherwise noted, system will be provided with solar panels by the manufacturer. Provide solar panels sized to allow system to work as needed 24/7 based on the 20 yr. projected traffic count of the facility. Unless otherwise noted, batteries will be provided by the manufacturer, and should be installed in a box mounted on a pole underneath the solar panel.

Provide a curve warning system capable of being monitored and controlled through a web based system. Ensure the system allows for management of device settings (such as solar and battery output and wireless signal), schedules (flash durations), and impact detection (# of activations and optional alerts via text or email if system is triggered and/or down).

### 3. CONSTRUCTION

Install sign posts in accordance to Item 644, "Small Roadside Sign Supports and Assemblies."

- 3.1. **Vehicle speed sensor activation.** Mount a low power draw digital signal processing based radar on the lead LED chevron in the curve warning system. Ensure curve warning system is capable of detecting a compact vehicle within 300 ft. of the chevron. Ensure the radar activates the LED system and wirelessly signals the LED chevrons in the curve to sequentially turn on. House the radar and transmitter in a control box mounted on the Lead LED chevron. LED chevrons in the system can flash in unison or sequentially depending on how the system is configured and flash duration is predetermined. The radar must provide real time vehicle detection (within 112 milliseconds of vehicle arrival).

Install each chevron sign as shown on plans and in accordance with D&OM (3).

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**4. WARRANTY**

The system as a whole will have a minimum 2 yr. warranty from the time of installation and acceptance of the system. Batteries must have a 5 yr. lifespan while operating 24/7. LED will operate at least 100,000 hours. Manufacturer will ship replacement parts at no cost as required during 2 yr. warranty period, except when installation has been damaged by outside forces.

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**5. MEASUREMENT**

This Item will be measured by each LED chevron or lead LED chevron. Each lead LED chevron must have a transmitter that will communicate with other chevron signs in the curve. Each chevron will have a receiver and will be paid for separately as each "LED Chevron." The Lead LED chevron will have the vehicle speed sensor. The Lead LED chevron will be paid for separately as each "Lead LED chevron."

Lead LED chevron will include cost of web-based device monitoring and control software. Software provides automated data analysis and reporting. Software also allows for data upload, incident detection, trend analysis, historic reviews, and interactive map with all similar devices.

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**6. 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 bids for "LED Chevron" and "Lead LED Chevron."

This price is full compensation for furnishing and installing complete LED chevrons/lead LED chevrons including sign connections and all hardware; attaching chevrons to the supports; washing and cleaning the chevrons; and equipment, materials, labor, tools, and incidentals. The price also includes testing of the LED curve warning system and making adjustments as needed. Price is full compensation for installing solar panels to ensure optimal recharging of batteries, solar powered batteries, solar powered batteries, interconnecting chevrons/lead chevrons so transmitter and receivers communicate with each other, to the satisfaction of the Engineer. A minimum of one day (8 hr.) of on-site training is included to train employees on setup of system, software installation, software control, and set up of alert notifications.

Installation of sign post and foundations will be paid for under Item 644, "Small Roadside Sign Supports and Assemblies."