Illinois Department of Transportation

2300 South Dirksen Parkway / Springfield, Illinois / 62764

July 27, 2022

SUBJECT   Various Routes
Section Dist 8 ITS 2023-1
Various Counties
Contract No. 76P95
Item No. 33, August 5, 2022 Letting
Addendum A

NOTICE TO PROSPECTIVE BIDDERS:

Attached is an addendum to the plans or proposal. This addendum involves revised and/or added material.

   1.   Revised pages 23,25, 27, and 32 of the Special Provisions.

Prime contractors must utilize the enclosed material when preparing their bid and must include any changes to the Schedule of Prices in their bid.

Very truly yours,

Jack A. Elston, P.E.
Bureau Chief, Design and Environment

MTS

Four copies of drawings showing the wiring for each cabinet shall be provided. One copy shall be placed in the clear plastic envelope furnished as part of the cabinet. The other three copies shall be delivered to the Engineer.

Method of Measurement: Cabinet Model 334 will be measured as a unit, completely installed and operational.

Basis of Payment: Work will be paid for at the contract unit price per each for CABINET MODEL 334, which price shall be payment in full for:

1. the removal, protection, and storage of the existing controller, controller cabinet and cabinet equipment and
2. furnishing and installing the cabinet and all connections; testing, and for all labor, tools, equipment, transportation, and incidentals necessary to complete this item of work.

TRUSS MOUNTED LED DYNAMIC MESSAGE SIGN

Description:

This work consists of providing a truss mounted dynamic message sign (TMDMS) at the location shown on the Plans and as directed by the Engineer. Truss mounted dynamic message sign assembly includes the TMDMS enclosure, communication cables, conduits, and associated mounting hardware and software as described in these Special Provisions and as shown on the contract Plans. It also includes operational TMDMS software that remotely provides access to the functionality and performance specified herein.

TMDMS Manufacturer Qualifications

The TMDMS Manufacturer shall submit references as specified below. Reference data shall include current name and address of organization, and the current name and telephone number of an individual from the organization who can be contacted to verify system operation, as well as date of system installation.

Experience Requirements

The TMDMS Manufacturer shall submit at least two references, preferably from other state departments of transportation, which are successfully operating a highway LED full matrix TMDMS system, supplied by this manufacturer under the current corporate name, which otherwise meets this specification, for a period of no less than two years. The LED TMDMS systems submitted shall be full-matrix with **full color display** and able to display at least 3 lines of **21** characters per line, 18" characters and have walk-in access housings.

References

The TMDMS Manufacturer shall submit three references, preferably from other state departments of transportation, which are successfully operating a multi-unit, multi-lane state or interstate highway, permanently-mounted, overhead dynamic message sign system supplied by this manufacturer under the current corporate name, for a period of no less than five years.

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All field equipment enclosures shall be designed to withstand the effects of sand, dust, and hose-directed water. All connections shall be watertight.

<u>Functional Requirements</u>

The TMDMS shall be capable of accepting commands, displaying messages and returning status as required by the current version (v2) National Transportation Communications for ITS Protocol (NTCIP) Specifications applicable for TMDMS and as specified in these special provisions. The TMDMS shall communicate without error for all of the applicable National Transportation for Intelligent Transportation System Protocol (NTCIP) standards and be compliant with all applicable NTCIP standards for TMDMS. The TMDMS shall support all mandatory objects of all mandatory conformance groups of NTCIP for TMDMS.

The TMDMS shall enable the display of text, consisting of a string of alphanumeric and other characters, **and graphics including but not limited interstate shield signs and route marker symbols.** Each character shall be formed by a matrix of luminous pixels. The matrix of a standard character shall consist of 35 pixels over 5 columns and 7 rows. Each TMDMS shall be minimum 54-pixel high x 250 pixel wide (Pixel Pitch Range from 20mm to 35mm), full matrix and capable of displaying three lines of text using a standard 5 wide x 7 high font size. All display elements and modules shall be solid state. No mechanical or electromechanical elements or shutters shall be used.

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All characters, symbols, and digits shall be 18" nominal character size and shall be clearly visible and legible at a distance of 1100' within a minimum 30-degree cone of vision centered around the optical axis of the pixel.

The sign shall be capable of displaying the following:

- A static message
- A flashing message
- Alternating messages, either flashing or static

The changing from one message to another shall be instantaneous.

For message creation, the TMDMS field controller, and TMDMS control software shall support the storage and use of a minimum of three (3) alphanumeric character font files comprising the ASCII character set and including 8 directional arrows. Software shall provide the ability to create and maintain message libraries containing up to 255 messages.

The sign shall be able to reproduce standard MUTCD colors per 23 CFR 655. These colors include:

- Black (no pixels on)
- White
- Blue
- Brown
- Green
- Light Blue
- Orange
- Purple

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Communications:	• Run nearly unlimited signs at once from traffic management centers with client-server architecture • Supports Ethernet and serial (COM Port) connections • Supports modem pools
Diagnostics:	• Log events and alert TMC staff via email • Locate pixel failures instantly with an in-software visual representation test • View status, errors, and problem codes of all DMS subsystems • Verify and troubleshoot at the pixel level
Security:	• Real-time verification of "on" pixels • Username/password restricted access to functional areas • Built-in security levels for easy setup • Prohibited words list

In the event that the software is not capable of operating on a laptop that is connected directly to the DMS sign, the Contractor shall provide ten additional licenses of software that can be used in the field to manage the DMS and perform sign diagnostics.

The vendor shall furnish updated copies of all software during the warranty period at no charge to the Department.

Software Documentation

Full documentation for all software and associated protocols shall be supplied to the Department on a CD-ROM. The Department reserves the right to provide this documentation to other parties who may be contracted with in order to provide overall integration or maintenance of this item.

Performance Requirements

TMDMS messages shall be clearly visible and legible from in-vehicle viewing distances between 150 and 1100 feet. While using an 18 in character height, the TMDMS shall be capable of simultaneously displaying up to ~~18~~ **21** characters in each of three lines with spaces between characters, using 5 horizontal X 7 vertical (or larger) pixel matrices. ⚠ 1

The TMDMS controller shall be capable of storing a minimum of 32 three-line full width messages. The controller shall be capable of downloading a minimum of 8 additional messages and commands from the communications interface.

The sign shall provide a RS-232 communications interface in the sign control cabinet suitable for wireless, PSTN, cellular, and fiber optic communications with the sign controller. Additionally, an RS-232 serial port and Ethernet port shall be provided in the control cabinet for full sign operation by means of a laptop computer. Each serial port shall support data rates of 19.2 kbps, 14.4 kbps, 9600 bps, 4800 bps, 2400 bps, and 1200 bps.

Optical Requirements

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candela minimum. All pixels in the sign shall have equal color and on-axis intensity. All pixels shall have a minimum on-axis intensity of 40 candela @ 20 mA forward current, with an overbright capability of 60 cd.

All pixels in all signs in this project, including the spare parts, shall have equal color and on-axis intensity. The pixel strings shall be powered from a regulated DC power source and the LED current shall be maintained at the LED manufacturer's specified nominal operating current to maximize life of the pixel. The failure of an LED in one string within a pixel shall not affect the operation of any other string or pixel. Pixel power drawn from the DC supplies shall not exceed 1.5 W per pixel, including the driving circuitry.

The LEDs shall be individually mounted directly to a printed circuit board and shall be easily replaceable and individually removable using conventional electronics repair methods.

The LEDs shall be protected from the outside environmental conditions, including, but not limited to, moisture, snow, ice, wind, dust, dirt, and UV rays.

TMDMS pixels shall be constructed with discrete **high quality** LEDs. Discrete LEDs shall conform to the following specifications: ⚠1

- LED's shall be non-tinted, non-diffused, high-intensity, solid-state lamps that utilize AlInGAP or InGaN semiconductor technology.

- LED lenses shall be fabricated from UV light resistant epoxy.

- The LED lens diameter shall be 0.2 inches (5 mm).

- Red LEDs shall be AlInGAP with a peak wavelength of 626 nm.

- Green LEDs shall be InGaN with a peak wavelength of 525 nm.

- Blue LEDs shall be InGaN with a peak wavelength of 475 nm.

- LEDs shall be obtained from a one-bin luminous intensity sort.

- LEDs shall have a minimum half-power viewing angle of 15°.

- LED package style shall be through-hole flush-mount; LED's with standoffs and surface mount LED's will not be accepted.

- All LED's used in all TMDMS provided for this contract shall be from the same manufacturer and have the same part number.

The sign shall have a minimum intensity of 12,400 cd/m2.

All LED display modules, as well as the LED pixel boards and driver circuit boards, shall be identical and interchangeable throughout the TMDMS. LED arrays shall not share a circuit board with the display drive electronics but shall be easily connected and disconnected from the driver board using plugs, sockets, and simple hand tools while excluding soldering operations.

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